



World Sustainable Development Forum

DSDS 2007

Delhi Sustainable Development Summit

Meeting the MDGs

Exploring the Natural Resource Dimensions

22–24 January 2007

New Delhi, India

SUMMARY OF PROCEEDINGS



The Energy and Resources Institute

DSDS 2007

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DELHI SUSTAINABLE DEVELOPMENT SUMMIT 2007

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The Energy and Resources Institute

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Tel. 2468 2100 or 4150 4900

Fax 2468 2144 or 2468 2145

India +91 • Delhi (0) 11

E-mail teripress@teri.res.in

Web www.teriin.org

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Preface

The theme of DSDS (Delhi Sustainable Development Summit) 2007 was 'Meeting the MDGs: exploring the natural resource dimensions'. The proceedings of the Summit are timely and an important output that carries the thinking and intellectual efforts of a large number of extremely distinguished leaders drawn from a range of organizations located in different parts of the world. The MDGs (Millennium Development Goals), which were accepted in the year 2007, had clearly articulated outcomes to be reached by the year 2015. Hence, the current juncture represents the mid point of the time in which these outcomes are to be achieved. Clearly, we are not on track as far as the world's efforts are concerned at reaching the required outcomes by 2015.

In discussing the MDGs it is not adequate to look at each specified goal in isolation of the whole complex of initiatives required for attaining a path of sustainable development. The main purpose behind the articulation of the MDGs was to see that global action is mobilized for removal of poverty in the world and for the provision of very basic services that unfortunately the poor are largely denied in different parts of the world today. An appropriate framework within which the MDGs and their attainment is to be analysed involves a number of cross-cutting issues that would support the achievement of the goals that have been specified for 2015. These include, for instance, the linkage between climate change and sustainable development. A number of communities and ecosystems in the world are being adversely affected by climate change, whereby the ability of human populations to achieve sustainable development and conditions for ecosystems to recover from the impacts of climate change are being severely impaired. Another important cross-cutting theme is the provision of energy, which though not identified as an MDG is an essential part of each of the MDGs, if they have to be reached within the time frame required. So also is the need for technologies becoming accessible to the poor who are currently far removed from the benefits of scientific and technological developments, which have provided enormous benefits to the richer sections of humanity. Similarly, water which is getting scarce in several parts of the world, requires constant and in depth appraisal as an essential input for meeting the MDGs .

This volume, which includes keynote addresses by some selected leaders drawn from different professions that are relevant to the attainment of the MDGs, provides very useful insights on a range of subjects that are an important part of sustainable development. The proceedings of each of the

sessions where presentations were made and panel discussions were conducted provide the collective vision and knowledge of very distinguished speakers and participants. DSDS is now becoming a major global event which attracts not only the leadership of different sectors of human endeavour from all over the world, but also innovators who have shown results in their own spheres of activity and who are providing outstanding models worthy of emulation elsewhere. It is hoped that this volume like those from previous summits will provide rich intellectual fare that would help in addressing some of the most critical challenges facing the world today.



R K Pachauri
Director-General, TERI

Acknowledgements

Each year the DSDS (Delhi Sustainable Development Summit) summit secretariat begins its summit preparations eight months in advance, but the high-level participation, the recognition, and continued success of the DSDS is due to the tremendous support that the summit and TERI receive from across the globe.

While the summit's carefully drawn Steering Committee helps in bringing together some of the most distinguished thought-leaders from across the globe, and within TERI, the session advisors play an important role in outlining and shaping the summit agenda. We thank the Steering Committee and advisors for their judicious counsel and support throughout the DSDS 2007 preparations.

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During the summit the role of the rapporteurs is crucial as they capture the salient discussion points in each session and pass them on to the experienced and talented colleagues of TERI Press who bring out impressive synthesis of the discussions at the end of each day.

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The DSDS series receives contributions and partnership support from different sectors, which includes government, multi/bilateral organizations, corporate sector, and also the media. The organizations that supported DSDS 2007 have been individually acknowledged later in this proceeding. They have been instrumental in bringing together to the summit the delegates and the speakers from across the globe.

The summit secretariat also wishes to thank the corporate leaders, who spared their time to join us for the DSDS Curtain Raiser: The CEO Forum 2007. The participating CEOs from diverse sectors provided refreshing and innovative ideas to mainstream sustainable development in their businesses. The synthesis of these deliberations has been brought out in a separate publication titled *Business Unusual: championing corporate social responsibility*.

Annapurna Vancheswaran
DSDS Secretariat

Prudent use of natural resources basis for sustainable development

Sangeeta Nandi and Shilpa Nischal*

TERI, New Delhi

Introduction

Sustainable development has emerged as a term of common usage with diverse perspectives and numerous definitions. The concept of sustainable development stresses the long-term compatibility of the economic, social, and environmental dimensions of human well-being, while acknowledging their possible competition in the short term (OECD 2001). This gives rise to two conclusions—development must balance different objectives and exploit their synergies; and development must be undertaken with a long-term view of its implications and of the uncertainties that surround them. Simply stated, sustainable development is the improved well-being of human beings and the ecosystem (IUCN 1997, 2001).

In 2000, 147 heads of state and 189 nations committed themselves to freeing the entire human race from want, with a focus on human rights and the billion-plus people living in extreme poverty. The MDGs (Millennium Development Goals), a set of eight time-bound and target-based goals, were formulated by the world community in 2000 to address the overriding concern of human deprivation as represented by income poverty and the inadequacy of enabling opportunities for all. Based on the Millennium Declaration adopted by all Member States of the United Nations, eight overarching goals for social development, environmental sustainability, and global solidarity were defined, to be achieved by 2015 on the basis of mutual commitment by both the developed and developing countries (Box 1). Subsequently, one of the critical issues of discussion at the WSSD (World Summit on Sustainable Development) in 2002 was the linkage between the concept of sustainable development and the MDGs, with one crucial element in that linkage being the environment–poverty nexus. The Millennium +5 Summit in New York in 2005 further emphasized the importance of sustainable management of environmental resources for the eradication of poverty and achievement of the MDGs.

DSDS (Delhi Sustainable Development Summit) 2007 reiterates the vital importance of natural resources in alleviating poverty and attaining the MDGs. With the understanding that ‘investing in environmental sustainability

*The authors acknowledge the research input provided by Ms Shazneen Gazdar.

is an effective and efficient leverage point for development' (Achim Steiner¹), this paper provides a background on the development imperatives to be deliberated upon at the summit against a scenario of unsustainable consumption and production patterns worldwide. The importance of sustained socio-economic progress in Africa, a continent endowed with a rich natural heritage, is also emphasized in DSDS 2007, as is the necessity of innovations and partnerships for sustainable development in the spheres of science and technology, governance, and development assistance. In the course of the sessions, the summit seeks some specific answers to questions of critical importance to a society aiming to develop equitably and sustainably. These are highlighted in the relevant sections of concern through the course of this paper.

Box 1 Attaining the MDGs: a global perspective

MDG 1: Eradicate extreme poverty and hunger

- Progress varied across regions with dramatic poverty reductions in Asia but a deterioration of the situation in sub-Saharan Africa.
- Hunger reduced in more than 30 countries, including 14 sub-Saharan countries, by at least 25% during 1999–2001.

MDG 2: Achieve universal primary education

- Steady progress in most regions; 86% increase in primary education enrolment in developing countries, including sub-Saharan Africa.
- Educational gender gap persists.

MDG 3: Promote gender equality and empower women

- Slight progress in women's status in labour markets; inequalities persist.
- Women's political power growing, though men still in the dominant position.

MDG 4: Reduce child mortality

- Survival prospects improved in all regions; but sub-Saharan Africa still trails behind.
- Vaccination of three-quarters of the world's children protected them effectively; but many still die of diseases.

MDG 5: Improve maternal health

- Maternal mortality still high despite gains in the number of assisted deliveries.

MDG 6: Combat HIV/AIDS, malaria, and other diseases

- Deaths and new infections continue despite preventive efforts proving successful.
- Efforts to curb malaria gaining popularity mainly through awareness campaigns; tuberculosis on the rise.

Continued...

¹ Details available at http://www.wbcsd.org/web/complus/documents/article_hntiyamira.pdf, last accessed on 7 January 2007.

Box 1 Attaining the MDGs: a global perspective (*continued...*)

MDG 7: Ensure environmental sustainability

- Rapid deforestation continues, though there is a slowdown of net loss in forested area.
- Efficient energy use practices increasing; though CO₂ emissions continue to rise globally.
- Access to safe drinking water and basic sanitation is still a distant target for many.

MDG 8: Develop a global partnership for development

- Led by debt relief, development assistance increases sharply but falls short of targets.
- Decrease in debt service burden, but for poor countries it is still quite high.

Source UNDESA (2006)

Natural resources and human development

Despite considerable efforts undertaken by diverse players worldwide to realize the pledge of making poverty history by 2015, progress on the attainment of the MDGs has not been uniform across regions. More than one billion people remain below the poverty line of one dollar per day, and 20 000 die from poverty each day (UN 2005). In this context, the decline in natural capital through various forms of environmental degradation and depletion poses a disproportionately larger threat to the livelihoods of the poor, for 'the world's poorest people are the most dependant on fertile soil, clean water, and healthy ecosystems for a living' (Klaus Toepfer).² This dependence translates into a higher degree of vulnerability for the poor, thus hindering the achievement of the MDGs (*Millennium Ecosystem Assessment Report 2004*).³

Broadly, the importance of nature for human development derives from three distinct environmental functions: a source of productive resources to aid human consumption and production requirements; a sink for assimilation of anthropogenic wastes; and the provision of services for the maintenance of vital life-sustaining ecosystem processes, for example, maintaining the protective ozone layer (Figure 1). The capacity of ecosystem goods and services to provide a capital base for socio-economic advancement is also underlined by development methodologies like the sustainable

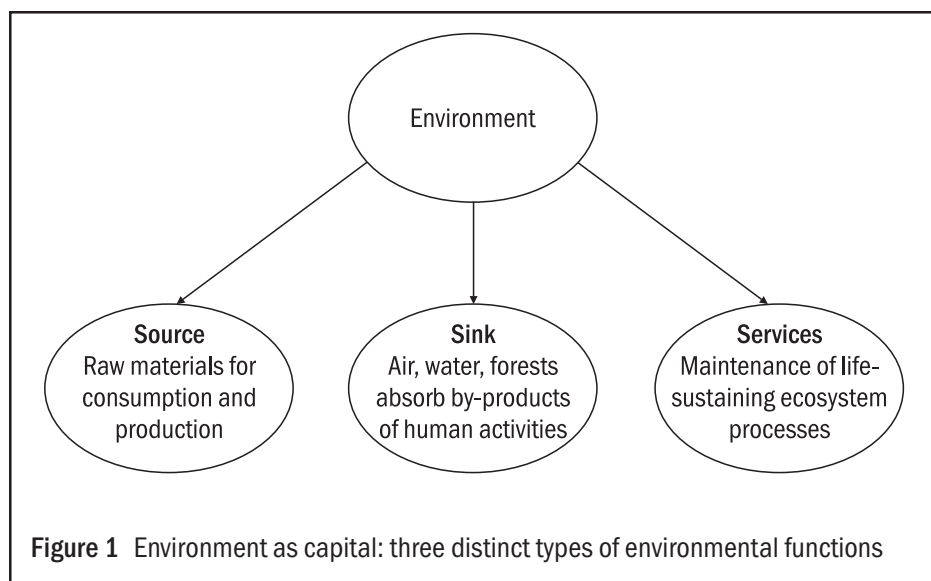
SUMMIT QUERIES

MDGs: the distance yet to be traversed

- What are the weakest links in meeting the MDGs and how can they be addressed?
- What mechanisms can be designed for leveraging natural resources towards poverty alleviation in a sustainable manner? Is natural resource degradation threatening to offset other initiatives aimed at poverty alleviation?
- How can we ensure access to services from cutting-edge technology to the underprivileged?
- How can learnings or successful experiments be shared most efficiently amongst countries?
- How can effective partnerships be formulated and scaled to yield desired outcomes?
- What institutional changes are required to ensure accelerated opportunities for growth/poverty alleviation while protecting our natural resource base?

² Details available at http://www.wbcsd.org/web/complus/documents/article_hntiyamira.pdf, last accessed on 7 January 2007.

³ Details available at http://www.wri.org/biodiv/pubs_description.cfm?pid=3927, last accessed on 7 January 2007



livelihood framework, which identifies natural capital as one of the five forms of capital essential for enabling improved livelihood conditions of the poor.⁴

Indiscriminate and continued environmental damage disproportionately impacts the poor in two ways: direct livelihood losses due to the depletion of the source function; and indirect impacts of degradation in the sink and services function. Estimates reveal that about 90% of the world's poor depend on forests for at least some part of their income (WRI 2005). A study in Uganda showed that the key variable explaining income levels for rural households in the country was access to land and livestock.⁵ In addition to the direct risks associated with the depletion of natural resources, the poor have lower capacities to defend themselves against the health and mortality repercussions of incessant environmental degradation (Table 1), manifested as air and water pollution, deforestation, climate change, and so on.

Apart from lower defensive capabilities, ill health amongst the poor reinforces the poverty cycle and acts as a negative asset. An ill household member erodes the family's living standard and is a potential factor for the household's decline into abiding poverty (WRI 2005). For example, families that face a health shock (such as an ailing earning household member) often cope by pulling children out of school and sending them to earn additional income, thus impacting the child's future well-being.

⁴ The five types of livelihood-enhancing capital identified by the sustainability framework, developed by DFID (Department for International Development), are physical capital, human capital, natural capital, social capital, and financial capital.

⁵ Details available at <http://www.iied.org/Gov/mdgs/documents/MDG-ch4.pdf>, last accessed on 7 January 2007.

Table 1 Global mortality statistics for major environmental risks

Environmental risk	Years of life lost (106 per year)		
	Male	Female	Total
Unsafe water, sanitation, hygiene	24.9	24.3	49.2
Indoor air pollution	17.3	17.8	35.1
Urban air pollution	3.5	2.9	6.4
Lead exposure	1.9	0.9	2.8
Climate change	2.4	2.5	4.9

Source WHO (2002), as produced in Goldemberg, Johansson, Reddy, *et al.* (2004)

Safeguarding the environment is, therefore, extremely important for the attainment of the MDGs. An unsustainable environment (MDG 7) has the ability to reinforce the cycle of poverty (MDG 1), thus undermining health care (MDGs 4, 5, and 6). The above may combine to further derail efforts to secure enhancements in prevailing socio-economic processes (MDGs 1, 2, and 3). Moreover, ensuring environmental sustainability is equally a responsibility of the developed and developing countries, and thus, necessitates partnerships for change (MDG 8). These partnerships must recognize that because of their dependence on ecosystem goods and services, the poor are especially vulnerable to environmental damage—thus, there is a need to ‘produce and consume differently’ (World Bank 1992).

Unsustainable consumption and production pathways

Humanity’s stake in environmental protection is enormous, especially against the backdrop of past development strategies, which have often been associated with large-scale environmental depletion and degradation. This assumes importance for most developing countries, where industrial development is an important element in the pursuit of economic growth. However, the growing economic wealth of nations tends to increase inequities in income distribution.⁶ There are also instances of highly polluting industries being relocated from crowded urban areas to peri-urban and rural areas to avoid clean-up costs.⁷ Both of the above expose the poor to the debilitating consequences of air and water pollution. On the other hand, private consumption expenditure has increased fourfold since 1960, with growing economic wealth leading people to adopt unsustainable lifestyle patterns, thus adding to the stresses on the natural resource base. With reference to current patterns of user behaviour and lifestyles, the Worldwatch

SUMMIT QUERIES

Sustainable use of natural resources

- Is poverty the worst polluter? Can ecosystems be the wealth of the poor?
- What are the critical linkages between natural resource degradation and livelihood options for the poor?
- What are the prerequisites for ensuring that ecosystem management does not exacerbate poverty and exclude the poor?
- Will payment for environmental services solve the conundrum?
- Do institutions and initiatives such as joint/community forestry management or water panchayats ensure a confluence of interests? What could be the role of governance?

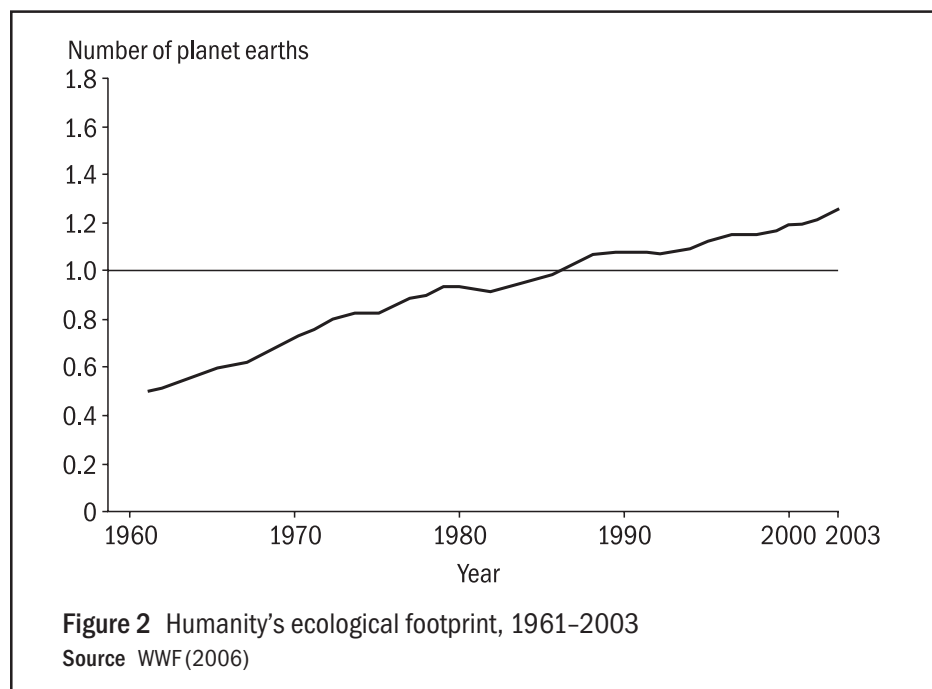
⁶ For example, in Latin America, the incidence of poverty has increased in the last decade even as gross domestic product per capita has increased (WRI 2005).

⁷ For example, in China; details available in WRI (2005).

Institute (2004) reported that approximately 1.7 billion people across the world had entered the 'consumer class', adopting diets, transportation systems, and lifestyles that were limited to the rich nations in the last century. Private consumption expenditures have also increased fourfold since 1960.

The rise in consumption is reflected in mankind's 'ecological footprint' – the demands placed by human beings on the natural world – having increased to the point where the earth is unable to regenerate renewable resources at the rate at which they are used. An estimation was done of the amount of productive land and sea needed to provide the earth's population with adequate energy, food, water, and materials used in everyday life, as well as absorb anthropogenic wastes. It was calculated that until 2003, the earth's ecological footprint exceeded its bio-capacity by about 25%. The ecological overshoot began in the late 1980s; the footprint having been calculated for the period 1961–2003 (Figure 2).⁸

In 1992, Agenda 21⁹ succinctly noted, 'The major cause of the continued deterioration of the global environment is an unsustainable pattern of consumption and production.' Subsequently, the JPoI (Johannesburg Plan of Implementation) adopted at the WSSD (2002) stated that changes in the way



⁸ World Wide Fund for Nature and Global Footprint Network, *The Living Planet Report 2006*, details available at http://www.footprintnetwork.org/newsletters/gfn_blast_0610.html, last accessed on 6 January 2007.

⁹ Blueprint of Plan of Action proposed for sustainable development, formulated at the United Nations Conference on Environment and Development, Rio de Janeiro, 1992.

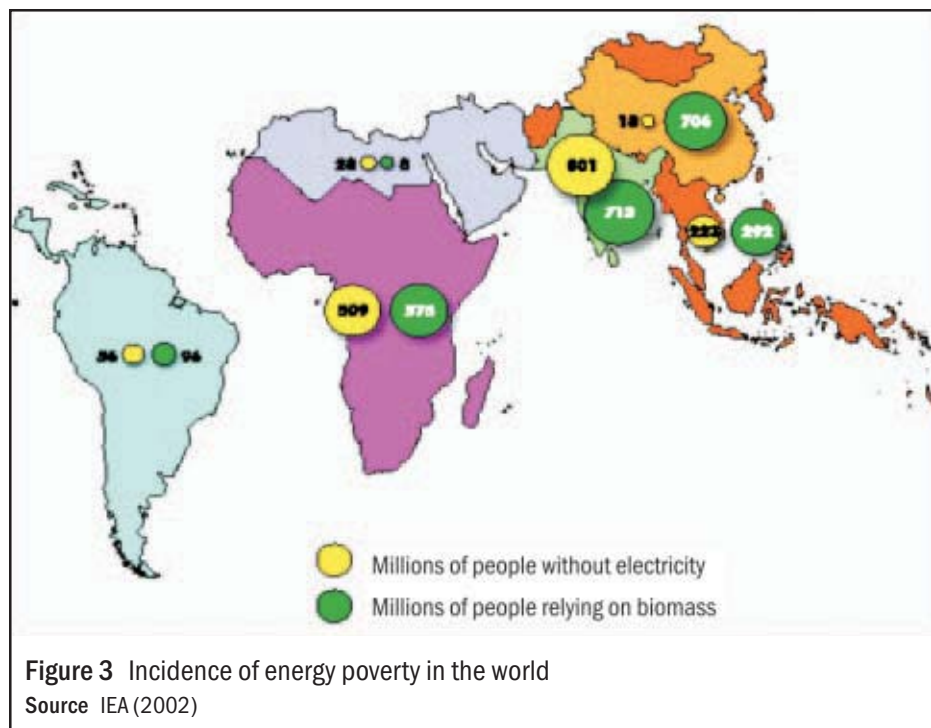
societies produced and consumed were indispensable for achieving global sustainable development. The changes require regional and national initiatives to promote less resource-intensive and more efficient production processes that lead to a reduction in resource degradation, pollution, and waste.¹⁰ Therefore, DSDS calls for patterns of socio-economic development that respect the carrying capacity of ecosystems such that extreme damages due to the pursuit of unsustainable pathways can be restricted. It highlights two critical manifestations of unsustainable production and consumption patterns: water insecurity and climate change. It also acknowledges that sustainable growth would require, at a very fundamental level, more environment-friendly adaptations and innovations in the energy sector.

Securing energy sustainability

Energy services have a significant role in facilitating both economic and social development. Energy underpins economic activity, enhances productivity, and provides access to markets for trading purposes. It also enables the fulfilment of basic human needs of nutrition, warmth, and lighting, in addition to education and public health. While increased access to energy services does not result in enhanced socio-economic development by itself, the lack of adequate energy input acts as a severe constraint on the development process, and thereby the attainment of the MDGs. The association between access to efficient energy carriers and development levels is also brought out by the fact that the relatively poorer continents of Africa, Asia, and Latin America are also characterized by large concentrations of people who are energy-poor, relying to a considerable extent on traditional biomass fuels, while simultaneously lacking access to modern electricity services (Figure 3).

At a very basic household level, a measure of energy poverty relates to the inability to use modern cooking fuels and the lack of a bare minimum of electric lighting. This corresponds to an estimated 50 kgoe (kilograms of oil equivalent) of annual commercial energy consumption per capita. Out of this, approximately 40 kgoe per capita has been estimated as the energy requirement for cooking purposes, and the remainder as fuel for electricity (World Bank/UNDP 2005). In general, the implications of lack of access to efficient energy sources are manifold for the absolute poor, with women in particular – especially in rural areas – being disproportionately affected. An ESMAP (Energy Sector Management Assistance Programme) study (2002) in rural India, for example, indicated that about 37 hours per month were required for fuelwood collection, with women suffering the maximum amount of drudgery due to this activity (World Bank/UNDP 2005). A recent

¹⁰Para 14 and 15, JPol (Johannesburg Plan of Implementation), United Nations website <www.un.org>



comprehensive countrywide assessment on household solid fuel¹¹ use also argues that curbing indoor air pollution from solid fuels can make a substantial contribution towards reducing child mortality (MDG 4) and improving maternal health (MDG 5), since women and young children are most exposed to indoor smoke from the use of solid fuels in poorly vented stoves (Box 2). The above is in addition to contributing to the attainment of other MDGs (Rehfuess, Mehta, and Prüss-Üstün 2006).

However, environmental damage due to inefficient energy use patterns occurs due to the unsustainable mining of natural resources for energy generation, or the degradation of the natural capital base as a result of emissions arising from the combustion of energy forms. In general, the consumption and production of energy from various sources can harm, in various ways, all the three essential elements of the planet: air, land, and water (Table 2).

Hence, while acknowledging the importance of energy services as an essential enabling factor for human progress, it is necessary to invest in the development and widespread disbursement of relatively cleaner RETs (renewable energy technologies).¹² Given the inevitable release of carbon

¹¹ Solid fuels include, biomass fuels, such as wood, charcoal, crops or other agricultural waste, dung, shrubs and straw, and coal (Details available at <http://www.who.int/whosis/whostat2006SolidFuels.pdf>, last accessed on 7 January 2007).

¹² Oil, natural gas, and coal provide approximately 80% of the world's primary energy supplies (IEA 2006).

Box 2 Choking under smoke

The WHO (World Health Organization) has identified indoor air pollution as a global environmental risk causing some 1.6 million premature deaths per year worldwide. An average life-shortening of more than 20 years is associated with these premature deaths, and the overall mortality risk is about 50% higher for women (who do the most cooking). Children exposed to indoor air pollution from household solid fuel have a 2.3 times higher risk of lower respiratory infection, while women exposed to such indoor air pollution have a 3.2 times higher risk of chronic obstructive pulmonary disease.

Source Goldemberg, Johansson, Reddy, et al. (2004)

Table 2 Impacts of modern energy sources on air, land, and water

Natural element impacted	Pathway of impact	Potential energy source of impacts	Broad categories of impact
Air	Emissions into the atmosphere due to the combustion of fossil fuels.	Coal, oil, natural gas (less polluting than coal and oil)	Smog; acid rain; haze; enhanced risks of climate change
Land	Land is used for the mining and extraction of fuels, and for constructing power generation facilities.	Coal, oil, natural gas, nuclear energy, hydro power	Soil erosion; loss of soil productivity; landslides; wasteful by-products of refining; power generation; fossil fuel combustion; as well as oil spills cause land contamination, and destruction of ecosystems and natural habitats
Water	Water resources are vital during the extraction and refining of raw forms of fossil fuel; used during the mechanics of power generation as well.	Coal, oil, nuclear energy, hydropower, natural gas	Drilling and mining operations can impact water quality and quantity, thereby affecting aquatic life and dependents on it, including humans; water discharges from power generation facilities often contain pollutants, including heavy metals like arsenic

dioxide, lead, methane, and other harmful GHGs (greenhouse gases) into the atmosphere due to the large-scale combustion of fossil fuels, the adoption of technologies for mitigating GHG emissions – like CCS (carbon dioxide capture and storage) – and the development of alternative sources of energy

SUMMIT QUERIES

Energy for sustainable development

- What are the challenges involved in diversifying and decarbonizing fuel mix in producing energy?
- What are the challenges for harnessing renewable energy technologies for affordable and accessible power?
- How can research and development in sustainable energy developments be accelerated?
- How can we better integrate and address environmental concerns (local and global) on energy supply side and environment dimensions of demand side impacts?
- What are the challenges in securing investments in the energy sector, especially in developing countries like India?

that are less harmful to the natural environment have almost become an exigency.

Mitigating and adapting to the adverse impacts of climate change

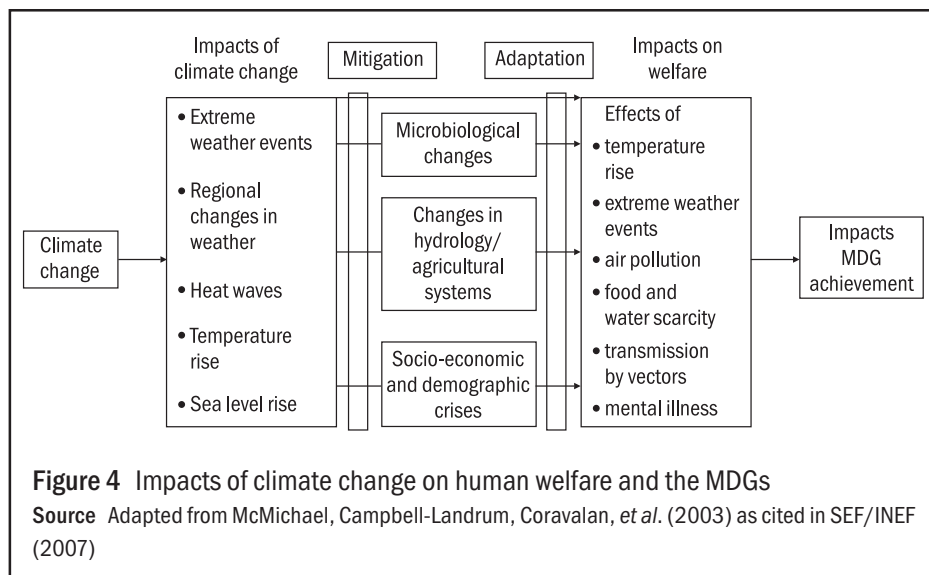
Climate change, a resultant of both natural and anthropogenic factors like changed land-use pattern, deforestation, and land degradation, is likely to exacerbate environmental vulnerability¹³ on account of rising temperatures, changed precipitation patterns, rising sea levels, and greater intensity or frequency of extreme events. These adverse impacts could affect not only ecosystems but also social and economic systems, threatening to undermine sustainable development. In this context, it might be pertinent to recall former UN Secretary General Kofi Annan's assessment that 'one of the greatest environmental and development challenges in the twenty-first century will be that of controlling and coping with climate change' (Annan 2005).

Climate change adds to the vulnerability of the poor due to their high dependence on natural resources and limited capacity to adapt to the changing climate (UN 2006). The IPCC (Intergovernmental Panel on Climate Change) indicates a rise of about 0.6 °C in the earth's average temperature above the average global temperature of 15 °C. This rise is a matter of concern, especially for developing countries, and populations that rely critically on climate-sensitive sectors such as agriculture, forestry, and fisheries for their livelihoods. Such populations are also most vulnerable to environmental changes (pollution, drought, and so on) and sudden extreme events such as floods and cyclones.

Changes in climate are also expected to alter distribution of important vector species (for example, mosquitoes) and may, therefore, increase the spread of disease to new areas that lack adequate public health infrastructure (Gol 2004). Given that developing countries generally lack financial, technical, and institutional capacities to be able to cope effectively with expected changes (IPCC 2001), the potential impacts of climate change on human welfare and the attainment of the MDGs for a vast majority of the earth's population are immense (Figure 4).

A range of measures is required to mitigate and adapt to the adverse effects of climate change. These could comprise energy-efficiency improvements, adoption of new energy sources, carbon capture and storage technologies, and changes in unsustainable patterns of production and consumption. Funding for climate change mitigation and adaptation activities is, therefore, important for achieving sustainable development objectives. Since 1994, significant investments in core mitigation activities and in sectors in developing countries have been undertaken. The Kyoto

¹³Environmental vulnerability is defined as the degree to which the environment is likely to be affected by natural or anthropogenic hazards (TERI 2003).



Protocol is but a small step in directing efforts towards mitigation. The commitments, as outlined in the Kyoto Protocol, of reducing emissions in Annex I Parties by an average of 5.6% of their 1990 emissions, if achieved, will at best reduce 0.8 Gg (gigagram) of CO₂ (carbon dioxide). An assessment of the Annex I achievements in the period 1991–2003 reveals that in 2003, GHG emissions from Annex I Parties may have declined by 7.4%, but this has been largely due to a 46.8% decline from EIT (economies in transition) countries. Emissions from non-EIT Parties have, in fact, increased by 12.4% in the same time period (UNFCCC 2005). It is in this context that accelerated efforts at mitigation assume further importance. The various processes launched in 2005, including the Gleneagles Plan of Action, the Asia-Pacific Partnership, and the long-term cooperative programme launched at the 11th Conference of the Parties in Montreal, are efforts to deal with this issue, though from different perspectives.

However, under-funding of adaptation is still a barrier to achieving the objectives of the Agenda 21 and WSSD—‘...we reaffirm our commitment to achieving the ultimate objective of stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, within a time-frame sufficient to allow ecosystems to adapt naturally to climate change...’ (JPol 2002, paragraph 38).¹⁴ Subsequent to the WSSD, the Parties to the FCCC (Framework Convention on Climate Change) have directed the GEF (Global Environment Facility) to support adaptation efforts in developing countries, particularly LDCs (less developed countries) and SIDS (small island

SUMMIT QUERIES

Climate change and sustainable development

- What will be the impact of climate change on efforts to meet the MDGs?
- How can we enhance international cooperation to mitigate climate change? Should the role of the Clean Development Mechanism be expanded?
- How should we distribute the financial burden of mitigation between countries, bearing in mind equity considerations and the imperatives of poverty eradication and achievement of MDGs?
- How can we adapt to climate change in order to minimize its negative impacts on MDG initiatives? How can funds be mobilized for adaptation?

¹⁴Details available at <<http://www.un.org>>, last accessed on 4 January 2007.

developing states). Currently, there are four avenues for funding projects aimed at enhancing adaptive capacities of the developing countries—the LDC Fund, SCC (Special Climate Change) Fund, Adaptation Fund, and the Strategic Priority on Adaptation under the GEF Trust Fund. Investments in adaptation-related projects, mostly in the water and agriculture sectors, have been made by various multilateral development banks. As on November 2005, the voluntary contributions to the LDC Fund established to support preparation of national adaptation programmes of action amounted to about \$32.9 million (UN 2006).

Water for life¹⁵

Water resource management is an essential component of socio-economic development and can impact the incidence of poverty, hunger, and ill health. It can also help ensure environmental sustainability and reduce gender inequalities. Clean water and sanitation are fundamental to 'what people can do and what they can become – to their capabilities' (UNDP 2006), and therefore, are prerequisites for attaining wider human development goals, including the MDGs. Recognizing access to safe water resources as a basic human requirement, the United Nations commented that 'the human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use.'¹⁶

However, competition, environmental stress, and unpredictability of access to water are powerful drivers of water insecurity for a large proportion of the global population, substantial to derail progress towards the MDGs and human development. As a result, more than 1 billion people continue to lack access to clean water, while 2.6 billion are denied the right to adequate sanitation (UNDP 2006). The critical importance of access to safe water and sanitation facilities for human well-being can be gauged by the fact that 1.8 million children die every year as a result of diarrhoea and other diseases caused by unclean water and poor sanitation (UNDP 2006). Illness caused by unsafe drinking water and inadequate sanitation generates costs that claim a large share of poor households' incomes (Box 3). On the other hand, improved access to water supply and sanitation services, by reducing the time spent on accessing these amenities, has the potential to enhance possibilities for education or other livelihood generation. Studies also show that inadequate sanitation in school is a powerful deterrent in attending school, especially for girls (WRI 2005).

¹⁵ 2005–15 has been considered as the International Decade for Action 'Water for Life', wherein the United Nations and governments are seeking to galvanize efforts to meet the internationally agreed targets of halving the number of people without access to safe drinking water and basic sanitation by 2015. Details available at <<http://www.un.org/waterforlifedecade/>>, last accessed on 4 January 2007

¹⁶ UN General Comment No. 15 on the Right to Water, 2002, cited in UNDP (2006).

Box 3 Clean water and basic sanitation facilities for human welfare: case studies

- The provision of safe water can reduce child death rates by more than 20% in Cameroon and Uganda.
- The presence of a flush toilet in the house reduces the risk of infant death by more than 30% in Egypt and Peru.

Source UNDP (2006)

While as a productive resource, water is essential in maintaining the livelihoods of the world's most vulnerable people, it also has destructive properties, as witnessed by storms and floods. In this context, changes in rainfall and temperature, associated with climate change, make the poor particularly vulnerable to uncertainties in the manifestations of water flows, thereby making an integrated system of water management a necessity for sustainable development. This is extremely important, since until recently, policy-makers have treated water as an infinitely available resource to be diverted, drained or polluted in the course of generating economic wealth (UNDP 2006). It must also be kept in mind by the policy fraternity that in situations of scarcity and misallocations, intense competition for a vital life-sustaining resource creates socio-political tensions, apart from economic and social hardships—and water is a resource beyond political boundaries.

Africa: a development imperative

Although some countries are making rapid strides in meeting the MDGs, Africa as a region appears to be developing more slowly than the rest of the world. The global attainment of the MDGs is largely dependent on the progress made by African countries towards these stipulated targets. While at the global level, the proportion of the people with income levels less than \$1 a day has declined in the past decade, the situation has deteriorated in sub-Saharan Africa, which already has the highest poverty rate in the world. Chronic hunger remains widespread in African countries—as high as 40% in Central Africa.¹⁷ Also, the growing population in the continent has been unable to find adequate productive employment opportunities, and HIV/AIDS has taken a brutal toll on the most productive segment of the population. Africa's efforts to achieve sustainable development have also been hindered by a number of other factors. These include an underdeveloped

SUMMIT QUERIES

Water—the need for integrated water resource management systems

- How does one address the prevalent contradictions in policy on integrated water management?
- What should be done to resolve interstate/ international conflicts?
- How does one overcome the problems and constraints towards ensuring safe drinking water and sanitation?
- Can public-private partnerships help make water management more efficient? How?

¹⁷ Details available at <<http://www.un.org/africa/osaa/reports/Achieving%20Food%20Security%20in%20Africa-Challenges%20and%20Issues.pdf>>, last accessed on 4 January 2007

SUMMIT QUERIES

Sustainable development in Africa

- How can we understand the nature of conflicts in African countries? Does their increased international attraction as raw material sources add to local conflicts?
- HIV/AIDS is impacting all sectors in sub-Saharan Africa and increasing the disease burden. What natural management strategies can contribute to alleviate the burden of HIV/AIDS in Africa and increase coping capacity?
- It is well established that disease and ill health can cause a slide into poverty. How can this vicious cycle of disease-poverty-disease in Africa be broken?

agricultural sector vulnerable to the vagaries of adverse weather conditions, conflict, political instability, insufficient investment levels, inadequate infrastructure, limited market access opportunities, supply side constraints, and unsustainable debt burdens.

Africa possesses great potential, particularly because of its abundant natural wealth, which includes significant energy potential in the form of oil and gas reserves, hydro power resources, and a perennially exploitable solar resource. Therefore, the efficient management of Africa's natural resources in the form of energy reserves, as well as availability of abundant arable land, water, minerals, and forests hold a key to the continent's sustainable development prospects. Internally within the continent too, the need for a sustainable pathway to socio-economic progress has been concretely acknowledged in the form of initiatives between countries, such as the New Partnership for Africa's Development, which provide a road map to eradicate poverty and move towards a path of sustainable development. The development potential of Africa has also been harnessed successfully in many spheres by international efforts like the Millennium Villages Project (Box 4).

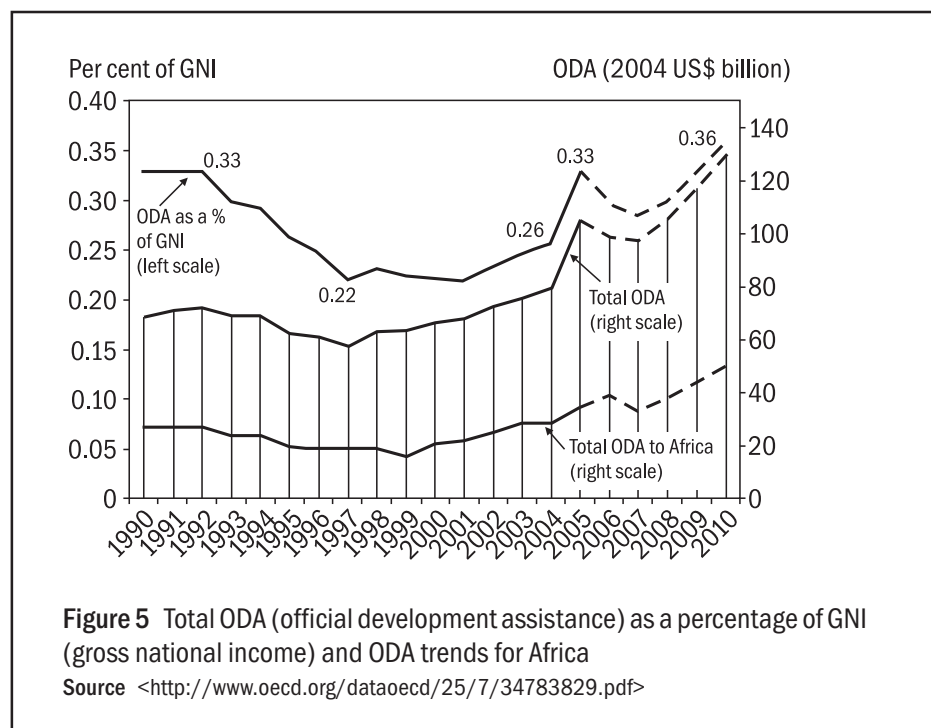
Mobilizing resources through higher levels of development aid, enhancing technological know-how, and building capacities of local people have an important role to play in the advancement of human welfare in Africa, along with good governance practices. Encouragingly, the total ODA (official development assistance) to Africa has been on the rise (Figure 5) although a gap still remains between the actual ODA disbursed and the levels commit-

Box 4 Millennium Villages Project: the success story of Sauri in Kenya

The Millennium Village Project is an attempt to bring villages in developing countries out of the poverty trap. The project's underlying principles include community empowerment, interventions based on scientific research, strengthening of local institutions, and self-sustenance. Under this project, Sauri in Kenya was adopted as a millennium village in 2005. Sauri is a village of approximately 4600 people with a strong community system, which lacks financial resources to sustain economic growth. Before being adopted as a millennium village, the vast majority of households in Sauri reported chronic hunger due to inadequate food production. However, since the Millennium Project's interventions in the village, recent harvests of food crops have more than doubled. These efforts have been recognized, and Sauri has been commended for its success in achieving the first Millennium Development Goal at the 2006 Africities Summit in Nairobi.

Source UN (2006), *UN Millennium Project Report*
Details available at <http://www.unmillenniumproject.org/reports/index_overview.htm>, last accessed on 6 January 2007

ted to by the international community at the WSSD 2002. In 2004, the net ODA to Africa was \$29 080 million. This accrued mostly to the social sector, in particular, education and health,¹⁸ thus reflecting the importance attached to capacity building and adequate formation of human capital in the continent, in addition to direct scientific and technical interventions for sustainable development.



Science and technology for sustainable development

Effective harnessing of existing and emerging technologies is central to facilitating the achievement of the MDGs (UNCTAD 2005). A comprehensive scientific vision and political commitment thus forms a fulcrum for achieving a sustained form of development, which helps alleviate human suffering while conserving the natural capital base (Figure 6). However, a lack of national capacity to acquire and harness technology potential prevents most developing countries from investing in innovations and fully leveraging the options offered by scientific and technical knowledge for attaining their development objectives in a sustainable manner.

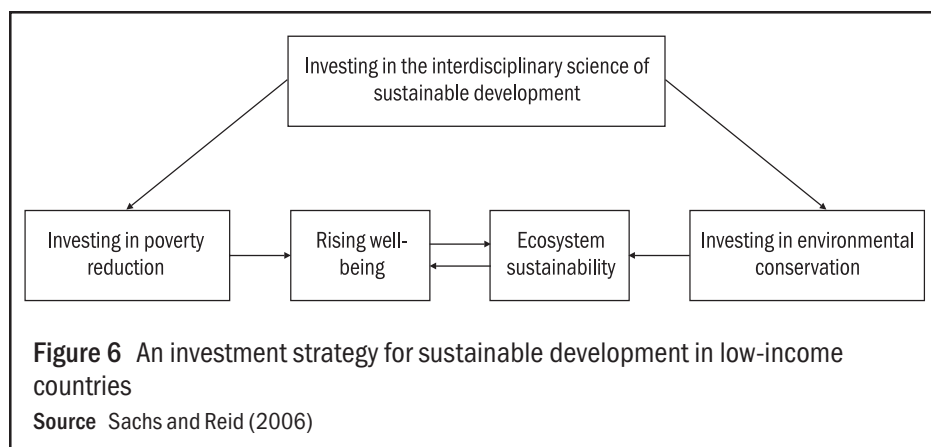
In comparison to developed countries, most developing countries are found to under-invest in R&D (research and development). India, for instance,

SUMMIT QUERIES

Sustainable development in Africa

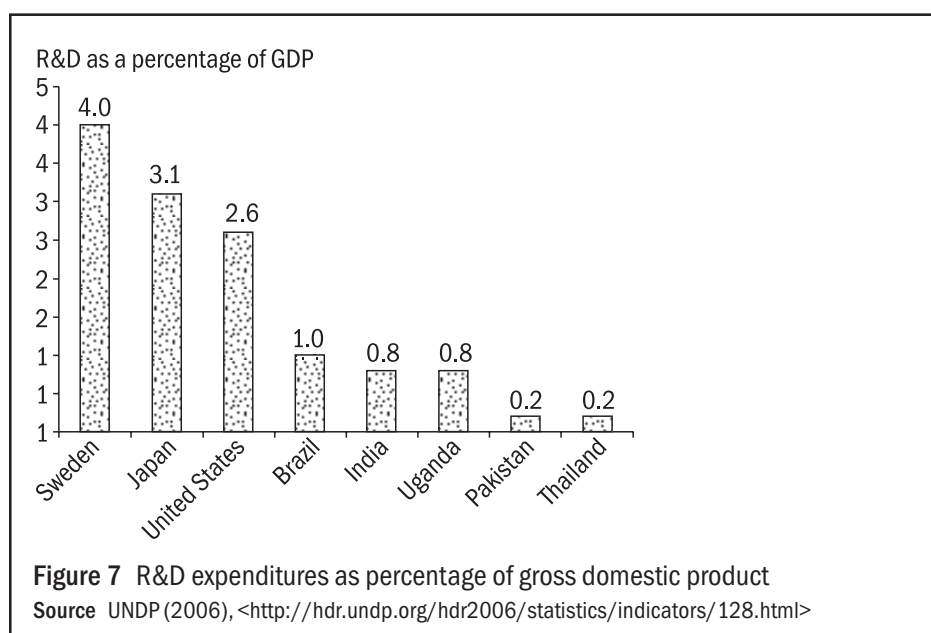
- How does one build a research culture in Africa? How can collaborative research links be established between Africa and the rest of the world? What innovative funding can be developed to develop science and technology in Africa?
- How can one address the energy needs of the poor in Africa? How can one rope in the large resource companies operating in Africa to invest in affordable and efficient energy systems?
- What empowering multilateral initiatives can be taken in Africa to build human capacity to address issues that relate to water, health, education, energy, agriculture, and the environment?
- How can India draw on its own development experience to address specific problems that Africa faces?

¹⁸ Details available at <<http://www.oecd.org/dataoecd/40/27/7504863.PDF>>, last accessed on 7 January 2007



incurs a per capita R&D expenditure of about \$5.5, a negligible amount compared to the per capita R&D expenditures of the United States (\$705) and Japan (\$978). In general, developed countries like Japan and Sweden spend a larger proportion of their GDP (gross domestic product) on research activities as compared to developing countries like India and Thailand (Figure 7).

In addition to building local capabilities, it is also important to facilitate technology transfer and technical cooperation between developed and developing countries. This was emphasized at the WSSD, which stressed the need to, 'take further action to mobilize the provision of financial resources, technology transfer, capacity building, and the diffusion of environmentally sound technologies' (JPoI, paragraph 20(a)). An example of an innovative approach of technology diffusion to the masses was the experiment by the



Centre for Cognitive Sciences in India in 1999, where the installation of a computer with free and unlimited access to the Internet outside the office building led to street-children learning functional computer skills within days. The World Bank expanded this initiative throughout India, with more than 75 computer kiosks set up, benefiting thousands of children in rural and urban India (UNCTAD 2005).

Both developed and developing countries are equally responsible for the penetration of new knowledge and technology worldwide, although their roles differ. While developed countries must ensure the dissemination of scientific and technological knowledge to low-income countries, the formulation of national innovation policies, clear technology visions, and sound governance systems conducive for adapting and adopting to new technologies in developing countries remain equally relevant.

Financing for sustainable development

The MDG framework was formulated based on a vision of developed countries partnering developing countries to achieve a sustained enhancement in human well-being. This was captured in Goal 8, which requires 'a global partnership for development'. In this context, meeting the MDGs requires adequate financial assistance to be imparted, along with overall policy reforms and improvements in service delivery. Aid plays a crucial role mainly in countries where the policy and institutional environment is conducive to poverty reduction.

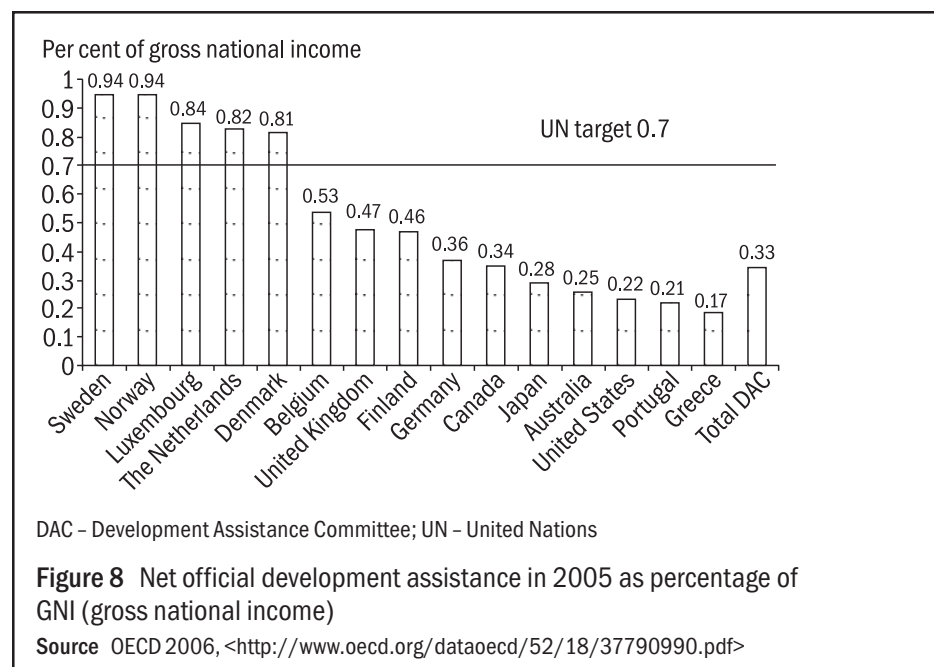
It has been estimated that the cost of attaining the MDGs globally is in the range of \$40–\$60 billion, in addition to foreign aid (World Bank 2005). The richer nations have, however, faltered endlessly on their commitment to contributing 0.7% of GNP (gross national product) as ODA to the developing countries. While these commitments have repeatedly been articulated at several forums (Rio Summit 1992, Monterrey 2001, WSSD 2002), not much has been achieved in terms of ensuring financial flows. Trends, in fact, reveal that ODA levels have decreased through the 1990s, especially as a proportion of GNI (gross national income) (Figure 8).

Apart from ODA, the enhanced mobilization of resources through increased government expenditure levels is also necessary to finance the meeting of the MDG targets. This additional resource requirement needs to be raised through other financing options such as global taxes, currency transaction taxes, environmental taxes to finance defensive expenditures against environmental damage, and so on. An important source of aid could be through the creation of opportunities for developing countries to sell their produce in international markets.

SUMMIT QUERIES

Sustainable development technologies for the poor

- How can technology act as a means for efficient and effective delivery of services required to meet the MDGs?
- In what ways can the use of modern technology by the poor be instrumental in fighting poverty? Are there enough case studies supporting this?
- How can the technical know-how for developing/customizing/servicing modern as well as traditional technologies be transferred at the grass-roots level to enable them to provide reliable solutions to meeting the MDG challenge?



Governance: innovating, delegating, and partnering for change

Ensuring good governance remains at the core of sustainable development. Innovative governance policies that recognize the importance of delegation and partnerships within an integrated system are crucial for attaining development objectives. Governance involves a host of issues relating to institutions, delivery mechanisms, and the supporting structure of legislation, rules, and procedures. An aspect that is often overlooked is the lack of a holistic view while formulating policy, which, to a large extent, stems from the compartmentalization of issues amongst various departments, each working in isolation. This organizational vacuum with fragmented responsibilities, therefore, remains a key challenge to be addressed, especially in the context of the multi-dimensionalities inherent in the paradigm of sustainable development. These multi-dimensional objectives, encompassing the society, the economy, and the environment in a framework that includes the present and the future, require the involvement of diverse administrative units within an integrated approach to overall human welfare.

Therefore, ensuring synergies across different levels of governance is crucial. In a number of instances, implementation happens at the grass-roots level, in which case local bodies like municipalities should be assigned greater responsibility and powers. Community participation also reaps positive results; this has been witnessed in the water and sanitation sector in many developing countries. In areas where the community acquires a

substantial part of the knowledge required for the design and operation of a project, efficiency improvement through increased ownership tends to deliver efficient results. User participation also makes services and service providers more responsive and accountable to beneficiaries, and aligns the provision of services with users' needs and ability to pay, thereby improving cost recovery and sustainability (TERI 2004).

Another key issue to be addressed in the context of environmental management is a conducive institutional set-up with a strong legal framework. This can be built through partnerships, strong accountability systems, and enhanced capacities of local bodies. Partnerships can act as a powerful tool in attaining several development objectives. In the sanitation sector, for instance, rapid progress has been achieved as a result of close associations between local communities and governments. Examples of this include slum dweller associations such as the National Slum Dwellers' Federation in India, the Orangi Pilot Project in Pakistan, and the total Sanitation Campaign in Bangladesh, which have effectively used the power of communities to mobilize resources and bring sanitation to millions of people (UNDP 2006).

Ensuring adequate governance for sustainable development requires efficient expenditure management and effective targeting of incentives such that resources earmarked for particular schemes reach the intended beneficiaries (Lopes, Nandi, and Murugesan 2006). Essentially, there remains an urgent need for a comprehensive result-oriented public expenditure management system to enable nations to improve their governance systems such that natural resources are harnessed sustainably, while environmental damages – both actual and potential – in the course of social-economic activity are addressed in a focused manner (Box 5).

Box 5 Examples of sustainable initiatives in Indian states

- **Andhra Pradesh:** Livelihood generation for tribal communities through the use of natural resources (bamboo).
- **Chhattisgarh:** Biofuel Development Programme, which aims at utilization of government's barren lands for jatropha cultivation for producing bio-diesel.
- **Gujarat:** Recharging of Kabotri and other abandoned mines with run-off water to conserve and improve the water-table level.
- **Karnataka:** Capacity-building of the stakeholders in natural resource management through activities of the Environment Management and Policy Research Institute's awareness creation and skill development.
- **Kerala:** Biodiversity conservation and educating community about the need for conservation activities.
- **Maharashtra:** Akshay Prakash Yojna, a project to provide uninterrupted power supply to villages.

Continued...

Box 5 Examples of sustainable initiatives in Indian states (*continued...*)

- **Orissa:** Protection of biosphere and tiger reserve by forming ‘Sabuja Vahinee’, or Green brigade, a group of volunteers to assist forest personnel in better forest protection.
- **Punjab:** Development of technologies for sewage disposal.
- **Rajasthan:** Sustainable Water Campaign – Jal Chetna Yatra – to ensure integrated water resource management.
- **Uttar Pradesh:** Improving quality of river water by controlling pollution from distilleries and pulp and paper industries.
- **Uttaranchal:** Natural resource management in selected degraded micro-watersheds using water-treatment technologies and community participation; student’s involvement in plantation activities for conserving and managing forest areas.
- **West Bengal:** Ecological security to Kolkata through the East Kolkata wetlands, which use the city’s waste water for enhancing output from the fish ponds.

Source Based on input provided by the respective states for the TERI award on innovative initiatives for managing natural resources.

Conclusion

The all-pervasive impact of human activity on the world’s natural resource endowments is gradually threatening the security of human activity itself: a threat the world has finally woken up to. The challenge before sustainable development practitioners is thus to align the world’s development imperatives with natural resource management in such a manner that balance is restored between human well-being and environmental health, especially since it is the poor who are disproportionately impacted by the ramifications of environmental degradation and depletion. DSDS 2007, therefore, sets out to explore the natural resource dimensions of sustainable development, keeping in mind Mahatma Gandhi’s assessment:

*The difference between what we do and
what we are capable of doing would suffice
to solve most of the world’s problems.*

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DSDS 2007 Curtain Raiser: The CEO Forum

Business and society: partnering for a sustainable future

Inaugural session

As is customary, the *CEO Forum* – curtain raiser event for the DSDS (Delhi Sustainable Development Summit) – kicked off DSDS 2007 with intense self-analysis and discussion, setting the tone for the coming days of international dialogue and debate on virtually every aspect of sustainable development. In this, the third edition of the *CEO Forum*, corporate leaders focused their attention on the organic relationship between business and society—how could businesses conclave and engage with the larger society to which they belong to counter the sustainable development challenges facing both?

CEO Forum 2007 began with welcome addresses by co-chairs, Dr R K Pachauri, Director-General of TERI and Mr Björn Stigson, President of the WBCSD (World Business Council for Sustainable Development). The co-chairs introduced the forum to delegates, and elaborated on its theme. It was pointed out that the *CEO Forum* is aimed at combining the strengths of the corporate, social, and governance structures accelerate sustainable development. And, while confidence in the governance structure was admittedly low, the more efficient corporate sector could form a fruitful partnership with society for a more just and equitable world. For this to happen, business leaders and CEOs have to play an important role. The forum, therefore, intended to stimulate thought and action among the assembled business leaders, by enabling dialogue, debate, and discussion, the co-chairs said.

Following the welcome addresses, in the inaugural session, Frannie Leautier, Vice President of the World Bank Institute, placed some of the challenges that confront business leaders. She pointed out instances of rising inequality, the dip in ethics and values, unsustainable resource exploitation,



Frannie Leautier
Vice President
World Bank Institute

Eighteen billion dollars would be required to solve the health problems of the world.



Jeffrey D Sachs
Director, Earth Institute; and
Special Advisor to the
Secretary General of the
United Nations

and lack of adequate rural infrastructure as issues that need urgent corporate attention. Partnerships, especially with the governance sector, should be given serious thought as a way of tackling these issues.

Prof. Jeffrey D Sachs, Director of the Earth Institute, delivered the keynote address. He put the global climate change challenge in the context of business prospects in a warming planet. His advice for business leaders was to invest in emission-reducing technologies and measures and aid in combating climate change. He also urged greater engagement with governments, as the climate change issue heats up as a political issue.

Mr Ashwani Kumar, Hon'ble Minister of State for Industry, Government of India, and also the Chief Guest for the session, reiterated the Government of India's commitment to creating an enabling environment for sustainable development, and outlined the actions taken so far. This was followed by an interactive session moderated by Mr Guy de Jonquieres, Asia Columnist and Commentator, *The Financial Times*.



Ashwani Kumar
Hon'ble Minister of State for
Industry, Ministry of Commerce
and Industry, Government
of India

Sectoral roundtable discussions

CEMENT AND MINING

The primary issues concerning the cement and mining sectors are climate change and energy. Both sectors have adopted global efforts to address these problems; for example, the CSI (Cement Sustainability Initiative) and the GMI (Global Mining Initiative). Participants at the roundtable agreed that bringing these two movements to India over the next year was a priority. As

for tackling emission and energy concerns, number of key issues were articulated. One such is the macro-level problem where cement industries are forced to set up captive power plants because of unreliability of grid power. These smaller units tend to be based on coal and their size makes the use of cutting-edge technology difficult. Future research should go into exploring renewables for captive power plants. Finally, both the cement and mining sectors would like to see clear government regulations that support innovative technologies and increased efficiency.

Cement and mining sectoral
roundtable discussions



DRUGS AND CHEMICALS

Aspects discussed at the roundtable included infrastructure, energy, sustainable finance, and affordable technology. Poor infrastructure was cited as a major bottleneck that impacts the global competitiveness of the Indian manufacturers and, therefore, requires immediate attention. Simultaneous to better infrastructure, reliable energy supply also needed to be ensured to end the reliance on captive power plants. With the sector populated by many SSI (small-scale industries), access to adequate and sustainable finance was an important issue. At the same time, SSI need to incorporate environmental ethics and values, just as the bigger companies in the sector are doing, to remain globally competitive and relevant. Participants also agreed that an incentive regime for innovation was instrumental to encouraging sustainability in the sector. For its part, such innovation should, in turn, result in outcomes that make drugs and pharmaceuticals affordable to all sections of society.



Drugs and chemicals
roundtable discussions

POWER

The efficiency of coal-based power plants is as low as 30%–37%; so a policy must be brought in to boost efficiency in coal-fired power plants. Keeping a check on efficiency would address the volume of emissions from power plants, and result in mitigating climate change. A well-defined technology road map could add further impetus to such an initiative. To achieve such objectives, the panel stressed on the need for greater cooperation between the government, business enterprises, and international agencies. Deliberations also revolved around demand-side efforts to reduce consumption and aggregate technical and commercial losses (as high as 49% in India). Going deeper into the issue of climate change, the panel again identified collaboration between the government, the private sector, and the international community to encourage and reward investments on research and development for sustainable technologies.



Power roundtable discussions

OIL AND GAS / PETROCHEMICALS

Climate change is the most important issue facing the oil and gas sector, followed by access to water. Minimizing carbon emissions and upgrading technology was cited as vital to mitigating climate change. Targeted research and development was, therefore, mooted, which could be kick-started by

employing a multi-sector approach. Such an approach must integrate initiatives undertaken not only by research institutes and the academia but also by the government and the corporate sector. An example cited was the promotion of alternative fuels such as bio-diesel and ethanol, which could be driven by oil and gas companies in collaboration with the agriculture and automobile industries. Participants also discussed technologies in the pilot stage in India that focus on emission reduction, such as 'underground coal gasification'. It was suggested that these technologies should also attempt to

effectively capture carbon released during the production stage, as and when they are commercialized. Vigorous promotion of renewables must also be accorded high priority.



Oil and gas/petro chemicals
roundtable discussions

ENGINEERING AND TECHNOLOGY

The engineering and technology discussion, spread over two tables, focused on the role of renewable energy technologies in industries. While recognizing that the energy mix would not change in the next 20 years, with coal as the primary source, industry should now start working towards expanding

renewable energy. Participants were unanimous in pointing out that existing infrastructure could be deployed to promote new and alternative technologies. For instance, land used for wind energy generation could also be used for energy plantations. A consensus also emerged that a conducive policy regime was essential to promote new and renewable technologies, which could include incentives, disincentives, and regulations. Other subjects of discussion included the development of affordable sustainable energy technologies and the widespread



Engineering and technology
roundtable discussions

deployment of ICTs (information and communication technologies) for rural development. Problems related to sustainable production of biofuel crops, a mechanism for technology transfer, and the sanctity of intellectual property rights were also discussed.

SERVICES

The discussion, spread over two tables, revolved around energy. The major concern here was the rapid depletion of non-renewable sources of energy. Participants proposed to accelerate the drive towards renewable sources of energy through education, which would drive consumer preferences and compel businesses to adapt. Incentives that encourage businesses to reduce emissions, such as carbon financing, should also be prioritized. In this context, bringing small- and medium-scale industries and financial institutions closer to make carbon crediting easier was vital. Examples were shared to illustrate the role being played by financial institutions in promoting environmental sustainability, such as environmental audits. It was suggested that the performance of a company in such audits could be a key factor in extending carbon-financing support to it. Participants also felt that adaptability and commercial consistency of renewable technology are two major decision-making parameters that required further action.



Services
round table discussions

Concluding session

Dr R K Pachauri summarized the different strands of discussion during the forum and pointed out some of the more interesting ideas that emerged from the various roundtable discussions. One of the primary concerns of delegates with respect to sustainable development, he noted, was the lack of adequate regulatory policies. He suggested that TERI-BCSD (The Energy and Resources Institute-Business Council for Sustainable Development) India should draft a white paper listing industry concerns on regulation, which could then be presented to the Government of India.

Mr Björn Stigson felt that energy and climate change were the two

The concluding session of the
CEO Forum



issues that saw the most animated discussions in the forum. He pointed out that, even if not a millennium development goal, climate change mitigation must be treated as integral to development. He also noted that the transition to energy sustainability will not be smooth and, therefore, it was imperative that best practices from all parts of the world be shared.

Dinner session

The Dinner Session of *CEO Forum 2007* featured an address by the Right Honourable David Miliband; MP; Department for Environment, Food, and Rural Affairs, United Kingdom. Mr Miliband sought to point out that climate change and global warming was not an environmental issue, as is commonly perceived. He contended that climate change was more a cultural and finan-

cial issue, posing a fundamental challenge to the way we live. Looking at climate change in this context, the threat from it becomes starker since it threatens the very way we live. Mr Miliband acknowledged that political attitudes to climate change are still ambivalent, in sharp contrast to scientific evidence. The role of commerce and industry was thus to help bridge the gap between science and politics.



The dinner session of the CEO Forum

Inaugural session

DSDS (Delhi Sustainable Development Summit) is envisaged as an important annual event that brings together world leaders and heads of states to mobilize public opinion towards the attainment of the MDGs (Millennium Development Goals) and adopting the principles of sustainable development. Current policy formulations are already beginning to stress the tenuous links between environmental concerns, economic development, and social justice. It is, therefore, imperative to transform our attitudes towards preservation and conservation rather than indulging in rampant consumerism as we develop further.

Recognizing climate change as a threat with multi-dimensional impacts is of utmost necessity. There is, therefore, a need to develop adequate and appropriate adaptation and mitigation strategies at the local, regional, and global levels. For this to happen, policy must lead to action. While policy changes at a local level must take into account the impact of environmental degradation on livelihoods, developed countries must help the developing countries by way of appropriate technology transfer at the international level. While policies must ensure supply of energy to the poor, they must simultaneously address sustainable use of energy by the rich. Public policy formulation must take cognizance of the links between economic development, social justice, and environmental concerns, and must involve all stakeholders, including the corporate sector, civil society, as well as the government.

The shift in stance in the US on climate change policies is expected to alter the way policies on the subject evolve elsewhere. The UK and the EU (European Union) have also initiated policy reforms to meet the challenges posed by climate change. Energy conservation is guided by the '3D revolution'. The first 'D'



Mr A Raja and Smt. Sheila Dikshit delivering their addresses at the inaugural session

Opening session

Welcome address

Dr Arcot Ramachandran, Chairman, TERI, New Delhi

Presidential address

Smt. Sheila Dikshit, Hon'ble Chief Minister of Delhi, India

Inaugural address

Mr A Raja, former Minister for Environment and Forests, Ministry of Environment and Forests, Government of India; at present Hon'ble Minister for Information Technology, Government of India

Vote of thanks

Dr R K Pachauri, Director-General, TERI, New Delhi

Introduction by

Prof. Ralph J Begleiter, Rosenberg Professor of Communication, University of Delaware and Distinguished Journalist in Residence, Delaware, USA

Special address

One planet living: G8 Gleneagles dialogue

Rt Hon. David Miliband MP, Secretary of State for Environment, Food and Rural Affairs, Government of United Kingdom

Commentary

Prof. Jeffrey D Sachs, Director, The Earth Institute and Special Advisor to the Secretary-General of the United Nations, USA

PANEL DISCUSSION

Creating a global resolve

Statements by heads of governments / heads of states

- HE Mr Kjell Magne Bondevik, former Prime Minister of Norway
- HE Mr Olafur Ragnar Grimsson, President of Iceland
- HE Ms Tarja Halonen, President of Finland
- HE Mr Mamadou Lamine Loum, former Prime Minister of Senegal
- HE Prof. Ruud FM Lubbers, former Prime Minister of the Netherlands

*Efficient markets
ignore the
poorest of the
poor—they have
no buying power.
We need public
policy actions to
save them.*

Prof. Jeffrey D Sachs
Director, The Earth Institute,
and Special Advisor to the
Secretary-General of the United
Nations, USA



Rt Hon. David Miliband MP

those steps followed by strict adherence to EU guidelines on decreasing carbon emissions, creation of a carbon market, and the establishment of a price on carbon. The British government is also calling for commitment on technology transfers, especially in terms of renewable sources of energy and the carbon proofing of all aid programmes. These efforts are geared towards achieving global reduction in emissions by 2012. The British government also proposes to reduce its ecological footprint to one planet from the current estimate of three planets.

Similarly, each country irrespective of its stage of development, can contribute towards achieving the MDGs. India, for example, can contribute towards transfer of sustainable technologies to boost agriculture yields in some of the African countries, while more developed countries can contribute to the development of clean and efficient technologies in the developing and underdeveloped countries. Iceland has helped China develop a geothermal power plant, a technology that could be used in India to provide de-carbonized energy.

intends managing energy demand by mandating at 'zero carbon' homes by 2030. The second 'D' relates to de-carbonization of energy demand—shifting the reliance from fossil fuels to renewable sources of energy. The third 'D' pertains to decentralization of energy supply. Implementation of these policies would require strident political action at regional, national, and international levels.

The British government has taken five steps to meet these challenges. Establishing a pathway to reduce the country's emissions by 50% by 2060 is the first of



Prof. Ralph J Begleiter



Prof. Jeffrey D Sachs

Reduction of the ecological footprint is sometimes construed as diminution in standards of living, which is neither feasible

nor desirable. Mobilization of science and technology to improve energy efficiency and bridge the gap between the developed and developing worlds is, therefore, thought to be a feasible solution. It involves upscaling of existing and known technologies for meeting short-term objectives. The conflict between long-term goals and short-term objectives should be resolved through appropriate policy and technology interventions. The combination of policy and technology will lead to creation of markets where even the deprived would be able to participate. Social development



HE Mr Mamadou Lamine Loum

civil society institutions.

Additionally, corporations need to be more responsive to the objectives of MDGs. They need to change their traditionally adversarial relationship with civil society organizations to build mutual trust and recognition of value. Such a relationship would not only enhance their image of a socially responsible corporation but also contribute to reduced risks of business and enhancement of profits.

Forms of governance also impact the sustainability of climate change policies. The democratic systems in Norway seemed



HE Prof. Ruud F M Lubbers

cannot be the sole preserve of market forces, as efficient markets tend to sideline the weaker sections of the society. Small businesses in most countries do not offer an effective alternative to large corporations that act as pressure groups, to bring about political change. As a result the long-term concerns of small businesses are not addressed. Policy intervention by the government and regulated help from large businesses can aid small businesses. In India, for instance, the brick, foundry, and glass industries use highly energy-inefficient technologies, and need technological support from large businesses and

A huge amount of resources – 100 billion dollars – that have been used in the Iraq war could have been used to achieve the MDGs.

Prof. Ralph J Begleiter,
Rosenberg Professor of
Communication, University of
Delaware and Distinguished
Journalist in Residence, USA



HE Mr Kjell Magne Bondevik

India has large potential in geothermal energy, which is by far the most profitable form of clean energy—30% more profitable than any other form of clean energy.

HE Mr Olafur Ragnar
Grimsson
President of Iceland



HE Mr Olafur Ragnar Grimsson

to have considerably helped the growth of an oil and natural gas industry in that country. A transparent, accountable, and sovereign bureaucracy, involvement of all stakeholders, robust economic and political interface with international companies, investment in social infrastructure, clear division of roles between legislation, regulation, and implementation generated mutual trust and respect among the people.

Lastly, political will would play an important role in translating intentions and policy recommendations into action. Political leaders need to initiate sustainable dialogues, beyond their electoral terms, at the national

and international levels for translating climate change policies into observable impacts on the lives of people.

An instance of inaction at the international level has been the poor implementation of the policies in favour of non-proliferation of nuclear armaments. The debate on non-proliferation started with President Eisenhower's paper on 'Atoms for Peace'. However, the Security Council members failed to take the policy beyond the paper. The problem has grown manifold now and needs to be addressed by involving countries like India, Brazil, South Africa, and Japan. Likewise, implementation of policies must happen on an immediate basis taking into account the concerns of various nations and stakeholders. This requires the like minded to 'convert' the 'unconverted' and then move ahead.



HE Ms Tarja Halonen

Keynote addresses

Meeting Asia's challenge of sustainable development

Prof. Jeffrey D Sachs

Emphasizing that economic development must be the long-term objective for the poorest of the poor, Prof. Jeffrey D Sachs expressed concern that one half of the population of Tropical Asia was below the poverty line, had a life expectancy of 40 years, and one out of every four children die in infancy. Hunger, malnutrition, non-availability of safe drinking water, and other basic needs are the major challenges in Asian countries. He contended that these problems demand low-cost, straightforward solutions like schools, village health centres, basic technological inputs for agriculture, access to water and irrigation, and safe technologies.

Prof. Sachs was of the opinion that the MDGs (Millennium Development Goals) can definitely be achieved even though only seven years remain before the plan period comes to an end. All it requires is will.

Stress was laid on the need for an economic era of great convergence where the gap between the rich and the poor is narrowed. Prof. Sachs expressed concern over the fact that even though Asian countries share 60% of the world's population, they make up only 20% of the share of the GNP (gross national product), which is now increasing and would reach 50% by 2050.

The well-known economist lamented that human beings have dominated over the earth's ecosystems. Technologies developed by humans are unsustainable at every level. These include land transportation, carbon dioxide emissions, water use, the skewed nitrogen cycle, destruction of plant life, and extension of marine fisheries.

The address by Prof. Sachs emphasized on two major issues that have been in focus over the past few years: climate change and water. The increase in temperatures due to anthropogenic activities will continue with the developed countries contributing the maximum to total emissions at a ratio of 4:1 when compared to developing countries. By 2010, China will be the largest contributor of carbon dioxide. Prof. Sachs called for combined efforts by both developing and developed countries to solve this huge crisis.

KEYNOTE ADDRESS 1

Chairperson

- Mr S Sundar, Distinguished Fellow, TERI, New Delhi

Speaker

- Prof. Jeffrey D Sachs, Director, The Earth Institute and Special Advisor to the Secretary-General of the United Nations, USA



Prof. Jeffrey D Sachs

The problem of the poorest of the poor is that even the low-cost technologies are not within their reach.

Prof. Jeffrey D Sachs
Director, The Earth Institute,
and Special Advisor to the
Secretary-General of the United
Nations, USA

In proposing the policy framework for the post-Kyoto UNFCCC (United Nations Framework Convention on Climate Change), Prof. Sachs proposed an agreement on a global mid-century target (500 parts per million); universal participation; a global price of carbon emissions and sequestration projects; standards for power plants and automobiles; rebates for the poor; transfer of technology to middle- and low-income countries; and global adaptation fund for poor countries.

Identifying water as the biggest challenge for Asian countries, particularly for India and China, Prof. Sachs dwelt on the massive and unsustainable use of groundwater through bore wells, which is causing the water table to deplete fast. In Punjab, water stress is leading to large-scale migration. Massive disruption of the Himalayan hydrology due to anthropogenic climate change is all set to alter global precipitation patterns.

The challenge of water conservation, according to Prof. Sachs requires the establishment of an IPCC-like (Intergovernmental Panel on Climate Change) body for proper understanding of water-related issues such as groundwater use, recharge, and depletion. He also provided technological, economic, and institutional options including technology transfer and cross-border cooperation for tackling the water crisis. But, above all, the urgent need for political will cannot be undermined, he emphasized.

KEYNOTE ADDRESS 2

Chairperson

- Mr Anil Razdan, Additional Secretary, Ministry of Petroleum and Natural Gas, Government of India

Speaker

- Mr John A Manzoni, Group Managing Director, BP Plc, UK

Turning challenge into opportunity: the business role in sustainable development

Mr John A Manzoni

The business sector has a key role to play in transforming India's economic and social demography by arresting the galloping population rate and increased use of primary energy and carbon dioxide emissions. However, growth remains tied to the consumption

of energy, and thus energy is a key component of development. Three main issues, which link sustainable development and energy, are energy security, energy equity, and climate change.

John A Manzoni, in his keynote address, highlighted the need for fossil fuels if a certain level of development is to be achieved. It is imperative that oil companies invest at least some of their profits in CSR (corporate social responsibility). Energy consumption is all set to increase as



we move ahead on the path towards development. It is, therefore, essential that businesses build models that ensure sustainable development. The right kind of policy intervention is also required to facilitate such efforts.

The role of companies, especially in the energy sector, is extremely important in the fight against climate change. It is imperative for developing countries to take early actions even while continuing on the path of growth.

Concerns of energy security have facilitated thinking on the need for better technologies. These technologies would result in greater recovery rates and minimal environmental impact. There is a need also for new generation low-carbon products in the transport sector, biofuels being one of them. As a clean fuel, it has immense potential. However, the availability of land and water to grow biofuel-yielding trees is the biggest barrier that the sector faces. Timely research and innovative designing of national level programmes could promote production.

In the power sector, CCS (carbon capture and sequestration) has been the focus. Though CCS is an expensive technology, increased use of it in future would decrease the incremental cost of deploying it. Hydropower and solar energy are sectors with huge potential in the field of clean power. Policy support to such technologies is vital, and sustainable efforts towards promoting these would benefit businesses, the environment, as well as governments.

Private investment can play a very important role in the lives of those belonging to low-income groups. Cleaner and safer *chulhas* (cookstoves) not only save time, they also result in environmental benefits in the form of low levels of indoor pollution. Such business models should be encouraged.

It is vital for an organization to identify key challenges and turn them into business opportunities. Businesses that look at sustainability and climate change issues while being on a path of growth is the need of the hour.

There are three issues that link energy and sustainable development: energy security, sustainability, energy equity, and climate change.

Mr John A Manzoni
Group Managing Director, BP
Plc, UK

The global energy challenge: technology scenarios for a sustainable future

Mr Claude Mandil

Mr Claude Mandil, Executive Director of the IEA (International Energy Agency) delivered his address on the *Global energy challenge: technology scenarios for a sustainable future*. At the outset, Mr Mandil pointed out that to ensure sustainable use of energy, attention must be paid to three specific aspects of the problem, or the 3 Es. These are economic growth, energy security, and environmental concerns.

KEYNOTE ADDRESS 3

Chairperson

Mr V Subramanian,
Secretary, Ministry of New
and Renewable Energy,
Government of India

Speaker

Mr Claude Mandil, Executive
Director, International Energy
Agency, France



Mr Claude Mandil

Fossil fuels currently form about 85% of the total global energy mix. The IEA, as part of its research activities, publishes projections of energy use characteristics for different regions of the world, under different scenarios. The best-case scenario, reflecting a continuation of the current trends and policies, predicts that as much as 85% of the world's energy mix in 2050 will be made up of fossil fuels. This is clearly, completely unsustainable. Such levels of fossil fuel use would violate not just one, but all three of the Es.

The best-case scenario suggests that all major consumers will depend massively on fuel imports from a handful of energy producers that are concentrated in a few regions of the world. This implies a huge increase in CO₂ emissions, and concomitant concerns about global warming. The twin problems of high emissions and consequent climate change, coupled with massive import dependency are most likely to

hamper economic growth.

The problem of the 3 Es is related to the sustainable production and use of modern, commercial energy. However, the world faces a more fundamental challenge. This is the problem of energy poverty. Over 1.5 billion people live without access to modern energy. More people die every year due to indoor air pollution from the incomplete combustion of biomass-based traditional fuels than due to malaria.

In this context, the IEA has an important role to play. Two of the most important tasks before the organization are: first, the collection of information about energy efficiency best practices in different sectors and the dissemination of this information among member and non-member countries, and second, intensive work on alternate energy strategies taking into account newer technology options available today.

*A more
sustainable
energy future is
possible with
known
technology; the
costs are also not
out of reach.*

Mr Claude Mandil
Executive Director
International Energy Agency,
France

Solutions and technologies

It is unlikely that technology breakthroughs will be commercially widespread before 2030. However, by the year 2050, there is some potential for the spread of alternative energy sources or cleaner technologies. Such widespread reach of alternatives to fossil fuels will require advances in certain key areas. These include cost-effective renewables, where advancements in efficiency and reduction in costs of solar photovoltaic and biomass energy will be critical; advanced nuclear technologies, particularly in the area of nuclear waste disposal; and CCS (carbon capture and sequestration), particularly in the light of heavy coal use in India, China, and the United States.

In addition to technological advances, it will also be imperative to price carbon. In that context, the price set for CO₂ (say \$25 per tonne) will also define what a 'cost-effective' renewable energy technology would mean.

Different scenarios can be framed to study the importance of advancement and commercial use of a variety of options. A low nuclear scenario, a low CCS scenario, and a low energy efficiency scenario can be compared with a 'best-case' scenario where all of the three improvements are implemented. The best-case scenario would mean that by 2050, emissions could be brought down to a level as low as in 2003. Unfortunately, the situation would not be anywhere near as positive if the standards set in the best-case scenario cannot be matched up adequately in terms of some real action on the issues. The gap between expectation and realized goals could be very large if efficiency improvements are not as high as projected and in the event that CCS technologies do not take off. The biggest savings in energy use in the short to medium term are therefore, going to come from demand side management and energy efficiency. This holds especially true of power generation.

Conclusions

There are a number of key messages we can take away from the IEA research and analysis and model projections. Broadly speaking, even current technologies can allow us to achieve big cuts in total CO₂ emissions. These options are available at an attainable cost. However, urgent action by different countries is necessary today. CO₂ needs to be priced to allow renewables to compete and to internalize some of the environmental externalities involved in CO₂ use. Increased collaboration between international agencies and between countries is essential—in R&D (research and development), technology transfer, capacity-building, project implementation, and so on.

Finally, oil producers often express concerns, that cutting down on oil use would mean hurting their primary means of growth and development. This however, is not really true since even in the best-case scenario, oil use in 2050 would be at about 2003 levels. Furthermore, since oil production outside the OPEC (Organization of the Petroleum Countries) countries would have dropped off, the share of OPEC nations would be even larger.

What is non-conventional today would be conventional tomorrow. In India, we have a particular luxury / liability in that we have as many as seven ministries dealing with energy—far too many!

Mr V Subramanian
Secretary,
Ministry of New and Renewable
Energy, Government of India

Perspectives on climate change

Dr R K Pachauri

Policy formulation relating to climate change must follow the principle of equity and sustainable development. It must be responsive to enhancement of both social and natural capital. Environmental and climate change are no longer fringe issues. There is urgency about the need to manage natural resources as well as the state of the atmosphere carefully. Issues related to water are perhaps the most imminent.

KEYNOTE ADDRESS 4

Chairperson
Mr Nitin Desai,
former Under Secretary
General of the United Nations

Speaker
Dr R K Pachauri, Director-
General, TERI



Dr R K Pachauri

Climate change represents a deviation from the path of sustainable development; we can't have sustainable development if we impinge unfavourably on the principle of equity.

Dr R K Pachauri
Director-General, TERI,
New Delhi

The Kyoto Protocol was identified as a mechanism to facilitate technological breakthroughs for reducing GHG (greenhouse gas) emissions. While the Kyoto Protocol is hardly the perfect agreement, it is certainly a major step forward; and CDM (clean development mechanism) projects do hold out hope. One of the consequences is the opening up of a market in carbon, which, it is hoped, will expand in the future. Even though countries do highlight the cost of meeting Protocol targets, an IPCC analysis shows that the costs involved in meeting Protocol guidelines will be an investment for the future, where benefits will far outweigh the costs.

It has been projected that global warming will result in sea-level rise. Apart from other woes, it will generally cause health problems, and specifically lead to an increase in respiratory and cardiovascular diseases. The impacts and associated losses will be far greater for developing countries.

Polar glaciers have already retreated and this will have serious implications for half-a-million people living in the northern subcontinent. Therefore, there is a need to adapt to changes by using an optimum mix of traditional and modern knowledge to build coping mechanisms.

On the technology transfer front, the UNFCCC clearly specifies that the developed countries will supply the incremental cost. For carbon-capturing and sequestration, advanced technologies are needed. While covering of incremental cost is essential, the overall lifecycle cost should also be looked at.

The time has come for the global community to throw up ideas for win-win opportunities. The key to integrating climate change issues into development thinking, as well as concrete plans, lies in focus on adaptation.

Atmospheric chemistry for climate in the anthropocene

Nobel Laureate Prof. Paul Crutzen

Prof. Paul Crutzen, in his address, focused on the scientific aspects of climate change, and the challenge thereof we face today. He also dwelt upon the possible solutions available. He explained that the climate change issue

KEYNOTE ADDRESS 5

Chairperson

Mr Pekka Plathan, Director General, Finnish Meteorological Institute, Finland

Speaker

Nobel Laureate Prof. Paul Crutzen
Director Emeritus, Max Planck Institute for Chemistry, Germany

should be broadened from the main theme of carbon dioxide emissions to consideration of other ozone-depleting gases such as methane, water vapour, and nitrous oxides.

Due to the unprecedented acceleration of human activity, atmospheric chemistry is undergoing a great change. The temperature is definitely increasing due to human activity. This leads to the question, 'what can we do?'. We need to stabilize the carbon-dioxide level in the atmosphere by reducing emissions by 60%, a target that Prof. Crutzen was skeptical about. Methane emissions have stabilized in the past five years. However, we still need to reduce nitrous oxide emissions. CFC (chlorofluorocarbon) reduction has been achieved, but due to the long lifetime of the gas, it will linger in the atmosphere for at least seventy years.

Solutions are available in the form of energy efficiency, carbon capture and storage, nuclear power, renewable energy, and so on. In the worst-case scenario, he offers as a solution an experiment on which he has worked earlier. This involves ejecting sulphur into the stratosphere, such as that occurs during volcanic eruptions. In this experiment, advanced modelling was used to create a realistic model of atmospheric conditions, replicating the climate conditions that currently exist, also called the 'control case'. Thereafter, the model was used to investigate the effects of three scenarios. The first scenario is where the carbon dioxide concentration is doubled, the second where sulphur is ejected, and the third one is where both these situations occur. The outcome showed that when both situations occur, there is a climate close to that of the 'control case'.

Although this is not a conclusive experiment, Prof. Crutzen still emphasized its importance in the present day so that we understand the situation should there be a time when rapid action is necessary. If these techniques are used in a short span of time, where the situation reaches a point that necessitates rapid, but un-thought-out action, then there is a danger that the negative consequences of this experiment and our actions may not be fully understood.



Prof. Paul Crutzen

New studies point out that the Arctic Ocean ice cover is 40% thinner than it was 40 years ago.

Nobel Laureate Prof. Paul Crutzen
Director Emeritus, Max Planck
Institute for Chemistry,
Germany

Chairperson

Mr Pekka Plathan, Director General, Finnish Meteorological Institute, Finland

Speakers

HE Mr Alain Juppe, Former Prime Minister of France and Mayor of Bordeaux, France



HE Mr Alain Juppe

Environmental threats and international governance on environmental matters

HE Mr Alain Juppe

Mr Alain Juppe, in his address, focused on two prime issues. He averred that, first, environmental effects of climate change raise fundamental challenges; and second, international governance mechanism on environmental matters must be enhanced and strengthened.

Mr Juppe attended the Conference of Parties at Nairobi, Kenya, in 2006. The conference provided an excellent opportunity to consolidate a significant international mechanism – the Kyoto Protocol – for combating climate change. He emphasized the fact that the existing international framework is inadequate in its current form if we are to meet challenges of global warming. There is a need to reinforce or extend the present regime in order to combat climate change after 2012. There is a broad consensus about the inexorable and extremely rapid nature of global warming as a result of human activity and, therefore, he urged the gathering to act now.

The report of the IPCC, to be released in Paris, should provide several confirmations of the fears with regard to climate change, with compiled surveys and figures providing a basis for some serious reflection. The figures provided by Prof. Crutzen reveal frightening and traumatic consequences, lamented Mr Juppe.

The impact of climate change on ecosystems and its consequences for biodiversity are too horrible to contemplate. Climate change risks are undermining our goals of development. The disparity between the North and the South will widen and make it tougher to attain the MDGs. The projections of expected rise in sea levels are frightening. It is most likely to cause massive population migration and displacement, resulting in increased number of 'climate-change refugees'. The increasing numbers of extreme meteorological phenomena need immediate attention.

With the element of human security that has entered the security discourse, food and water resources must be considered along with other security issues. The detailed analysis of all these matters must go hand in hand with agreement on the economics of it all. The recent Stern Report provides an assessment of scale of economic consequences of climate change. The cost of inaction will be gargantuan. Collective and immediate action is imperative, and also, far less costly.

Political will is greatly required under the scenario, and must be aimed at gaining acceptance of effort necessary for humankind's survival. There must

be a profound and rapid transformation into low-carbon economy. For this to come about, there must be a common understanding across the globe.

We need to limit global warming to an average of 2 °C. This threshold demands a reduction in GHG emission. There is a good level of awareness in France. Therefore, a law on energy policy that set the target of reducing emission by 75% by 2050 has been enacted. Mr Juppe wished that other industrialized countries set this as a collective target. He also hoped that positive developments in the US also turned to reality.

We must explore innovative forms of commitment from all countries to reduce emissions. We must also reflect upon common and differentiated measures for meeting the two-degree target. Delineation of actions on all these issues has to be a lot more precise. This is especially true for poorer countries that depend on radical, rapid, and effective action to eradicate GHG emissions. And all these actions have to be better integrated into policies.

The success of international measures on which we will have concurred can only be guaranteed by improving international governance in the environmental domain. There exists no real governance system internationally for the environment at present, even though there exist a huge number organizations and institutions. However, the good news is that this led to financing environment programmes. The creation of the UNEP (United Nations Environment Programme) in 1972 is result of such development. Quoting from the Stern Report, Mr Juppe said that failure to recognize international environmental governance would have negative consequences.

Mainstreaming of environmental concerns is important. The proliferation of these institutions gives a misleading impression that sustainable development already exists. However, there is not enough action. The situation is seriously worrying in terms of insufficient support to developing countries. All UN organizations address specific needs of developing countries in the field of environment. The need for capacity-building is immense but not well organized; add to that inadequate policy-making. There exists no long-term environmental strategy that is integrated. Everything is very sectoral at the moment. There are about ten major multilateral environmental agreements arrived annually that have economic consequences for all of us who support these organizations. Weak regulation and fragmentation leads to overlap between actors. It is, therefore, impossible to sustain the win-win situation that we expect.

Although it has visibility and tradeability, international environment has no permanent home. It has no clear voice to cope with increasing challenges of our time, nor a unique, emblematic, and high-level personality able to embody the world conscience for the environment. There is also a problem in financing.

Will this consensus on the assessment now be converted to mobilization for proper action? The momentum clearly exists. Now it is time to face the responsibility and give the UN the required tools, means, and authority by

Success of international measures can be guaranteed only if we improve our governance on environment in the international domain.

HE Mr Alain Juppe
Former Prime
Minister of France and Mayor of
Bordeaux, France

upgrading the UNEP into special agency for environment—perhaps, as UNEO (United Nations Environment Organization). This organization will be the leader of the IEG (international environmental governance) system. It will have a strong mandate for coordination, and become an umbrella organization for major environmental agreements. It should also become a centre of excellence in scientific expertise. The proposed UNEO shall ensure policy and decision-making based on sound and reliable knowledge. The executive director of this organization would be the face and voice for the environment on the global scale.

KEYNOTE ADDRESS 7

Chairperson

Mr C Dasgupta
Distinguished Fellow, TERI
New Delhi

Speaker

Mr Richard Sandor,
Chairman and Chief
Executive Officer, The
Chicago Climate Exchange,
USA



Mr Richard Sandor

Evolution of environmental markets: a practitioner's view of the past, present, and path forward

Mr Richard Sandor

Mr Richard Sandor, Chairman and Chief Executive Officer, The Chicago Climate Exchange, USA, in his address, focused on devising market-based solutions to environmental problems such as rising GHG emissions. Giving the example of the CCX (Chicago Climate Exchange), Mr Sandor explained how environment markets could be a force-multiplier in the fight to reduce GHG emissions. Various insights were provided into the market architecture, activities, and functions of the CCX, USA. The CCX is a voluntary emissions management and trading system. On entering the exchange, it becomes legally binding to buy/trade carbon credits for a price. Its member firms include various corporate entities, universities, waste management companies, steel companies, and cement companies. The CCX market architecture aims to cut emissions by 6% from the baseline levels by 2010.

Price discovery is the main function of any market. The same holds true for the market for carbon credits too. The sale and purchase price of allowances is determined by the cost of technology. If the price of the allowance is below the cost of technology, you buy the allowance and if the price is above the cost of technological fix, you sell it. The markets also provide direct signal to inventors to monetize the invention.

The CCX market architecture aims to cut emissions by 6% from the baseline levels by 2010. The price discovery mechanism is driven by seasonality, temperature, commercial and industrial growth, and GDP growth. Political decisions also have an impact on the price discovery mechanism in these markets.

Designing of a market necessitates the creation of laws for the enforcement of property rights. This is critical in the efficient creation and functioning of a market. Unambiguous property rights allow borrowing and lending of financial instruments, and enable and create enormous sets of value. Building underlying institutions that range from clearing, settlement practices, giving tax allowances, proper accounting practices, gaining adequate academic knowledge, setting standards in giving clearances, monitoring, and verification is another important element of market creation. The process has to be rule-based and simple with transaction costs as low as possible and each product has to be homogeneous.

India could replicate the same process followed by the CCX. Given India's proposition of 9% GDP growth a lot of wealth is being generated. Good educational institutions and emphasis on innovation and invention would facilitate this kind of process.

Each carbon bargain has to be rules-based, simple, and homogenous

Mr Richard Sandor
Chairman and Chief Executive Officer, The Chicago Climate Exchange, USA

Technological breakthrough, the key to sustainable development

Mr Tsutomu Makino

The keynote address by Mr Tsutomu Makino centred around the importance of achieving technological breakthroughs, especially in the energy sector, to meet the many human development challenges facing the world today. Mr Makino initiated his speech with an introduction to NEDO (New Energy and Industrial Technology Development Organization), Japan's largest public research and development organization. After initially being established as an organization to develop new energy and energy conservation technologies, NEDO's scope was expanded, and now includes technology development within a variety of fields such as machinery, biotechnology, and nanotechnology. Since its establishment in 1980, NEDO has undertaken a wide variety of energy-related projects and has interacted with countries all over the world, with a particular focus on Asia.

Mr Makino then went on to address the centrality of technological breakthroughs to achieve sustainable development, positing this challenge within the energy mix as it exists today. Giving a global perspective on energy, Mr Makino emphasized that heavy dependence on fossil fuels, especially oil, should provoke some serious concerns regarding the supply and price of oil as one considers future energy prospects. With the world today being highly dependent on oil, the development of new oil-alternative energy sources and conservation technologies, which is the common responsibility of all nations, must gain significant priority.

KEYNOTE ADDRESS 8

Chairperson
Mr R K Batra, Distinguished Fellow, TERI, New Delhi, India

Speaker
Mr Tsutomu Makino, Chairman, New Energy and Industrial Technology Development Organization, Japan



Mr Tsutomu Makino

The key to sustainable development lies in technological breakthroughs; energy issues and environmental issues are closely linked.

Mr Tsutomu Makino
Chairman, New Energy and
Industrial Technology
Development Organization,
Japan

In this context, Mr Makino stressed on the importance of energy conservation and new energy sources. Giving the example of Japan, he provided insight into the ways in which the world can adopt energy conservation and new energy sources. Japan has implemented measures systematically and in an integrated manner to conserve energy and boost support for new and alternative sources of energy. As a result of collaborative efforts by industry, academia, and the government, energy conservation has been greatly advanced in some industries, including steel and cement. However, there are additional opportunities for energy conservation yet to be undertaken in the consumer and transportation sectors.

The Japanese government is intensively involved in the effort to improve the energy efficiency of household appliances such as air-conditioners, refrigerators, and televisions. For example, the 'Top Runner' programme makes it mandatory for products to achieve the same energy efficiency as the most energy-efficient product in their sector, which is referred to as the 'top runner', within a specified time frame. For instance, if a product of company A is the most energy efficient, then companies B and C have to achieve the level of company A by a specific target year.

In addition to energy conservation, Mr Makino highlighted the need to scale up the efficiency of new energy technologies. Giving the example of Japan again, he said that despite the necessary natural resources for renewable energy in Japan being quite modest, Japan accounts for about half of the worldwide PV (photovoltaic) production. This can be credited to Japan's advanced PV power generation technology. However, the costs of producing solar cells will have to be reduced until it reaches one-fourth of today's cost.

Mr Makino acknowledged NEDO's role in facilitating energy conservation and new energy development in Japan. The High Performance Industrial Furnace, which achieves energy savings of more than 30% over conventional models by recovering exhaust heat, was developed by NEDO. NEDO is also promoting energy conservation for houses. Subsidies are available if energy consumption can be reduced in existing homes through the installation of energy conservation technologies like PV power generation systems, high-efficiency insulation, and high-efficiency hot water heaters. Speaking on NEDO's commitment to new and renewable energy development, he listed the many technologies promoted by the institution. These include hybrid power generation systems combining PV and hydropower, and biomass. NEDO is now focusing on the development of technology to produce ethanol

from cellulosic biomass, technology that is not commercially viable today, but that will play a key role in the future.

Cooperation between NEDO and Japan with other nations of Asia was the next topic of Mr Makino's address. In the near to mid term, economic growth in developing countries will lead to significant increases in conventional energy demand. It is, therefore, the common responsibility of all nations to ensure that these limited energy resources are distributed fairly between countries and to prevent the deterioration of the environment resulting from the increased use of hydrocarbon energy. Articulating the NEDO view, he said that in response to a situation where development imperatives will apply greater stress on dwindling fossil fuel reserves, the development of energy conservation and new energy technologies is a vital undertaking in which countries must participate in a cooperative spirit, rather than adopt competitive postures.

Within this context, he paid special attention to the cooperation between Indian and Japanese organizations and the governments of the two countries. Recently, dialogue and cooperation at the governmental level between the two countries have been gaining momentum. NEDO, he said, would like to establish a closer cooperative relationship with India as well. Having collaborated with various private Japanese enterprises, NEDO would like to act as an intermediary between the private sectors of both countries. He went on to outline some of the NEDO projects launched in this country in collaboration with the Government of India.

He mentioned the India-Japan Energy Forum, held in December 2006, co-organized by TERI and NEDO, as an example of fruitful cooperation between India and Japan. In addition, India's Prime Minister Singh visited Japan last December, and, together with Japan's Prime Minister Abe, agreed to initiate an energy policy dialogue between Japan and India. Urging delegates to take advantage of the cooperation between India and Japan, he hoped they would soon create a mutually beneficial 'win-win' relationship between the two countries. Mr Makino closed his remarks by once again reiterating the importance of technological breakthroughs in the energy sector to achieve sustainable development.

Plenary sessions

SESSION 1

Chairperson

Dr Prodipto Ghosh, Secretary, Ministry of Environment and Forests, Government of India

A report on CEO Forum 2007: Business and society—partnering for a sustainable future

Mr Björn Stigson, President, World Business Council for Sustainable Development, Switzerland

Speakers

- **Mr Ashok Alexander**, Director-India, Bill and Melinda Gates Foundation
- **Dr James Baker**, Former Administrator, US National Oceanic and Atmospheric Administration and Consultant, NESCO and the H John Heinz III Center for Science, Economics and Environment, USA
- **Mr James Leape**, Director-General, WWF International, Switzerland
- **Mr Herman Mulder**, Senior Advisor to the UN Global Compact and World Business Council for Sustainable Development
- **Mr Hideaki Oda**, Councillor to the President, Japan Water Forum and Member of the UN Secretary General's Advisory Board on Water and Sanitation
- **Mr Michael P Schulhof**, Chairman, Global Technology Investments, LLC, USA



MDGs: The distance yet to be traversed

The session began with a report presented by Mr Björn Stigson on the CEO Forum 2007—*Business and Society: partnering for a sustainable future*. The report highlighted the issues discussed at the forum, such as the need to stimulate deployment of technology and the importance of energy efficiency to meet the challenges posed by climate change. The participants also emphasized that businesses today need to have a medium-to-long-term perspective in defining their goals and objectives. Furthermore, provision of incentives to businesses for promoting sustainable development was stressed upon. It also stressed on the importance of public–private partnerships and the need to bring people from diverse backgrounds to work together on issues of sustainable development.

The HIV/AIDS (epidemic in India is widespread compared to any other region of the world, as high-risk groups (transgendered people, gay sex workers) conduct their operations from homes and not brothels, which could be easily identified for future improvement. Another major hurdle is the social stigma associated with HIV/AIDS. Prevention of the disease can be made a reality by adopting a flexible approach and involving affected communities in prevention activities. India is at a crucial stage as far as HIV/



Mr Björn Stigson



Mr Ashok Alexander

functioning poorly in terms of overall coverage and data availability. Many poor countries, because of lack of infrastructure and funding, cannot disseminate the warnings as and when required. It is also important to generate public awareness on these issues and use various media like print, films, books, and the Internet. For combating disasters like floods, storms, and tsunamis, it is pertinent to install effective early warning systems. Water-related disasters are predictable and loss can be reduced drastically through better use of advanced technology.

AIDS is concerned. In particular, the Avahan programme, a Bill and Melinda Gates Foundation initiative, uses business management principles coupled with sound public health policy to deliver HIV/AIDS prevention services to a population of approximately 250 000 male and female sex workers, 20 000 injection drug users, and over 5 million clients across six states of India.

One of the greatest threats that the world faces today is that of natural disasters. World Weather Watch, the basic observation system for natural disasters, is

In the path of sustainable development, there will be winners and losers, countries, and companies. It won't be easy as the losers won't go down quietly... but it is inevitable and must be faced.



Dr James Baker

Mr Björn Stigson
President, World Business
Council for Sustainable
Development, Switzerland



Mr Herman Mulder

There is a need to adopt a holistic approach, taking into consideration all aspects of environment and sustainable development. We must learn to manage the available resources in the most efficient manner at national and international levels, and focus on governance issues in management of our ecosystem. At the same time, we must also focus on applying advanced technology to make the production of resources more efficient. Businesses, governments, and civil society must work in close coordination at all levels. An exemplary initiative in this

regard has been the partnership between US-based Glory Oil, TERI, and financial institutions in application of technology for increasing efficiency of production of American oil wells. There is an urgent need to move from conventional technologies towards new methods that would not only lead to improved energy efficiency, thereby reducing the requirement of energy to attain the same level of output, but also increase energy output per se. These technologies should be financially sustainable as well as scalable to achieve the desired results.



Mr Hideaki Oda

*You can't
address the
water needs of
the poor with
taps and toilets.
You need to
manage the
ecosystem that
supplies it.*

Mr James Leape
Director-General,
WWF International,
Switzerland

Reversal of degradation of ecosystems is not easy and will have to be based on use of improved data, better and more accessible information, and a higher level of awareness, leading in turn to increased responsibility and commitments for action. To make progress towards meeting the MDGs (Millennium Development Goals), better environmental information needs to be collected and provided in a more accessible format and used effectively at all levels.

Poverty reduction cannot be achieved if development is not sustainable. There is a need for promoting widespread understanding of the present unsustainable lifestyle and then moving towards addressing this issue. The discussions also focused on the importance of networking in initiating dialogue at the regional and global levels.

The session highlighted that the paradigm of 'business and society' has changed to 'business in society'. It also stressed on the need for Indian businesses to step up their efforts and play a greater role in international initiatives on sustainable development.



Mr James Leape

The criticality of water as a resource was put forth during the discussions. Internationally, there is a consensus that water and disaster issues need to be given the highest priority. However, there is no mention of water-related disasters in the MDGs. That is the worrying factor, especially for the Asia-Pacific region that faces the need to drastically reduce the vulnerability to water-related disasters. The Asia-Pacific region accounted for 91% of the world's total deaths and 49% of the world's total damage due to natural

disasters in the last century. Furthermore, water management is an essential part of land management. Parched deserts and arid region have been expanding over the years. Effective use of water will result in effective use of land and energy, and ultimately sustainable development.

More than one-third of the MDGs can be achieved by solving the water and sanitation problem. The need of the hour is to recognize the impact of our ecological footprints on the ecosystems and generate political will to move forward in a sustainable manner.



Mr Michael P Schulhof

PLEDGES

Mr Björn Stigson

Mr Stigson pledged to continue supporting the business community through the action framework of the WCSD (World Council for Sustainable Development). For the Indian sub-continent, he pledged to facilitate interaction among the Indian business community through a white paper on the framework of 'business and sustainable development'.

Mr Ashok Alexander

Mr Alexander pledged sustained support to the National AIDS Programme and vowed to expand the sphere of influence and support of the Gates Foundation in fulfilling the other MDGs.

Dr James Baker

Mr Baker vowed to work towards communication of issues of chronic climate risk to the public and work towards creating a consortium of ambitious projects. He also stressed on the need for a UN convention of ocean observers.

Mr James Leape

Mr Leape made it clear that WWF (World Wide Fund for Nature) can draw no specific pledge without consulting its partners. However, he shared the broad plan of action for 2007.

The WWF would endeavour to guide the EU (European Union) towards the adoption of aggressive climate change policy and reduction in their GHG (greenhouse gas) emissions by 30%. The organization also hopes to be able to negotiate on a

*If we apply
TERI's MEOR
technology to the
750 000 mature
or low-
productive oil
wells in the US, it
can increase the
oil production
from 5 million
BPD (barrels per
day) to 10 million
BPD.*

Mr Michael P Schulhof
Chairman, Global Technology
Investments, LLC, USA

post-2012 era with a draft framework in place. WWF would also work with the world's largest fish retailers to make their practices more sustainable.

Mr Herman Mulder

Mr Mulder pledged to work on both the 'top and bottom of the pyramid', especially for India. While 'top of the pyramid' referred to strengthening the Indian financial sector by facilitating the adoption of the Equator Principle by Indian banks, 'bottom of the pyramid' was directed towards providing opportunities to millions of poor in India through monetary assistance by micro-finance schemes.

Mr Hideaki Oda

Mr Oda pledged to promote the upcoming Asia-Pacific Water Summit as a point of future action towards solving Asian water issues and also invited Indian participation for the summit.

Mr Michael P Schulhof

Mr Schulhof pledged on behalf of GTI (Global Technology Investments) to continue working on increasing energy efficiency methodologies and also vowed to increase energy output using effective technologies, which serves the purpose of increasing scalability to feasible levels.

India-specific points

- To adopt a flexible approach incorporating business management principles, community participation, and a sound public health policy to deliver effective system for HIV/AIDS prevention especially in the vulnerable segments of the population such as sex workers and drug users.
- To institutionalize the 'Cement Sustainability Initiative' in India on the lines of the Cement Sustainability Initiative of the World Business Council. This is important since the cement sector is energy intensive and polluting, and there is a need to make it more environmentally conducive.
- Indian businesses to step up their efforts and play a greater role in international initiatives on sustainable development.
- To foster development and deployment of clean coal solutions and technologies in view of the increasing dependence of the country on fossil fuel especially for power generation.



Climate change and sustainable development

Discussions in this session revolved around the vexing issue of climate change, which poses a hurdle in the path of sustainable development. Climate change represents a threat that can no longer be ignored or underestimated. With a corpus of scientific evidence pointing out that the adverse impacts of climate change are not distant but are now being increasingly felt, there is need for immediate action.

Some of the grave consequences of climate change that are already being observed were elaborated upon. Some of these impacts are being manifested in the form of rapid melting of snow and ice, especially in the polar regions and other alpine terrain. Alpine glaciers are water reservoirs during dry seasons and contribute to the flow in snow-fed rivers. Rapid melting of glaciers as a result of climate change would, therefore, have severe consequences in the form of initial flooding and even-

tual drying up of snow-fed rivers and consequent impacts on the population dependent on run-off from glaciers. Other implications of the melting glaciers include the phenomenon of rising sea levels and other cross-sectoral impacts in the agricultural and hydro power sectors. Though these impacts are likely to be significant in high latitudinal and altitudinal regions, the implications of these pose huge challenges to all countries, including those in the developing world, thus, impeding the achievement of the MDGs. It was also highlighted that while discussing the direct



Mr Roger Harrabin

Chairperson

Mr Roger Harrabin, Senior Environment Analyst, BBC, UK

Setting the theme

Mr Yvo de Boer, Executive Secretary, United Nations Framework Convention on Climate Change, Geneva

Speakers

- **Mr Howard Bamsey**, Deputy Secretary, Australian Department of Environment and Heritage, Australia
- **Ms Preeti Bhandari**, Director, Policy Analysis Division, TERI, New Delhi, India
- **Dr Klaus S Lackner**, Ewing-Worzel Professor of Geophysics, Earth and Environmental Engineering, Columbia University, USA
- **Prof. Akio Morishima**, Chair of the Board of Directors, Institute for Global Environmental Strategies, Japan
- **Dr Pal Prestrud**, Director, Center for International Climate and Environmental Research, Oslo, Norway
- **Dr Camilla Toulmin**, Director, International Institute for Environment and Development, UK

*We have a notion
that if politicians
fail, the scientists
can bail us out.*

Mr Roger Harrabin
Senior Environment Analyst,
BBC, UK

impacts of climate change, the secondary impacts such as influence on the economy and trade patterns should not be overlooked.

Socio-economic development pathways are intricately related to changes in the climate system. Each socio-economic development path has certain driving factors that give rise to GHG (greenhouse gas) emissions, which in turn lead to climate change, with associated impacts on natural and human systems. These impacts, in turn, would eventually influence the pathways of development. From

a development perspective, the task of addressing future risks involves addressing the current vulnerability to climate variability and planning accordingly, in order to enhance the resilience of communities to the probable impacts of climate change. Development could be severely hampered if the increasing risk of climate change is not tackled. This is especially true in the case of countries with poor adaptive capacity and communities having their livelihoods dependent on climate-sensitive sectors such as agriculture, water resources, forestry, and fishery. In a country like India, which has an economy where livelihoods of millions are dependent on the natural resource base, climate change will pose an additional stress along with other socio-economic challenges such as poverty.

In the wake of climate change, the response of the global community has taken a dual approach, with mitigation (anthropogenic intervention to reduce the sources or enhance the sinks of GHGs) on one hand and adaptation (adjustments in natural and/or human systems in response to actual or



Dr Pal Prestrud



Mr Yvo de Boer

expected climatic stimuli or their effects) on the other. While mitigation strategies are important, adaptation strategies are also imperative, because even an immediate and steep drop in global GHG emissions would not fully prevent the impacts of climate change. Hence, communities need to adapt to the level of changes in the climate system that have already begun.

Though socio-economic development pathways impinge on climate change and pose an enormous challenge to developmental aspirations, there is also an opportunity for governments and corpora-

tions to try and develop new and alternative modes of energy technologies on a low-carbon mode. Technologies such as carbon capture and storage can likewise be tapped for this purpose. There is, however, need to garner financial resources for tapping and implementing such technologies. Growing economies have developmental aspirations such as enhancement in infrastructure and human development. Meeting these requires financial resources and technical skill sets, and the transition towards a low-carbon path would require additional investments. The challenges faced by developing countries are primarily in terms of improving access to resources and promoting sustainable ways of resource usage and resource conservation. Developing countries also face a large gap in technologies that are required in order to meet the energy needs of the poor, in terms of adequate financial investment, access, and affordability. To access financial resources for alternative technologies, speakers cited opportunities offered by the CDM (clean development mechanism) in this direction. However, the CDM also has some technical complexities that need to be overcome in order to realize its full potential.

Discussions also focused on the role of governments in bringing about international consensus on climate change and sustainable development. Though climate change manifests itself as a global problem, the efforts to address this issue are often inadequate, especially because of lack of coordination and inconsistency in the development and national security goals of the involved nations. With the international climate change dialogue often

being marked by disagreements and expectations, countries need to strike partnerships and foster global cooperation in order to arrive at common solutions and to push the cause of climate protection. Recent partnerships such as the Asia-Pacific Partnership and G8 highlight the key role to be played by the private sector in this context.

Speakers also called for commitment of the highest political order in order to achieve global cooperation. It was, however, emphasized that developing countries must be provided appropriate incentive



Dr Camilla Toulmin

If we all lived like people in sub-Saharan Africa, we would use only half the planet.

Dr Camilla Toulmin
Director, International Institute for Environment and Development, UK



Ms Preeti Bhandari

Climate change is a real threat to development but not responding to climate change is a much greater threat.

Howard Bamsey
Deputy Secretary,
Australian Department of
Environment and Heritage,
Australia

structures to encourage participation to address the dual challenge of climate change and sustainable development effectively. The concept of carbon finance should be used to green the energy growth along with developing country participation, provided there was full flexibility in the implementation of market-based mechanisms. Broadly, the speakers identified integrating action on mitigation and adaptation into the policy-planning process as the focus for long-term, country-level strategies to deal effectively with climate change. This would include formulation of a long-term cooperative programme, advancing development goals in a sustainable way, addressing action on adaptation, and realizing the full potential of technology to facilitate mitigation and adaptation. Internationally, buttressing long-term cooperative programmes that seek to strengthen the protections on the global environment must be given topmost priority.

India-specific points

- Climate change poses a threat to the livelihood security of millions in India, owing to their dependency on the natural resource base of the country, which is vulnerable to the variations in climate (changes in rainfall, precipitation, occurrence of extreme events, and so on).
- Owing to the large contribution of snow and glaciers into river systems in India, the melting of glaciers could affect populations dependent on these snow-fed rivers of the Himalayan system, with the probability of an initial increase in river flows and consequent flooding, and eventual drying up of these rivers, with the receding of glaciers.
- For developing countries such as India, social and economic progress is essential to create coping capacities and adapting to climate change. However, one of the key challenges in climate change mitigation is to reduce carbon intensity in a manner consistent with the social and developmental priorities.



Energy for sustainable development

Energy in the context of sustainable development, particularly in developing countries, was the focus of the session. With developing countries such as India and China growing rapidly and undergoing massive industrialization and urbanization, the role of energy can hardly be overemphasized. The need of the hour is a focus on demand and supply of energy. In this regard, it is essential to recognize the role of developed countries. However, the approach to securing energy sustainably for developing countries is not going to be simple; various solutions need to be explored.

The year 2006 marked a turning point in global awareness on energy and sustainable development, and also witnessed recognition of the need to reduce the dependence on fossil fuels and increase the use of renewable sources of energy. The three challenges facing us today include the rising prices of fossil fuels, climate change, and

investment in the right infrastructure. The solutions involve, among others, optimizing the use of ESTs (environmentally sound technologies). Technologies like CCS (carbon capture and sequestration) and new generation photovoltaics are being developed and should be ready for use soon. With the right public policies, these technologies could cover the increasing energy demand. It is also essential to involve all stakeholders to address the drawbacks of these technologies collectively. Implementing the right public policies is crucial for promoting ESTs. Right



Dr Adnan A Shihab-Eldin

Chairperson

Dr Adnan A Shihab-Eldin, former Acting Secretary General and Director of Research at OPEC and Advisor to Kuwait Petroleum Corporation, Austria

Speakers

- **Mr Jean-Paul Bouttes**, Director, Prospective and International Relations, Electricité de France, France and Chief Executive Officer, Sherpa, France
- **Mr Pieter van Geel**, Cabinet level, State Secretary, Ministry of Housing, Spatial Planning and the Environment, The Netherlands
- **Dr Bindu N Lohani**, Director General, Regional and Sustainable Development Department, Asian Development Bank
- **Mr Nick Mabey**, Chief Executive Officer, E3G, UK
- **Mr Vikram Singh Mehta**, Chairman, Shell Group of Companies, India
- **Dr Lutz Mez**, Executive Director, Environmental Policy Research Centre University of Berlin, Germany
- **Ms Cornelia Richter**, GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit GmbH), Germany
- **Dr Leena Srivastava**, Executive Director, TERI, New Delhi, India
- **Mr Patrick Verhagen**, Senior Vice President, Holcim, Zürich, Switzerland

investment incentives, along with the recognition of complementarities between different policies as well public-private partnerships, are important for pursuing the path of sustainable development.

Energy does not figure in the formal structure of the MDGs. It is essential to give priority to energy needs and integrate them within the development agenda of the developing countries if the MDGs are to be achieved. To meet energy demands sustainably, the solution lies in energy efficiency and enhancing the use of re-



Mr Jean-Paul Bouttes

While technologies have advantages, they also have drawbacks, which we have to address in order to achieve true sustainable development.

Mr Jean-Paul Bouttes
Director, Prospective and International Relations
Electricite de France, France
and Chief Executive Officer,
Sherpa, France



Dr Bindu N Lohani

newable energy sources. The developed world must take a lead in meeting their targets of emissions reduction.

Even at the ADB (Asian Development Bank), the issues of energy, climate change, and low-carbon technology have assumed unprecedented importance. Recognizing the need for investing in energy efficiency and new technologies, the ADB has been increasingly looking at investing in cleaner technologies, and more than a million dollars have been invested in such technology. Some cities in Asia like Delhi and Manila are larger than some of the countries of the world. Therefore, it is important to ensure

that they are sustainable, and an important aspect of this is the transport sector in these cities, which is a major emitter of carbon. Energy efficiency has an important role to play in transport sector efficiency.

The enormous increase in global energy use, which according to some projections is likely to double by 2050, presents a grave problem. However, the importance of hydrocarbons in day-to-day life and in areas such as transportation cannot be ignored. The need of the hour is to find integrated carbon solutions. In this regard, the role of a company like Shell was



Mr Pieter van Geel



Mr Nick Mabey

emphasized. Shell contributed to reducing emissions by 15% since 1990; it is the largest distributor of bio-diesel and invests hugely in wind energy. However, most importantly, integration between energy, environment, and society is required. In this respect, the need to bring in the public-private realm by promoting partnerships can hardly be overemphasized. Companies should begin to look into partnerships that complement the strengths of each partner. Such partnerships should not be only between the government and private sector, but

should involve civil society and local communities.

The importance of renewable energy sources as a long-term sustainable solution was also emphasized. Coal and other hydrocarbons must be ruled out from the world energy scene. It needs to be recognized that renewables such as solar, biomass, hydro, and geothermal energy offer a long-term sustainable solution. These will increase access to local, modern, and reliable energy sources. International experiences need to be utilized for rural energy development-incorporating energy-demand analysis,



Mr Vikram Singh Mehta

The cost of continuing, as we are, is greater than the cost of mitigation.

Mr Vikram Singh Mehta
Chairman, Shell Group of Companies, India

assessing local renewable energy sources, tariff and connection policies, choice of energy technologies, and financing and delivery mechanisms. It is, therefore, critical for a sustainable energy future that the solar age replaces the fossil-fuel age soon.

Sustainable development is certainly a well-used term internationally. However, a lot still needs to be done to create awareness about it in developing countries. What needs to be realized is that the presence of abundant energy resources does not automatically lead to sustainable development. The key to sustainable development lies in



Ms Cornelia Richter



Mr Patrick Verhagen

*The solar age has
to replace the
fossil and nuclear
age sooner or
later.*

Dr Lutz Mez
Executive Director,
Environmental Policy Research
Centre University of Berlin,
Germany

ing dependence of developing countries on fossil fuels is inevitable. In such a scenario, the right energy mix, energy technologies like CCS, and renewables will come to the rescue and offer a win-win solution. However, it is important for developed countries to take the lead and support developing countries in switching to low-cost energy-efficient options.

investing in an energy mix that suits the country's needs, decreasing dependence on fossil fuel imports and other resources, and an incessant striving for energy security. The approach must be a multi-stakeholder approach.

Although energy-efficiency and savings are certainly important for securing energy sustainably, it cannot be an enduring solution. For that, it is important to turn to renewables. Fossil fuel exhaustion is inescapable and the increas-



Dr Lutz Mez

India-specific points

Access to energy is very pertinently foreseen to be of prime importance in the future of developing countries specially for the massively industrializing and urbanizing economies of India and China, with large populations of poor particularly vulnerable to the lack of access to energy. Though these countries at the moment are consuming a small proportion of world energy as compared to the developed world, it does not imply that they could be complacent in their efforts to conserve energy. Rather, they should pursue to do so in the most efficient and affordable way they can.

Some of the points that were mentioned in the course of discussion at the session specifically with regard to India include the following.

- It is essential to make sure, some of the big Asian cities such as Delhi are sustainable. The buildings in such cities need to be more energy efficient and the western way of going to work downtown leaving the suburban areas or going

Continued...

India-specific points *(Continued...)*

to a mall for shopping is not just feasible for 14–15 million people. Therefore, there is an urgent need to design a transport policy which is efficient, to recycle energy efficiently, and make cities like Delhi more environment friendly.

- It is expected that the role of hydrocarbons will remain pretty fundamental at least for the foreseeable future and especially for transportation fuels. In countries like India it will remain the most affordable and accessible fuel. So the challenge really is to find integrated carbon solutions on how do we resolve the question on emissions? It is companies like Shell that will have to play a role here, by first looking within their own shop, what can they do inside their own company and then secondly by deploying the appropriate technologies and thirdly in seeking partnerships, which complement the strengths of each individual partner.
- There is a huge demand for energy in India and this is expected to rise in the future given its rapidly growing economy. Estimates for the year 2030 depict a massive increase in the import dependency of every fuel form in India, thus posing a huge challenge in terms of energy security and access to cleaner forms of energy in required quantities. Technologies such as carbon capture and sequestration are wonderful, however, there is a lack of efforts on part of the developed world in terms of demonstrating the use of this technology and lack of support for its commercialization. In India there was a call for all new power plants having carbon capture and sequestration technology but there are no concrete programmes that would allow that to happen as an immediate effect. Therefore, there is a need to focus on sustainable development as a means of climate change mitigation in India, many low-cost options that are already being worked on and there are others that need to be pushed further.

SESSION 4

Chairperson

Mr Denis McDonough, Senior Fellow and Senior Adviser to Distinguished Senior Fellow, Tom Daschle at the Center for American Progress, USA

Speakers

- **Mr Yves Cabana**, Special Advisor to the Chairman, Executive Committee Secretary and Vice President, Sustainable Development, Veolia Environment, France
- **Mr Warren Evans**, Director of Environment, The World Bank, USA
- **Prof. Michael von Hauff**, University of Kaiserslautern, Germany
- **Prof. Peter Hennicke**, President, Wuppertal Institute for Climate, Environment and Energy, Germany
- **Dr Ganesh M Kishore**, Vice President, Science and Technology and Chief Biotechnology Officer, DuPont Research and Development, USA
- **Prof. Charles Kolstad**, Department of Economics, University of California, USA
- **Prof. Akimasa Sumi**, Director, TIGS (Transdisciplinary Initiative for Global Sustainability) in IR3S (Integrated Research System for Sustainability Science) and Head, AGS Promotion Office, University of Tokyo, Japan



Sustainable use of natural resources

The session focused on various aspects of sustainability relating to natural resources, looking at the issue from the academic, policy, donor, and industry perspectives. Sustainable use of natural resources is a prerequisite for achieving sustainable development, and helping natural resource extraction to adopt sustainable practices in India would also help the developed world in meeting its own sustainability challenges. The 21st century was defined as one of knowledge expansion and sustainable development, and it was emphasized that there was a need for technology to build an issue-based trans-disciplinary approach to sustainability—one that can reliably predict the future, share views of the future with peers and stakeholders, and create a network of data and knowledge. There should be a three-way linkage between global, social, and human systems, comprising both long-term and short-term approaches with subdivision and compartmentalization of science.

The concept of sustainability itself is not controversial, but needs to be practical and implementable in a manner that can be translated into sensible policies. In this context, reference was made to three fundamental issues—sustainability, reversibility, and intergenerational equity. The discussion was supported by the examples of renewable natural resources like forests and fisheries and exhaustible resources like copper and oil. The draft Delhi Master



Mr Warren Evans

Plan 2021 also found mention in the context of sustainable policies.

Urgent priorities of multilateral agencies were also elucidated in the session. These include valuation of environmental services and development of mechanisms for ecosystem services (through upstream watershed conservation and downstream watershed consumer benefits). Meeting the immediate needs of communities who depend on natural resources is as important as long-run sustainability goals. Lessons learnt from the past show that depletion of natural resources and their



Mr Yves Cabana



Prof. Peter Hennicke

poor management lead to poor economic growth and little per capita national wealth creation, with the poor most affected by it. While technology can increase the efficiency of natural resource utilization, there remains the need to look at the benefits of conservation of other natural resources in the ecosystem, besides taking into consideration environmental security.

Presenting the private sector view, panellists talked about water, waste, and energy management as services that could be supplied through private initiatives. Referring to water-supply systems, it

The economists are also telling us here that there is a value to the moral question of what happens to that resource the day after.

Mr Denis McDonough
Senior Fellow and Senior Advisor to Distinguished Senior Fellow Tom Daschle at the Centre for American Progress, USA

was suggested that municipalities should integrate economic and technological solutions, focusing on reduction in leakage rates and improved metering with technological, managerial, and social changes. Volumes of waste can be treated and recycled in a carbon-efficient way with energy recovery models. Sustainable development can thus become an integral part of business functioning.

In the same vein, biotechnology and renewable systems were emphasized as being absolutely essential for sustainable natural resource use. Biotechnology, in



Dr Ganesh M Kishore

From an environmental afterthought there is the possibility of environmental forethought. New paradigms are going to be possible based on this integration.

Dr Ganesh M Kishore
Vice President, Science and
Technology and
Chief Biotechnology Officer
DuPont Research and Development, USA



Prof. Charles Kolstad

of banana. The contribution that biotechnology could make towards achieving the MDGs was also discussed.

Panellists devoted much time to the concepts of sustainable consumption and production and the challenges in achieving them. The relative decoupling of GDP (gross domestic product) in a manner that could help the growing global consumer classes was discussed. Emphasis was laid on integrating energy-efficiency and renewable resource use in the context of more efficient use of natural resources.

The concept of 'sustainability cluster' for eco-efficient management was discussed in the session, in which a strategy was suggested for the sustainable use of natural resources through a triangular approach involving the ecology, economy, and society. The discussion highlighted that eco-efficiency was not only important for ecological and environmental protection, but also vital to decrease energy requirements for industries. Thus, the identified areas of action could be eco-efficiency and its measurement, which could increase resource productivity and the productivity of both material and energy.

The chairperson urged panellists to comment on the relatively less discussed issue of governance. The following were the key responses.

- Governance creates more choices so that at the individual level, better decisions can be taken.
- Local governance institutions are normally more willing to pay for local development than national institutions.

particular, has an important role to play to meet the increasing food, energy, and clean water demands of the world, especially in poor nations, which cannot normally access expensive technology to satisfy their basic needs of food and nutrition. The impact of green biotechnology was discussed, as also the integrated possibility of producing fuels (for example, starch to high-density ethanol/butanol) through innovative application of biotechnology. Other areas of innovation discussed included the possibility of disease prevention by soya protein and clone



Prof. Akimasa Sumi

- Meeting information needs (as through the media) is critical for validating information and generating consensus on scientific issues.
- Conflicts between local-level livelihood needs and countervailing macroforces could be resolved through local innovation (such as value addition of forest products).
- Good governance is critical and there is a need for the regional and national framework to achieve this.
- Governments should support the open market by encouraging the regional and local markets as well.
- New opportunities should be brought into play within existing mechanisms, and more openness towards innovations is desirable.
- Governments should not only take a regulatory and controlling role in natural resource management, but also be a facilitative and supportive agent.

The chairperson concluded by remarking that any definition of sustainability should necessarily take into account impacts on future generations—essentially a broad moral issue that was reiterated during the summit.

India-specific points

- Helping natural resource extraction to adopt sustainable practices in India would also help the developed world in meeting its own sustainability challenges.
- It was suggested that municipalities should integrate economic and technological solutions, focusing on reduction in leakage rates and improved metering with technological, managerial, and social changes.
- Conflicts between local-level livelihood needs and countervailing macroforces could be resolved through local innovation (such as value addition of forest products)
- Good governance is critical and there is a need for the regional and national framework to achieve this.

Governance provides the choices with the potential to deal with the eco consequences and enable at the individual level the best decision to be made.

Mr Warren Evans
Director of Environment
The World Bank, USA

SESSION 5

Chairperson

Mr Raj Chengappa, Managing Editor, *India Today*, Delhi, India

Setting the theme

Ms Monique Barbut, Chief Executive Officer and Chairperson, Global Environment Facility, USA

Speakers

- **HE Ms Rejoice Mabudafhasi**, Deputy Minister for Environmental Affairs and Tourism, South Africa
- **Dr Alok Adholeya**, Director, Biotechnology and Management of Bioresources Division, TERI, New Delhi, India
- **Mr Francois Binder**, Country Director, Swiss Agency for Development and Cooperation, India
- **Ms JoAnne Disano**, Director, Division for Sustainable Development, Department of Economic and Social Affairs, United Nations, USA
- **Dr Arun Kumar**, President, Business Initiatives, Development Alternatives, India
- **Ms Pearl Tiwari**, Director, Ambuja Cement Foundation, India



Sustainable development technologies for the poor

Until recently, environment and poverty were treated as two disconnected areas within the development paradigm. Yet increasingly, through focused developmental initiatives in the recent past, the disconnect has been reduced to a stage where there is considerable acceptance of the benefits to the poor from the promotion of environmental sustainability. Within this context, sustainable technologies contribute towards achieving the MDGs

and reducing system risks.

The speakers in this session contended that as the Green Revolution bypassed the condition of infrastructure and basic service delivery in the poorest of poor regions, technology solutions had to be bolstered to ensure the participation of these regions in the broader economy. In this context,



Mr Raj Chengappa

there was a need for technology-specific developmental programmes focusing on the vulnerability of the poor. Twenty-first century technologies must draw upon traditional, indigenous knowledge. The example of Tumkur district in Karnataka was offered, where a major transformation had been achieved through technology interventions. In this particular project, the community was working closely with international bodies for institutional and economic solutions. The panel also emphasized the need for 'replicability' and 'accessibility' of

technologies. The replicated technologies could work towards climate change mitigation and assuring better standards of living in the developing world.

This brought discussions to sustainable technologies in the shadow of climate change. Biodiversity demonstrates that nobody is exempted from the impact of climate change, and within this, the poor are most vulnerable. It is, therefore, essential to identify viable technology solutions to meet urgent energy needs in the most sustainable manner. For instance, technology based on SPV (solar photovoltaic) is a clean energy solution. SPV technology can be used for domestic lighting, entertainment, and for productive activities. In this way, SPV serves the purpose of economic development through environmentally sound technological interventions. Panellists noted that global action was required to scale up the promotion of these technologies.

The promotion of sustainable technologies depends on how successfully these technologies fulfil the three As—affordability, accessibility, and appropriateness. The affordability issue is central in the context of the relevance of sustainable technologies to poverty reduction. The poorest of the poor do not have the purchasing power to invest in expensive technologies, and therefore, sustainable technologies must be sensitive to the financial constraints of the poor to be effective engines for poverty reduction.

Other issues that dog the development and promotion of sustainable technologies include the lack of interest in research and development and the extent of public funding available for the same. These issues are further

exacerbated by the continued flight of scientific and research talent from developing countries. Likewise, it is essential that governments address the absence of micro-enterprises for economic development for the poor in developing countries. Women and youth, the custodians of the environment, are generally sidelined in most technology-related developmental initiatives. One of the strategies suggested in the course of the discussion was the creation of markets to involve the poor as actors or producers along the value chain. Within this strategy,



Mr Francois Binder

*Consider poor
as customers
not beneficiaries.*

Mr Francois Binder
Country Director, Swiss Agency
for Development and Cooperation,
India



HE Ms Rejoice Mabudafhasi

it was stressed that the public sector should concentrate its efforts on public goods, and the emergence of dynamic markets be promoted. Over the next five years, panellists maintained that there must be more focused action for the development of cleaner and more affordable energy, sanitation technology, and needs-based interventions, as opposed to donor-driven ones.

Another criterion for technology intervention for the poor is guaranteed high economic returns—for example, efficient irrigation systems. The introduction of



Dr Alok Adholeya

South-South cooperation should be nurtured for solving problems specific to poor countries.

Ms JoAnne Disano
Director, Division for Sustainable Development,
Department of Economic and Social Affairs, United Nations,
USA



Ms JoAnne Disano

sustainable technology in the developing world must also ensure flexibility to the poor and enhance business opportunities for micro-enterprises of different kinds through product enhancement and increase in the supply of inputs such as the use of ICT (information and communication technology) for generating awareness. Innovation in technology must look into quality building material and adding to locally available resources in the target areas. Needless to say, such criteria would result in better access to technology itself in poor pockets. Perhaps equally importantly, they would lead to greater access to infor-

mation and finances, which are at present sub-optimal.

As an example of the viability and impact of sustainable technologies in aiding the poor, a presentation was made during the session on the work carried out by Ambuja Cement in the state of Gujarat in India. The project area comprised 760 villages with a total population of about one million. The company had concentrated its efforts on water resource management and mine reclamation with the use of local technology. Under the project, check dams were constructed and



Dr Arun Kumar



Ms Pearl Tiwari

interlinking of water bodies was undertaken to increase access to water. Water-efficient technologies for irrigation purpose were introduced in the villages, including sprinklers and drip irrigation systems. These efforts have also resulted in raising the quality of water available to communities in the area.

During the session there was consensus on the need for international funding for research and development in global public goods, more specifically, technologies for the poor. Collaborative North–South research was cited as the

need of the hour. The speakers asserted that detailed examination of all aspects of technology innovation should be undertaken. Also, South–South cooperation in this area was believed to be important along with enhanced government involvement and public–private partnership.

Panellists also discussed the hesitancy among banks to securitize carbon revenues. Carbon revenues could help to fully service the capital cost of technology within a period of five years, and more dialogue between banks, development agencies, and countries was needed to address the issue in a manner that could benefit the poor in developing countries.

The session was concluded with speakers calling on all stakeholders to work in tandem towards changing mindsets and attitudes to poverty reduction and technology, in a bid to align the latter to the former.

Innovation is the way forward, it is key to progress.

Dr Arun Kumar
President, Business Initiatives
Development Alternatives
India

India-specific points

Projects implemented in India

- There is a need for technology-specific developmental programmes focusing on the vulnerability of the poor. Twenty-first century technologies must draw upon traditional, indigenous knowledge. The example of Tumkur district in Karnataka was offered, where a major transformation had been achieved through technology interventions (particularly biomass gasifiers). In this particular project, the community was working closely with international bodies for institutional and economic solutions.
- A presentation was made during the session on the work carried out by Ambuja Cement in the state of Gujarat in India. The project area comprised 760 villages with a total population of about one million. The company had concentrated its efforts on water resource management and mine reclamation with the use of

Continued...

Our research priorities are an embodiment of our development programmes.

HE Ms Rejoice Mabudafhasi
Deputy Minister for
Environmental Affairs and
Tourism,
South Africa

India-specific points *(Continued...)*

local technology. Under the project, check dams were constructed and interlinking of water bodies was undertaken to increase access to water. Water-efficient technologies for irrigation purpose were introduced in the villages, including sprinklers and drip irrigation systems. These efforts have also resulted in improving the quality of water available to communities in the area.

Issues/concerns relevant to India

- Biodiversity demonstrates that nobody is exempt from the impact of climate change, and within this, the poor are most vulnerable. It is, therefore, essential to identify viable technology solutions to meet urgent energy needs in the most sustainable manner. For instance, technology based on SPV (solar photo-voltaic) is a clean energy solution. SPV technology can be used for domestic lighting, entertainment, and for productive activities.
- A criterion for technology intervention for the poor is guaranteed high economic returns, for example, efficient irrigation systems.
- The promotion of sustainable technologies depends on how successfully these technologies fulfil the three As: affordability, accessibility, and appropriateness.
- Issues are further exacerbated by the continued flight of scientific and research talent from developing countries.
- Innovation in technology must look into quality-building material and adding to locally available resources in the target areas to ensure better access to technology in poor pockets.



Sustainable development in the states of India

In this session, the delegates discussed the experiences of Indian states in inculcating sustainable development in their policy and programme frameworks. At the outset, it was agreed that to achieve sustainable development objectives, initiatives both at the state and local levels were equally important to national-level interventions. It was also stated that the basic philosophy of sustainability has to percolate down to the local level in order to meet the desired objectives. The session showcased state initiatives wherein the involvement of stakeholders had delivered positive results.

In Madhya Pradesh, for instance, stakeholder involvement through demand-driven initiatives in health and education sectors has clearly made a visible impact on the quality of lives of the people. In a rural set-up, representatives from the community were appointed to ensure education to all. This inculcated in them a sense of ownership and responsibility towards the community at large, a key factor for the success of the state in enhancing the level of primary education. A similar result was seen in case of health sector under the *Jan Swasth Rakshak* (barefoot doctors), wherein training was imparted to local villagers with the UNICEF's support to ensure availability of primary health care to all. The improvements in health indicators in the state were considered as a benchmark for adjudging the performance of these doctors who enabled a change, with the role of the government being confined to that of facilitation.

Pressure on natural resources is increasing with growing populations and economic imperatives. Their effective management, therefore, holds the key to attain sustainable

Keynote address

Hon'ble Mr Digvijay Singh, Former Chief Minister of Madhya Pradesh and General Secretary, All India Congress Committee, India

Setting the theme

Dr Alan C Lloyd, President, International Council on Clean Transportation, USA

Chairperson

Dr R K Pachauri, Director-General, TERI, New Delhi, India

Speakers

- Mrs Vibha Puri Das, Principal Secretary and Commissioner, Forest and Rural Development, Government of Uttaranchal, India
- Ms Sharwaree Gokhale, Principal Secretary Environment, Government of Maharashtra, India
- Mr Vivek Rae, Principal Secretary, Urban Development, Government of National Capital Territory of Delhi
- Mr Rakesh Mehta, Principal Secretary (Power), Government of National Capital Territory of Delhi



Mr Digvijay Singh



Dr Alan C Lloyd

The need of the hour is to have a basic policy shift. The forest produce ultimately belongs to the people, not to the state.

Hon'ble Mr Digvijay Singh
former Chief Minister of
Madhya Pradesh and General
Secretary, All India Congress
Committee, India

programme undertaken by the Jhabua tribe in Madhya Pradesh. Even during the worst drought, Jhabua villages have adequate water to meet their needs.

The session also stressed upon the achievement of the MDGs. Alleviating people out of poverty necessitates livelihood opportunities to the local community. In case of other natural resources, such as forests, where legislation has not been delivered successfully, the constitution of JFM (joint forest management) committees has reaped positive results. The challenge now is to leverage such successful experiences across sectors and secure the livelihood of India's poor.



Mr Vivek Rae

development. Water is one such resource that is in particular need for management. Watershed management programmes have been undertaken in many states to rejuvenate the water tables. The need for putting in place integrated watershed management programmes was emphasized by the speakers. Such programmes can serve as means to overcome the prevalent barrier of limited coordination amongst the diverse government departments and agencies in undertaking a particular initiative. An example, in this respect, is the water management



Ms Vibha Puri Das

Promotion of organic farming, particularly in the Himalayan states of the north, was highlighted as another example of sustainable development initiatives in India's states. The villages that have taken up organic farming have managed to raise their standard of living. With proceeds from organic farming being invested in sanitation facilities, the general state of cleanliness of the villages has also improved. New and locally available sources of energy, such as biogas, are being explored to create additional livelihood opportunities in these villages.

The speakers at the session also put forth the contention that to achieve sustainable development in India, success stories from the developed countries could be replicated. In this context, the state of California in USA has undertaken several measures for curtailing the increasing pollution – especially GHG emissions – arising from industrial activity and lifestyle choices. This is a problem that afflicts most urbanized areas in India too. In this regard, cleaner technologies and better vehicular fuels could be considered. For instance, to ensure sustainability, California has implemented recommendations of CAT (Climate Action Team), and has taken policy initiatives in HFC (hydrofluorocarbon) reduction, forest management, improving water-use efficiency, and encouraging better land-use practices. In the transport sector, California has pursued the promotion of low carbon content fuel, renewable fuels, and biofuels.

Another aspect of sustainable development is the increasing migration from rural to urban areas, which brings in its wake insecurity, depressed standards of living, and livelihood uncertainty for the migrants, coupled with a steep rise in the pressure on natural resources in migrant settlements. Arresting increasing migration remains crucial to manage natural resources sustainably. Rising slum populations have taken a toll on resources, with waste management, water and energy availability, transportation, and affordable housing being impacted. The panellists noted that these could be collectively tackled through forging partnerships and promoting community participation. In the state of Delhi, the involvement of resident welfare associations, traders associations, and youth have reaped positive results. The air quality has improved in the capital, which has brought respite to many, and energy efficiency measures have been promoted, such as mandatory installation of CFL (compact fluorescent lamps) in buildings, along with solar water heating plants in certain cases. The challenge is to create similar stakeholder partnerships to tackle problems facing slums.



Ms Sharwaree Gokhale

Urbanization, as a trend, has come to stay; migration from rural to urban is not only because of deprivation but also aspirations.

Ms Sharwaree Gokhale
Principal Secretary Environment, Government of Maharashtra, India



Mr Rakesh Mehta

The session also stressed upon the fact that biodiversity conservation also has a key role to play in meeting sustainability goals, particularly in a country such as India that has rich biodiversity. The Himalayan state of Uttarakhand has undertaken several policy measures, such as biodiversity registers, conservation of medicinal plants, preserving the gene pool, and so on to conserve biodiversity. New technology such as GPS (global positioning system) is also being used in the state for rapid mapping exercises to more accurately document its natural resources. These and other examples of biodiversity conservation have to be replicated in all the states of the country to take India forward on the sustainable development pathway.

The session concluded with the speakers asserting that more initiative and enthusiasm are required in India's states to push the sustainable development agenda, with a focus on multi-stakeholder participation in meeting the country's development goals.

Urban agglomeration is very dynamic, it generates a lot of resources.

Mr Vivek Rae
Principal Secretary
Urban Development
Government of NCT of Delhi

India-specific points

- To achieve sustainable development in India, success stories from the developed countries could be replicated.
- Increasing migration from rural to urban areas, brings in its wake, insecurity, depressed standards of living, and livelihood uncertainty for the migrants, coupled with a steep rise in the pressure on natural resources in migrant settlements. Arresting increased migration remains crucial to manage natural resources sustainably.
- Biodiversity conservation has a key role to play in meeting sustainability goals, particularly in a country such as India that has rich biodiversity.
- More initiative and enthusiasm are required in India's states to push the sustainable development agenda, with a focus on multistakeholder participation in meeting the country's development goals.



Chairperson

Ms Frannie Leautier, Vice President, World Bank Institute, USA

Setting the theme

Mr Anand Sharma, Hon'ble Minister of State, Ministry of External Affairs, Government of India

Speakers

- HE Mr Svend Auken, Member of Parliament, Vice President of the Danish Parliament and Dy Speaker, Government of Denmark
- HE Mr Brice Lalonde, Former French Minister and Chair of the OECD Round Table on Sustainable Development, France

Summary and concluding address

HE Mr Mamadou Lamine Loum, Former Prime Minister of Senegal

Sustainable development in Africa: ministerial perspectives

Africa is facing great challenges in meeting the MDGs. While much will depend on the actions of the African developing countries themselves and on the policy frameworks they have in place, the support of the international community is crucial for Africa to achieve the MDGs. This is particularly so for the low-income countries in Africa that face serious resource constraints and enormous challenges in meeting their development challenges. Therefore, panellists in the session called for greater international community cooperation, besides more concerted assistance from industrial countries, to support Africa's sustainable development efforts.

Assistance is required in increasing ODA (official development assistance), removing trade barriers, and ensuring that current debt relief efforts meet the goals of debt sustainability. The labour productivity in the continent is not only inefficient but also not keeping pace with the growing population. Because of centralized planning and development taking place only in selected urban pockets, migration is a serious issue. Africa is rich in oil and mineral resources, but these have not proved their financial viability due to their mismanagement and myopic exploitation. Some other specific challenges faced by Africa include increasing crop yield to feed the growing population, reversing the unsustainable exploitation of water, dealing with life-threatening diseases like HIV/AIDS, tuberculosis, and malaria, and coping with the debilitating effects of harsh natural disasters like drought and famine. In addition, African countries are



Ms Frannie Leautier

constrained by huge debt burdens, poorly developed markets, and limited overseas development assistance. The poor countries of sub-Saharan Africa are most vulnerable to the impacts of climate change—their vulnerability is increased by the fact that they already live on the frontline of pollution, disaster, and degradation of resources and land. Compounding the plethora of challenges faced by the continent is the issue of poor governance.

The efforts made by India towards facilitating progress towards sustainable development in Africa were also elaborated in the session. A brief summary of the long-standing relationship between India and Africa was also given. It was argued that India's model of development, through democracy and intermediate technological developments, is of particular relevance to Africa. For instance, the success stories of small and micro enterprises in India can help in dealing with the challenges of low labour productivity in the continent. Supporting Africa's fight against apartheid and colonization, implementing programmes of technical assistance and capacity building, extending concessional lines of credit, and contributing to peacekeeping operations have been some of the key elements in India's engagements with the continent. Under its technical cooperation programmes for Africa, India has so far extended more than \$1 billion worth of assistance for initiatives that include training, deputation of experts, and implementation of projects in African countries. By contributing \$1 million, India became the first Asian country to enjoy a full-fledged membership of ACBF (African Capacity Build-



Mr Anand Sharma

Agriculture is the engine of growth for many regions of the world, including Africa.

Ms Frannie Leautier
Vice President, World Bank
Institute
USA



HE Mr Svend Auken

ing Foundation). ACBF is perceived by India as the premier international development institution, spearheading the building of sustainable human and institutional capacities for poverty reduction in sub-Saharan Africa. India has also maintained that developed countries should open up markets for African products and ensure that agricultural subsidies in their domestic markets do not adversely affect the markets for African agricultural produce.



HE Mr Mamadou Lamine Loum

The issues of Africa's vulnerability to climate change also came up in the context of renewable energy development. The panel drew attention to the need for the widespread development and dissemination of environmentally friendly renewable energy technologies in Africa, given its susceptibility to the vagaries of global warming. It was noted that Africa could look for assistance and inspiration from the countries that have successfully scaled up renewable energy development. Denmark is one such country that has had a successful renewable energy

revolution, especially in the context of wind energy that has proved to be a boon in terms of both financial benefits and employment generation. The wind industry is a very important enterprise in Denmark, with wind-manufacturing activity bringing about three billion euros into the Danish economy and employing 20 000 people. Wind power is a green, clean, and a renewable source of energy. If large investments into renewable energy are made in Africa, the continent, it was contended, would be able to solve the issue of energy poverty in an environment-friendly manner. This would also help generate employment at local levels, which in turn would increase income sources. The investments must come from the international community, and thus concerted efforts must be made to increase ODA to Africa and enhance trade cooperation with African countries.

Another energy option that may be explored in the continent is the use of biomass in decentralized diesel generators for electricity production. The specific example of bio-diesel based on palm tree oil was given to illustrate how the sustainable development challenge can be tackled in Africa with the help of locally available resources. Palm-oil-based bio-diesel is an environment-friendly, renewable energy source, and it is potentially cost-effective because of the abundance of palm trees in Africa. Moreover, the oil would tap local human and land resources for its production. With an average productivity of four tonnes of palm oil per hectare of land, the palm tree can be efficiently cultivated through independent smallholdings. Policy frameworks, which encourage a common

The debate is now how to transform the natural resource in Africa in human capital.

HE Mamadou Lamine Loum
former Prime Minister of
Senegal



HE Mr Brice Lalonde

market across the continent, as well as a common agricultural policy, would be conducive to such an action plan.

The session concluded reiterating the fact that progress towards a sustainable development path is indeed a challenge in the continent of Africa. But it is not impossible for the continent to develop sustainably, if concerted efforts are made by policy-makers in Africa. Stressing on the need to strengthen international initiatives aimed at placing Africa on a sound and sustainable growth path, it was agreed that each small development initiative taken by varied international organizations would contribute to large-scale improvements in human well-being in the continent.

With the active pursuit of sustainable development you can achieve environmental goals, economic goals, and security in terms of energy.

HE Mr Svend Auken
Member of Parliament
Vice President, Danish
Parliament and Dy. Speaker
Government of Denmark

India-specific points

Amongst the plethora of ministerial perspectives expressed on sustainable development in Africa, Mr Anand Sharma, Minister of State for External Affairs, Government of India, elaborated on the efforts made by India towards facilitating progress towards sustainable development in Africa and a history of a long-standing relationship between the two countries. The following were the key points he deliberated upon, which relate to India.

- India's model of development through democracy and intermediate technological developments is of particular relevance to Africa. The success stories of small and micro enterprises in India can help in dealing with the challenge of low labour productivity in the continent.
- India's steadfast support to Africa during its fight against apartheid and colonization, programmes of technical assistance and capacity-building undertaken in Africa, extension of concessional lines of credit, and contribution to peacekeeping operations have been some of the key elements in her engagements with the continent.
- Africa today is the largest recipient of India's technical cooperation programmes and has so far extended more than \$1 billion worth of such assistance for initiatives that include the training, deputation of experts, and implementation of projects in African countries. Financial assistance from the country has always been on concessional terms; and India became the first Asian country to become a full member of ACBF (African Capacity Building Foundation) by contributing \$1 million. The ACBF is perceived by India as the premier international development institution spearheading the building of sustainable human and institutional capacities for poverty reduction in sub-Saharan Africa.



Chairperson

Mr Gourishankar Ghosh, Chief Executive Officer, F&B India SURAKSHA

Setting the theme

Ms Khempheng Pholsena, Vice-President (Finance and Administration), Asian Development Bank, The Philippines

Speakers

- HE Mr Malik Amin Aslam, Minister of State for Environment, Pakistan
- HE Mr Anil Kumar Bachoo, Minister of Environment and National Development Unit, Government of Mauritius
- HE Dasho Paljor J Dorji, Advisor, National Environment Commission, Royal Government of Bhutan
- HE Mr Petre J Kalaš, Minister of Environment of the Czech Republic
- Prof. Saif-ud-Din Soz, Hon'ble Minister of Water Resources, Government of India

The need for integrated water resources management systems: ministerial perspectives

Integrated water resources management is now accepted as the most essential intervention to ensure access to water for productive and consumptive purposes. It enunciates adaptation strategies and measures to sustainably meet water demand, and prevent the negative impacts of extreme hydrological situations such as floods and droughts. This session highlighted the fact that water is an irreplaceable resource that could lead to conflicts if not managed appropriately. Growing population and changing lifestyles have had a significant impact on water demand that has been shooting up relentlessly. In addition, water has social, political, and economic connotations attached to it. Inequality is most visible in the context of gender differences vis-à-vis access to and allocation of water resources. Hence, it is imperative that these inequalities are kept in mind during planning for IWRM (integrated water resource management).

The current constraints in IWRM are growing water demand, but near-constant or worsening resource availability. The decline in availability of surface water has increased the abstraction of groundwater resources, one of the reasons of deteriorating groundwater quality. In some parts of India, the annual decline of groundwater table has reached up to a metre. The challenge that countries are currently grappling with is to devise sustainable strategies to accelerate IWRM, and to have more effective regional and inter-regional partnerships. Also, water ministries and authorities need to be empowered to develop synergies for effective partnership. There is a need for coordinated efforts towards development



Mr Gourishankar Ghosh

Every dollar invested in the water sector will return six dollars in time; water needs to be managed, both as a resource and as a service.

Ms Khempheng Pholsena
Vice-President (Finance and Administration), Asian Development Bank, The Philippines

and management of all resources to maximize economic and social welfare, without compromising on the sustainability of vital ecosystems. In the context of India, initiatives for effective IWRM include decentralization of management of resources by linking with panchayats for planning, designing, and implementation of schemes.

In the context of water resources management in SIDS (small island developing states), the constraints come from a narrow natural resources base and the growing threat of climate change. While

the extent of the crisis is not quantitative alone, a paradigm shift in the management of available resources – using the IWRM approach – is much desired as a means to achieve economic efficiency, equity, and environmental sustainability. The situation in SIDS is highly vulnerable, and there is a need for greater assistance and trade initiatives from developed nations, including the sharing of best practices and transfer of technologies.

Another relevant factor for IWRM is effective implementation, which was highlighted through the example of Pakistan, wherein the government is pursuing a two-pronged approach of supplying clean drinking water for all, and ensuring source water sustainability. The session recognized the growing threat to water availability from climate change and trans-boundary conflicts.

The session also stressed on the fact that to ensure sustainable water management, the issue of water needs to be handled functionally rather than politically. At the national level, focus needs to be on three areas: IWRM as part of national development strategy; optimizing technological usage for ef-

iciency improvement; and the involvement of all stakeholders in planning, implementation, and management. At the same time, since environmental problems are not region/country-specific, there is a need for technology transfer, sharing of best practices, and the development of effective practical decision-making tools. The European Union's IWRM initiatives under FDC (Foreign Development Cooperation) were discussed in this context. The initiatives recognize the principle of mutual solidarity and shared responsibility in finding



HE Mr Anil Kumar Bachoo



Ms Khempheng Pholsena

solutions to mutual problems. Projects undertaken under FDC in countries like Mongolia, Vietnam, and Sri Lanka have an integrated approach, focusing on field-work, technical assistance, transfer of new environmental technologies, and project implementation.

Another initiative that was discussed at much length in the session was the ADB's (Asian Development Bank) water-financing programme 2006–10, with an annual investment of over \$2 billion. The programme approaches the subject of water from two perspectives: as a resource and as a service. It recognizes IWRM as a tool to improve and maximize economic and social benefits in an equitable manner, without compromising on the sustainability of vital environmental systems. The programme aims to provide safe drinking water and improved sanitation to about 200 million people, extend better irrigation and drainage services to 40 million people, and reduce flood risks for about 100 million people. The enabling environment for this would comprise strong governments, leaderships, firm political will, and active stakeholder participation. In addition, public–private participation would aid in working out a model in which IWRM is treated as a service and is based on the cost recovery principle. ADB has also introduced new financing mechanisms and approaches that are highly relevant and responsive to changing needs, and focuses on achieving better development results.

To operationalize IWRM, there is a need for directives and frameworks within which various governments and other agencies can operate. For instance, the European Union water framework directive is a useful instrument for IWRM for river basin management. It also ensures the involvement of NGOs (non-governmental organizations) and various stakeholders in the planning process, and aims to improve the status for water resources by setting timetables and deadlines for action.

The session ended on an interesting note as speakers took individual pledges to reinforce their commitment to IWRM. Some of the pledges taken include the following.



HE Mr Malik Amin Aslam

The water availability issue also warrants effective transboundary cooperation.

HE Mr Malik Amin Aslam
Minister of State for
Environment, Pakistan



Prof. Saif-ud-Din Soz

- In Pakistan, there has been a 700% increase in the budget for the ministry of Environment. The money thus generated will be used to provide clean drinking water and access to sanitation for all



HE DASHO PALJOR J DORJI

- ADB's water-financing programme for 2006–10 envisages an annual investment of over \$2 billion for three key areas: rural and urban water supply and IWRM in river basins.
- In the Czech Republic, the challenge of making industrial operations more sustainable would be overcome in the near future. There was also a commitment towards providing technical assistance to the developing regions.
- In Mauritius, the initiative towards improving the efficiency of the water supply network, and recycling and reuse of water would be accelerated in the coming year.



HE Mr PETRE J KALAŠ

India-specific points

- To work towards cleaning the Yamuna, and organize activities around it. This needs to be done with renewed vigour.
- The project on interlinking of rivers has to be taken forward and for the same negotiations/consultations have to be made with various state governments. Regional (South Asia) cooperation also needs to be enhanced in this regard. This would be a gradual process but would need to be democratic and consultative.
- To arrest the alarming trend of ground water exploitation and explore means of conserving the natural water resources by applying the alternative options.

Concluding and valedictory session



Chairperson

Mr Chaitanya Kalbag, Editor-in-Chief, *Hindustan Times*, New Delhi, India

DSDS 2007 Summary

Dr R K Pachauri, Director-General, TERI, New Delhi, India

Address by the Chief Guest

Mr Jairam Ramesh, Hon'ble Minister of State, Ministry of Commerce and Industry, Government of India

Vote of thanks

Ms Annapurna Vancheswaran, Associate Director, Sustainable Development Outreach, TERI, New Delhi, India

The valedictory session commenced with Dr R K Pachauri, Director-General, TERI, summarizing proceedings of the three-day conference that covered wide-ranging subjects. He mentioned that adequate attention was paid to the growing threat of climate change and the looming water crisis.

Dr Pachauri also spoke about the detailed exercise on water that the Earth Institute and TERI would carry out in the coming year. Other highlights such as the launch of the India Council for Sustainable Development, updates on the extensive study Green India 2047, and the first meeting with the patrons of the World Sustainable Development Forum were also mentioned.

The Sustainable Development Leadership Award 2007 was presented to Governor Arnold Schwarzenegger of California for his leadership role in instituting emission standards in his home state. The award was received by Dr Alan C Lloyd, President, International Council on Clean Transportation, USA, who also delivered Governor Schwarzenegger's acceptance speech on his behalf. Mr Chaitanya Kalbag, Editor-in-Chief, *Hindustan Times*, reiterated the fact that Delhi was on the verge of desertification after having reversed centuries of ecological balance.

Delivering the valedictory address, Hon'ble Minister of State for Commerce and Industry, Mr Jairam Ramesh, stressed on the demographic dimension as an imperative in all future thinking on sustainable development. He also stressed that higher growth has to be

*If we have
superpower
ambitions and
vision, we must
take on
superpower
responsibilities.*

Mr Jairam Ramesh

Hon'ble Minister of State,
Ministry of Commerce and
Industry, Government of India



Mr Jairam Ramesh

The amount of attention we pay in the media (in India) to environmental concerns is not enough. The message should be gotten across in a far more direct and dramatic way to the audience.

Mr Chaitanya Kalbag
Editor-in-chief,
Hindustan Times

supported by targeted interventions in the social sector.

Addressing issues such as agriculture and energy, Mr Ramesh spoke in terms of the looming challenge of feeding a growing population. Food security, he said, is a central element in any theorization on sustainable development. Stressing on the need for R&D (research and development) in the public domain, Mr Ramesh raised the issue of the commercialization of energy and the future increase in the use of fossil fuel—an inevitable outcome of a high-growth strategy.

Bringing the three-day long deliberations to a close, Ms Annapurna Vancheswaran, Associate Director, TERI, thanked the distinguished speakers and sponsors. She also praised the efforts of colleagues in the TERI Press and the Programme Cell.



Mr Chaitanya Kalbag



Sustainable Development Leadership Award 2007

The Sustainable Development Leadership Award – instituted by TERI in 2005 – is given away every year in recognition of significant contribution towards the cause of sustainable development.

The third Sustainable Development Leadership Award was presented to Mr Arnold Schwarzenegger, Governor of California, USA. The award was received by Dr Alan C Lloyd, President, International Council on



Clean Transportation, USA, on behalf of Mr Schwarzenegger, and was presented by Mr Jairam Ramesh, Hon'ble Minister of State, Ministry of Commerce and Industry, Government of India.

Special events

Launch of the India Council for Sustainable Development

The ICSD (India Council for Sustainable Development) is a newly formed platform that seeks to perform an advisory function as a non-governmental entity and contribute analysis and guidance to usher in sustainable development in India. The ICSD was launched at the sidelines of DSDS 2007 by Dr Montek Singh Ahluwalia, Hon'ble Deputy Chairman of the Planning Commission, Government of India. Dr R K Pachauri, Director-General, TERI and the co-chair of the ICSD, introduced assembled delegates to the members of the body, and gave a broad overview of the ICSD. Prof. Jeffrey D Sachs, Director, The Earth Institute and co-chair of the ICSD, spoke about the need for India to plan for its environmental challenges in terms of decades, and not centuries, and expressed confidence that the ICSD would be able to make a contribution in this regard. For more information on the ICSD, please visit <<http://www.icsusdev.org>>.



Dr Montek Singh Ahluwalia

Technology transfer for climate change mitigation

Highlighting technology transfer as a key instrument in mitigating climate change, the special event focused on 'financing' and 'intellectual property rights' for the effectiveness of the same. On the financing front, various funding options were discussed, such as venture capitalist funds, risk guarantee funds, and also multilateral funds like the GEF (Global Environment Fund).

To implement new and promising technology, speakers highlighted the role of initiatives such as standards and labelling. These would encourage adoption and further refinement of clean technologies. At the other end of the technology-transfer spectrum, as cleaner technologies become widely available, inefficient technology would be gradually phased out, leading to a big step forward in mitigating climate change. Besides mechanisms that promote clean technology, there remains the need to cover the risks involved in bringing such technologies on line. Here, the risk guarantee fund was cited as a possible mechanism.

To address climate change challenges at the local level, speakers noted the pressing need to design products that are locally adaptable and easily absorbed by local communities.

Coming to knowledge creation and transfer, speakers concurred that knowledge transfer is imperative in the CDM if it is to facilitate technology transfer. Along with the 'know-how', it is also important to transfer the 'know-why', the cognitive processes that result in technical innovation.

Discussions on technology transfer for climate change mitigation



Energy and climate: a global perspective

Discussions on energy and climate: a global perspective



Held over two modules, the event was an occasion to discuss and share global as well as regional perspectives on the synergies between energy security and climate change mitigation. In the morning session, panellists focused on the global perspective, and discussions ranged the full spectrum of issues—from technology interventions to market opportunities. Speakers contended that while, in the long term, technological breakthroughs could play a significant role in climate change mitigation, the short-term focus would have to be on energy efficiency improvements.

The second module of the event focused on Asian perspectives on the issue. Initiatives being undertaken by industry and government to address the issue of climate change were discussed. The Asia-Pacific Partnership on clean development and climate came in for praise as a step in the right direction to accelerate the development and deployment of clean energy technologies in the region.

Youth conference Water management: waste water recycling



To seek innovative solutions for effective management of waste water, TERI, under the aegis of the Department of Science and Technology, Ministry of Science and Technology, Government of India, organized a one-day youth conference as a special event of DSDS 2007. UNESCO and Delhi Jal Board partnered TERI to organize the event. With the theme *Water management: waste water recycling*, the youth conference was structured around plenary sessions, expert sessions, and a poster session to discuss and debate the role of the youth in enabling effective

water management. Topics included in the sessions were waste water policy, waste water treatment, health impacts of waste water, and communication interventions to inform and educate society. The conference provided a unique platform for students, who participated and shared their views on issues related not just to waste water management but also to sustainable development as a whole. It also provided an excellent opportunity for youngsters to engage with development practitioners and broaden their perspective on sustainable development.

Sustainable buildings: developments and challenges

The session had Dr Binu Parthan, Deputy Director, REEEP (Renewable Energy and Energy Efficiency Partnership), Austria, giving an insight into the activities of REEEP. Mr Henry Derwent, Chairman of REEEP, delivered the inaugural address.

Participants deliberated over the implementation of ECBC (Energy Conservation Building Codes) and stressed on the need for integration of various frameworks. The discussion also dwelled at length on disruptive technologies associated with existing buildings, which comprise 97% of total buildings in India. The session also touched upon the sustainable building initiatives taken up by TERI, including TERI-GRIHA (green rating for buildings), which could be a model for ECBC 2006. It was also emphasized that training, awareness generation, and human resource development to carry out energy conservation activities were most imperative for a sustainable future.



Discussions on sustainable buildings

Focus group discussion on South-South cooperation for development of small and micro enterprises

The CEO Forum held on 21 January 2006 provided a background for the special event on South-South cooperation. The Forum had raised the issue of the abilities of the SMEs (small and micro enterprises) to address energy and environmental issues. The focused group discussions acknowledged these issues and the importance of external support for the development of SMEs, which is generally a protected sector, to achieve energy efficiency and meet environmental compliance while ensuring profits.

The participants shared their experiences in different interventions, which could act as useful guide towards South-South cooperation.

Examples put forth include activities under ITEC (Indian Technical and Economic Cooperation) of the Government of India, TERI-SDC (Swiss Agency for Development and Cooperation) work in South-East Asia in brick and biomass sectors, and successful experimentation with ethanol production from bio-sources in Brazil.



Discussions on development of South-South cooperation on SMEs

The group visualized multilateral partnerships comprising research institutions and training centres, while bringing on board other important stakeholders like financial institutions and local banks. It was also felt that the envisaged partnerships must match know-how, technologies, and skills with the local-level needs. Credibility, trust, and fostering a right image were considered important for building a conducive atmosphere for South-South cooperation.

TERI awards for Innovative Sustainable Development Initiative (2006/07)



The awards were given to the state of

- 1 Gujarat in recognition of the initiative on ***Water recharge through abandoned kabootari mines in Junagadh***
- 2 Uttarakhand in recognition of the initiative on ***Students' involvement in plantation activities***
- 3 Andaman and Nicobar Islands in recognition of the initiative on ***Vegetable cultivation by Nicobaree tribals in Car Nicobar***

Essay competition abstracts

An international essay competition inviting essays from across the world was organized for the first time during DSDS (Delhi Sustainable Development Summit). The focus group of this event was educational institutions, researchers, students, and NGOs (non-governmental organizations) working in the field of sustainable development. The aim of this competition was to provide an opportunity for the young participants to interact with the finest minds in the field of sustainable development. Equally important was to invite their thoughts and make their opinion available to a wider audience. The abstracts of four best essays selected are given below.

Wild Protein

Jeff Schrader

Wild protein sources, defined as both wild meat (sometimes referred to as bushmeat) and non-farmed fish, provide the majority of protein intake for much of the world, especially countries with the highest levels of extreme poverty. Because these food sources come only from natural ecosystems, they are especially susceptible to degradation or destruction. Therefore, when framing a discussion about the effectiveness of MDG (Millennium Development Goal) 7, the effectiveness of this goal in protecting wild protein sources while providing for increase in caloric consumption should be questioned. Billions of people in nearly every country around the world eat wild fish. According to the Millennium Ecosystem Assessment, more than 15% of the world's protein intake comes in the form of wild fish, and 56% of the world receives 20% or more of its protein from fish.

It is no surprise that the areas with the highest consumption of wild protein are also the areas with the highest rates of poverty, because the incentive to consume wild protein comes from two

major sources. First, low income levels are associated with a greater consumption of wild meat. Second, the history of wild protein consumption stretches back hundreds of thousands of years, and many cultures prefer the taste of wild meat to domesticated protein sources. This cultural preference explains much of the continuing consumption of wild meat in South-East Asia despite the recent economic success in the region.

The fundamental problems that arise with the over-consumption of limited wild protein sources include indirect causes of species loss such as pollution, invasive species, and climate change. Basic economic logic suggests, and specific data confirm, that the twin problems of wild meat and wild fish over-consumption cannot be solved without completely changing the way a society eats.

Meeting the Millennium Development Goals: exploring the natural resource dimensions

Kailesh Kushal Naidu, The University of the South Pacific, Fiji Islands

Natural resource management is an imperative application of the green principles set by humans. The degree of this application is dependent solely on human efforts—although viewed from universal down to small acreages, even to the minute. Our management actions must address the processes of natural resource management on an appropriate level and then be maintained for an extended time (sustainable development) with appropriate interim improvements for our socio-economic objectives to be realized. Therefore, it is obvious that natural resource management is entwined with human development. Human development encompasses issues that go beyond the accumulation of incomes and wealth. It is about creating an environment in which people

can realize their full potential and lead industrious lives relative to their needs.

People with lower incomes depend more directly on natural resources to meet their needs than those categorized in higher income brackets, the reason being that they do not have many options. In the Pacific, strong links exist between eradication of poverty and the importance of agriculture for sustainable development. These links are justified mainly on the basis of the large rural population. Due to heavy reliance on natural resources for both household and commercial purposes, it becomes very clear that appropriate natural resource management may be a vehicle for poverty alleviation, wealth generation, and employment creation.

Further, it is principally the poor who do not have access to appropriate water and sanitation facilities. The situation is widespread in rural areas and in squatter settlements in the suburban localities. This is because people are not able to afford clean water and proper sanitation amenities. Moreover, squatter settlements are highly vulnerable to diseases and water pollution due to the closeness of the houses. Human development is also about human freedom. In order to achieve goals, it is vital that freedom of all forms prevails. People, irrespective of gender, race, and creed should have the right to make decisions that affect their lives. Hence, human development fosters respect for each other and in doing so enforces control.

Aligning determinants to evolve social policies in a developing economy: Integration of natural resource economics in the MDG framework

Nalinee Giri, B A (Economics), second year, Stella Maris College, University of Madras, Chennai

MDGs (Millennium Development Goals) integrate natural resource economy with human develop-

mental indices in social matrices to incorporate sustainable consumption of energy and resources, protection of environment and habitat, alleviation of poverty and diseases, and conservation of ecology and biodiversity on the treatise of equality and empowerment among women, stakeholders and tribal communities for a global partnership on sustainable development. They derive from the deep-rooted philosophies of natural resource economy (Law of Conservation), social indices (Malthusian Exponent), and natural justice (Darwinian Theory). The whole debate on sustainable environmental performances, conservation of natural resources and socio-economic developmental issues derives the emergence of societal and governmental responsibilities for alleviation of poverty, universalization of primary education, improving life expectancy and health of masses, empowering communities, stakeholders and women on equality and justice.

The essay derives a sustainable MDGs vision in the socio-economic, ethical, and environmental context, projecting goals, indicators and targets, leading to evolve developmental indices to meet social, economic and environmental challenges of 21st century within the framework of UNDP (United Nations' Development Programme) to minimize environmental damages at zero level, conservation of natural resources at highest level for the economic progression and growth of future generations, and above that evolving community leadership through education and empowerment on elevated social justice, under the treatise of sustainable development. The theme of the essay necessitates evolving long-term policy approaches to address demographic, environmental and sustainable socio-economic developmental issues, particularly among developing nations, in terms of the defined MDGs, with a vision and mission to build a better world in 21st century through global partnership.

The essay concludes with a socio-economic model of sustainable environment and natural

resource economy, building long-term global partnership on improving human developmental indices, giving a clarion call to civil society for promoting education and gender equality, empowering communities, reducing poverty, eliminating dreadful diseases and aiming at combating child mortality.

MDGs: exploring the natural resource dimensions—the primacy of natural resources

Oluwatosin Omole, Nigeria

The MDGs (Millennium Development Goals) embody a global partnership that grew from the commitments and targets established at the world summits of the 1990s culminating in the Millennium Declaration in September 2000. Responding to the world's main developmental challenges and to the calls of civil society, the MDGs promote poverty reduction, education, maternal health, gender equality, and aim at combating child mortality, AIDS and other diseases. Set for the year 2015, they are goals that can be achieved if all actors work together and do their part. Poor countries have pledged to govern better, build their capacity and invest in their

people through health care and education. Rich countries have pledged to support them, through aid, debt relief, and fairer trade.

Achieving the millennium development goals, especially that of halving poverty rates by the year 2015, depends heavily on progress in natural resource protection. Over 90% of the 1.2 billion people living in poverty depend on forests as the basis of their survival. Here they, find not only food, but also medicinal plants, oils and other resources. Worldwide, over two billion people rely on wood and charcoal as only available source of energy, mostly using it for their primary domestic energy needs.

In my country Nigeria, crude oil is the most important export commodity providing about 95% her exports. However, destructive use, gas flaring, corruption and inappropriate laws have combined to prevent the local population from receiving a fair share of the revenues. In a phenomenon referred to as the paradox of poverty in the midst of plenty, the Niger Delta region (where oil is produced) is the least developed part of the country. Basic social amenities are lacking and the environmental degradation in this area is monumental. Many of the oil companies act as if they are only interested in short-term profit.

Quotes from sponsors



Ms Moumita Sen Sarma
Vice-President and Head,
Microfinance and Sustainable
Development, India

“DSDS 2007 was again a great experience for us, both as sponsors as well as participants. We have to congratulate TERI for bringing on stage, at one place, practitioners of issues that confront especially people in developing nations such as India. ABN-AMRO’s association with TERI started with DSDS 2006. As an organization that was amongst the founding members of Equator Principles, ABN-AMRO has supported organizations with business and ethical integrity. We are proud to be associated with TERI and DSDS.”



Dr Ashok Jhawar
Country Head

“In 2007, DSDS once again brought together an outstanding group of thinkers. The theme, the natural resource dimension to building sustainable routes to development, is a critical one and key issues were debated. We have been proud to be associated with the event which plays an important role in seeking solutions to the challenges that many developing nations face today.”



Rt Hon. David Miliband MP
Secretary of State, UK
Department for Environment,
Food and Rural Affairs

“The world has no option but to tackle sustainable development concerns such as climate change and the over exploitation of natural resources. The DSDS brought together a remarkable group of people from across the international community, representing businesses, NGOs, and governments, to face up to these challenges. Together we shared a sense of the urgency and of the magnitude of the effort needed, and together I hope we can find the courage and inspiration to make a sustainable future for all a reality.”



gtz



Rolf Suelzer
Country Director

“Since 2006 we have seen DSDS grow and mature annually not only in terms of participation from all corners of the world but also in terms of solidarity towards the cause of sustainable development. DSDS is very well positioned for discussing environmental concerns, which directly and indirectly affect many other aspects. We are glad that through the DSDS, German Development Cooperation and GTZ can reinforce their commitment to shaping sustainable development at a global platform.”



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC



François E Binder
Counsellor Development &
Country Director

“At the time when the world is faced with escalating environmental threats and challenges, the DSDS has been a catalyst in the global efforts to save the natural environment. We are honoured and encouraged by the participation and visionary contribution of great leaders at the summit. There is a growing appreciation of the need for a collaborative approach to take on the sustainability path and TERI with its global forum like DSDS has taken the lead in contributing towards tackling the obstacles faced by the developing communities.”



Siddhartha Behura
Special Secretary(E&F),
Ministry of Environment and
Forests, Government of India

“The MoEF and TERI have been working together in different areas for a long time and share a common responsibility to promote and conserve our environment and natural resources and also encourage to develop solutions that respond to different challenges. We are happy to have associated with DSDS since the beginning and hope to continue this partnership in future towards fulfilling our common obligations.”



HE Mr Jon Westborg
Ambassador, Norwegian

“We are pleased to be a Partner in DSDS (for the past five years), which has consistently drawn together local, regional, and global individuals and institutions that work on the issue of sustainable development. DSDS has tremendous potential to transform the vibrant academic deliberations that place into concerted practical action, contributing to the achievement of MDGs. We wish DSDS continued success in the coming years too.”



R S Sharma
Chairman and MD and
Director (Finance), Oil and
Natural Gas Corporation Ltd

“DSDS, since its inception, has focused on bringing to the fore the needs of the society for sustainable development and making genuine efforts for probable solutions through dialogue with global leading authorities. It is our proud privilege to be associated with DSDS and the changes that it strives to achieve. ONGC also has been supporting the cause of sustainable development of the economy. Towards this end we have been contributing to the DSDS platform. We find the mission of DSDS in line with our corporate objective of social responsibility.”



HE Mr Pieter van Geel
State Secretary, Ministry of
Housing, Spatial Planning and
the Environment,
The Netherlands

“We are a regular partner at DSDS events and have played an active role in participation both through speakers from The Netherlands on the subject of sustainable development and attendance from our country. DSDS has been playing an important role in dissemination information available in different parts of the world and TERI's own knowledge base. The participants and speakers at DSDS have a great opportunity of exchanging ideas and practices in different areas of sustainable development. We are happy to be part of this important global conference and look forward to its continued success.”



NOKIA



Veli Sundbäck
Executive Vice President,
Nokia

“Taking responsibility for sustainability is a prerequisite for long-term success of companies. We would like to congratulate TERI for its firm commitment in ensuring a balance of conserving and preserving natural resources by organizing global events like DSDS.”



Sumit Banerjee
Managing Director,
ACC Ltd

“We are proud to have been associated with DSDS 2007. Our association with TERI and this event is not new. We were impressed by the manner in which DSDS has been able to assemble an array of opinion leaders from across the globe comprising heads of state, planners, environmentalists, and industry to mobilize world opinion on a wide range of sustainability issues. In particular, we were most satisfied with the CEO forum convened during this event by the Cement Sustainability Initiative of the World Business Council for Sustainable Development which offered us the valuable opportunity to explore ways to further improve the cement industry's climate and energy impacts. We congratulate the organizers, speakers, and delegates and look forward with enthusiasm for a follow up on the deliberations.”



World Business Council for
Sustainable Development



Björn Stigson
President, WBCSD, Geneva

“WBCSD's mission is to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues. Therefore, the WBCSD has been strongly engaged in the Delhi Sustainable Development Summit since its inception in 2001. We consider this event as one of the most important platforms in the developing world to explore the strategic partnerships required to address pressing sustainability challenges in the region.”

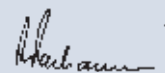
DSDS 2008

Sustainable development and climate change

7–9 February 2008 • New Delhi

The next DSDS (Delhi Sustainable Development), an event which has clearly emerged as the most significant annual gathering dealing with critical issues of sustainable development globally will be held during 7–9 February 2008. The 2008 summit assumes unusual importance, because it would be dealing with the theme of 'Sustainable Development and Climate Change.' Given the enormous increase in awareness worldwide on climate change, particularly in the wake of the three Working Group reports of the IPCC (Intergovernmental Panel on Climate Change) being released, the February 2008 event is scheduled to draw very high level of participation. Climate change is the result of human society having pursued a path of development which is not sustainable, and the impacts of climate change in turn make it difficult for societies across the globe being able to implement measures of development which are sustainable. It is necessary, therefore, for decision makers and leaders of public opinion to understand this two-way linkage. What is of particular concern is the fact that some of the poorest societies in the world, which are already facing multiple stresses related to water scarcity, unsustainable agriculture, poor health conditions and lack of capacity to deal with natural disasters, are now also facing additional stresses on account of climate change. The ability of these societies to pursue sustainable development, therefore, remains impaired to an increasing extent.

The 2008 DSDS has another significance which is related to the process of negotiations being undertaken as part of the Kyoto Protocol and the UNFCCC (United Nations Framework Convention on Climate Change). The 13th Conference of the Parties to the Convention scheduled to be held in Bali in December 2007 will provide a platform for discussions and mapping out the path of future negotiations and timely agreement by which the world can tackle the challenge of climate change. Hence, it would not be an exaggeration to state that the 2008 summit would be an extremely crucial step in the global process, particularly since several heads of states, heads of government, leaders of the corporate sector and civil society as well as distinguished academics and researchers would be present at DSDS 2008 to shape the output of the 2008 summit.



R K Pachauri
Director-General, TERI



World Sustainable Development Forum

The success of TERI's annually held flagship event, the DSDS (Delhi Sustainable Development Summit, www.teriin.org/dsds) inspired the establishment of the WSDF (World Sustainable Development Forum) in 2005. This forum was formed as a platform for creating awareness in different parts of the world on the sustainable development issues that arose at each DSDS and functions to carry forward the baton from each summit.

WSDF has the objective of bringing together the finest minds and leading thinkers of the world to focus on the global challenge of sustainable development. It has been envisaged as a conduit for identifying, analysing, and disseminating policy interventions to enhance human well-being in the present, and create conditions for a sustainable future. WSDF provides an arena for knowledge accumulation and policy discourse aimed at tracking and influencing the adoption of MDGs (Millennium Development Goals), while providing for environmental sustainability and global developmental cooperation to expedite the alleviation of human suffering and environmental damage.

In this endeavor, the forum is supported by highly distinguished patrons who are global leaders in government, industry, and academia, all of whom are opinion-makers in their respective disciplines.

List of WSDF patrons

- HE Mr Kjell Magne Bondevik, former Prime Minister of Norway
- HE Mr Maumoon Abdul Gayoom, President, Republic of Maldives
- HE Mr Olafur Ragnar Grimsson, President of Iceland
- HE Ms Tarja Halonen, President of Finland
- Mr Jeffrey Immelt, Chairman and CEO, General Electric Company, USA
- Mr Kamal Nath, Hon'ble Minister for Commerce and Industry, Government of India
- Mr A Raja, former Minister for Environment and Forests, Government of India
- Dr Jose Antonio Ocampo, Under Secretary General for Economic and Social Affairs, United Nations
- Lord John Browne, Group Chief Executive, BP
- Prof Jeffrey D Sachs, Director, The Earth Institute; and Special Advisor to the Secretary-General of the United Nations, Washington, DC
- Late Dr Shoichiro Toyoda, Honorary Chairman/Member of the Board, Toyota Motor Corporation, Japan

The first meeting of the WSDF patrons was organized on the morning of the DSDS inaugural ceremony, on 22 January 2007, to stimulate discussions and arrive at a plan of activities to be undertaken under the forum. On this occasion, the WSDF website, www.wsdforum.org, was also launched by HE Ms Tarja Halonen, President of Finland.

A steering committee comprising a group of experts was formed to guide the activities of the forum. The members of this committee are as follows.

- Ms Lorraine Bolsinger, Corporate Vice President, Ecomagination, GE
- Dr Adnan A Shihab-Eldin, former acting Secretary General and Director of Research at OPEC as well as Advisor to Kuwait Petroleum Corporation, Austria
- Mr Warren Evans, Director of Environment, The World Bank, USA
- Dr Prodipto Ghosh, former Secretary, Ministry of Environment and Forests, Government of India
- Ms Frannie Leautier, Vice President, World Bank Institute, Washington, DC
- Dr Bindu N Lohani, Director-General, Regional and Sustainable Development Department, ADB (Asian Development Bank), Manila, Philippines
- Dr Ligia Noronha, Director, Resources and Global Security Division, TERI
- Dr Pal Prestrud, Director, Center for International Climate and Environmental Research, Oslo, Norway
- Dr Leena Srivastava, Executive Director, TERI
- Dr Kazuhiko Takeuchi, Director, International Affairs Planning Office and Professor, Graduate School of Agricultural and Life Sciences, The University of Tokyo
- Mr Georges Valentis, Managing Director, The Institut Veolia Environnement, France
- Prof. Wei Zhihong, Former Director, Global Climate Change Institute, Tsinghua University

Under the auspices of WSDF and the Ministry of Environment and Sustainable Development of Tunisia, during 18–20 November 2007, Tunis, will host a conference titled 'Mainstreaming Climate Change Development Concerns in African and the Mediterranean'. The title is based on the eighth edition of the DSDS's chosen theme of 'Sustainable Development and Climate Change'.

The 21st century has been dubbed the century of the environment. Therefore, to truly maximize the available opportunities and a forum of this caliber, we invite expressions of interest for WSDF endeavours.

For further details, contact

The WSDF Secretariat, TERI, Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi – 110 003

Tel. +91 11 2468 2100 or 4150 4900 • Fax +91 11 2468 2144 or 2468 2145

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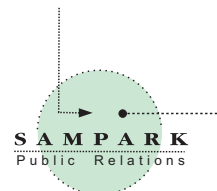
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India

Tel. 2468 2100 or 4150 4900
Fax 2468 2144 or 2468 2145
India +91 • Delhi (0) 11
E-mail teripress@teri.res.in
Web www.teriin.org