SEI ANNUAL REPORT 2007

SEI STOCKHOLM ENVIRONMENT INSTITUTE

Bert Bolin, Professor Emeritus of Meteorology from Stockholm University, co-founder of SEI and a world leader in climate research, passed away 30 December, 2007

Bert Bolin played a key role in the development of international climate research as well as serving as a knowledge broker between science and policy. Bolin was co-founder of the UN Intergovernmental Panel on Climate Change (IPCC), which was joint winner of the 2007 Nobel Peace Prize, and served as its first chairman from 1988 to 1998.

He played a pivotal role in the upsurge of global climate awareness and also provided a broad understanding in social, economic and political terms of the causes and effects of climate change. Bolin was co-founder of SEI in 1988. He was also instrumental in the development of the ICSU International Geosphere Biosphere Programme (IGBP), a Study of Global Change, which was launched in 1986.

For SEI staff it was both a privilege and a pleasure to work with Bert in his role as an SEI Board Member and later as a Special Advisor to the institute on climate and energy issues. His unwavering commitment to and engagement with SEI over the years was felt by all who worked alongside him. He always gave his time freely and exhibited an enduring optimism, a collegial manner and an extraordinary modesty that is uncommon for such a brilliant scientist. He will certainly be missed, yet in the future will remain a great inspiration for SEI as well as for many others.

STOCKHOLM ENVIRONMENT INSTITUTE ANNUAL REPORT 2007

STATEMENT FROM THE EXECUTIVE DIRECTOR AND CHAIRMAN

IF 2006 WILL BE REMEMBERED as the year when the scientific debate ended over the anthropogenic causes of climate change, 2007 will certainly appear in the history books as the year when it entered the centre stage of national, regional and global politics.

To stay? Unfortunately yes. Humanity has no choice. We cannot escape from the huge adaptation investments required to cope with the warming the world is already committed to, and there is no doubt that mitigation of climate change will require fundamental system shifts in all spheres of civilisation – from human lifestyles and global climate justice, to national accounting and global trade flows. Incremental change is not an option if we are to achieve convergence towards a global zero-carbon economy in four generations – and neither is it feasible in a world where carbon injustice hits twice: first by subsidising the wealth of the rich, and second, when this wealth subsequently causes disproportionate climate damage among the poor and vulnerable. We are in for a challenging ride, where science plays – and will continue to play – a critical role in contributing to a transition to global sustainability.

This Annual Report is devoted to SEI's work on climate change, not only as a reflection of the extraordinary focus on climate change in 2007, but also to communicate our research, which places a strong and broad emphasis on social and ecological systems in its approach to climate change and development. Climate change research to support shifts in policy must include key aspects of development rights among the poorest communities, as well as the integrity of ecosystems and the climate regulation they provide. Furthermore, taking a cross-sectoral and interdisciplinary approach is fundamental to SEI's research on climate change, addressing implications for livelihoods and water resources, energy scenarios, food security, sustainable use of biofuels, air pollution, and options for adaptive governance and institutional change.

SEI has an important legacy to build on. We were closely involved, through SEI's first Director Gordon Goodman, in setting up the Advisory Group on Greenhouse Gases (AGGG) in the 1980s, which subsequently evolved into the Intergovernmental Panel on Climate Change (IPCC). SEI has since then contributed significantly to all IPCC reports, culminating in the Fourth Assessment Report, in which SEI had more scientists involved as authors than any other Swedish research institution. SEI has a particularly strong reason to honour the tremendous achievements of the late Professor Bert Bolin: not only was he one of the key architects of the IPCC model, as well as its first chairman, he was also involved in establishing SEI and served as its chairman in the late 1990s. The award of the Nobel Peace Prize to the IPCC and Al Gore is both a vitally important inspiration for future climate change research and an acknowledgement of Bert Bolin's scientific leadership in building bridges between science and policy.

In 2007 SEI has been strongly devoted to exactly this endeavour: bridging science to policy in the field of climate change and development. At the UNFCCC 13th Conference of the Parties (COP13) in Bali in December 2007, SEI launched a report on Greenhouse Development Rights, which outlines the analytical arguments for a post-Kyoto regime that respects planetary boundary conditions – essentially a 90% reduction in greenhouse gas emissions by 2050 – while at the same time supporting the urgent need for a rapid increase in energy access among the world's poor. SEI also convened an ad hoc task force on climate and development

Johan Rockström
Executive Director

Lars Anell
Chair of the SEI Board

to discuss and communicate policy recommendations to the G77 group of developing countries, among others. The Greenhouse Development Rights concept was well received as a possible structure for a post-Kyoto regime. These and other initiatives launched by SEI in Bali – particularly on the urgent need for investment in climate adaptation as an integral part of development and mitigation efforts – contributed to the outcome of the COP negotiations: a high-impact example of SEI's work at the science-policy interface.

Successfully bridging science and policy hinges on scientific credibility, institutional reputation, and the ability to nurture vibrant networks. In 2007 SEI was established as the United Nations Environment Programme (UNEP) Collaborative Centre on Adaptation to Climate Change, and as such will act as an international resource-hub to link country needs with knowledge and experience from around the world. Our weADAPT project, a web-based wiki tool for sharing adaptation experience, together with *Tiempo*, a bulletin on climate change in developing countries, also contributed to science outreach on climate and development. These efforts are strengthened through SEI's engagement in international research initiatives such as the ADAM project on climate adaptation and mitigation strategies, and the NeWater project on water resource and climate variability: both are major EU research programmes.

In 2007 SEI's research has focused particularly on Africa, China and the United States in connection with climate issues. In the US, SEI provides analysis and support to various state and regional initiatives on greenhouse gas emission reduction strategies, among them the Western Climate Initiative, which includes a large number of western-US states and provinces. In China, together with the Chinese 50 Economists Forum, SEI has initiated a high-level research programme on the economics of climate change. In Africa, SEI is strengthening its commitment to sustainability research across all its programmes. Climate change and development is central to this effort, which will lead to the establishment of SEI's seventh research centre, the SEI Africa Centre, in 2008.

There is no doubt that we have entered a new era of science and policy for sustainability. We have only seen the beginning of the social implications of the planetary scale imbalances between biophysical capacity and human use of natural capital. We know that the world's most vulnerable will be hit the hardest by future environmental shocks. But, as pointed out by Nobel Prize laureate Amartya Sen, understanding the problem is half of the solution. SEI will continue to commit all its efforts on two fronts: advancing broad social-ecological understanding, and being part of the solution, which in the decades to come will demand nothing less than a great transition towards a sustainable future. □

CLIMATE AWARENESS COMES OF AGE

2007 HAS SEEN an unprecedented focus on climate change, culminating in the award of the Nobel Peace Prize to Al Gore and the IPCC. For SEI, the Peace Prize highlights the value of investing in the science-policy interface, including SEI's participation in the IPCC process.

In the ongoing dialogue between policy and climate science, independent organisations such as SEI play a key role in developing new ideas and keeping issues alive that are not at the top of the political agenda. The institute's strong record on linking energy research and poverty reduction and its presence on all policy levels from local to global are cases in point. Stakeholder involvement and a bottom-up approach have always been at the heart of SEI's activities. For example, SEI's active engagement with local communities in South Africa has increased understanding of how multiple stressors such as HIV, water extraction for mining and a changing climate interact to affect vulnerability. This kind of approach has recently emerged at the forefront of the global climate debate, with the emphasis on reducing vulnerability to meet development goals without contributing to climate change.

Another long-term SEI goal has been to bridge the issues of development and climate change. This was highlighted at the December 2007 Bali climate meeting, where SEI co-hosted the Climate and Development Days and, together with partners in the South, presented weADAPT – a web platform for sharing knowledge on climate adaptation. In addition, Sweden announced the International Commission for Climate and Development, which will be hosted at SEI in Stockholm. The launch of the journal *Climate and Development* in 2008 is a new initiative that will further develop this theme. The journal will provide a forum for knowledge from developing countries, thus contributing to the diversity of perspectives that is essential for the future success of the IPCC.

"Climate change is already hitting the most vulnerable societies in the world. Now we need to gather momentum to support developing countries in their efforts to adapt. SEI can provide vital experience and knowledge for the work ahead."

SEI Executive Director Johan Rockström

In 2007 there has been a shift in the climate debate with increasing emphasis on integrating climate issues into all development planning. Consequently, greater synergies are being developed between the institute's climate research and the theme of policy integration. Climate change mitigation and adaptation are increasingly seen not only as complementary, but also synergistic – an issue that was highlighted in an SEI-led IPCC chapter.

The growing climate awareness places new demands on actors at the science-policy interface. Connecting local efforts to global climate policy and research, we look for effective linkages between issues that have previously been treated separately. The potential to integrate and share knowledge across SEI programmes and with external partners puts SEI in a strong position to meet these demands. Some answers will also develop through the new collaboration with the Stockholm Resilience Centre, which emphasises research on social-ecological systems – one of the areas where collaboration is being developed is 'transformations in risk'. In addition, work on establishing the UNEP Collaborating Centre on Climate Adaptation is well under way, and the centre should be operational in 2008. SEI's strong tradition of scenarios research may also become timely as demand grows for linking climate knowledge to social and political developments.

What are the potential paths to a non-carbon society? In 2007 SEI developed an energy and environment scenario that engages policymakers in developing countries, and generated decision-making tools for adaptation to better tackle uncertainty. In the coming year, the institute's work on sanitation will link carbon cycling and energy use in agriculture. These and other SEI initiatives are important first steps forward. □

SEI researchers share climate change knowledge at a workshop in Ga-Selala village, Limpopo province, South Africa

SEI authors or contributors to IPCC assessment reports

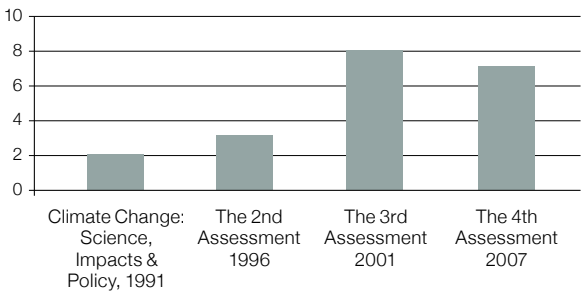


Photo: Vince Reichardt / VOL

SHAPING THE GLOBAL DEVELOPMENT AGENDA: SEI'S CONTRIBUTION TO GEO4

THIS YEAR THE UNITED NATIONS Environment Programme (UNEP) released its fourth Global Environment Outlook report (GEO4), the most comprehensive UN report on the environment. It assesses the current state of the world's atmosphere, biodiversity, land, and water, describes the changes that have occurred since 1987, and identifies priorities for action.

Nine SEI experts have contributed to the development of the report over the past three years. Johan Kuylenstierna (Director of SEI York) is a lead author of chapter 2. Frank Thomalla (Leader of the Risk, Livelihoods and Vulnerability Group at SEI Stockholm), and Vikrom Mathur (from SEI Asia), were lead authors of chapter 7. Other SEI contributors include Mike Ashmore, Mike Chadwick, Sivan Kartha, Linn Persson, Dieter Schwela and Bingyan Wang.

Massive climate consequences for the poorest

The report predicts major changes for the poorest regions that are least able to cope. Sea-level rise threatens millions of people in coastal regions and the very existence of small island states. Adaptation to anticipated climate change is now a global priority, and urgent action is needed to reduce emissions from the energy, transport, and agricultural sectors.

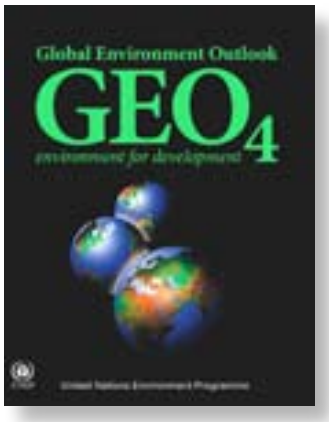
Air pollution is still a major problem. Globally, more than two million people each year are estimated to die prematurely due to indoor and outdoor atmospheric pollution. Although air quality has improved dramatically in some cities, many urban areas – particularly in Asia – are still badly affected.

The ozone layer

The report concludes that the hole in the ozone layer is still an important issue. However, the Montreal Protocol has been very successful and emissions of ozone-depleting substances have decreased over the last 20 years. It is estimated that the ozone layer over the Antarctic should fully recover around 2060, assuming full Montreal Protocol compliance. Without precautionary action, the consequences would have been disastrous.

Vulnerability of people and the environment: challenges and opportunities

Focusing on the human dimensions of change, chapter 7 of GEO4 defines several "archetypes of vulnerability" and uses them to identify opportunities for tackling vulnerability and increasing human well-being while protecting the environment.



Very different patterns of vulnerability are found in different regions of the world – in industrialised and developing countries, and urban and rural areas. The archetype approach allows policymakers to place their particular situations within a broader context, encouraging connections to be made between regional and global issues and facilitating possible solutions.

The report shows that countries with more equitable income distribution and better access to medical services have generally achieved higher life expectancy and lower levels of child mortality. However, opulence, consumerism and increases in relative poverty are contributing to ill health in many wealthier societies. Although to some degree international trade has helped to reduce poverty, it is also sustaining unequal patterns of consumption.

Furthermore, many developing countries have to deal with the environmental consequences (such as hazardous waste) that result from outsourcing the extraction and processing of natural resources. Both the scarcity and abundance of environmental resources can aggravate existing tensions and contribute to conflict, especially in societies that lack the capacity to effectively and fairly manage competition for resources. Investment in environmental cooperation is therefore vital to promote sustainable resource use and equity within and between countries.

Building on the GEO4

The GEO4 contribution lays a foundation for SEI's Risk, Livelihoods and Vulnerability Programme to further develop vulnerability assessment. Through collaboration with the Potsdam Institute for Climate Impact Research (PIK) and the new Stockholm Resilience Centre, the programme can help to build understanding about emerging complexes of vulnerability that are not adequately captured by existing archetypes. In addition, SEI's weADAPT web platform is advancing concepts and techniques that link climate vulnerability and adaptation. □

NEW SOLUTIONS FOR CLIMATE CHANGE AND DEVELOPMENT IN THE SOUTH

THE GREENHOUSE DEVELOPMENT Rights Framework, devised by SEI and Ecoequity, offers solutions to the climate crisis while supporting development in the South.

Published in 2007, the framework report is titled *The Right to Development in a Climate Constrained World* and is authored by Sivan Kartha, Director of SEI's Climate and Energy Programme, and Paul Baer and Tom Athanasiou of EcoEquity, supported by Christian Aid, the Heinrich-Böll Foundation and SEI core funds.

The report argues that the emerging climate crisis must be seen against the backdrop of an ongoing development crisis, and that it is unacceptable and unrealistic to expect those struggling against poverty to focus their limited resources on averting climate change. And it draws the necessary conclusions: those who are wealthier and have produced higher levels of emissions must take on the bulk of the costs of a global "emergency programme" of mitigation and adaptation.

The report argues that developing countries should still curb their emissions, but the global consuming class – the industrialised world and elites within developing countries – must cover the costs and provide the resources.

The report presents a burden-sharing framework based on a straightforward accounting of national responsibility and capacity, which requires those who consume and emit more to carry a larger share of the global cost of an emergency climate program.

Under the framework, one third of the burden of dealing with climate change would fall to the United States and one quarter to the European Union. China would bear less than one fifteenth and India less than one three-hundredth.

Complex challenges

The road ahead is not straightforward. The report states that as long as there is no serious burden-sharing proposal on the table, one that ensures an emergency programme can be implemented without stifling development in the South, developing countries will conclude that they have more to lose than to gain from serious engagement.

Co-author Sivan Kartha says, "Greenhouse Development Rights is offered as a framework for a regime that could break the current impasse in international climate negotiations."

"The world's wealthy minority has left precious little atmospheric space for the poor majority. Indeed, even if emissions from industrialised countries were suddenly and magically halted, the dramatic emissions reductions demanded by the climate crisis would still require developing countries to urgently decarbonise their economies, and to do so while combating endemic poverty. This is not only the core of the physical challenge, but also the crux of the international political deadlock that now stymies the negotiations." □

SUMERNET: ADVANCING SUSTAINABILITY IN THE MEKONG REGION

THE MEKONG REGION accommodates more than 250 million people from six countries and is one of the fastest developing regions in the world. The Sustainable Mekong Research Network (Sumernet), a flagship programme of SEI Asia funded by SIDA, aims to catalyse the transition to sustainability in the Mekong region through collaboration in applied research, policy engagement, network development, and capacity building. This regionally owned and regionally driven network represents a diverse combination of national, regional and international research institutions, universities and academic organisations, international cooperation agencies and NGOs.

The research component of Sumernet has built a substantial knowledge base on key issues affecting sustainable development in the three regions covered by the project: the Mekong Delta, upland, and Tonle Sap regions. In 2007 Sumernet published a research monograph, *Challenges to Sustainable Development in the Mekong Delta: Regional and National Policy Issues and Research Needs*. The monograph was launched in Hanoi, Vietnam, during an M-Power meeting attended by approximately 80 actors involved in Mekong issues. A second monograph on the Tonle Sap and two working papers on the upland region will be published in the next few months.

Sumernet's capacity building efforts aim to achieve a collectively owned and ever growing knowledge base. In 2007 Sumernet developed a range of training methods, including a course on EndNote bibliographic software to teach trainees to store and exchange bibliographic information, and a workshop on effective science-policy communication, held in Bangkok. Another key capacity building effort is the Sumernet Fellowship Programme, which provides grants to young researchers in the region. The grant awards range between USD 5000 and 10 000.

Sumernet's policy engagement component is increasingly seeking to broaden its policy-engagement base. Sumernet has been working hard to boost its networking efforts, which are undertaken both within and outside Sumernet through face-to-face meetings, online conferencing, monthly internal updates and the Sumernet website (www.sumernet.org).

2007 was a busy year for Sumernet – setting up a knowledge community, learning as a group from its experiences and documenting them so that others can benefit. The first phase of Sumernet will be completed by the end of 2008. □

Training workshop on the WEAP software for water system analysis organised for the Department of Water Resources of Thailand, 6–7 November, 2007

The WEAP (Water Evaluation and Planning) software developed by SEI has evolved as an effective tool for integrated water resources planning. As water-related issues become increasingly complex, the updated version of WEAP has taken on new functionalities for understanding the combined effects of climate change, land-use change, and other stressors on goods and services provided by aquatic ecosystems.

WEAP as a Regional Tool for Sustainable Water Analysis in the Mekong, a project funded by the IPS grant, seeks to assess the current status of WEAP as applied in the Mekong and identify key priority areas for improvement. It is envisaged that the project will be implemented in five phases over five years. In 2007 the first phase has focused on identifying priority areas to be enhanced, a pilot development of the regional irrigation water-demand module, and on developing the capacity of SEI Asia and its external partners in Thailand.

In November 2007 SEI Asia, in coordination with SEI US and Kasetsart University in Bangkok, conducted the first WEAP training workshop for the Department of Water Resources of Thailand to build capacity for sustainable water-resource planning. To support the growing user community in Southeast Asia, the WEAP software, website, and supporting documents are being translated into Thai.

SEI TALLINN: A KNOWLEDGE BASE FOR ESTONIAN CLIMATE POLICY

IN 2007 SEI TALLINN has worked in close partnership with the Estonian Government on implementing the UNFCCC Kyoto Protocol. The most important achievement of the Tallinn centre has been to work out the Estonian National Allocation Plan (NAP) of Greenhouse Gases allowances for the implementation of EU Emissions Trading Scheme (ETS). In 2004 the NAP for the first trading period 2005–2007 was prepared, and in 2007 on the request of the Ministry of Environment the second NAP was prepared for the period 2008–2012.

To involve renewable energy projects in line with European Commission (EC) directives in Estonia, the Tallinn Centre has developed a database on existing and potential Joint Implementation (JI) projects to link them to the Kyoto second commitment period for emissions trading. For many years SEI Tallinn has assisted the government on JI by acting as a facilitator and intermediary in the renewable energy sector. Close co-operation with the Council of the Baltic Sea States in the Ad Hoc Group on Climate Change has led to fruitful consultancy work with the JI Testing Ground Facility. Many wind farm projects' technical documentation was prepared for emissions trading. SEI Tallinn's long experience in renewable energy is well in line with the EC's climate change mitigation policy and wider uptake of renewable energy. Estonia's NAP II can be found on the EC website (see http://ec.europa.eu/environment/climat/2nd_phase_ep.htm).

The Tallinn Centre's active co-operation with Government started in 1996 when it was chosen to be the implementing agency for two UNEP and GEF global programmes. The third study requested by the EC on the methodological issues of the JI pilot phase was carried out in partnership with Surrey University. SEI Tallinn has also helped to develop the Estonian Climate Change Mitigation Programme for 2003–2012 – a good starting point for the next decade of R&D work.

SEI Tallinn currently participates in three EC Sixth Framework Programme projects (NEEDS, COFITECK and ENERGY TROPHY+), covering internalisation of external costs in the power generation sector, renewable energy and energy conservation. A fourth project, launched in January 2008, is CHANGE BEHAVIOUR, a project of the EC Seventh Framework Programme co-ordinated by the National Consumer Research Centre in Finland.

Photo: Provided by SEI Tallinn

SEI Tallinn works closely with the Estonian power-generation sector to reduce carbon emissions.

Dr Tiit Kallaste, Director of the Climate, Energy and Atmosphere Programme at SEI Tallinn, is a member of the Estonian Governmental Commission on Implementation of the UNFCCC and the Kyoto Protocol. The commission takes decisions on climate action development needs, controls and adopts the decisions on ET and JI, and designs the country's future strategic programmes in these areas. He was part of the Estonian governmental delegation to the UNFCCC climate conference in Bali in December 2007 representing Estonia's NGOs. □

THE ATMOSPHERE: CONNECTING THE ISSUES

Air pollution, ODS and climate change

The SEI Atmospheric Environment Programme has increasingly focused on the linkages between key atmospheric-environment challenges, acknowledging that issues such as air pollution, climate change and the emission of ozone depleting substances (ODS) are inseparably connected. The major driving forces of urbanisation and industrialisation and the rise in demand for transport all increase air pollutants and greenhouse gas emissions. Climate change and air pollution interact to affect both human health (especially in urban environments) and crop yields, where there are clear implications for adaptation strategies in the agricultural sector. Focusing on these connections brings real opportunities to develop policies that can potentially reduce both climate change and air pollution.

Global synthesis of atmospheric environment issues

In 2007 the UNEP Global Environment Outlook 4 was launched. SEI coordinated the development of the "atmosphere" chapter. This describes the status of key global atmospheric issues and reviews the development and implementation of major global and regional policy frameworks developed to address atmosphere-related problems. The report concludes that the success of the Montreal Protocol on reducing ozone-depleting substances gives hope for global cooperation, but that the global response to climate change is inadequate. The improvements in air quality and reduction in the emissions of some pollutants show that measures exist to tackle air pollution. However, such measures are not sufficiently implemented in cities in developing countries, where concentrations of harmful pollutants are in some cases extremely high.

Key areas for further research

Emissions: By combining the LEAP model devised by the SEI US Centre, and the emission inventory methods of the SEI York centre, the Atmospheric Environment Programme will further develop its scenarios research to assess the impact of key driving forces on greenhouse gas and air pollutant emissions. This will be aided by including CO_2 emissions in SEI's air pollution inventory methods, which are being used to develop rapid urban assessment of air pollutants and co-benefits related to climate change. These methods will be applied in Kathmandu in 2008. The CURB-AIR project has also looked at the opportunities provided by the Clean Development Mechanism for reducing air pollution in developing countries.

UNEP

SEI received a Montreal Protocol Partners Award at the twentieth anniversary celebration of the Montreal Protocol in Montreal in September 2007. The nomination stated: "Stockholm Environment Institute and its staff Ms Linn Persson, Ms Katarina Axelsson, Mr Oskar Wallgren, and formerly Ms Maria Delvin and Ms Ingrid Kökeritz, contributed significantly to the implementation of the Montreal Protocol and its amendments… SEI has also been very active in other regions especially Asia–Pacific concerning customs cooperation projects."

Impacts: The impacts of climate change and air pollutants have a combined effect on crop yield and food security in developing countries. SEI is developing methods and approaches to understand the additive, antagonistic or synergistic relationships between the impact of ground-level ozone and climate change on crop yield. SEI is also working to locate the greatest future threats to global plant biodiversity from atmospheric nitrogen emissions.

Regional intergovernmental agreements: The Global Atmospheric Pollution Forum is increasing its activity, and aims to establish regional intergovernmental agreements on air pollution in Africa and Latin America, as well as global technical harmonisation and consensus-building programmes. The forum will host a major workshop on the co-benefits of addressing climate change and air pollution in 2008. □

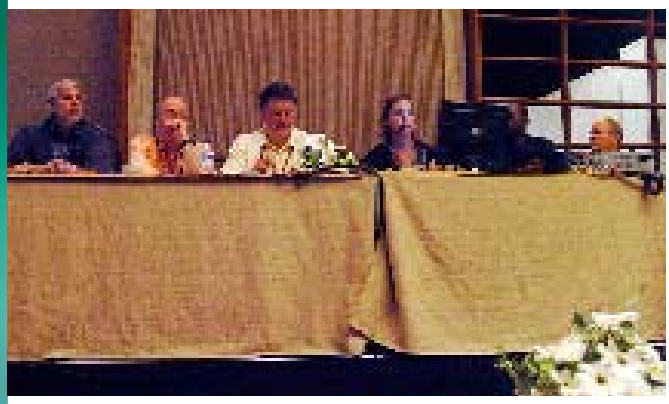
Photo: Vince Reichardt / VOL

SEI IN BALI

FIVE OF THE SIX SEI CENTRES were represented during the UNFCCC 13th Conference of the Parties (COP13) in Bali in December 2007, to present SEI's views on integrating climate change mitigation and adaptation with development. Some of these activities are highlighted below.

Climate change and food security

Teaming up with the UN's Food and Agriculture Organization, SEI co-hosted a panel discussion on climate change and food security. Tom Downing and Gina Ziervogel of SEI Oxford gave talks on the socio-institutional dimensions of adaptation, the use and communication of climate information, dealing with uncertainty, and the development of new tools for accessing and analysing climate data.



IISD Reporting Services

The SEI / FAO panel on climate change and food security.

Sustainable trade in bioenergy

In partnership with the International Centre for Trade and Sustainable Development (ICTSD) SEI organised an event on sustainable trade in bioenergy, which included Francis X. Johnson from SEI and speakers from Brazil, the UNEP Risoe Centre and ICTSD.

Integrating community-based adaptation into the post-2012 framework

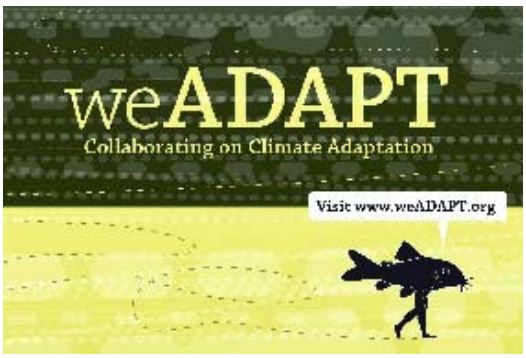
Richard J. T. Klein of SEI Stockholm was a panelist at this side event organised by Practical Action, UK, raising the question of how to better incorporate bottom-up approaches in helping communities to draw on their own knowledge and use new information and resources to devise adaptation strategies. The discussion centred on the role the UNFCCC can and should play in building community-based adaptation in the post-2012 framework.

Climate and Development Days

SEI, alongside the Institute for Environment and Development, the International Institute for Sustainable Development and the Ring alliance, organised Climate and Development Days. The event gave a platform for individuals and organisations working on development and climate change to exchange experiences, discuss challenges and present emerging ideas on reducing the vulnerability of those who are and will be experiencing adverse effects from climate change in developing countries. The event has been held each year at the COP since 2002.

weADAPT launched

SEI, as part of the weADAPT group, coordinated the launch of a new climate change adaptation web platform. Responding to the need for an integrated approach to making practical and robust climate risk-management decisions, weADAPT provides resources and guidance for those involved in adaptation work by pooling knowledge and expertise from various sources,



The weADAPT graphic, 'a fish out of water'

Photo: Vince Reichardt / VOL

"weADAPT is an exciting opportunity to access, contribute, learn from and become part of a growing and dynamic network of organisations working on climate adaptation." Mukufute Mukelabai, of Zambia.

such as datasets, past experience, innovative tools and methods, and training material. The weADAPT Group will work with the UNEP Collaborating Centre for Climate Adaptation (see www.weadapt.org).

Greenhouse Development Rights

Greenhouse Development Rights, a major research work produced by SEI, was presented in several forums during the Bali conference, including an event devoted to GDR involving the UK's lead climate negotiator, organised by Christian Aid and the Heinrich Böll Foundation; a briefing hosted by Action Aid for the chair of the G77 group of developing countries; and a panel hosted by the South Centre. The report helped to inform the G77 negotiating position on critical and contentious issues at the core of the Bali roadmap. Sivan Kartha and his co-authors, with fellow SEI researcher Tariq Banuri, also convened a climate and development task force to provide analysis and input to the G77. □

CARBON FOOTPRINTS, TRADE AND CLIMATE CHANGE

THE FUTURE SUSTAINABILITY PROGRAMME has devoted much time in 2007 to understanding the carbon footprint of consumption, taking into account the fact that countries exchange both goods and services with each other. Over the past eight years we have undertaken applied research in the area of sustainable consumption and production, and developed robust methodologies and models with the aim of providing evidence relevant to decision-making, particularly in relation to climate change. More than 200 policy makers now use our software, REAP, to understand the effectiveness of their policies on climate change mitigation (see www.sei.se/reap).

The programme uses environmental input-output analysis as the scientific basis for its methodology – an established field of ecological-economic research on which we have contributed a number of articles to renowned journals. We are particularly experienced in applying leading-edge hybrid techniques, such as combining economy-wide material-flow analysis and carbon-footprint analysis with input-output models.

The programme's most recent achievement has been the development of a multi-regional input-output model, which allows for robust, reliable, reproducible measurement and analysis of carbon embedded in the international trade of goods and services. The model could also provide a foundation for a consistent analysis of production sectors and consumer patterns throughout the economy. □

COMMUNICATING CLIMATE CHANGE

Tiempo, the climate change bulletin for developing countries, was jointly founded in 1991 on the basis of consultation with southern stakeholders. As the only global publication on climate change that provides a voice for commentators on developing country issues and a forum for North-South debate, it has served the need for a capacity-strengthening project for poorer nations in the South. The *Tiempo* website was created in 1994 to complement the bulletin, providing up-to-date and extended coverage. *Tiempo* has a global circulation of approximately 6000 people (see www.tiempocyberclimate.org/newswatch/latest.htm).

SEI in the media

In connection with the IPCC report released in April 2007, Johan Rockström (SEI Executive Director), Richard Klein (Leader of the Climate and Energy Group in SEI Stockholm), Frank Thomalla (Leader of the Risk, Livelihoods and Vulnerability Group in SEI Stockholm) and other SEI colleagues delivered SEI's research message to the public through a range of national and international media, including Swedish television, *Dagens Nyheter, Svenska Dagbladet,* Al Jazeera, the BBC, Deutsche Presse-Agentur, Radio-Télévision Belgique Française, *Time, The Nation, Thinking Europe* and *Dagsavisen.*

Climate Talk: increasing awareness and inspiring action

Working in collaboration with media, regional and local government and community groups, SEI York initiated Climate Talk – a multi-platform campaign intended to raise awareness and understanding of climate change in Yorkshire by engaging the public in discussion and debate. It aims to educate the public about how climate change is a global issue with local consequences, and how they can make a difference (see www.climatetalk.org.uk).

Renewable Energy for Development (RED)

The RED newsletter is an effective forum for sharing viewpoints and practical lessons on the energy-environment-development nexus. First published in 1988, it is mainly concerned with renewable energy policies, projects and programmes in developing countries, as well as the interface between technology and institutions. Approximately 50% of the RED audience are from developing countries in Africa, Asia and Latin America (see www.sei.se/red/redindex.html).

SEI at US symposium on climate change

A recent research symposium on climate change at Tufts University in Boston highlighted SEI's academic excellence in the field of environment and development. The institute's work was acknowledged by the expert audience, which included members of the Nobel Peace Prize-winning IPCC. SEI scientists focused on analysis of the links between climate change and international development, and explored policy frameworks that could provide climate protection while ensuring fair and equitable development for the world's poor. The symposium also examined climate mitigation and adaptation in the US, with talks on carbon offsetting, water resources and local climate action.

Photo: Vince Reichardt / VOL

ATTAINING MILLENNIUM DEVELOPMENT GOALS THROUGH ECO-SANITATION

www.ecosanres.org

2007 was the second year of the five-year EcoSanRes Phase 2 Programme. The year was highlighted by a number of key achievements including:

sustainable sanitation alliance

- The launch of the Sustainable Sanitation Alliance (SuSanA) with four meetings in Germany, Switzerland, Sweden and India during the World Toilet Summit.
- Coordination of the International Conference on Sustainable Sanitation in Dongsheng, China where the world's largest urban eco-sanitation project has been built. The conference attracted some 500 people, including a study tour by the Swedish Parliamentary Committee on Agriculture and Environment.
- Publication of the news magazine *Sanitet.NU*.

- Participation in the launch of the UN International Year of Sanitation 2008 in New York in November.
- Publication of the handbook *Toilets that Make Compost* by Dr Peter Morgan from Zimbabwe.

- Completion of the study on Appropriate Sustainable Sanitation Solutions for West Africa as part of the NETSSAF–EU Programme.
- Finalisation of the peri-urban ecosan pilot project in Tepoztlan, Mexico.
- Completion of the epidemiological study linked to 65 000 eco-toilets in collaboration with University of KwaZulu-Natal in Durban, South Africa.

- Organising two Advanced International Training Programmes (Ecological Alternatives in Sanitation) for Africa, Asia, Latin America and EECCA. Some 200 professionals from over 50 developing countries have been trained since the course was started in 1999.
- Completion of scoping studies to identify regional nodes for capacity building in Eastern, Western and Southern Africa, Latin America, China and South East Asia.

EcoSanRes group:
Upper row, left to right: Thor-Axel Stenström, Cecilia Ruben, Charmaine Poutiainen, Marianne Kjellén, Madeleine Fogde, Elisabeth Kvarnström, Hidenori Harada (guest researcher, Kyoto University). Lower row: Gunilla Brattberg, Arno Rosemarin, Anna Tufvesson (Sida), Håkan Jönsson, Ian Caldwell.

SELECTED PUBLICATIONS

A small selection of published work by SEI staff in 2007

Ackerman, F., Ishikawa, M. and Suga, M.
The carbon content of Japan–US trade. *Energy Policy*, 35(9): 4455–62. http://www.sciencedirect.com/science/journal/03014215

Briones, M. J. I., Ineson, P. and Heinemeyer, A.
Predicting potential impacts of climate change on the geographical distribution of enchytraeids: a meta-analysis approach. *Global Change Biology,* 13(8): 2252–69

Disney M., Quegan, S., Grace, J. and Heinemeyer, A.
Forests, carbon and climate. *Catalyst: Secondary Science Review,* 17(4): 12–15. http://www.sep.org.uk/catalyst/articles/catalyst_17_4_327.pdf

Emberson, L. D., Büker, P. and Ashmore, M. R.
Assessing the risk caused by ground-level ozone to European forest trees: A case study in pine, beech and oak across different climate regions. *Environmental Pollution*, 147(3): 454–66.

Harmens, H., Mills, G., Emberson, L. D. and Ashmore, M. R.
Implications of climate change for the stomatal flux of ozone: a case study for winter wheat. *Environmental Pollution,* 146(3): 763–70

Huby, M., Owen, A. and Cinderby, S.
Reconciling socio-economic and environmental data in a GIS context: An example from rural England. *Applied Geography*, 27(1): 1–16

Johnson, F. X., Seebaluck, V., Kerr Watson, H. and Woods, J.
Renewable resources for industrial development and export diversification: The case of bioenergy from sugar cane in southern Africa. K. Wohlmuth et al. (eds), *African Development Perspectives Yearbook: Africa – Commodity Dependence, Resource Curse and Export Diversification.* Berlin: LIT Verlag

Karlberg, L., Rockström, J., Annandale, J. G. and Steyn, J. M.
Low-cost drip irrigation of tomatoes using saline water: a suitable technology for southern Africa? *Agricultural Water Management,* 89(1/2): 59–70

Klein, R. J. T. et al.
Portfolio Screening to Support the Mainstreaming of Adaptation to Climate Change into Development Assistance. Tyndall Centre Working Paper, 102. Norwich, UK: Tyndall Centre. http://www.tyndall.ac.uk/publications/working_papers/twp102.pdf

Purkey, D., Huber-Lee, A., Yates, D., Hanemann, M. and Herrod-Julius, S.
Integrating a climate change assessment tool into stakeholder-driven water management decision-making processes in California. *Water Resources Management*, 21(1): 315–29

Forecasting the Ecological Footprint of Nations: a blueprint of a dynamic approach

Lenzen, M., Wiedmann, T., Foran, B., Dey, C., Widmer-Cooper, A., Williams, M., and Ohlemüller, R.

This report is co-authored by ISA/University of Sydney and SEI/University of York. It describes a new dynamic ecological footprint concept, which is a dynamic forecasting framework incorporating land use and biodiversity, among other factors, into a causal network of driving forces. It also takes into account globalised trade along with its complex supply chains.

The report contains a temporal analysis up to the year 2050, and applies a range of global data sets at the country level. This new concept aims to bring together previously diverging footprint approaches, and incorporates additional sustainability objectives such as species threats, biodiversity decline and international trade.

Rockström, J., Barron, J., Karlberg, L. et al.
Managing water in rainfed agriculture. D. Molden (ed.), *Water for Food, Water for Life: A Comprehensive Assessment of Water Management in Agriculture.* London: Earthscan. 317–52

Turner, K., Lenzen, M., Wiedmann, T. and Barrett, J.
Examining the global environmental impact of regional consumption activities: Part 1 – A technical note on combining input-output and ecological footprint analysis. *Ecological Economics,* 62(1): 37–44

Wiedmann, T. and Lenzen, M.
On the conversion between local and global hectares in ecological footprint analysis. *Ecological Economics*, 60(4): 673–77

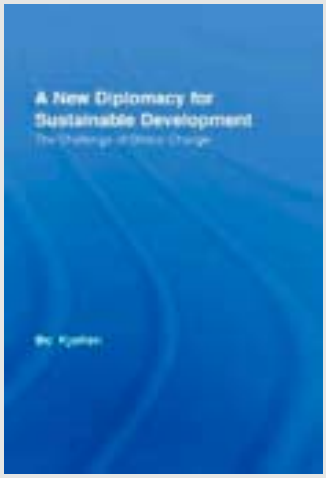
Multilateral Environmental Agreements on the Ground – Lessons from Supporting Implementation of the Montreal Protocol

Persson, L., Persson, Å. and Nilsson, M

The growing realisation that environmental challenges need global responses has led to an increasing number of Multilateral Environmental Agreements (MEAs). Their implementation at the national level often meets significant challenges, especially in countries with weak governance structures and poor institutional capacity. This report takes a closer look at a number of national implementation issues, by taking stock of and discussing our experiences gained from 1999–2006 within a Swedish-supported bilateral programme under the Montreal Protocol – the Swedish Ozone Layer Protection Programme.

A New Diplomacy for Sustainable Development: The Challenge of Global Change

Bo Kjellén



Bo Kjellén's book, *A New Diplomacy for Sustainable Development* is based on 40 years' experience in multilateral negotiations as a diplomat and international negotiator. The book develops the theoretical foundations of the concept of a new diplomacy and links it to the notion of enabling conditions, describing the close linkages between domestic policy and international negotiations. Kjellén writes that fast accelerating, human-induced changes in global natural systems, with global warming as a prime example, are modifying international relations. Diplomacy has to recognize that new types of threat will require new solutions and a new spirit of cooperation. However, he warns that this is a gradual process, and traditional conflicts will continue to haunt the international system and traditional methods of diplomatic work still prevail. In conclusion, Kjellén comments on present negotiation processes and offers ideas for institutional reform of the international system.

The book is the fourth in the Routledge-SEI Environment and Development Series

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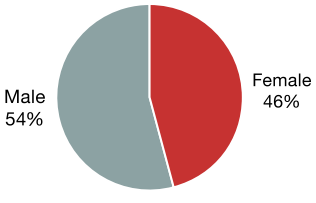

Gender distribution

MAIN FUNDERS AND CLIENTS

BILATERAL AGENCIES

Danish International Development Agency (DANIDA)
Government of Germany, GTZ, BGR, GLOWA
Swedish International Development Cooperation Agency (Sida)
UK Department for International Development (DFID)

MULTILATERAL AGENCIES

European Commission
Food and Agriculture Organization of the United Nations (FAO)
United Nations Economic Commission for Europe International Cooperative Programme (UNECE ICP) on Vegetation
United Nations Department of Economic and Social Affairs (UNDESA)
United Nations Development Programme (UNDP)
United Nations Environment Programme (UNEP)
United Nations Framework Convention on Climate Change (UNFCCC)
United Nations Institute for Training and Research (UNITAR)
United Nations Office for Project Services (UNOPS)

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Stockholms läns landsting Regionplane- och trafikkontoret
Swedish Environmental Protection Agency
Swedish Meteorological and Hydrological Institute
Swedish Ministry for Foreign Affairs
Swedish Ministry of the Environment

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Government of Estonia
Government of France, French Energy Management Agency (ADEME)
Government of the Netherlands, DGIS
Government of South Korea
Government of the United Arab Emirates

United Kingdom

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Department of Environment, Food and Rural Affairs (DEFRA)

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City Government of Sharon, Massachusetts
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El Dorado Irrigation District
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US National Oceanic and Atmospheric Administration
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International Soil Reference and Information Centre (ISRIC)
National Environment Research Council (NERC)
Natural Heritage Institute
Natural Resources Defense Council
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Rand Corporation
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Tellus Institute
World Wildlife Fund (WWF)

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The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning (FORMAS)
Winrock International Institute for Agricultural Development

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ETC International Group
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Ramboll Natura AB
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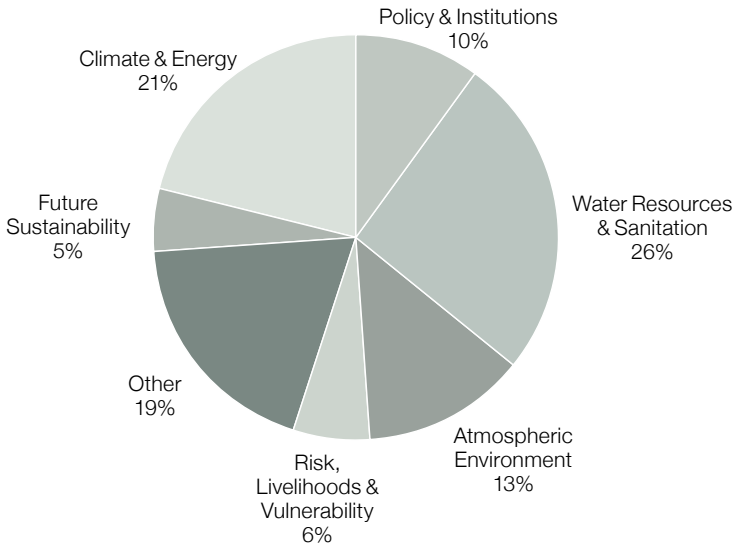
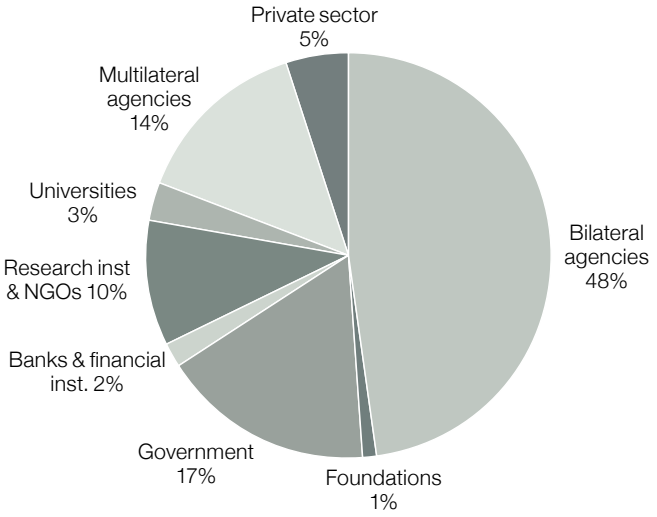
SEI RESEARCH VOLUME

SEI generated approximately SEK 130 million in research volume in 2007.
The diagrams below show the sources of SEI's finance in 2007 by sector, and give a break-down of how it has been allocated by research area and geographic focus.

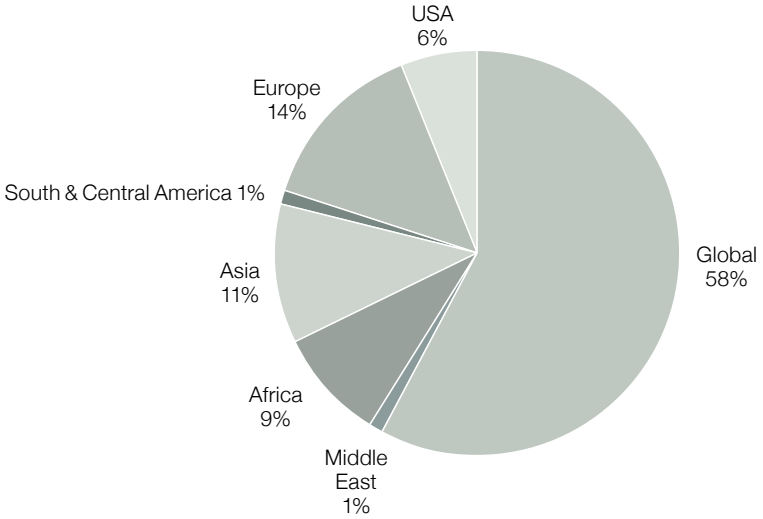
Research area



Sources of finance by sector



Geographic focus



THE STOCKHOLM RESILIENCE CENTRE

THE YEAR 2007 marked the first year of operations for the Stockholm Resilience Centre, which in effect began in April with the move to new premises in Kräftriket at Stockholm University (shared with SEI headquarters and SEI Stockholm Centre), and ended with the successful establishment of a vibrant, though young, institution with approximately 40 staff members, an emerging research agenda on resilience and sustainability, and a financial base in the order of SEK 30 million SEK in project and core grants. This rapid development is a result of the three combined strengths of our new Centre:

- First, the institutional set-up – the Stockholm Resilience Centre is a joint project between Stockholm University, the Beijer Institute of Ecological Economics at The Royal Swedish Academy of Sciences, and SEI – a joint initiative between three strong and complementary institutions.
- Second, the Centre is a result of a major, long-term grant – the largest ever environmental research grant in Sweden – provided by the Foundation for Strategic Environmental Research (MISTRA).
- Third, a research agenda well in tune with growing global concerns and the emerging political agenda on governance in the face of unexpected cross-scale social-ecological feedbacks that cause interacting social transformations and ecological tipping points.

The Centre draws on several SEI core competencies: the Risk, Livelihoods and Vulnerability Programme, the Policy and Institutions Programme, and the Water Resources and Sanitation Programme. A number of key partnerships have been established with research organisations around the world, and important progress has been achieved in positioning the Centre in priority policy processes, particularly related to the follow-up of the UN Millennium Ecosystem Assessment. □

Photo: Carl Falke

Production: SEI Stockholm Centre
Copy-edit: Tom Gill
Graphic design: Sirje Papp AB
Print: Lenanders Grafiska 2008
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SEI's mission is to support decision-making and induce change towards sustainable development around the world by providing integrative knowledge that bridges science and policy in the field of environment and development.

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