

14th DELHI SUSTAINABLE DEVELOPMENT SUMMIT

5–8 February 2014 | New Delhi, India



PROCEEDINGS

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Dr R K Pachauri
Director-General, TERI



The Summit in 2014 acquired special significance because of the current UN processes of setting Sustainable Development Goals (SDGs) for the world by 2015, and arriving at an agreement on climate change.”

Preface

The experience, knowledge, and talent that illustrious participants bring to the Delhi Sustainable Development Summit each year, has helped the event emerge as the most important global meeting held annually to deal with issues of sustainable development. Having begun this series in 2001, we feel gratified at the initiative we took because sustainable development is now clearly the central objective of development policy around the world as well as the guiding principle for advancing human activities. The Summit in 2014 acquired special significance because of the current UN processes of setting Sustainable Development Goals (SDGs) for the world by 2015, and arriving at an agreement on climate change.

The culmination of these processes will map out the terrain on which human society must now traverse to ensure inclusive and equitable growth across the globe and proper protection of the earth's vital ecosystems. Recent meetings and summits, such as the Rio+20 Summit in June 2012, have been able to attract all stakeholders, including government, business, research and academia, and civil society. There is now a need to define collectively a roadmap by which human society can attain the path of sustainable development. And time is certainly not on our side, because moving along the 'business as usual' pathway will lead to several negative impacts that we must avoid in the interest of ensuring the welfare of the current generation and that of generations to come.

DSDS 2014 was organized in a distinctive manner, which has become the hallmark of this annual Summit. We had a galaxy of distinguished speakers and an equally important group of participants. The following pages summarize ideas and thoughts coming from a large range of enlightened individuals and institutions of excellence. Solutions to some crucial challenges are articulated in these proceedings.



**Dr Annapurna
Vancheswaran**

Director, Sustainable
Development Outreach
Division, TERI



The debates at the 14th edition of DSDS focused on ways the comity of nations can come together to meet the challenges that are faced in attaining security of energy, water, and food for all.



Acknowledgements

The Delhi Sustainable Development Summit (DSDS) serves as a vital platform for nations of the world to discuss and debate strategies in the realm of sustainable development and explore avenues for synergy.

The Summit allows representatives from different walks of life, namely polity, economy, academics, and civil society to contribute to the formulation of effective policies that would benefit both the people and the planet.

The 14th edition of TERI's flagship event was inaugurated by the Hon'ble External Affairs Minister of India, Mr Salman Khurshid, with special addresses by HE Mr Danny Faure, Vice President, Seychelles and Dr Farooq Abdullah, Hon'ble Minister of New and Renewable Energy, India. The keynote address was delivered by Mr Kofi Annan, Chairman, Kofi Annan Foundation and Former Secretary-General, United Nations.

The Summit was graced by current and former Heads of State, ministers from 18

countries, nearly 200 eminent speakers from across 18 sectors and countries, and over a thousand delegates. In recognition of his leadership of the Mahindra Group, Mr Anand Mahindra, Chairman and Managing Director, Mahindra & Mahindra was conferred the Sustainable Development Leadership Award on the occasion.

The debates at the 14th edition of DSDS focussed on ways the comity of nations can come together to meet the challenges that are faced in attaining security of energy, water, and food for all. Speakers discussed their ideas on themes ranging from the demographic challenges that are faced in the issues that are peculiar to the continents of Asia and Africa, and the crucial role of businesses and Millenium Development Banks (MDBs) and how they can take further the achievement of sustainable development goals. The theme 'Attaining Energy, Water, and Food Security for All' provided an interesting

topic for debate and discussion on an array of disciplines with diverse countries. The Summit witnessed relevant stakeholders, including the scientific community, deliberate on the way forward to attain resource-efficiency, both in developing as well as developed countries.

TERI is grateful to all the dignitaries, speakers, participants, and delegates for contributing to the engaging discussions and making the Summit a success. Their views and insights will help take all of us further on the path of sustainable development.

Introduced at DSDS 2013, the parallel Thematic Tracks enabled greater interaction and in-depth discussion on various topics relating to the overall theme. The DSDS 2014 Thematic Tracks received an encouraging response, with an increase in the number of tracks and participants this year.

The topics covered a spectrum of issues relating to energy, water, and food security. The Thematic Track partners deserve a special mention for their wholehearted support, ideas, and encouragement in making these sessions a success.

The curtain-raiser to the Summit, the High Level Corporate Dialogue, initiated discussions with respect to corporate responsibility towards food, water, and energy security along with a constructive strategy for adoption and compliance with the new Companies Bill 2013. It brought together eminent international and Indian leaders from the corporate world as well as institutions and bilateral/multilateral organizations.

An exhibition on 'Innovations for a Secure Future' showcased a series of technologies and programmes from India and around the world that can help

meet the demands of individuals and institutions with respect to their respective needs of energy, water, and food.

DSDS 2014 would not have been possible without the magnanimous support of all our Summit partners from across governments, bilateral and multilateral organizations, and corporates. Not only did they provide the Summit with the necessary financial support to make the necessary arrangements, their encouragement and continuous guidance provided the impetus for us to aim higher and further improve the quality of the Summit. The Ministry of Environment and Forests (MoEF) deserves special mention for their continued support for the conference. The DSDS secretariat and colleagues from across the Institute deserve credit for their untiring efforts, cooperation, and commitment.

Attaining Energy, Water, and Food Security for All: A Background Note

The world today faces numerous challenges with respect to energy, water, and food security, which are closely interlinked. In order to face this combined challenge, appropriate strategies need to be developed. These should be considered comprehensive and critical aspects of managing supply and demand for energy, water, and food in a manner that ensures security in each of these critical areas. The world today has reached a population of seven billion which, according to most projections, is likely to increase by another two billion in a few decades. It is also expected that despite the current economic problems that several countries are facing, incomes will grow, particularly in some of the largest and most populous countries in the world. All this would translate into a greater demand for all three necessities which form the core of all human activities.

Water Security

Water is the bloodstream of a green economy, but it is now known that some parts of the world are already facing a serious level of water stress. For instance, the Fourth Assessment Report (AR4) of the IPCC projects that in 2020, a total of 75–250 million people in Africa would be living under water stress as a result of climate change. Estimates for other parts of the world also provide reasons for concern. With population growth and higher levels of per capita consumption, the problem of scarcity will only continue to grow. Agriculture is a major consumer of water the world over. Scarcity of water, therefore, could become an important determinant of possible reduction in food supply. For instance, in the case of Africa, the AR4 has assessed that by 2020 some countries may face reduction in yields up to 50 per cent on account of climate change and climate variability. More than a billion people in the world lack access to clean water.

Further increase in population and economic growth will strain the demand–supply balance and estimates show that in the next two decades, the average supply of water per person will drop by one-third. Governments and civil society leaders need to pitch in collectively to fight the challenges to water security.

Water security issues are expected to arise at the local, national, regional, and international levels. At a local level, security of access to water is the most pressing problem while at the regional or international levels the primary focus is on military threats.

The next decade will see many countries experiencing several problems in ensuring energy, water, and food security. As per the second World Water Forum, the seven challenges to achieve water security in the 21st century are to meet basic needs, secure food supply, protect ecosystems, share water resources, manage risks, value water, and govern water wisely.

The challenge at the local level is to ensure adequate supply of good quality water across competing sectors.

The key factors in improving water security are improving access to water and achieving Water Use Efficiency (WUE).

In order to improve access to water, a number of challenges such as the high cost of project interventions and sustainable water infrastructure, poorly defined property right regimes, and disparity in access to safe water across regions and economic classes would have to be tackled. In the context of India, inefficiencies in water use are high in agriculture; a gap of about 15 per cent is observed in the irrigation potential created and utilized. Improving WUE in agriculture remains the biggest challenge yet. The industrial sector is also facing the crunch of water supply. On the one hand, industrial water demand has been increasing while, on the other, there is fierce competition for the limited resources in agriculture, energy, and the domestic sector. Increasing water security will require tailored policy responses that can be adapted to local,

national, and regional contexts. Policies are needed on water planning, allocation and pricing aimed at increasing water security through increased water efficiency in industrial, agricultural, and domestic water use, while ensuring affordability for those who are unable to pay. It is necessary to create an enabling environment along with supporting policies for the use of unconventional water sources, such as wastewater management, and desalination for the recovery and reuse of water for human and other competing uses. Various technologies and management solutions capable of achieving these goals have been developed and are evolving with time. However, the deployment and scaling up of these technologies remains a challenge. Economic and social incentives need to be created to promote WUE and protect freshwater ecosystems.

As recognized the world over, good governance is a prerequisite to achieve water security. Cross-cutting frameworks may be created that bridge ministries and sectors, leading the way to water, energy, and food security in a

green economy. Enlightened policies can have implications on other dimensions. For instance, improvements in the irrigation sector can decrease electricity consumption and, simultaneously, reduce the level of water consumption in the agricultural sector.

Energy Security

Energy security is a multi-dimensional concept that incorporates several sub-themes. With issues ranging from global trade and geopolitics to household-level energy access and affordability, the idea of energy security can be said to be all-encompassing and far-reaching. According to the World Energy Outlook 2012, the global demand for energy is expected to increase by nearly one-third by the year 2035. This rising demand, coupled with constrained supplies of energy, necessitates a deep dive into the issue of ensuring energy security at the global, national, and local levels. There are a number of frameworks to improve energy security, such as the four As—Availability, Accessibility, Acceptability, and Affordability and the five

Ss—Supply, Sufficiency, Surety, Survivability, and Sustainability.

Introduction of new policies and technologies have helped the cause of energy security and both short- and long-term measures are being implemented for this purpose, such as building up strategic petroleum reserves; enhancing production of domestic energy sources, both renewable and conventional; pursuing diplomatic relations with energy exporting countries; rationalizing energy prices through phasing out petroleum product subsidies; introducing demand-side energy-efficiency policies; introducing policies that aim at enhancing access to modern forms of energy; and engaging in responsible consumption practices across population segments and consumption patterns. Some of the key challenges that will determine future energy pathways and success in ensuring energy security include ensuring access to energy at both the national as well as household levels. An integrated and proactive approach will go a long way in addressing some of the key energy-related challenges that the global community currently

faces. Energy security is closely linked to the issue of water security. Substantial energy is also being consumed for use of groundwater in irrigation of food crops. Groundwater resources account for almost 80 per cent of the recent growth in irrigation in South Asia. With practices that result in over-exploitation, the water table is dropping rapidly in several parts of the world. Even more serious is the problem of contamination of groundwater with chemicals, fertilizers, and pesticides which is an increasing cause of serious human health problems.

Food Security

The issue of food security is not one that can be explained and understood on the basis of aggregate global values, rather it should be seen at the basic grassroots level in terms of security of supply for individual households. A large number of farmers in the world produce barely enough food to meet their own needs. While a reduction may not impact the global food scenario in a major way, it would certainly affect the livelihoods of a large number of small farmers and their families. Yet, it is precisely this section

of farmers who have not yet benefited from research in the agricultural field. There is need for global efforts that will focus on agriculture in drought-prone areas and in locations where there is high dependence on rainfall, the patterns of which may be changing.

Coming to the issue of food security in towns and cities, that are overpopulated, it is seen that not only is there a substantial increase in the demand for food, but demographic changes have also altered the manner in which the food supply chain is being managed. Urbanization has changed the manner in which food is processed, packaged, supplied, and stored. Increase in income has also impacted the mix of food being consumed. The Food and Agriculture Organization (FAO) of the United Nations defines food security as: 'Food security also needs to take into account treatment of food losses and waste at all levels—from farm to fork.' Given the relationship between water, energy, and food, solutions which are efficient, equitable, and universal would need to consider all three aspects influencing food security in accordance with the definition given by FAO.

It is also essential that climate change impact is included as an important determinant of food supply in the future. Not only would climate change lead to changes in precipitation, it would also change the demand for water in food production. There is now growing evidence of the significant impacts of climate change on the yields of several crops. Adaptation measures need to be devised in a manner which would not jeopardize global food security.

Also, there are serious inconsistencies and stark disparities with respect to consumption of food and levels of nutrition across the globe. Lack of food security can either be a continuing and chronic condition or purely temporary such as inadequacies which are purely seasonal in nature. Some regions of the world today are facing a problem of excessive consumption of food in terms of quantity and calorific value, while others are suffering from chronic hunger, malnutrition, and deprivation bordering on conditions not very different from prolonged famine. The problem of undernourishment

can be tackled only when economic growth is coupled with development and implementation of policies that specifically target this sector.

Integrating Energy, Water, and Food Security

The issue of food security has to be seen in connection with the secure supply of energy as well as water. Energy is being increasingly required at all stages of food production and consumption cycles. For instance, production of fertilizers and other chemical inputs require energy. Similarly, transportation and storage of non-vegetarian food of various kinds such as meat, poultry, and seafood also require energy inputs.

If the world is to move towards effective mitigation of Greenhouse Gas (GHG) emissions, then major changes would be required in the manner in which energy is produced and utilized. Inevitably, this would involve high levels of efficiency in the entire energy cycle and a shift towards low-carbon sources, particularly renewable sources of energy. That would

involve changes across sectors, that is, those which consume energy as well as supply it. Given the fact that infrastructure today is designed for current patterns of energy supply, it has to be ensured that these assets are not rendered obsolete. They have to be replaced over time so that it does not result in massive reduction of economic output or employment opportunities. Differences between developed and developing countries, and variations even within each of these groupings, need to be considered along with issues of financing, easy access to technology, and building of capacity and capabilities in various institutions. It is of crucial importance today to bring within the fold of the modern energy system the 1.3 billion people who are without access to energy and the almost 3 billion who use biomass as a fuel, while also ensuring reduction in GHG emissions and local pollutants. These changes need to take place alongside the changes in demand for energy for space conditioning.

Agenda

Day 1: February 6, 2014	
09:30–10:30	<p>Inaugural Session</p> <p>Welcome Address</p> <ul style="list-style-type: none"> • Dr R K Pachauri, Director-General, The Energy and Resources Institute (TERI) <p>Special Addresses</p> <ul style="list-style-type: none"> • Dr Farooq Abdullah, Hon'ble Minister of New and Renewable Energy, India • HE Mr Danny Faure, Vice President, Seychelles <p>Presentation of the 10th Sustainable Development Leadership Award</p> <p>Keynote Address</p> <ul style="list-style-type: none"> • Mr Kofi Annan, Chairman, Kofi Annan Foundation and Former Secretary-General, United Nations <p>Inaugural Address</p> <ul style="list-style-type: none"> • Mr Salman Khurshid, Hon'ble Minister of External Affairs, India <p>Vote of Thanks</p> <ul style="list-style-type: none"> • Dr Annapurna Vancheswaran, Director, Sustainable Development Outreach Division, The Energy and Resources Institute (TERI)
1030–1130	<p>Leadership Panel: The Demographic Challenge</p> <p>Chair: Mr Nitin Desai, Distinguished Fellow, The Energy and Resources Institute (TERI)</p> <ul style="list-style-type: none"> • HE Ms Tarja Halonen, Former President, Finland • HE Dr Bharrat Jagdeo, Former President, Guyana • HE Mr Göran Persson, Former Prime Minister, Sweden • Lord John Prescott, Former Deputy Prime Minister and Member of Parliament, House of Lords, UK
1130–1145	<p>Keynote Address: The Role of Water Management in Addressing the Water-Food-Energy Nexus</p> <p>Chair: Mr Howard Bamsey, Director-General, Global Green Growth Institute</p> <ul style="list-style-type: none"> • Mr Takehiko Nakao, President, Asian Development Bank

1200–1330	<p>Ministerial Session 1: Ensuring and Expanding Access to Energy, Water, and Food</p> <p>Chair: Ambassador C Dasgupta, Distinguished Fellow, The Energy and Resources Institute (TERI)</p> <ul style="list-style-type: none"> • HRH Prince Mostapha Zaher, Director-General, National Environmental Protection Agency, Afghanistan • HE Mr Juhan Parts, Minister of Economic Affairs and Communications, Estonia • HE Mr Belete Tafere Desta, Minister of Environment Protection and Forestry, Ethiopia • Mr Heherson Alvarez, Commissioner, Climate Change Commission, Philippines • HE Mr Marcin Korolec, Secretary of State, Government Plenipotentiary for Climate Policy and President of COP19/CMP9, Poland • Hon’ble Prof. Silas Lwakabamba, Minister of Infrastructure, Rwanda • Rt Hon’ble Gregory Barker, Minister of State for Energy and Climate Change, UK • Mr John Bryson, Head, Bryson Climate Initiative, Woodrow Wilson International Center for Scholars and Former Secretary of Commerce, USA
1330–1350	<p>Keynote Address: Sustainable Transformation of Human Society</p> <p>Chair: Dr Fatima Denton, Officer In-Charge, African Climate Policy Center, Special Initiatives Division, United Nations Economic Commission for Africa (UNECA)</p> <ul style="list-style-type: none"> • DrYuan Tseh Lee, Nobel Laureate and President, International Council for Science
1350–1400	<p>India-California Air-Pollution Mitigation Program (ICAMP) Statement for DSDS</p>
1445–1600	<p>Re-thinking Development</p> <p>Chair: Dr Ajay Mathur, Director-General, Bureau of Energy Efficiency, Government of India</p> <p>Keynote Addresses</p> <ul style="list-style-type: none"> • Mr Achim Steiner, Executive Director, United Nations Environment Programme (UNEP) and UN Under Secretary-General • Dr Kandeh K Yumkella, Special Representative of the UN Secretary-General for Sustainable Energy for All and Chief Executive Officer of the Sustainable Energy for All Initiative

	<p>Panelists</p> <ul style="list-style-type: none"> • Dr Ines Dombrowsky, Head of Environment and Resource Policy, German Development Institute • Mr Hideaki Domichi, Senior Vice President, Japan International Cooperation Agency (JICA) • Prof. Pavel Kabat, Director-General and CEO, International Institute for Applied Systems Analysis (IIASA) • Prof. Pradeep K Khosla, Chancellor, University of California, San Diego • Prof. Luigi Paganetto, President, Economics Foundation, University of Rome Tor Vergata
1600–1615	Launch of Planet for Life Series – Innovation for Sustainable Development
1615–1730	<p>How Can Businesses Help Attain Energy, Water, and Food Security</p> <p>Chair: Mr Vikram Singh Mehta, Chairman, Brookings India</p> <ul style="list-style-type: none"> • Mr John A Beed, Mission Director, USAID India • Ms Tomoyo Nonaka, Chairperson, NPO Gaia Initiative • Mr Assaad Razzouk, Group Chief Executive Officer, Sindicatum Sustainable Resources • Mr Onno Rühl, Country Director, India, The World Bank • Dr Shiv Someshwar, Director, Climate Policy, Center on Globalization and Sustainable Development, Earth Institute, Columbia University and Senior Advisor, UN Sustainable Development Solutions Network • Dr Zubin Varghese, Senior Director, Innovation and Advanced Engineering, Ingersoll Rand
1730–1845	<p>The Role of MDBs in Attaining Energy, Water, and Food Security</p> <p>Chair: Mr Howard Bamsey, Director-General, Global Green Growth Institute</p> <p>Video Message: Dr Jim Yong Kim, President, The World Bank Group</p> <ul style="list-style-type: none"> • Mr Gyan Chandra Acharya, Under Secretary-General and High Representative for the Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States • Dr Naoko Ishii, CEO and Chairperson, Global Environment Facility • Dr Bindu N Lohani, Vice President, Knowledge Management and Sustainable Development, Asian Development Bank • Ms Anne Paugam, CEO, Agence Française de Développement (AFD) • Mr Alexandre Meira da Rosa, Manager, Infrastructure and Environment Department, Inter-American Development Bank

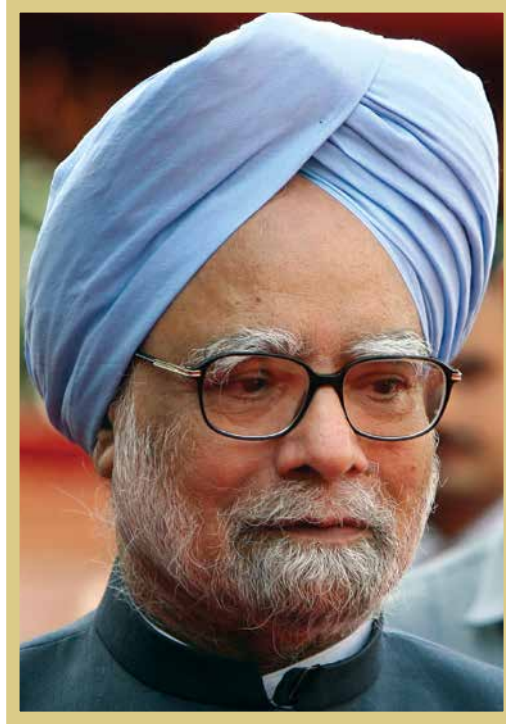
1845 – 1900	ADB Perspectives—Thinking Differently About Water, Food, and Energy
1900 onwards	Reception hosted by the Asian Development Bank (ADB) followed by Dinner
Day 2: February 7, 2014	
0930–1045	<p>Dealing with the Energy, Water, and Food Security Challenge in Asia</p> <p>Chair: Dr Prodipto Ghosh, Distinguished Fellow, The Energy and Resources Institute (TERI)</p> <p>Announcement of South Asian Regional Hub for SDSN</p> <p>Keynote Address: Prof. Jeffrey D Sachs, Director, Earth Institute & Special Advisor to the United Nations Secretary-General (via Video)</p> <ul style="list-style-type: none"> • Dr Anindya Chatterjee, Asia Regional Director, International Development Research Centre (IDRC) • Ms Lise Grande, UN Resident Coordinator and Resident Representative, United Nations Development Programme, India • Prof. Hironori Hamanaka, Chair, Board of Directors, Institute for Global Environmental Strategies (IGES) • Mr Ajay Vir Jakhar, Chairman, Bharat Krishak Samaj (Farmers' Forum, India) • Dr David Molden, Director-General, International Centre for Integrated Mountain Development (ICIMOD) • Dr Leena Srivastava, Vice-chancellor, TERI University
1045–1135	<p>The Energy, Water, Food Triangle</p> <p>Chair: Dr Leena Srivastava, Vice-chancellor, TERI University</p> <ul style="list-style-type: none"> • Prof. François Mancebo, Full Professor, IRCS (International Research Center on Sustainability)–IATEUR Rheims University • Prof. Nebojsa Nakicenovic, Deputy Director-General, International Institute for Applied Systems Analysis (IIASA) • Mr Jake Schmidt, International Climate Policy Director, Natural Resources Defense Council (NRDC), USA • Prof. Petteri Taalas, Director-General, Finnish Meteorological Institute • Dr Kazuhiko Takeuchi, Vice-Rector, United Nations University • Dr Georges Valentis, Managing Director, The Institute Veolia Environment, France
1135–1145	TERI and the Royal Norwegian Embassy Initiatives on Climate Change

1145–1345 Thematic Tracks	Promoting Energy Efficiency in Micro, Small, and Medium Enterprises (MSMEs) <i>In partnership with SDC</i>
	How to Steer the Indian Innovation System towards Sustainability <i>In partnership with AFD & IDDRI</i>
	Special Interactive Session: How Can Legislators Help Tackle Climate Change <i>(By Invitation Only)</i>
	Water and Food Security <i>In partnership with UNDP</i>
1345–1430	Lunch hosted by the Royal Norwegian Embassy
1430–1440	Presentation by Mr Jack Andraka , Inventor
1440–1600	Tackling the Energy, Water, and Food Security Challenge in Africa Chair: Dr Fatima Denton , Officer In-Charge, African Climate Policy Centre, Special Initiatives Division, United Nations Economic Commission for Africa (UNECA) Keynote Address: Dr Carlos Lopes , Executive Secretary, UNECA and UN Under Secretary-General <ul style="list-style-type: none"> • HE Dr Raphael Edou, Minister of Environment, Climate Change and Reforestation, Benin • HE Mr Henri Djombo, Minister of Forest Economy and Sustainable Development, Congo • Hon’ble Mass Axi Gai, Minister of Fisheries and Water Resources, Gambia • HE Ms Ana Paulo Samo Gudo Chichava, Deputy Minister for the Coordination of Environmental Affairs, Mozambique • Prof. Rolph Payet, Minister for Environment and Energy, Seychelles • HE Prof. Ephraim Kamuntu, Minister of Water and Environment, Uganda
1600–1645	Communicating for Sustainability Chair: Mr Lance Igon , Managing Director, Public Relations, Citizen Group <ul style="list-style-type: none"> • Mr Tim Nuthall, Media Manager, European Climate Foundation • Mr Guido Schmidt-Traub, Executive Director, UN Sustainable Development Solutions Network

1600–1645	<ul style="list-style-type: none"> • Mr Nitin Sethi, Senior Assistant Editor, The Hindu • Mr Ali Tauqeer Sheikh, CEO, LEAD Pakistan and National Programme Director and Asia Regional Director, CDKN
1700–1900 Thematic Tracks	<p>Role of Renewable Energy in Enhancing Energy Security in Developing Countries <i>Supported by the UK Government</i></p> <p>Food-Water-Energy Nexus: Approaches to Securing Nutrition for Vulnerable Populations <i>In partnership with ADB</i></p> <p>Extreme Risks, Vulnerabilities, and Community-Based Adaptation in India (EVA): A Pilot Study <i>Supported by the Norwegian Embassy</i></p> <p>Roundtable on Mining within the Sustainable Development Framework</p>
1900 onwards	Cultural Evening followed by Reception
Day 3: February 8, 2014	
1000–1115	<p>Ministerial Session 2: Dealing with the Impacts of Climate Change</p> <p>Chair: Rt Hon'ble John Gummer, Lord Deben, Former Secretary of State for Environment and Member of Parliament, House of Lords, UK</p> <ul style="list-style-type: none"> • HE Mr Lyonpo Yeshey Dorji, Minister of Agriculture and Forests, Bhutan • HE Mr Graco Ramírez Garrido Abreu, Governor of Morelos, Mexico • HE Dr Oyun Sanjaasuren, Minister of Environment and Green Development, Mongolia • HE Dr Thet Thet Zin, Deputy Minister, Ministry of Environmental Conservation and Forestry, Myanmar • HE Mr Lars Andreas Lunde, State Secretary (Deputy Minister) of Climate and Environment, Norway • HE Mr Jorge Moreira da Silva, Minister of Environment, Spatial Planning and Energy, Portugal • Hon'ble Lord John Prescott, Former Deputy Prime Minister and Member of Parliament, House of Lords, UK
1115–1123	Presentation of the 2nd Georgescu-Roegen Awards

1123–1130	Signing of MoU with Jain Irrigation Systems Limited
1130–1330	Key Lessons from CDKN-START Research on Disaster Risk Reduction and Climate Change Adaptation in South Asia <i>In partnership with CDKN & START</i>
Thematic	Adaptive Development for the Sustainability of Asia: Research and Practice <i>In collaboration with Keio University, IGES, and TERI University</i>
Tracks	High Level Dialogue on Energy, Water, and Food Security <i>In partnership with Jain Irrigation Systems Limited</i>
	First TERI-ICCT Lecture: Transportation Should Never Be Addressed in Isolation <i>In partnership with International Council on Clean Transportation (ICCT)</i>
1415–1515	<p>Centre-stage India: In Conversation with Indian Officials</p> <p>Moderator: Mr Karma Paljor, Business Editor and Senior Anchor, CNN-IBN</p> <p>Chair: Mr B K Chaturvedi, Member, Planning Commission, Government of India</p> <ul style="list-style-type: none"> • Mr Amitabh Kant, CEO and Managing Director, Delhi-Mumbai Industrial Corridor Development Corporation • Mr Rajeev Kher, Secretary, Department of Commerce, Ministry of Commerce and Industry, India • Mr Surender Kumar, Secretary, Department of Science, Technology and Environment, Government of Tripura, India • Mr Arunendra Kumar, Chairman, Railway Board, Ministry of Railways, India • Mr Ajai Malhotra, Former Ambassador of India to Russia • Dr S K Sarkar, Secretary (Personnel), Department of Personnel and Training, Ministry of Personnel, Public Grievances and Pensions, India • Mr Gireesh Pradhan, Chairperson, Central Electricity Regulatory Commission, India
1515–1630	<p>Gender: The Core Issue in Sustainable Development</p> <p>Chair: Dr Ligia Noronha, Executive Director (Research Coordination), The Energy and Resources Institute (TERI)</p> <ul style="list-style-type: none"> • HE Mr Dasho Paljor J Dorji, Special Advisor, National Environment Commission, Bhutan

	<ul style="list-style-type: none"> • Sir Jonathon Porritt, Founder-Director, Forum for the Future • Dr Remi Quirion, Chief Scientist, Fonds de Recherche du Quebec • Prof. Veena Sikri, Convener, South Asia Women's Network (SWAN) and Vice Chairperson, South Asia Foundation (SAF-India) • Mr Muhammad Irfan Elahi, Chairman, Planning and Development Board, Government of Punjab, Pakistan • Mr Adam Koniuszewski, Chief Operating Officer, Green Cross International
1630–1700	<p>Valedictory Session</p> <p>Chair: Rt Hon'ble John Gummer, Lord Deben, Former Secretary of State for Environment and Member of Parliament, House of Lords, UK</p> <p>Valedictory Address</p> <ul style="list-style-type: none"> • Mr Montek Singh Ahluwalia, Hon'ble Deputy Chairman, Planning Commission, Government of India <p>Vote of Thanks</p> <ul style="list-style-type: none"> • Dr R K Pachauri, Director-General, The Energy and Resources Institute (TERI)



Special Message from the Hon'ble Prime Minister of India

Dr Manmohan Singh, on the occasion of the
14th Delhi Sustainable Development Summit



प्रधान मंत्री

Prime Minister

MESSAGE

It gives me immense pleasure to know that The Energy and Resources Institute (TERI) is organizing the Delhi Sustainable Development Summit (DSDS) 2014 from February 6-8, 2014 at New Delhi.

The theme for DSDS 2014, 'Attaining Energy, Water and Food Security for All' touches upon the very core of sustainable development. Rapidly expanding populations, increasing urbanization and growing prosperity have put enormous pressure on global resources and have made our task of securing energy, water and food for all a daunting one.

During the past century, while global population has tripled, our use of water has increased six-fold. Moreover, the quality of available water is gradually deteriorating due to uncontrolled human activities. On the food front, there are serious challenges with every eighth soul suffering from chronic hunger. Energy is the most critical input in unlocking human potential. However, large sections of poor people are still deprived of access to energy. Water, food and energy are intrinsically inter-related. Therefore, we need increased collaboration among experts of these sectors belonging to diverse geographies.

If policy makers, experts, academics and business leaders share their knowledge and experiences, we can evolve sustainable solutions to the most pressing challenges that the world is facing today.

I am sure that DSDS 2014 would provide such a platform. I hope that implementable policies for universal energy, water and food security would emerge from these deliberations.

I wish all success to these deliberations.

Manmohan Singh
(Manmohan Singh)

New Delhi
05 February, 2014





Keynote Addresses



Dr R K Pachauri
Director-General, TERI

Inaugural Session: Welcome Address

Dr R K Pachauri, Director-General, TERI

Nelson Mandela was absolutely right when he stated that 'Overcoming poverty is not a task of charity, it is an act of justice. Like Slavery and Apartheid, poverty is not natural. It is man-made and it can be overcome and eradicated by the actions of human beings. Sometimes it falls on a generation to be great. YOU can be that great generation. Let your greatness blossom.' Lack of security in energy, water, and food bedevils the lives of hundreds of millions of human beings across the globe even today as we move forward in the 21st century, all of which defines the character of widespread poverty. Even now there are 1.3 billion people who live without access to electricity and twice that number are dependent on biomass, often of poor quality, for meeting their cooking and space heating needs in ill-ventilated homes. Recent research has brought out not only the known drudgery associated with such an energy regime, such as women spending hours in walking several kilometres to collect a headload of fuelwood,

but also serious health impacts of emissions from kerosene lanterns and biomass burning cookstoves. A large proportion of human society remains totally outside the reach of modern energy systems.

In the case of water, projections vary substantially, but the Intergovernmental Panel on Climate Change (IPCC) in its Fourth Assessment Report has projected that the population at risk of increasing water stress for specific scenarios is projected to be between 1.1 to 3.2 billion in the 2080s. As early as 2020, it is projected that 75 to 250 million people may be exposed to increased water stress due to climate change in Africa. In our part of the world, climate change related to melting of glaciers could seriously affect half a billion people in the Himalaya-Hindu Kush region and a quarter billion people in China, all of whom depend on glacial melt for water supplies. Of course, climate change is only one factor that would influence future water stress, while demographic, socio-economic and technology



Even now there are 1.3 billion people who live without access to electricity and twice that number are dependent on biomass, often of poor quality, for meeting their cooking and space heating needs in ill-ventilated homes.”

changes may play an even more important role.

Estimates provided by the Food and Agriculture Organization (FAO) indicate that nearly 870 million people were suffering from undernourishment between 2010–2012. We, therefore, have a serious challenge with respect to ensuring energy, water, and food security for all. Widespread poverty is the biggest barrier that prevents attainment of security in these areas. We need to keep in focus Nelson Mandela's view of poverty while mounting sustained efforts in that direction, and we possibly need an application of renewed ethics and values in dealing with the problem.

The time has come when conventional solutions may need to be replaced by totally new and substantially different measures. Quite apart from policies and instruments by which change can be brought about, there are some fundamental issues that human society has to absorb and tackle head-on. I would like to quote two economists who I respect greatly, and who left this world many years ago but have left us with wisdom that we cannot afford to ignore any longer. It was Nicholas Georgescu-Roegen who wrote, 'The importance of natural

resources in the life of our species is written on the face of history.'

The Great Migration that moved tribe after tribe from Asia to Europe during the first thousand years of our era was triggered by the exhaustion of soil nutrients after millennia of sheep rearing and overgrazing. All wars have been fought for the possession or the control of natural resources, even though as a rule the rallying cry was ideological. The 'limited' wars that now do spring up in one place and then in another leave no doubt about this truth. Another distinguished economist, Kenneth Boulding, who actually held the position of the President of the American Economic Association in 1968, perhaps the one position that every economist in the US covets, stated, 'Anyone who believes exponential growth can go on forever in a finite world is either a madman or an economist.' Elsewhere, Boulding also stated, 'The essential measure of the success of the economy is not production and consumption at all, but the nature, extent, quality, and complexity of the total capital stock, including in this the state of the human bodies and minds included in the system.'

The purpose of referring to these powerful thoughts from

some of the most erudite and visionary economists of the 20th century is only to emphasize the fact that we cannot possibly treat the challenges ahead as those that require mere tinkering with the current system. We envisioned the Delhi Sustainable Development Summit to evolve as a platform and an institution that looks at least towards the end of the next quarter century in defining a path of development for human society that would help us meet some of our most daunting challenges. May I emphasize that any forum that focuses on merely economic prospects in the next quarter is doing disservice to the welfare of the human race, no matter how much glamour and how many celebrities it attracts. The presence of those individuals who have control of a large share of the world's economic activities might have us believe that the fate of humanity is in their hands and tied to the decisions that they make. It is our vision and endeavour at TERI to see that DSDS focuses on the real problems and challenges ahead and not merely those that deal with business-as-usual. We offer the bewildering traffic and vibrant energy of the city of Delhi as our setting, and no ski slopes and the company of the

super-rich to attract you. But we solicit your presence here to stir up the soul of humanity, to focus on the challenges in the decades ahead and the solutions that we must collectively devise and implement to preserve all that we hold dear in our lives and on this planet. The truth is that we have very clear options and a limited period of time in which we need to act. In September 2013 the IPCC brought out its Working Group I Report, which is part of the Fifth Assessment Report of the Panel. In that we put forward the assessment that, for instance, limiting the warming caused by anthropogenic CO₂ emissions alone to less than 2 °C since the period 1861–1880 would require CO₂ emissions from all anthropogenic sources to stay between 0 and as low as 790 giga tonnes since that period. An amount of 515 giga tonnes of CO₂ was already emitted since 2011. Hence, human society has a limited amount of space and time in which it has to carry out stringent mitigation of emissions of greenhouse gases (GHGs) and carbon dioxide in particular so that the earth's climate can be limited to below 2 °C rise in temperature. It is also obvious that if we delay action, the cost

of stabilization will go up as the emissions and concentration of GHGs continue to increase.

The point that I would like to make before this august audience is that we cannot delude ourselves into believing that business-as-usual will help us solve some of our most serious problems, particularly in a world where while the rich are doing rather well the large numbers of poor people are left behind. It is significant that even in the US, the most powerful economy in the world, President Barack Obama in his State of the Union address stated, 'Today, after four years of economic growth, corporate profits and stock prices have rarely been higher, and those at the top have never done better. But average wages have barely budged. Inequality has deepened. Upward mobility has stalled.' Undoubtedly, this is a State of the Union address that would be applicable to a large number of countries in the world, regrettably in India as well. We, therefore, have to look much deeper and find viable means by which perhaps transformative solutions can be devised and implemented with a sense of urgency and a deep sense of determination. The reason why we have instituted awards in the

name of Nicholas Georgescu-Roegen is because his thesis on the entropy of the economic process is becoming apparent to us increasingly every day. We do not necessarily have to go through failure to learn, since science and knowledge should convince us of failure if we are heading towards it. Boulding has rightly said, 'Nothing fails like success because we don't learn from it. We learn only from failure.' If we have failed to provide a large mass of human society with security in respect of energy, water, and food, then it is time that we learn from the root causes of this massive failure. And knowledge can come to our assistance in this effort. Knowledge today and a clear perception of the future give us an understanding of failure that we face without the misery of having to live through it. Decision-makers, thinkers, and leaders from across the world need to consider whether merely dressing up the current system will solve the problem.

In reality, there is clearly a need for both incremental as well as transformative changes, and in devising actions for the future learning from experience generated in various parts of the world would be invaluable. As

part of the events, TERI is also working with the University of California at San Diego and the California Air Resources Board to see how California's experience in bringing about improvement in air quality can be used in various parts of India. Over four decades, California reduced particulate emissions by about 90 per cent although the number of vehicles increased by 175 per cent and diesel consumption as

well as miles travelled increased by 225 per cent. We at TERI feel privileged that our founders set up this Institute with the objectives of sustainable development and its various elements even before there was awareness anywhere in the world on the subject of sustainable development. Today, TERI is perhaps the largest institution of its kind in the world, with a staff of over 1,200 professionals, and activities

stretching across the globe. We feel privileged to welcome such a distinguished galaxy of thought leaders and pioneers who have come here today to help the world in its mission to achieve sustainability and to assist TERI in its humble efforts to motivate and facilitate change in the right direction. It is a great privilege for me to welcome you on this occasion.



Dr Farooq Abdullah
Hon'ble Minister of New and
Renewable Energy,
Government of India

Inaugural Session: Special Address

Dr Farooq Abdullah, Hon'ble Minister of New and Renewable Energy, Government of India

Let me start by saying it is great to see you all. Shows that if we work together and we think together, there will be no danger to this world. That is what is essential. Let us work together, let us think of this world as God's gift to us. And we human beings have done everything possible to destroy this world and are now looking and thinking together to save what God has given us. And what Dr Pachauri and TERI have done. I am very happy that they have brought you all together. How do we have a better future? How do we have a better future for

our children? And for this world to survive? Let's get rid of the tendency to fight. Time has come and I think humanity must rise above petty considerations. If we all work together, think together of our safety, every one of us will be safe. No longer can we think in cubbyholes, that we alone can save it. It is like the human body. If one section of the human body goes out of gear the entire body goes out of gear. And that is what has happened to this world. For a long time we have been thinking separately for each nation. Each nation thinks that they can do

something only for themselves.

But time has shown that this is no longer possible. We can only survive together. And that is a great advantage and I am glad that we all are here. In India, we are fighting to survive. We have 1.2 billion people. And 40 per cent of those people do not have access to energy. Even after 67 years of independence, we still have people who do not get safe drinking water. Also the food nowadays is highly adulterated, it compels people to wonder whether one should eat the food that is before them. All this is happening because of man's greed. This greed of man needs to change. India is moving forward. India needs energy. Therefore please forgive us, but we have to use nuclear energy till renewable energy comes up to such a level that we are able to dispense with fossil fuels and nuclear energy. India spends 80 per cent of its foreign exchange on getting fossil fuels. This money could be instead used for supplying better drinking water, building better roads, hospitals, providing better education, etc. And here is a challenge for all of us. Let's work together to improve renewable energy. We started in 2010 with the Jawaharlal Nehru

Solar Mission. By the grace of God we hope by 2017 we should have 30,000 mega watts of solar power. Unless we cooperate we are not going to be able to do it. Similarly, in wind power, we are number five in the world. We are now going offshore. There are nations who have great expertise in this. Similarly, we are developing biomass as well. All this is being done so that our people have a better life, a better future, and we want to help other nations too. We feel we should work together. And I am glad I see some top industrialists of India here on whom we depend in a big way. We hope that all of you will take this challenge, not only for India but for the world. Please start thinking not only for your nation but start thinking for other nations too. I hope this conference that is being held will bring you together, will bring other nations together and move forward to give people better life, security of food, security of better air, and a better life. I am sure we can do it if we all work together. May God protect us from disasters that take place. I hope all of us work together for a much better world than what I have seen and what my children might see. By the grace of God

we hope by 2017 we should have 30,000 mega watts of solar power.

Let us work together, let us think of this world as God's gift to us.



I hope this conference that is being held will bring you together, will bring other nations together and move forward to give people better life, security of food, security of better air, and a better life.





Mr Kofi Annan

Chairman, Kofi Annan Foundation
and Former Secretary-General,
United Nations



A fundamental shift
to a more sustainable
development pathway is
urgently required. ”

Inaugural Session: Keynote Address

Mr Kofi Annan, Chairman, Kofi Annan Foundation and former Secretary-General, United Nations

Let me express my thanks to The Energy and Resource Institute (TERI) for hosting this conference, and for inviting me to join you. The presence of so many influential leaders and experts underlines the importance of the subjects under discussion. They are issues in which TERI has been at the forefront in identifying and addressing. Forty years ago, green energy and sustainable development were at the top of few agendas. The decision to set up TERI in 1974 was an example of the vision and intellectual leadership which is a hallmark of this country. These qualities have never been more essential. The contrasts and challenges we see around the world have rarely been greater. Collectively we are better off than any previous generation could have imagined. Prosperity has spread from the mature economies of Europe and North America to Asia, Latin America, and, more recently, Africa. Asia has seen a particularly dynamic transformation and is now a major driver of global growth. This growth has reduced by

50 per cent the number of people living in extreme poverty since 1990. But we all know that this is only half the story. Despite this progress, hundreds of millions of people lack access to food, water, and energy—the very basic necessities of life. One in eight of our fellow human beings do not have enough food to eat. In the Asia-Pacific region, 1.7 billion people lack access to sanitation and 680 million are without electricity. Inequality is growing both between and within societies. According to a recent Oxfam report, the richest 85 people in the world own as much wealth as the poorest 3.5 billion. Here in India and across the world, we remain a long way from our goal of providing a decent life for all. For we are exploiting finite resources at an alarming rate and causing huge damage to our environment. Our existing model of development does not give an economic value to fresh water, energy, biodiversity or environmental resources. As a result, they are not prioritized in policy-making. Instead, wasteful

production and consumption patterns are encouraged. The challenges are growing. Each year 10 million people in India alone move to towns and cities as a result of population growth and urbanization. An expanding middle class is changing lifestyles and consumption patterns, increasing pressure on natural resources. It is now estimated that by 2030, we will need 30 per cent more water, 40 per cent more energy, and 50 per cent more food. Looming above all these challenges, and exacerbating them, is climate change. As India knows, climate change is not a future threat as it already impacts people's lives and livelihoods.

A recent report suggests that a quarter of India's landmass has been affected by rising temperatures and fluctuations in rainfall. Across the world, more frequent extreme weather events are reducing harvests and forcing people off their land. No country or society will escape the impacts of climate change. But as always, it is the poorest and most vulnerable who will suffer most. These inter-linked challenges cannot be addressed by tinkering around the edges. A fundamental shift to a more sustainable development pathway

is urgently required. We must do more to promote integrated policy-making which addresses social and environmental goals, and not just economic targets. Making the transition from the brown to the green economy is perhaps the biggest challenge of our age. It will require leadership, courage, and commitment from all the sectors represented here—government, business, academia, and civil society. No one has all the answers but let me set out a few priorities. First, we have to act on climate change. We need a robust, universal, and legally binding agreement to limit temperature rise to less than 2°C—above which climate change may be irreversible. For the agreement to be reached in Paris next year, every country, whatever be their stage of development, must raise its sights and commit to reducing greenhouse gas emissions. But fairness demands that richer countries lead in the scale of their emission cuts, and in providing financial support for adaptation, and diffusion of green technology.

Internationally and nationally, the right policies and incentives must be put in place to ensure a shift to renewable and efficient sources of energy. This would

include putting a price on carbon and phasing out harmful fossil fuel subsidies. Second, sustainability must be at the heart of the global development framework which succeeds the Millennium Development Goals (MDGs) 2015. The MDGs helped countries lift millions out of poverty, and increased access to health, education, and drinking water. But as we transit to a new development framework, we must ensure that environmental degradation, inequality, and unemployment are tackled through ambitious and universal sustainable development goals. They must create decent jobs for the youth. Thirdly, sustainability must be at the core of national policy-making. Too often policies to manage food, water, and energy resources are developed and implemented in isolation when we know that they are interlinked. Governments must do more to foster policy coherence and encourage cooperation between ministries and stakeholders. Only then will we have the right incentives to encourage more efficient and sustainable production and consumption frameworks. Fourth, accelerating the shift to sustainability will require leveraging the full

potential of every human being. Women and girls are major drivers of development, yet challenges to eliminating discrimination and achieving gender equality remain significant.

In India and elsewhere, women continue to be denied opportunities to have a voice in decisions that affect their lives and those of their families and communities. We see a continuing gender gap in education—the greatest investment any country can make in its future. In too many countries, women face unacceptably high levels of violence, including sexual violence, which is an affront to our common humanity. So

we must dedicate ourselves to transforming relations between men and women at all levels of society, and put the welfare of women and girls at the heart of all we do. The role of government is vital in catalysing action on these priorities. But delivering the fundamental shift to a new sustainable model is not the responsibility of governments alone. The private sector is the main engine of the global economy and accounts for two-thirds of the use of natural resources. It has an enormous responsibility, and an indispensable role to play. Businesses, big and small, must embed sustainable development goals in their policies, production

processes, and value chains. They can drive research, innovation and investment to facilitate the transition to a green economy. South–South cooperation can play a major role by sharing these advances across regions. Civil society must also bring their expertise to bear. By working closely with local communities, they are ideally placed to ensure that government policies meet local needs and priorities. The well-being of our global community depends on overcoming these challenges. With courage, vision, and a renewed spirit of solidarity, we can move decisively towards a truly sustainable development path. We have no time to waste.



HE Mr Danny Faure

Vice President,
Republic of Seychelles

“
India and Seychelles are
Natural Blue Economy
partner. A sustainable
ocean will lead to a
sustainable planet.”

Inaugural Session: Special Address

HE Mr Danny Faure, Vice President, Republic of Seychelles

It is indeed a great pleasure and honour for me to be here representing the President of the Republic of Seychelles, HE James Alex Michelle, the Government of Seychelles and the people of Seychelles at this very important 14th Sustainable Development Summit in Delhi. We, the Small Island States, will not cease to make our voices heard because we believe we are the sentinels of our planet. We are the custodians of the planet's most important natural asset, the oceans. For many decades, attention on oceans has been marginalized in international debates, and while significant progress was made in Rio at the last Global Summit on Sustainable Development, our understanding of the oceans is still very sparse. We Small Islands know very well that it is the oceans that drive the global climate. It is the oceans that contribute significantly to the air we breathe and the food we eat. It is the oceans that connect us to our roots, and while humankind has been notorious in exploiting and polluting the oceans we are

yet to define the framework for the sustainable management of the oceans. It is the responsibility of all of us, whether Small Island nations or coastal states, landlocked countries or desert nations to drive the development of this framework. The blue economy is such a framework which was pushed by many Small Island States including Seychelles at the Rio+ 20. Through our efforts we managed to place oceans high on the global agenda and we need to keep pushing so that the blue economy can truly live up to its promise as our template for sustainable development. The challenges of Small Island States can easily be forgotten in the international community if we do not continue to pursue the goals for a sustainable planet. Small islands are important for global development.

Even the largest vehicle cannot get very far if a small bolt is neglected. Furthermore, the challenges we face today as small islands can easily proliferate into global issues. Take, for example, water security as a result of

climate change. So islands hold many solutions as well as early warnings. No one can afford to ignore what is happening on our island coasts, erosions, extreme weather events, coral bleaching, all linked to global processes. Through the blue economy concept however, what we are presenting to the world is not a list of problems but rather a unique opportunity to solve many of these sustainability questions through better management, ownership and development of our oceans. We need determined world leaders and world organizations that take bold and concrete steps to address these issues. We need to see positive results. Hitting a level of 400 parts per million in atmospheric carbon dioxide for the first time in recorded history spells disaster for Small Island States.

To repeat, we need to see positive results. Hitting 400 parts per million in atmospheric carbon dioxide for the first time in recorded history spells disaster for Small Island States. This is not a positive result. We are either getting too much water that floods our islands or too little water that we are without water for many months. The oceans are getting too warm for our corals in some

cases or too cold for our fish that migrate elsewhere. More carbon dioxide in our atmosphere means more ocean acidification. Our failure to take proactive action on curbing greenhouse gas emissions pushes us further over the edge. We need action that brings about positive results. The wealth of the oceans needs to translate into real wealth for our local people and future generations. We can't just think of today, of bottomline profits; we need to think of tomorrow. We need to be reminded that we owe the future generations a better ocean from the one we all inherited.

As we continue our discussions on the post-2015 development agenda and on the sustainable development goals that will succeed the MDGs, we need to urgently consider sustainable development goals that adequately reflect the importance of the oceans. We need research, support and resources, to manage and properly tap into the vast potential of our oceans. We need to ensure marine biodiversity does not decline but is conserved and managed for the prosperity of our nations and the future of our planet. Those needs will not and

cannot be achieved if we maintain this business-as-usual trajectory. To achieve those needs, we need to embrace a solution in which the oceans are at the centre of our development. This is what we call the Blue Economy. The Blue Economy is our life; we will not be able to achieve sustainable development without the Blue Economy. The theme of this Summit, 'Attaining Energy, Water and Food Security for All', will not be achieved without enhancing our engagement with the Blue Economy. Our future energy and water will come from the sea, there is no doubt. We also need to ensure that our food continues to come from the sea. Whilst its vast benefits and resources are well appreciated, we are yet to fully incorporate the oceans into our development agenda.

Many still perceive the ocean as a resource which belongs to everyone and, therefore, can be exploited by those with the means and power to do so. Some are also of the view that the ocean is unlimited in terms of its resources and ability to absorb pollution. And the assault on our oceans continues everyday unabated.

We need to reverse current trends. We need determined leaders to reverse the current

trend of overfishing estimated at 87 per cent of existing fish stocks by FAO and the degradation of marine and coastal systems through land use change, especially destruction of forest areas and discharge of land-based pollution.

On an island, wherever we turn, whenever we look, we see the oceans. The oceans surround us. They feed us; they keep our people together. Today, Seychelles depends upon tourism and fisheries for its economic development, in contrast to many other countries who have other sources of economic income. Our resources are fragile, we remain vulnerable and traditional economic development models do not really recognize these concerns. Small Island Development States will, therefore remain vulnerable if they do not learn to manage the economy with the sea, with the ocean at the heart of its economic planning. Addressing sustainable development and the green economy in Small Island States and coastal states

will be incomplete without addressing the blue economy. Our blue economy is the green economy, it is about the ocean conservation and sustainable use, it is about creating jobs. It is about eradicating poverty and obtaining equitable revenue from our resources. It is about creating a link between what we do on land and in the ocean, it is about partnerships for development, preserving the oceans is therefore a global responsibility, a joint effort and a long-lasting commitment. The political outcome of the Blue Economic Summit held in Abu Dhabi last month calls upon the international community to come together to address those challenges and create a blue economy framework. To assure the future of the oceans and our islands. We need your help in advancing this framework. I am pleased to state that India and Seychelles are natural blue economy partners, our shared maritime security framework is one which addresses environmental threats such as marine pollution

and illegal fishing as priorities. Our partnership in research and hydrographical surveys are also catalysts for wider development of a blue economy. To make full use of our ocean's potential, we are grateful to have nations with a technological dynamism such as India by our side. We firmly believe that it is through such partnerships that we can help place exploration ahead of exploitation of our oceans. In this UN International Year of Small Island States, oceanic development through the blue economy can be a catalyst for the change required. To move beyond the rhetoric of sustainable development, as we approach the Third International Conference on Seas in Samoa, we are reminded of partnerships that we will achieve through sustainable development. We need to keep oceans on the agenda and embrace blue economy as the mechanism for sustainable development in Small Island States and coastal regions of the world. A sustainable ocean will lead to a sustainable planet.



Mr Salman Khurshid
Hon'ble Minister of External Affairs,
Government of India

“DSDS highlights the growing relevance of this annual event and India's growing contribution to global affairs.”

Summit Inaugural Address

Mr Salman Khurshid, Hon'ble Minister of External Affairs, Government of India

We gather here today at a very critical juncture for humankind. It is not merely about improving conditions of our lives but about life itself. And it's a privilege for me to be amongst these distinguished people gathered at this inaugural of the 14th edition of the Delhi Sustainable Development Summit. The Summit that was first held in 2001 on a very modest scale but fortunately with a very high ambition and a vision of what a platform such as this can achieve on the subject of sustainable development has indeed come a long way. The gathering of such a distinguished group of leaders from all over the world is a reflection of the importance of the theme pursued by the Summit, and the purpose of organizing successive summits annually. It also highlights the growing relevance of this annual event and, I believe, India's growing contribution to global affairs—both in volume and impact. The theme for the 14th Summit—‘Attaining energy, water, and food security for all’—is topical and critical. And one wonders whether

these words for the chosen theme are sequential or randomly interdependent. We are living in a complex world where disparities between rich and poor are wide and continue to grow. The world population continues to grow and increase globally. Consequently, the needs also grow exponentially. We, therefore, need a new global awakening to be able to deal with disparities by which the needs of the poor can be met effectively and adequately. This is not just a political imperative as we have been reminded because of important and dramatic changes taking place in several countries in the world but also a moral obligation.

In this regard, I am delighted to learn that DSDS will revolve on Thematic Tracks on specific issues in the areas of food, water, and energy security. The problems of energy, water, and food are likely to become more acute over time unless we take urgent steps globally to anticipate future challenges in this regard and start dealing with them right away. There are large number of

people in the world who have no access to electricity. There are people living under the shadow of water shortages, hunger, and malnutrition across the globe. Continuation of these conditions will lead to global tension and threats to peace. The global community and international organizations, in particular, have to be in the forefront of efforts to change direction if need be, and take such initiatives as are required to solve these problems. As an Indian, I am proud that we in India have placed great emphasis on the topics which are being discussed here—food, water, and energy. At home and in all our deliberations, multilateral arena, etc. The UN, UNFCCC, Rio+, and other fora have voiced the firm belief that no global effort to live in peace together would be possible unless we ensure sustainable development, both development that is itself sustainable and

development that sustains. And this sustainable development would be impossible without food, water, and energy security. Therefore, these would indeed be and must be the highest priority. We are also aware that they will be impacted by climate change and growing greenhouse gases. Consequence of imbalances in any one of these components has direct impact on the other. They are interdependent. This thinking is clearly reflected in the theme for this year's Summit but it is heartening to see that DSDS is able to attract people from every corner of the globe. And that clearly indicates our global commitment. We believe the solutions lie in collaborative and cooperative effort on the part of all stakeholders including government, business, research and academia as well as civil society. The media also has an extremely important role to play in informing the public at

large and ensuring that the real problems facing humanity are not drowned by irrelevance. I am also glad that we are recognizing efforts of those who achieve sustainable development by giving the Sustainable Development Leadership Award which saw the 10th distinguished recipient. I congratulate the winner and I must admit that I am a personal beneficiary of some of the remarkable work that has been done by Mahindra & Mahindra. Today, as we stand here, I urge all you to reflect upon how difficult it is to be good and whether we should not work more concertedly for the possibility of altruism. Conservation and preservation will come if we stop destruction. It is a challenge that can be described as now or never. I wish you all a meaningful and successful Summit in its deliberation on issues that are of critical importance to the future of all humankind.



Mr Takehiko Nakao
President, Asian Development Bank



Attaining energy, water, and food security for all is one of the most complex development issues that we have ever faced. ”

Keynote Address: The Role of Water Management in Addressing the Water–Food–Energy Nexus

**Mr Takehiko Nakao, President,
Asian Development Bank**

It is my pleasure to join you today to discuss water-food-energy security. I thank Dr Pachauri and his colleagues at The Energy and Resources Institute (TERI) for bringing us together for this timely summit.

Sustainable development has been the core business of Asian Development Bank (ADB) since its inception in 1966. And it remains our guiding principle in working towards an Asia and Pacific free of poverty. The theme of this summit, 'Attaining Energy, Water, and Food Security for All', is one of the most complex development issues we have ever faced. Solving this challenge is increasingly critical.

I will discuss the role of water management as a foundation to achieve food and energy security, and look at the interlinkages or nexus between water, food, and energy.

Water Security: The Foundation of Food and Energy Security

As we frequently see in the

daily headlines, water security matters far beyond its sectoral boundaries. In partnership with the Asia–Pacific Water Forum and regional research centres, ADB has developed a practical cross-cutting definition of water security.

'Societies enjoy water security when they successfully manage their water resources to satisfy household water and sanitation needs; support agriculture, industry and energy; sustain livable cities; maintain healthy rivers; and protect communities from floods and droughts'. However, ADB's Asian Water Development Outlook 2013 found that 36 out of 48 regional member countries in Asia and the Pacific, including India and the People's Republic of China, have poor water security. Some already face imminent water crises that threaten their food and energy security.

Water resource is finite. In many river basins, constructing new dams or pumping stations is no longer an option because the water is already fully utilized.

Choices have become tougher, the options more limited, and the timing more urgent.

The water-food-energy nexus highlights issues around these difficult decisions. River basin managers need to ensure efficient water use and carefully weigh the trade-offs between uses, such as agriculture, industry, and energy production. They must find ways to provide the right amount of water, of the right quality, where it is best used. For achieving this, improving access to better information; adopting transparent and inclusive decision processes; and investing in new technologies is required.

Water and Food

Now I would like to look at the nexus of water and food security more specifically. Demand for water in Asia is expected to skyrocket over the coming decades. And, as 80 per cent of water used is for agriculture, water shortages will directly lead to food shortages.

Against this backdrop, we must realize that food wasted is also water and energy wasted.

Maintaining food security is essential for sustaining economic advances and social stability. The recurrent spikes in food prices

since 2008 have been a sharp wake-up call. Both water and agricultural land are limited and, in many places, industrialization and urbanization are reducing availability for agriculture.

At the same time, new technologies are creating opportunities for farmers to use water more productively and achieve 'more crop per drop'. Support for research and knowledge sharing is increasing, irrigation control systems are being modernized. Adoption of advanced field techniques, such as drip irrigation and precision land levelling, are saving water. More efficient transport, market infrastructure and systems are helping to reduce food waste during distribution—and boost farmers' incomes. And more efficient 'field-to-plate' supply chains are being adopted to reduce loss of food after harvest. Perhaps in classrooms, especially in the advanced societies, we should more seriously teach our children the culture of not wasting food.

ADB's work with the Karnataka state government in the Krishna basin is a good example. An inclusive approach is combining participatory river basin planning and stronger policies with efforts

to modernize irrigation canals. Farmers are learning water saving techniques and forming water user associations. Millions of cubic metres of water will be saved and used to irrigate additional land, benefiting up to 1.5 million people.

Water and Energy

I will now turn to the second area—nexus of water and energy. Water is needed for energy. The anticipated dramatic escalation in our region's energy needs will squeeze already scarce water resources. At the same time, we must keep in mind that the energy is required for water uses too, such as for water pumping and treatment. Let us first look at water for energy.

Hydroelectric is an important source of power generation. Good practices in water management should be incorporated in hydropower projects. These good practices will ensure adequate flow to meet the needs of downstream communities, prevent river bank erosion, and protect river basins. ADB is also supporting run-of-the-river hydropower schemes without large dams, where appropriate, as they have fewer social and environmental impacts.

Contrary to the perception of many people, traditional

thermal power plants also require large quantities of water for cooling. ADB is investing in projects to improve water efficiency in generating thermal power. Existing power plants are being rehabilitated to capture cooling water, treat, and reuse it. Plants in Bangladesh provide a good example.

We must also consider energy for water in three key areas: agriculture, water utilities, and sanitation.

In agriculture, the availability of low-cost pumps and poor irrigation services has led many farmers to increase their reliance on groundwater. This has increased crop production and farmer incomes. But there are costs, most notably increased energy demand for pumping and unsustainable rates of groundwater use. To combat these trends, ADB is encouraging sustainable groundwater use through improved irrigation technologies. In the case of utilities, the energy used for pumping water makes up a large proportion of the cost of supplying municipal water. ADB is working with utilities to reduce water losses and also to introduce more energy-efficient motors. For example, ADB provided a grant

to improve energy efficiency in Ho JOHNMinh City's water supply system by upgrading the pumps. In India, ADB approved multi-year loans amounting to \$400 million for replacing outdated pumps and pipes of Kolkata water supply system.

For sanitation, ADB is working with sovereign and private clients to improve the efficiency of wastewater treatment processes. But, water treatment requires energy. Some 80 per cent of the region's wastewater presently receives little or no treatment. This causes widespread pollution. Treated wastewater is a valuable resource for maintaining river flows and for industrial and agricultural use—but requires energy. Our work with a private enterprise in the People's Republic of China provides an example of what can be done. Upgrading wastewater treatment plants will enable the reuse of 20 per cent of the country's wastewater by 2023.

Thinking Differently about Water, Food, and Energy Security

Let me turn now to my final topic, the importance of thinking differently about water security and its nexus with food and energy. I will make three points on how to

move forward. First, managing water resources independently by each sector must stop. As we will hear during this summit, different sectors have approached the water-food-energy nexus from their own perspective. The lack of a coordinated approach has led to a difficult situation.

Second, inappropriate pricing of water or energy, or both, provides perverse incentives. This has resulted in unrestricted growth in water demand, energy consumption, and inefficient water use. A clear example is the unsustainable over-extraction of groundwater due to subsidized energy prices for pumping. This practice threatens agricultural sustainability on large tracts of land and also disrupts power supply to other users. These distortions must disappear.

Third, we believe river basin organizations are a key to resolve competition between uses including, most importantly, food and energy production. ADB is working with basin organizations to facilitate basin planning, encourage collaborative water resources management, and develop human and institutional capacity to improve governance of water. Fresh institutional arrangements, better data

and information, innovative technologies, and updated skill-sets are being created. Through these actions, ADB is helping improve water security for over 400 million people in some 30 river basins.

In closing, I would like to emphasize that business-as-usual will not achieve water, food and energy security. We need to raise awareness

that food wasted is water and energy wasted. And that water wasted is often energy wasted. We need to think differently about water and its uses for food and energy production—and take action.

Attaining 'Energy, Water, and Food Security for All' is a difficult challenge. Many countries in the region are, or will soon be, facing difficult decisions about how to

ensure water, food, and energy security for their population. The challenges are about appropriate allocation, efficient use, investment for the future and innovation. Overcoming these challenges will call for leadership from the highest levels of governments and active participation of the private sector and communities.



Dr Yuan Tseh Lee

Nobel Laureate and President,
International Council for Science

“
We must lower both
population and
consumption growth.”

Keynote Address: Sustainable Transformation of Human Society

**Dr Yuan Tseh Lee, Nobel Laureate and President,
International Council for Science**

It is impossible to overstate the importance of the question at the heart of this Summit: How can we attain energy, water, and food security for all in a time of changing climate?

As mentioned by Mr Kofi Annan, Oxfam Foundation recently reported that the world's 85 richest individuals owned as much wealth as the poorest 3.5 billion. That's just shocking, when 1.3 billion people do not have electricity, and 2.5 billion live on less than \$2 a day. This level of inequality and poverty is unacceptable.

Everyone deserves to live a decent life secure in the basic necessities of energy, water, and food.

Unfortunately, there's a big complication. Even with billions in poverty, the rest of us are already consuming too much and overloading the earth.

You see, decades of scientific research show that our planet is a complex life-support system. Life exists on the earth only because this system functions and provides services.

But humans are seriously messing with the system.

Human impact on nature has exploded across the board—from deforestation to land-use degradation. And this pressure is seriously disrupting the system. The climate is warming, species and habitats are dying, disasters caused by extreme weather are intensifying. If this continues, at some point the earth's system might be unable to support human life, let alone human prosperity.

What does this mean for our hope to attain energy, water, and food security for all? It means that we must totally transform the way we develop. If we continue the current way of development, and gave nine billion people an American or European level of consumption, we will definitely destroy the earth. For everyone to live well on a limited planet, we must transform development.

But, what would this look like? Well, it should fulfil three conditions.

First, it must preserve a healthy planet. Last year, a group of top scientists led by David Griggs argued that 'Sustainable' development should be 'development that meets the needs of the present while safeguarding the earth's life-support system, on which the welfare of current and future generations depends.'

In other words, protecting the earth is not something nice to do once you get rich. It is the first, absolute and non-negotiable condition for human survival.

Second condition is that we must put a limit on growth.

Since the Brundtland Commission in 1987, we have had many definitions of sustainable development. But none of them ever addressed two critical factors: 'What do we mean by development? And what do we really need?'

One country pursues happiness with limited consumption, while another one wants luxury with unlimited consumption. Which one is development? Both?

How much energy do people need? A sleeping person can survive on 100 watts, continuously supplied. But the average American consumes a hundred times that, 10,000 watts. A project in Switzerland thinks everyone should be able to live well on 2,000 watts. Which is the right level of need?

You see, if we don't define 'development' and 'need', they can mean anything, like having big mansions, many cars, and buying new gadgets every year that could be development.

That could be what we need. And then our consumption explodes.

And it did. In the 20th century, global consumption of resources grew by eight times, as population grew by four times, and per capita consumption doubled. And in the human history, it is the first time we have started to pass beyond many planetary boundaries.

By 2050, experts project 9.6 billion humans. Many people say, 'Well, with improved diet and living standards, we'll just need to increase food production by 80 per cent, and double resources by 2050. The Green Revolution proved Malthus wrong. Science and Technology can work miracles.' I'm sorry, but that is unlikely to happen again. Science shows that climate change, especially with extreme weather events, will reduce resource availability, not increase it, because we are also damaging our ecosystem and living environment at the same time.

We live on a finite planet, where infinite growth is not possible. So as we transform development, we must put a limit on growth, especially population and consumption growth.

Back in 1994, 58 science academies from around the world met here in Delhi and

later issued a statement to make exactly this point. Then in 2012, before Rio+ 20, 105 academies issued exactly the same request. This is the second condition—lower both population and consumption growth.

The third condition is equity and justice. When humanity as a whole is consuming way too much, but three billion of them get almost nothing, something is seriously wrong. In such an unequal world, it's no wonder that people don't feel a sense of ownership of the earth.

For everyone to have a decent life on this limited earth, development must be equitable. This requires that the rich countries cut their consumption and emissions drastically. At the same time, the developing countries cannot follow the Western model of development. We must find new

ways. Gandhi once asked: 'For India to achieve Britain's standard of living, how many earths would it have to colonize?' Earth provides enough for everyman's need, but not every man's greed.

So this is the message I leave with you. If we wish to secure energy, water and food for all, but, still preserve our earth system, we must totally transform the way we develop.

Yes, the rich countries must cut back. But Asia, Africa, and all other regions need to develop, but must also shift to a new way of development. We all have to work together. The biggest threat we face is no longer from each other, the enemy is invading across the borders. It's our own unsustainability that is threatening all of us. This is a global crisis, and it demands global responses. I'm happy to say that the global

science community is already mobilizing with massive research efforts to produce useful knowledge and real solutions. One example is Future Earth. It's a global research programme that my organization, the International Council for Science, has initiated together with the International Social Science Council, the Belmont Forum, and UN agencies like UNESCO, UNEP, UNU, and WMO.

But it won't mean much unless we turned knowledge into real action. And we better do it soon. Science shows that if we don't turn away from unsustainable development in the next few years, it will be too late. How will future generations judge us then? For the sake of us all, let's start the transformation today!







**Plenaries/ Launches/
Special Sessions**

LEADERSHIP PANEL 1

The Demographic Challenge



HE Ms Tarja Halonen opened the discussion with the topic of the well-being of the people. She stressed on the notion that the people of the planet are accountable for it and that it needs to be seen whether they have the potential to behave responsibly. Noting that it has been 20 years since the famous Cairo Summit on International Conference on Population Development (ICPD) she spoke of the composition of human population in terms of gender.

Ms Halonen underscored the point that some cultures place a premium on men and



The idea that sustainability can be simple with more growth is questionable. Even more questionable are its consequences.



Lord John Prescott

CHAIR

Mr Nitin Desai Distinguished Fellow, The Energy and Resources Institute (TERI)

PANELISTS

HE Ms Tarja Halonen
Former President, Finland

HE Dr Bharrat Jagdeo
Former President, Guyana

HE Mr Göran Persson
Former Prime Minister, Sweden

Lord John Prescott
Former Deputy Prime Minister and Member of Parliament, House of Lords, UK



HE Mr Göran Persson

it is not sufficient to just accept this fact, more research should be undertaken to comprehend the reasons for such a bias. She advocated greater campaigning for gender equality as this would enable women to get education and become useful contributors to the society. Ms Halonen welcomed the idea of population growth but expressed an exigency in educating the girl child as this would help them avoid early and frequent pregnancies, which turns into a health concern for both the mother and the child.

The globe, according to Ms Halonen, does not comprise a homogenous texture of population, and it is necessary to study the different trends in demography. Noting that the North had a higher number of ageing population, she claimed it as a consequence of a superior healthcare system that enabled people to live longer. Yet, according to her, if the world sees greater longevity coupled with a smaller number of infants, the population as a whole would be categorized as 'ageing'.

Ms Halonen elucidated on her collaboration with the Former President of Mozambique, Mr Joaquim Chissano, regarding the formulation of guidelines for next year's ICPD, wherein sexual

and reproductive rights will be included in the Human Rights programme. She mentioned her other involvement, in the capacity of the UN Ambassador of Goodwill, of undertaking research in dryland areas. The thrust of this research will be to understand the role of women and study the food and energy issues in Sub-Saharan Africa.

HE Mr Bharrat Jagdeo explored with the audience the almost utopian question of whether there are some cultures that had reached equilibrium between their population and natural resources. He elaborated with the example of his own country Guyana which, according to his estimates, would probably not face a crisis involving population growth and stress on natural resources in the near future. He questioned the utility of tackling the problem of sustainability at the community level. He emphasized that this was a global issue and not limited to some countries alone. Tracing the demographic trends in the developing world, Mr Jagdeo felt that the growing needs of particular countries would not necessarily be met by their own natural resources but by that of others. For example, Asia's demand for food and water might be met by Latin America.



Expressing concern over previous attempts at making countries come to an agreement regarding climate change, Mr Bharrat Jagdeo suggested working towards a global framework on the issue. This global framework, according to him, would assess the true economic costs of natural resources in the production of consumables and propose a system of progressive taxation that would penalize an overuse of resources. He also suggested the introduction of a system of incentives that will align profit motive with good sustainable practices. He urged governments to start working on breakthrough technologies that will enable companies to manufacture more commodities with increased shelf life and with less and less of resources.

Another plausible solution that Mr Bharrat Jagdeo proposed was the opening up of the oceans. According to him, governments must try and invest in breakthrough technologies that would enable them to extract the vast underutilized mineral wealth at the bottom of the oceans without disturbing the marine ecosystem. He opined that in a democratic country it is not possible to contain population growth arithmetically. It was at this point that he was interrupted by Ms Halonen who added that it is a woman's prerogative to decide when and how many children she wants. In agreement with her, Mr Jagdeo continued with the argument of focusing on either increasing

resources or maximizing the utility of existing ones. He expressed apprehensions over these ideas remaining only aspirational, like the UN negotiations, he remarked tongue-in-cheek. He concluded by appreciating the efforts of the Global Green Growth Institute which is working on the same goals that he suggests.

HE Mr Goran Persson supported the UN negotiations but was sceptical of an immediate outcome. He spoke in favour of countries like India and China taking the lead in modernizing the society by using their resources in a more efficient way. Mr Persson expressed his apprehensions regarding the older, anachronistic, and more inefficient technologies.



HE Dr Bharrat Jagdeo



Lord John Prescott

He believes that those who take a step in the direction of employing newer technologies today will be the winners of tomorrow. He pressed for the need to start modernizing now and not wait for the United Nations to come up with a solution. The second tenor of his argument was demography. He spoke with passion of governments being able to feed 10 billion people only if they cooperate and the agricultural sector rapidly revamps itself. Mr Goran Persson voiced his concern over an ageing and diminishing population. According to him, in the coming decade, the disparity in the nature

of demography will only magnify, with the northern part of the globe ageing and the southern part still being youthful. Remarking that ageing countries have a tendency to turn inwards, Mr Persson feels that solidarity between the North and South will be difficult to maintain. He also emphasized on being watchful of the graying population in the South (countries in Asia, Africa, and Latin America) where the absence of quality healthcare and concrete pension systems will put immense pressure upon the society.

Economic growth is not to be feared according to Mr Persson, it is the lack of it which is dangerous. He emphasized that the youth of the globe will be the driving force for economic growth and it is for them we must plan.

Lord Prescott began by emphatically declaring his support for economic growth yet in the same breath voiced his apprehensions on how it is achieved and distributed, and its consequences. He criticized the Davos Summit for not delving deeper into the problem of climate change and suggesting tangible ways of combating its effects. The much publicized 'trickle-down' theory invited Lord Prescott's displeasure,



who pointed out the increasing inequality of global wealth. This argument he supported with reports of one billion people being undernourished and another two billion being overweight. He criticized the global trend of destroying vast amounts of edible produce and at the same time setting up of food banks for the unemployed. Lord Prescott expressed his dismay at the high mortality rate in the developing world and felt that the real problem lay not in the production but distribution aspects. He called for people to bring about a change in their conventional values and beliefs. He faulted governments for wasting time on wars and urged them to focus on the

urgent issue of world hunger and deprivation. He strongly urged for the inclusion of the provision of food and water to everyone in the Millennium Development Goals of the United Nations. He lamented the lack of power and importance given to the UN.

He presented to the audience the agreement reached in the Council of Europe against the wastage of food. Lord Prescott reiterated the goal discussed in the Kyoto negotiations of finding an agreement on Climate Change by 2015. He is of the opinion that acquisition of land for biofuels instead of food is a miscalculation as also is the fixing of prices. He concluded by declaring the main issues to be of good governance and climate change.

MINISTERIAL SESSION 1

Ensuring and Expanding Access to Energy, Water, and Food



The discussions in the session focused around the core issue, 'Ensuring global access to energy, water, and food'. The session was chaired by Ambassador C Dasgupta, who displayed sincere optimism in believing that this century will see humankind liberate itself from the shackles of mass poverty. The achievement of this milestone, according to Ambassador Dasgupta, critically depends on access to clean energy. In order to show the way to achieving clean energy, he invited the distinguished speakers to present their views.

The panelists in the session deliberated on viewpoints that were highly divergent in terms of financial strength and problems being faced by individual countries. HRH Prince Mostapha



HRH Prince Mostapha Zaher

CHAIR

Ambassador C Dasgupta

Distinguished Fellow, TERI

PANELISTS

HRH Prince Mostapha Zaher

Director-General, National Environmental Protection Agency, Afghanistan

HE Mr Juhan Parts

Minister of Economic Affairs and Communications, Estonia

HE Mr Belete Tafere Desta

Minister of Environment and Forest, Ethiopia

Mr Heherson T Alvarez

Commissioner, Climate Change Commission, Philippines

HE Mr Marcin Korolec

Secretary of State, Government Plenipotentiary for Climate Policy and President of COP19/CMP9, Poland

Hon'ble Prof. Silas Lwakabamba

Minister of Infrastructure, Rwanda

The Rt Hon'ble Gregory Barker

Minister of State for Energy and Climate Change, UK

Mr John Bryson

Former Secretary of Commerce, USA



HE Mr Juhan Parts

Zaher spoke of the dire need to attain energy, water, and food security for all. He implored governments and international collaborations to take concrete steps in achieving sustainable development. Speaking about the widespread impoverishment of the South Asian population, he expressed optimism in DSDS 2014 finding some solutions to the problem. HRH Mostapha Zaher outlined equitable access to energy, water, and food as the top priorities for the South Asian region and the world as a whole. According to him the basic impediment in development is the limited access to energy. Taking up the case of the SAARC nations, HRH Mostapha Zaher highlighted the plight of about 30 per cent of the population that lives without electricity. He urged for rapid remedial action to combat this situation. He spoke of the vitality of water and the fact that this natural resource has become a source of conflict between nations today. He blamed the SAARC member countries for their failure to conserve water, resulting in shortages and increased top soil erosion that in turn causes natural disasters. HRH Mostapha Zaher lamented the shrinking livelihoods of people due to severe

contamination of rivers and other hydro-ecosystems. Citing the presence of one of the highest cryospheric reserves in the world in his country Afghanistan, he called for effective partnership and collaboration among the SAARC regions to preserve them, as any disruption on the mountain tops can result in catastrophic consequences for the people living in the plains. Calling it an impact of climate change, HRH Mostapha Zaher enumerated a list of disasters that have hit various parts of the globe. He denounced the critics of climate change and suggested the launch of a realistic and practical sustainable development vision to combat the phenomenon. Among the other things he proposes are: realistic and implementable master plan for water, energy, and food security; community public and private partnership; energy security needs to be highlighted and better forest management. HRH Mostapha Zaher hailed technology as a game changer in the effort to minimize the effects of climate change. He argued for liberal use of technology in delivering solutions. He called for the using of SAARC, United Nations Framework Convention on Climate Change (UNFCCC),



Convention on Biological Diversity (CBD), United Nations Convention to Combat Desertification (UNCCD) and other forums in order to tackle the changing climatic scenario.

HE Mr Juhan Parts laid emphasis on the exploration and development of unconventional resources, along with comprehensive utilization of existing communication technology, in order to meet the growing needs of the planet. He elucidated the recent rise of unconventional resources and how they might become the mainstream in the near future. He suggested that they could bridge the gap between the global demand and supply of oil. Mr Parts appreciated the recent qualitative leap in technology that has resulted in unconventional and renewable energy resources becoming commercially viable. He proposed the transfer of technology instead of raw materials around the world. Citing the example of his country Estonia, which has been using oil shale for the production of electricity and heat, he recommended that India too explore its unconventional and renewable reserves. This, according to him, will boost self-sufficiency and decrease

dependence on imports. Mr Parts compared the resource wealth of India with Estonia and urged governments to improve technology for achieving greater efficiency. Continuing with the example of Estonia, Mr Parts added that the use of renewable resources, particularly biomass, had complemented the energy supply in his country. He urged governments to invest in research and development in wind, solar, fuel cell, electrolyte, and computer-based energy management systems that will enable them to cut down on their carbon emissions. Anticipating a further increase in global energy demand by 2030, he supported the idea of developing new resources by means of technological advancement.

HE Mr Belete Tafere Desta spoke of the stunted development of Africa due to its colonial past. He, however, pointed out the advantageous position of Africa in embarking upon an accelerated path of development while avoiding the mistakes made by others. He informed the audience of the intent of African leaders to focus on green growth.

Mr Desta favoured the exploitation of the abundant natural resources such as wind, solar, hydro, and geothermal.



Mr Heherson Alvarez

Giving the example of the interconnecting electric grid system present in Ethiopia, Mr Desta proposed a similar system for other regions as well. He suggested the coordination and cooperation of countries to ensure water security. He visualized energy security in Africa coming about through appropriate infrastructure development and generous international collaboration. Mr Desta deplored the past agricultural malpractices, which coupled with extreme climatic conditions in some places, have rendered vast tracts of land uncultivable. He informed the audience of the successful rehabilitation and restoration of landscapes achieved in Ethiopia by mobilizing limited resources and harnessing the enterprise of its populace. He laid stress on weaving a system of interconnected energy web that will ensure energy security to the continent.

Mr Heherson Alvarez presented to the audience the case study of the Philippines. In context to the super typhoon Haiyan that ravaged the archipelagic nation in November last year, Mr Alvarez brought out the plight of the Filipino people. Estimating the damage caused

by the typhoon to be around 85 million dollars, he thanked world leaders for the humanitarian aid extended to his nation. He expressed concern about the vulnerability of Philippines to the havoc of global warming and climate change. Mr Alvarez elaborated on the availability of several natural resources in the Philippines and saw technological barriers as the greatest hindrance in realizing their optimal potential. He added that technological and financial barriers could be surmounted through creative and determined policies. He labelled the use of fossil fuels as the greatest barrier to sustainable development as coal and petroleum remain the cheapest energy sources in the market today. Singling out coal and oil processing plants as the largest sources of carbon emissions, Mr Alvarez projected a gloomy future for the Philippines as their dependence on fossil fuels is expected to rise. He blamed policy-makers for the subsidy on coal and other fossil fuels, terming the economic policy on coal a formidable political and psychological barrier. He called for sustained efforts and determined policy changes from the world leaders in order to



HE Mr Marcin Korolec

change the future of the planet.

HE Mr Marcin Korolec, taking a cue from his last year's speech where he outlined the three major needs and rights of humans to be that of energy, water, and food security, added yet another dimension—the right to develop and improve living standards. With the projected population rise in the coming years, Mr Korolec reminded everyone of our dependence on natural resources for economic development thus making it imperative that we use them in a sustainable manner. He stressed the desirability of monitoring of the environmental integrity of all human actions.

Mr Korolec spoke of the significant strides made by Poland in the last 25 years and attributed their reduced greenhouse gas emissions to the adoption of latest technologies. He advocated for letting every country develop but reminded them of the changing climatic conditions and that they must adapt. Terming sustainable development a global goal, he urged all countries to contribute towards it through bold actions. Mr Korolec spoke of the success gained by Poland in reducing environmental impact through 'Eco Fees' that has been driving

technological innovation and striving for energy efficiency. He elaborated on the achievements of the Warsaw Climate Change Conference held in November 2013 and aspired for an even better outcome from the next summit scheduled to be held in Paris. He showed confidence in the climate negotiations and hoped for a speedy drafting of legal text for an agreement binding on all countries. He concluded on an optimistic note urging world leaders, policy-makers, and business heads to work towards ensuring a cleaner, healthier, and self-sustaining planet.

Hon'ble Prof. Silas Lwakabamba presented a gloomy picture of the availability of food, clean water, and electricity in many parts of the world. According to him, addressing this issue is not only a human necessity but also an economic imperative. He drew the audience's attention to the plight of many families who have to wander in search of wood for their cooking needs. Lack of access to electricity, maintains Prof. Lwakabamba rightly, also kills their chances of acquiring education. He opined that such degrading circumstances are unacceptable in the 21st century. Prof. Lwakabamba outlined the



Prof. Silas Lwakabamba



The Rt Hon'ble Gregory Barker

ambitious and laudable plan of Rwanda to provide electricity to 70 per cent and clean drinking water to 100 per cent of its population by 2018. He recounted the inspiring story of William Kamkwamba from Malawi who built windmills for his village. He praised the efforts of this young man and urged people to support such promising individuals. Speaking of Africa, he emphasized the resource wealth of the continent and called for cumulative efforts of governments, development agencies, and the private sector in order to tackle the problem of inadequacy. He spoke with conviction about the ingenuity of human nature and encouraged one and all to act.

The Rt Hon'ble Mr Gregory Barker espoused the cause of incorporating sustainable development in economic growth, given the expected rise in human population in the coming years. He argued for the commercial viability of sustainable development and reproved the disinterested populace for their inaction. He stated emphatically that in recent years the economics of sustainability has transformed, with resource efficiency taking place. He challenged the widespread notion that resource

efficient businesses cannot withstand competition. Mr Barker underscored a positive trend that has emerged in the new millennium—quick reduction of global poverty but at the same time cautioned that this would increase pressure on the already scarce resources. Therefore, according to Mr Barker, the time to act is now and this is not a matter to be relegated to the backburner. He hoped for a positive outcome of DSDS 2014. Expressing satisfaction at the dispelling of the myth that growth and environmentally responsible efficiency cannot go hand in hand, Mr Barker highlighted his experience in Britain and came up with some important points. Firstly, he advocated the prudent utilization of the finite and increasingly expensive resources. Secondly, he called for a radical shift in the traditional meaning of green model growth. Simply doing existing things better will not suffice, what is required is innovation. By creating new products, companies also create new markets and jobs which contribute to growth. His final observation was that in order to achieve all this, collective effort between countries is imperative. He called for pooling of



Mr John Bryson



expertise, enhancing international collaboration and forging joint research initiatives in order to strengthen businesses. Rt Hon Mr Gregory Barker spoke of the traditional cooperation between the United Kingdom and India and that they can impart their expertise to the rest of the world. He referred to the involvement of the Prime Minister of UK, Mr David Cameron, in the high level panel of post-2015 development agenda and that their report envisioned a world without poverty brought about through sustainable development.

Mr John Bryson appreciated the thoughts presented by all the speakers. He appreciated TERI particularly for correctly focusing on food and water as

critical issues and pointed out the criticality of water to energy generation.

He asserted the need for addressing climate change as all talk of ensuring food and water security will be rendered meaningless in its absence. Mr Bryson lauded the micro-level experiments being conducted by CALTECH in the area of artificial photosynthesis. According to him this mechanism, if successful on a large scale, could eliminate our dependence on fossil fuels. He opined that generating energy directly from sunlight could well be the next big thing for the planet. He called for global cooperation and collaboration on this issue.



To ensure security of water upstream and downstream, countries and local communities have to coordinate their use of water.”

Mr Heherson T Alvarez

India–California Air Pollution Mitigation Programme (ICAMP) Statement for DSDS



The University of California, San Diego (UCSD), California Air Resource Board (CARB), and The Energy and Resources Institute (TERI) put together the India–California Air Pollution Mitigation Programme (ICAMP) to use learnings from California to mitigate vehicular emissions and improve air quality in

Indian cities. This programme focused on the transport sector and explores as to how best pollutants emitted by vehicles can be reduced through better understanding of the science, appropriate use of available off-the-shelf technologies, and better governance. The Californian experience has demonstrated

that the technology to cut these pollutants is available. Between 1968 and 2008, California reduced emissions of ozone precursor gases (CO, NO_x, and SO₂) by 75–90 per cent and cut its black carbon emissions by 90 per cent while its population increased by 100 per cent, the number of vehicles increased

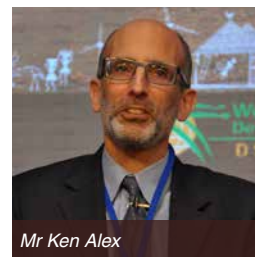
by 175 per cent, and its diesel consumption as well as miles travelled increased by 225 per cent. India has a great opportunity to benefit from the improvement in the transportation sector demonstrated by California and leapfrog to sustainable transportation by adopting the holistic path of AVOID, SHIFT, and IMPROVE.

The first meeting of ICAMP was held in October 2013 in Oakland, California wherein the Californian and Indian delegations had wide-ranging discussions on issues of air quality, vehicular emissions, and urban mobility. Based on the discussions and further research carried out, the group came up with a Knowledge Action Plan (KAP) consisting of specific sections on scientific knowledge, technological options, and issues related to governance in the sector that need to be addressed to mitigate vehicular emissions

in India. In order to discuss the document and come up with an action agenda, a Policy Conclave was organized during February 4–5, 2014 at Hotel Taj Palace, New Delhi.

The meeting was attended by stakeholders from Central and State governments, oil and automobile industry, NGOs, and academia. The delegation from the US comprised officials from the Office of the Governor of California, scientists, and regulators. The issue of advancement of fuel quality and vehicular emission standards was debated and useful insights were gained.

Based on the KAP and the deliberations that took place in the two-day conclave, ICAMP group proposes to come up with an Action Agenda consisting of recommendations to the Government for control of vehicular emissions in India.



Mr Ken Alex



Mr Achim Steiner



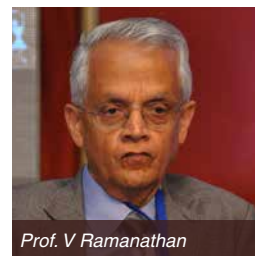
Mr I H Rehman



Mr Phil Marker



Prof. Pradeep K Khosla



Prof. V Ramanathan

Re-thinking Development



Climate is a challenge for innovation, so is biodiversity, so are other environmental issues . . . so let's change the paradigm to serve this partnership better. ”

Prof. Dr Pavel Kabat
Director, International Institute for Applied Systems Analysis



L–R: Dr Pradeep K Khosla, Mr Hideaki Domichi, Dr Kandeh K Yumkella, Dr Ajay Mathur, Mr Achim Steiner, Dr Ines Dombrowsky, Prof. Pavel Kabat, and Prof. Luigi Paganetto

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Prof. Dr Pavel Kabat

Director-General and CEO,
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The session on 'Re-thinking Development' opened with the United Nations Under Secretary-General and Executive Director, United Nations Environment Programme (UNEP), Mr Achim Steiner arguing for the suitability of 're-thinking development', given the current world situation. He presented the dichotomous scenario binding the world today where the path of intensifying production is still seen as the road to development, that the strain on the already precarious natural resources it puts is often ignored. He spoke of the threat of geopolitical Darwinism consuming the smaller countries and claimed that this fear is shared by world leaders, which is why they are working towards developing sustainable development goals. He delineated the two cardinal concepts associated with sustainable development goals—universality and integration and decried the traditional concept of 'trickle-down development'. He argued for sustainability being at the heart of development and not just a response mechanism. He added that this is what the world's leading agencies are also realizing and working towards.

Taking a leaf out of Mr Kofi Annan's address, Mr Steiner

stressed on the need for valuing the ecosystems and biodiversity, thereby making them 'visible' in our scheme of things. He spoke of valuing human health over trivial economic issues as was the case with the use of lead some years ago. According to him, the main hurdle in making a transition to a cleaner habitat is the existence of a powerful lobby that questions the financial and economic viability of this transition. Mr Steiner proposed a recalibration in the way economies value goods, services, and technologies. Terming sustainable development goals a planetary issue, he called for massive global cooperation in terms of expertise and finance as no government is single-handedly capable of transiting itself and others. He takes into consideration the argument of financial institutions, regulators, rating agencies, etc., questioning the economic viability of this transition but at the same time expresses optimism in finding a way by which this can be accomplished. The thrust would be to incentivize the private sector and redefine economics. He ended by underlining the need to recalibrate world economies and taxation systems in order



to grant a better future to the global community.

Dr Kandeh K Yumkella spelt out the theme of his address as 'Powering the Third Industrial Revolution'. He presented the audience with facts of future projections involving the increase in world consumption levels owing to an increase in the middle class. Given these facts, Dr Yumkella expressed an urgency in ushering in the intended revolution. His concern, however, is on the question of producing energy for this revolution, something for which he took the help of Jeremy Rifkin's hypothesis of distributive decentralized power systems. According to him, decentralized renewable energy along with the digital revolution could create an energy internet that can help avoid the energy crisis in the world. He spoke of the joint initiative launched by the United Nations and The World Bank to attain sustainable energy for all. It aims to achieve universal access to energy by 2030, double the annual rate of energy efficiency and double the share of renewables. Citing public policies as the main hurdle in tapping newer technologies, Dr Yumkella urged world leaders and financiers to look at innovation

as a business opportunity and not a liability.

In order to mobilize resources for global partnerships as suggested by Mr Steiner, Dr Yumkella suggested the formation of three coalitions: (i) Coalition to reduce the cost of renewables, which could include the G8 countries partnering with research institutions to drive down the cost of solar energy; (ii) Coalition for energy efficiency, which could include 23 of the highest polluters in the world to strive towards energy efficient pathways; and (iii) Coalition of the progressives, a multicultural, cross-issue coalition of individuals and organizations united for economic and environmental justice, and to challenge the status quo. This would include developing nations such as China, India, and Brazil to forge a partnership with Norway and Germany in order to leapfrog on the clean energy front with the help of renewables. With these three grand coalitions, Dr Yumkella proposed the creation of a powerful energy internet that could eliminate energy poverty in the world.

The central theme of Ms Ines Dombrowsky's remarks was to ponder over the lessons drawn from the energy process.



Dr Kandeh K Yumkella



Dr Ines Dombrowsky

The first lesson according to her was of broadening the agenda to include environment. She was in favour of setting targets that reflected planetary boundaries. She expressed hope in an emerging consensus between the environment and development communities. The second lesson that she gave was the need for a participatory process involving universal goals that would be embraced by the developing countries as well. Ms Dombrowsky outlined her third and final lesson as the desirability of having a limited set of inspirational goals and measurable targets. She, however, cautioned against the hurdles in achieving these as being the ever challenging task of what to prioritize. She concluded by highlighting the role of the Indo-German expert committee, of which she is a member, in undertaking this difficult journey.

Mr Hideaki Domichi picked the parameters of demography and presented the notion of region-specific solutions to solving energy problems. In terms of the Millennium Development Goals, he favoured the allocation of specific goals and targets that would be suitable and achievable by different regions. He enumerated several global agendas, such as

food, water, and energy security along with universal health coverage but expressed his disagreement with setting identical goals for all regions. He argued for region specificity while setting goals. Taking into cognizance the inevitability of population growth and a further stress on the environment, he chose to focus more on growth and its capacity to address these issues rather than living in a scenario with no growth. He praised India and its efforts to achieve environmentally sustainable growth. With respect to energy, Mr Domichi directed his remarks towards energy efficiency rather than renewables. Energy efficiency, according to him, holds the key to solving many energy related problems as has been demonstrated by Japan. He envisaged a much greater role for India in the world arena and advised leaders and policy-makers to surge ahead with a positive approach.

Prof. Pavel Kabat, with the help of many years of research in the domain of interconnectivity, elected to share five key principles which he believed were needed to progress towards sustainable development, the first being forging new partnerships. Prof. Kabat argued for getting



Mr Hideaki Domichi



Prof. Dr Pavel Kabat

the top academia, businesses, governments, and civil society together in order to create new think tanks and reach effective conclusions. The second key principle that he talked about was of altering narratives that deal with the climate issue in terms of a threat. Terming the projection of the future as a threat is erroneous according to him and that efforts must be made to change it into a positive prospect by highlighting innovation. As the third key principle, Prof. Kabat spoke of energy in terms of equality and how the focus should be to achieve efficiency and utilizing renewables. He advocated the cause of thinking and acting cross-sectorally as it can lead to huge savings in the overall cost of the measures. His fourth principle dealt with the money issue. According to him, there is no dearth of money in the world, the real problem lay in its usage. Prof. Kabat urged people to invest in end-of-the-pipe solutions rather than at the beginning. Another aspect that he touched upon was the under-utilization of new technologies that are waiting for investors. The last principle that Prof. Kabat spoke of was of interconnectivity. His argument was that there were no more local solutions that were

not connected. He elaborated this with the example of shale gas revolution that is waiting to explode on the global stage. A small transition to shale gas could have many repercussions around the world including the altering of geopolitical equations.

Dr Pradeep Khosla talked about the Millennium Development Goals and questioned the availability of resources and conditions required to fulfil them. He expressed conviction in the absence of these conditions. He maintained that development corresponded with wealth creation and wealth creation is the only way to alleviate global poverty and that mere redistribution of wealth would not suffice. He buttressed his argument by advocating investment in research to generate enough energy to propel development. He lamented the lack of research initiatives undertaken by countries with limited applicability and called for every country to create a research portfolio in order to eradicate world poverty.

Prof. Luigi Paganetto sought to redefine poverty as the fulcrum of re-thinking development. Poverty entails lack of opportunity and this according to Prof. Paganetto is the reason





for the disparity in knowledge seen between the developed and developing nations. He criticized some development policies for being anti-poor and questioned growth as being the only path for poverty reduction. He explained with

the help of graphs how world policies would fail in achieving global poverty alleviation owing to regional variations. He elaborated on the different trends in poverty worldwide and attributed several reasons for their existence thereby proving

the difficulty in assessing the outcomes of the Millennium Development Goals. He argued, primarily, to revisit the nomenclature and definition of poverty before trying to formulate policies that will otherwise not yield the desired outcomes.

How can Businesses Help Attain Energy, Water, and Food Security



L–R: Dr Zubin Varghese, Mr Onno Rühl, Ms Tomoyo Nonaka, Mr Vikram Singh Mehta, Mr John A Beed, Mr Assaad Razzouk, and Dr Shiv Someshwar

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Group Chief Executive Officer,
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Dr Zubin Varghese

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'The issue of energy, water and food security is a definitional issue,' Vikram Mehta averred as he opened the discussion. He said there are many ways by which one can address or talk about this subject. Questioning whether energy, water, food commodities, and public utilities constitute basic human rights, he opined that depending on the definition one takes, one can offer suitable solutions as well. If it's a commodity, for example, the market could be the most effective way of addressing the issue. He discussed how all of us have been witness to the fact that the market does not have the appropriate mechanism through which this particular issue needs to be looked at.

Businesses have a lot of questions to ask themselves. What is it that they can do in terms of best practices? Can they offer positive solutions? Can they actually alter their institutions to look at this subject holistically? Do they actually understand the externalities associated with their operations? Very few people seem to understand that it takes 9,200 litres of water to make one litre of diesel, 4,200 litres of water to make one litre of biodiesel... so, these are some of the questions

that businesses have to ask themselves if they want to really offer positive and constructive solutions to this critical problem confronting the world.

Dr Shiv Someshwar asked to help frame what is the context of energy, water, and food security that we want businesses to enter and do well in, not only for themselves but also for the society. There are no silver bullets or sure shot answers, he said, rather there are ten other broad issues that the water, energy, and food security efforts have in common.

Diversity of risks from natural disasters and climate, trade risks, and market risks when businesses, civil society and governments are involved, all these kinds of risks are present. They play out across very different agro-economic and socio-administrative diversity regimes. Secondly, there are cross-scale interactions from the farm or village upwards to nation-states, cross-border issues that cannot be ignored or avoided. There is no scope for spatial leapfrogging, as in the case of the IT technical revolution. These efforts are very capital intensive, they require a lot of capital to get said that USAID up-and-running. Many of them



have protected IPRs that result in higher costs for users. And for the right reasons. IPRs have a certain cost associated with them, so they do not come cheap irrespective of what the policy-makers promise in countless negotiations. Being in the public domain, one cannot talk about either completely state-led or completely unfettered markets, or even unfettered civil society institutions. There needs to be a judicious mix. Increasing efforts towards scientific precision through modelling is not a very positive move, there needs to be a more heuristic understanding.

There is also the case that some influential NGOs control or influence which technologies can be selected, which stakeholders to work with, infrastructure choice, etc. All the efforts towards energy, water, and food security are all led by governments and institutions that work within well defined silos, marked by fierce turf protection.

Given all these dimensions, it is a very difficult terrain to work in. These issues impact in varying combinations that result in cascades marked by uncertainty. Uncertainties in risks, costs, and outcomes are something that businesses, for that matter any institution, cannot handle easily. It is necessary to understand

the nature of these uncertainties. Even though we cannot actually reduce these uncertainties, but we can certainly understand them. Therefore, this is not a situation where the private sector may go boldly.

There is a practical need for partnerships between state, market, and civil society. The Sustainable Development Solutions Network is a global initiative, recently initiated at the request of the UN Secretary-General Ban Ki-moon and led by Prof. Jeffrey Sachs. It is designed to take on these challenges in a very practical sense; to bring the best science, engage scientific and academic communities to help deliver sustainable development, both nationally and internationally.

Dr Zubin Varghese discussed the two things which businesses can offer for sustainable progress: one being technology and the other services. He highlighted many examples from India of what Ingersoll Rand has done. One of their products in India is refrigerators for fruits and vegetables. Almost 40 per cent of the fruits and vegetables produced in India go waste. It has developed solutions which have facilitated the refrigerated



Mr Onno Rühl



Dr Shiv Someshwar

transport of fruits and vegetables from farm to fork. Technology developed in the West cannot be directly applied in India. It needs to be localized, which involves a lot of work, before it can be applied here. It took them nearly four years to perfect the refrigerated transport technology for use in India.

He explained how technology, services, and other aspects of value addition cannot be done by businesses alone, they need partners. Businesses can develop the technology and services but to get the technology to the right people at the right time requires partnership with government, policy-makers, NGOs, etc. Through partnership and innovation, businesses can really contribute to sustainability.

Mr Assaad Razzouk feels that business is not going to help attain energy, water, and food security going by current trends. Sustainability becoming a part of the DNA of companies has to be enforced, with the exception of a few outliers.

Over the last few years, there has been a breakdown in governance. While we know this is a huge problem, our actions are only increasing the size of the problem. Top-down policies

have not really worked. The long UN negotiating process has not really delivered any results in terms of what is needed, which is a decrease in emissions below a certain level. National policies are not successful either. He explained how in India 27 per cent of its land is already affected by climate change, it is suffering from sea-level rise, land erosion, droughts, precipitation problems, etc. yet India spends approximately 140 billion dollars with external costs per year on fossil fuel subsidies. And based on recent media reports, the fossil fuel subsidies have been increased. India and China are embarking on building approximately 800 coal-fired power plants with the help of the banking sector as well as the MDBs. Coal locks up that infrastructure for 50 years. And India is already on the frontline of suffering from adverse effects of climate change. This topic, therefore, appears to be rather 'schizophrenic', commented Mr Assaad Razzouk.

He further stated that governments are not delivering on solutions and neither are businesses. Businesses are designed to go after the marginal dollar and play within a set of rules. They are not designed to



save the world of their own volition. Nobody in business is actually paid to do that and, as a matter of fact, most people would lose their jobs if they did so. Civil society is not delivering either. The climate change movement, so to speak, has not been as effective as the HIV/AIDS movement, for example, in effecting fundamental change and getting results.

This leaves two constituencies on which, in his view, the focus is going to be and from which the change is going to come in the next five years. The first one is the judicial system, and the second one is the investors. Investors manage 70 trillion dollars in assets. Around 22 trillion of this is already in investor groupings for social and responsible investing. And the key is to get the two to interact in a way that would actually force change down the line. Business values money, it is ever willing to do the latter's bidding. If the 70 trillion dollars tells business to jump, business will obey. After that, private capital will flow in and that will solve 80 per cent of the problem. He believes that 80 per cent of the huge amount of money that goes into climate finance is actually private sector money, not public sector money. So the public sector can

only enable but it cannot finish the job. Over the next five years, we are likely to see an increasing emergence of a recurring theme, which is that 'fighting climate change is a human right'. There is an increasing trend in looking to find a way through which human rights law is applied to get an acceptable result on climate change. The question then is, what obligations follow when our rights are effectively violated and how do we increase compliance? He emphasized that all must keep in mind that most climate change effects are induced by humans. Only 90 companies account for pretty much all of the greenhouse gas emissions, all of which are oil, gas, coal, and cement companies.

Mr John Beed discussed how at USAID they see the engagement of business on these core development challenges—energy, water, and food security—as not only highly relevant and important but really increasingly at the centre of what we are trying to accomplish. He further elaborated how the known growth really comes from the private sector. It's the engine of job creation and of economic growth virtually in every country. But increasingly, the private sector companies/businesses have become highly

influential actors and drivers of sustainable development and progress. He discussed that just thirty years ago, of the flow of resources to the developing world and to development concerns, 80 per cent came from official sources, donors, and public institutions. That's changed completely, and now 80 per cent of it comes from private inflows of capital. It is kind of in rhetoric and in terms of major thinking when we look at the World Economic Forum in Davos, the major news is not necessarily made by governments or by foundations but by companies that are interested in making sustainable investments in development. And it's not just a question of corporate social responsibility as we see it. We are increasingly interested in where we see an intersection of interests between a business's core strategic interest in growth or market development and where that clearly intersects with our own interests in human development. He explained how one can innately see those overlaps, and have seen those examples. If you are a big ICT company and you are interested in your next generation of clients, that clearly drives you to take an interest in technology and access to quality education.

Focusing on the themes, he said that it is clearly in the interest of beverage companies to have access to clean water. And certainly for food security and agro-business concerns that is a very important intersection of interests, which has led to some very important partnerships for them. He highlighted that over the last twelve years, USAID has really put an emphasis on these kinds of public-private sector undertakings, have entered into a number of such alliances, not just with US companies and multinationals but also with firms in the countries where they are investing and operating. In India, he pointed out, there is a great opportunity to build on these kinds of public-private undertakings because of the richness and the dynamism of the private sector in the country. He said that USAID has really made this the centrepiece of their new approach here in India, where it means engaging with the private sector and trying to tap into what has been for a while a deep vein of philanthropic commitment on the part of a lot of companies here who have been investing in social programmes. He gave some examples of how concretely that played out on their clean

energy programme. They helped support a partnership between a Karnataka state public utility and an energy services company that led to 40 per cent energy savings through the installation of more efficient water pumps. In agriculture, USAID saw an opportunity not only to make an impact in India but in also taking Indian innovation, expertise, and models to have development impact in other parts of the world, whether it's Afghanistan, Sub-Saharan Africa or Asia. In the energy sector, USAID is looking at the formation of a public-private alliance to help connect more people to the power grid in India.

Looking at a more global scale, Mr Assaad Razzouk mentioned may be one of the best examples of multi-sector stakeholder commitment and the success brought about in the HIV/AIDS area. Here in India, clearly some of the amazing advances in development, whether it's polio, the Green Revolution, or access to education have really been a function of the public and private sector coming together. He ended by saying that it is apparent that the public sector cannot ignore the private sector, and the private sector cannot ignore the government. A development

agency cannot afford to ignore either and they really see it as their core mission to try to serve as a bridge between the sectors to have the kind of impact we are all aiming for.

Mr Onno Ruhl said the question is how can businesses help support energy, water, and food security. Focusing on this he put up two questions: one is, what influences businesses, and the second, what we expect from them. Business gets influenced by the market which in turn gets influenced by regulation. He felt that depending on the different roles in the economy, the three important aspects that are required are innovation, implementation, and scale up. We as consumers usually exercise a demand that goes against the objective that we are trying to achieve. And we do that individually. So the question is how can we change that? We need regulators for this very purpose. He quoted an example that he had mentioned at another event, about phasing out CFCs in refrigerators. The government simply mandated that in ten years it needs to be done and it was done. Businesses found a way to adjust and innovate. Innovation is absolutely important for that. If businesses are given a clear

incentive to innovate, they can and will. If car emission standards change, emission levels change. If car fuel consumption standards change, car companies find a way to adapt. If you don't change standards, people do things like selling patio heaters, which means you are literally trying to heat up the earth without any other significant benefit. He emphasized that it is very important to think through how business can be influenced as he is hopeful of the positive impact that business can have, given the right incentives. The problem is so severe we are getting further away from the goal every day, that there is actually a good case for regulation. There's also a good case for consumer pressure and consumer behaviour changing, which is much more difficult but awareness generation really can work. If the number of the litres of water per litre of diesel of production got repeated relentlessly on TV every day, it might actually influence what we do and that might in turn influence what businesses do. He discussed how finance is often seen as the way to get this kind of influence—'if only banks enforced this' Banks have no different incentives than businesses and consumers.

So to assume that banks would do this is not a good assumption. Now, coming to scale up, once an idea is there, finance can actually play a role in achieving scale up. Perhaps the second most commonly used electrical appliance in Indian homes is a ceiling fan. It is actually possible today to make a ceiling fan that is three times more energy efficient than a normal one. It is just that no business has yet seen the incentive to find a way to produce it at scale and the same cost of the current fan. He said they are working with the Bureau of Energy Efficiency to actually incentivize companies to bid for a time-bound subsidy that will help them get to that goal. So they can bid for the lowest subsidy over a three- or five-year period, and the goal is to get to market parity with one-third of the energy consumption, then the subsidy can be withdrawn. For scale up, subsidy or finance can be an effective instrument.

Ms Tomoyo Nonaka opened her address by explaining the evolution of the Earth. Referring to planet Earth as 'Gaia', she said that we recognize this planet as having homeostasis, it's a living, self-regulating organism. This is not a spiritual concept but a purely scientifically proven

principle. Just like our body, it has some homeostasis mechanisms in that it can repair and regulate itself. Referring to a couple of PowerPoint presentations, Ms Tomoyo Nonaka chose to question the very existence of human beings on Earth and whether it was a superior power, i.e. God that has allowed the human race to survive for so long.

She further added that in the 20th century, priority was more towards economic results and less importance was given to environmental impact, leading to high profits and environmental burden. As long as businesses made profits, everything seemed perfect. However, towards the end of the 20th century, businesses realized they needed to be socially responsible and began undertaking CSR initiatives. For the 21st century to chart a new future, the goal should be to do good for the Gaia—greater contribution towards the environment and society—then the money will follow. Calling it the Gaia Competency Management, she mentioned that there is a shift from two dimensions of profit and efficiency (Return on Investment) to three dimensions, the third being Gaia.

Companies need to do good for the earth and in turn make profits. If they make profits alone but harm our future, it is not good for the people or the planet. The theme today is 'How can Businesses Help Attain Energy, Water, and Food Security?' According to her, this is an old-fashioned question for the 20th century. We have to shift to the more relevant question which should be: 'How can Energy, Water, and Food Security Help Business?' Without energy, water, and food, there will be no business, no human beings, and no tomorrow. 'Business for what?' is a question for the 21st century.

Referring to the Warli paintings which were a part of DSDS, she said that she was helping the Warli tribe and supporting the dying art form. She also informed the audience that the Warli tribe do not have letters, so they are trying to transmit their knowledge and wisdom through paintings. And the tribe knows that we are the family of the Sun, the solar system, so this serves as a Bible of how we should be leading our daily lives. They have a very Gaia way of life. They have not changed their lifestyle for thousands of years, it is an eternally sustainable life.

Ms Nonaka added that the developed world, which forms a small fraction of the whole world, is responsible for most of the environmental problems. The developing world is waiting for the marriage of new cutting edge technology and the new minds with fresh ideas, not for money but to insure the future. So the problem is not business but us. In order to shift the world to sustainability, we really need to ponder on what we can do, as businessmen or as consumers.

Mr Vikram Mehta stressed on the fact that there is no future with a degraded environment, an environment without water and energy. He said the real issue now is how do businesses actually go about safeguarding the future. He observed that some of the issues that have come up are those which have recognized the fact that governance and institutional structure are simply not transformational, and do not encourage business to take a holistic view. He spoke about the other solutions that could perhaps be looked at but said that we must introduce solutions step-by-step and maybe lay the foundation one step at a time. The first step could be to lay the foundation for

a second and larger stride in the right direction. We must focus on ways investors can perhaps bring pressure on business, there could be appropriate legislation. Consumers can put positive pressure, there could be a regulatory system that brings pressure, but ultimately all of us know that the businesses will respond if the incentives are structured to get them to actually address this crisis in a determined fashion and in a way that will not only look for short-term gain but also safeguard the long-term future of our society.

Taking the view that there can be no trade-off between profits and sustainability, he added that businesses cannot afford sustainability if they don't make profits, but equally businesses do not deserve profits if they do not respect sustainability. He pointed out that businesses will have to appreciate that energy, water, food, and environment and their inter-linkages are essential for their success; it is not just profits. Profits will not be sustainable if they do not recognize the importance of these connected issues.

The Role of MDBs in Attaining Energy, Water, and Food Security



L–R: Ms Anne Paugam, Dr Naoko Ishii, Mr Howard Bamsey, Mr Gyan Chandra Acharya, Dr Bindu N Lohani, and Mr Alexandre Meira da Rosa

CHAIR

Mr Howard Bamsey Director-General, Global Green Growth Institute

PANELISTS

Video Message

Dr Jim Yong Kim
President, The World Bank Group

Mr Gyan Chandra Acharya
Under-Secretary-General and High Representative for the Least

Developed Countries, Landlocked Developing Countries, and Small Island Developing States

Dr Naoko Ishii

CEO and Chairperson, Global Environment Facility

Dr Bindu N Lohani

Vice President, Knowledge Management and Sustainable Development, Asian Development Bank

Ms Anne Paugam

CEO, Agence Française de Développement (AFD)

Mr Alexandre Meira da Rosa,

Manager, Infrastructure and Environment Department, Inter-American Development Bank

Climate change is a threat to our fragile existence on this planet and could reverse decades of development and progress. A 2°C rise in global temperature will affect global health, infrastructure, food supply and all businesses. Multilateral Development Banks (MDBs) have to help countries invest in clean growth alternatives that create jobs and make nations more competitive and resilient. The World Bank Group is trying to reduce the risk of low-carbon investments and leveraging finance from the private sector which includes investments in renewable sources of energy. They are also helping countries identify and develop renewable energy sources and supporting flood reduction. They are supporting climate smart agriculture. To address climate change there is need for more research, investment, and political support.

The session on 'The Role of MDBs in Attaining Energy, Water, and Food Security' was opened by Mr Howard Bamsey who deliberated on the role played by the Multilateral Development Banks (MDBs) in attaining energy, water, and food security.

Mr Gyan Chandra Acharya spoke of the problems of the



Least Developed Countries (LDCs), landlocked countries and Small Island Developing States. Referring to the 48 LDCs, he said that almost two-thirds of these were in Africa, one-third in Asia, and nearly eight in Latin America. Of the 31 landlocked countries, almost half of them were in Africa and the remaining in Asia, Europe, and Latin America, Mr Acharya added.

Speaking of the Small Island Developing States, Mr Acharya said that all of them had some commonalities in terms of the fundamental vulnerabilities they face, which include a very high level of poverty, huge impacts of climate change, capacity constraints, and lack of access

to water, energy, and food. He stressed on the need for a global approach in resolving these issues and that any approach could be centric to one particular nation. He spoke about the forthcoming conference of the Small Island Developing States in Samoa and another conference that will take place in Vienna in September. Now there will be a lot of discussion on these issues because we now know that climate change is an overarching issue for all these countries. In all of them, whether we talk of melting of glaciers in the Himalayas and elsewhere, desertification in many of the countries, the landlocked countries and the land degradation, or sea-level rise in the Small Island Developing States, you see the connection of the severe impacts of climate change in all of them. I think therefore we have to look at the problem from the perspective of these countries. We are talking about really having a global approach to the solution of this global problem. Now when you look at the severe impact on all of them, the energy access of these countries is very low. Around 80 per cent lack energy access, 90 per cent lack modern fuels, 30 per cent are undernourished,

and all of them are characterized by low infrastructure, low productivity, and high dependence on agriculture.

Mr Acharya further added that almost 60 per cent of people in the LDCs are dependent on agriculture, yet the contribution of agriculture to the GDP is just 20 per cent. Now again when you look at the climate change impacts and then at energy and water, only 40 per cent of people have access to drinking water in these countries and only 30 per cent have sanitation. So all this shows that when you look at the issues of water, energy, and the climate change impact on these resources, you appreciate the severity of the problems in these countries.

Stressing on the fact that



Dr Naoko Ishii

everything actually depended on access, affordability, and reliability, he said that we need to understand that having access does not mean that it is affordable and reliable. Considering the complexities of the challenges that the LDCs face, Mr Acharya added that the most efficient way to deal with these challenges is to move away from a silos approach to an integrated and holistic approach.

Elaborating on the role of MDBs, Mr Acharya said that we need to firstly understand the role the MDBs will have in these countries as there are many other banks like the Asian Development Bank, the African Development Bank, and the Inter-American Development Bank which have invested a lot of money for addressing the developmental issues. The key would be to understand the nexus and have a right policy framework in place. An integrated policy approach would be an important contribution as many big investors are linked to these banks. Secondly, the policies can be transplanted, adapting the policies to the situation on the ground. Financing programmes and leveraging adequate resources will be another aspect that will need to be ascertained



vis-a-vis the MDBs. Technology access and adaptation in order to modernize and leapfrog into the new sustainable development path is also necessary.

Dr Naoko Ishii, CEO and Chairperson, Global Environment Facility, talked about the growing population and the pressures it is putting on natural capital, on ecosystems and ecosystem services. Increase in population results in the increasing demand for food, transport, energy, housing and buildings. She expounded on how biodiversity and anthropogenic climate change, which is due to human intervention in nature, is pushing nature's carrying capacity to its limit. It is important to integrate natural capital into

our discussions and recognize the contribution that institutions can make to achieve results. An integrated approach with due recognition of the value of natural capital and good governance to formulate schemes to bring the stakeholders together is important. She was hopeful about the contribution that institutions can make in this endeavour. To reiterate, of particular importance are an integrated approach, recognition of value of natural capital and good governance in schemes to bring the stakeholders together. Dr Bindu Lohani, Vice-president, Asian Development Bank, focused on the problems in the Asia-Pacific region. Stressing on the fact that water energy, transport, and food make up 75 per cent of their business, he said that the Bank would be releasing three major studies later in the year—one on energy security, another on water security, and yet another on food security. Quoting from a few studies conducted by ADB earlier, he said that the result of a study showed that by 2050, 70 per cent will live in cities and three billion in rural areas. So more energy, food, water will be required by cities. We will have to start thinking and doing things differently. Talking

about the energy sector, he mentioned that ADB has funded a lot of innovative projects in support of energy-efficiency. He emphasized that sound advice on best technologies on coal and gas, policy and pricing are extremely important and so is the role of the private sector. More public-private partnership is required. Energy in the transport sector is also important. Water conservation using the reduce-reuse-recycle methodology is needed which provides safe drinking water 24 hours a day. What happens when climate change brings flooding? How do we climate proof our investments in future? As a multilateral bank, they are developing these data sets and looking at investments



Ms Anne Paugam



Mr Alexandre Meira da Rosa

while recognizing the importance of focusing on the food value chain.

AFD's Ms Anne Paugam, spoke about reducing waste in order to achieve the goal of energy, water, and food security post-2015. She highlighted the fact that one needs to concentrate more on how we are going to meet this goal, and added that the whole issue of energy, water, and food security needs to be dealt with

taking an integrated approach at a proper territorial scale.

She also pointed out how choices regarding food production have an impact on water resources. The way water is distributed and treated will also impact energy needs, she observed.

Rising population was another issue pointed out by Ms Paugam. She said that the problem of climate change coupled with the

issue of rising population will surely lead to demographic pressure on resources which will further lead to a condition of severe water stress. Adding that this is where the development banks could play a major role, she said that the Banks would have to anchor, nurture, and scale up innovation to bring all plans to fruition. She also added that public funding will not be sufficient to meet the goal set for water, food security, and

agriculture. Public funds from the North and the South need to serve as a catalyst to attract private funds, and these need to be directed towards the production of public goods. This could be done either by providing expertise, or having a dialogue or support public policies that will develop the right framework to secure private funding. Another way would be to promote Green credit lines and provide commercial banks with an incentive to finance SME projects for private companies. For instance, through local banks in Turkey AFD is financing SMEs for upgrading their investments towards a more

green production. Mr Alexandre Meira da Rosa from the Inter-American Development Bank, talked about freshwater reserves in the US which constitute almost 30 per cent of the world average. He added that although the US was well-endowed in terms of natural resources, there still exist 85 million Latin Americans without access to potable water. Their economy is highly vulnerable to water scarcity. 90 per cent of crops are rainfed, the agricultural supply chain employs 30 per cent of the labour force, half of their electricity generation comes from hydro power. So, they are very vulnerable to climate change.

They have a target of lending 25 per cent of their business income towards climate change mitigation, renewable energy promotion, and sustainability improvement. They have invested time and resources in studies in economics of food security, adaptation mechanisms and are mainly targeting the Ministry of Finance as they are responsible for allocation of resources. They have supported the deployment of wind power in Latin America and PV solar energy in different regions. They are facilitating the market entry to technologies that offer great promise.

Planet for Life Series: Innovations for Sustainability

Book Launch

On the occasion of the book launch of the *Planet for Life Series: Innovations for Sustainability* Dr R K Pachauri emphasized the need to challenge conventional wisdom and initiate fresh thinking in the realm of sustainability. He elucidated the topics covered in the previous books in the Planet for Life series and recommended

their relevance for people from all backgrounds. According to Dr Pachauri, the latest addition to the series—*Innovations for Sustainability*—contains messages of prudence for its readers. He underlined the need for the right kind of attitude as a prerequisite for mankind's obligation to innovate. This book,

Dr Pachauri explained, subsumes chapters from 40 eminent authors that will go a long way in guiding policy-makers to steer the planet towards sustainability. He concluded by expressing his satisfaction on being part of such a meaningful endeavour.

Mr Jean-Yves Grosclaude picked up from where Dr Pachauri left off by elaborating on the topics covered in the book. He proposed four key messages incorporated in the latest publication. First, that overdependence on technology to bail us out in the future might be erroneous as it can be malevolently exploited to the detriment of ecosystems and societies. Second, that innovation must not be divorced from socio-economic development. The third message he conveyed was of acknowledging the analogous character of conventional models and the available alternatives. In the last message he voiced his apprehension of the arbitrary imposition of sustainable innovation. He favoured the cause



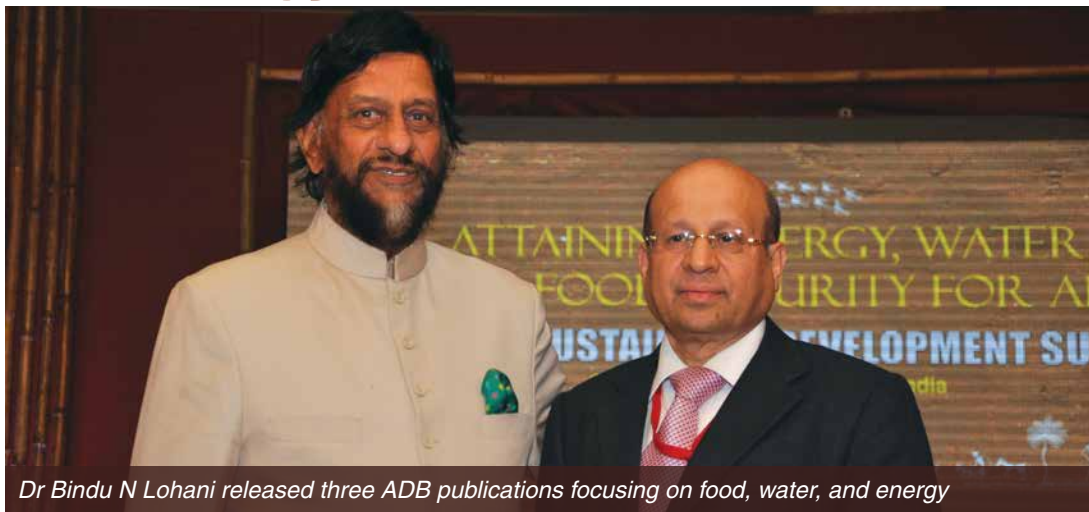
L–R: Mr Jean Yves Grosclaude, Dr R K Pachauri and Mr Alexandre Meira Rosa

of generating local impetus for innovation. He thanked various people for their contribution towards the publication of the book. Dr Damien Damailly began by sharing his excitement at being given the opportunity to edit the book which he called an intellectually stimulating exercise. He cautioned readers not to get taken in by the superficial humdrum of innovation but to delve deep into the different dimensions of innovation for sustainable

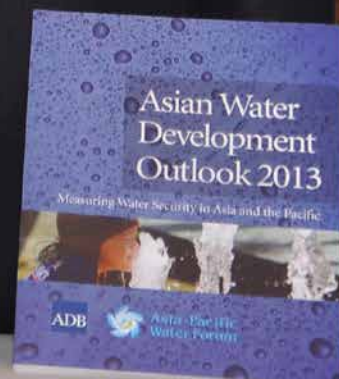
development. Mr Damailly pleaded for political leaders and policy-makers to broaden their horizons regarding innovation and complement the introduction of newer technologies with tangible spatial changes in lifestyles. He mentioned the example of Professor David Holloway of Stanford University who, through the extensive use of electric vehicles, has demonstrated the improvement in air quality. But this according to Mr Damailly is not

enough and must be augmented with a corresponding reduction in the range of travel. He also spoke of the manifold repercussions of introducing newer technologies with the example of him being able to multi-task with his smart phone today. He also touched upon the ongoing debate on geography of innovation and expressed joy in the fact that the global capacity to innovate has seen an upward trend.

ADB Perspectives—Thinking Differently about Water, Food, and Energy



Dr Bindu N Lohani released three ADB publications focusing on food, water, and energy



Sustainable Development Leadership Award



L–R: Mr Anand Mahindra, Dr R K Pachauri, Mr Salman Khurshid, and HE Mr Danny Faure

Anand Mahindra's Award Acceptance Speech

I am, of course, very honoured indeed to be the recipient of the TERI Sustainable Development Leadership Award and I am particularly pleased because I think it is becoming increasingly clear to all right thinking people, that sustainability is ultimately

linked not just with environmental preservation but with viable development and in fact a peaceful world. I think it is no coincidence that in the last 10 years it is the Nobel Peace Prize that has twice been awarded for environmental contributions.

In English literature, there is a device called the synecdoche where the part represents the whole. So we have phrases like 'lend me your ears' or 'all hands on deck' which are examples of synecdoche and I believe

that bestowing this prize upon me is really another example of synecdoche because although the award is bestowed on me as an individual, I am really just the part that represents the whole. And it is to that whole—the whole Mahindra Group organization, that this award really goes. It is my colleagues who have incorporated sustainability into their thinking both as a strategic direction and frankly as a potentially profitable business opportunity. This award therefore is rightfully theirs. Normally business people are not exactly the most important people in a conference like this. In fact, I often wonder whether you need a special visa to get into a conference like this because we're usually like the graphically bad villain in a bad Bollywood movie when we appear here and I think the only way to change that is not by ticking off boxes for what we have done for the environment, for how many trees we have planted, though we have planted many, how many certified

buildings we have erected, but I have a personal conviction, ladies and gentlemen, that the challenge going forward is to erase the dichotomy between sustainability and profit, to get more and more businesses to see sustainability as creating a potential, profitable value for the Group. And that, in my opinion, is the most effective way to integrate business goals with the sustainability agenda. To us in the Mahindra Group the value creation inherent in sustainability is highly visible. In fact we see it as our 'next big thing' that we are going to use to leverage the diversity of our Group.

We want, ladies and gentlemen, to be one of the world's most admired brands, that's our aspiration. That's what our people co-created as an aspiration and we recognized some time ago that you don't get to be admired unless you have thought leadership in some area. And the thought leadership position that we want to take has to be seen as a credible contributor to sustainable urbanization, and

that of course, is India's biggest challenge today. But that is also where we see an opportunity and sometimes when I fantasize, I fantasize that the ideal business scenario in which our Group, all our Sectors are going to contribute to sustainable cities that are built from scratch, it can even be done in India. We have built one in our Group called the Mahindra World City in Chennai. There's another one in Jaipur. We have our agri-business which we hope will come out with ways to eat food produced on urban farms and vertical farms.

As was generously mentioned in the citation, we are pioneers in electric mobility. It sounds utopian, but to me that's the best case future scenario, where the interests of business and the future of sustainability will be inextricably intertwined. And as our mark of gratitude for accepting this award, I hope that the Mahindra Group, and I commit to you, that the Mahindra Group will be at the vanguard of that movement.

On behalf of the Group, thank you again for this honour and I wish the Summit great success.

Dealing with Energy, Water and Food Security Challenge in Asia

The session was chaired by Dr Prodipto Ghosh and witnessed the launch of the South Asian Regional Hub of the Sustainable Development Solutions Network (SDSN). Prof. Jeffrey D Sachs, in his keynote address, remarked that the role of such environment and development think tanks is important. He cautioned that with an unabated increase in greenhouse gases, especially the 35 billion tonnes of carbon dioxide projected to be emitted solely due to fossil fuel extraction and global temperature rise of 2–4



CHAIR

Dr Prodipto Ghosh

Distinguished Fellow, The Energy and Resources Institute (TERI)

KEYNOTE ADDRESS

Prof. Jeffrey D Sachs

Director, Earth Institute & Special Advisor to the United Nations Secretary-General (via Video)

Dr Anindya Chatterjee

Asia Regional Director, International Development Research Centre (IDRC)

Ms Lise Grande

UN Resident Coordinator & Resident Representative, United Nations Development Programme, India

Prof. Hironori Hamanaka

Chair, Board of Directors, Institute for Global Environmental Strategies (IGES)

Mr Ajay Vir Jakhar

Chairman, Bharat Krishak Samaj (Farmers' Forum, India)

Dr David Molden

Director-General, International Centre for Integrated Mountain Development

Dr Leena Srivastava

Vice-chancellor, TERI University

°C, a call for deep transformations in society is needed. Prof. Hironori Hamanaka stressed that a nexus approach requires trade, investment, climate policies, and political will as well as money and technology to meet the surging demand for food, water, and energy.

He pointed out that the world needs an integrated qualitative assessment of the linkages between these issues at the regional, national, and

continental levels. Mr Ajay Vir Jakhar introduced himself as a farmer from a developing nation, and submitted that so his perception of food security may differ from that of the developed world. He said that developing countries have a hard time dealing with their GDP indicators, and they tend to ape their western counterparts. He thought that it is the duty of the developed world to act responsibly and demanded that the world spend

“The entirety of human civilization depends upon six inches of topsoil and the fact that it rains.”

Confucius,
Chinese Philosopher



L–R: Dr David Molden, Mr Ajay Vir Jakhar, Ms Lise Grande, Dr Prodipto Ghosh, Dr Anindya Chatterjee, Prof. Hironori Hamanaka, and Dr Leena Srivastava



The remaining Carbon budget within which we can safely use fossil fuels is almost depleted.”

Prof. Jeffrey Sachs, Earth Institute and Special Advisor to the UN Secretary-General

US \$100 billion on environmental impact mitigation. Dr David Molden raised the problem of air pollution and the challenges faced by mountain communities. Dr Leena Srivastava pointed out the absence of suitable mechanisms for the nexus, the lack of available data, and the role of public finance. According to Dr Anindya Chatterjee, efforts made during the Green Revolution for wheat, corn, and rice should be extended to other crops. Ms Lise Grande said that as the Millenium Development Goals (MDGs) are going to expire next year, new sustainable development goals should replace them. Food security

was the highest priority under the MDGs, and it is time to deepen this commitment by adopting energy security for food as an unalterable Sustainable Development Goal (SDG).



It is now time to deepen our commitment to food security by adopting as the first goal of the new sustainable development global framework, a goal that links water and energy to food security.”

Ms Lise Grande, UNDP

The Energy, Water, Food Triangle

The session was chaired by Dr Leena Srivastava, Vice-Chancellor, TERI University, who recounted her recent visit to Ecuador and related how the South American nation is taking a long-term view in planning for climate change to manage its water resources in the future.

Prof. François Mancebo, referring to previous similarly themed conferences which focused largely on the social dimensions of the water–energy–food nexus, sought to view the problem from an economic perspective. Stating that it is not

right to impose environmental restrictions and deprive only some sections of people of the benefits of development, he stressed that the complex issues surrounding the water–energy–food security nexus revolve around the social conditions and historical background of particular places as also the physical and political environment. Underlining the interconnected nature of the relationship between these three essential resources, he felt that the question calls for an interdisciplinary approach that addresses the

interdependence and co-evolution of human economies and natural ecosystems. He also stated that we must take into account all the elements of the environment bearing in mind the interplay of global and local processes with ecological and social characteristics. Prof. Mancebo emphasized that there is a strong connection between the three points of the triangle. Water nourishes plants that provide food and energy is required to maintain high levels of productivity and for transportation of commodities to markets.

CHAIR

Dr Leena Srivastava

Vice Chancellor, TERI University

PANELISTS

Prof. François Mancebo

Full Professor, IRCS (International Research Center on Sustainability)–IATEUR Rheims University

Prof. Nebojsa Nakicenovic

Deputy Director-General, International

Institute for Applied Systems Analysis (IIASA), Austria

Mr Jake Schmidt

International Climate Policy Director, Natural Resources Defense Council (NRDC), USA

Prof. Petteri Taalas

Director-General, Finnish Meteorological Institute

Dr Kazuhiko Takeuchi

Professor and Director, Integrated Research System for Sustainability Science (IR3S), The University of Tokyo

Dr Georges Valentis

Managing Director, The Institute Veolia Environment, France



However, groundwater resources are depleting at an alarming rate. This compounds the problem of providing food security for all. The answer lies in taking a landscape approach and devising solutions that take into account the local conditions specific to different geographical areas.

He stressed that information should be based on practical experience for making collaborative decisions to enhance local livelihoods. No productive arrangement can be devised without considering the interest of the stakeholders of the resource. Any policy must, therefore, draw upon the views of the local communities, non-government institutions, and individuals with local knowledge. Prof. Mancebo recalled the work of the American

political economist Elinor Ostrom, who held that man is inherently rational and can be relied upon to make sensible decisions affecting his condition.

Notwithstanding the population explosion since the Industrial Revolution more than 200 years ago, Prof. Nebojsa Nakicenovic agreed that mankind has made significant progress in increasing food production leading to higher standards of living globally. He pointed out that economic output has outstripped both population increase and food production and communication and mobility are increasing even faster. Prof. Nakicenovic pointed out that it is the distribution aspect that is lagging, there are still many who are excluded from the fruits of development. This unsatisfactory

situation extends to energy. Access to electricity is crucial to development as it is required for meeting basic needs, such as heating, lighting, and cooking. Many people have to use solid fuels which cause harmful emissions with adverse effects on health and mortality. A similar problem exists in the water sector. Water scarcity is a pressing issue among many communities. This in turn affects sanitation. Since water affects both food and energy production, its non-availability can give rise to conflict among societies. He emphasized that policy-oriented research should be conducted to make an integrated assessment of global problems so that development can proceed apace and people can realize their aspirations. Such

an approach can also bring spin-off benefits to humanity that may not be evident at first.

Mr Jake Schmidt talked about the water scarcity in the city of Delhi and the grim prospects in the coming summer months. Mr Schmidt noted that it is a condition ripe for conflict and strife. Clean air, water, food, and power are the bedrock of successful economies and any disruption in their supply can have serious consequences for civilizations. He gave the example of the US stating that even though it is a developed country it is feeling the effects of indiscriminate water usage as in fracking, which requires huge amounts of water to extract natural resources but is leading to resource depletion and water pollution. He suggested that optimal use of water can help reduce the impact on water resources and avoid water stress in the years to come. The impacts of climate change are forcing us to change our habits in ways that are more beneficial to the planet and its inhabitants. We must particularly heed the projections put out by IPCC and, unless suitable measures are taken, the implications for humanity will be challenging.

In his presentation, Prof. Petteri Taalas sought to lend an

atmospheric science angle to the problem. He stated that global warming is causing sea levels to rise which is causing floods in turn and affecting farmlands and productivity. Referring to the latest IPCC report 'Scenarios for the Future', he pointed out that the rate of rainfall appears to be declining in many parts of the world and an important source of water, i.e., glaciers are shrinking at an alarming rate especially in countries like India and China which will affect agricultural production. He highlighted the fact that natural disasters are becoming more frequent and more widespread than before causing immense economic losses and putting people to great hardship and the outlook for the future also does not look bright. Prof. Taalas said there is a direct relationship between growth and atmospheric pollution. As countries progress on the path of development, as the number of cars grows, as meat consumption increases, emissions of carbon dioxide and other greenhouse gases will also rise correspondingly. Dangerous air pollution is a real threat but the burgeoning middle class will also contribute considerably to such emissions as they pursue their



DSDS is becoming an important forum for the way forward. ”

Prof. Nebojsa Nakicenovic, IIASA



An indispensable measure to follow all the time is to save energy and water, wherever and whenever possible. ”

Dr Georges Valentis,
Managing Director, The
Institut Veolia Environnement

own development ends.

His suggestion for limiting harmful levels of pollution is that the question of use of bioenergy to sustain growth will be best addressed by managing our forest resources in a sustainable manner to produce biofuels.

Dr Kazuhiko Takeuchi opined that rather than maximization, it is necessary to optimize the production, supply, and distribution of energy, water, and food. It is also necessary to take a global approach, learn from other countries and adopt best practices. He cited the failure of *Jatropha* in Sub-Saharan Africa, whose seeds are used to extract biodiesel and which were thought to be able to grow in arid conditions with very little water, but for it to be commercially viable the plants have to be grown in good soils with plenty of water. The primitive Baka people in that region still use it for extracting oil but the scale of production is small.

He said that even though we have come a long way in bringing large areas of land under farm production but it has been at the cost of agricultural biodiversity and traditional knowledge. He pointed out that the UN's FAO estimates

that a large part of our food energy comes from a handful of plants and animals and just three plants—wheat, rice, and maize—contribute 50 per cent of that energy, but all the three crops are highly energy and water intensive leading to an unsustainable situation in the long run. Dr Takeuchi also mentioned the Satoyama Initiative of Japan's Ministry of the Environment supported by the United Nations University, which follows from the deliberations of the UN Convention on Biological Diversity and seeks to apply traditional knowledge reinforced by modern scientific practices to solve local problems of production and supply in the food and forestry sectors. He too recalled the work of the late Elinor Ostrom, who also had participated in DSDS 2012, and who held that it is this local knowledge that humanity must exploit to the fullest. He said that after the recent disaster in his country, Japan is being forced to develop renewable energy sources to replace nuclear energy. He stressed on the need to integrate policies that should govern the three sides of the triangle.

Dr Georges Valentis stated

that it is important to save both energy and water at all times as production of food requires both. Dr Valentis explained that as has been demonstrated by his company Veolia Water in the Indian state of Karnataka, it is possible to make drinking water available 24x7 to cities but at the same time, it is important to check leakages which contribute to precious water loss. He emphasized that metering consumption can help in preventing indiscriminate use of energy and water. He said that another way of augmenting water resources lies in the area of wastewater reclamation, treatment, and reuse, by which water can be utilized for irrigating fields and can also be put to various other uses. Dr Valentis stressed on the importance of desalination of seawater which can also provide opportunities for producing water for consumptive uses. Desalination holds great promise as the oceans constitute a limitless reservoir of fresh water. He concluded by saying that all these measures might seem quite insignificant by themselves but taken together they can make a substantial impact in improving water availability.

Tackling the Energy, Water, and Food Security Challenge in Africa

The session was chaired by Dr Fatima Denton. Dr Denton emphasized the magnitude of the task at hand as it involves the question of increasing crop productivity to feed a rapidly growing population in the face of global warming and climate change, which causes deforestation, land degradation, water scarcity, and flooding, all of which adversely affect agricultural production. Her prescription is for transforming the complex

interrelationships that exist between the three elements of the energy–water–food security nexus into concrete business plans to benefit the poor and vulnerable sections of the society. She underlined the imperatives of keeping the agricultural sector permanently at the focus of our efforts. Dr Denton said that Africa is developing but the pace of progress has to be accelerated.

As the late Prime Minister Meles Zenawi of Ethiopia used to

say, she averred, the people of Africa must inspire themselves to lift themselves out of poverty and put the continent firmly on the road to progress and prosperity.

Dr Carlos Lopes, in his keynote address, stressed on the vulnerability of the African continent to the impacts of climate change and the need to evolve robust environment-friendly principles of inclusive growth and sustainable development. He pointed out that whereas Africa causes the

CHAIR

Dr Fatima Denton

Officer In-Charge, African Climate Policy Centre, Special Initiatives Division, United Nations Economic Commission for Africa (UNECA)

KEYNOTE ADDRESS

Dr Carlos Lopes

Executive Secretary, UNECA and UN Under Secretary-General

PANELISTS

HE Dr Raphael Edou

Minister of Environment, Climate Change, and Reforestation, Benin

HE Mr Henri Djombo

Minister of Forestry Economy and Sustainable Development, Congo

Hon'ble Mass Axi Gai

Minister of Fisheries and Water Resources, Gambia

HE Ms Ana Paulo Samo Gudo Chichava

Deputy Minister for the Coordination of Environmental Affairs, Mozambique

Prof. Rolph Payet

Minister for Environment and Energy, Seychelles

HE Prof. Ephraim Kamuntu

Minister of Water and Environment, Uganda



The session on 'Tackling the Energy, Water, and Food Security Challenge in Africa' in progress

least harm to the climate it is the one likely to suffer the most from anthropogenic GHG emissions. He sees green industrialization as the mantra to tackle the continent's energy, water, and food security challenges.

Dr Lopes outlined a six-pronged strategy for undertaking development in order to bring prosperity to the people of the African continent. He suggested that since the continent is blessed with abundant sunlight, it should invest in renewable and clean energy sectors and offset traditional energy sources based on fossil fuels, biomass, and forest resources. He also felt that greater investment in climate science is essential to

disseminate climate information widely to enable policy-making and development planning. Africa must promote institutional mechanisms for involvement of all stakeholders to improve coordination and mainstream international development plans. He mentioned that South-South cooperation is necessary to bring together countries facing similar challenges and enable learning from each other's experiences, and proposed that boosting agriculture and agro-processing will bring rich dividends to the economy and contribute significantly in enhancing livelihoods and alleviating poverty. Investments in ecotourism can also be an important source



Climate change is a global issue and can be solved only by global solution.”

HE Prof. Ephraim Kamuntu



L–R: HE Prof. Rolph Payet, Hon'ble Mass Axi Gai, HE Dr Raphael Edou, Dr Fatima Denton, Dr Carlos Lopes, HE Mr Henri Djombo, HE Ms Ana Paulo Samo Gudo Chichava, and HE Prof. Ephraim Kamuntu

of revenue for Africa which will greatly profit its people.

While conceding that the energy–water–food security issue presented a challenge of immense proportions in Africa, HE Dr Raphael Edou chose instead to take a more sanguine view of the problems facing the continent. Dr Edou stated that climate change impact mitigation can translate into several opportunities in the areas of job creation, capacity-building, and economic development with spin-off benefits in education, waste management, healthcare, and local governance

and can inject fresh blood into the national and world economy. He stressed that citizens should take it upon themselves to develop initiatives that have local relevance, initiatives as simple as planting a tree and taking care of it, which will in turn help in soil restoration and prevent land degradation. He called upon civil society and private players to join hands to plant trees on a massive scale and to nurture them in the initial years for maximum benefit. He particularly lamented the fact that the world is now turning to Africa for its requirement of wood



Competition for global natural resources could present a rare and historical opportunity for a rapid green industrialization offering incredible investment opportunities and real dividends.

Dr Carlos Lopes, UNECA

which would eventually destroy its pristine green cover and rich biodiversity.

HE Mr Henri Djombo emphasized that in order to find solutions to issues in sustainable development afflicting countries in Africa, it is necessary to first jointly identify the problem which can then lead to formulation of a national strategy to combat difficulties in vital sectors of the economy. He stated that of particular importance in this regard are improvements in water efficiency, water for agriculture and energy generation, water infrastructure development and management, higher allocation for agriculture development, large-scale investment and adoption of renewable energy, promotion of fuel-efficient and less polluting public transport, public-private partnerships in these crucial areas, and more international aid for infrastructure development.

Hon'ble Mass Axi Gai stressed upon the relevance of the topic of the panel discussion to his government and other countries in Sub-Saharan Africa. He mentioned that in order for Gambia to progress on the path of development it must achieve the triple objective of ensuring security of food, water, and energy. He also stated that

agriculture in the country has received a much-needed fillip from their President's call to all citizens to engage in farming and by his setting a personal example and the same emphasis on increasing agricultural activity can now also be seen in other African countries. He said that women are also being empowered by being provided training and capital to form cooperatives, develop agri-businesses, and set up storage facilities. He also pointed out that the Gambian government is undertaking measures to make electricity widely accessible in spite of the huge financial outlay involved, renewable energy technologies are being given due attention and the concept of Integrated Water Resource Management is also being promoted on a large scale.

HE Ms Ana Paulo Samo Gudo Chichava welcomed the opportunity to participate in this high level panel discussion and present the Mozambican government's long-standing recognition of energy, water, and food security as being essential to all-round growth and sustainable development. She informed that the Mozambican government has already initiated policies, plans, and programmes in these crucial

areas. A number of infrastructure projects in the hydropower and renewable energy sectors are being implemented to increase access to modern energy services. She stated that Mozambique's exports include clean energy to countries in the Southern African Development Community and others. She spoke of how the water sector in the country is witnessing infrastructure development and institutional reform aimed at targeting Millennium Development Goal No. 7 of ensuring environmental sustainability. She also highlighted how efforts being made to eradicate extreme poverty and hunger are also achieving significant progress and are contributing to the economic growth and improving the conditions, both in rural and urban areas of the country.

Ms Chichava further informed about the launch of Mozambique's National Climate Change Strategy at Rio+ 20, saying it has come a long way since then and seeks to engage all sections of the population including government, civil society, and the private sector in their efforts to build a sustainable future.

Prof. Rolph Payet began by stating that the three areas of water, energy, and food are

strongly linked and the way we frame policies, technologies, and approaches will determine the success of achieving poverty reduction and ensuring sustainable development. He pointed out that the most important requirement is that we protect our natural capital, the bounteous nature, and this can easily lead to job creation. He said, the fact that the Ministers of Water, Energy, and Agriculture from different African countries were present together at the conference is in itself a hopeful sign and provides a rare opportunity for improving cooperation amongst the countries of the continent. From the viewpoint of his country Seychelles, where tourism is the mainstay of the economy, he expressed his belief that agro-tourism has huge potential and can be promoted appropriately. Prof. Payet also discussed the concerted efforts being made in agriculture to achieve self-sufficiency in food. Being a Small Island State with limited water resources, he said Seychelles understands the importance of devising integrated approaches for water management and is taking suitable measures in this regard.

HE Prof. Ephraim Kamuntu echoed Dr Lopes's assertion

that Africa's situation was indeed paradoxical. He stated that the impact of climate change on the continent is disproportionate to its GHG emissions and that in spite of being one of the most endowed continents on the planet and having rich resources of mineral wealth, it is ranked among the least developed countries of the world.

He further stated that his country Uganda receives on average 1,200 mm of rainfall annually, but people still have to trudge long distances to find water—a task performed mainly by women and children.

He informed the gathering that since the equator passes through Uganda, the country enjoys bright sunshine, but electricity access is poor and very little research in solar energy is being done in the country by Western nations. He highlighted the fact that lack of electricity affects their people in several ways. They are forced to cease work at sunset which in turn leads to unintended effects of population growth, unutilized potential of productivity, and reduced levels of competitiveness. He concluded by saying that to lift themselves out of poverty, the people of Africa must lose their lethargy and

sense of complacency and be fired by ambition and a desire to improve their lot and take it upon themselves to modernize and to be more competitive in a fast-changing world.



Climate change is an opportunity for the future in the matter of job creation.”

HE Dr Raphael Edou, Benin

Communicating for Sustainability



L–R: Mr Nitin Sethi, Mr Tim Nuthall, Mr Lance Ignon, Mr Guido Schmidt-Traub, and Mr Ali Tauqeer Sheikh

The session was chaired by Mr Lance Ignon who oversees public relations for his firm Citizen Group, which specializes in value-based strategic communications in fields such as healthcare and the environment, particularly climate change, and endeavours

to target for its clients the triple bottom line of marketing and advertising—People, Planet, and Profits.

Mr Ignon stated that sustainability has become a byword in common parlance today and that the public would

like firms to be environmentally benign, the business community likes to profess sustainability, and industry aspires to it. He agrees that buyers tend to appreciate a company's green credentials and buy into its corporate social responsibility but many times purchase decisions of consumers are driven by other factors as well such as price and quality. Mr Ignon emphasized on rebranding the concept of sustainability to make it more pertinent and attractive to consumers. According to him, at present they see it only as a means of deprivation of luxuries and comforts that have so far been taken for granted. There must be greater involvement of civil society

CHAIR

Mr Lance Ignon

Director, San Francisco Office, Sitrick and Company

PANELISTS

Mr Nitin Sethi

Senior Assistant Editor,
The Hindu

Mr Tim Nuthall

Media Manager,
European Climate Foundation

Mr Guido Schmidt-Traub

Executive Director, UN Sustainable
Development Solutions Network

Mr Ali Tauqeer Sheikh

CEO, LEAD Pakistan and National
Programme Director and Asia Regional
Director, CDKN

in sustainability initiatives, he said. Mr Ignon acknowledged how many people still do not fully understand climate change and how it can affect their lives. We have a long way to go in better communicating the meaning of sustainability. Only an earth shattering event can jolt policy-makers out of their complacency and impel them to take action.

Mr Nitin Sethi brought out the difficulty in sustainability communication which he said arises from a standard message originating in one part of the world being sought to be transmitted as such to another part of the world which may be widely divergent in its economics, social culture, and politics. He stated that often civil society, business and industry, and government do not see eye to eye on issues of sustainability. The debate has reached a point where it is seen less as one of environment and development and more of competition.

He stated that the problem is made more acute by the presence of multiple actors in this effort. For example, an international NGO from a developed country cannot hope to advise governments and communities in lesser developed nations on issues innate to its culture and that have been practised down the ages.

Mr Sethi doubted if one can expect a galaxy of scientists, intellectuals, and luminaries sitting together in conclave to propound theory and practice for people who may be many miles away and whose geography and politics bear little or no relevance to their own.

Mr Tim Nuthall averred that it is futile to keep repeating a procedure or process endlessly in the hope of reaching a different result and the same is the case with communication. He emphasized that one should explore ways of packaging and presenting the available information differently to achieve the desired outcomes. He said one cannot engage in a knife-fight with a spreadsheet meaning thereby that volumes of data are practically useless in the face of sheer doggedness and resistance to change. Mr Nuthall also stated that scientists, policy-makers, civil society representatives, are all so removed from the reality on the ground that it is difficult to take them at face value or treat them as known quantities. He finds it unfortunate that our communication is not aimed at the grassroots where change is required but at policy-makers situated at the other end of the

development spectrum, which can lead to a severe disconnect between intent and outcomes. Being a grant-making organization in Europe, his organization's concerns will increasingly revolve on how effectively the funded organizations address the communication aspect of their work. They are also working on rendering the Fifth Assessment Report of the IPCC into easy-to-understand language for the business community.

Mr Guido Schmidt-Traub said the failure of communications is evident because the response of the development community to the challenge of climate change is not at par with the seriousness of the challenge facing mankind. Mr Schmidt-Traub underscored three points as worthy of mention in this context.

He pointed out that firstly, the term sustainability itself has become too clichéd and should be replaced by something more meaningful to the public. In addition to environmental sustainability, it should also encompass economic development, social inclusion, and good governance, the other pillars of human endeavour. It should be as applicable in a poor or developing country as in a developed one. More importantly,

it should visibly be seen to be so because in the public's perception these connections are lacking at present. Secondly, it is not enough to frame pious sustainable development goals to adorn the hallways of academe. They should be reduced to the language of the common man and touch upon agriculture and productivity, climate and environment, education and health, issues that affect him every day. Thirdly, the science itself is progressing and more work is required to arrive at practical recommendations. It is the policy-makers who are in urgent need of being trained to appreciate the meaning of the terms they use and their scientific implication. He underscored how important it is for all communication to be direct and attempt to deliver concrete action points for consumers that can be implemented straightaway.

Mr Ali Tauqeer Sheikh said it has become customary for modern day communicators to couch words and messages in new terminology that mean little to the people at large. And, because of the frontier nature of the science, new knowledge is constantly being accumulated. It, therefore, becomes difficult to put out the right information to all

the people everywhere. He briefly described three major processes that are concurrently under way in climate negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). He explained that even though one attempts to limit global temperature rise, the parameters are still uncertain and he also talked about a new set of MDGs to be called SDGs which is being formulated to take us to the year 2050, when they would be reviewed again. Yet another subject of discussion in climate negotiations is the ambitious Hyogo Framework for Action (HFA), a 10-year plan to make the world safer from natural hazards, which has already undergone two revisions. Mr Sheikh further explained that the long-term nature of these interventions makes their impact a lot less certain and the plethora of issues involved makes the messages much more diffuse. According to Mr Sheikh, communication should be less about adopting a prescriptive posture and lecturing to people on any perceived ills of following in their age-old, traditional ways of doing things and should instead concentrate on understanding the immediate and near-term issues facing a community,

devising appropriate solutions, and conveying them effectively with due regard to the capacities and capabilities of the concerned individuals. As has been wisely said, 'If you communicate with a person in your language it goes to his head but if you communicate with someone in his language, it goes to his heart.'

He expressed the view that communicating for sustainability misses its intended purpose because its practitioners talk too much and listen less. The target audience is not identified correctly, their problems are not understood properly, and the solution is not stated empathetically. It is, therefore, important to strengthen evidence-based policy-making to ensure that decision-making is well-informed by the best available research knowledge. The success of a communication strategy lies in simplifying the message for policy-makers, industry, business community, media persons, and the public.



Our present approach to communicating for sustainability is like taking a spreadsheet to a knife-fight.”

Mr Tim Nuthall, Media Manager,
European Climate Foundation

TERI–Royal Norwegian Embassy Initiatives on Climate Change



Mr Lars Andreas Lunde

The session opened with Dr R K Pachauri, Director-General, TERI, speaking of the partnership between TERI and the Norwegian Ministry of Foreign Affairs which strives to address global concerns of sustainability, energy security and climate change through cooperation between TERI, the Norwegian Government,

and other Norwegian institutions. Such cooperation is proving to be especially helpful in building its climate modelling capabilities that can be used to further knowledge of adverse climate change impacts in different parts of our country. Dr Pachauri invited Norway's State Secretary (Deputy Minister) of Climate and Environment, Mr Lars Andreas Lunde, to say a few words and share his views.

Mr Lars Andreas Lunde highlighted the significance of the Delhi Sustainable Development Summit, addressing as it does topical issues of sustainable development and developing country issues. Mr Lunde expressed the view that the presence of politicians, officials, academics, business representatives from across the world and representatives from bilateral and multilateral organizations is additional testimony to the international relevance of the theme and the high profile of the event. He

reiterated Norway's commitment to strengthening the partnership and noted the untiring efforts of Norway's Ambassador to India, HE Mr Eivind Homme, to facilitate the cooperation.

A short film on the project that TERI is implementing under the Norwegian Framework Agreement was screened. With a team strength of over 100, 50 per cent of which were women, the five-year long TERI–NFA programme has reached out to villagers, corporates, NGOs, researchers, academia, and the government. It has been successful in generation, dissemination, and application of new knowledge in the field of global warming and climate change.

TERI researchers explained that the primary aim of the project is to enhance clean electricity access in rural areas and to initiate income-generating activities for the rural population. TERI's solar energy systems are presently operating in Assam, Uttar Pradesh, Madhya Pradesh, and Odisha.

The Institute has acquired modern equipment to assist in climate modelling. The new knowledge will assist policy-makers and planners in identification, design, and delivery of nationally appropriate mitigation actions. The empirical evidence which has come out of this study would actually help in strengthening the developing country position. The NFA project has helped in establishing research collaboration with prestigious foreign universities. The project has also helped TERI build a specialized repository of literature on the science of climate change. TERI has devised Action Plans for each of the



Dr R K Pachauri

eight Missions which support the efforts of the Government of India in its National Action Plan on Climate Change.

HE Mr Eivind S Homme, the Ambassador of Norway in India, was happy that the project had achieved impressive results in clean energy, energy efficiency, and climate change cooperation. Mr Homme stated that the programme has already had a positive impact on people's lives and also on the political agenda in India and has internationally produced new knowledge about climate change. Clean energy cooperation with states and business community in India are strong examples of this. He also mentioned that the Uttar Pradesh government has developed applications for replicating the TERI solar model in 200 different villages.

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The programme has already had positive impact on people's lives and also on the political agenda in India and internationally produced new knowledge about climate change.”

HE Eivind S Homme, Royal
Norwegian Embassy

“

The evidence which has come out of this study would actually help in strengthening the developing country position.”

Ms Indrani Barpujari

“

The challenges facing the global community are increasing day-by-day and we have to act fast in addressing them before they cross the irreversible thresholds.”

Mr Lars Andreas Lunde,
Royal Norwegian Embassy

Special Presentation: Jack Andraka, Inventor



In a Special Presentation, Dr R K Pachauri introduced Jack Andraka, a high school student in Maryland, USA, who has developed a novel paper sensor for early detection of cancer of the pancreas and ovary. The diagnostic test is quick and inexpensive in that it takes only five minutes to administer and costs only three cents.

Hailing him as an innovator, a genius, and an inventor, Dr Pachauri said that Jack's research has won him the Intel International Science and

Engineering Fair (Intel ISEF) and the Smithsonian American Ingenuity Award. He was named a 'Champion of Change' by President Barack Obama for his work to break down scientific journal paywalls that require a subscription for accessing webpage content on the internet. He has spoken at the Technology, Entertainment, and Design (TED) Conference in Long Beach, California.

He has addressed over 16 TEDx events including the Houses of Parliament, UK and has been

featured on '60 Minutes', a popular television programme in the USA. Andraka has also been featured in channels like World News Tonight, National Public Radio, Popular Science, BBC, Al Jazeera, and The Colbert Report.

The paper sensor invented by Jack Andraka can detect pancreatic cancer, ovarian cancer, and lung cancer in the early stages of their development thus greatly improving chances of survival.

Andraka's interest in cancer research was aroused as a ninth grader at the age of 13 when a close family friend died of pancreatic cancer. Out of curiosity, he tried to access information on the disease via the internet.

It came as a surprise that a very high percentage of pancreatic cancers are not diagnosed early. Moreover, the method of detecting the cancer was a 6-decade old technique, quite expensive and highly inaccurate. The lack of a rapid, low-cost, and early screening method contributed to the poor survival rate among

individuals with pancreatic cancer. This drove him to try and change cancer diagnostics for the better.

It was a difficult task involving isolating about 8,000 types of nearly identical proteins in the bloodstream in trying to find that one cancer-causing protein. But by dint of hard work, he got down to studying each of those proteins one by one. It was something akin to looking in a haystack for a particular wisp of hay. His perseverance paid off finally and after studying nearly 4,000 types of protein during the summer break, he found the one protein that he was investigating, the cancerous biomarker mesothelin.

For obtaining funding for doing further research into the causes of pancreatic cancer, he contacted about 200 research professionals at Johns Hopkins University in Maryland and the National Institutes of Health. After 199 rejection letters, he finally received acceptance from Dr Anirban Maitra of Johns Hopkins University. He built his device using inexpensive strips of filter paper, carbon nanotubes, and antibodies sensitive to mesothelin, the protein that signifies the

presence of pancreatic cancer, which adheres to these antibodies and can be detected by changes in electrical conductivity of the nanotubes. His efforts bore real fruit when after seven months of work he was able to develop a paper sensor that was both quick and easy to administer and inexpensive. Current methods of detecting the cancer are 168 times slower, over 26,000 times more expensive, and more than 400 times less sensitive. His diagnostic method has a 90 per cent accuracy rate in detecting the presence of pancreatic cancer.

Andraka's work in the area of cancer treatment can break new ground fast. The new diagnostic test is a hugely significant development as it enables testing for pancreatic, ovarian, and lung cancers at an early stage, thereby increasing the chances of survival.

It also holds great promise in detection of Alzheimer's, disease, other types of cancer, HIV Aids, and heart diseases. It has potential environmental applications too, such as in detecting presence of heavy metals in pesticides, as well as in biotechnology.

“

Having easier access to information is vital in order to encourage younger people to get involved in science-related work.”

Mr Jack Andraka, High School Student

“

It's my hope that we all can begin to use the internet in more inventive ways than just taking pictures of cats and posting them on our Instagrams and YouTube.”

Mr Jack Andraka, High School Student

MINISTERIAL SESSION 2

Dealing with the Impacts of Climate Change



L–R: HE Mr Jorge Moreira da Silva, HE Dr Thet Thet Zin, HE Mr Graco Ramírez Garrido Abreu, HE Mr Lyonpo Yeshey Dorji, Rt Hon'ble John Gummer, Lord Deben, HE Dr Oyun Sanjaasuren, HE Mr Lars Andreas Lunde, and Lord John Prescott

The session was presided over by the Rt Hon'ble John Gummer Lord Deben. Lord Deben stressed the imperative of heeding IPCC forecasts of dangerous

climate change being caused by anthropogenic emissions of greenhouse gases that is the root cause of global warming. He highlighted the fact that countries

like Australia, England, and the USA, which had so far remained immune to the disastrous effects of climate change, have recently felt the brunt of unprecedented extreme events like unbearably hot weather, intense flooding, and unseasonal cold spells, which heightens the urgency of tackling this growing phenomenon. Lord Deben emphasized that we must sit up and take note of these developments right now instead of putting off action to a time in the future. Already the loss of lives and widespread destruction wrought by these events is massive in economic terms and delaying

CHAIR

The Rt Hon'ble John Gummer, Lord Deben

Former Secretary of State for Environment and Member of Parliament, House of Lords, UK

PANELISTS

The Rt Hon'ble Lord John Prescott

Former Deputy Prime Minister and Member of Parliament, House of Lords, UK

HE Mr Lyonpo Yeshey Dorji

Minister of Agriculture and Forests, Bhutan

HE Mr Graco Ramírez Garrido Abreu

Governor of Morelos, Mexico

HE Dr Oyun Sanjaasuren

Minister of Environment and Green Development, Mongolia

HE Dr Thet Thet Zin

Deputy Minister, Ministry of Environmental Conservation and Forestry, Myanmar

HE Mr Lars Andreas Lunde

State Secretary (Deputy Minister) of Climate and the Environment, Norway

HE Mr Jose Moreira da Silva

Minister for the Environment, Spatial Planning and Energy, Portugal

action on this front will prove much more costly. He also said that we equally need to impress upon the sceptics of climate change to look at the overwhelming evidence that human activity is altering our climate in several ways with adverse impacts on monsoon patterns, crop productivity, water availability, and human health. Central to the battle against climate change is the important relationship between legislators and the parliaments of the countries of the world. Stating that his organization encourages legislators across the world to act and to take on the responsibility of saving the inhabitants of planet earth from assured destruction, he called upon his colleague in GLOBE, Lord John Prescott, to describe the outcome of an earlier meeting of legislators held under the aegis of DSDS 2014 of which he was a part and to set the tone for the present discussion.

Lord John Prescott stated that it is the legislators who can be instrumental in developing international agreements on efforts to combat climate change. The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) expires next year and we must reach an agreement binding

on all countries before the next meeting to be held in Paris in 2015. Lord Prescott particularly welcomed the DSDS initiative to devote an entire session where invited legislators share their own country experiences and discuss ways and means to reach a common understanding on how best to arrive at legal frameworks that enjoin the people to adopt sustainable means of production and consumption. His fear is that if we cannot accomplish within our own nations what has to be achieved internationally then the international agreement will not be worth much. The original Kyoto Protocol applied to industrialized countries but the new agreement seeks to bring under its ambit all the 190 countries of the globe.

He is also the Vice-President of GLOBE, an organization which brings out reports on what legislators in member countries are doing regarding climate legislation. We have to arrive at legally binding agreements if we are to take the negotiating process forward and not undo the gains from the Kyoto Protocol. Lord Prescott is all for institutionalizing the process of legislators filing reports on measures adopted by them on various issues of sustainable development and sharing the report card in appropriate discussion forums. According to him, there is a broad consensus that climate change is severely affecting all countries and actions must be taken urgently to check the trend.



HE Mr Lars Andreas Lunde (L) , The Rt. Hon'ble Lord John Prescott (R)



Sustainable Development is not a choice but an absolute necessity.”

HE Ms Oyun Sanjaasuren
Minister of Environment and
Green Development

Citing the case of Mexico and Australia, who are doing much to implement climate legislation in their own countries, he called upon the legislators of the world to draft proposals and make them enforceable by law so that they acquire a degree of legitimacy, sanctity, and permanence and cannot be rolled back arbitrarily by future governments. Lord Prescott welcomed in particular the initiative taken by DSDS 2014 to have a meeting of legislators to report on the progress in their own countries which his organization-GLOBE-can treat as a basis for further action.

HE Mr Lyonpo Yeshey Dorji spoke about the main economic development activities in the

Kingdom of Bhutan which are based on agriculture, hydro power, and forestry. All three sectors are extremely sensitive to climate variations. The melting of the Himalayan glaciers causes both water scarcity in the higher reaches and flooding in the plains with consequent economic and health impacts on affected communities. He stated how Bhutan realizes the important role forests play in the provision of energy, water, and food security and endeavours to maintain 60 per cent forest cover in the country at all times. He explained how forests are also important to fight climate change as they serve as a sink for absorbing carbon. Trees and plants absorb carbon dioxide from the atmosphere and emit oxygen. Also, wood can be a substitute for fossil fuels and carbon-intensive materials such as concrete and steel used for construction. He informed about the 16th SAARC Summit that was organized at Thimpu in Bhutan on the theme of climate change which adopted a declaration on building a green and happy South Asia. HE Mr Lyonpo Yeshey Dorji also mentioned that Bhutan is moving ahead on its REDD readiness. The idea behind REDD is that developed economies with



HE Mr Lars Andreas Lunde

emission reduction obligations should compensate developing countries for leaving their forests untouched and that in line with the country's National Adaptation Plan for Climate Change, its transport, energy, and industrial sectors are also to be put on a low-carbon path and relevant activities have been initiated in this regard.

HE Mr Graco Ramírez Garrido Abreau informed that Morelos's net GHG emissions accounts for about 8.84 metric tonnes CO₂ equivalent which forms 1.2 per cent of the country's emissions of 737.56 metric tonnes CO₂ equivalent. Its per capita emissions stand at 4.98 tonnes CO₂ equivalent which is about 6.3 per cent of the country's 6.57 tonnes CO₂ equivalent. Morelos is also experiencing rapid urban and industrial pollution, land use change, pollution, and overexploitation of aquifers in the state with resulting threats to endemic flora and fauna, and rainfed agriculture. Protected areas receive greater attention now and rehabilitation and restoration of degraded lands is being taken up on a large scale. The practice of sustainable agriculture is also being promoted widely. Mr Ramírez emphasized that Morelos is the only state in Mexico



HE Dr Thet Thet Zin (L) and HE Mr Graco Ramirez (R)

that has all municipalities already in the climate change action plan. In its climate change mitigation efforts, Morelos has adopted as a guiding principle participatory planning and capacity development on sustainable use of energy. He stressed that while climate change is being tackled at the national level, it also falls upon individual states in the union to do their bit in preventing the situation from getting out of control. The case of the Mexican state of Morelos is especially instructive because it has decided to adopt efforts at climate change mitigation quite independent of the central government, which is quite laudable.



TERI deserves gratitude for creating the important dialogue that the Delhi Sustainable Development Summit has become. ”

Mr Lars Andreas Lunde, Royal Norwegian Embassy

Presenting an overview of her country, HE Dr Oyun Sanjaasuren stated that Mongolia is most vulnerable to climate change because of its harsh continental climate, fragile ecosystem, nomadic lifestyle, and socio-economic structure. She informed that the impact of climate change on Mongolia is not in keeping with its growth curve. A study by the non-governmental organization Germanwatch ranks Mongolia at number 12 in the list of countries most affected by climate change. The population is inching towards the three million mark and it is doing well on the economic front.

Dr Sanjaasuren drew attention to the various challenges, such as dry climate, desertification, and glacial melt coupled with lesser rainfall which lead to habitat loss, water scarcity, and pasture degradation and directly affect the lives and livelihoods of its nomadic population. Melting permafrost also affects soil fertility which reduces agricultural productivity. Moreover, climate change has affected its flora and fauna as seen in reduced number of rare animal species indigenous to Mongolia such as the Gobi bear and the black-tailed gazelle. She stressed how conserving, protecting, and

restoring endangered wildlife was an immediate need. Like many emerging countries in the region and beyond, Mongolia pays due attention to climate legislation in its pursuit of greener growth. The economy is growing at a healthy rate and the government has introduced green development strategy and climate change related policy documents relevant to mitigation of GHG emissions. Buttressing her message of the importance of sustainable development to Mongolia, she said that while her country is growing, the need of the hour is to make the right investments in infrastructure development from the very start and that Mongolia looks to other countries for cooperation in green technology infrastructure development.

HE Dr Thet Thet Zin cited the ADB Report of 2009 which states that Southeast Asia is one of the regions most vulnerable to the impacts of climate change and Burma is no exception. She informed that rainfall has decreased by nearly 30 per cent in the last half a century. The reduced number of rainy days together with late onset and early withdrawal of monsoonal rain is altering the germination cycle of staple crops and fruits.

As a result, the country is being forced to develop new varieties of crops resistant to vagaries of the weather. She highlighted the growing stress on water availability which is evident in several areas, how groundwater levels are falling and freshwater is getting scarcer. All these situations are forcing the government to adopt new systems of water management in the agriculture and food processing industries. Another issue mentioned by her was the rapid depletion of fossil fuels and how renewable energy development assumes urgency. We can produce biofuels from some cereals and sugarcane but this should not lead to food shortages and push up the cost of food. We have to bring about fundamental changes in resource use and waste generation and disposal.

HE Mr Lars Andreas Lunde stated that climate change is caused by human activity and this is becoming clearer day by day. Destruction of ecosystems, economies, human lives, and property is happening all around us. Climate change is happening extensively in India, he added. He emphasized that we must diminish vulnerability and build resilience of the people to the

impacts of climate variations. The post-2015 agenda should make poverty reduction the main plank for ensuring sustainable development. Central to this agenda is the necessity of protecting the forests of the world. Forests provide food, fuel, augment freshwater production and help prevent floods, droughts, erosion, and avalanches. Mr Andreas Lunde stressed that Norway knows the importance of forests in carbon sequestration and tries to engage with many organizations to promote REDD activities that aim to limit GHG emissions. The Minister reaffirmed his government's commitment to continue to support REDD in the coming years. He also mentioned that around 60 per cent of GHG emissions can be put down to energy use. It is obvious, therefore, that renewable energy technologies can play an important part in reducing global emissions and the private sector should be motivated to get involved in this effort. Equally, politicians also have their role cut out in developing proper sustainable development goals and in climate negotiations.

As a former Vice-President of GLOBE, HE Mr Jose Moreira da Silva welcomed the opportunity

to share the dais with its serving President and Vice-President. He said global warming is a reality and harmful emissions have reached extremely high levels. The World Economic Forum, which meets annually in Davos, Switzerland, notes that four out of the top ten risks to the world economy can be put down to climate change accounting for as much as 12 per cent of GDP. The Minister echoed the views of earlier speakers that we cannot afford to delay action on this front any longer but achieve substantial reductions in GHG emissions at the earliest. He mentioned how being equally affected by climate change, Portugal takes the issue very seriously. It is focusing on developing renewable energy resources, such as water, wind, solar, biomass, geothermal, and waves. Presently, almost 60 per cent of electricity produced in Portugal is based on renewable energy, and 25 per cent of the final consumption of energy is also met through renewable energy. Portugal is adopting a four-pronged strategy to arrest climate change by the year 2030: firstly, a target to reduce carbon dioxide emissions by 40 per cent; secondly, increasing use of renewable energy by 40 per cent;

thirdly, effecting improvements in energy efficiency and reducing energy consumption by 30 per cent; and lastly, by introducing wide-scale emissions trading in the EU Carbon market.



Sustainable Development is not a choice but an absolute necessity. ”

HE Mr Lyonpo Yeshey Dorji



The four Es of fighting climate change: Enabling, Exemplifying, Encouraging and Engaging. ”

HE Mr Jose Moreira da Silva, Portugal

Centre-stage India

In Conversation with Indian Officials



Sustainability is a function of good planning. ”

Mr Amitabh Kant, Department of Industrial Policy and Promotion



L–R: Mr Surender Kumar, Mr Ajai Malhotra, Mr Gireesh Pradhan, Mr Amitabh Kant, Mr Karma Paljor, Mr B K Chaturvedi, Mr Rajeev Kher, Mr Arunendra Kumar, and Dr S K Sarkar

The session participants were drawn from the top levels of the bureaucracy and included a Member of the Planning Commission, three secretaries to the Government of India in

the ministries of (i) Personnel and Training, (ii) Commerce and Industry, and (iii) one in charge of the Science, Technology, and Environment portfolio at the state level, the senior-most officers

of three important Government bodies: (i) the Railway Board, (ii) the official regulator in the electricity sector, and (iii) a big industrial development project of the Government, in addition to

MODERATOR

Mr Karma Paljor

Business Editor and Senior Anchor, CNN-IBN

CHAIR

Mr B K Chaturvedi

Member, Planning Commission, Government of India

PANELISTS

Mr Amitabh Kant

CEO and Managing Director, Delhi-Mumbai Industrial Corridor Development Corporation

Mr Rajiv Kher

Secretary, Ministry of Commerce and Industry and Textiles, Government of India

Mr Surender Kumar

Secretary, Department of Science, Technology and Environment, Government of Tripura, India

Mr Arunendra Kumar

Chairman, Railway Board, Ministry of Railways, Government of India

Mr Ajai Malhotra

Former Ambassador to Russia

Dr S K Sarkar

Secretary, Ministry of Water Resources, Government of India

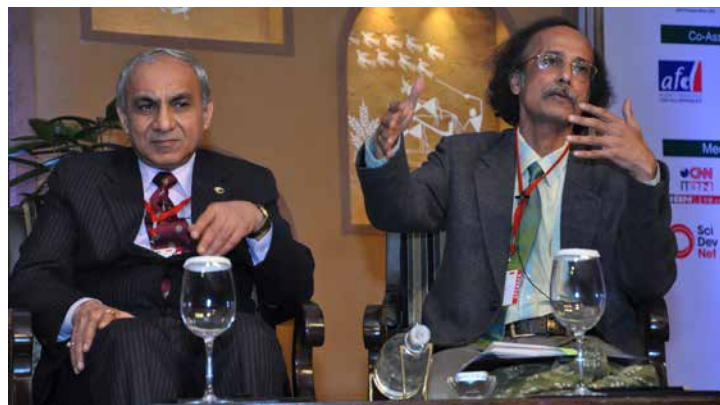
Mr Gireesh Pradhan

Chairperson, Central Electricity Regulatory Commission, India

a former diplomat In his theme setting remarks, Mr B K Chaturvedi underlined the need to provide electricity access to a large section of the population which has remained out of its reach till now. Many people in our country in rural areas still depend on biomass or fuels from organic materials to meet their daily cooking needs, or for space heating. It is necessary to enable them to switch over to cleaner fuels which are more efficient and less harmful to human health. Only then can the goal of energy security be said to have been fully achieved.

India is developing fast and aspiring to attain higher levels of income. But development requires energy to sustain it. This implies that as development progresses our energy requirements will also grow. Therefore, we have to improve our energy availability from indigenous sources otherwise we shall be forced to rely on imported supplies of coal, oil, and gas to satisfy this demand, which will prove to be very expensive. It is therefore imperative that we turn our attention to renewable sources of energy, such as solar, wind, etc.

Another issue of prime concern is augmentation of water resources in the country. None of our major cities are self-sufficient



in water supply. Gross misuse and unchecked wastage of water should be prevented to minimize this deficiency and improve the situation.

Production and supply of food is contingent upon availability of energy and water. If we have adequate water and energy, food production will go up. All these issues have to be dealt in an integrated manner to ensure sustainable development.

In reply to a query from the audience regarding the provision of subsidies for farming of certain food crops that are both water- and energy-intensive, he stated that the practice of providing free power to farmers must be abolished immediately. After all, when something is available for free, it will not be valued at all. At present, such copious

water utilization is not even being metered thus opening the floodgates to indiscriminate use of water. The problem is that the centre and the states do not always think alike because of their different compulsions and building consensus becomes difficult. But if we are serious about efficiency, we must consider abolishing all wasteful subsidies.

We must invest in water-saving technologies and adopt progressive methods of farming as is being done in the agriculturally advanced countries and can also be found in some Indian states. Only such a strategy can prevent wastage and improve efficiency of use. The principle of efficiency of use should also govern electricity and oil and gas. Significant gains are to be had from developing renewable



energy substitutes and effect savings on oil and gas.

India is urbanizing rapidly and this process presents formidable challenges as more and more people migrate to cities in search of employment or in pursuit of business opportunities. It is a known fact that cities are major contributors of GHG emissions. This urban migration will put severe pressure on municipal systems and functions. To tackle this large influx in urban areas, according to Mr Amitabh Kant, we have to find new and efficient ways to provide water and power, build roads and other infrastructure, control traffic and pollution, and it all being underpinned by an effective system of governance. Every city sits like a giant spider on

its public transportation network. It is, therefore, necessary to keep the arteries of the network working smoothly at all times for the city to be able to function well. It is in this context that the pioneering Delhi–Mumbai Industrial Development Corridor project of Indian Railways assumes relevance. By building a Dedicated Freight Corridor, it will cut travel time between the two important commercial centres from a couple of weeks to only a few hours and facilitate quick and easy transport of container cargo. The project is said to be nearing completion.

The project also envisages setting up of seven new cities on either side of the corridor on the design of the so-called smart cities that provide high quality of life through use of ICT

applications. The sudden increase in population in these new cities will naturally demand matching infrastructure provision. Along with vehicular roads in these cities we must also provide cycling tracks, walkabouts, parks, playgrounds, and open spaces.

Urbanization has reached a level of saturation in Europe and America but India is witnessing an unprecedented boom in construction activity. The DFC project thus affords India a good opportunity to improvise on existing models of smart city development and demonstrate the power of mass transportation and environment-friendly technologies in ushering in the sustainable cities of the future whose ecological footprint is small and whose economic gains are significant. We are extremely fortunate that in this effort we can fall back on the latest advances in digital technology available to us at the push of a button. Building smart cities of the future can go a long way in promoting sustainable development.

In response to the apprehension that cycling would not be very safe in crowded agglomerations, he pointed out that this should be made a part of the planning process from the start

and should make safety an inbuilt component in all infrastructure planning. Such measures are also being adopted in many western countries with benefit.

Mr Rajeev Kher made the proposition that the field of commerce has traditionally been seen as being anti-environment till now, concerned as it is mainly with the production and distribution of goods and services. But now that environmental sustainability has taken centre stage in the process of growth and development, the country is forced to walk a delicate tightrope in meeting its commitments to international trade and also establish its green credentials.

In its latest ministerial conference held in Bali under the aegis of the World Trade Organization, it was decided to ease barriers to international trade. However, many developing countries are unable to appreciate the benefits of such moves that promote trade liberalization and many outstanding issues between member countries persist which prevents consensus on major issues. International organizations in the developed countries of the West would like to lay down rigorous standards of business operation and introduce modern

tools to check the carbon footprint to assess ecological impacts of particular processes. However, the developing countries tend to regard these with deep suspicion and open disfavour as they can potentially harm their business in the immediate term. India has also steadfastly opposed the use of carbon footprinting for trade purposes.

As with all debates, Mr Kher avered, there are two sides to the sustainability argument. But none of these issues can be viewed in isolation but only as one composite, integrated whole.

Mr Surender Kumar pointed to the dilemma facing states of the north-eastern part of the country, particularly in his state of Tripura.

Nature has been kind to the north-eastern region. It is home to one of the most exceptional ecosystems and habitats. It has

verdant hills, thick forests, and enjoys good rains. Yet it suffers from chronic underdevelopment. Despite being home to areas with the highest rainfall in the world, both its plentiful surface water availability and huge hydroelectric potential remain untapped. Consequently, agriculture production is affected in the higher reaches as it is mostly rainfed. Energy generation is also very low because of lack of associated infrastructure.

A Ministry of Development of the Northeastern Region (DONER) is undertaking the task of planning and execution of infrastructure projects for improving transportation, availability of power, and extending the telecommunications network. But it has its work cut out as little development can be done in a region rich in biodiversity without



respecting the guidelines of donor organizations and without overcoming the resistance of the local populace.

Given our finite resources, limited funds, planning and implementation have to be taken up in a scientific and sustainable manner to provide the necessary infrastructure that has the potential for the broadest possible impacts while maintaining the unspoilt nature of the region.

Giving an overview of the huge transportation network he heads, one of the largest in the world, Mr Arunendra Kumar outlined the difficulties that beset Indian Railways in its modernization drive and achieving economies-of-scale. Energy and water conservation are two elements of immediate concern.

Indian Rail incurs a cost of Re 1.37 per tonne kilometre of freight which is quite high by global standards. Outlay on traction, both diesel and electric, is high. Presently passenger and freight trains run on the same track that gives rise to inefficiencies. To overcome this problem, the Railways is introducing dedicated freight corridors that would ease movement of goods and also improve punctuality. Attempts are being made to run



locomotives of higher horsepower while keeping fuel consumption within limits. Changeover to gas-based engines is being experimented with which has successfully been done for cars and scooters. However, for running on long routes, adequate infrastructure of filling stations should be set up. In another attempt aimed at improving energy efficiency, efforts are being made to recover the energy generated during braking and feed it back to the system through overhead lines. The Railways is also experimenting with the new concept of power trading to reduce the overall energy impact on the nation.

There is enormous scope for bringing down water use on Indian Railways, which sees frequent

washing of coaches and railway tracks for better hygiene. With this in mind, the concept of dry, discharge-free, odourless toilets in trains is receiving due attention and trials are on. The initial results have been encouraging and quite affordable.

In keeping with his past experience as a diplomat, Mr Ajai Malhotra began by bringing an international flavour to the discussion. Environmental negotiations and development paradigms are often discussed at a global level but overriding development concerns of poverty eradication and infrastructure development are to be addressed nationally. Yet the country cannot afford to insulate itself from the world but must participate actively in inter-governmental deliberations

and decisions for the greater good. However, such involvement comes with the caveat that one should be careful to accept only such obligations that are not legally binding.

While praising the concept of the high-speed Dedicated Freight Corridor between Delhi and Mumbai that is nearing completion, he cautioned that it is not enough to make cities simply 'clean, green, and efficient'. Citing the example of Delhi's exurb Gurgaon, which today is nothing more than a concrete

jungle serviced by a rapid mass transportation system, he stressed the importance of making cities livable and healthy and not just smart. Encouraging people to take up walking, cycling, solar lighting, segregation and proper waste disposal will pay dividends in time.

Referring to the comments of an earlier speaker on the principles governing international trade and food security, he found it ironic that the rich countries can resort to food subsidies but when developing countries do the same it is seen as being inefficient

and unsustainable. Reacting to the views of yet another speaker before him who pointed to the lack of infrastructure and economic development in the Northeast, he opined that we may take up urban development but always with due care to provision of basic health services and better facilities for the urban poor.

As a former Secretary of the Water Resources ministry, Dr S K Sarkar highlighted the dire situation regarding water confronting the country. It is believed that India is likely to



The session on 'Centre-Stage India' in progress

become a water-stressed country within this decade itself and the situation would deteriorate further in the years leading up to 2050 by which time it is in danger of being declared water-scarce. Augmentation of water resources must therefore be done on a war footing.

It is noteworthy that the Government of India has approved the National Water Mission which has the objective of increasing water-use efficiency especially in the water intensive sector of agriculture. It is critical to achieve efficiency improvements in both demand and supply. The National Water Policy announced in 2012 goes a step further and recommends a system of water pricing to curb inefficient water utilization.

To a question about improving inter-agency coordination, he explained that the difficulty of introducing water use efficiency is compounded by the fact of it being a State subject. The constitution allows individual states to enact legislation quite independent of the Centre. Moreover, there is a multiplicity of Government agencies dealing with water issues at the Central level. He feels that a combination of incentive schemes and reform related measures

can play a very significant role in bringing about efficiency in use of water.

According to Mr Gireesh Pradhan, India's level of electricity consumption is considerably low at present. It is in this context that developing renewable energy can help improve access and also meet the requirements of sustainable development. Citing the example of Bihar which lags on several indicators of economic development, he said that solar pumps of small capacity can be used to pump out water because the water resides quite close to the surface and one doesn't have to dig too deep to reach it. This will provide enough water for irrigation and better agriculture productivity leading to food security.

Regulators in the power sector also now realize the indispensability of renewable sources in the national energy mix and the Electricity Act makes it mandatory for the energy distribution companies to also fulfil their obligations under the Act. Another measure being resorted to is power trading whereby power companies buy power when it is available cheaply.

To a question from the floor regarding his Commission's role in spurring overall development,

Mr Pradhan responded that although the Forum of Regulators has no statutory powers but they function as a think tank and play an advisory role and provide policy inputs to Government that may help inform and refine its perspective on important issues.

Rounding off the discussion, and also echoing the views of one of the speakers, the moderator Mr Chaturvedi observed that in this era of coalition politics our biggest challenge will be to ensure that there is a meaningful partnership between the Centre and the States so that they work in consonance in honestly implementing policies and programmes chalked out in pursuit of socio-economic development.

“Urban poor are growing in number and urban sprawl is increasing.”

Mr Ajai Malhotra, Former Ambassador to Russia

Gender: The Core Issue in Sustainable Development



Gender inequality is a far-reaching societal impairment, not merely a special deprivation of women.”

Prof. Amartya Sen
Nobel Laureate

Pointing out the striking gender imbalance inherent in the composition of the panel, which consisted of five men and one woman, the moderator introduced the subject with a short presentation on the socio-cultural aspect of gender inequality to identify areas of human

development where gender gaps exist and discuss how these affect sustainable development across the four domains of economy, health, education, and politics.

Gender gaps are differences in the outcomes that men and women achieve with respect to employment, the types of

CHAIR

Dr Ligia Noronha

Executive Director (Research Coordination), The Energy and Resources Institute (TERI)

PANELISTS

Prof. Veena Sikri

Convener, South Asia Women's Network (SWAN) and Vice

Chairperson, South Asia Foundation

Mr Muhammad Irfan Elahi

Chairman, Planning and Development Board, Government of Punjab, Pakistan (TC)

Mr Adam Koniuszewski

Chief Operating Officer, Green Cross International

Dr Remi Quirion

Chief Scientist, Fonds de Recherche du Quebec

HE Mr Dasho Paljor Jigme Dorji

Special Advisor, National Environment Commission, Bhutan

Sir Jonathon Porritt

Co-Founder, Forum for the Future



Sir Jonathon Porritt

occupations they pursue, the level of success attained by them, and the income they command in the job market. The presentation provided a framework for capturing the magnitude and scope of gender-based disparities around the world.

Relying on data from the latest Global Gender Gap Report of the World Economic Forum and the Yale University Environmental Performance Index, the moderator attempted to draw a correlation between gender gaps and sustainable development outcomes on the basis of four performance criteria: income, human development, competitiveness, and environmental performance. The Index is designed to measure gender-based gaps in access to resources and opportunities in individual countries rather than the

actual levels of the resources and opportunities available in those countries.

It is seen that the countries with the greatest gender parity are the Nordic nations of Iceland, Norway, Finland, and Sweden, which are also at the top of the income bracket. These countries also do well on the factor of human development. Likewise, competitiveness is also improved. The aspect of environmental performance is also decidedly better in countries performing well on the other three counts. This would suggest a strong interrelationship amongst these commonly accepted yardsticks of social development.

A careful study of national gender gaps would suggest that the gap is gradually narrowing in the areas of education and health. However, there is still

a big difference in the level of participation in economic activity by women in relation to men. This difference is magnified in the case of political empowerment.

Gender gaps are lowest in the USA and highest in the Middle East. Interestingly, however, with regard to the quantitative benchmark index of political empowerment the gap is smallest in countries of the Asia-Pacific. India outperforms even the USA on this score as it has more women in parliament, more number of women having attained high rank in government, and more women having served as the country's executive head during the preceding fifty years.

Providing an interesting point of discussion for the debate, the moderator posed the question as to how can a reduced gender gap and greater women's participation in everyday life affect sustainable development outcomes positively. It is obvious that since women account for half a country's potential talent base,



a nation's competitiveness in the long run depends significantly on how it regards women in the matter of education, employment, and empowerment. Thus, gender sensibilities should be receiving greater attention and the role of international organizations, governments, business, and civil society groups becomes even more important.

During the course of the discussion, and reinforcing a reaction from the audience that there are actually more than two genders, the moderator clarified that the word gender applies to not only men and women but that it also encompasses children. It may be pertinent to mention here that lately a fourth gender has gained widespread acceptance, comprising members of the transsexual community.

Recalling Amartya Sen's description of gender inequality as a deep-rooted ill afflicting society, Prof. Veena Sikri, argued that it is important to see gender inequality not only as a human rights issue. She said doing so only serves to label it as an enduring problem of sociology and detracts from the absolute urgency of addressing the question and emphasized that it should be seen as an unfair

means of deprivation of women which could otherwise result in increased prosperity for the entire community. Reducing the gender gap will result in greater empowerment of both men and women and be good for all.

Women still lag far behind men in terms of salary and job opportunities and this does not benefit anybody in society. In its latest World Development Report, The World Bank makes gender equality a core development objective since greater gender equality can make institutions more representative, enhance productivity, and improve development outcomes for the next generation.

She explained how the argument that gender equality

by itself is sufficient for achieving sustainable development outcomes may be fallacious because there are some countries where gender parity is high but the level of development is still low, like in Lesotho for example. But there is no denying the fact that without gender equality no nation can overcome poverty or achieve its full potential for economic growth and prosperity.

Prof. Sikri makes the proposition that perhaps the MDGs have remained unfulfilled because they see growth as the only acceptable model of economic development to the exclusion of other factors that should also be of concern. As we work on the successor to the MDGs, the proposed



The session on 'Gender: The Core Issue in Sustainable Development' in progress

Sustainable Development Goals must treat gender equality as an independent, stand-alone goal and also as a cross-cutting goal in every sector of economic development, be it education, health, or climate change.

Prof. Sikri also suggested that gender budgeting can be an effective tool for women's empowerment and gender auditing should be introduced in the Government's functioning in all areas that touch upon public expenditure and policy, indeed in all enterprises that employ men and women. It is important to ensure that the money that is being spent is done so equally on men and women and brings benefits to men and women equally. Women should be seen as agents of change. They should be allowed to participate in the process of development so that their voice is heard.



Mr Muhammad Irfan Elahi on the podium

Her South Asia Women's Network, which includes the eight SAARC nations and Myanmar, has created a roadmap for sustainable development for the women of Southeast Asia which seeks to engender a new socio-political order, a new environmental order, and a new economic order which will lead to greater women's participation in society. In the words of the Nobel Laureate Muhammad Yunus of Grameen Bank fame, giving money to a woman brings significant changes in the pattern of spending and benefits society as a whole unlike in the case of men.

During Q&A, she observed that an effective way to sensitize men towards women is by beginning the process of education early at the primary school level itself giving due regard to how women are portrayed in textbooks and to also conduct a gender sensitive

review of all textbooks. Women can also play a useful role in peacekeeping and conflict resolution because they can better appreciate its ramifications, find local solutions acceptable to the whole community, and resolve the matter quickly.

Dispelling any notions of gender discrimination prevailing in his country, HE Mr Dasho Paljor Jigme Dorji, drew himself up to his full height to reveal his dress, a knee-length garment that looks much like a skirt, as if to suggest that it is the women in Bhutan who wear the proverbial pants in the house.

Women in Bhutan have great privileges like being the decision-makers in the family and enjoy the right to inherit property. But they put the family at the center of their concerns and so their involvement in many other activities is so much reduced. They are not

interested in taking up a regular job in government or elsewhere. However, that attitude is changing now with effective education and political empowerment. Many women in Bhutan today occupy positions of power and influence in government, public sector undertakings, educational institutions, and civil society organizations. They are represented in foreign affairs, the legislature, and have also entered politics. In a light-hearted comment on their continuing sway in Bhutanese life, he remarked that the woman's sphere of influence now extends even to the royal household where the king has four brides.

Continuing the banter on the gender imbalance existing in the panel where the men outnumbered women by five to one, Mr Muhammed Irfan Elahi, concedes that this only proves that the female sex or the fairer sex, often called the weaker sex, is really the stronger sex.

Mr Elahi reminded everybody of their responsibility to preserve and protect our planet for the sake of future generations and that this principle should be made the cornerstone of human development. The entire process of growth and development stands

to gain from striking the right balance between the economic, social, and environmental objectives of sustainable development and integrating them wherever possible. On the other hand, failure to close gender gaps invariably translates into nation's inability to advance on sustainable development outcomes. Although gender gaps have narrowed over the past two decades yet substantial inequalities remain across every developmental priority from political participation to economic inclusion and pose a significant challenge across all sectors.

The Pakistan National Sustainable Development Strategy lays stress on the protection of women's rights through appropriate legislation to grant them greater control over matters

concerning land, energy, food, water, and sanitation. Women and girls are discriminated against in health, education, and employment with negative repercussions for society.

The proportion of girls in schools and universities is going up which has a roll-on effect on productivity, reduction of poverty, and in making institutions more representative. These trends are visible globally. Gender gaps have almost been eliminated in primary education and are fast reducing in secondary education. In fact, a pattern of more girls attending school and college can be seen now in emerging economies, particularly in some countries of East Asia, Latin America, and the Caribbean. Women now represent 40 per cent of the global labour force, 43 per



L-R: Mr Adam Koniuszewski, Mr Muhammad Irfan Elahi, Dr Ligia Noronha, Dr Remi Quirion, Prof. Veena Sikri, Sir Jonathon Porritt, and HE Mr DASHO Paljor J Dorji

cent of agriculture labour force, and more than half of the world's university students. And with this strength, if used appropriately by imparting skills and eliminating barriers that discriminate against women, the productivity can increase by no less than 25 per cent.

Gender equality benefits society in many ways. The governments by making it a priority can make a change in other fronts, such as health, early childhood care, nutrition, water and sanitation, community empowerment, and reduction of child labour because all these would be reduced if the women are empowered and we reduce the gender inequalities.

Mr Elahi sets out a broad six-point agenda for closing the gender gap. These can be stated as follows: identify the constraints that limit development and prioritize them, focus on those gender gaps where the development dividend is likely to be the highest, provide an enabling infrastructure and regulatory framework to remove the constraints, encourage merit while abolishing quotas, and make adequate financial allocation for tackling these challenges.

Mr Adam Konuszeuski stressed that sustainable development can be better addressed if our investments have the maximum possible impact on social and environmental challenges and also bring in a profit. Considering the gender aspect of the investment decision is of prime importance. Glaring gender disparities confront us to the disadvantage of the womenfolk and society at large. He explained how a higher proportion of men are in positions of influence today than women which is quite an anomaly given their similar abilities and mentioned that women work longer hours, having to work both inside and outside the house, but a lot of that work goes unpaid.

Making reference to an earlier presentation on introduction of cookstoves, Mr Konuszeuski found it puzzling that it was the men who were resistant to change even in a matter chiefly concerning women and one which directly results in mitigation of air pollution. He felt that it might be instructive to look at the contribution to energy use, pollution, and carbon dioxide emissions made by men and women separately. He is of the view that this should

be a major concern because cities in Asia will undergo rapid development in infrastructure and transportation projects and the voice of women stakeholders should also be heard as they are equal partners in progress. The present inequality can deeply threaten our long-term prosperity by giving rise to more strife.

Green Cross International, of which Mr Konuszeuski is the COO, works on improving access to water and sanitation in Latin America, Asia, and Africa. These activities involve provision of rainwater harvesting systems, wells, boreholes, ecological latrines, all of which benefit women directly in their livelihoods, income status, and their ability to participate in decision-making. In Green Cross it is mandatory for all projects to have at least 60 per cent women's representation on their committees.

Mr Konuszeuski was hopeful of the prospects of collaboration between his organization and TERI.

According to Dr Remi Quirion, the Government of Quebec in Canada has initiated strategy to fight climate change. Quebec is a huge land with very cold temperatures and is home to the indigenous Inuit population,

the local Indian population and many whites.

Climate change is affecting Quebec seriously. He said the region experiences severe cold, population is growing, housing is limited, houses stand on shaky foundations of permafrost, and social change is taking place very fast, being fuelled as it is by the cyber media and social networking services, such as Internet, Twitter, Facebook, giving rise to all its attendant disorders including addiction, violence, and suicide. With all these social problems, the issue of sustainable development is not being taken seriously.

In its search for gender equality, Quebec lays stress on what the speaker calls the 4 Es: Equality, Environment, Economy, and Education. The key is providing equal opportunities for men and women at all levels of society, environmental problems need solution, and the economy should witness consistent growth. But the most important factor is education, especially higher education for women.

Sir Jonathan Porritt believes that the issue of sustainable development cannot be resolved by cutting-edge technological advance, weight of economic compulsion, or force of political

movement but by instilling in young men and women the importance of their role in changing society in ways that treat women and men as equal partners in progress. The notion of patriarchy that puts man at the head of the family needs rethinking.

Of utmost importance is to avoid violence against women in all forms and to that end we need to make deep structural changes in society. The press today is rife with instances of sexual atrocities against women and children. Coupled with unrestricted availability of sexually explicit content in the social media, this easy access to salacious material is corrupting young minds and bringing out the animal spirits in man.

Sir Jonathon concurred with some of the earlier speakers that women worldwide contribute two-thirds of the hours worked, earn one-tenth of the income and own a lot less property in the world today. Any examples of successful women who have reached the pinnacle of achievement in their chosen fields are few and far between, they are more like exceptions to the rule. To him, therefore, the eco-feminist view that subordination of women in families and society leads

to degradation of nature is not entirely without basis.

He emphasized that we must promote greater empowerment for women in both politics and business. On the role of women in business, Sir Jonathon referred to the thinking of Christine Lagarde, the current head of the International Monetary Fund, who early in her professional career was of the opinion that fixing quotas for women is by itself restrictive and goes against the very concept of promoting a system of meritocracy and fostering competition.



Gender is central to success in sustainable development.”

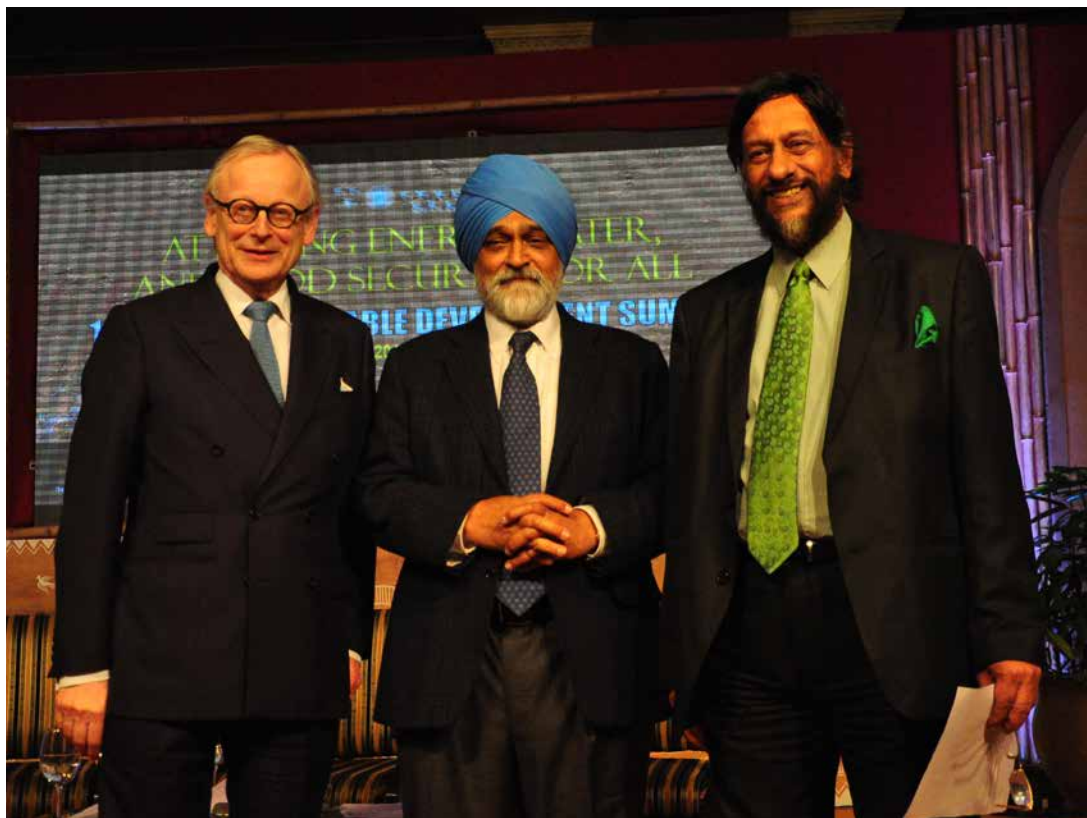
Dr Remi Quirion
Government of Quebec



Gender inequality is a far-reaching societal impairment, not merely a special deprivation of women.”

Prof. Amartya Sen
Nobel Laureate

Valedictory Session



L–R: Rt Hon'ble John Gummer, Lord Deben, Mr Montek Singh Ahluwalia, and Dr R K Pachauri

The Valedictory Session started with opening remarks from the chairperson, Rt Hon'ble John Gummer, Lord Deben, Former Secretary of State for Environment,

and Member of Parliament, House of Lords, UK. He congratulated the organizers upon the successful completion of DSDS 2014, and highlighted the achievements of

the various sessions conducted during the conference. He then invited Mr Montek Singh Ahluwalia, Hon'ble Deputy Chairman, Planning Commission

to make his valedictory address. Congratulating TERI on the success of the summit, Dr Ahluwalia noted its contribution to awareness generation on sustainability issues. Speaking on the thematic focus of the conference, he stated that the difficulty of handling scarce resources lies at the heart of sustainability.

In his opinion, from a sustainability point of view, food security is not a problem in the same way as water security and energy security are. Therefore, greater attention should be given to issues of both energy

and water as challenges to sustainability. He opined that most people now recognize energy as a problem. Linking the issue of energy production with energy supply and energy efficiency, he stressed the issue of effective energy pricing. Turning to water, he highlighted the criticality of this highly scarce domestic resource, reminding delegates that that we need to be more concerned about water considering there is no scope for importing it. He said that in spite of not having a global externality like carbon emissions, the domestic externalities of water are huge. However, the most

important aspect before us is the need for change in the present mindset where there is little public acceptability to pay for water.

The Valedictory Session ended with a vote of thanks by Dr R K Pachauri, Director-General, TERI. He thanked the sponsors for their generous support, and the speakers and guests for their considered views and active participation in the deliberations. He noted with appreciation the efforts put in by the organizing team and the TERI family in making the Delhi Sustainable Development Summit 2014 a success.



The Nicholas Georgescu-Roegen Awards

The Nicholas Georgescu-Roegen awards were launched at the Delhi Sustainable Development Summit 2012 on his 106th birth anniversary. In his introductory comments, Dr R K Pachauri, Director-General, TERI, outlined the significance of the awards and the work of Dr Nicholas Georgescu-Roegen.

Georgescu-Roegen may be called the Father of Bioeconomics, a branch of social economics that attempts to build a comprehensive theory of economy and society governed by certain biophysical constraints. Georgescu-Roegen's work revolved around human interactions with the environment, issues concerning food and hunger, land, capital, labour, resource scarcity, and social institutions as propounded by the classical English economist, David Ricardo, and linking it to traditional knowledge.

The awards are made in two categories: Unconventional Thinking, and Bioeconomic Practice. The seven-member jury awarded the Nicholas Georgescu-Roegen Award 2014

in the former category to Prof. Inge Ropke of Aalborg University, Copenhagen while the corresponding award in the other category went to the Western Ghats Ecology Expert Panel chaired by the eminent ecologist, Prof. Madhav Gadgil.

In her acceptance speech, Prof. Inge Ropke felt that Georgescu-Roegen should have been considered for the Economics Nobel and that TERI has done a great service to the cause of modern ecological economics by instituting an award in his name.

Being the first to be appointed to the professorship of ecological economics in her University, Prof. Ropke felt that the award was due recognition of the importance of this emerging branch of social science to tackle problems of the environment and sustainable development.

Georgescu-Roegen's work is increasingly relevant today. Everywhere we appear to be pursuing growth for growth's sake regardless of the biophysical limits to economic growth in the

“
Rethink development beyond the 'growth first' paradigm.”

Dr Ligia Noronha, TERI



Prof. Inge Ropke receiving the award

form of pollution, contamination, and wastage of resources. If we continue to pursue development with the usual means of production and consumption, our society will die out faster than if we followed small-scale production, employed resource-saving technologies, and followed limited consumption patterns.

The award was received by Dr Ligia Noronha from TERI on behalf of the Western Ghats Ecology Expert Panel chaired by the well-known ecologist Prof. Madhav Gadgil.

The panel was set up by the Ministry of Environment and Forests, Government of India, to explore the issues surrounding economic development in the



Dr Ligia Noronha from TERI received the award on behalf of the Western Ghats Ecology Expert Panel chaired by the well-known ecologist Prof. Madhav Gadgil

Western Ghats with due consideration to the environmental sensitivity and

geographical significance of the region.

In their report, the panel has suggested a policy framework that tries to achieve economic development without sacrificing ecological sustainability. This has been done based on a partnership between science, state, and the citizens. It is felt that the report has generated an enormous interest in rethinking development beyond the 'growth first' paradigm.

Dr Ligia Noronha hopes that this award will help fuel a further interest in bioeconomic-based development policy approaches and more equitable and sustainable frameworks for India and for other parts of the world.



Dr Ligia Noronha

Signing of MoU with Jain Irrigation Systems Limited



Mr Anil Jain and Dr R K Pachauri signing the MoU

On the occasion of 14th DSDS, TERI entered into an agreement with Jain Irrigation Systems Limited (JISL) to collaborate on research in the critical area of water resource management that can bring benefits to the entire country. Dr R K Pachauri, while signing the MoU expressed his extreme happiness at this collaboration.

JISL had humble beginnings and is headquartered in a remote part of the country in the western state of Maharashtra which was quite devoid of economic

activity at one time and quite untouched by the spread of development. However, with its emphasis on judicious water management, development of appropriate interventions, and use of renewable energy technologies, the company has been able to transform the barren countryside into an oasis of plenty. JISL's model of sustainable development can hold useful lessons for other parts of the country as well, especially those located in difficult and inaccessible terrain.

Stating that TERI has established a full-fledged Water Resource Management division for furthering the objectives of the collaboration, he invited Mr Anil Jain, Managing Director of JISL, to say a few words on the occasion.

Giving a brief history of JISL, Anil Jain said JISL is a 50-year old company and for a major part of that period it has been guided by a philosophy of 'more from less'. It is particularly noteworthy that the group has followed this principle, which is the very crux of sustainable development, since the time when people little realized its importance to the welfare of humankind and at a time when the phrase had not even gained currency in common language.

'JISL has successfully expanded its corporate philosophy and today strives to provide not only 'more from less' but 'more from less for more', that is, it aims for the greatest good of the greatest number. This enables small farmers to be significantly more productive while efficiently saving

water and energy, and limiting use of fertilizers and pesticides thereby leading to substantially increased incomes and enhancement of livelihoods.

Agriculture or irrigation water is the single biggest user of water in India, accounting for about 83 per cent of the national average. It is therefore, obvious, that savings on this front will make more water available for the industrial and domestic sectors. Such an approach would be greatly helpful in preservation of what is undeniably our most precious natural resource.

The Company's guiding philosophy is that 'We have not inherited the earth from our ancestors but have received it on



Mr Anil Jain and Dr R K Pachauri



loan from our descendants' so that it is our bounden duty to leave it in better shape than we found it.

The new Water Resource Centre established under the TERI-JISL partnership at Delhi and the Company headquarters will work towards closing the widening gap between what we profess outwardly and what we practice in reality. It will aim to initially engage the small farmers and society at the micro level for bringing about all-round improvements in water management, agriculture, food

processing, and value addition of farm products.

Mr Anil Jain reiterated the durability of the agreement and reaffirmed his commitment to the TERI-JISL tie-up.

“Agriculture is an article of faith with us.”

Mr Anil Jain, Managing
Director of JISL



Thematic Tracks



Promoting Energy Efficiency of Micro, Small, and Medium Enterprises (MSMEs)

In Partnership with SDC



L–R: Mr Girish Sethi, Mr Hideaki Domichi, Dr Veena Joshi, Dr Ajay Mathur, Prof. Hironori Hamanaka, Dr Pradeep Monga, and Mr Jean-Yves Grosclaude

Many livelihoods in India are supported by MSMEs. Many of these MSMEs operate in highly competitive markets, so changing their business practices and upgrading technologies to more efficient ones is more a challenge than an opportunity.

The SDC–TERI partnership aims to support small and medium enterprises in improving their technologies and help reduce some of their energy costs as well as improve their business prospects in the process. The thematic track was an opportunity

to review approaches that have been used in working with MSMEs and examine the results achieved so far. It has helped identify practices that have worked or those that need to be improved upon. It has also helped establish a forward looking strategy and provided useful lessons on how further synergy in operations could be developed to usher in collaborative approaches which directly address their needs and help them improve their energy efficiency. The session opened with an Ernst & Young presentation which showcased their findings on the approaches that have been used in these studies and also informed the audience of the results achieved through the adaptation of these approaches. The session was of special relevance because MSMEs in India, and actually

in almost every country in the world, occupy a special place in terms of innovation; export; and in providing employment. An important issue is how to address the issue of promoting energy efficiency in MSMEs as human capacities are relatively limited. The panelists included Mr Hideaki Domichi, Senior Vice President, Japan International Cooperation Agency (JICA); Mr Jean-Yves Grosclaude, Executive Director (Strategy), Agence Française de Développement (AFD); Prof. Hironori Hamanaka, Institute for Global Environmental Strategies (IGES); Dr Veena Joshi, Senior Advisor, Swiss Agency for Development and Cooperation (SDC); Dr Pradeep Monga, Director of the Energy and Climate Change Branch at the United Nations Industrial Development Organization (UNIDO); and Mr Girish Sethi, Director, Industrial Energy Efficiency, The Energy and Resources Institute (TERI). The session was chaired by Dr Ajay Mathur, Director, General, Bureau of Energy Efficiency (BEE), India.

The presentation by Ernst & Young showed how the various policies to promote energy efficiency in MSMEs have worked so far. After the presentation, the

Chair invited panelists to share their views on what more needs to be done, what the panelists themselves are planning to do in this regard, and discuss their experiences, either in their interventions in India or globally.

Dr Veena Joshi shared her experience of how TERI and Development Alternatives were perhaps the only two organizations to start work in this field 20 years ago, much before the setting up of the Ministry of Micro, Small and Medium Enterprises, Government of India. However, to date the work in this field continues to remain in its nascent stage.

In the beginning, when sectors for intervention were being shortlisted, a suggestion put forward was that of buildings. SDC

had poverty as an area of focus but as the subject of buildings was not in their core competence, low capacity end-uses were chosen instead. Almost six years ago work on buildings started when India entered the new league of fast-growing countries. It came as a huge opportunity to make knowledge-based interventions in the MSME sector. It is important that we bridge the information gaps and strengthen the baseline. The MSME Ministry has invested time and effort in compiling an overview of different interventions which identifies strengths and weaknesses and areas that need immediate attention. Also the information on what the entrepreneurs are doing in this context needs to be studied.



This was a proposition which she recommended this forum should take up.

The buildings programme has benefited immensely from the energy conservation building code as a framework, a similar framework is needed for the MSME sector as a whole. There is a lot of scope for innovation in the smaller capacities where one is faced with extreme diversity. Templates and guidelines are the best way to handle diversity. An interesting example of this in the building sector is the development of templates for small town buildings developed by SDC. There is also a need to map institutions bottom-up. Efforts should be made to conduct resource mapping exercises cluster by cluster—district-level institutions, the local bank, industry associations—to identify industries that could grow based on locally available raw materials and to create a pool of skilled manpower for the industries. These should be aggregated at the state level and then brought to BEE and the Ministry where it will be consolidated to build a comprehensive programme of action.

Mr Hideaki Domichi said that as compared to Japan, India's

use of primary energy is 7.8 times higher. The demand in India will continue to grow, but in order to achieve economic growth, energy security, and environment preservation simultaneously, it is essential to improve energy efficiency and there is a tremendous scope therein. The Japanese experience witnessed the rise of energy consumption in transport, residential, and commercial sectors in proportion to GDP growth. But a dip was noticed in the industrial sector in absolute terms as a result of their efforts. A similar situation can take place in India, especially in energy-intensive sectors, such as steel, cement, chemicals, paper, textile, and food processing. He said these sectors may be called heavy industries, but the energy use of India's MSMEs is estimated to be about 25 per cent while they account for 45 per cent of all industries and the number is on the rise, thereby making it important to improve energy efficiency of the MSME sector.

It is known that the MSME awareness on benefits of improving energy efficiency is low but experience shows that SIDBI financing to MSMEs—an activity supported by JICA for improving energy efficiency—has been

extremely effective. It has resulted in an achievement of 36 per cent energy efficiency and significant increase in profits made by these MSMEs. However, only about 6,000 MSMEs were covered by this programme which forms only a small fraction of the total. He emphasized that all the challenges that have been discussed during the session should be combined in order to derive concrete benefits. He also said that the progress of India under the leadership of BEE should be praised but if the energy cost is very low, it becomes difficult to create incentives. The energy cost and introduction of new technologies particularly on renewable energy is related. The other issue is that relevant data is absolutely essential and there is a lack of this in India.

The chair laid stress on three specific issues. First, energy per unit of GDP being the commonly accepted standard of comparison, a problem arises in cross-country comparisons because one has to convert all figures to dollar terms. Till July 2013, the Indian energy intensity in purchasing power parity terms, not market terms, was 0.14 kg of oil equivalent per dollar of GDP. In three months, as the rupee fell in value it became 0.19 kg but nothing changed. This

is anomalous. Therefore we index it to rupee of GDP, so now its KGO per rupee of GDP. We index 2000 as 100 and then see the effect on energy intensity. Thus this issue of inter-country comparison becomes a little difficult. The second issue is that energy costs in India are very high. Probably the only other country in the world that has high energy costs is Japan at 14 to 20 cents per kilowatt hour of electricity, \$650 per tonne of fuel oil, 1.5-2 cents per 1,000 kilo calories of coal. The Indian industry and commercial buildings barring agriculture and low income households face amongst the highest energy prices in the world which should serve as a strong motivator for achieving energy efficiency.

Another point that was discussed was the issue of the JICA line of credit and the linkages with technology templates. A question put forward was if these templates can be tweaked sector-wise or cluster-wise. This implies more effort in the beginning but we will probably have greater depth of understanding. The second issue is, has equipment-based financing restricted larger investments? There is no denying, however, that it is giving MSMEs a feel of the kind of benefits energy efficiency

investments can bring in. Another important question is, when do we move from equipment-based financing to project-based financing? Prof. Hironori Hamanaka then shared his experience of implementing a project that advocated the introduction of low-carbon technology applications into MSMEs in India, which in his opinion demonstrated a significant potential for energy efficiency improvements and the reduction of energy costs and carbon emissions. The project has adopted a multi-stakeholder approach and successfully engaged the private sector both from India and Japan and a broad range of activities were executed including capacity-building and awareness generation. Pilot projects were undertaken which involved the application of different low-carbon technologies followed by impact monitoring and evaluation. Capacity-building and awareness generation activities have been conducted including on-site workshops targeting MSME managers and workers at unit level, cluster workshops focusing on business entrepreneurs, business associations to introduce low-carbon technologies including best operating practices or BOPs, training Indian

auditors, training of trainers on BOPs both in India and Japan and facilitating interaction with policy-makers through seminars, policy dialogues, and symposiums.

These had resulted in an increase in energy efficiency in a large number of units where these interventions had been employed. These experiences had also led to the establishment of a good network of enthusiastic Indian businesses which were keen on pursuing further collaboration. The next important question he addressed was how to replicate and scale-up energy efficiency in Indian MSMEs at cross-levels or even sectoral levels. Important next steps include dissemination of findings providing inputs for relevant policy processes, and extending the network to reach out to financial institutions, private banks, energy service companies and other regional and national organizations. What is most needed is a synergy amongst stakeholders, follow-up activities are essential to replicate scale-up and handholding and match-making among stakeholders is crucial. Information sharing is more important than funds availability because funds will be better allocated based on individual strengths, capacity, and awareness.

Dr Pradeep Monga presented UNIDO's work in the field of industrial energy efficiency, the only UN agency focusing on industrial development.

UNIDO's mandate is to provide for an inclusive and sustainable industrial development in developing countries and economies in transition. UNIDO focuses on three areas whenever work is initiated in any country. It begins with an examination of the status of technologies, processes and management practices as benchmarking provides a ready reference point. It is a practice followed not only across countries and within countries but also within states. Second, focus is put on energy management systems as most people understand energy-efficiency from the technological or financial point of view. But it also has a management challenge inherent in it. Energy-efficient practices start from the CEO and are thus a top-down approach, not a bottom-up approach. That is, unless the CEOs and the board of directors and the senior management are really convinced about advantages of employing energy-efficiency measures across organizations,

until then it is only tinkering at the periphery. UNIDO has had a very successful experience with Toyota in South Africa where the payback period was less than a year. UNIDO also came up with a practical guide, with a particular focus on MSMEs as MSMEs need more help than large enterprises that have the advantage of skills, large resources and access to global knowledge but the MSMEs lack in these areas. UNIDO is part of the global standards on energy management launched in 2011 and together with partners like the BEE in India, in every country they are instrumental in looking at how can these global standards be brought down to a country, state, and enterprise level. These are voluntary standards which can make any enterprise effectively competitive so far as energy efficiency is concerned. The third area where UNIDO is working is systems optimization. When energy-efficiency is talked about mention is made of components—pumps, compressors, and fans. There is no systems approach. Most often the pumps are efficient but then the compressors are not. So, as a result the system efficiency levels are low and they can drop down from 80 per cent to almost 30 per

cent in some cases because of the system's problems. Efficiency can easily rise by 20–25 per cent if we adopt a systems approach and that is precisely what UNIDO is doing in many sectors.

Among the other suggestions made by Dr Monga were that convergence is required not only at the national level but also at state and district levels where the need is for out-of-the-box solutions to bring in public-private partnerships. Second, attention should be paid to transactional costs. Besides financial technology there should be social engineering too built into the programme. In India, a cluster programme has been implemented by UNIDO which brings clusters of industries together and makes them more of 'partners' than competitors in knowledge sharing. This element of social engineering has had a very high success rate, however the diversity is to be approached in a cluster-specific manner. Finance and training needs all differ within clusters depending on where they are located. It is essential to capture these differences in order to make the business model sustainable. Thirdly, in financial institutions and banks, there is very little awareness with

managers on energy-efficient projects and knowledge about how to incentivize is minimal.

MSMEs have to be essentially provided with incentives to be made more energy-efficient. They are open to guidelines and demand tools in order to be empowered and this is where the role of agencies like the BEE becomes crucial. The project has to be bankable in order to be sustainable. Fourth, when talking of energy efficiency for MSMEs, we don't talk about opportunities for renewables. All energy incentive clusters one way or the other use oil, gas, coal or electricity and renewables can provide a lot of incentives and meet a part of that requirement, if not fully. We must converge energy efficiency and renewable energy as almost 40–50 per cent of the need for diesel and coal can be reduced by introducing solar or biomass gasification technologies. In India, UNIDO works with FICCI, CII, and other industry associations in promoting energy efficiency. However, in India work does not have to start from scratch. BEE, and other national agencies and departments have become proficient in promoting, monitoring and evaluating energy efficiency-measures adopted in

various establishments. However, innovations in the area of energy efficiency for MSMEs are not being recognized. The challenge is to recognize and nurture them. To achieve this, the MSMEs themselves need to innovate. Why does India have to borrow technologies from others when they can be leaders in some technologies too? The answer is to clearly identify, nurture and scale up innovations and make it a bankable project. Here India can play a very important role for promoting South–South cooperation and transferring best practices to other developing countries in need of such interventions. It is important to document best practices and disseminate it as part of South–South cooperation.

Aspects that are important are a systems approach rather than individual equipment approach. The second issue is empowering financial institutions. What does it mean? What do we do to empower them? And the third issue is innovation, its development and its dissemination.

Mr Jean-Yves Grosclaude informed the audience of how the Agence Française de Développement (AFD) decided about 3–4 years ago that 50 per

cent of its activity should be climate-friendly. In any country, it is essential to first to understand its specific needs and then devise solutions. In India, two very important factors are the human sector and the cost of energy in production. Hence, the best way to intervene in the field of energy-efficiency for a financial institution could be done in either of two ways, one being direct loans with the inherent risk of insolvency and non-repayment. Bulk of the production in India takes place in MSMEs. They started with a credit line for MSMEs with a lot of conditions so that they could understand what it meant to work in the MSME and energy efficiency sector in India. Three main ideas came out. First, they tried to convince the manager who was not so keen to change the existing production chain. So they had to make a convincing argument that the idea to work on energy efficiency may be profitable and when you talk about money you are in fact talking of energy as cost of energy is very high. The second point is that different measures are needed for different situations. Thus different ways had to be devised for reducing transaction costs bearing in mind the differences in industry, area,

and country. Also, there is lack of accurate data to estimate savings and the MSMEs have to be relied on for the figures they present. Data collection is a problem and so measures have to be taken whereby the MSMEs take on the task themselves. Presently, one convinces a financial director of a company to experiment with a new technology, this in turn may lead to finding many more innovations or lead to the discovery of some other difficulties instead of working only on the savings component of the existing process. Finally, this question of management leads to what we refer to as a process system. Very often when we talk about energy, we refer to a specific equipment or a very specific situation in a sector. But it is often discovered that a lot of energy can be saved in the entire process. In conclusion, he said that there is no single solution even in one country irrespective of its size. Therefore, some very specific objectives—economic, technical, and organizational—are required but after that one has to adapt to each situation in each area. The two most important aspects that have to be stressed are capacity, building and equity in terms of having access to local financial institutions and for a guarantee or

collateral which is very important for the banking system to provide funding.

The audience was informed that BEE has just launched a partial risk guarantee facility which could provide guarantees to financial institutions who lend to MSMEs for projects that are performance based. If there is a default in payment because of performance risk, the financial institution can be reimbursed 50 per cent of the amount guaranteed. But again this is a new strategy, we will have to see how it actually works out. Mr Girish Sethi commented on the technological and financial approaches based upon TERI's work on the ground in association with SDC over 20 years and in the last 4 or 5 years with JICA and Japan Science & Technology Agency (JST). He emphasized that before technologies are discussed it is also important to categorize the MSMEs, not the definitions from the perspective of micro, small or medium which are defined as per the MSMEs Act of the Government of India but generally speaking they could probably be divided into two broad categories. One would be the old traditional small and micro enterprises and the other would be the more advanced type

where they have adopted some newer approaches. The brick industry has been using the same technology for ages. Our friends and colleagues from outside India would not be familiar with the manner in which we actually make bricks. As per TERI estimates it is probably the third or fourth largest consumer of energy in India and almost all the units in this sector fall in the micro category. Other examples could be those of the brassware industry and the glass industry which are traditional industries where a home-grown or customized solution is required to tackle the issue of technology improvement. Yet another example could be the sunrise industries—pharmaceuticals or formulations, and some auto ancillaries, which are linked with the large automobile manufacturers like Maruti and others who have good systems in place and may even have the MSME follow guidelines set by the large Japanese automobile manufacturers. So this is one basic difference we should take into account. And from our experience there are large opportunities which are available in these traditional industries in terms of energy efficiency. As pointed out by speakers earlier, in the use of specific equipment like

compressors and pumps, what is extremely important is to employ a systems-based approach. Simply changing a part here and there will not yield the desired results though these may result in a 10–15 per cent improvement. But when process-based improvements are made they can easily result in improvements of 25–30 per cent. Process technology is the hardest to improve, whereas pumps, boilers, motors are easier. Savings on energy does not imply electricity saving. It is energy savings per se. Hence the basic premise is that energy saving in process-based industries and with process based technologies is much higher, around 35 per cent. However, most of these technologies, for example a furnace, need a lot of re-engineering. While working with melting furnaces in glass industries near Agra, savings of the order of 30–35 per cent have been achieved. This was possible due to a detailed technological needs assessment, subsequent development of technologies to suit local needs, following the bottom-up participatory approach by working with the entrepreneurs and also skills pooling. Next is the subject of dissemination, which is of extreme importance. A technology which was developed

in 2000–01 took more than 10 years before being transferred to the entire cluster. Thus, dissemination is an extremely important element and as a part of dissemination, handholding which local entrepreneurs need has to be provided. In this context, the role of LSPs, or local service providers, is another extremely important aspect. Whether they fall under policy or financing categories is debatable but it is essential to have programmes where handholding can be extended to small local service providers who will in turn be able to provide support to MSMEs. Speaking from experience, Mr Sethi made two additional points with respect to his work with private players from Japan. Japan is a leader in technologies and there are many small-time technologies where one can really learn a lot from the Japanese. One is to take these demonstrated technologies forward but there are many others where one can actually collaborate internationally and explore new technologies and improve on them. The second is to learn from the whole issue of baselines and ensuring savings. Working with Japanese technology suppliers, before the technology was demonstrated,

yielded the data of almost one year of each parameter of baseline and after the technology has been demonstrated data is still being collected. The intention is to continue with this for one more year post-demonstration. So, season-wise, day-wise data is available thus contributing to an effective monitoring of savings. This may lead to increase in transaction costs but the savings will be significant. The need for cluster specific programmes is supreme. As far as financing goes, it should not be just banks going to MSMEs but also the other way round. Last but not the least is the issue of pricing of fuels and subsidy. The price of natural gas has increased by 44 per cent and that of electricity has increased by an equal amount for the entrepreneur. One really doesn't know how things will turn out unless one makes these corrections because the entrepreneur always has the option to use another fuel. There are many examples of differences between the prices of different fuels: electricity vs coal, electricity vs oil, and natural gas vs biomass. Many interrelated issues are there so it is not only limited to technology or financing but also the issue of pricing really plays an extremely important role.

The chair summed up the discussions remarking that it is essential for innovations to have local service providers. Local associations tweaking both technologies and programmes to individual clusters is something that finds widespread acceptance. Reviewing all that has been said, a few points stand out in almost every intervention. One is the issue of project vs equipment. What is the better choice? The second is how does one get financial institutions interested in lending to MSMEs and also the other way round, that is getting the MSMEs interested in availing loans from banks. The third is the issue of skills upgradation. It is an important issue being denied its due attention from operators of local service providers or local associations. Another factor is the issue of enabling innovation as well as enabling replication and scale-up. For it to be sustainable, it has to be based on the kind of economies which exist locally.

Questions were invited on some very controversial suggestions, namely, should financing be only for equipment, upgradation of skills of operators, or for innovation if MSMEs come together with a technology

development organization? Do incentives in energy efficiency make sense? Yes, incentive for transition makes sense but not in the commercial base. Thirdly, if there has to be government support, should it be provided to associations for data collection on an annual basis, benchmarking issues, and baseline studies? This will also provide local employment; can help and train local energy auditors. There are a number of simple practices which need to be adopted and they do not involve financing or equipment. These include not burning wet coal, keeping a stack of three feet and not three-and-a-half feet of coal in the foundry, etc. These simple things require effective communication of practices by the local fabricators, operators, and associations. It, however, demands a common systematic approach—social engineering - as defined by Dr Monga—which in turn requires networking and linkages to be formed across different kinds of local actors.

It was also pointed out that mandatory training was required not just for credit officers and others but also for new products and schemes. If a banker talks to an MSME about energy efficiency;

the benefits will be seen immediately without having to offer subsidized interest rates. Training programmes and dissemination of information was another important need which was identified and which should be a continuous process. We also have to conduct train-the-trainer programmes for emerging economies and create a pool of experts who are capable of doing audits. Banks can then fund and subsidize the audit and also subsidize the investment. And innovations are appreciated, the more they innovate the better the technology becomes and higher is the subsidy offered. The second is creating regional networks especially on cross-cutting technologies. People understand better the reduction of costs because ultimately it is cost which matters for the small and medium enterprises, not the energy saving.

Last but not the least, owners should have a long-term interest and should be willing to invest if they are convinced that there is a financial return for them in the long run. At present, there seems to be a lack of either awareness or conviction with these entrepreneurs.

How to Steer the Indian Innovation System towards Sustainability?

In Partnership with AFD and IDDRI



Since 2010, there appears to have been a paradigm shift in India as far as the promotion of innovation is concerned—the announcement of a decade of innovations (2010–20), the initiation of a new Science, Technology, and Innovation Policy in 2013, an

increased allocation of \$28 billion for Science and Technology in the 12th Five-Year Plan, the creation of 50 Centres of Excellence, etc. How can the Indian innovation system be turned towards sustainability? What are the incentives that should be created for encouraging

entrepreneurs to invest in attaining the challenges of food, energy, and water security for all? To what extent do ‘frugal innovation’ models represent opportunities for India? How do development banks see themselves in the innovation promotion business? How are they innovating themselves in the new set-up?

The debate was introduced by Dr R K Pachauri, Director-General, TERI and Ms Anne Paugam, Chief Executive Officer, Agence Française de Développement. The thematic track was chaired by Mr Keerthi Laal Kala, Chairman and Programme Lead, Industry Innovation Cluster Initiative.

It was acknowledged that India has made a creditable breakthrough in the globalized economy of innovation, but it faces many challenges, including:

(i) Strong sectoral and geographical concentration of innovation which excludes significant territories and sectors, especially rural territories and agriculture; (ii) Public innovation policies that, as in most BRICS nations, have mainly benefited multinational corporations that outsource but ultimately invest little in the country's innovation system, and with few spillover effects on the local industrial fabric (the government claims that India has a lot of foreign R&D centres, and that the number of patents are increasing, not realizing that the assignees of those patents are actually multinational companies); (iii) Public policies that are overly focused on R&D (notably through a generous tax policy), rather than considering the ecosystem of innovation in its entirety; and (iv) An innovation system that has not significantly moved into green tech development. The major challenge for India will not only be to innovate green technologies, but also to diffuse innovation across consumer markets. Innovation is not just the development of innovation, but diffusing it across different sections of society.

For a long time it has been said that the North innovates

and the South imitates. This is no longer the case. On a daily basis in emerging economies such as India, thousands of ingenious entrepreneurs and firms are coming up with cost-effective and sustainable solutions that address the socio-economic needs of local communities using minimum resources. They are pioneering a whole new approach to innovation called 'frugal innovation'—a disruptive new paradigm that the West has much to learn and benefit from. It's a very inclusive, flexible, and minimalistic approach to innovation, diametrically opposed to the Western model of innovation that dominated the 20th century, predicated on big R&D budgets, very top-down planning systems and highly structured processes. India is not an emerging market for innovation, but is becoming an emerging source of innovation. Frugal innovation is going to become what India will be known for in the coming decade. Indeed, a *Jugaad* mindset, or a frugal and flexible approach to innovation, a determined approach to get things done by quick-fix solutions is very important to the Western world, where there is going to be prolonged economic stagnation. Through global innovation networks, we will not only be

able to combine the best ideas, talent, and capabilities but also the mindsets from the North and the South while preserving our singularity, combining things so that we can achieve synergies and co-create global and sustainable solutions for global markets. We see a cross pollination of ideas and best practices that will span the entire world.

Development agencies and international development finance institutions have long been pioneers in promoting sustainable economic growth on an international scale. They have shown a strong ability to innovate by responding to opportunities, adapting their work to the global agenda, helping design and implement internationally disseminated tools and by blending grants, subsidies, and market funding to attract enhanced funding. Environment and sustainability issues, absent from international aid plans thirty years ago have gradually risen in prominence to become a central concern. Now traditional donors find they must again redefine their policies and operations as demand keeps changing and rethinking about cooperation models and purposes is required. Aid architecture has opened up to



L–R: Mr Anand V Tanikella, Ms Surabhi Rajagopal, Mr Keerthi Laal Kala, Ms Urmi Goswami, Mr Sunil Mani, Mr Navi Radjou, and Mr Mustapha Kleiche

new financiers, the geographical centres of manufacturing and technological innovation have shifted, and financial and economic crises have weakened several industrialized donor countries, raising new challenges for international development strategists.

With limited financial resources, all multilateral and bilateral agencies need to innovate in order to bring value addition. Several areas of improvement can be identified in a country like India: (i) Financial innovations, dedicated resources and more

focus on capital than debt, since green technologies are capital-intensive in the early stages but have lower running costs; (ii) Diffusion and implementation of innovation: avoiding strictly equipment-oriented projects, working on the 'business plan' of our partners (cities, states, local government, enterprises) and looking at their strategy; and (iii) For the smaller players, promoting more maturity in the market, by creating a sustainable market for green technology and green equipment, democratizing green technology

and disseminating it to the largest number of people.

Innovation does not have to happen in the same place as production. Indeed, science is universal but technology is local. We need to reconcile the two. Especially as an industry, innovation must meet the needs of the world and the needs of the people. We can't substitute what we develop in cold climates for what we do in hot climates.

Innovation, when applied in the field, must go beyond research and development and technology transfer. End-user financing, skills upgradation and training, access to capital for an enterprise are crucial dimensions to be taken into account. It is also about enterprises attempting to reach out to the lowest income groups with the 'for profit' business model.

Ecosystem creation is a big part of what is missing. Building local grassroots entrepreneurship is a critical part of moving innovation forward. Collaborative and cross-sectoral approaches are missing. Policy is being implemented in isolation.

Special Interactive Session: How can Legislators Help Tackle Climate Change



The session revolved around themes concerning prospects and events that influence climate change. The Copenhagen Effect and questions on whether countries would agree to a global legal framework on climate change was referred to in opening remarks by the chair. The background issues

included references to diverse facts, including that Europe would prefer a legal framework, China was developing a white paper and the US would opt for choices made by its legislature or its own executive. In light of this, domestic legal arrangements can take care of a broad legal framework, which can be domestically

imposed but globally disputed. Since countries are at different stages of development, the global commitments can be different. Whilst governments change, so do policies and in that light contributions from legislators becomes key in arriving at workable and acceptable climate change-related solutions.

Representatives from GLOBE underscored the importance of legislators engaging in and contributing to issues on climate change. Legislators help contextualize climate change at global, local, and national levels. As such, it would make sense to get legislators more involved with climate change. The recent extreme events in the Himalayas puts the focus on issues of legislative engagement and puts in perspective the importance of the role of legislators in contributing to and learning from

shared experiences in climate change. It is thus important that through the legislators, the voice of the people gets reflected in treaty negotiations, especially with respect to climate change. It was also felt that the methodology of these negotiations should be more open for the results to be perceived more fairly. In terms of climate change negotiations, it needs to be noted that Mexico continues to be the only country that insists that parliamentarians be a part of the negotiating delegation. This example is of immense importance to the larger role of legislators in engaging with the debates and processes of addressing climate change.

Legislators thus have a critical role. In the absence of substantial unilateral actions, without legislation it would be very hard to ensure energy-food-water security for all. Yet again, in terms of better enforcement of international conventions, legislators can help synthesize diverse issues and help integrate water, food, and energy security.

The problem of climate change needs to be viewed from different perspectives. One would be the human perspective. This would imply educating people. Complex questions would involve

queries as to whether climate change legislation could create jobs, opportunities for livelihood enhancement. What would be the costs of services? These questions invariably add to the limitations in getting legislations in place. Different viewpoints emerge from different countries, particularly those from Small Island Developing Nations (SIDN). Whilst some nations feel they are the victims and so should not be asked to effect cuts in carbon emissions, others feel that they are an intrinsic part of the globe and therefore should contribute to emission reductions. Amongst regional and local effects of globalization, the disproportionate impact of carbon tax on air travel in Seychelles is a recent example. Notwithstanding all this, a healthy climate is indeed everyone's right.

The human perspective gets intrinsically linked to that of importance of involvement of communities in climate change. The environment thus needs to be seen in its entirety. The aspect of environmental integrity also needs to be understood much more clearly. Some viewpoints suggest that this integrity can be furthered through taking a community perspective to the entire problem.

Climate change is likely to affect economies in several ways. Impacts include issues of crop productivity and human health as well. The potential damage that can be caused by climate change also transmigrates in the form of a human rights violations perspective.

The legislators felt that in the light of scientific recognition of climate change, strong actions need to be taken to address complex issues therein. The Mexican example of legislation on climate change, passed as recently as 2012, could provide useful lessons for countries in terms of legislative approaches to tackling thorny issues common to all. Clearly, such legislative actions should not just be limited to agreements between government and parliament, but also involve the society or community at large.

Naturally, the felt need for bringing such actions was an overarching agreement, beyond state and beyond parliament. Some of the actions required can benefit from past experiences and although consultations between civil society and government take time but thereafter the legislations do come into force, as shown by the Mexican experience. Some of these actions could also involve

energy including those of reforms addressing issues of dismantling of monopolies based on the principle of consensus.

A revolutionary departure from dependence on fossil fuels would critically involve renewable energy sources.

The latest report of the IPCC has sent even stronger signals of climate change. Climate change has increasing implications on national security. As such, investments in climate change are good investments and these can take the form of actions including those such as electric cars and climate neutral municipalities. From the Norwegian perspective, such actions could include cooperation and change at the local and regional level so as to contribute significantly to climate change mitigation and adaptation efforts.

The climate partner commitments can be wedged further in these actions. Herein, climate change provides the opportunity through which one can resolve employment generation problems. TERI's initiative of Lighting a Billion Lives as a job creating programme is

an illustration of this opportunity. Climate change related actions, have to be centred on clear and effective communication as well. As an example, while it is important not to communicate the wrong idea of development, at the same time the reality of climate change should be communicated unambiguously. Common but differentiated responsibility should be a guiding principle and implementation should be done at the local level. There is a need to assess how prompt and effective governments can be in creating climate change laws.

Apart from local environmental impact assessment laws some legislators underscored the importance of developing more indicators of climate change. Climate change and job creation can be a key focus of developmental experts. Other forms of action can focus on energy efficiency. The American example of intervening by executive authority in addressing climate change shows the directional impact that a definitive approach can take. Legislations along with rule of law should be central to efforts at addressing

climate change. In view of huge global demand the international community should encourage positive actions. Yet, good legislation and international cooperation can provide good examples for other countries to learn from and adapt.

Some legislators also spoke of the importance of changing perspectives on climate change. Climate change, if addressed effectively, provides an economic opportunity which could lead to achieving the three goals, that of achieving food, water, and energy security.

It was also felt that climate change negotiators also need guidance in taking the right approach. The Swedish representative chose to dwell on infusing trust in the process of negotiations. Whilst negotiations are not a perfect process and have their own dynamics, resultant global agreements can inspire local legislation. Negotiations thus have to be participative, and are to be applicable universally. Efforts should be made to arrive at global agreements that can accommodate all legal systems of the world.

Water and Food Security

In Partnership with UNDP



The Thematic Track on 'Water and Food Security' was hosted in collaboration with UNDP. This report documents the proceedings of the parallel breakaway sessions. Mr Anshuman, Associate Director, Water Resource Management Division, TERI, welcomed the panelists and participants. In his welcome address, Mr Anshuman emphasized on enhancing water use efficiency and the need to increase land productivity in India. He then invited

Mr Srinivasan Iyer, Assistant Country Director and Head, Energy and Environment Unit, UNDP to chair the session. In his opening remarks, Mr Iyer highlighted the growing water crisis in Asia and stressed upon the increasing water demand in India for industrial use. He emphasized on the fact that around 60 per cent of India's blocks face rapid deterioration of groundwater. Mr Iyer then introduced the panelists and requested the first panelist

Dr B C Barah, NABARD Chair Professor, Indian Agricultural Research Institute, New Delhi, to take the discussion forward. Dr Barah explained the underlying role of human behaviour in securing sustainable livelihood. He also felt that conservation agriculture would play a major role in the near future and elaborated on the need to blend technology appropriately in order to ensure food security. The next speaker of the thematic track, Mr Surinder Makhija, Strategic Advisor, Jain Irrigation Systems Limited, explained a few steps that could be taken towards ending hunger and ensuring food security. He also stated that water is a source of societal, regional, and international conflict and hence should be dealt with utmost care. Mr S Vijay Kumar, Distinguished Fellow TERI, shared his vast experience as Secretary in the Government of India in planning and execution of various projects at the national as well as state level. He presented interesting insights on various

initiatives and programmes carried out by the Government of India and stressed on the need for communication and coordination between different ministries as well as programmes. On behalf of Dr Himanshu Kulkarni, Executive Director and Secretary, Advanced Centre for Water Resources Development and Management (ACWADAM), Pune, Mr Srinivasan Iyer made the presentation. The various aspects of groundwater management were highlighted along with some interesting insights and case studies. He further added that groundwater is under immense threat and mismanaging this scarce resource would have serious implications on future generations. The last panelist, Mr Animesh Shrivastava, Country Sector Coordinator for Agriculture and Rural Development, The World Bank, spoke about closing the 'water gap', as mentioned in the Vision 2030 document of the Water Resources Group, and presented his views on conceptualizing actions towards closing this gap in order to attain water and food security. This session highlighted the need to enhance water use efficiency in all sectors throughout the country. It was discussed that conservation



agriculture can play an important role in the near future. The panelists felt there is a need to blend technology appropriately in order to ensure food security. The participants enthusiastically interacted with the panelists and raised important issues, challenges, and bottlenecks towards achieving a water and food secure world. Various low-cost solutions for water and food security were also discussed and deliberated upon. The curious participants also posed questions related to farmer suicides, interlinking of rivers, prospects of growing pulses, millets and cash crops, sustainable use of chemical fertilizers, System of Rice Intensification (SRI), etc. The

distinguished panel answered all the questions with a multifaceted approach and ground realities in the context of current planning and policies. A vote of thanks was proposed by Dr Girija Bharat, Water Resource Management Division, TERI, at the conclusion of the event.

At the panel discussion on the theme 'Water and Food Security' Mr Srinivasan Iyer welcomed the participants of the Thematic Track event and appreciated the importance given to the theme in an international summit like the Delhi Sustainable Development Summit. He mentioned that Asia is home to a large population; therefore, the per capita water availability is lower than other

continents. He further noted that in India, we are overusing water. We assume that water resource is always recovered. However, the fact is that all the eastward flowing rivers dry up soon after the monsoon and River Ganga is no longer able to sustain the Sunderbans. The situation of surface water resources in the country is also not very promising, Mr Iyer added. Emphasizing the fact that our next big priority after food security is water security and with the growing demand, the pressure on water is increasing. Critical examination of the agricultural policies in India reveals that the policies largely focus on land productivity and high-value agriculture. So there is a need to shift in the agricultural sector from a narrow to a broader perspective. He lauded the work of Jain Irrigation System Limited in devising various ways to save water and to provide economically feasible and viable options to farmers. Dr B C Barah initiated the discussion by stating the importance of water and food security in the context of sustainability. He put forth his viewpoint by stating that in order to attain food and water security, it is important to focus on resource

conservation, resource allocation, and innovative practices of choosing the right technology. He raised several important issues in this context, viz. raising more with less, how to innovate technology, desirable approaches to drive greater adoption among the community, and enhance resource use efficiency and security. He stressed on the fact that climate change is one of the biggest risks to global prosperity. He quoted from the report on Global Risks 2014 presented at the World Economic Forum 2014, which identified climate change as one of the top five risks over the next 10 years. If the global risks are not effectively addressed, their social, economic, and political fallout could be far-reaching. In this report, among the top 10 global risks of greatest concern in 2014, water crisis is at third and food crisis is at eighth rank. This definitely is a cause for grave concern. He further classified the risk, uncertainty, and insecurity of sustainable development into four categories, viz. Environmental risks, Geopolitical risks, Societal risks, and Technological risks. Dr Barah described risk in relation to water security. In future water resources could become more impacted, and water shortages

coupled with poverty and societal instability could be a major source of economic distortion and geopolitical tensions. Water management is becoming increasingly complex and difficult. As populations expand and people become wealthier, demand for more freshwater, food, and other related demands grows manifold. Water is an equally important input for energy. Increasing water-related risks could ravage the poor economies, thus locking them more deeply into cycles of poverty and hunger. In the context of food security, he stated that rice and wheat are two pillars of food security and to meet the projected future demand, concentrated efforts are needed in order to explore the untapped potential of the area. Rice and wheat account for 77 per cent of the total food grain production of India and hence play an extremely vital role. If the business-as-usual approach is not working, there is a need for appropriate measures to be implemented. If we have to reach out to more and more people, we need to focus on inclusive development. Discussing a case study, Dr Barah noted the disparity in rice yield in India where almost 376 of the 571 districts studied have been

producing less than 2 tonnes/ha which covers about 39 per cent area, producing approximately 21 per cent of total production, most of which belongs to rainfed areas. Furthermore, about 92 districts have rice yield of less than 1 tonne/ha. He stressed on the concept and advantages of SRI, which may prove to be a solution to attain food security. According to him, SRI is a pro-poor practice for improvement in rice production, and is also environmentally benign. He presented a three-pronged strategy for promotion and upscaling of the agro-ecological innovations, such as SRI, which is a synergistic set of agronomic practices resulting in higher production of rice with lesser inputs. He also touched upon the policy challenges and support strategy for achieving food security. To sum up, he mentioned that water and food are intricately interwoven along the entire value chain, be it production, processing, or end-user consumption. A major demand for water comes from the agricultural sector.

Mr Surinder Makhija contributed to the discussion by explaining the concept of food security and emphasized on the importance

of nutritional security and cereal security for achieving food security, thereby paving the way for a healthy nation. He discussed about the three important factors affecting food security, viz. availability, affordability, and sustainability. He explained the importance of enhancing productivity in order to make food available to all. Towards addressing the associated challenges, he emphasized on solutions such as better seeds, appropriate methods of irrigation, mechanization, plant protection, etc. In order to make food affordable, it is required to produce 'more with less'. He also illustrated how sustainability could be made truly sustainable at all times by ensuring increased production of food items. He listed the major challenges to food security, such as increasing population, adverse impacts of climate change, increasing irrigated area, increasing demand of fibre crop, and fodder. The most important issue, that of water security linked with food security, was discussed in some detail. Mr Makhija mentioned the status of water use in India, where the agricultural sector alone consumes 80 per cent of the available fresh water unlike many

developed countries where water used for agriculture is only about 40 per cent. In the agricultural sector, saving water by 20 per cent can reduce the pressure on water resource allocation in other sectors significantly. Micro-irrigation combined with fertigation and skilled crop management could enhance the crop yield by 50–300 per cent, while using 30–70 per cent less water. He also gave the example of micro-irrigation techniques in Israel, which is a good example of producing more with less water. Mr Makhija presented some exemplary case studies carried out by Jain Irrigation Systems Limited. This consisted of better irrigation techniques such as micro-irrigation, water conservation, and rehabilitation of existing systems. Further, some innovative initiatives like combination of drip irrigation with solar pumps for dryland farms were also explained for the benefit of the participants. He recommended some policy interventions, which can be taken up by the government, in order to make water conservation measures more effective. While concluding, he said that the traditional approach of crop production is just not sustainable.

There needs to be a paradigm shift from peasant agriculture to agri-businesses. He introduced the new concept of 'Aqua Credits' based on the concept of virtual water, which can be traded. He also explained the process of transaction of aqua credits between two parties. Summing up he said that a revolutionary new approach is needed in order to make virtual water a tradable commodity.

The presentation of Dr Himanshu Kulkarni was again made by the chair, Mr Srinivasan Iyer. This was regarding groundwater management with a focus on the concept of operationalizing concepts into practice and policy. He explained the typology of the hydrogeological settings of India and then presented the status of percentage of dug wells to bore wells over the years 1960–2009. In the initial years, the dug wells were dominating. But from the year 1994, bore wells started taking a major share. By the year 2009, bore wells were in majority except for the year 1997. Dug wells are seen more as a renewable resource because of their shallow nature, which makes them easily replenishable, unlike the bore wells, which take decades to

replenish. He presented the groundwater vulnerability map of India, which showed that 60 per cent districts were vulnerable to exploitation and/or contamination. This has been mainly due to the nature of contamination, largely due to the release of volatile chemicals from rocks in the aquifers. The nature of exploitation of the groundwater resources is mainly responsible for this contamination. This results in 'slipback' of water source in many habitations and villages, thereby adversely affecting the drinking water supply. This is causing health-related hazards, such as arsenicosis, fluorosis, selenicosis, and uranium poisoning, resulting in varying degrees of morbidity. The presentation highlighted the fact that over the years, recharge has reduced and abstraction has increased, leading to a rise in energy input and decrease in drinking water availability. With depleting levels, more energy is required for pumping thereby reducing water availability for consumptive and productive use. This is a typical case of an agrarian economy. The small and marginalized farmers face tough competition in gaining access to water as more and more water

resources are being exploited by drilling deeper, which is a very unsustainable practice. As a case study, he presented the example of Madhya Pradesh where except for two districts all the other districts had a positive water balance. This was computed based on the annual abstraction and recharging capacity over the years. As the abstraction increased, size of the agrarian economy also increased, which otherwise would have shrunk if water use efficiency measures had not been introduced. Given the high level of geographical and hydrogeological variations, it is extremely important to look at groundwater management in a disaggregated manner as this varies from aquifer to aquifer. Different strategies are required to manage this situation, based on the following scenarios: Scenario 1: Where irrigation is carried out through dug wells. Here, the farmer is impacting only within his land area. Scenario 2: Where the farmer has a bore well. Here, the farmer is probably affecting aquifers covering four hectares of land. There are already significant externalities, which put other neighbouring farmers into considerable insecurity. Scenario 3: Deep

drilling of tube wells, where the individual draws water from a much wider area. This is mainly due to choice of crops, which are water intensive. In this scenario, major water withdrawal occurs, which adversely impacts the water security of a large area. In these circumstances, it is pertinent to ponder on how to influence the choice of crops and how the farmers could restrict the withdrawal of water below their own land if it is not within annually rechargeable limits. This defines the problem and there is an overarching lack of uniformity in the typology of hydrogeological situations. If India is looking at drinking water security, resilience to agriculture and sustainability, we need to look at farm-level choice of crops and farm efficient crops. Mr S Vijay Kumar gave a detailed overview of the Indian agriculture scenario which is mainly dominated by small and marginal farmers. He framed the challenges in terms of bringing technology and investment to improve productivity and efficiency, both from the agriculture side and the water use side. He emphasized the fact that a good food security framework needs to focus not only on productivity, but also on diversification. He enumerated

the ongoing initiatives taken by the Government to enhance food security. The National Food Security Mission, Rashtriya Krishi Vikas Yojana, etc., is one of these initiatives. He stated that the impact of climate variability on agriculture reinforces the need for integrating modern agriculture techniques and local knowledge with special focus on rainfed areas. He also mentioned that the Indian farmers have evolved many coping strategies to deal with climate variability but that may not be sufficient. There is a need to synergize modern agriculture with indigenous wisdom on traditional methods of natural resource conservation and management. Also, special attention is needed for rainfed areas having complex cropping systems under fragile ecological conditions. He also discussed the National Mission on Sustainable Agriculture (NMSA), main objective of which is to provide better resource management including irrigation and groundwater management. He further presented the challenges and problems posed by the agricultural sector, specifically in terms of irrigation. Some of these challenges are: the large and increasing gap between irrigation

potential created and utilized, insufficient water distribution mechanisms, high water loss in distribution due to inadequate regulatory mechanisms and control structures, collection of water charges, ineffective Water User Associations (WUAs), and poor awareness and management practices. Since independence, while public investments have focused largely on surface water, groundwater resource exploitation both for drinking water and irrigation has been supported mainly by private sector investments, both institutional and individual. In the last four decades, nearly 84 per cent of the total addition to net irrigated area has come from groundwater, often through unsustainable extraction. Yet there is no dedicated national programme for groundwater management, which is suffering the same fate as other Common Property Resources (CPRs). And, because of poor governance, farmers even in the Command Areas are switching to tube wells, incentivized in many cases by free or subsidized energy. This is adding to the existing problems in the sustainable management of groundwater resources. For all the identified

issues and challenges, he proposed taking a multi-dimensional approach to the conjunctive use of land and water. He summed up his presentation by outlining the essential elements of the approach as: moving away from a narrow engineering-construction based approach to a more multidisciplinary participatory management approach of land and water with sustained efforts to reduce waste and improve efficiency of water use; adopting the NREGA and Integrated Watershed Management Programme (IWMP) route to involve Panchayati Raj institutions in managing CPRs and in overseeing implementation and social audit; massive expansion of the current IWMP by converging MGNREGA with IWMP (and with the programme for Repair, Restoration, and Renovation of Water Bodies) treating surface and groundwater as a single resource. Dr Animesh Shrivastava mentioned the importance of water and food security in the context of India and discussed the various case studies which The World Bank is carrying out in many states of India. In discussing the actions taken up in this sector, he elaborated on the way we

frame the issue and illustrated the solutions and the calculus involved. He brought to the attention of the audience and the panelists the fact that 15 per cent of current food is produced by using mined water, a practice which is quite unsustainable. Much of the growth in this sector is highly input based. He stated that our vision of equitable growth for the country will be severely undermined if we take into account the fact that an average Indian family spends about 48 per cent of its income on food. In the lower income categories, this percentage is much higher. Any price rise is bound to increase this proportion. He directed the attention of the gathering to the findings of the Water Resources Group documented in the Vision 2030 Report, which shows a gap of 50 per cent in demand and supply of water, and linked it with water security. He also highlighted the various signatories to the report. In light of the report findings, he stated that 80 per cent of water in India is used for agriculture to sustain food security and of this, 95 per cent is required for food production. And, in order to address this challenge and close this gap, some radical thinking is required

though the answer is not traditionally hydrologic as in spite of spending over \$23 billion, engineering solutions do not seem enough. Working on agricultural demand management alone will more or less be able to close this gap. A management solution is required. Drip irrigation, better drainage, etc. offer 80 per cent low-cost solutions. Improving germplasm techniques would help close the gap by another 15 per cent for irrigated and dryland crops. Better genomics supported by drip and sprinkler irrigation would close 25 per cent of the water gap. In order to conceptualize the action, we need to build capacity at the individual, community as well as at the institutional level. We need to create an enabling environment in the current political economy of our country, which does not involve perverse incentives. He illustrated the various case studies carried out by The World Bank in India to achieve food security. These projects are implemented by the State and Central Government with technical and financial support of The World Bank. He named a few ongoing World Bank projects, such as the modernization of hydrologic and climatologic

information systems for promoting sustainable use of water, which encompasses 13 states and eight central agencies. This involves groundwater mapping of aquifers. He also mentioned about the Madhya Pradesh water sector restructuring and reform project, which involves comprehensive rehabilitation and modernization of the Water Resources Department. The other major project was in Bihar, in which SRI technique was taken up and scaled up for the entire state. He also mentioned about the various watershed development projects as well as the tank management

projects in many of the states of India. All these projects were focused towards attaining water and food security. In the end, he mentioned that if business-as-usual continues, by 2030, in order to produce food grains, another 31 million hectares of irrigated land would be required. Solutions to such problems could come from sectors that are not necessarily dealing with water as such.

This session highlighted the need to enhance water use efficiency in all sectors throughout the country. It was agreed that conservation agriculture can play

an important role in the near future. The panelists felt there is a need to blend technology appropriately in order to ensure food security. Steps towards ending hunger while ensuring food security were also discussed. How to frame issues, what are the options available, and probable future solutions for water and food security, these were some of the points discussed by the panelists. Aquaculture, being a low-cost solution, was stated to be the best option to solve water and food security related problems.



Role of Renewable Energy in Enhancing Energy Security in Developing Countries

Supported by the UK Government



The thematic track of the 14th Delhi Sustainable Development Summit 2014 titled, 'Role of Renewable Energy in Enhancing Energy Security in Developing Countries' was held on February 7, 2014. The chair for the session was Mr Gyan Chandra Acharya, Under-Secretary-General and High Representative for the Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States.

The panelists comprised Mr Prabhat Kumar, Joint Secretary, Energy Security and ITP (Investment, Technology, Promotion) Division, Ministry of External Affairs, Government of India; Dr Bernard Muok, Executive Director and Director of Programmes, African Centre for Technology Studies (ACTS), Kenya; Mr Munehiko Tsuchiya, Executive Director, New Energy and Industrial Technology Development

Organization (NEDO), Japan; Mr Heherson T. Alvarez, Commissioner, Climate Change Commission, Philippines; and Dr Ritu Mathur, Associate Director, Modelling and Scenario Building, TERI.

Special remarks were made by Dr R K Pachauri, Director-General, TERI and HE Mr Jorge Moreira da Silva, Minister for the Environment, Spatial Planning and Energy, Portugal. The proceedings began with an introduction of the agenda and of the speakers by the emcee followed by a keynote address by Dr Pachauri. A joint presentation by Mr Ashish John George and Dr Ritu Mathur set the context before the panelists took on the discussion.

The thematic track began with Mr Acharya stating that as a Member of the Sustainable Energy for All group in the United

Nations, he attaches a great deal of importance to this topic. He also said that the countries he represents in this group have been actively looking forward to increasing the role of renewables in the context of energy efficiency, energy access, and energy security. Dr Pachauri added that for a variety of reasons a large part of the world lacks security of supply and also lacks supply of even conventional, modern forms of energy, in the context of energy access. There are 1.3 billion people outside the ambit of modern energy systems having to resort to the use of biomass in an inefficient and non-environment friendly way. In this case renewables is an option that not only addresses energy security but also provides good quality

energy. He also mentioned that with regard to a long-term energy strategy for India, it is important to keep in mind and make allowance for the risk of a sudden increase in oil prices in order to safeguard the aggregate energy requirements of the country.

Mr Ashish John George began by saying that the challenge of energy security came into prominence during the 1973 Arab oil embargo. However, the dimensions of energy security are not limited to merely the issue of supply disruptions and recently there have been efforts undertaken to improve understanding of other dimensions such as quantitative and qualitative attributes that reflect a state's energy security including both traditional energy security concerns and many new

factors, such as environmental, socio-cultural, and technological aspects. Various agencies have put forth their definition of energy security that touches upon many important aspects. For instance, the International Energy Agency (IEA) definition states, 'Energy security refers to the uninterrupted availability of energy sources at an affordable price', thus laying emphasis on continuous availability and affordable prices. India's Integrated Energy Policy states, 'The country is energy secure when we can supply lifeline energy to all our citizens as well as meet their effective demand for safe and convenient energy to satisfy various needs at affordable costs at all times with a prescribed confidence level considering shocks and disruptions that can be reasonably expected', highlighting aspects, such as lifeline energy, safe and convenient energy, affordable costs, and reasonable resilience to shocks. Many of the risks associated with integration of a developing country into global markets can be alleviated with increased domestic production in the form of renewable energy. Until now the case for renewable energy was made through issues such as climate change mitigation, economic value creation, job



creation, etc. However, energy security is emerging as a new driver for renewable energy especially in the context of developing countries.

Dr Ritu Mathur talked about a recent scenario-building study by TERI relevant to the topic under discussion titled, 'The Energy Report—India: 100 per cent Renewable Energy by 2050'. The report examines the possibility of a 100 per cent Renewable Energy Scenario for India while taking into account country-specific issues, such as access, resource availability, energy security considerations, and the existing plans and policies of the government. The study examines the theoretical and technical potential of renewable options for India as well as the barriers, limitations, and practical issues involved to bring in transformational change highlighting challenges in R&D, finance, technology, international cooperation, cost reduction, and scaling up. The report concludes that a high level of renewables is desirable from an environmental perspective as well as from an energy security perspective by displacing the use of imported fossil fuels, providing greater resilience to market price volatility

and fluctuations when compared to conventional energy fuels. The report also makes mention of domestically produced second generation and algal biofuels as steps to improve energy security. But achieving such a scenario poses considerable challenges at this point in time and would require several transformational changes in all sectors to be undertaken with a sense of urgency. These include not only the timely availability of alternative commercially viable technological solutions across sectors, but also a rapid scaling up of these options, together with accelerated building-up of supporting infrastructure, appropriate skill-sets, regulatory and institutional frameworks, and adequate renewable manufacturing capacities.

Mr Heherson T Alvarez mentioned climate change and renewable energy as opportunities to reduce external dependence on energy. There is a need to focus more on primary energy and not just electricity. Renewable energy is the best option for any country to increase security of supply. He also mentioned that the current understanding of energy security tends to be 'comprehensive but not dynamic'. He emphasized on the effect of global climate

change and said there needs to be 'Global security equation' to consider and that all countries are stakeholders. He mentioned that the Philippines has fairly abundant renewable sources especially due to a long coastline which can harness offshore wind energy. It also has about 72,000 MW solar and biomass potential. However, he stressed on technological difficulties which he emphasized should be tackled with substantial assistance from developed countries.

Mr Prabhat Kumar warned about possible trade-offs between the quest for energy security through renewable energy and other national issues such as food security and said that a holistic approach must be taken towards accelerated deployment of renewables in India. He also spoke of the high cost of renewables as a barrier. However, it was also said that India cannot rely on limited sources of energy and that renewables need to play an important role especially in the context of energy access where conventional energy technologies haven't succeeded in delivering lifeline energy to millions of people in India. The current account deficit and fiscal deficit are also negatively affected by imports

and as India does not have ample hydrocarbon sources, it becomes important to develop renewable energy domestically. Mr Kumar also highlighted many policies and programmes and said that India is doing its best to boost renewables with new aggressive plans to increase renewables in the system, but concluded by saying that conventional energy would continue to play a big role.

Dr Bernard Muok began by drawing attention to the non-realization of various projections and targets in many African countries. These targets claimed a rise in amenities in the mid-term future which would result in the rise in status of these countries to that of middle level income nations. He drew a parallel with the case of renewable energy saying that although projections and targets are being made, they need to be realized. He mentioned a World Bioenergy Association study stating availability of sufficient biomass to meet all human energy requirements, suggesting a 100 per cent renewable energy scenario. He said that today Africa needs practical solutions for the problems it faces. As of today, 80 per cent of the 1.5 billion people without electricity are in Africa. And in the areas with electricity,

70 per cent supply is from oil and 30 per cent from hydropower. He pointed out that Kenya has about 10 GW of geothermal potential and said that for it to have 15 GW of power by the year 2030 to meet its total electricity demand and become a middle income country, the untapped geothermal energy could play a huge role in achieving this target. He also said that the peak of fossil fuel has passed and as the recovery rates from new explorations are diminishing it is becoming more and more essential to tap into renewables. He emphasized on the need for a better policy framework, greater technology transfer, financing, better infrastructure, better grid availability and quality as essential to greater energy security in Africa.

Mr Munehiko Tsuchiya stressed on the need for technological solutions and technology cooperation between countries to achieve energy security. He said an important characteristic of renewable energy is that it is a clean energy technology and now from an energy security point of view it is becoming increasingly important for all countries across the world. He said that a country must reduce its imports of energy and develop

renewable energy to increase its energy security. He added that due to the remarkable growth of developing countries in the recent past, local power generation with the help of renewable energy must be encouraged in areas lacking availability of electricity from conventional energy sources. This method would help in satisfying local demand and should be taken seriously by developing nations. He said key factors central to dissemination of renewable energy are cost reduction and improvement in efficiency and quality. He offered some insights into the development of specific renewable energy technologies by saying that offshore wind power is expected to become more popular than onshore wind technologies due to availability of optimum wind conditions and lesser restrictions on wind turbine construction and installation, which has proved to be an imposing barrier. He also underlined the need to make bioethanol cost competitive with oil, and that research must focus on delivering bioethanol from locally sourced materials such as grass and wood such that it doesn't affect food production and food security. He also viewed wave and tidal generation technologies as critical options that need to be

developed. It is important for India to have a stable supply of energy in order to sustain its economic growth trajectory. He highlighted a particular intervention which was the use of micro-grids to deliver high quality green power. The micro-grids stabilized intermittent solar power which is now being supplied to industrial townships where stable power supply is necessary. Finally he also talked about the importance of energy conservation in order to cut down on oil imports.

Several questions and comments were raised during the

open session. It was mentioned that the first fundamental issue to be resolved when moving towards energy security in developing countries needs to be energy access. It has been seen that lack of access to energy leads to a drastic drop in the quality of life and increased health risks and thus must be considered as the most important goal. It was also stated that with reference to Africa, political will has been a significant barrier for increased energy projects. It is also felt that in Africa there needs to be a development of inward capacity

first before looking outwards for cooperation with the international community in the implementation of energy projects. With regard to biofuels in Africa, it was said that a large amount of waste and vacant land is available in many African countries and that plantation of biofuel crops will not result in a trade-off between energy and food security. Similarly it was also stated that due to the development of second generation algal biofuels and with India's vast coastline, a trade-off between food and energy security will not occur in India. However it remains to be seen whether this biofuel technology is robust. India is also one of the largest producers of sugarcane which could also be used to promote energy security if land availability issues can be addressed. A brief mention was also made about the safety aspect of nuclear technology in India and whether further reliance on this energy source would be a wise choice for the country. It was, however, conceded that nuclear technology will remain an interim solution until more stable sources of energy can be developed.



Food–Water–Energy Nexus: Approaches to Securing Nutrition for Vulnerable Populations

In Partnership with ADB



L–R: Mr Gil-Hong Kim, Mr Robert Meaney, Prof. Peter Rogers, Dr Bindu N Lohani, Mr Samuel Daines, Mr Peter Kenmore, and Dr Pramod K Joshi

The world is currently passing through a period of concern about the future sustainability of food supplies. The causes of this concern are based on many premises: the population is growing

fast; with increasing wealth, the diet is shifting to consumption of higher value products; the yield in major grains is levelling off; availability of land suitable for food production is limited;

water for irrigation is scarce; and climate change is leading to rise in temperature with more variable rainfall. Concern over availability of food and its conflict with water and energy resources is leading to new problems for regional planners. Most of the international and bilateral aid agencies have tended to focus on expanding agricultural production via infrastructure investments and less on food logistics management. This has been traditionally left to the government and local entrepreneurs, and more recently to the private sector.

In addressing these food security concerns, we need to better understand new global transitional conditions which require new thinking about the nexus of food, water, energy, and

climate. The major transitions in urban population, nutrition, climate, and energy are happening so fast that the training and mindset of most senior planners and managers have long since been overtaken by these equilibrium shifts. Well-tried solutions to food, water, and energy management of the past are no longer viable. The stakes involved in not adapting to the great global transitions are enormous. A misguided choice of technology or policy in the near future could set in motion a whole set of circumstances that may be difficult to reverse. For example, relying on small farm agriculture to provide for the future food supply of many heavily populated developing countries may lead to exhaustion of water and land resources due to inefficiencies in the current production process and food chains under traditional agriculture, to increase the already huge rural to urban migration, and to food importation strategies to sustain the feeding of large cities which would further impoverish the rural populations.

Reducing the inefficiencies in the food chain cannot be considered independently of energy policy and agricultural commodity trade policies. Caring for all the inter-sectoral policies

in the face of a very uncertain climate future is extremely difficult to articulate and it makes it even harder to develop future plans.

By focusing on water, energy, and climate we can identify unified specific strategies and policies to meet food and nutritional demands and large efficiencies in resource use can be achieved by considering them simultaneously. Given the magnitude of the food security challenge and the huge economic resources needed, we must be ready to take advantage of these efficiencies. Improving efficiencies along the entire food value chain allows for broadening the cropping choices available, particularly with accesses to markets, large gains are made possible.

In order to estimate the extent of efficiency gains of resource-saving technologies, institutional and logistical modernization and vertical integration of food value chains, a hypothetical case study of new agricultural developments in the Indonesian islands of Sumba/Sumbawa and in Mindanao in the Philippines was discussed. The regional food corridor case was developed based on modelling food logistics within the framework of international and intra-national corridors, while taking into

account the regional comparative advantage of spatial and temporal variation of water and energy resources. The corridor focuses on part of the Brunei Dar es salaam–Indonesia–Malaysia – The Philippines East ASEAN Growth Area (BIMP–EAGA). BIMP–EAGA, an Association of Southeast Asian Nations (ASEAN) collaboration created in 1994, has a combined population of 57.5 million and a land area of 1.6 million square kilometres. BIMP–EAGA plans to develop a regional nautical highway via the expansion of roll-on roll-off (RoRo) ferry networks at priority ports, including the development of RoRo shipping and port services in selected BIMP–EAGA ports.

Preliminary findings of the case study indicate the potential for vertical integration and modernization of food value chains to achieve food and nutrition security through drastically reducing their price structures and generating rural employment, while helping ease the competition over natural resources in the food–water–energy nexus. Aggregation of small farms, backed by equitable institutional arrangements, and mechanization and modernization of agriculture not only maximize efficiency in the

use of land, water, and energy but also enable many small farmers to access and benefit from emerging business opportunities in urban markets. Specifically, the regional food corridor case identified the opportunities for reducing the cost of food production and distribution by 80 per cent through combining the latest energy- and water-saving technologies in a vertically integrated food value chain in an autarchy infrastructure throughout the four stages of the chain from 'farm to fork':

- At the production stage, harnessing efficiency gains from large-scale production in most climate-efficient and climate change resilient zones with optimal soils, low-cost and water-saving irrigation, and geographically concentrated production in build-operate-transfer lease, train-transfer cooperative agro-parks on unutilized reclamation areas allow up to 5–25 per cent cost reductions;
- At the packing-processing stage, eliminating supermarket-type packaging, harnessing renewable energy, and using efficient large-scale processing technologies together can reduce the cost by another 5–25 per cent;

- At the transport stage, an operating cost reduction of 90–98 per cent can be achieved by shifting from energy-intensive and high-cost road transport to energy-efficient new shallow-draft waterways and light railways; and
- At the marketing stage, the high wholesale and retail marketing margin can be reduced through direct sales from farmer cooperatives to consumer wholesale cooperatives, and the marketing stage spoilage can be reduced by using the same 40-foot refrigerated container packed in the field as the consumer cooperative shops in urban areas.

The case study shows that food–water–energy nexus responsive food value chain infrastructure innovations can reduce the price of the key food varieties for the urban poor, allowing them to access a middle-income diet on a lower income budget. The case presents an alternative approach to accelerate the pace in providing a more secure and better nutrition supply to the poor. The importance of grains in the food supply of the poor should not be ignored, however, because of their

dominant role in current diets, and will remain so for a considerable time. The technology is now available to use the same resource base to provide needed amounts of food grains as well as low-cost, high quality non-starchy foods such as dairy products, fruits and nuts, and animal fats and oils to the urban and rural poor.

The goal of this nexus approach is to stress the importance of generating rural employment, and effecting a redistribution of income by developing producers and marketing cooperatives to garner a larger portion of the margins between 'farm and fork'. The greatest efficiency improvements in meeting adequate food supply may not lie in the production part of the food chain. Creative bifurcation of the market into middle class and poor could be achieved by organizing the food chain to exploit these differences in the margins at various points along the chain.

Institutional innovations to efficiently aggregate a large number of small farmers and link them to commercial food value chains in partnership with the private sector are the key factors in developing such vertically integrated food value chains. The increased size of landholdings

needed could be facilitated by using land concessions with long-term leases, or producers' cooperatives, expanding the role of domestic and international commercial enterprises, and stressing the role of 'agribiz' in the development of 'agricultural business parks'. The modality to aggregate small landholdings and modernize agriculture has already been tested in Kenya and other parts of Africa and is yielding positive results on the access of small farmers in Kenya to international markets. We have not stressed classical economic recommendations for efficient production, such as correct pricing of inputs and reduction of subsidies, removal of

trade barriers, etc, because most agricultural settings worldwide are plagued by subsidies and other impediments—often very large—which distort the pricing signals leading to many suboptimal results. These problems should be addressed, but should not be allowed to interfere with action on pressing current food problems.

Classical comparative advantage due to geography, climate, location, trade, and transit networks can lead to a balanced and resilient food system. The fact that temperature varies with elevation is a good way of dealing with adjusting to potential climate change. It is important that countries and regional international agencies document

the land availability by elevation as well as soil type, so that if the climate changes more rapidly than currently expected, an available strategy for adjustment to the change would be readily apparent. Also, by relying on modern farming methods, the amounts of agricultural chemicals used may be better matched to actual plant needs. The use of drip or centre pivot irrigation techniques not only saves large amounts of water, but also drastically reduces the amounts of agricultural chemicals used per hectare. Correctly enacted, a policy based upon the nexus would be very helpful in maintaining environmental quality.



Extreme Risks, Vulnerabilities, and Community-based Adaptation in India (EVA): A Pilot Study

Supported by the Royal Norwegian Embassy



As part of DSDS this year, a Thematic Track on the project 'Extreme Risks, Vulnerabilities, and Community-Based Adaptation in India (EVA): A pilot study, in Maharashtra' was organized. The EVA project is an Indo–Norwegian Research Collaboration on Climate Change Adaptation funded by

the Royal Norwegian Embassy in New Delhi. This project is a collaboration between the CIENS Institute, TERI, and AFPRO. The main goal of the project is to assess the enabling conditions for effective community-based adaptation to the impact of extreme events at the community level.

As part of the event, a booklet presenting the scope and activities being undertaken in this project along with some preliminary results was launched following an overview presentation about the project and a panel discussion on the findings. Dr Prodipto Ghosh from TERI welcomed the speakers and introduced the event. Dr R K Pachauri, Director-General, TERI, spoke about the Indo–Norwegian research partnerships in EVA, and commended the study as a good example of connecting science with vulnerable communities.

The objectives, methods, and preliminary findings of the EVA study were summarized by Dr Trond Vedeld, Norwegian Institute for Urban and Regional Research (NIBR). He highlighted the need for better local

climate risk management, more effective water management, and addressing policy gaps for community-based adaptation to become a reality in the villages of Jalna in Maharashtra. The EVA study combined a variety of research methods, which showed local variations in vulnerability and adaptive capacity. The preliminary findings of the study indicated the need for both incremental and transformational change. In particular, Dr Vedeld emphasized three policy messages:

- ▶ -Move to long-term climate risk management, including coordinated climate services and improved provider-user interface;
- ▶ -Decentralize power and capacity, e.g. coordination across neighbouring village panchayats on watershed development; and
- ▶ -Convergence among actors across scales, e.g., MNREGS has become a major vehicle for watershed development but is not being implemented properly.

Shri R A Rajeev, Principal Secretary, Environment Department, Government of Maharashtra, spoke about the 2012 drought in Jalna, and noted

that despite facing the worst drought in 40 years, households in Jalna were food secure as they had sufficient food stocks from previous years. He fully endorsed the three recommendations of the study on behalf of his state's government. Acknowledging that the well-intentioned policies of the state or centre do not always operate efficiently at local levels, he agreed that village institutions should be empowered. Since traditional knowledge may not be sufficient in such extreme events, we need to give village institutions timely information for their decision-making and bring in technological innovations into a proper long-term planning process. He expressed his expectation of a detailed follow-up

field study to develop a concrete adaptation programme for Jalna. He offered his government's help to carry out such a study and willingness to consider appropriate financing.

A perspective on climate change governance was presented by Dr Trude Rauken, CICERO. Even though knowledge is getting more certain, governments are not putting climate change higher on their agendas.

A review of the role of subnational institutions in climate change adaptation in India reveals that the top-down system of governance undermines incentives for adaptation, and often even earmarked funding remains unused. Moreover,



adaptation does not receive substantial media coverage and knowledge networks are lacking. She noted that uncertainties in scenarios are problematic for decision-makers. She concluded by saying that adaptation is not a decision, but a process, and should be viewed as such.

Dr Seleshi Bekele Awulachew, ACPC spoke about the relevance of the EVA study to the drylands of Africa. He outlined the critical challenges for this region, including water scarcity (both physical and economic), low agricultural productivity, and very low energy production and access, and linked these to the water–food–energy theme of the

conference. Climate change and climate variability will intensify this challenge, for instance, with current semi-arid areas becoming arid. Dryland livelihoods, especially pastoralism, are very vulnerable. The solutions proposed by EVA are useful to create resilience in the African context also. We need technologies and better access to markets and institutions. For instance, it has been found that those who have access to irrigation technologies are 22 per cent less poor than rainfed farmers in Africa. Women are an important part of the workforce in Africa and their livelihoods need to be protected. The panelists' remarks were followed by the launch of the

EVA booklet by Mr Lars Andreas Lunde, Deputy Minister of Climate and Environment, Norway.

Mr Lunde expressed his pleasure that environmental cooperation between Norway and India is well established. Studies like this have the potential to reduce the vulnerability of the poor, not just in Jalna, but also elsewhere in India and other countries. He was glad that the Government of Maharashtra showed interest in the project. The research is important but the results should be communicated in simple language to all stakeholders and this booklet is a fine effort in this regard, he remarked.

Roundtable on Mining within the Sustainable Development Framework



The roundtable discussion on 'Mining within the Sustainable Development Framework' opened with Dr R K Pachauri, Director-General, TERI pointing out that we need to be aware and responsible in our actions so as to not affect other stakeholders even though our 'service' is necessary. The production and supply side must

take into cognizance the issues and concerns of the demand side to exploit the limited mineral resources judiciously.

Sir Jonathon Porritt, Founder, Forum for the Future, who chaired the session, flagged off the discussions with an ice-breaking introductory speech. A wide mix of participants was present

from various stakeholder groups including corporates, government, regulatory bodies, consultancies, and research institutions who are front-runners in the area of mining. Mr S Vijay Kumar, Distinguished Fellow, TERI co-chaired the roundtable and gave essential inputs to the deliberations at the end of the event.

The discussion focused on issues concerning the mining industry scenario in India, the judicial pronouncements governing the international mining systems and the way forward to develop mining within the sustainable development framework.

Sir Jonathon Porritt acted as the moderator for the session.

Sir Jonathon mentioned the need for efficient regulatory systems to develop mining within the sustainable development framework as current practices are adversely affecting the society and economy. The inability to maintain intergenerational equity was identified as an inadvertent outcome of mining

as intergenerational demand has been on the rise mainly due to changing lifestyles and conspicuous consumption. As equity cannot exist, we need to devise systems to ensure sustenance of these essentials for as long as possible.

Mr P K Mukherjee, Executive Director, Sesa Sterlite Limited, Vedanta Resources Plc. spoke about the 'last mile connect' where the government forges policies and legislations without much consultation with the stakeholders. The policies must be made to trickle down to the bottom so that it stands equal for all. He also spoke about the new set of contours which is majorly impeding the

mining practices and advocated for better technology and governance system with fewer governance windows. He summed up by mentioning that the industry needs a revolution with more exploration and development.

Mr Tuhin Mukherjee, Managing Director, Essel Mining Industries Limited and Chairman, Mining Committee, FICCI shared some important insights on the overall mining scenario in India. He mentioned that sustainability is the only aspect that can take the mining industry ahead. Underlining the fact that the mining industry is an indispensable contributor to the growth of the economy and society, he said that



The session on 'Roundtable on Mining within the Sustainable Development Framework' in progress

the mining players need to take the 'Social License to Operate' seriously and engage the local communities. The locally resident stakeholders must recognize mining as a part of their lives and feel motivated to cooperate.

Mr R K Bansal, CEO, Sustainable Mining Initiative, Federation of Indian Mineral Industries (FIMI) articulated certain anomalies in the system which could be avoided to augment efficacy in the systems of regulation in the government. He also directed concern towards certain areas that are essential to be addressed including mineral security, governance and regulatory framework and malpractices within operations. Talking about environmental clearances, he said that clearances are given as seamlessly as an assembly line operation owing to other unforeseen inconsistencies that might otherwise arise and delay the appraisal process. The leases and approvals are granted based on the cumulative impact and outliers are thus ignored.

It is these practices by some players that force the judiciary to come up with adverse pronouncements that affect the entire industry. Rajasthan, for instance, recorded 80 per cent

illegal mining which distorts the pricing of raw materials required in everyday life as supply does not commensurate with demand. We, thus, need coherence and integration in processes along with fresh regulations which are not redundant. Mr Hem Pande, Additional Secretary, Ministry of Environment and Forests, Government of India, emphasizing on the conservation of resources, said that due measures need to be taken into account during extraction as there exists a wide diversity of natural resources and a rising population to consume it as well. A win-win situation could be reached if progress is made in a responsible manner without a great deal of judicial intervention. It is a continuous learning curve for all stakeholders including the ministries, corporations and the beneficiaries. We need to support environmental health and social impact throughout the value chain, even after the closure stage. We need to further promote greater degree of transparency and encourage 'Rehabilitation and Resettlement' as an essential practice to be carried out by the miners.

The issues were later discussed in an open house format where it was noted that

the regulatory framework has failed and the same has led to the emergence of a formal Sustainable Development Framework (SDF) with respect to mining practices. It was also pointed out that there was a disconnect between the federal and the state government which posed problems while implementing a robust set of rules and regulations. One of the major reasons was the lack of political conviction in spite of the strong consultative structure. Further, the reclamation of natural resources is important keeping in mind the aspect of intergenerational equity. It was also said that most of it depends on the new law on mining which may come into force only after the next government assumes power.

Mr S Vijay Kumar, Distinguished Fellow, TERI, talking about the regulation aspect, further added that there should not be the need of having an independent body for environmental regulation as it should be internalized within the sectoral regulation. The current legislation prescribes the need to have a separate environmental body which may have long-term implications.

P Bala Krishnan, CEO, Anglo American Plc. India and Head of Mining Committee, CII, as the

voice of the Confederation of Indian Industry (CII), providing his views on international practices, talked about the 'project life-cycle' which is religiously followed from exploration to post-closure stage in the international arena. On the sustainable development considerations in terms of mine planning, design, operation and closing, every aspect of technology plays a very critical role along with constant knowledge gain from best practices around the world. Another important factor considered is the size of operation (mining) which plays a critical role as India has numerous small-sized mines that are fragmented and keeping a tab on operations is difficult with respect to technology or any other sustainable methodology. Assessment of environmental, social and economic verticals is not considered as a one-time activity abroad and is done every two to three years and accordingly plans for the way forward would also develop. In terms of biodiversity, a highly integrated approach to land-use planning and bio-diversity conservation in mining should be developed. Tools and best practices also need to be developed concomitantly as it is a

20–30 year activity. A dialogue needs to be in place to develop synergies with the international counterparts to eventually see constructive impact in the years to come.

Mr Neil Marshman, Chief Consultant, Rio Tinto has been one of the industry leaders in the mining sector with operations in most countries including Australia, Canada, Africa and the US. Mr Marshman conveyed that they have also managed to engage constructively with the local communities through their operations. He stressed on the need for understanding the practical viewpoint with respect to sustainability rather than making it sound like a utopian concept. In mining, the social component generally overarches the environmental component. Sustainable development is an essential part of mining worldwide and technology alone will not solve the problems. Money, though central to this aspect for continuing operations, active consideration must also be given to interest of other stakeholders like investors, customers, shareholders, employees and the local communities as well for integrated development of the system as a whole. A company

must keep improving itself with new experiences. The major pillars noted include sustainable development, environment, socio-economic development, and the government. The projects planned should keep the sustainable development framework intact along with a strong leadership that stimulates development. Good practices create goodwill in societies that others mostly emulate.

Dr N R Ramesh, Additional Director-General, Geological Survey of India, said that the organization is responsible for collecting the spatial data (2D and 3D) to monitor activities like mining. The organization is constantly trying to bridge the gaps in technology and capacity to optimize the use of resources and save cost even in case of hidden deposits. Technological upgradation and methodologies should be better aligned with processes to have the most gains with minimal exploitation of resources and minimum impact on the environment. They also contribute to the extraction of the minerals from the byproduct for reducing wastage. They further make use of predictability maps to analyse pollution levels against set benchmarks and

conduct operations responsibly to avoid water or soil pollution. GSI is also helping the Indian Bureau of Mines in policy and regulation assessment to identify practical issues faced on the ground for appropriate policies to be developed. The mapping process is able to gauge many downstream issues for this purpose. Most environmental issues affect operations commodity-wise, geography-wise, and climate-wise; so, there needs to be a customized solution to generalize the problems and make fixed template solutions

to save time and money. The panelists further deliberated to elucidate the generic picture with respect to international practices. They mentioned that efficiency can only be brought in as a knee-jerk initiative by pumping in more funds for technology. The industry further needs to motivate players by allowing increase in mine size which is currently small and also simplify the licensing process. The international players invest in exploration but are not ready to do so if they would still get the mining license, which is a major drawback in the system. Accountability of

Reserves and Resources (R&R) is essential for better planning and the stakeholders must be aware of all major changes in operations. All these should be integrated in the basic corporate governance structure. All other political advocacy can follow once the internal systems are in place. The meagre mine sizes in India discourage sustainability initiatives due to the lack of incentives associated with bearing that extra cost. This aspect also needs to be remedied. Mr Ranjan Sahai, Chief Controller, Indian Bureau of Mines, provided the regulatory





perspective to the deliberations. With the advent of organized mining since 1957, the availability of data made it possible to track the progress. The mining plan was very sketchy, only enough to grant leases. Concrete action and plan on this front was made only in the late '90s when the United Nations Framework Classification (UNFC) came into existence and the same was adopted in 2003-04. It helped in managing data with respect to mining activities in a more systematic manner. It brought about certain essential changes to the Indian mining scenario including technology associated with conservation, systematic mining practices, and environmental protection.

Further, with the development of a formal Sustainable Development Framework (SDF) with respect to mining within the new mineral policy that was proposed in 2008, there is now a set of guidelines to be used voluntarily. Another important issue that needs to be addressed is the cohesiveness between the federal and the state governments which was attempted to be bridged by means of a coordination committee. This committee meets quarterly at the Ministry of Mines with all relevant stakeholders at policy level to discuss issues pertaining to constructive reformation of protocols to be followed by the federal and state governments. A significant intervention by this

committee was to study the grant process for leasing a mine to a player due to the absence of a formal system to grant lease conventionally. Another aspect identified was the lack of private sector presence in the exploration process due to the absence of inadequate incentives.

The Sustainable Development Framework exercise was outsourced to a private company to come up with various indicators to quantify the sustainability quotient in mining operations. Some pilot studies in a few states are also in the pipeline where the SDF indicators could be applied.

Ms Neena Singh, one of the chief architects of the SDF indicators along with Mr Vijay Kumar, further pointed out two major issues that require immediate action. The first one was impact which can be cumulative or regional. Regional impact is, however, overshadowed by the cumulative impact and issues mostly remain unresolved. Addressing regional impact is practical as cumulative impact may miss out on specific adversities caused due to mining. Alternately, some interventions by small miners in local areas may not be able to mitigate effects at the cluster level. Another aspect

touched upon by Ms Singh was that of monitoring and reporting. The collection of data from the very first stage is important so that the impact and report have results based on correct data. This data must be coherent across government departments for better credibility and future research. The SDF is expected to put pressure on companies to comply with accurate data collection and reporting.

A cumulative picture should thus be considered with authentic data pointers for some areas of priority and concern. It is important that we start collecting and reporting the information to an external agency to remove bias and to have such deliberations at association level and make it a universal practice across the sector for developing a credible roadmap.

Dr P K Anand, Senior Advisor, Mines, Planning Commission stimulated the discussion by stating that in most private operations, while the profits belong to the corporations, most costs are borne by the local societies. And most of such costs can be covered by good regulation. There must be adequate efforts to replenish the natural capital towards equilibrium in terms of trees and the water

table that gets altered in course of mining. Other steps may include restoration and concessions to the displaced individuals even by the smallest of mining corporations. The benefits of mining royalties are also routed to the society at large. We need to assess the data and information accurately enough to extend the life of mines and the minerals they are endowed with. Further, as an important way forward, we must consider the use of better technology and scientific methods of extraction with an optimum balance between the miners and the environmentalists. We must further look at potential availability of alternatives or substitutes with respect to mineral utility for which the gap could be bridged with better technology. Although initial costs are high, the volumes are expected to bring the costs down. Also, there is need to look at a horizon of 20–50 years when speaking of mines. The panel further commented on a possible way forward and the moderators encapsulated the deliberations to distil the essence of the discussions. With the development of substitutes by means of better technologies, we are now moving towards adopting alternatives like fabricated mica, carbon nanotubes instead of

steel, etc. Also, the reusability quotient is increasing owing to an integrated sustainability across the consumer stage in the value chain. Although it is perceived that sustainability in mining is only for the private players and the government, miners can have it their way nevertheless. It is, however, established that the environmental framework applies to them as well. The Public Sector Undertakings (PSUs) are also enrolling in the Sustainable Mining Initiative of FIMI.

Dr Ajay Dua, Former Secretary of Commerce and Industry, delivering the concluding remarks, stated that with rising population and income levels, demand for mineral-based commodities is on the rise coupled with a high demand for energy that corresponds to the indiscriminate coal mining. Although with the recent judicial pronouncements to ban iron ore mining, a sizeable foreign exchange by means of exports is being lost. The same is being compensated marginally (due to size of operation, inconvenient licensing norms, etc.) with some foreign direct investment by the international players for exploration. It is also seen that due to a large number of players,

aggregation and transferring of leases is cumbersome along with technology transfer that has been lacking for decades in terms of feasibility in the Indian context. The mining sector hitherto is just contributing a meagre 1.5 per cent to the GDP. The smaller miners have not been discharging their responsibility to pursue sustainable mining practices and bear that extra cost. Some of the bigger players too have consciously not indulged in good practices and smartly got away with regulatory default. They are hopeful that the new mining law which holds the key to a Sustainability Development Framework for mining sees the light of day soon.

Mr SVijay Kumar, further adding to the deliberations, claimed that the courts were proactive to bring the situation alive with respect to the degradation of the environment due to irresponsible mining practices especially in the Chinese boom era of high demand for iron ore which further lead to regulatory paralysis. This was so, as major regulation was with the

federal government and the state government was delegated with the leasing process. With a large number of small mines in India, anyone can get a license to drill and malpractices in this area are common. This may result in the small miners pulling down the big miners. There is an evident lack of knowledge about mineral resources, inter-generational equity, exploration, and the scope for exploitation. The policy-makers must be educated in time to be able to make responsible decisions regarding the sustainability of India's natural capital. With respect to compliance with the SDF, a worrying fact are the players who see compliance as a cost and so it is necessary to make it mandatory. The new act encompasses the small mines with respect to the SDF and suggests expansion of the mine size by 2.5 times. It further allows mergers and acquisitions to get optimum results over time.

Mr Martin Wright, Editor-in-Chief, Green Futures, Forum for the Future added final comments to the proceedings and

acknowledged the contribution of participants for their vital inputs. He reflected upon the deliberations at the roundtable and commented on the outcome in general. He agreed that intergenerational equity is a necessary evil that society will need to bear as long as it can sustain the resources with responsible extraction. The need for better laws and regulations with SDF plugged into the system is also seen as an essential input to break this logjam with the courts. He further said that reporting practices is important and it also motivates other players to join the bandwagon of good operations. Associations must share knowledge and learn to solve issues related to water management, biodiversity, transportation, etc. Stakeholder engagement was seen as an indispensable act to move with mining practices to uphold the welfare of neighbouring societies. Technology too was seen as another catalyst to boost efficient operations and mitigate environmental degradation along with promotion of alternate utilities.

Key Lessons from CDKN–START Research on Disaster Risk Reduction and Climate Change Adaptation in South Asia

In Partnership with CDKN & START



There is little doubt that climate change will increase disasters throughout South Asia thus requiring long-term climate change adaptation informing and integrating with disaster risk

reduction through planning and response. Integration of disaster risk reduction and climate change adaptation is increasingly in the forefront of policy discussions for disaster management, yet action

on this integration is lagging behind. Climate Development Knowledge Network (CDKN) and START organized a thematic track and a separate Learning Forum to bring together a diverse group of scientists, policy-makers, and practitioners to review experiences of how best to integrate disaster risk reduction and climate change adaptation for resilient development in the context of South Asia.

Researchers from collaborative projects based in India, Nepal, and Pakistan conducting research in the area of adaptive capacity, climate change, and disaster risk reduction shared how their projects involve scientists who are investigating institutional

arrangements and governance structures, policy innovations that promote convergence of disaster risk reduction and climate change adaptation into policy and practice, and the changing nature of development factors, all of which shape vulnerability to disasters.

The session threw up several notable lessons about integrating disaster risk reduction and climate change adaptation from the local to regional scale in South Asia.

Advocating for mainstreaming has not produced tangible action. Whether researchers, practitioners, community members, or policy-makers, they are all advocating for mainstreaming climate change into policies and actions related to disaster management. However, the co-investigators asserted that words rarely translate into action, or at least do so only slowly. The six research projects explored the possibilities of mainstreaming

CCA into DRR from the community scale to national policy. SEEDS India worked with communities in Rajasthan and Ladakh to develop community-based monitoring of weather to prepare for and understand disasters arising from floods, droughts, and changing temperatures. Some NGOs like the Intercooperation Social Development India (ICSD) and All India Disaster Mitigation Institute (AIDMI) shared their research results on climate smart disaster management with national and state government bodies, such as the National Disaster Management Agency.

It is about planning, not only about responding. When a disaster strikes, there is always a response, but that can be adhoc and disorganized, and use human and financial resources inefficiently. With the increasing pressures of climate change, disaster management requires planning rather than dependence on post-disaster management. Such planning involves working across vertical and horizontal scales and across sectors to anticipate, prepare against, and manage possible disasters. Based on their case study of flooding in Gorakhpur, the Gorakhpur Environmental Action Group

(GEAG) and Institute for Social and Environmental Transition (ISET) developed a training module for disaster managers and planners which will be used across districts countrywide.

Who is responsible for planning? While it is clear that planning is necessary, the details are quite unclear. Which sector should be involved in mainstreaming and planning, all sectors or does that dilute responsibility? What scale should the planning be done on? Who are the intermediaries between communities and national policies that can implement plans? The research teams were left with more questions than answers highlighting the successes and exposing failures of their case study research. Work done by the Ashoka Trust for Research in Ecology and the Environment (ATREE) in Darjeeling and Sikkim revealed the importance of place-based management given different socio-political and ecological contexts. The varied contexts require coordination across a range of stakeholders, including traditional local administrative bodies (Dzumas), district government, and NGOs.

Even if plans are being developed, data availability and



information reliability to support robust decision-making may not be available, transparent, and shared between agencies. WWF-Pakistan used an analysis of productivity loss to inform policy on fisheries and livestock sectors related to pre- and post-disaster and recovery after flooding in Manchar Lake and Chotiari Dam. The National Disaster Risk Institute (NDRI) in Nepal used hydro-meteorological modelling and a socio-economic

vulnerability assessment to provide policy recommendations on the establishment of a dam in the Koshi river basin. However, even if the data is available, disaster managers need to be conversant with the data to enable informed action. The researchers explained the challenges in communicating effectively to inform policy decisions at any stage.

Dr Hassan Virji from START had a word of caution: Tomorrow's

reality is not already defined. Our actions of today will create the future. What we have done here is to put together a list of story lines in science, policy, and practice to better understand the problems of today and to create strategies for the future. We have planted a seed and nurtured a system. How do we best communicate these messages? We have miles to go before we sleep.



Adaptive Development for the Sustainability of Asia: Research and Practice

In collaboration with Keio University, IGES, and TERI University



The thematic track on 'Adaptive Development for the Sustainability of Asia: Research and Practice' was hosted by TERI University in collaboration with Institute for Global Environmental Strategies

(IGES) and Keio University Graduate School of Media and Governance with a focus on the science-policy interface for climate change adaptation and environmental risk reduction.

The aim was to build an interface for science, policy, government, industry, and local communities focusing on energy and water. This was sought to be done through experience sharing and



discussion on prospects for sustainability in the Asia-Pacific countries. The purpose of the thematic track was to share educational content based on innovative ideas, pedagogy methods, tools and systems as the common platforms for young leaders and entrepreneurs.

The session was chaired by Prof. Kimio Uno, Executive

Supervisor, LEAD Japan Asia Pacific Initiative, Dean, Faculty of Policy Management, Keio University, Japan and Visiting Faculty, TERI University, India and co-chaired by Prof. P K Joshi, Head, Department of Natural Resources, TERI University, India. The chair briefly introduced the need and philosophy for establishing an academic

partnership on research and learning for adaptive development. The session was divided into two sub-themes: (i) Science-Policy Interface, and (ii) Value of Field-based/Project-based Learning and Action Research followed by a panel discussion with participants and concluding remarks by Dr R K Pachauri, Director-General, TERI, New Delhi and Chancellor

TERI University, India. Prof. Hironori Hamanaka, Chair of the Board of Directors, IGES, Japan gave the keynote address. While emphasizing on the Importance of Adaptive Development for Achieving Sustainability, he also discussed the common goal to be achieved by the consortium of Keio University, IGES, and TERI University and welcomed other academic and research institutions to be part of this effort.

In the first sub-thematic session Prof. Dr Gürkan Kumbaroğlu, Boğaziçi University, Turkey shared the experience gained by his university on pioneering research and multi-layered collaboration towards sustainability. He related some of the experiences at the Boğaziçi University using project-based approach of capacity-building.

Mr Kenta Usui, Policy Researcher in Climate and Energy, IGES, Japan discussed the principles and practices to be followed for policy perspectives on climate change and adaptive development. While stressing upon the difficulty to attribute certain events to climate change, he emphasized on the categories and policy cycle of adaptation. He further stressed on the need to mainstream adaptation policies

into development planning.

Prof. Arabinda Mishra, Dean, Faculty of Policy Studies, TERI University, New Delhi discussed about public policy of climate change in India while dealing with the emerging paradigm of a science-policy interface. He emphasized on the importance of project-based learning and interfaces between science and policy with examples from an integration research project being executed at TERI and in the higher education programmes at TERI University.

In the second sub-thematic session Prof. Mario Tabucanon, Visiting Professor, United Nations University Institute for the Advanced Study of Sustainability and Emeritus Professor, Asian Institute of Technology stressed on fostering global and local leadership for sustainability. While presenting the aims of UNUI to serve the international community through policy relevant research and capacity development focussed on sustainability, he raised issues around inspiration, developing capacities, planning, and implementation. He also discussed the introduction of the subject of sustainability in postgraduate education and research through ProSPER.Net

Leadership Programme Model, ProSPER.Net-Scopus Young Scientist Award in Sustainable Development (YSA) and Global Action Programme on Education for Sustainable Development.

Dr Brendan Barrett, Academic Programme Officer, Head of Communications, United Nations University Office of Communications shared his views on innovative approaches for communicating complex scientific issues. He discussed two models of science communication (Deficit and Dialogue). He also discussed some of the success stories and milestones achieved by UNUI in communicating science for policy making.

Prof. Prateek Sharma, Dean Faculty of Applied Sciences, TERI University, New Delhi discussed project-based learning and action research for sustainability education. He emphasized on interdisciplinary knowledge creation in the context of sustainability science as also effectiveness and constructiveness through an example from the practices being followed in TERI University.

Prof. P K Joshi summarized the discussion while re-emphasizing on project-based learning and action research for Science-

Policy interface. This was followed by a panel discussion revolving around capacity-building issues to develop science-policy interface to meet the sustainable development goals. The participants enthusiastically interacted with the panelists and brought to their attention various practices being followed in this field and important issues, challenges, and bottlenecks. Dr R K Pachauri concluded the session by highlighting the need for research and practice for strengthening adaptive development. The session

stressed the importance of academic knowledge combined with field work and practice-based learning. The multi-layered discussion brought out the need to enhance project-based learning, field-based learning, and action oriented research to promote sustainability in the region in particular and the world at large.

A vote of thanks was proposed by Prof. Kimio Uno at the conclusion of the event. The forum concluded that adaptive development is a critical input for sustainable development, climate change adaptation, and disaster

risk reduction. It is important to recognize that adaptive development needs to be included in action effectively. And for this, capacity-building and the mechanism of capacity-building are crucial. The academic and research institutions can mobilize pragmatic knowledge creation through field-based and project-based learning, practices and action research. Such activities should ensure interface between science and policy for better exchanges and implementation.



The session on 'Adaptive Development for the Sustainability of Asia: Research and Practice' in progress

High Level Dialogue on Energy, Water, and Food Security

In Partnership with Jain Irrigation Systems Limited



The Energy and Resources Institute (TERI) in association with Jain Irrigation Systems Limited (JISL) signed a Memorandum of Understanding (MoU) to set up a 'Resource Centre on Water Use Efficiency'. The MoU marked the beginning of a new chapter in carrying out comprehensive

research in the areas of water use efficiency at the farm level, water conservation, and regeneration practices along with more efficient farm system practices by adopting a holistic approach.

The signing of the MoU between TERI and JISL was followed by a 'High Level Dialogue

on Energy, Water, and Food Security' during the thematic track event. It commenced with a welcome address by Dr R K Pachauri, Director-General, TERI. Speaking on the occasion, he expressed his pleasure on the collaboration with JISL and mentioned that this is a unique

example of a partnership between a business organization like JISL and a knowledge organization like TERI. He appreciated the pioneering efforts made by JISL in addressing the issue of water and food security. Emphasizing on the food, energy, and water nexus, he said that water being a critical input for both food and energy, a major change in its management policy and usage has to be brought about. He also laid stress on devising mechanisms to address the impacts of climate change on water and food production. He complimented JISL on developing a comprehensive model for sustainable irrigation.

The keynote address for the session was delivered by HE Dr Sanjaasuren Oyun, Minister of Environment and Green Development, Mongolia. She stated that water was among the top ten risks as per the World Economic Forum. She stressed that in the last decade, a majority of extreme weather conditions have revolved around water, be it floods in the Philippines and Pakistan or the droughts in Russia. There have been climate disasters in Mongolia as well wherein it has been experiencing consecutive years of dry summers followed by very cold winters. This has not just

affected hay production but has also led to reduction in livestock by 10 million. She also expressed her fear that in the next two decades, energy and water demand is going to grow by 40 per cent and the related complexities are only going to multiply. Comparing India with Mongolia, she went on to say that India is 440 times more populated than Mongolia. However, Mongolia is relatively dry and major rains are concentrated in a one-third part of the country. Besides, there are big mines that are drawing a lot of water. The administration of Mongolia had proposed 4 to 10 times higher water tariff for industries which has finally been pegged at 2 to 4 times higher tariff. Besides, they also have water pollution fees. 100 per cent of the royalty collected through water tariff is put back into the village, 50 per cent of which is used for measures aimed at protecting the environment. She highlighted the need for educating our children about the value of water, making them aware of where our water comes from and maintaining and protecting water sources.

The first thematic address was delivered by Mr Gajendra Haldea, Adviser to DCH (Infrastructure), Planning Commission of India.



He said that we should focus on more economic and optimal use of water. He reiterated that irrigation accounts for the major part of water use and a lot of it gets wasted due to waterlogging. Stressing on economic use of water, he cited the example of countries like Israel which are using sprinkler and drip irrigation in a big way.

Despite government subsidies, there are only a few organizations that have adopted economic irrigation practices and the progress is quite slow. There is a need to adopt a village-wise, block-wise approach involving community and private investors. JISL has presented a structured scheme for implementing this through the Ministry of Water Resources and in the next three years, the Ministry is planning to irrigate two million hectares through drip irrigation. Unless there is a revolution in irrigation



practices, the next stage of the Green Revolution will be severely constrained. Presently more than half of the water that is being supplied in urban areas is lost due to pilferage or leakage. There is a need to price water for those who can afford it and give subsidized water to economically weaker sections and lower middle class sections. The cost of subsidy can be recovered if the losses can be reduced to 10–15 per cent.

The presentation by Mr Anil Jain, Managing Director, JISL focused on water use efficiency in agriculture. He began by sharing the vision of his organization—'Leave this world better than you found it.' The company believes in creating value by promoting a self-sustaining agri-cycle. The organization has earmarked 2,300 acres of land for research and development work. They are also

engaged in training half a million farmers per year. They buy back produce from farmers and provide credit to them. He said as water impacts agriculture, health, and nutrition, the focus should be on water, food, and energy as a single entity.

The issues related to water can be solved if we adopt an integrated, judicious, efficient and economical approach to water management. Furthermore, pricing of water, improving distribution systems, and training people are also essential. He also informed how the farmers managed to produce more with less water usage and using lesser area of land. The government has spent billions of dollars in creating infrastructure for surface water use so that more farmers are able to access water for irrigation purposes. However there are huge losses due to evaporation, percolation, and leakages in the canal system. There are also conflicts related to water sharing between farmers living upstream and downstream. He also mentioned that both TERI and JISL believe that through this collaboration, they can enhance their efforts in achieving water use efficiency, particularly in the agriculture sector, besides

promoting basic research, knowledge exchange, and policy advocacy. He concluded his presentation by saying that JISL intends to do 'Probably not Nobel but noble work'.

In the second thematic address, Mr Onno Ruhl, India Country Director, The World Bank expressed concern over extreme poverty in India and especially along one of the largest and most important river basins, i.e., the Ganga river basin, which covers one-fourth of India's area and 80 per cent of the people living in this basin thrive on \$2 per day. Besides, the water quality of this river is very poor and with growing population and climate change, the situation is only going to worsen with time. Thus, economic growth of the basin has to happen at a very fast pace. The water storage capacity of the river has to increase and it is up to the





stewards of the river, i.e., India, Nepal, and Bangladesh, to decide how much energy they would like to create, how much they would like to invest on cleaning the river and how they intend to increase the efficiency of irrigation.

The unique characteristic of water is that all its uses are essential. Thus there is a need for prioritizing usage and adopting rigorous and holistic river basin management.

Mr D K Manavalan, Executive Director, Action for Food Production (AFPRO), New Delhi focused on geography and behaviour of water. He emphasized on management of Ground Water by looking into the geology of the area. He said that the 12th Schedule to the Constitution of

India talks about grassroots level participatory approach towards management of water. He stressed on the need for a paradigm shift in management of groundwater. Behavioural changes in the attitude of people towards water has to be brought about if we want to conserve our water resources. The repository of information in the form of groundwater prospecting maps created by the National Remote Sensing Centre (NRSC), Hyderabad has revealed some very disconcerting figures on groundwater overdraft (250–270 per cent). However, these maps are not being used. As part of the National Water Mission, the Government of India has now initiated the work of aquifer mapping. Thus there is a

need for demystifying the local community and creating a stimulus in the minds of the people to adopt best practices towards water utilization.

Finally, Mr Anshuman, Associate Director, Water Resource Management Division of TERI gave a presentation on the proposed activities of the newly established Resource Centre on Water Use Efficiency. He argued for sustainable management of water resources in agriculture and other sectors and a multidisciplinary approach that incorporates more efficient management and use of water. Dr Girija Bharat, Area Convenor, Water Resource Policy and Management, TERI proposed a vote of thanks.

First TERI-ICCT Lecture: Transportation Should Never be Addressed in Isolation

In Partnership with International Council on Clean
Transportation (ICCT)



The transport sector is known to have multiple impacts on sustainability. Amongst these, issues of equity and environmental degradation are

of deep concern. The Energy and Resources Institute (TERI) and the International Council on Clean Transportation (ICCT) are two organizations which work on

these issues and try to influence policy through applied research and outreach. Considering the enormity of the task, both agreed to work jointly and signed a



Memorandum of Understanding (MoU) in 2012. The main objective of this MoU was to work together on the issues of improving efficiency in the transportation sector, along with reducing its contribution to air pollutant emissions. The MoU is a step towards establishing a collaborative and systematic approach to address the above issues through a long-term relationship. For the first year, the effort is being supported by

the Shakti Sustainable Energy Foundation, New Delhi. As part of this joint effort, the two institutions decided to organize an annual lecture related to sustainable transport. The first TERI-ICCT lecture was delivered by Sir Jonathon Porritt, co-founder of Forum for the Future and an eminent writer, broadcaster, and commentator on sustainable development. Sir Jonathon Porritt highlighted the huge gap between

knowledge and its practical implementation. He mentioned that a sustainable economy is only possible when we either reduce the travel demands or think of mobility of both people and freight in a low-carbon way. The transport sector is generally placed at a very low level in the hierarchy of sustainability. This sector has never been considered as a priority issue. This sector is not seen to be a place where the



brightest brains make a career. He mentioned the need for more forward-looking professionals in the field of transportation.

He then spoke about the transformations in the transport sector and more specifically the role of electric vehicles in reducing our carbon footprint. He mentioned about the lightweight composite material, new aerodynamics, different fuel type, and a drive for higher fuel efficiencies in vehicles. He also stated that similar fuel efficiency improvements have also been made in the aviation sector where fuel use per passenger mile has improved by about 70 per cent during 1970 to 2000. Consequently, aviation is now more efficient in terms of fuel

use per passenger mile than the vehicle sector. He also stressed on the role of biofuels which he

considers will play an extremely significant role in decarbonizing the transport sector.

He then highlighted the lack of policies to incentivize the technologies for decarbonization of the transport sector. The three major structural problems he emphasized in this regard were infrastructure locking, narrow mindsets, and lack of capacity. On infrastructure locking he mentioned that transport infrastructure lasts for a very long time and is generally locked for a very long period. It is very difficult to reverse any such decisions. Hence, this needs to be carried out carefully. He stated that infrastructure



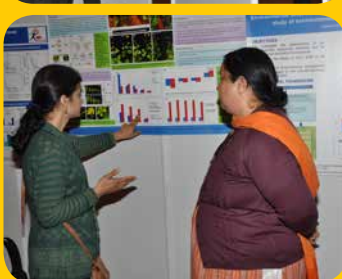
development in one part of the world cannot be copied to other parts. For example, the Bus Rapid Transit system working in Curitiba, Brazil cannot be replicated in India. He stated that the real issue is whether the investment in the sector is less destructive of natural resources and environment, locally and globally. Presently, one of the biggest infrastructure development programmes of the world is the one in Africa. He emphasized that the investment could go wrong if we do not proceed with sufficient sensitivity and foresight about what these investments will do for a better future. On mindsets, he said that people are finding it

extremely difficult to think about transportation and infrastructure development in ways beyond the era of relatively cheap fossil fuels. The global economy will expand three times by the year 2050 and there is a need to reduce GHG emissions roughly by 80 per cent. But it is not going to happen unless every single thought and action is on radical decarbonization. On lack of capacity, he stressed that transport is at the heart of almost everything that makes the nation work, but still the transport sector is treated as a single non-priority department. We need our transport planners to be holistic thinkers and visionaries and transportation must not be seen



in isolation as a single sector. The lecture ended with an interesting question and answer session and discussions over improving transportation systems across the world.

International Sustainable Development Exhibition: Innovations for a Secure Future







High Level Corporate Dialogue Proceedings





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High Level Corporate Dialogue

Luncheon Session

PRESIDENTIAL ADDRESS

- **Mr Arun Maira**, Member, Planning Commission, Government of India
- **Keynote Address**
India's energy dilemma: Policy, technology, and partnerships the way forward
- **Mr Dev Sanyal**, Executive Vice President and Group Chief of Staff, BP Plc.

IN CONVERSATION

- **Mr Yvo de Boer**, Global Chairman, Climate Change and Sustainability Services, KPMG International and Former Executive Secretary, UNFCCC
- **Dr R K Pachauri**, Director-General, The Energy and Resources Institute (TERI)

The High Level Corporate Dialogue was convened as



the curtainraiser to the Delhi Sustainable Development Summit on February 5, 2014. The event began with a Special CEO Luncheon Session hosted by TERI to flag off the proceedings.

The session began with a welcome address by Dr R K Pachauri followed by individual addresses by Mr Dev Sanyal, Mr Arun Maira and Mr Yvo De Boer.

Dr Pachauri categorically pointed out that a shortage in any element of the Energy,

Water, and Food triangle directly affects business activity. Rising population, growing income levels coupled with contemporary lifestyles have further stressed essential resources. The challenges posed for seamless business operations have thus become more daunting. Corporations must align their focus on Research and Development (R&D) in areas of technology, processes, innovation, and strategically position their

corporate responsibility initiatives for the societies they operate in to create models of success. Businesses should also work with the government along with other stakeholder groups including civil society, the research community, and academia to identify problems and devise solutions.

Mr Dev Sanyal took over the reins of the discussion and directed attention to the energy aspect of the theme. He said that the recent shift to Compressed Natural Gas (CNG) has considerably transformed India from energy poverty to economic prosperity by tripling our power generation in a decade and also reducing levels of sulphur dioxide. He posited India's energy problems as an 'energy trilemma' by pointing out three major issues namely, Energy Supply, Sufficiency, and Sustainability. He claimed that demand for energy increases by 1.75 per cent every year and is expected to increase by 41 per cent through 2012–35. Close to 95 per cent of this demand is coming from non-OECD nations led by India. Technology is making up for this huge demand hike as of now. He further stated that 80 per cent of oil reserves are held by just eight countries and questions the integrity of equitable distribution of

this scarce resource. The demand for gas, coal, and oil is expected to grow at 1.19 per cent, 1.1 per cent, and 0.8 per cent respectively, posing a threat to India's current account and trade deficits. Mr Sanyal further pointed out the ever increasing CO₂ emissions, along with increasing demand for energy. With the existing demand for coal, India is bound to increase its emissions and soon surpass China.

With such problems to contend with, Mr Sanyal suggested some solutions especially for the Indian context. Other national models of success are of great relevance and must be studied in depth for scope of replication. Policies that support investments, technology, and partnership must be encouraged, that may stimulate the energy revolution as in the west. The emission levels in USA have gone down to 1995 levels after the shale gas revolution. Four major areas pointed out by Mr Sanyal for policy interventions are:

- **To create the right above-ground conditions:** Policy framework to incentivize competition, regulatory partnerships, and other Public–Private Partnerships;

- **Enable right price signals:** Free market pricing can reduce dependence on imports and manage trade deficits;
- **To bring up the proportion of gas in the energy mix:** Improved renewable energy scales to bring down energy intensity; and
- Support the market needs in creation of supply chains that provide capability and technology to drive energy.

Mr Arun Maira, illustrated his viewpoint with the analogy of an aircraft that has to be repaired while it is flying. He related the paradox of popular theories by Darwin and the second law of thermodynamics about the capability of a system improving with time as enunciated by Charles Darwin and the second law of thermodynamics which states that the sum total of energy in a system remains unchanged. He makes the proposition that we are living in an open system that continuously interacts with nature. As we end up biting more of nature than we can chew, nature starts consuming us. So, the elements of this system have to be repaired while we are within the system. We need to

re-orient and re-engineer ourselves to cope with the dynamics of nature that reacts to our over-consumption. These signals have to be recognized and acted upon continuously. The social dynamics in the system needs to be addressed methodically before formulating any policy along with the suitability of its application. We need policies to help the environment to be able to repair itself and subserve the generations that follow. We need to work through the present to address the concerns of people for a sustainable future.

The need for policy reforms in our country is undeniable along with institutional re-orientation to build a strong foundation for the evolving economic framework. Corporates are expected to align with policy and strengthen their operation cycles, supply chain, etc., and address the concerns of people directly through governance, accountability, and trust. Corporations and policy-makers must move together and be sensitive to bring about change. They must take cognizance of the critical state our population is going through and must intervene ceaselessly. The approach must be to visualize the problems through the lens

of society and devise solutions accordingly.

Mr Yvo De Boer connected the dots in the discussion to steer the deliberations to a logical conclusion. He extracted four keywords namely, Intangibles, Partnerships, Trilemma, and Systems and connected them constructively towards the context of the discussion. He mentioned the importance of True Value as a summation of financial value and value to society and environment. The true cost of operations must consider implications on climate change, forests, energy, water, and ecosystems. It is said that if such aspects are also monetized, one would lose around 40 cents for every dollar spent, making operations unviable. The triangle of major stakeholders involving Policy-makers, Investors, and Consumers is expected to respond to situations within the contours of their defined role. They must unite and converge to a common perspective. The policy-makers shall look at things in aggregate and may leave outliers. The investors do not see beyond a horizon of six months. And the consumer is simply not expected to be careful of his actions which are supposed to be monitored by the policy-makers, by laws

and administration. The business community though, is at the centroid of this triangle. They can come together as a partnership and repair the plane while in flight.

It was further highlighted by Mr Maira that there is a declining trust in business and institutions and that is undermining the efficacy of any constructive action. There is an ongoing policy discourse between government and corporates but the beneficiaries still do not trust them. To build trust, we need to communicate and understand what exactly is needed. It is required to make the stakeholders believe and view policies in good spirit.

Ms Amina J Mohammed further contributed to the proceedings in the open house session. She added that Sustainable Development has to be good for business and economics to carry people and planet along. Politics and business must move together and win the trust of other stakeholders who may otherwise grow disaffected in due course. Mr de Boer identified 'pricing' as a potential area to create a level playing field. Stock exchanges today lay emphasis on sustainability quotients in companies before enlisting them

on their respective exchanges. She added that consumers want better quality at lower price and they expect such regulation from the government.

Mr Dev Sanyal proposed the need for incentives and claimed

that subsidies distort market dynamics. Multilateral partnerships and collaborations can help arbitrate between extremes to normalize such distortions. Mr Maira re-emphasized on his analogy of repairing the aeroplane

while flying. He said that we need to learn sooner to repair faster. Corporate responsibility must be self-regulated and self-conscious. We need to re-orient the value chain and regulate accordingly.

Inaugural Session

WELCOME ADDRESS

- **Dr R K Pachauri**, Director-General, The Energy and Resources Institute (TERI)

SPECIAL ADDRESS

Implications of SDGs on Business

- **Ms Amina J Mohammed**, Special Advisor of the United Nations Secretary-General on Post-2015 Development Planning

PRESIDENTIAL ADDRESS

- **Mr Arun Maira**, Member, Planning Commission, Government of India

INAUGURAL ADDRESS

- **Mr Vivek Rae**, Secretary, Ministry of Petroleum and Natural Gas, India



L-R: Ms Amina J Mohammed, Mr Arun Maira, Mr Vivek Rae, and Dr Annapurna Vancheswaran

CONCLUDING REMARKS

- **Dr Annapurna Vancheswaran**, Director, Sustainable Development Outreach Division, The Energy and Resources Institute (TERI)

Dr R K Pachauri opened the proceedings for the High Level Corporate Dialogue by formally welcoming the delegates from around the world. He shared his genuine concern at the huge

scope for corporations to come up with sustainable pathways for the future by means of technology, financial support, and policy advocacy.

The inaugural session had addresses from Ms Amina J Mohammed, Mr Arun Maira, and Mr Vivek Rae who was the guest of honour on the occasion.

Ms Mohammed began her address highlighting the Millennium Development Goals (MDGs) which were set in the

year 2000. She said it had been an insightful journey on the whole and there had been useful deliberations to set the right framework for the next development agenda. She stated that it had been an intelligent framework of suggestions but implementation of solutions was a problem due to inhibited institutional capacities to deliver and scale up. In the case of India, the high population poses many challenges and complexities, but there is still scope for intervention. While climate change and environmental degradation is affecting the global water cycle by way of irregular rainfall, floods, and droughts, it further affects agriculture, food supply, and eventually business. Impeding livelihoods for world's poor coupled with unsustainable lifestyles adopted by the ones with the means has further created problems in equity of benefits for which we need to look at alternatives. As we produce more food, primary energy demand will also increase by 50 per cent by 2035 and demand for water will increase by 40 per cent by 2030. We, thus, need downward advocacy for sustainable consumption as well. We further need to understand the linkages between energy, water,

food, land, soil, and biodiversity to come up with innovative smart agriculture for greater productivity resulting in better incomes and reduced GHGs. We have seen continuous interactions between governments, communities, and businesses and outcomes of such deliberations must be fed into the framework. The specific impacts of interventions must also be mapped, which is otherwise a potential challenge. Inputs by the UN General Assembly and the UN Global Compact network are well received by the corporations towards adopting a country-level engagement model.

We need to leverage domestic resources, unlock private capital, encourage FDI, and look at the agenda globally to usher in a resource-efficient, economically-stable, and inclusive system. Young entrepreneurs and businesses need to be encouraged to adopt sustainable patterns of production and consumption along with participatory monitoring, and accountability framework. Partnerships further need to be redefined and opportunities should be aligned with an enabling environment along with innovative approaches to make investments to address the issues on hand. Dividend and profit must be in

sync with the plight of the poor. The UN Business partnerships have paved the way towards constructive action. UN-SE4All (United Nations Sustainable Energy for All) has mobilized over \$50 million commitments to achieve the major objectives of the UN-SE4ALL campaign by 2030. Mr Arun Maira was also requested to deliver the presidential address at the High Level Corporate Dialogue which he began by saying that the rate of consumption of the 'common' resources is greater than its ability to renew itself. We are struggling with the top-down approach of getting a global agreement amongst governments which is not effective as there is limited common ground of agreement between governments on accountability to its citizens. There are only short-term concerns which are treated as paramount. The mismatch between the nature of problems and design of solutions by institutions further dooms the consensus between governments globally. The other approach pointed out by Mr Maira was a bottom-up approach which spoke of collaboration between civil society organizations, scientists, and corporations to develop solutions that can change our orientation towards

the global commons. These actors need not be daunted by the parochial concerns of the elected governments. Solutions by scientists and innovators can be adopted sooner if either the government mandates (destructive approach) or if the actors see an incentive. The benefits must therefore, be propagated much faster. We must also study scenarios of not pursuing the suggested activities and their likely consequences. He further added that we must be open to address concerns and modify the solutions to be accepted more widely. The business leaders are thus expected to lead this movement to create such institutional reform.

Mr Vivek Rae, who was the guest of honour, provided viewpoints from the world of energy. He claimed that businesses cannot lead unless there is an environment that facilitates them to do so. The environment for businesses is set by the policies that emanate from governments to give signals to businesses to expand or contract. Essential signals include prices (oil, gas) as we are directly affected by international prices because of our massive imports of oil, gas, and coal. Another issue he pointed out was the multiplicity of objectives and sometimes there are severe contradictions between them

leading to unintended trade-offs and a win-win outcome is rare and the key objectives are often overlooked. The growth objective must be paramount to seek investments to create jobs by means of employment, education, and skills. Sustainability concerns, social concerns (gender, child labour) should exist but growth (businesses) must be a priority. Mr Rae concluded by stating that clean fuel for rural India is essential for health even more than sanitation. This is also applicable in urban India. This dimension could be considered by corporates via CSR.

SESSION 1: Corporate Action towards Energy, Water, and Food Security: Challenges and Prospects

CHAIR

- **Mr Yvo De Boer**, Global Chairman, Climate Change & Sustainability Services, KPMG International & Former Executive Secretary, UNFCCC

PANELISTS

- **Mr Philippe Joubert**, Managing Director, Energy and Climate, World Business Council

for Sustainable Development and Executive Chair, Global Electricity Initiative

- **Dr Bindu N Lohani**, Vice President, Knowledge Management and Sustainable Development, Asian Development Bank
- **Mr Tadashi Maekawa**, President, Mayekawa Mfg Co. Ltd

- **Mr Stephen Rumsey**, Chairman, Permian Global
- **Mr Tulsi Tanti**, Chairman, Suzlon Group

The first official session of the High Level Corporate Dialogue aimed at deliberating on understanding corporate initiatives towards strengthening the Energy, Water, and Food nexus. The session was chaired by Mr Yvo De Boer and



L–R: Mr Tulsi Tanti, Mr Tadashi Maekawa, Mr Philippe Joubert, Mr Yvo de Boer, Mr Bindu N Lohani, and Mr Stephen Rumsey

had participation from captains of industry, leaders of civil society, and senior policy-makers.

Mr De Boer initiated the discussion by talking about building resilience and sustainable transformation and that businesses could eventually contribute by means of innovative products, services, and other sustainable business solutions to redefine brand value. He invited the other panelists to share their views on corporate action towards ensuring Energy, Water, and Food Security.

Mr Philippe Joubert opined that man has himself created the conditions for scarcity of natural resources such as energy and water. Innovative methods are being used to save water in

industrial operations. Water and Energy are serious issues today in most nations and we must have as much focus on the present as on the future. We need to be resilient to regain lost ground and this could be done by means of technology and scaled up by stable, long-term policies. Mr Joubert further stated that 'R&D is a careful decision based on the clear vision of a market opportunity. R&D needs confidence in stability of systems and a clear pricing signal of not just the end-product but also the intermediary resources consumed through the value chain. Decisions should thus not be made on the basis of distorted prices through the value chain. The deliberations were further enriched by Dr Bindu Lohani who

viewed the issue from an urban and business perspective. He claimed that almost 60–70 per cent of energy, water, and food is going to be used in cities by 2050 and the current way of doing business is not going to meet that requirement. A transformational approach is thus needed. With respect to energy, the renewable agenda is going up despite heavy dependence on hydrocarbons. Technology, innovation, and continuous R&D can be leveraged by corporations to weave in sustainability in their operations. Transportation uses a lot of energy which cannot be undone in a short span of 10 years. We need the right mix of policy, public–private partnership, and CSR to stabilize it in the long run. In the case of water, indiscriminate wastage from household, industrial, urban and rural centres is stressing the environmental concerns further which is compounded by natural disasters. Reduce–Reuse–Recycle is the long-term solution to sustain water as it is not a one-time commodity. Corporate partnerships in water is not seen much mainly due to pricing (cost) and the management of utility for water.

Water management must be operated like a private sector

entity (Singapore model, Manila model, etc.). Talking of food, we need to learn to produce more food with less water and less energy. The private sector has assisted in the technology for water and energy use. There is still a lot of scope to improve the yield. We need another Green Revolution (more quantity and quality) along with optimum resource use and acknowledge climate change issues. More than food, we need Nutrition Security. The private sector has emphasized on the food value chain which is a good way to reduce waste, optimize energy efficiency, and improve storage. Each country can produce its own food keeping in mind the global food chain systems.

Mr Tadashi Maekawa, President, Mayekawa Mfg Co. Ltd, Japan further enlightened the audience with his organization's contribution to the agenda of corporate participation towards sustainable food production, energy conservation, and water consumption and also screened a movie displaying how his organization has showed the way in such domains. He claimed that rise in population is one of the biggest hurdles for attaining energy, water, and food security.

Japan's major concern is energy shortage and so it is a priority and Mayekawa conserves energy in various ways by using appropriate technology, equipment, and processes. He further gave instances of installation of heat pumps in India that save energy by as much as 40 per cent.

This was followed by a presentation by Mr Stephen Rumsey who said that effects of human destruction of forests is more harmful than our use of fossil fuels. Also if the forests could recover a quarter of their biomass that they have lost, that would reduce atmospheric CO₂ from 400 to 80 units. It is thus important to manage forest land effectively. There is a need for private sector investment and Public-Private Partnerships along with commercial expertise to provide watershed protection as one of the major interventions. This model can yield constructive returns to all stakeholders. Watershed protection safeguards water quality, prevents landslides and flooding, creates employment, assists in achievement of local development goals, enables revenue sharing with government partners, and mitigates climate change and climatic disasters. As an illustration, he informed that the

pilot project in Ghana, 'Reducing Emissions from Deforestation and Forest Degradation' (REDD+), will become a National Park contingent on carbon financing and will provide fresh water for about five million people (25 per cent of Ghana's population) and alternate options would be very costly. True pricing of natural resources is thus essential.

Mr Tulsii Tanti, a leader in bringing renewable energy to the Indian masses, contributed to the proceedings by saying that affordable energy for all is the ultimate objective, with low-carbon emission and long-term sustainable jobs to enable a peaceful society. Being a stalwart in the wind energy segment, he said that wind as a renewable energy source is now a viable option and the maturity of this technology is expected to bring down the cost of the technology. Wind projects are installed in rural areas where grid infrastructure is not available. Water is available but electricity for agriculture is not which impedes food production. Wind farms in such areas, and availability of power in off-grid areas has provided power backup for irrigation and pumping aiding food production and security. Wind energy has given energy

access to 40 million people and has helped social, economic, agricultural, and environmental development in these areas.

The session provoked many participants to ask about issues pertaining to securing energy, water, and food. Bridging the gap between business and science by better transparency of information and to align strengths of the two communities came out as a real need. Time taken for business decisions by CEOs was further seen as a hurdle. There was absence of a conducive environment for CEOs to take long-term decisions

Mr Masamitsu Sakurai, Advisor, Ricoh, Japan was invited to give a speech titled, 'How Japanese Businesses have Addressed Sustainable Development'.

Headquartered in Tokyo, the Ricoh Group operates in about 200 countries, including India.

Ricoh is a global technology company specializing in office imaging equipment, document management systems, and IT services.

The world is now facing various challenges, such as climate change, shortage of water, energy, and food supply and it is to be recognized that the scope for businesses has to be restricted within the contours of the limited natural resources available. Keeping the climate in a stable condition is one of the most important challenges in order to secure a constant supply of the resources.

Mr Sakurai further pointed out that back in 1998 Ricoh Group demonstrated to the society of 'Sustainable Environmental Management' how to achieve both environmental conservation and financial profit at the same time. Since then, they have aggressively implemented

this strategy, focusing on environmental technology innovation. Their sustainable management successfully promoted innovation, improved productivity, enhanced brand value and resulted in high recognition by international societies.

They see the most important key to success as 'Innovation'. In order to encourage innovation, it is important to set a challenging and meaningful mid- to long-term energy reduction target. Ricoh set a voluntary 2020 target to reduce lifecycle CO₂ emissions from their product's lifecycle to promote innovation.

Industry and business sectors of various countries are expected to understand these critical challenges and must take a leadership role in tackling them by enhancing mutual cooperation.



SESSION 2: Changing Paradigms of Creating Social Value for Businesses

MODERATOR

- **Mr Martin Wright**, Founding Editor, Green Futures and Director-India, Forum for the Future

PANELISTS

- **Mr Krishan Dhawan**, CEO, Shakti Sustainable Energy Foundation
- **Ms Naina Lal Kidwai**, Country Head, HSBC India and Director, HSBC Asia Pacific
- **Mr Ravi Pandit**, Chairman and Group CEO, KPIT Technologies Ltd
- **Mr Assaad Razzouk**, Group Chief Executive Officer, Sindicatum Sustainable Resources

Mr Martin Wright opened the session by emphasizing on the concept of corporate responsibility and the onus to contribute towards creating social value is gaining attention in recent times. He said that most leading corporations are engaging with this concept



primarily to keep abreast of their competitors. Many renowned companies such as Puma, Unilever and Marks & Spencer have made a mark by integrating elements that create social value through the course of their value chain, even if they do not refer to it as the heart of their growth strategy. Social values and business imperatives can really begin to coincide and we are today in for a shift from the primitive charitable model to a strategic model.

The panelists advocated charting a corporate citizenship blueprint to achieve the desired ends. Mr Krishan Dhawan said that more and more companies are getting conscious about integrating sustainability into their value chains by means of

energy efficiency in buildings and operations, waste treatment, and water management. Within CSR, these companies intervene in local areas of business operation to benefit the direct stakeholders (schools, vocational, health, etc.). There is still, however, a lot of scope for many companies to integrate sustainability within their operations. Their CSR projects lack scalability and are unable to make a lasting change. Companies have an interest to invest in the policy space to bring stability into systems, and respect pricing signals to realize business goals. There is a further need for strategic re-orientation towards growth.

Ms Naina Lal Kidwai added that we need to conclusively define

CSR for it to work appropriately for the Indian context across sectors. She asserted that sustainability has to be in the DNA of the organization (top-down and bottom-up) to have the greatest impact on stakeholders. The CSR policy of an organization must be defined concretely and must be made clear to the management. The requisite metrics and definitions are important to be made public to provide a common playing field for all actors and to pull the relatively smaller companies up the sustainability chain. Further, the supply chain has to be managed more appropriately by any company with benchmarks to best practices so that we could gauge performance better. Other best practices pointed out by Ms Kidwai were in the areas of green financing by means of green bonds (financing for green projects), the market for which will be close to \$25 billion by 2050. The financing policy should further present itself in a way that appeals to the local business environment.

Providing a technology angle, Mr Ravi Pandit, dwelt on innovation and cost-effectiveness. He gave the example of the automobile industry where technology has the scope to reduce fuel consumption by 30–40 per cent

at affordable prices and take the country on the path of energy security. He advised that demand planning, estimation, waste/resource reduction are essential components to a sustainable society. With the IT revolution, there are better methods to map energy usage and such metrics help us monitor consumption and devise strategies continuously. He further stated that such changes need to also cut through the inertia of complacency and processes by motivating the staff and other stakeholders to comply wholeheartedly. He presented ways and means by which his organization has integrated such changes in CSR that include solid waste management, vermiculture, water management, etc. He further explained how they have mobilized the local communities by spreading awareness, policy advocacy, economic model interventions, and technology improvements.

Mr Assad Razzouk provided an alternate vision with some radical ideas by claiming that it is not viable for businesses to lead India's energy, water, and food security in today's times. Sustainability in the DNA of a company will have to be enforced from above as their focus will always remain on the marginal

dollar ahead of sustainability. We have to change the fundamental driver for that change to happen. He further pointed out that around 90 companies alone from the coal, oil, gas, and cement industries are responsible for almost all manmade emissions today. We tend to literally buy into coastal erosion, land-loss, rise in sea level, precipitation decline, and droughts by our unsustainable ways due to coal-fired power plants, rampant deforestation, conspicuous consumption of resources and indiscriminate lifestyle at close to \$140 billion a year. Businesses own \$70 trillion worth of assets, so they will have to be the agents of change, as businesses are embedded with government and vice-versa.

He also said that civil society is not mobilized in an effective manner and the judicial system is not yet at a level mature enough to decide on exemplary punishment in case of default. We need to channelize the funds in the right direction with least resistance from opposing groups. Another point raised by Mr Razzouk was regarding carbon pricing. He said it should be standardized, which principle has hitherto been skewed. Climate change must move around the doctrine,

'Climate Change as a Human Right', as it affects our right to live, our right to good health, our right to subsistence due to the food security issues including water shortage and water quality, sea-level rise, and crop failure.

Mr Wright concluded the session with some original inputs, saying that global resource pricing is very often dictated by radical interests of the policy-maker. He stated that technology pricing should be made fair and technology will make up for the loss by leap-frogging with scale and efficiency. He further added that cost estimation must be accurate taking into account the intangible externalities as well. Presently there is improper engagement with the end

stakeholder to connect with climate change issues.

The session was followed by a special presentation by Mr Erik Eid Hohle, Managing Director, The Energy Farm, Norway where he discussed his organization's strengths that align their practices within the contours of sustainable development.

This was followed by a report launch of 'YES Bank-TERI-BCSD Survey of Green Real Estate Sector 2014', released during the High Level Corporate Dialogue aimed to bring out a comprehensive view of the multi-stakeholder perspectives on the challenges, gaps, and key drivers for the growth of the green real estate sector in the country.

The report further reveals the lack of awareness on green

building benefits and unavailability of preferential lending rates as the biggest challenges for the green real estate sector and underscores the urgent need for all stakeholders to work towards the growth of this emerging sector.

The next publication released, titled 'The Compendium of India's Natural Capital Leaders', provides valuable insights on how corporates can mainstream the ethos of resource efficiency and environment conservation with their strategic business priorities. The compendium also highlights best practice case studies of select industry leaders on their exemplary water conservation, waste disposal, and carbon management practices.

Concluding Session

PANELISTS

- **Mr John Bryson**, Head, Bryson Climate Initiative, Woodrow Wilson International Center for Scholars and Former Secretary of Commerce, USA
- **Dr Shashi Tharoor**, Hon'ble Minister of State for Human Resource Development, India

- **Dr R K Pachauri**, Director-General, The Energy and Resources Institute (TERI)

The concluding session saw the presence of Dr Shashi Tharoor, Hon'ble Minister for State for Human Resource Development, Government of India and Mr John Bryson, Head, Bryson Climate Initiative, Woodrow

Wilson International Center for Scholars and Former Secretary of Commerce, USA.

Dr R K Pachauri summed up the proceedings by saying that we need solid partnerships among government organizations, business entities, and research and academic institutions that can further the goal of attaining



L–R: Dr R K Pachauri, Dr Shashi Tharoor, and Mr John Bryson

energy, water, and food security. With respect to water, demand is not just for domestic use, but also for industry. Business entities need to be more sensitive to the use of water and energy and consider the macro picture. Otherwise it would be very difficult for businesses to survive.

In terms of food security, Dr Pachauri referred to the results of the latest IPCC Report saying that climate change would lead to an overall decline in crop yields. There is a projected decline in food production in most countries in Africa as early as 2020 on account of climate change alone.

He cautioned that the impact of climate change has to be carefully considered while studying the implications on energy, water, and food security today. We need to plan for an efficient energy

mix for the future. Businesses now have to take an active role in seeing the macro picture by aligning themselves with policy, socio-economic changes happening globally and respond to such changes by devising and refining strategies and processes to meet some of these pressing challenges.

Former Secretary of Commerce from a developed country, Mr John Bryson pertinently said that businesses should recognize the opportunity to integrate operations for the greater good. India has had a long time to manage its water resources and governments have fought over water. He also mentioned that the best companies are those that create, innovate, research, and build. Partnerships between businesses and governments

are key to solving this problem today.

In his valedictory address, Hon'ble Minister Dr Shashi Tharoor stressed that energy access, water availability, and food security are major prerequisites to achieve the greatest possible benefits for India's demographic dividend. The energy, water, and food nexus demands innovative, integrated, and interdisciplinary solutions. Beyond food security, we also need to impart skills and create livelihoods by providing sustainable energy access for corporations to thrive. Water is to be safeguarded more than anything else as it is an irreplaceable lifeline for the masses. Water has an impact on most aspects of governance including external affairs, economic sustenance, political linkages, and social systems. Scarcity of water has in the past caused epidemics, social unrest, and has also been a cause of conflict amongst nations.

A society secure on these three counts, viz., Energy, Water and Food, offers an ideal market and a strong customer base for a sustainable business to flourish. Motivation for environmental stewardship must descend to a more mundane level for

businesses to get interested. The Companies Act can further serve as an effective catalyst for the corporations to complement the efforts of the government via CSR to enhance the strength of the Millennium Development Goals (MDGs). Moreover, the business sector has the expertise and practical tools to offer as a solution to developmental challenges.

The corporate sector can further contribute by Six Sigma

business practices and quality, lead management, and devise strategies to mitigate risk along with logical supply chains that can play a vital role in fine-tuning practical approaches to meet such challenges. Financing investment in renewables, low-carbon technology, and solution-oriented research investments are imperative in diversifying the right energy mix, which will sustain India's economic growth and strengthen India's

geopolitical position. They can see how shale gas has reduced USA's imports from the Middle East. Businesses could further collaborate with universities by financing research to optimize use of resources.

The government can accelerate this movement by strengthening environmental education in schools. It can help build institutional capacities and awareness for our future generations.

Regional Launch of The International Decade of Sustainable Energy for All (UN-SE4All)

PANELISTS

- **Dr Shashi Tharoor**, Hon'ble Minister of State for Human Resource Development, India
- **Mr Dev Sanyal**, Executive Vice President and Group Chief of Staff, BP p.l.c.
- **Dr Kandeh K Yumkella**, Special Representative of the UN Secretary-General for Sustainable Energy for All and Chief Executive Officer of the Sustainable Energy for All Initiative
- **Dr R K Pachauri**, Director-General, The Energy and Resources Institute (TERI)

Dr R K Pachauri opened the session as a mark of a Regional Launch of the UN Sustainable Energy for All campaign. He pointed out that when the Millennium Development Goals were being framed, TERI had advocated that 'Energy' also be included in the main portfolio of interventions. We have since been committed to the concept of sustainable energy to be the driver of sustainable development. We are implementing programmes in several countries, particularly in Africa. The esteemed guest for the session, Dr Kandeh Yumkella, further elaborated

on this issue and said that the United Nations Secretary-General and head of The World Bank collaborated for the first time in a combined effort towards attaining sustainable energy for all. He said that we cannot attain sustainable development without putting energy at the centre of our concerns. They have deliberately designed the structure in a way to get dominated by the corporates, the scale of investments and innovations to make that energy revolution happen is huge.

They have set three targets as a part of the challenge:

- To achieve universal access to energy by 2030 (eliminate the 1.4 billion energy-poor and double the annual rate of improvement of energy efficiency from 1.7 per cent to 2.5 per cent);
- To double the share of renewable energy in the global energy mix; and
- Devising four more targets in the same direction, namely:
 - ▶ Energy and Water
 - ▶ Energy and Women's Empowerment
 - ▶ Energy and Food Security
 - ▶ Energy and Poverty

He further revealed that they have a budget of about \$900 billion and have raised only about \$400 billion to achieve the first three targets. The corporates are invited to participate in this mission for a combined effort towards attainment of a universal objective.

The objective is to eventually seek a dedicated Sustainable Development Goal for Energy and use public money, leveraging private investment alongside of the order of \$600 billion a year. They could also come up

with newer business models with lesser risk that call for concerted action. There is further a need to bring most technologies in the open source for all nations to use that would increase market opportunities, information, and best practices to maintain an optimum energy mix for today's times. He said that they seek advocacy only on the basis of evidence and not on estimates.

Dr Shashi Tharoor contributed by saying that India is already deeply committed to the three challenges of UN-SE4All, clean energy, energy access, and we seek to remove the barriers we come across. Our goal of reaching 20,000 MW of solar power by 2022 is already being scaled up to 100,000 MW by 2030 and if possible by 2027 itself. The Government of India is also setting up a National Institute of Solar Energy, a global level R&D centre to pursue efforts in this area. It is recognized that to achieve a stable GDP growth rate of 9 per cent, we may need an increase of 5.8 per cent increase in energy supply annually. Access to energy also fuels the efficacy of other programmes,

such as education, skills improvement, and livelihoods enhancement and health, and also saves time and brings quality. The challenge is not just for the government to act, but also for civil society and the private sector to join in.

The discussions were enriched by another address by Mr Dev Sanyal, who was invited to be on this panel considering his close association with energy. He stated that 'Sustainable Energy for All' is an important initiative to bring about some vital partnerships which may result in progress. He said that the objective is to have various parts of the society provide solutions for energy needed for development. He said that at BP, they support carbon pricing and believe that investing in renewables is a long-term solution as a means to reach out to rural areas. The 'Energy Sustainability Challenge' could be met by a consortium of academicians from some leading universities to analyse the relationship between Energy, Water, and Land (food).

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