



SUMMARY OF INTERNATIONAL FORUM ON SOILS, SOCIETY AND GLOBAL CHANGE: 31 AUGUST - 4 SEPTEMBER 2007

On the occasion of its centenary, the Soil Conservation Service of Iceland, held the International Forum on Soils, Society and Global Change in Selfoss, Iceland, from 31 August - 4 September 2007. Held in partnership with three Icelandic institutions, and 18 international agencies, organizations and universities, the forum brought together approximately 130 participants, including scientists, policy makers, land users and private sector representatives. The forum, which had as its patron Iceland's President, Ólafur Ragnar Grímsson, aimed to explore the synergistic roles of soil conservation and vegetation restoration in meeting local, regional and global environmental and social challenges. It also aimed to facilitate the transfer of knowledge and ideas between scientists, policy makers, land users and private sector representatives.

The meeting consisted of presentations, plenary and working group discussions. Plenary sessions focused on four themes, which then fed into working group discussions: Setting the Stage: Soils, Society and Global Change; Healthy Soils: Supporting Food Security, Water Provision, Poverty Reduction and Biodiversity; Mitigating Climate Change through Restoration of Degraded Land; and Creating an Enabling Environment. The five working groups addressed: soil stewardship and landcare; soil management and multilateral environmental agreements; carbon sequestration, carbon markets and land restoration; knowledge management; and capacity building for legislative and policy development in soils management.

The meeting resulted in two related sets of outcomes. First, each of the working groups identified key issues and related recommendations, together with a set of actions and *modus operandi* for implementing their recommendations. Additionally, forum participants accepted a Programme of Action summarizing key aspects of the working group outcomes. It is also anticipated that a book of conference proceedings, incorporating working group reports and presenters' papers, will be released in late 2007 or early 2008.

A BRIEF HISTORY OF EFFORTS TO ADDRESS LAND DEGRADATION AND RELATED CHALLENGES

LINKS BETWEEN LAND DEGRADATION AND OTHER ENVIRONMENTAL CHALLENGES: The linkages between land degradation, in the form of soil erosion and desertification, and other global environmental problems

are significant. The Millennium Ecosystem Assessment ranked land degradation as one of the world's greatest environmental challenges, affecting climate and biological diversity, reducing environmental security, destabilizing societies, endangering food security and increasing poverty.

Land degradation is directly linked to global climate change in several ways. Land degradation reduces the carbon sequestration capacity of land, particularly through soil erosion and loss of vegetation cover. Loss of vegetation in turn creates a range of adverse impacts. At the same time, climate change exacerbates land degradation, primarily through changes in precipitation and evapo-transpiration patterns, coupled with increases in the frequency and extremity of certain meteorological events. Increases in floods, droughts and fires are a consequence of a changing climate and deteriorating vegetation, and these in turn accelerate land degradation processes.

Additionally, loss of soil and vegetation, or changes in soil nutrients and moisture, can lead to a loss of biodiversity. This can reduce production, accelerate land degradation and constrain our capacity for responding to change.

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UNCCD: The UN Convention to Combat Desertification (UNCCD) is the centerpiece of the international community's efforts to combat desertification and land degradation. Adopted in June 1994, it entered into force in December 1996 and currently has 191 parties. The UNCCD recognizes the physical, biological and socioeconomic aspects of desertification, the importance of redirecting technology transfer so that it is demand-driven, and the involvement of local communities in combating desertification and land degradation. The core of the UNCCD is the development of national, subregional and regional action programmes by national governments, in cooperation with donors, local communities and non-government organizations.

UNFCCC AND KYOTO PROTOCOL: An international political response to climate change first took shape in 1992 with the adoption of the UN Framework Convention on Climate Change (UNFCCC). The UNFCCC sets out a framework for action aimed at stabilizing atmospheric concentrations of greenhouse gases in order to avoid "dangerous anthropogenic interference" with the climate system. The UNFCCC entered into force in March 1994 and now has 191 parties.

At the third Conference of the Parties (COP 3) in December 1997, delegates adopted the Kyoto Protocol to the UNFCCC, which commits developed countries and countries with economies in transition (Annex I parties) to achieve quantified emissions reduction targets. These countries agreed to reduce their overall emissions of six greenhouse gases by an average of 5.2% below 1990 levels between 2008 and 2012, with specific targets varying from country to country. The Protocol also establishes three flexible mechanisms to assist Annex I parties in meeting their national targets cost-effectively: an emissions trading system; joint implementation of emissions-reduction projects between Annex I parties; and the Clean Development Mechanism (CDM), which allows for emissions reduction projects to be implemented in non-Annex I (developing) parties. The Kyoto Protocol entered into force in February 2005 and now has 175 parties.

CBD: The Convention on Biological Diversity (CBD), negotiated under the auspices of the UN Environment Programme (UNEP), was adopted in May 1992, and entered into force in December 1993. There are currently 190 parties to the Convention, which aims to promote the conservation of biodiversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the use of genetic resources.

A Strategic Plan for the CBD was adopted at COP 6, held in April 2002, in The Hague, the Netherlands, by which parties committed to more effective and coherent implementation of the Convention's three objectives and to achieving a significant reduction in the current rate of biodiversity loss by 2010. The 2010 target is supported by more specific goals and objectives, which address global leadership and cooperation, national implementation, capacity building and stakeholder engagement, while the Strategic Plan is being implemented through the CBD work programmes, National Biodiversity Strategies and Action Plans, and other activities.

LAND DEGRADATION AND RESPONSES IN

ICELAND: Vast areas of Iceland have undergone extensive vegetation degradation and soil erosion as a result of

deforestation and overgrazing. As much as half of Iceland's vegetative cover may have been depleted since early human settlement. A national survey completed in 1997 revealed that serious soil erosion characterizes about 40% of the country's land. Such soil erosion involves the removal of rich Andosol soils by water and wind, as well as sand encroachment. The effects of this land degradation include loss of shelter from strong winds, increased snowdrift and more limited food production capabilities.

The Government of Iceland and the Icelandic community have worked together for some time to develop successful ecosystem restoration schemes for vast areas of severely degraded land, and to protect existing ecosystems and unique landscapes. A key channel for such efforts is the Soil Conservation Service (SCS) of Iceland. Established in 1907, it is one of the oldest soil conservation organizations in the world. It works to control erosion and to reclaim denuded or damaged areas of land. Much of the SCS's current focus is on giving guidance to all those involved in landcare. It does this by providing technical assistance to land managers, undertaking land reclamation and research activities, and growing, harvesting and distributing seeds for conservation plantings nationally.

MEETING REPORT

The International Forum on Soils, Society and Global Change addressed four main themes: Setting the Stage: Soils, Society and Global Change; Healthy Soils: Supporting Food Security, Water Provision, Poverty Reduction and Biodiversity; Mitigating Climate Change through Restoration of Degraded Land; and Creating an Enabling Environment. These themes were addressed through expert presentations and plenary discussions on Friday, 31 August, Saturday, 1 September and Monday, 3 September, and through working group discussions held from Saturday through Monday. On Monday afternoon, participants discussed and accepted the working group outcomes in plenary, before agreeing to a brief Programme of Action that summarized key aspects of the working group outcomes. The forum's closing session, which was held to celebrate the centenary of the SCS, took place on Tuesday, 4 September. The forum also involved two field trips and a side event on the Icelandic Land Restoration Pilot Training Programme.

This report summarizes the presentations and discussions that took place throughout the forum, along with the meeting outcomes. It also provides a brief summary of the two field trips.

OPENING SESSION

Chair of the opening session, Sveinn Runólfsson, Director, SCS, stressed the importance of sharing ideas and experiences in seeking to address the world's environmental challenges. He thanked the international community for its sustained interest in Iceland's soil conservation efforts and the contribution of various bodies and institutes to the forum itself. He also thanked the Icelandic Ministries of Fisheries and Agriculture, and of Foreign Affairs, for their support for the forum.

In providing the forum's opening address, Einar Gudfinnsson, Minister of Fisheries and Agriculture, Iceland, reflected on Iceland's history, its efforts over the past century

in the arenas of soil conservation and forestry, and its tradition of seeking specialist knowledge and education from other countries. He noted that Iceland's experiences in land restoration can be fruitfully shared with developing countries through new initiatives,



L-R: Sveinn Runolfsson, SCS; Einars Guðfinnsson, Minister of Fisheries and Agriculture, Iceland; former president of Iceland, Vigdis Finnbogadóttir; and Andrés Arnalds, SCS, during the forum's opening session

along similar lines to the training programmes used to share its fisheries practices and use of geothermal energy.

Parviz Koohafkan, Food and Agriculture Organization (FAO), noted that significant progress has been made in global food production and economic growth, but that various problems persist, such as food insecurity, environmental degradation and hunger. He said that these factors, together with desertification, have adversely affected the rural poor in particular, and that meeting the Millennium Development Goals (MDGs) thus remains a formidable challenge. He underscored the advantages of conservation agriculture and local farmer participation, together with the importance of scientific knowledge, sound policies and political will.

Goodspeed Kopolo, UNCCD, called attention to an ancient Amazonian soil management technique, namely burying charcoal in soil to increase its productivity. He noted the advantages of this technique, including increased water retention and nutrient capacity, reduction in soil erosion and climate change mitigation. He noted the lack of a global soil and land protection strategy, despite the long-term recognition of such a need, and related adverse effects on the poor. He stressed the significant cost implications of land rehabilitation and the need for a concerted effort to address land and soil degradation, to which he said the UNCCD must be central and to which the forum would contribute.

Jaime Webbe, CBD Secretariat, said that ecosystem degradation and related biodiversity loss is often most severe when soil, the basis of ecosystems, is degraded. She noted the contribution of soil biodiversity to ecosystem services and the value of soil as a significant terrestrial carbon store. She outlined key soil related events in the history of the CBD process, and noted that celebrations surrounding the International Day for Biodiversity, to be held on 22 May 2008, will focus on agricultural biodiversity.

Gemma Shepherd, UNEP, discussed pressures on soil resources, and different types of land degradation and soil erosion problems faced throughout the world and their related impacts. She outlined the benefits of good soil management, and noted that one third of the world's terrestrial carbon is contained in peat alone. After providing an overview of UNEP's engagement with soil management activities over the past 30 years, she emphasized the importance of broad participation in addressing land degradation issues.

Luca Montanarella, Joint Research Centre, European Commission, reflected on recent efforts to address land degradation, including: the finalization of the EU Thematic

Strategy for Soil Protection and the current development of a related legislative framework; and the increasing prioritization of climate change adaptation activities. He also noted that the SCS has long provided an example of how to effectively implement soil protection strategies.

Referring to soil as one of the world's most precious resources, the Chair of the forum's Organizing Committee, Andrés Arnalds, SCS, introduced the forum's theme, "Don't forget the Soil!" He explained that the forum aimed to elaborate on the synergistic roles of soil conservation and vegetation restoration in meeting environmental and social challenges, and to highlight soil as the vital common denominator in achieving global, regional and local goals relating to climate change, biodiversity, water supply, food security, poverty reduction and peace. He outlined the four main themes of the forum, together with the intended focus of the forum's working groups. Noting that no single international agreement comprehensively addresses all soil conservation and land degradation issues, he urged the building of bridges between existing multilateral environmental agreements (MEA)s.



Andrés Arnalds, Soil Conservation Service (SCS)

SESSION 1 - SETTING THE STAGE: SOILS, SOCIETY AND GLOBAL CHANGE

The first of the forum's main themes, "Setting the Stage: Soils, Society and Global Change," took place on Monday. The session was chaired by Roger Crofts, Environment and Management Advisor, Scotland, who noted the centrality of landcare to Icelandic culture, and urged participants to share their collective thoughts and ideas on soils, society and global change.

THE GLOBAL PERSPECTIVE: Presenting on soils and the living earth, Ólafur Arnalds, Agricultural University of Iceland, emphasized that soil is a key component of the biosphere and a living and dynamic resource, and plays a fundamental role in biodiversity and the carbon cycle. He said that in understanding land degradation, it is important to differentiate between land degradation processes, land use that causes degradation and the underlying drivers of land use. He discussed methods for assessing degradation and outlined difficulties in obtaining a global view of land degradation. Providing a summary of existing information on global land degradation, he noted differences in estimates and the inadequacy of degradation data. He concluded that land degradation poses real threats, and that an increasing number of people are dependent on the well-being of soil resources. He emphasized the need for: developing new paradigms in land degradation assessment methods; moving beyond the UNCCD's definitions of desertification and degradation; rethinking the current focus on degradation in drylands; and increasing the emphasis on global soil protection and all aspects of land degradation.

Uriel Safriel, Hebrew University of Jerusalem, Israel, began by noting that the definition of “desertification” remains contested, and that this sometimes has confounding political effects. He said that even though the spatial occurrence of desertification is unclear, and may be limited to certain areas, desertification can nevertheless have global effects. He also explained that in addition to definitional problems, it is difficult to separate



Uriel Safriel, Hebrew University of Jerusalem, Israel

human- from naturally-induced causes of degradation. He outlined the findings of a prehistoric-geomorphologic study in the Negev Desert, Israel, which shows that desertification in that region over the last century was driven by natural not anthropogenic climate change. He stressed the interlinkages between land degradation, climate change, biodiversity loss and poverty, but also noted that global change in drylands can create new economic opportunities as well as risks.

Focusing on social and equity issues, Maryam Niamir-Fuller, United Nations Development Programme (UNDP), stressed that combating land degradation must involve appropriate ethics, incentives and policies. Noting that the majority of countries are not presently achieving their poverty and hunger eradication goals, she highlighted the social and economic drivers of poor land management and of the loss of ecosystem services, including: global population growth; North-South income inequalities; energy use and consumerism; and globalization and migration. She said that these problems are augmented by poor governance and inadequate public funding, and a lack of capacity in developing countries. She discussed the growing trend of marketing environmental services as commodities and related questions regarding the ethical use of carbon markets. She concluded by stressing the recognized need for linkages between the UNFCCC, UNCCD and the CBD (Rio Conventions), and the challenge of scaling up the policies and mechanisms needed to support ethics and equity.

Discussion: Participants discussed the ambiguity and inadequacy of the existing definition of “desertification,” with some noting that ambiguity can generate a lack of credibility in relation to scientific findings of desertification. One participant suggested that the forum produce a statement regarding the use of statistics in defining desertification, while another proposed compiling accurate local statistics before integrating data on a broader scale. Participants also addressed the complexities of “cause and effect” in desertification processes and how to adequately explain these, and the coordination of mechanisms and efforts designed to address land degradation.

REGIONAL AND LOCAL PERSPECTIVES: Elena María Abraham, Argentine Institute for Arid Lands Research (IADIZA), Argentina, presented examples from Latin America and Argentina of desertification and its related effects, which she said could likely be extrapolated to drylands elsewhere.

She explained that the major problem faced in the Andes Region is uncertainty about the medium- to long- term impacts of climate variability on severely desertified ecosystems. She stressed that addressing these complex problems requires the application of an integrated assessment of desertification, including participative planning and the incorporation of local communities. She concluded by underscoring the need to scale up such assessments, to determine ways to link local assessments to those at the national, regional and global levels, and to discuss and agree on what models of assessment to employ.

Sem Shikongo, Ministry of Environment and Tourism, Namibia, provided a brief history of the problems, including various environmental problems, faced by Africa fifty years ago and today. He said poor soil quality is a major limiting factor for agriculture in some parts of the continent. Based on Namibia’s experience, he suggested that agriculture is a “poverty trap” in drylands and that farming in such areas is unlikely to provide high returns. He said that in Namibia, tourism and wildlife-based activities are considerably more economically viable than farming, and that securing the right policy environment is thus important. He also indicated that creating strong incentives for the wise and sustainable use of natural resources requires placing high value on such resources.

Andrés Arnalds, SCS, explained how human settlement disrupted Iceland’s delicate natural balance, causing a “vicious cycle” of unsustainable land management. He discussed the root causes of Iceland’s land degradation, namely, overgrazing, over-exploitation of vegetation and land, deforestation and agriculture. After outlining the various consequences of this degradation, he discussed the history of the SCS’s approach to landcare, noting the evolution from a top-down style of land management to a participatory approach involving ecosystem management. Describing Iceland as a “living laboratory,” he discussed Iceland’s cooperation with other countries, including a three-year pilot training programme in land restoration, currently being supported by the Icelandic Ministry of Foreign Affairs, that brings individuals from developing countries to Iceland. He concluded that the main lessons from the SCS’s century of work include the synergistic roles of soil conservation and land restoration, and the importance of participatory approaches to land management.

Discussion: One participant questioned the possibility of increasing food production while simultaneously reducing land degradation. Pointing to improvements in multi-functional agriculture, another responded that it should be possible and Sem Shikongo stressed the central role of indigenous species in meeting this challenge. Another question concerned whether globalization is the cause of land degradation, and Sem Shikongo clarified that the globalization of food stuffs, plant species and farming techniques has fostered a loss of traditional knowledge about food production and land management in Namibia. He also discussed Namibia’s community-based natural resource management (NRM) programme. Other participants stressed that desertification is a problem for society as a whole, not just for those that work the land, and highlighted the diversity of the global ecology and the need to use land according to its ecological capability.



Presenters from the session on "Healthy Soils: Supporting Food Security, Water Provision, Poverty Reduction and Biodiversity"

SESSION 2 - HEALTHY SOILS: SUPPORTING FOOD SECURITY, WATER PROVISION, POVERTY REDUCTION AND BIODIVERSITY

Introducing the second session, held on Saturday morning, session Chair Magnús Jóhannesson, Ministry for the Environment, Iceland, highlighted the importance of healthy soils for ecosystems, including for human well-being.

Parvis Koohafkan, FAO, drew on FAO findings in reflecting on looming global challenges to food and agricultural production, including reductions in soil potential. He indicated that growth in agricultural production requires sustainable land use intensification, environmentally friendly technologies and the maximization of resource usage. Suggesting various options for assisting the world's poorest people, he stressed the need to increase investment in the agricultural sector, including through investment in natural, social, human, physical and financial capital. He noted that there is considerable knowledge of social processes and technologies for local level sustainable agriculture, but that social and institutional conditions for applying and extending these processes and technologies are less well known. He touched on key antecedents to success in ensuring local-level sustainable agriculture, such as sectoral integration, and emphasized the promise of planned, sustainable land use intensification.

Addressing land degradation and the sustainable management of water resources, Zafar Adeel, United Nations University International Network on Water, Environment and Health (UNU-INWEH), outlined the magnitude of desertification and the global water crisis, noting their impacts on poverty and human well-being. He noted that water scarcity has been influenced by policy failures, and has strong correlations with infant mortality. He described the destruction of the inland Aral Sea and its impact on the livelihoods of thousands of people. He said that appropriate responses to ensure sustainability require integrating assessments of water resources and land use patterns with policy formulation, and defining broader management approaches. He provided positive examples of biosphere reserves in Egypt and Pakistan, and concluded by calling for a paradigm shift in the development community toward better integrating their activities.

Presenting on the role of ecological restoration and sustainable land management (SLM) in protecting biodiversity, Ása Aradóttir, Agricultural University of Iceland, discussed the key attributes of biodiversity and the common features of biodiversity loss. She then explained that SLM that preserves ecosystem functions plays an important role in conserving biodiversity, but that the minimization of non-sustainable land use may not be sufficient to reverse degradation. Noting that

restoration might therefore also be necessary, she concluded that: restoration strategies leading to an increase in exotic or weedy plant species may reduce important aspects of biodiversity; the restoration of many aspects of biodiversity is possible, even under difficult conditions; the outcome of restoration efforts depends on the context and methods used; and restoration programmes should be designed with multiple goals in mind, including restoring native biodiversity, increasing resource retention, restoring ecosystem services for local communities, and sequestering carbon.

Ian Hannam, University of New England, Australia, presented on building capacity for the development of national legal and policy frameworks for soil conservation and protection. He explained that lessons can be learned from the experiences of various developing countries, including China, Thailand, Brazil and the countries of Central Asia, in reforming law and policy. He outlined the efforts of the World Conservation Union's (IUCN) Commission on Environmental Law and others to identify the relevance of international law to soil management, outstanding gaps in international law, and guidelines for the use of MEAs in developing national soil laws. He said that while a sound body of materials on legal frameworks for soil management now exists, more attention must be paid to implementation. He also noted the need for continuing cooperation between the environmental law and scientific communities, which he said has been sound to date.

Michael Stocking, University of East Anglia, UK, proposed a systems approach to land degradation and SLM in order to avoid the reduction of issues to their component parts. He outlined three ways to achieve this, including finding synergies with other focal areas, connecting SLM with global development agendas, and identifying practical interventions for improving techniques, research, policies, laws and institutions. Regarding the latter, he said that the main challenge is matching technology with farmers' circumstances. Noting the weakness of many governmental environment agencies and the benefits of catalyzing SLM investments, he referred to new Global Environment Fund (GEF) strategies for addressing land degradation through the building of conducive policy and institutional environments. He said the expected outcomes of GEF's investments include enhancing institutions' capacities and inter-sectoral capabilities, and the systematic up-scaling and dissemination of sustainable management systems.

Mélanie Requier-Desjardins, Sahara and Sahel Observatory (OSS), Tunisia, presented on the economics of ecosystem services in the Sahel, focusing on production and regulation services. She stressed that the loss of ecosystem services is costly to societies, but that current ways of evaluating these services, particularly regulation services, are limited by a poor understanding of the complexities of ecosystems. She reported, for example, that the diversity of agricultural systems is not adequately represented. She noted that while SLM techniques are beneficial for ecosystem services, poor rural people do not often have the means to pursue SLM, and that some SLM practices such as eucalyptus planting may have contradictory or negative effects on other ecosystem services. She called for the incorporation of the concept of multi-functionality into economic analyses of ecosystem services.



A forum participant commenting on the presentations during the "Healthy Soils" session

Discussion: Participants asked questions about: the emergence in Africa of a reliance on biofuels activities as a solution to land degradation problems; the need to consider how international law provisions concerning farmers, rural communities and rural organizations are relevant to soil management; the relative worth and success of integrated approaches to land management, including in developed countries; and how to balance food production and land management needs.

Ása Aradóttir stressed the importance of addressing multiple goals and needs in land management activities, Michael Stocking cautioned against a single issue approach to solving land degradation problems, and Parviz Koochafkan noted the need for a code of conduct for the biofuels and bioenergy industry. Ian Hannam provided examples of how different institutional structures can suit the particular features of different countries. He also noted that at the national level, considerable work has been conducted on legislative elements of soil protection with regard to disadvantaged people. One participant also shared information on developments in addressing land degradation in the Balkan region, while another commented on his experience of using eucalyptus clones in certain parts of Africa.

SESSION 3 - MITIGATING CLIMATE CHANGE THROUGH RESTORATION OF DEGRADED LAND

A session on mitigating climate change through the restoration of degraded land was held on Saturday afternoon and was chaired by Brynhildur Davídsdóttir, University of Iceland.

Rattan Lal, The Ohio State University, stressed that land degradation is underpinned by poverty. Discussing the tragedy of the commons, he noted the absence of an adequate land ethic, and the need to view land and humans as part of one community. He outlined links between climate change, land degradation and poverty, emphasizing the importance of scientific and technological solutions to desertification. He discussed: various abiotic and biotic carbon sequestration strategies; the global potential of desertification control and soil restoration to sequester carbon; and varying estimates of global carbon sequestration potential. He said that the application of scientific innovations can work only under conducive social, economic and political conditions, and underscored the need to build bridges across international programmes and MEAs.

Presenting on carbon finance and the MDGs, Maryam Niamir-Fuller, UNDP, highlighted the low development dividends from existing carbon finance projects and limitations arising from the ineligibility of certain types of projects for carbon financing. She noted that although most existing projects are large-scale, commercial plantations with few MDG benefits, small-scale projects are also worthwhile for addressing sustainable development and climate change adaptation priorities. She outlined three categories of biocarbon projects: restoring degraded lands; improving the productivity and ecological viability of agriculture; and changing land use in order to restore its original capability. She stressed that carbon finance is a means to development rather than an end in itself, and requires overcoming investment and transaction costs and risks, and discussed the various requirements for the registration and operation of CDM projects. She recommended market transformation through the relaxation of requirements for project eligibility, and by fostering an enabling environment for the development and implementation of carbon finance projects.

Richard Tipper, Edinburgh Centre for Carbon Management, UK, presented on the potential for, and effectiveness of, harnessing carbon finance for land restoration. He said carbon finance is seen as an attractive source of funding for SLM, but that the reality of the CDM in this regard has been disappointing, with few projects approved and low carbon benefits from some projects. Referring to projects in Mexico, India, Uganda and Mozambique, he stressed that successful intervention requires, *inter alia*, planning based on local needs and capabilities, finance that reaches the community level, and long-term programmes that build on experience and disseminate good practice. He noted that the CDM provides opportunities for the development of sustainable land use systems at the community level, but that some failures are inevitable and that learning through practical experience is key. He concluded that key challenges include market development, and effective risk management and its demonstration to policy makers.

Louis Verchot, World Agroforestry Centre (ICRAF), Kenya, discussed the potential of climate change mitigation in the agricultural sector, as well as the associated costs. He concluded that: the opportunities to mitigate non-carbon dioxide greenhouse gases in this sector are limited; land use, land-use change and forestry offers a more cost effective option for reducing the greenhouse gas footprint of the agricultural sector; and biofuels also offer viable opportunities. He said potential recommendations from the forum's Working Group III could include: making carbon finance work for multiple benefits, including for poverty reduction; making carbon finance work for the least developed countries and developing demonstration projects outside the voluntary market that generate real benefits in rural communities. He said the first steps toward achieving such recommendations could include: overcoming the technical constraints of measuring and monitoring emissions; addressing institutional constraints in developing countries; addressing the issue of permanence (of carbon sequestration or emission reductions) within the context of sustainable development; establishing standards for meeting



the sustainable development goals of the CDM and Joint Implementation; and developing project tools to help project development partners.

In addressing whether Iceland can become a carbon neutral country, Anna María Ágústsdóttir, SCS, noted three unusual aspects of Iceland's greenhouse gas emissions profile: its relatively high use of renewable energy; the high proportion of emissions from the fisheries sector; and the fact that individual sources of industrial emissions have a significant impact at the national level due to the small size of the economy and Iceland's relatively low mitigation potential. She assessed Iceland's overall emissions mitigation potential as: significant to moderate in the transportation sector; moderate in the waste sector, as well as in other sectors with a relatively low proportion of emissions; low in the fisheries and industrial sectors; and limited in the agricultural sector. She concluded that the likelihood of Iceland achieving carbon neutrality depends on: the political environment and the legal basis and requirements for emissions; the availability of funding for mitigation activities; and increased public pressure and peer pressure within sectors and between communities.

Discussion: Participants raised questions regarding: the capacity of soil to act as a natural sink; whether current assessments of carbon financing opportunities are too optimistic; imperfections in the carbon market; how to manage the risk of the unintentional loss of sequestered carbon; and how to secure the political will to restructure the way in which carbon financing currently operates. Richard Tipper agreed that expectations about carbon financing opportunities were artificially raised in recently years and added that only known risks can be anticipated and addressed. Regarding the latter, for example, he said that modeling research on the light reflectivity of land is still under way and thus not all related factors can be taken into account. Maryam Niamir-Fuller emphasized the various barriers that need to be overcome in order to access carbon financing and noted the opportunities for the forum's Working Group III to propose concrete recommendations. She also urged participants to reflect on the fact that the forum, including participants' travel, had produced 117 tonnes of carbon dioxide.

SESSION 4 - CREATING AN ENABLING ENVIRONMENT

The fourth session, held on Sunday morning, addressed the creation of an enabling environment, and was chaired by Sizwe Mkhize, National Department of Agriculture, South Africa.

J. Ronald Engel, Center for Humans and Nature, United States, outlined the history of efforts to develop a global earth covenant to comprehensively address ethical aspects of global environmental, economic and social concerns. He introduced the Earth Charter, the final text of which was launched in 2000, noting that it has been adopted or endorsed by a wide range of bodies worldwide, including IUCN. He said its primary significance could be in encouraging the advancement of the global covenant process. He then outlined ways in which soil ethics could inform the further development of a global covenant, as well as how the latter could contribute to our understanding of soil management. He focused on: soil ethics and global ethics; soil integrity and ecological integrity; soil stewardship and the common good; "soil humility" and the

precautionary principle; soil histories and our common but differentiated responsibilities; and "soil solidarity" and earth spirituality.

Andrew Campbell, Triple Helix Consulting, Australia, discussed the history of landcare in Australia. He noted its success in terms of engaging people in land restoration and management, but also highlighted that recent efforts to scale up landcare activities have not adequately involved community and volunteer groups. He emphasized that sustainable NRM is actually about "people management" and requires widespread behavioral change. He explained that knowledge, including land-related knowledge, is highly contextual and that it is necessary to consider how entire knowledge systems work. He further suggested that new ideas or practices will not be adopted if they are: too complex; cannot be trialled; do not fit with local contexts and capabilities; and do not offer relative advantages.

Delia Catacutan, ICRAF, Philippines, stressed that conventional approaches to NRM have resulted in the compartmentalization of interventions, which reduces opportunities for collaboration and integration. She said the integration of approaches is critical for addressing the complex socio-cultural, economic and political contexts underlying land degradation, and called for "boundary organizations," which can link research knowledge and practical experience to action. She outlined the successful landcare approach to NRM initiated in Australia in the mid-1980s, which provides an inclusive, adaptable framework for promoting partnerships between different groups and advocates a host of different land management activities. She emphasized the importance of local stakeholder involvement in landcare, and concluded by calling for the integration of a landcare approach into the heart of the Rio Conventions.

Based on the notion of "reading the landscape," Gunnar Bjarnason, Agricultural Council of Faroe Islands, presented a Nordic initiative designed to raise awareness about soil and water management and conservation. He explained that the initiative involved the distribution of a free, illustrated booklet, translated into local languages, which contains classic images of erosion and land degradation. He said the booklets are primarily targeted at local land users and aim to increase understanding of, and change attitudes about, soil and water management.

Paul Martin, University of New England, Australia, outlined that sustainable resource use ultimately concerns behavioral change. Noting that there is no single, proven behavioral change strategy, he said that regulatory, market and voluntary mechanisms can all encourage behavioral change, but also regularly fail. He stressed the need for a shared theory or practice of learning in seeking to apply and understand different behavioral strategies. He said social justice concerns should be considered in the development of all strategies, that under-resourced or weak agencies will result in poorly implemented instruments, and that political commitment is also central. Advocating a systematic approach to developing and understanding incentives and disincentives for behavioral change, he suggested, *inter alia*: focusing on transactions that shape resource use systems; considering barriers to innovation

and the reduction of “perverse path dependence”; better exploiting transaction costs; and moving from single-issue to multi-issue instruments.

Presenting on global gender issues and SLM, Mirey Atallah, UNDP/GEF Regional Coordination Unit for Arab States, discussed key issues concerning the different interests, roles and responsibilities of, and capacity building for, men and women. Providing examples from Micronesia, Nepal and southern Africa, she proposed increased gender sensitivity in SLM, highlighting factors constraining women’s effective participation in decision making including: cultural and financial limitations; illiteracy and lack of access to extension services which provide SLM knowledge; and lack of land tenure and secure access to resources. She said overcoming these barriers requires: data disaggregated on the basis of gender; measures to facilitate women’s access to credit and resources; and special attention to ensure women’s participation in SLM processes. She concluded by asking how momentum for gender empowerment and mainstreaming can be maintained, and how emerging market-based instruments can accommodate gender-sensitive approaches.

Discussion: Discussion focused on the Earth Charter, the role of gender and children in approaches to landcare, how to approach the concept of landscapes, and systematic approaches to SLM. Several participants expressed support for Earth Charter, while one Icelandic representative noted concern about text on non-native species, given the dependence of the Iceland forestry sector on such species. J. Ronald Engel welcomed recommendations for continuing the dialogue on global ethics that led to the Earth Charter. On gender, participants raised questions about how to build women’s capacity and the negative impacts of international trade barriers on women.

In response, Mirey Atallah referred to the increasing use of capacity building indicators and the need to lift barriers in international markets to facilitate natural resource trade, which she said benefits women in developing countries. Participants also commented on different types of soil threats and noted the need to consider the potentially negative outcomes of some future land use options. Paul Martin stressed that innovative approaches to understanding and changing behaviors that affect soils are more important than finding singular solutions.

WORKING GROUP DISCUSSIONS AND FORUM OUTCOMES

The forum included five working groups, which sought to further explore topics discussed in plenary. These groups addressed: soil stewardship and landcare; soil management and MEAs; carbon sequestration, carbon markets and land restoration; knowledge management; and capacity building for legislative and policy development in soil management. The focus and objectives of each group were introduced in plenary on Friday and the five groups convened on Saturday and Sunday afternoons, and Monday morning. Each group sought to develop recommendations on key issues in relation to its chosen topic, and to elaborate on ways of implementing their recommendations.

Discussion of the working group outcomes took place in plenary on Monday afternoon, in a session chaired by Anton Imeson, Amsterdam University, the Netherlands.

Several participants suggested that some outcomes placed too great an emphasis on the role of international bodies in soil management, at the expense of recognizing the experience and capacities of regional and national organizations. The working group Chairs clarified aspects of the recommendations relating to regional and national institutions, and confirmed that the widespread involvement of such institutions would be essential for ensuring the credibility and success of the proposed actions.

One participant queried the viability of asking individual scientific organizations to organize themselves so as to make their research findings accessible to all stakeholders and to transmit relevant knowledge to the UN conventions. The participant also raised the possibility of creating an institution to facilitate communication between the scientific and policy communities. Working Group IV Chair, David Niemeijer, said his group had not proposed the replacement of existing mechanisms, rather, that it had sought to stress the responsibility of scientists and scientific institutions to communicate their findings to different stakeholders.

With regard to Working Group V’s recommendations on developing an international legal framework for soil protection, participants discussed the status and utility of existing instruments. Some participants suggested that current mechanisms are insufficient, resulting in the need for a new instrument, while others said the focus should be on improving existing instruments and structures rather than creating new ones. One participant emphasized that work carried out to develop national and international law guidelines on soils had been done at the request of, and in consultation with, the scientific community. Stating that soils will not acquire the high profile or political momentum of climate change or other environmental problems, another participant proposed focusing on producing evidence of the positive impact on land degradation of investing in soil management. After further discussion, the working group outcomes were accepted by the forum.

WORKING GROUP I: Working Group I was chaired by Andrew Campbell, Triple Helix Consulting, Australia, and had Ingibjörg Björnsdóttir, University of Iceland, as its Rapporteur. Its objective was to consider the landcare approach to soil and land conservation and management, with a view to examining the feasibility of developing guiding principles on soil stewardship and landcare.

The group’s participants began by reviewing existing information, knowledge and networks on landcare programmes, and lessons learned from successful experiences in various countries. They then discussed key principles and lessons learned that could form the basis for a set of guiding principles on landcare and stewardship. Suggested principles included: avoiding the imposition of hierarchies or divisions between stakeholders; stressing the importance of educating children about landcare; taking account of local land user and farmer perspectives; building trust with the aforementioned constituencies; starting landcare activities through small projects in order to build confidence; and taking into account not only farmers but other key actors and stakeholders.

On strategies for landcare promotion, the group focused on the issue of land literacy, namely developing practical educational tools to help people, particularly children, to listen to and understand the land. The group also explored



potential linkages between, and opportunities for incorporating landcare principles into, international processes, including into MEAs. Participants further considered whether an international community of practice in landcare could be established to share experiences and lessons. Finally, the group discussed the possibility of establishing an International Year of Landcare. They generally supported this idea and created a “sub-committee” to further explore and pursue possibilities for organizing such an initiative.

Final Outcome: Working Group I recommends that:

- an informal group of practitioners on landcare approaches be developed as an international community of practice;
- a set of guiding principles for soil stewardship and landcare be developed and promoted as part of a soil stewardship and landcare knowledge base;
- the feasibility of an International Year of Landcare be further investigated beyond the forum; and
- existing materials on land literacy education and training materials be brought together as part of a soil stewardship and landcare knowledge base.

WORKING GROUP II: Working Group II, co-chaired by Luca Montanarella, Joint Research Centre, European Commission, and Youba Sokona, Sahara and Sahel Observatory (OSS), focused on how to encourage increased synergies on aspects of soil management in implementing the key MEAs, notably the Rio Conventions.

Participants first discussed the history of the term “synergies” in the context of MEAs and whether this term implied something different than “cooperation.” They then discussed potential differences between environment- and development-oriented conventions, noting that the UNFCCC and the CBD are largely the former, while the UNCCD is primarily the latter. Most participants agreed that general efforts to increase synergies between the Rio Conventions should address sustainable development and attainment of the MDGs. They also reached agreement on the value of developing a common scientific understanding of how soils relate to desertification, biodiversity and climate change.

On the basis of these conclusions, the group considered potential recommendations to encourage sustainable soil management as part of a broader process of enhancing cooperation in the implementation of the Rio Conventions. Several key ideas emerged. The first concerned the possible development by the Intergovernmental Panel on Climate Change (IPCC) of a Special Report on land degradation and climate change, that would take into account the global dimension of soil degradation. The second concerned a soils “synergies assessment report,” that could be based on the proposed IPCC Special Report and existing documents such as the IPCC Special Report on Biodiversity and Climate Change. The third, related idea concerned the development of guidelines on implementing the Rio Conventions with respect to soils. Participants said that such guidelines should be aimed at the national focal points of the three conventions, as well as at donors.

Another recommendation emerged regarding the possibility of a voluntary certification scheme for project proposals that would indicate when a project jointly serves the aims of all three conventions. Participants noted that this would help to give greater visibility to synergies at the implementation level.

Finally, participants discussed the lack of local-level awareness about MEA synergies and hence the need to invest in grass-roots awareness raising, training and education on synergies. The group developed the concept of a “training the trainers” programme that could complement and promote existing education initiatives on synergies.

Final Outcome: Working Group II recommends initiating cooperation in implementing the Rio Conventions on the ground. In this regard, it specifically recommends:

- UNCCD’s Committee on Science and Technology (CST) recommend that the UNCCD COP request the IPCC to prepare a Special Report on Land Degradation and Climate Change, taking into account the global dimension of soil degradation;
- the CST recommend to the UNCCD COP that its Secretariat make contact with the CBD and UNFCCC Secretariats in order to establish, under the authority of the Rio Convention Joint Liaison Group, an *Ad Hoc* Group of Experts to carry out an assessment of existing documents dealing with linkages between the subject matters of the Rio Conventions, recognizing that soil is a key linkage point between them; and
- that this *Ad Hoc* Group of Experts be mandated to compile, on the basis of its initial assessment, guidelines, targeted at donors and national focal points for the three conventions, regarding implementing the Rio Conventions on the ground. Working Group II further recommends:
- that each Convention develop certification criteria regarding the subject matter of the other two Conventions, so that project proposals could use these criteria in order to gain added value for their projects; and
- the dissemination of information to stakeholders on the ground about the added value of linkages between MEAs, through launching a “training the trainers” programme and through promoting existing initiatives.

WORKING GROUP III: Working Group III was chaired by Bal Ram Singh, Norwegian University of Life Sciences, and its Rapporteur was Mirey Atallah, UNDP/GEF Regional Coordination Unit for Arab States. The group’s objective was to consider recommendations for lifting barriers to help transform the carbon market in order to facilitate equitable and ethical carbon trading, and in order to encourage the sequestration of an increased proportion of global carbon emissions through land restoration.

In seeking to share and develop their own knowledge, the group first discussed aspects of terrestrial carbon sequestration. Turning to carbon financing for land restoration projects, participants discussed a wide range of matters concerning barriers to market transformation and how to overcome them. They noted practical examples of experiences and constraints, including in relation to voluntary carbon markets and farming legislation in Iceland, the US and the UK. They also discussed carbon finance in the context of payment for other environmental services. Several participants pointed to differences between “pro-poor” projects and larger, industrial projects, including the differential rate of returns, and others queried how the UN and other international agencies can better support the transformation of markets. In this context, several participants suggested modification of aspects of the CDM



project requirements, and means for enhancing the integrity and credibility of project-related institutions so as to maximize benefits to local land users.

The group reached several conclusions, including that land restoration has the potential to mitigate climate change and to generate multiple benefits through carbon finance, and that the CDM, as well as state-mandated and voluntary markets, are important but imperfect tools. They also identified the need to, *inter alia*: ensure coherent regulatory frameworks, including in relation to property rights and procurement mechanisms; adopt rules of engagement that promote the involvement of, and benefits for, developing countries; improve project monitoring, evaluation and risk management practices; develop local expertise in relation to project design; create opportunities for “learning by doing” and sharing lessons learned; and foster awareness of and commitment to societal values. On obtaining recognition of the “multi-benefits” of projects, participants suggested offering a premium price for projects addressing societal and ecosystem services and developing a common system of project certification and verification. These conclusions formed the basis for considering possible recommendations and actionable items.

Final Outcome: Working Group III recommends:

- identifying costs and barriers in the existing project cycle;
- negotiating specific targets for the reduction of, and with local and international agencies steps to reduce, transaction costs;
- reporting by local and international agencies on performance in reducing transaction costs;
- standardizing objective-based methodologies for monitoring and verification;
- developing a portfolio of pilot projects to test project bundling and risk management tools and to develop lessons learned;
- promoting voluntary certification systems as a risk management approach to address social and environmental safeguards for land restoration;
- engaging the insurance sector in terrestrial carbon financing;
- strengthening capacity-building programmes in relation to data on soils, including through the establishment of a clearing-house mechanism;
- exploring the possibility of a global institution creating a flexible facility to mediate between project actors in order to reduce transaction costs, manage risks and ensure multiple benefits for bio-carbon and land restoration projects;
- developing a certification system for calculating premiums for land restoration projects; and
- encouraging the modification of certain CDM requirements so as to provide further incentives for land restoration and carbon sequestration in terrestrial ecosystems.

WORKING GROUP IV: Working Group IV was co-chaired by David Niemeijer, Niemeijer Consult, the Netherlands and Mary Seely, Desert Research Foundation of Namibia. The group’s aim was to analyze and discuss how knowledge management can lead to a more thorough and systematic understanding of the linkages between soils, climate and society and to improved responses to related challenges.

The group first focused on the responsibilities of different stakeholders in the creation and transfer of knowledge. Participants discussed the role of local-level stakeholders,

especially land users, in sharing knowledge and noted current constraints hindering knowledge transfer. Co-Chair Niemeijer urged participants to also consider the role of non-local stakeholders, and to challenge the assumption that all stakeholders have the same needs in terms of knowledge management. Participants then discussed the responsibility of scientists to share their insights through two-way dialogue with other stakeholders, which implies a more active role for scientists in development processes. This theme continued throughout the group’s discussions. Additionally, Co-Chair Seely stressed the need to consider how to effect the transfer of knowledge among stakeholders.

The group next considered successes and weaknesses in relation to knowledge management. With regard to data collection they noted: the lack of funding for such activities; the importance of avoiding the duplication of efforts; and that new approaches could mean that data previously collected loses relevance. On the topic of capacity building to meet knowledge management challenges, participants noted that capacity-building approaches suffer from, and waste resources on, “re-inventing the wheel,” due to the difficulties of accessing lessons learned by other organizations. Related to this, participants discussed: successful activities in Iceland that are targeted at developing country participants, in particular, the Icelandic Land Restoration Pilot Training Programme; training programmes more generally; formal academic courses; South-South dialogues; publications; and internships.

Participants also noted that the use of outdated data and information leads to the development of counterproductive decisions or policies. They observed that overcoming knowledge management challenges would require ongoing financial and technical support for data collection institutes, and identified key individuals to take this agenda forward. Participants also commented on the potentially valuable contributions that the private sector could make to addressing knowledge management concerns.

Last, participants spent considerable time debating the responsibility of scientists, and their institutions, to share their research findings with stakeholders at all levels, from land users to policy makers, and with international conventions and institutions. Some participants felt that this was up to individual scientists, while others stressed the responsibility of scientific institutions. Other participants said that funding streams for scientific research should be used to produce policy relevant outputs. The group agreed that universities and research institutes on the one hand, and policy institutions on the other, should seek innovative ways of bringing scientific findings to both land users and decision makers, including by stimulating scientists to find ways of presenting their findings to a wider audience.

Final Outcome: Working Group IV recommends:

- securing more funding for data collection, improving data accessibility through a centralized data index, harmonizing methodologies across institutions and over time, and incorporating new data into assessments in a timely manner;
- involving businesses in sponsoring and supporting capacity building and awareness raising about environmental issues and in contributing to solutions;



- establishing a knowledge base about capacity building similar to that of the World Overview of Conservation Approaches and Technologies regarding agricultural practices; and
- recognizing that scientists have the responsibility to make their key findings available and accessible to stakeholders at all levels, and that those involved with NRM have a particular responsibility to ensure that relevant information and knowledge is transmitted to biodiversity, water and climate change-related conventions and international institutions.

WORKING GROUP V: The key objective of Working Group V was to address how to improve legal and policy frameworks for soil protection at the national and international levels, and to consider possibilities for a new international instrument on soils, as well as linkages with and between relevant MEAs. The group was chaired by Robert Fowler, University of South Australia, and had Bernard Vanheusden, Hasselt University, Belgium, as its Rapporteur.

At its first meeting, the group decided to focus its deliberations on several issues: the feasibility and worth of an international instrument on soils; possibilities for addressing soils management within the existing MEAs; and other means of further promoting legislative developments at the national level.

Noting the existence since the early 1980s of a range of “soft law” instruments on soils, most participants agreed on the need for some kind of “hard law” instrument. They then addressed whether a stand-alone agreement would be preferable to the development of a protocol under an existing MEA and, if the latter, which MEA would be best suited to a soils protocol. Several participants suggested it might be easier to draft a protocol to sit under the CBD rather than the UNCCD. In this context, participants also discussed the practicalities of how any new instrument would actually be implemented, especially in developing countries and in countries with economies in transition, in light of existing capabilities and available resources. They also noted the need to consider the focus, purposes and intended effects of any international instrument, and considered the text of a draft protocol on soil management prepared by IUCN.

Several participants queried the likelihood of any new instrument being created at this time, given “MEA fatigue” and the world’s current focus on climate change. Yet, participants also noted limitations in both the UNCCD and the CBD with respect to the scope and coverage of soils issues. Ultimately, most of the group agreed on the need for some form of international instrument and decided to recommend that IUCN, through its Commission on Environmental Law Specialist Group of Experts on the Sustainable Use of Soil and Desertification (SGSS&D), and in consultation with others, continue its work on a draft protocol for the protection and sustainable use of soil.

Participants then explored the issue of developing a “soil ethic,” recognizing a need to better integrate a concern for soil values and ethics into international declarations on global ethics. In this regard, they explored possibilities for linking the Earth Charter to a soil ethic.

The group also addressed possibilities for improving the focus of the CBD and the UNCCD on soils, highlighting opportunities within the CBD’s work programme on agricultural biodiversity and developing guidelines to assist national governments to implement their responsibilities under the UNCCD in relation to the protection and sustainable use of soils. Expanding further on the topic of guidelines, participants agreed on the need for the development of guidelines for national legislation on soil protection and management, including specifically in relation to the treatment of soil contamination.

Final Outcome: Working Group V recommends that:

- a binding international instrument relating to the protection and sustainable use of soils be developed;
- IUCN, through its SGSS&D and in consultation with its Ethics Specialist Group and the soil science community, progress the work on the Draft Protocol for the Protection and Sustainable Use of Soil pursuant to the Soil Resolutions of the IUCN World Conservation Congress, with the aim of advancing the process for the development of a binding international instrument;
- the Earth Charter Council, in partnership with the Ethics and Soils Specialist Groups of the IUCN Commission on Environmental Law and other interested parties, prepare an interpretative statement concerning the ways in which soil ethics can be incorporated into the Earth Charter Initiative;
- a lead international agency be appointed by the CBD COP to take responsibility for soil biodiversity and soil protection with respect to its work programme on agricultural biodiversity, and that the COP, following the conduct of the forthcoming in-depth review of this work programme, appoint an Ad Hoc Technical Experts Group to provide technical expertise in support of the work programme;
- the SGSS&D develop guidelines to assist national governments to implement their responsibilities under the UNCCD in relation to the protection and sustainable use of soils;
- the SGSS&D prepare guidelines for national legislation, in consultation with other relevant institutions such as UNEP; and
- the SGSS&D develop guidelines for national legislation concerning the treatment of contaminated soils.

FORUM PROGRAMME OF ACTION: Late on Monday, participants considered a Programme of Action, based on key aspects of the working group recommendations and conclusions. The session was chaired by Ingibjörg Jónsdóttir, Agricultural University of Iceland.

In introducing the draft Programme of Action to plenary, Roger Crofts, Environment and Management Advisor, Scotland, summarized key features of the forum’s proceedings. He pointed to various factors identified by participants as negatively impacting soil protection, including that: land degradation statistics are inadequate and unclear; no single, adequate definition of desertification exists; MEAs operate as independent “silos”; traditional, single solution approaches are often inadequate to protect soil health; new mechanisms such as carbon trading do not always deliver on SLM and development goals; and there is an insufficient focus on the concept of a land ethic and on traditional knowledge of land management. He also noted promising opportunities



and recommendations, including on: integrated and holistic approaches; ethics and values as an important component of SLM; land custodians and local communities as key actors; solving problems through new mechanisms and technologies; learning from mistakes and successes; and maximizing the opportunities provided by environmental markets. He also discussed possible means of following up on the forum's outcomes and noted the importance of promoting the forum's key messages.

In the ensuing discussion, participants called for amending the draft Programme of Action to include reference to: soil as an important carbon store; carbon sequestration; the role of soil in food production; the importance of collecting new primary data; an ethical framework for soil management; and Iceland's experience of soil management. Other participants raised queries regarding the relationship between the draft Programme of Action and the working group outcomes, and expressed a desire to take away from the forum a clear message endorsed by all participants. After considerable discussion, participants decided to first accept the working group outcomes in plenary, after which informal discussions were held to amend the draft Programme of Action. An amended version of the Programme of Action was then accepted by participants late on Monday.

Programme for Action: In the opening section of the Programme of Action, forum participants note that successful implementation of efforts to prevent, mitigate and adapt to environmental and social changes begins with the stewardship of the soil by and for the users of the land. Participants also note that soil stewardship results in:

- conservation of the soil resources and of the ecosystem services that depend on them;
- improved food security and fiber productivity for human well-being and development;
- increased water storage capacity, flood prevention and water supply; and
- the mitigation of global climate change via increased capture and retention of carbon and other greenhouse gases.

Finally, participants recognize that experiences of soil stewardship and restoration efforts are diverse and location-specific, and invite institutions engaged in relevant fields and other interested partners to engage in the process of soil stewardship.

The remainder of the Programme of Action consists of five paragraphs, each of which notes the recommendations of the working groups summarized above.

CLOSING SESSION: CENTENNIAL CELEBRATORY EVENT

Opening the forum's final session, held to celebrate the centenary of the SCS, its Chair, Kristín Ingólfssdóttir, University of Iceland, welcomed the forum's patron, Ólafur Ragnar Grímsson, President of Iceland. President Grímsson paid homage to the scientists and officials who have led soil conservation efforts over the last century, saying that the forum celebrated this journey and also marked the search for methods to deal with future global challenges presented by the relationship between soil destruction and climate change. He noted that these challenges demonstrate the imperative for new ways of translating scientific knowledge into problem solving and policy making.

President Grímsson outlined a possible action programme, including: expanding Iceland's training programme for developing country experts; establishing field laboratories, including in Iceland, for conducting research on desertification control and for providing training; deploying scientists and practitioners to share new soil management approaches and technologies; initiating efforts to promote desertification controls and restorative technologies in developing regions; creating a system of carbon credits linked to land use monitoring; establishing ways to use income streams generated by carbon trading to provide incentives to restore soils and ecosystems; fostering the growth of a global research community; raising awareness about desertification and the benefits of soil preservation for carbon sequestration; increasing collaboration between scientists, governments and international authorities; and supporting scientists to encourage the private sector and civil society to think in novel ways about soil management. He concluded that the forum could be instrumental for learning, cooperation and fostering new policies based on scientific foundations.

Sveinn Runólfsson, Director, SCS, spoke on Iceland's century of conserving and restoring soil and vegetation, following the severe degradation of Icelandic ecosystems from unsustainable land use. He described the struggle for soil conservation by key individuals during the first half of the twentieth century, and the role of native grass species and conservation innovations in stabilizing dunes and saving certain districts from desertification. He outlined the SCS's current goals, including to: halt erosion; restore lost resources; and promote sustainable land use. He then described the respective means to achieve these goals and thus "help people to heal our land": cooperation with land users; research, monitoring and planning; and education and encouragement of stakeholders.

Roger Crofts, Environment and Management Advisor, Scotland, presented on "Soil Conservation in Iceland: Celebrating a Century and Looking Forward." He explained that Iceland faces a "double challenge" in relation to soil conservation, namely natural forces and human activity. He outlined successes in Icelandic soil conservation, including stabilizing dunes, nitrogen fixation, creating farmland, colonizing new lava, and overcoming erosion. He outlined key successes and lessons learned, including related to: ensuring sound inventory and assessment work; using experiments and demonstration techniques, as well as technical solutions; and engaging the "right people," including farmers and their families. He commented on the considerable public knowledge of and support for soil issues in Iceland, and, in looking to the future, pointed to the need for ongoing outreach and innovation, both nationally and globally.

Thröstur Eysteinnsson, Iceland Forest Service, outlined the history of forestry care in Iceland and its connections with soil protection. He noted that while most Icelanders support forest and soil protection, public spending in these areas has not kept pace with Iceland's economic growth over the past decade, and that Iceland must renew its determination to further improve its work in these areas.

Sigurgeir Thorgerirsson, Icelandic Farmers Association, highlighted the world's increasing food demands and noted that soil is a fundamental prerequisite for agricultural production



and human livelihoods. Drawing on Iceland's experience, he emphasized that farmers are the most important users and guardians of the land, meaning that their understanding and participation in landcare is essential.

Roger Crofts presented the forum's Programme of Action, outlining its key action points. He concluded by noting the fundamental and practical message of the meeting, namely, "Don't Forget the Soil!" Olav Kjørven, UNDP, noted the centrality of land to environmental and development-related issues, including climate change. He highlighted that the Kyoto Protocol's flexible mechanisms have created a new stream of finance for developing countries, and that the role of land as a carbon sink is central to this. Describing the work of the UNDP-hosted Commission on Legal Empowerment for the Poor, he stressed the interconnected nature of property rights and environmental issues, which have land as their common denominator.

Halldór Thorgeirsson, UNFCCC, said the world's leaders need to take decisive actions to deal with climate change and greenhouse gas emissions. He noted the importance of finding ways to address climate change after the end of the first Kyoto Protocol commitment period in 2012. He pointed to the significance of the next two years, including of the UNFCCC and Kyoto Protocol-related meetings to be held in Bali in December 2007, for post-2012 planning. In this context, he noted the importance of the issues debated at the forum.

Zafar Adeel, UNU-INWEH, said that the forum had facilitated a focus on land degradation and related threats to societies, and had underscored the need to take action to correct policy directions and to enable developing countries to tackle challenges through their own scientific research and capacities. He described how the UNU aims to bridge divides between the scientific and policy communities, and to highlight critical synergies between issue areas and conventions. He also outlined work being undertaken with UN agencies and other organizations to support SLM.

Jan Hartke, Clinton Foundation, stressed that world leaders are finally heading toward a shared understanding of the significance of climate change. He emphasized the importance of harnessing private markets to secure the financial resources necessary to achieve change in the developing world and said the fundamental challenge is to engage the next generation.

Dana York, Natural Resources Conservation Service (NRCS), United States Department of Agriculture, spoke about the development of the NRCS, originally called the Soil Conservation Service, in the United States, which she said has drawn soil science and society together for the benefit of all citizens. She described how the originally narrow mission on soil health had expanded to address issues concerning water, plants and animals. She said experience showed that agricultural productivity and sound environmental quality are compatible national goals. She explained that while financial support can assist with the adoption of conservation practices, technical assistance is key. She called for adaptive strategies regarding the delivery of technical assistance and information, noting that her agency's customers include part-time farmers and those who wish to access information over the internet and on the weekends.

Rajendra Pachauri, Chair of the IPCC and Director General, The Energy and Resources Institute (TERI), India, pointed to the central role of soil in the health of the planet and the critical dependence of the world's poor on ecosystem services. He noted: the need to consider the many factors that impact soil quality, health and climate change; that connections between soils and climate change have received inadequate attention to date; and his personal interest in the forum's suggestion that the IPCC consider developing a Special Report on soils and climate change. He outlined key features of the IPCC's upcoming Fourth Assessment Report, and welcomed the forum's emphasis on the importance of carbon sequestration. He noted that the forum had brought together a wide range of practitioners and pointed to opportunities for future networking and follow-up activities.

Pointing to key aspects of the forum's Programme of Action, Andrés Arnalds, SCS, noted the need to promote key forum messages in the future. He expressed his thanks to the President of Iceland, and to the staff of the SCS and the forum's partner institutions, and closed the forum at 1:21 pm.

FIELD TRIPS

FIELD TRIP ONE: On Friday afternoon, participants enjoyed a field excursion, traveling through the fertile agricultural areas and drained wetlands of southern Iceland toward Mount Hekla, one of the world's most active volcanoes. The tour passed through several areas that were historically covered with woodlands but subsequently desertified due to natural and human factors. Participants observed the positive results of soil conservation and restoration efforts, including of birch plantations and shelter belts, while also learning about Icelandic history and culture from knowledgeable guides.

The tour ended at the SCS headquarters in Gunnarsholt, where Sveinn Runólfsson welcomed the group. During



Vigdis Finnbogadóttir, former president of Iceland

a dinner hosted by Einar Gudfinnsson, Iceland's Minister of Fisheries and Agriculture, Vigdis Finnbogadóttir, former president of Iceland, addressed participants, reflecting on the centrality of the landscape to Icelandic history and identity, and the parallels between the erosion of soil and the erosion of languages. She thanked the participants for their

contributions throughout the forum, and remarked on the wealth of knowledge shared during the forum.

FIELD TRIP TWO: On Sunday afternoon, participants were treated to a second field trip, organized by Reykjavík Energy and the SCS. Participants toured an area of Iceland renowned for its geothermal activity, which is characterized by steaming fumaroles and mud pools. Participants heard about various land restoration activities being undertaken in the area by Reykjavík Energy in conjunction the SCS and other partners.

The field trip also included a visit to Hengill, one of the largest high temperature geothermal fields in the country, which is connected to three volcanic systems. The area



includes four drill rigs, which harness geothermal energy. The tour finished at the new Hellisheidi Power Plant, which draws on Hengill's geothermal activity in providing electricity and hot water for space heating in the industrial and domestic sectors. Participants enjoyed dinner at the plant, hosted by Reykjavik Energy.

UPCOMING MEETINGS

EIGHTH SESSION OF THE CONFERENCE OF THE PARTIES TO THE UN CONVENTION TO COMBAT DESERTIFICATION: UNCCD COP-8 will take place in Madrid, Spain, from 3 - 14 September 2007. Delegates will consider the following agenda items: the 2008-2009 programme and budget; review of the implementation of the convention; review of the report of the Committee on Science and Technology; review of activities for promotion of relationships with other relevant organizations; follow-up to the 2002 World Summit on Sustainable Development; the work of the Regional Coordination Units; and review of the 2006 International Year of Deserts and Desertification activities. The Committee for the Review of Implementation of the Convention and the Committee on Science and Technology will also convene during the COP. For more information, contact: UNCCD Secretariat; tel: +49-228-815-2800; fax: +49-228-815-2898; e-mail: secretariat@unccd.int; internet: <http://www.unccd.int>.

CLIMATE CHANGE AND DESERTIFICATION: MONITORING, MODELING AND FORECASTING: This conference will take place from 10 - 13 September 2007 in Wengen, Switzerland. Participants will review: where we were and what we have learned about desertification processes over the last three decades; the current state of the art in this and related fields; and where we are heading, given the high likelihood of significant climate change in the coming decades. For more information, contact: Organizing Committee; tel: +39-3-3278-5567; fax: +39-3-3278-9960; e-mail: martin.beniston@unige.ch; internet: <http://www.unige.ch/climate/Workshops/wengen07.html>

UN HIGH-LEVEL MINISTERIAL MEETING ON CLIMATE CHANGE: A high-level ministerial meeting on climate change is scheduled to take place at UN Headquarters in New York, USA, on 24 September 2007, during the UN General Assembly session. For more information, contact: Office of the President of the UN General Assembly; tel: +1-212-963-7555; fax: +1-212-963-3301; e-mail: secretariat@unfccc.int; internet: <http://www.un.org/climatechange/2007highlevel/index.shtml>

TWENTY-SEVENTH SESSION OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE: IPCC-27, which will take place from 12 - 16 November 2007, in Valencia, Spain, will focus on the adoption of the IPCC's Fourth Assessment Report. For more information, contact: Rudie Bourgeois, IPCC Secretariat; tel: +41-22-730-8208; fax: +41-22-7-30-8025/13; e-mail: IPCC-Sec@wmo.int; internet: <http://www.ipcc.ch/meet/27session.htm>

THIRTEENTH CONFERENCE OF THE PARTIES TO THE UNFCCC AND THIRD MEETING OF THE PARTIES TO THE KYOTO PROTOCOL: UNFCCC COP 13 and the Kyoto Protocol COP/MOP 3 will take place from

3 - 14 December 2007 in Bali, Indonesia. These meetings will coincide with the twenty-seventh meetings of the UNFCCC's subsidiary bodies and the *Ad Hoc* Working Group on Further Commitments from Annex I Parties under the Kyoto Protocol. COP 13 and COP/MOP 3 are expected to be accompanied by a UNFCCC Dialogue on Long-Term Cooperative Action on Climate Change and various other events. For more information, contact: tel: +49-228-815-1000; fax: +49-228-815-1999; e-mail: secretariat@unfccc.int; internet: http://unfccc.int/meetings/cop_13/items/4049.php

NINTH CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY: CBD COP-9 will take place from 19 - 30 May 2008, in Bonn, Germany, and is being organized by the CBD Secretariat. For more information, contact: CBD Secretariat; tel: +1-514-288-2220; fax: +1-514-288-6588; e-mail: secretariat@cbd.int; internet: <http://www.cbd.int/doc/meeting.aspx?mtg=COP-09>

WORLD ASSOCIATION OF SOIL AND WATER CONSERVATION MEETING: This meeting, which will be held within Tara National Park, Serbia, is scheduled for the first half of 2009. The meeting will be organized by the World Association of Soil and Water Conservation (WASWC) and the Faculty of Forestry, Belgrade University. For more information, contact: Miodrag Zlatić; email mizlatic@yubc.net; internet: <http://www.waswc.org>

GLOSSARY

CDM	Clean Development Mechanism
CBD	Convention on Biological Diversity
COP	Conference of the Parties
COP/MOP	Conference of the Parties serving as the Meeting of the Parties
CST	Committee on Science and Technology (UNCCD)
GEF	Global Environment Facility
GWP	Global warming potential
ICRAF	World Agroforestry Centre
IPCC	Intergovernmental Panel on Climate Change
IUCN	World Conservation Union
MDGs	Millennium Development Goals
MEAs	Multilateral Environmental Agreements
NRM	Natural Resource Management
SBSTTA	Subsidiary Body on Scientific, Technical and Technological Advice (CBD)
SCS	Soil Conservation Service (Iceland)
SGSS&D	Specialist Group of Experts on the Sustainable Use of Soil and Desertification (IUCN Commission on Environmental Law)
SLM	Sustainable Land Management
UNCCD	United Nations Convention to Combat Desertification
UNFCCC	United Nations Framework Convention on Climate Change
UNU-INWEH	United Nations University International Network on Water, Environment and Health