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WATER

FRONT

A FORUM FOR GLOBAL WATER ISSUES

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World Water Week to Focus on Hard and Soft Development Options



India's Centre for Science and Environment Wins 2005 Stockholm Water Prize

Tsunami Special Report



Improved Water and Sanitation: Costing Far Less Than It Would Earn

SOME CRISES defy action because they appear too complex and intractable to respond. Others persuade us they are beyond hope of solution because we allow ourselves to see them only as threats, when – at least as much – they are opportunities. The world water and sanitation crisis is one such crisis. Yes, solving it would be expensive. But it would save far more than it cost, it would unlock huge potential, and it would improve countless lives.

One person out of every five alive today lacks access to a safe water supply. Two in five do not have even basic sanitation. Every day, 5000 people die of diarrhoeal disease, 90% of them under the age of 5. At any moment, almost half the developing world's population are suffering from one or more diseases linked to poor water and sanitation or poor water resources management.

The Governments of Norway and Sweden commissioned the Stockholm International Water Institute to quantify the economic benefits of improved water management and services; the World Health Organisation contributed to the research. The report's findings demonstrate just how much good macroeconomic sense it makes to end the crisis. For more on the reports, see page 15.

For a start, improving water, sanitation and management is a key way of reducing poverty. Higher income levels and access to a water supply are related. Increasing investment in household access to safe water by 0.3% is associated with a 1% increase in GDP. Individuals and families get richer, and so economies benefit too.

The world has committed itself, in the Millennium Development Goals, to reduce by half the proportion of people without sustainable access to safe drinking water by 2015, and to make comparable progress on sanitation. Doing that will spare people the unproductive drudgery of tramping for hours to find water and carry it home. It will save lives. And by creating a healthier population it will lessen demands on health services, and improve livelihoods.

The annual global value of adult working days gained from reduced illness would be almost USD 750 million. The total number of working days gained would be 3.2 billion. For every USD 1 invested, the report says, the savings in other sectors would amount to at least USD 3, and could be ten times as much, depending on the region and the technologies used. The total annual savings it puts at USD 84 billion.

Another area, improved water storage capacity, helps to ease societies out of their vulnerability to changes in rainfall, whether it

comes in the form of droughts or floods. Societies less at the prey of the elements can expect to have more robust economies. They will gain in another way as well, as healthier ecosystems provide more goods and services like fish, flood control and cleaner water.

Global estimates of the extra annual investment needed to achieve the water and sanitation targets in the Millennium Development Goals (MDG) suggest a total of USD 11.3 billion, a huge amount – but less than one-seventh of the overall savings the world could expect to see every year. Expressed in per capita terms, the cost is more modest still. For five of the world's poorest countries – Bangladesh, Cambodia, Ghana, Tanzania and Uganda – it would be somewhere between USD 4 and USD 7 for each citizen per year.

It is natural to doubt. The eight MDGs are a commitment made by world leaders who were resolved that they, or at least their successors, would achieve them. A third of the way to 2015 there are fears that at least some of the Goals may not be achieved.

But in 1970 all UN members agreed the developed countries should raise their aid budgets to 0.7% of their GDP by 1980. Twenty-five years on, five countries have achieved it – Norway, Luxembourg, Denmark, Sweden and Holland. It looked for years more like an aspiration, a reproach even, than a target for most of the developed world. Gradually, though, it is starting to happen. The same can happen with the MDGs. Better water and sanitation save lives and save money. Once the realisation sinks in, change will follow.



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Technology? Policy? Both?

Hard and Soft Development Solutions in Focus
at 2005 World Water Week

Development has occurred differently throughout the world, and regional climates and conditions vary greatly. Thus, the 2005 World Water Week in Stockholm, August 21-27, will be framed within the context of the two primary ways of meeting future water-related development needs – the “hard” path and the “soft” path.

“Hard” path solutions are traditionally supply-oriented and emphasise centralised infrastructure and decision making: dams and reservoirs, pipelines and treatment plants, water departments and agencies. It delivers water, mostly of potable quality, and takes away wastewater. Particularly for wealthy and water-rich countries, such solutions drove development during the 1900s. The demand-oriented “soft” path may also rely on centralised infrastructure, but complements it with extensive investment in decentralised facilities, efficient use of technologies and human capital. It strives to improve the overall productivity of water use and deliver diverse water serv-

ices matched to the users’ needs at local and community scales.

According to Mr. Anders Berntell, Executive Director of the Stockholm International Water Institute (SIWI), which arranges the World Water Week, the two approaches are not mutually exclusive.

“There are complementarities between the two approaches,” he says. “In many cases, a mix of ‘hard’ approaches such as technology and ‘soft’ tools such as participatory management may be needed. Tailoring solutions to situations will be a key focus during the week.”

And what a World Water Week in Stockholm it is shaping up to be. Already, by April 2005, a record number of independently organised seminars and side events had been planned by collaborating partners. The week’s Stockholm Water Sym-

posium, “Drainage Basin Management – Hard and Soft Solutions in Regional Development” has through the abstract process seen its programme grow to one of unprecedented strength and diversity. Workshops will examine issues such as infrastructure, climate variability and water efficiency in the industrial and agricultural sectors.

And, as always, the World Water Week’s technical tours, social events and prize award ceremonies will be first-class. The presentation of the 2005 Stockholm Water Prize may best meld the multifaceted nature of the week, when India’s Centre for Science and Environment and Ms. Sunita Narain accept the 15th jubilee award on August 25 from the hands of HM King Carl XVI Gustaf of Sweden. CSE’s work has shown great respect for science and technology, but always with a social conscience which puts people first.

Experts from business, government, water management, science, inter-governmental organisations, non-governmental organisations and United Nations agencies and programmes have made the World Water Week in Stockholm more than a regular stop on the development agenda. It has become a critical juncture in ongoing processes, a forum for innovation and a beacon for keeping water and related development issues high on the international agenda.

Join us in Stockholm, August 21-27, for the 2005 World Water Week.

The Clock is Ticking – Register Today!



Registration for the World Water Week is open now, and significant savings can be incurred by registering before June 20, 2005. In addition, registration is flexible. You can register for the entire week, or choose a one-day registration for seminars, plenary sessions or workshops. To register, or for more information about the Stockholm Water Symposium, seminars, side events and ceremonies taking place from August 21-27, visit www.worldwaterweek.org and download the World Water Week Second Announcement/Call for Registrations!

The Four Pillars of the World Water Week in Stockholm

A Brief Look at the August 21–27, 2005, Activities Which Combine to Make One Unique Event

Symposium

Plenary sessions with noted speakers, panel debates of leading experts, and scientific workshops fuelled by professionals who submitted papers or posters are the core of the annual Stockholm Water Symposium. Since 1991, the meeting has carved its niche as a leading, forward-looking gathering for scientists, politicians, decision makers and different stakeholders.

The theme for the 15th Stockholm Water Symposium is “Drainage Basin Management – Hard and Soft Solutions in Regional Development”. The general focus can be broken down into three categories:

- 1) water resources development, conveyance, allocation and environmental flow,
- 2) water supply and sanitation to cater for household requirements, and
- 3) water management, including pollution abatement, in industrial and food producing sectors.

The workshops will explore different aspects of these categories (see list, page 5). A number of workshops have additional co-convening organisations. In addition to invited speakers for each workshop, the workshop programmes have been supplemented by speakers chosen from an abstract submittal process which ended February 1, 2005. A poster exhibition complements each workshop.

Plenary speakers, and special panels such as a High Level Panel on Water Infrastructure, will also delve into the issues. With the Stockholm Water Symposium serving as its scientific core, the World Water Week is well grounded as a leading research-based, but policy oriented gathering.

Seminars/Side Events

In recent years, the World Water Week has experienced an exponential growth in the number of independently arranged seminars, side events and launches. Whether arranged as stand-alone events, or as part of ongoing processes, these seminars have enabled the week to tackle a wider range of issues and involve more organisations.

In 2005, around 30 seminars and side events had been planned as of press time, on subjects as varied as corruption in the water sector to transboundary water governance (see full list at right).

For example, the EU Water Initiative (EUWI), UN-Water and the Water Supply and Sanitation Collaborative Council (WSSCC) are among those initiatives and organisations organising seminars in Stockholm. The EU Water Initiative was launched in 2002 to catalyse efforts on behalf of the Millennium Development Goals (MDGs). In 2005, the Stockholm meeting will include a multistakeholder forum to inform, further mobilise EUWI partners, and develop synergies with other international processes.

A seminar by UN-Water will explain how the 24 UN system entities co-operate around water, including in the international policy environment among others.

WSSCC will have a multifaceted programme in Stockholm highlighting its AMIWASH Initiative, which is designed to bring together African ministers in support of reaching the MDGs. Seminars take place on several days during the World Water Week, primarily on Sunday, August 21, and Thursday, August 25 and a special one-day fee allows for flexible participation.

Prizes and Awards

Honouring excellence in the water field has always been an important pillar of the World Water Week in Stockholm. Award-winners provide inspiration and are proof that innovation, whether in technology, social policy or any number of fields, can make a positive impact.

Since 1991, the Stockholm Water Prize, given annually by the Stockholm Water Foundation, has recognised excellence in the field. HM King Carl XVI Gustaf of Sweden is the Patron of the Prize and hands over the honour. In 2005, Ms. Sunita Narain, on behalf of the Centre for Science and Environment in New Delhi, India, will ascend the marble steps of the Stockholm City Hall on August 25 to receive the honour. 2005 marks the 15th anniversary of the Stockholm Water Prize, and a number of former Prize Laureates are expected to be in Stockholm.

Three other important awards are presented during the week. The international Stockholm Junior Water Prize will be presented to a winning student or team from one of around 30 countries which will participate in Stockholm. Indeed, the countries are already active throughout the spring with their own national competitions to select their international representative. HRH Crown Princess Victoria of Sweden is the Patron of the Prize, which encourages interest in water issues among young people.

In June 2005, the winners of the 2005 Stockholm Industry Water Award and the 2005 Swedish Baltic Sea Water Award will be announced by SIWI. These winners, too, will be honoured in Stockholm.

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Seminars and Workshops Tackle Many Issues

The World Water Week features many Symposium workshops and independently arranged seminars. Here is a listing of them. Full descriptions can be found in the World Water Week Second Announcement and www.worldwaterweek.org

Social Events, Tours and Exhibitions

Some of the most intense and productive discussions often occur outside the meeting room, and in Stockholm, a number of social activities provide ample opportunities to mix business with pleasure, as do off-site study visits.

The “Meet and Greet” in the Stockholm City Hall has by tradition been the opening social event during the week. Site of both the Stockholm Water Prize Royal Banquet and Award Ceremony, and the Nobel Prize Award Ceremony, the City Hall offers a unique ambience in the heart of Stockholm.

The World Water Week Dinner also offers relaxation outside of the meeting room. In recent years, this event has become a favourite of participants due to the fine food, pleasant environment, live music and good company. A new dinner event, at the Aquaria Water Museum in Stockholm, was added to the social programme during 2004 and proved popular.

Off-site study tours in 2005 will visit a facility showing new sanitation alternatives in the Stockholm area along with the traditional visits to the Henriksdal, a unique and well-respected underground wastewater treatment facility in Stockholm.

Finally, an on-site (Stockholm City Convention Centre/Folkets Hus) exhibition by sponsors of the World Water Week and key collaborating organisations, also offer attendees further opportunities to expand knowledge in the field by seeing innovative technology or progressive activities by leading organisations.

Stockholm Water Symposium Workshops

- Design and Operation of Infrastructure for Multiple Development Objectives
- Coping with Climate Variability, Climate Change and Water Related Hazards
- Water Provision Across Sectors and Jurisdictions
- Tailoring Water and Sanitation Solutions to Reach the Millennium Development Goals
- Strategies to Increase Resource Use Efficiency in Industrial and Agricultural Sectors
- Political and Social Negotiation Processes: Sustainability and the Politics of Water
- Approaches to Mitigate Land Degradation and Gully Erosion
- Water Quality Degradation by Hazardous Substances and the Cost of Non-action

World Water Week Seminars

- AMIWASH – African Ministers to Meet the MDGs
- Finance for Water Solutions: How Capital Markets, Banks, Insurers and Asset Managers Can Work for Water
- 2005 Founders Seminar on Business, Water and Development
- From the Millennium Summit to 2015
- Harnessing Uncertainty: Taking Complexity and Vulnerability Seriously in IWRM
- Hydraulic Infrastructure as a Platform for Economic Growth
- IWRM- Do we Practice that in the North?
- Local Actions for a Global Challenge (4th WWF)
- Marketing Sanitation and Hygiene
- Meet International Water Targets Without Fighting Corruption?
- Modelling the World of Water – Decision Support Tools for Water Resources Management
- Multistakeholder Forum of the EU Water Initiative
- Prediction in Ungauged Basins (PUB): Data, Science and Policy

- Practices in the NGO Sector: The Role of Rotary Clubs
- Water and Energy
- Scenario Building as an Approach for IWRM Planning
- Shared Water Problems in the Middle East: Water for Agriculture
- SIWI Seminar – Benefit Sharing from Integrated Land and Water Use in River Basins
- SIWI Seminar for Young Water Professionals
- The Political Economy of Defecation
- Transboundary Water Governance as a Manifestation of a Trialogue
- UN-Water Seminar

World Water Week Side Events

- A Plan to End Poverty: Meeting the Millennium Development Goals by Investing in Development
- Innovations in Service Delivery to the Poor
- Launch of the Initiative on the Economics of Water: Towards Sustainability
- Political Aspects of the New Swedish Water Management System
- The Children’s Water Way
- Water-Related Risk Management

Remember, you can register for the entire World Water Week or just for those seminar and workshop days you are most interested in. See www.worldwaterweek.org for more details.

India's Centre for Science and Environment Wins Stockholm Water Prize



The Centre for Science and Environment (CSE) in New Delhi, an influential Indian non-governmental organisation led by Ms. Sunita Narain, a dynamic advocate for water, environment, human rights, democracy and health, will receive the 2005 Stockholm Water Prize from HM King Carl XVI Gustaf of Sweden in August. In its Citation, the Nominating Committee lauded CSE and Ms. Narain

“for a successful recovery of old and generation of new knowledge on water management, a community-based sustainable integrated resource management under gender equity, a courageous stand against undemocratic, top-down bureaucratic resource control, an efficient use of a free press, and an independent judiciary to meet these goals.”

The Stockholm Water Prize is awarded annually to individuals and institutions for their outstanding contributions to the world of water. This year's prize to CSE acknowledges the growing crisis of water management in many regions of the South and the need for new approaches that provide local food and water security to communities. CSE's work, through its many publications, its research and advocacy has helped create new thinking on how traditional systems of water management, which use rainwater endowment, once rejuvenated could become the starting point for the removal of rural poverty in many parts of the world.

Building a Water-Literate Society

It is clear that the management of water, and not scarcity of water, is the problem in many parts of the world. CSE's work on rainwater

harvesting has shown the many ingenious ways in which people learnt to live with water scarcity. The solution, practiced diversely in different regions, lies in capturing rain in millions of storage systems – in tanks, ponds, stepwells and even rooftops – and to use it to recharge groundwater reserves for irrigation and drinking water needs.

The world faces a critical challenge to improve the productivity of rainfed and marginalised lands. In this challenge, water can turn a large part of the country's currently parched lands into productive lands, reduce poverty and increase incomes where it is needed the most. CSE has shown through its advocacy that localised water management is a cost-effective approach and more importantly that local water management – harvesting and storing water where it falls – can only be done through community participation.

The work of CSE has highlighted that water cannot become everybody's business until there are fundamental changes in the way water is managed. Policy will have to recognise that water management, which involves communities and households, has to be done co-operatively. For this, the organisation forcefully argues that the prevalent mindset that water management is the exclusive responsibility of government must give way to a paradigm built on participative and local management of this critical life source. This powerful idea is gaining ground to become the policy and practice in many regions of the world.

The 2005 Stockholm Water Prize is given for CSE's contribution to build a water-literate society that values the raindrop and teaches society to learn from the frugality of our ancestors, to build a water prudent



Photo: Madhya Pradesh

Upscaling is possible. Government programmes learn from micro-level experiences of people. A large-scale replication of traditional understanding to secure land and water futures.

world. The movement has the potential to change the water futures of the world.

Reviving Ancient Water Harvesting Techniques

CSE has lobbied successfully for rainwater harvesting to be an accepted, important element in India's water strategy. CSE's founder director Anil Agarwal co-edited with Narain, the eye-opening 1997 book, *Dying Wisdom: Rise, Fall and Potential of India's Water Harvesting System*, spawned a rediscovery of this practical, traditional and inexpensive technique to capture rainwater for drinking and agricultural purposes, and to help alleviate pressure on India's centralised water system – itself a remnant of colonial times. *Making Water Everybody's Business* (2001) expanded upon *Dying Wisdom* by documenting traditions, practices, technologies and policies of water harvesting in India, and by assessing state government efforts to deal with drought.

CSE's National Water Harvesters Network has put the ancient wisdom into practice by creating awareness, undertaking policy research and lobbying to bring about change in policy as required so that water management is decentralised and water availability increased.

Tackling Global Climate Change, Scrutinising Indian Companies

CSE has worked actively with both global and Indian issues. Through Narain – a winner of the Indian government's highest civilian honour, the Padma Shri – CSE became involved in discussions on the Kyoto Protocol to the UN Framework Convention on Climate Change. Claiming that the Kyoto emission quotas favoured rich countries, CSE campaigned that the atmosphere is a global common and should be equally shared by all citizens. CSE campaigned to bring policy changes in the areas of air pollution, industrial pollution, water management and pesticide use. In India, CSE's Green Rating Project (GRP), for example, is a respected civil society initiative to develop an alternative form of governance to control industrial pollution. Its ratings scorecard has led to sharpened scrutiny on the activities of the paper and automobile industries.

Building Fact-based Credibility

CSE has distinguished itself in the global crowd of NGOs through its insistence on hard facts before rhetoric. This philosophy has given the Centre considerable social capital within civil society, politics and the media in the push for policy change. CSE's research programme on ecosystems

and their relation with the human populations they support showed that, in India and elsewhere, environmental degradation leads to human poverty, rather than the converse. This degradation, among other things, burdens women by increasing their daily responsibilities to collect wood for fuel and water to run households. In all that it does, CSE works to build decentralised decision making processes that involve all stakeholders, preferably locally. Rainwater harvesting, managed at the village level by women, is one such example.

Dedication to its core values – environmental sustainability; respect for science, nature's diversity and traditional knowledge; equity and public participation; education and training, documentation and pollution monitoring – have also given CSE the credibility to litigate against formidable adver-

saries such as the soft drink industry. The 2003 CSE study of popular soft drinks and bottled waters, identified pesticides from contaminated groundwater that could cause cancer, damage the nervous and reproductive systems, cause birth defects and severely disrupt the immune system.

CSE uses media outreach and information dissemination effectively to support its advocacy. The Centre produces an impressive and steady output of timely publications and other learning aids, including the fortnightly magazine, "Down to Earth". The magazine, which critiques current policies has become an important voice of the practitioners of hope and change.

Web Sites to Visit: www.cseindia.org
www.rainwaterharvesting.org



An upturned cup on a saucer! An ingenious system to harvest rainwater on an artificial catchment, called Kundi, found in desert state of Rajasthan. With one hectare of land, and 100 mm of rainfall, one can harvest 1 million litres of rainwater.

The Stockholm Water Prize



The Stockholm Water Foundation was established in 1990 to encourage research and development of the world's water environment by awarding the international Stockholm Water Prize. The Stockholm International Water Institute administrates the activities of the Stockholm Water Foundation.

Founders of the Stockholm Water Prize are Swedish and international companies in co-operation with the City of Stockholm. They are:

Anglian Water, Bacardi, DuPont, Europeiska Insurance, Fujitsu Siemens Computers, General Motors, Grundfos Management, Hewlett Packard, Hilton and Scandic, ITT Flygt, Kaupthing Bank Sverige, Kemira Kemwater, KPMG Sweden, P&G, Ragn-Sells, Scandinavian Airlines (SAS), Snecma, Stockholm Water Festival, Swedish Railways (SJ), Uponor Group, Water Environment Federation

Tsunami Impacts on Coastal Ecosystems of Southern Sri Lanka



Photo: Rebecca Tharme

A closer look at coastal ecosystem damage as a result of the tsunami along the coast of Sri Lanka has provided much-needed impetus for integrated coastal zone management (ICZM) linked with integrated water resource management (IWRM). Mr. Sithara Atapattu and Ms. Rebecca Tharme of the International Water Management Institute (IWMI) explain.

By mid-January 2005, in the aftermath of the tsunami that devastated much of the coastline of Sri Lanka, disaster relief agencies had provided considerable humanitarian support to affected communities, and mapping of affected areas was well underway. The majority of attention and resources were directed at assessing and providing for the immediate needs of survivors. In most areas, removal of human remains and large-scale clearing of debris were completed.

Rapid On-site Assessments

The first environmental assessments of a range of coastal ecosystems along the south coast of Sri Lanka were initiated by various organizations, including IWMI, providing some preliminary observations on the nature and scale of the tsunami's impact on their biophysical character.

The degree of direct physical damage to wetland ecosystems was found to be incomparable to the devastation brought about to people and their livelihoods, and to settlement infrastructure. However, the assessments were necessarily rapid, limited in scope and reliant on once-off observations. It is anticipated that more comprehensive biophysical monitoring of change, in comparison with pre-tsunami baseline information for specific systems, may yield evidence of more pronounced detrimental effects.

The spatial extent, laterally and in terms of inland penetration, and intensity of impact on coastal ecosystems were highly variable and a complex function of multiple factors, from coastal bathymetry to ecosystem condition. As a result, it could not simply be assumed that where areas showed little or no sign of impact, it was attributable to a high degree of protection by natural systems. Overall, observations did suggest, however, that where natural ecosystems and their habitats were intact or in good condition, the impact of the waves was reduced, while in areas subject to intensive anthropogenic modification, impacts appeared greater in magnitude. In some places though, it appeared that nothing would have prevented the devastation that was incurred.

Thailand and Sri Lanka

Many stretches of the southern coastline are characterised by sand dune systems vegetated with indigenous and alien trees (e.g. Casuarina), shrubs and creepers. Impacts were less where the foredunes were elevated and stabilised with vegetation, forming an effective barrier protecting adjacent inland areas. There were areas where seawater had washed over low dunes or eroded gaps, damaging the dune system. In many areas, the natural cover of Pandanus and Ipomoea was reduced by up to 75% and marine turtle nesting sites were damaged, according to a survey by The World Conservation Union, IUCN, Sri Lanka. Coconut plantations and home gardens were also affected where they occurred near the beach.

Physical damage to coastal lagoons appeared relatively limited and patchy at first evaluation. It is likely that detailed follow-up assessments will show changes in ecological character from original condition



Photo: Matthias Rust

across the many types of lagoons present in the south, from freshwater to hypersaline systems. Karagan Lagoon showed an increase in surface area, shifts in salinity concentrations and the short-term effects of high debris loads. In this lagoon, as in others, there was evidence of inputs of marine organisms, while mortalities of fresh- and brackish water fish and plants, due to elevated salinities or loss to the sea, was recorded in other cases.

Kalameiya Lagoon, situated within the Lunama-Kalameiya Sanctuary, a protected mangrove site, was markedly affected and transformed from a closed system pre-tsunami, separated from the sea by a sand bar, into an effectively open system to the sea – part of the sand bar was removed completely and the remaining low bar has the potential to be breached easily, especially a concern with the upcoming monsoon season starting in May (Photograph page 10 bottom). These changes are bound to have long-term ecological consequences. Moreover, as the lagoon was (and remains) an important fishing ground, there are serious livelihoods repercussions for the surviving members of the neighbouring villages.

Estuaries and lower rivers were conduits of water inland, with tsunami-induced waves travelling upstream in both large and small systems. Physical impact on one or both

banks typically was localised, with scouring of bank sediments and removal or damage of riparian vegetation. In systems structurally altered by bridges and road culverts, for example, impacts appeared enhanced, with the structures allowing accelerated passage of water into upstream marshes, rice fields and small-scale banana and young coconut plantations – flattening vegetation and leaving behind salt and sediments with potential future effects.

Mangrove ecosystems have been slightly or moderately affected in many areas where broad, multi-storey mixed stands of *Avicennia*, *Ceriops* and other species were in good condition, for example, along the lower reaches of the Madhu Ganga (River), a protected Ramsar site. At Kalametiya Mangrove Sanctuary, which is dominated by stands of *Sonneratia*, as in other locations, sections of mangrove forest acted as frontline buffers to the waves; large healthy trees were seen toppled by the tsunami as far inland as several hundred metres from the beach.

Coral Reefs Under Pressure

Coral reefs, which form as scattered fringing reefs around the coastline of Sri Lanka, are currently subject to tremendous pressures due to coral mining and the collection of ornamental fish and invertebrates. Coral reefs were further highly degraded by a bleaching event in 1998, which killed many reef areas. Some scientists argue that the hardest hit areas were those that experience the most coral mining. The reef system protected within Hikkaduwa National Park, which was severely degraded in 1998, escaped with minimal tsunami damage (localised debris impacts, some dislodgement of corals), whilst the vast majority of tourist boats and many shoreline buildings were destroyed. Prior coral bleaching did not seem to exacerbate

the impact. Less is known as yet of the effects of the tsunami on coastal sea grass beds.

Large-scale impacts have occurred to coastal lagoon fisheries and agricultural lands which have triggered new livelihoods dynamics for fishers and farmers alike. Considerable attention is now focused, though multi-partner proposals, on restoring and/or providing alternative livelihoods options for coastal communities dependent on natural resources. Support for livelihoods needs to be not only acceptable for the local people, but also environmentally appropriate and controlled, to best cater for the altered patterns of resource use and access.

Future Coastal Zone Development

The impacts observed have several implications for rehabilitation and future development planning of the coastal zone. The south coast of Sri Lanka has evidently had poorly planned coastal developments to date. This situation has made the immediate coastal area extremely vulnerable to more frequent natural disasters than tsunamis, including cyclones and hurricanes. The Sri Lankan Government is looking at a way forward in terms of future development of the coastal zone, and a 100 metre buffer zone for coastal development, with 300 metres for certain high-risk areas of the coast, is being mooted at present. There are of course difficulties inherent in such an approach, including the issue of the potential relocation of towns and entire fishing communities at sites far removed from their current sources of livelihood.

There are numerous initiatives for coastal reconstruction underway involving international and local NGOs, local universities and government agencies. These rapidly evolving initiatives require practical environmental guidance, delivered through well-coordinated efforts. For instance, the Ramsar Convention

on wetlands has convened a Ramsar Tsunami Reference Group comprising Wetlands International, the World Wildlife Fund (WWF), IUCN, BirdLife International and IWMI (<http://www.wetlands.org/tsunami/>).

Its immediate priority is to coordinate ongoing rapid assessments of the affected areas and to bring together scientifically sound advice on wetlands in the Asia region, in order to assist governments in choosing the most effective response measures and to help inform settlement and re-development plans.

Currently in Sri Lanka, few aid-based plans for rehabilitation seem to pay sufficient attention to environmental concerns, either in the short-term or longer-term. There is a high risk of sites being located too close to ecologically sensitive or protected areas – such areas need to be delineated and prioritised as many people are rebuilding homes and businesses on the original sites and some new resettlements are already under construction.

Much debate has centred on the significance and role of natural coastal ecosystems in mitigating the impact of the tsunami. There has been recognition that natural and human landscapes need to be managed as an integrated system. In this regard, the disaster has provided much-needed impetus for integrated coastal zone management (ICZM) linked with integrated water resource management (IWRM), in Sri Lanka and elsewhere in the region.

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Ms. Rebecca Tharme is a researcher in freshwater ecology at IWMI. She can be reached at r.tharme@cgiar.org. ■



Photo: Rebecca Tharme



Photo: Rebecca Tharme



Photo: Rebecca Tharme

Sand dunes severely damaged by wave action, fishermen repairing boats and small-scale agricultural lands and wetland areas affected by the wave.

Tsunami-Induced Coral Reef and Coastal Ecosystem Damage in the Indian Ocean

Long-term damage to the coral reefs and coastal ecosystems in the tsunami-affected areas of south Asia is the subject of intensive study. Damage appears to vary from country to country, and even locally. Prof. Olof Linden of the World Maritime University provides an update.



Photo: Matthias Rust

The Sida-supported CORDIO (Coral Reef Degradation in the Indian Ocean) project has formed a network of coral reef experts and managers in 11 countries of the Indian Ocean. These experts are involved in coral reef monitoring, targeted research, management and policy issues, education and training, and research and development of alternative livelihoods for coastal communities that no longer can support themselves from traditional coastal activities such as fishing. These expert groups were already on “stand-by” when the tsunami took place and as a consequence could secure data regarding the impact of the tsunami on coastal ecosystems quite soon after the event. CORDIO-teams of marine biologists started assessments in Sri Lanka, India, Maldives, Seychelles and Kenya and were in the field within days after the catastrophe. Additional teams started diving in Thailand just four days after the event.

Thailand and Sri Lanka

In Thailand and Sri Lanka coral reefs at several hundred sites along the entire Andaman Sea coast of Thailand and the south, southwest and east coast of Sri Lanka were surveyed. The tsunami impact varied dramatically between sites, with damage ranging from almost unaffected in about 50% of the sites to severe. Extreme mechanical damage was seen on approximately 15 to 30% the sites. On the reefs of Trincomalee in eastern Sri Lanka, the damage was particularly bad. Here, nearly half the reef area was turned into fields of rubble and sand. More than 75% of the remaining reef has been severely damaged by large coral blocks and dead

coral that have bulldozed the reef, tearing off the live coral and eroding the limestone foundation of the reef, particularly along the southern reef margin (Figure 1).

Virtually all remaining live corals have been damaged, and many *Acropora* colonies (Staghorn coral) were sheared. Among standing thickets, most branches were loose and moving with the swell. Many tabulate and massive corals had been uprooted and toppled over – even some *Porites* colonies (Brain coral) over 2 metres in diameter, and many colonies of less than 50 centimetres have been transported large distances. Signs of paling and bleaching were evident in remaining massive colonies, which may be caused by sediment stress and abrasion.

In many sites, damage was patchy, with scars in the reef ranging from less than one to several meters across, but often far apart. Large coral boulders that had been killed by the el Niño-related bleaching in 1998 had been turned over by the tsunami wave and caused the scars in the surrounding reef. Also, rubble that had been formed by dead coral from the 1998 bleaching had been shifted by the wave and was now partly covering large stands of *Acropora* coral reef.

Litter and debris from land included textiles, plastics, tree branches and logs, parts of boats and household items. Some smothering of corals was observed, but it appears to be primarily from re-suspended marine sediments rather than terrigenous matter. Damage to sea grass beds was minor and, where present, was mostly due to shifting rubble.

Although some impact on fish populations of the reef areas was noted during the acute phase, notably on small fish such as gobies, butterfly fish and wrasse, long-term studies are necessary to assess whether these impacts will be of significance. Notably, the problem of overfishing in the affected coastal areas is by far the most important issue in coastal management.

Severe beach erosion was observed both in the east and southwest, but the impact was patchy. Severe damage was observed where illegal coral mining in the sea has been rampant. While there was evidence that in places where mangroves and coastal vegetation were less disturbed, the energy of the tsunami dissipated more efficiently. Hence, additional information on how the tsunami was shaped, deflected, weakened or focused by bathymetry and shore profile is essential to draw more detailed conclusions.

India, Gulf of Mannar

Scientist surveyed 11 sites within the Tuticorin, Vembar, Keezhakkarai, Mandapam groups of islands and one mainland site in the Gulf of Mannar between January 4 and 10, 2005. No significant coral damage was recorded at any of the sites (Figure 2). Within the Tuticorin and Keezhakkarai Groups a few table corals (*Acropora cytherea*) were tilted and few branches of *Acropora intermedia* and *A. nobilis* were broken by the strong waves of the tsunami. In the Vembar and Keezhakkarai Groups, sea grass and seaweed entangled corals and had also been washed ashore. The gravel sand seafloor near the reefs was replaced by layer of fine sand about one centimetre thick, but was not smothering branching and massive corals. At the mainland site, the tsunami filled 25 to 30% of the cup-shaped colonies of *Turbinaria* sp., which dominate this reef, with 4 to 5 centimetres of fine sand. Except for a few displaced colonies, no damage was recorded within a 60 m² area that has been artificially restored by SDMRI using coral fragment transplanted on cement slabs. There was no sand deposition on this site and the faunal assemblages had not changed.

No impacts on the fish community were recorded at any site and no significant impact to sea grass beds was recorded at any of the sites surveyed.

On Thalaiyari Island in the Keezhakkairai Group, trees were uprooted as a result of soil erosion. Soil erosion was also noticed between the mainland and Krusadai Island in the Mandapam Group. It is worth mentioning that mining of both living and of dead corals in the reef areas of the Gulf of Mannar is extensive.

Andaman and Nicobar Islands

Reef Watch Marine Conservation carried out assessments of the impact of the tsunami on coastal marine biodiversity starting in late January 2005. The turtle nesting beaches of South Andaman, Little Andaman and the Nicobar Group of islands have almost disappeared as the tectonic activity that initiated the tsunami has caused the subduction of these islands by 1 to 4 metres. This will affect the reproductive potential of Leatherback, Green Sea, Hawksbill and Olive Ridely turtles which use these islands as nesting sites.

The tectonic movement also affected the coral reefs in Nicobar and south Andaman and resulted in a subduction so that the reefs suddenly were located up to 4 metres deeper in the water. The opposite was the case for the reefs of north Andaman, where some reefs were lifted 4 metres above their previous position. Other physical effects (breaking of branches) were caused by wood logs and other debris from land. In most of the reefs, the larger colonies of *Porites* were toppled. Previously the coral reefs in the area were dominated mainly by the genus *Porites* followed by *Acropora*. If there is substantial damage to *Porites*, then entire reefs in that particular region are likely to become unstable and may be unable to withstand further environmental stress.

Coral reefs in several areas in Nicobar and south Andaman (for example Jolly Buoys, Redskin and Alexandra) has been extensively damaged. In the reef flats sand and silt has been deposited on the coral reefs. Large coral colonies (larger than 2 metres in diameter) have been uprooted and scattered all over the

reef, and coral colonies occurring on the reef edge have been pushed out to deeper water, perhaps up to 20 metres. Broken branches of *Acropora* and *Hydnophora rigida* have been scattered over the reef, the fish abundance and diversity decreased, and tree logs and other land-based debris originated is found over large parts of the reefs.

Seychelles

In the Seychelles coral reefs on coralline substrates such as on the northern islands clustered around Praslin (including Curieuse, La Digue, Felicite and the rocks of Isle Coco and St. Pierre) showed very high levels of damage (approaching 100%). The assessments showed that the reef framework in these areas was too loosely consolidated to be able to withstand the force of the tsunami wave. The consequence was very dramatic damage to the corals, which broke loose and turned

over. A contributing factor was that the coral reef had been weakened by the extensive mortality during the 1998 El Niño and subsequent bioerosion. In these areas significant amounts of reef rubble was moved by the wave and deposited on live coral colonies. In contrast to the reefs on coralline substrates, the corals on the granitic seabed around Mahe showed much lower levels of impact, generally below 10%. The limited damage on Mahe is due to the shelter provided by the outer northern islands and dissipation of wave energy as the tsunami travelled over the greater distance of shallow water from the outer edge of the banks to Mahe.

Prof. Olof Linden of the World Maritime University (WMU)/International Maritime Organization (IMO) is a member of the CORDIO network. He can be reached at ol@wmu.se. ■



Photo: Rebecca Tharme

Kalametiya Lagoon, Sri Lanka, with remains of sand bar. The sensitive Mangrove vegetation has been seriously affected.



Photo: Mattias Rust

Cottages upturned by the waves.

More Reading on the Web

CORDIO, IUCN and scientists from different research institutions reported the initial impacts of the tsunami based on rapid assessments by scientists. "Rapid Assessment of Tsunami Damage to Coral Reefs in Sri Lanka: Interim Report 19 January 2005" by NARA/CORDIO/IUCN/GCRMN., and other reports, regular updates and tsunami-coral reef resource materials, can be obtained from the CORDIO (www.cordio.org) and IUCN (www.iucn.org) websites.

Long-term Implications of the Tsunami in Aceh, Indonesia



The northern tip of Sumatra in Indonesia, and the provincial capital of Banda Aceh in particular, bore the brunt of the 2004 tsunami. Dr. Sutardi Sutardi of Indonesia's Ministry of Public Works, and also Program Secretary of the Indonesia Water Partnership, examines the full impact of the event across several sectors, and what remains ahead.

Of all the countries in South and South-east Asia affected by the Asian tsunami, Indonesia was perhaps hardest hit. According to the National Board of Coordination for Disaster Management, as of March 7, 2005, more than 125,766 people are known to have lost their lives in Sumatra alone, with some 94,494 people still considered missing. Sadly, the true number of perished may never be known.

The northern tip of Sumatra and the provincial capital of Banda Aceh in particular bore the brunt of this tsunami. Satellite imagery shows that 49 km², or 80% of the built up area of Banda Aceh city, was either totally destroyed or extremely damaged. Outlying villages were likewise devastated; while loss of life there may not have been as severe, infrastructure, housing and livelihoods have been lost on a wide-scale.

Water Supply and Sanitation

Pre-disaster, water supply networks served about 35% of urban population and about

7% of rural population, while the rest were getting their water from shallow fresh water wells. In tsunami-affected areas, water supply networks (80% damaged) and water treatment plants and pumps (65%) were hard hit. Shallow freshwater wells for household use are now saline, with water table around 5 metres deep and contaminated by potentially infectious sludge.

Water and sanitation impacts are a concern at temporary camps; there are no waste disposal collection or disposal system, and no proper storage facilities for food or water (small containers only good for 1–2 days supplies). Inadequate numbers of latrines is also a widespread concern. Obviously, long-term access to fresh, safe drinking water is a concern. Emergency measures by the local and national governments as well as the international community are providing safe water supply and proper sanitation for temporary camps and the affected people. The rehabilitation and reconstruction phases will be focused on rehabilitating the broken water supply and sanitation infrastructure, and possibly the extension of service to newly reconstructed areas/settlements.

Health

Significant quantities of waste have accumulated on land, in canals, and even been washed back to sea. Debris (including corpses) is still being deposited on beaches

by tides. There is no guidance or procedures for appropriate solid waste disposal; waste is being dumped (in which its composition is not known) 5 to 10 kilometres inland from Banda Aceh along the roadsides. Some sites are near rivers or temporary settlements, with the focus being on speed and ease of deposition. Transportation for waste collection is inadequate, delaying clean-up and prolonging the infectious period. Hospital waste has been washed into open public areas; there is no organized collection or safe disposal of such materials.

There are fears of leakage of toxic materials (oil leaks, pesticides from warehouses and shops in and around Banda Aceh) and airborne transmission of infectious organism from dust and dry sludge, and during the collection and transportation of gathered wastes. Pollutants of many types are being transported and deposited in other areas causing problems to be transferred from one location to another. Open burning of solid waste and debris poses a serious health hazard.

Food

The tsunami and earthquake caused serious damage to irrigation structures, canals and embankments, and flood protection facilities along the river mouth. Many farmers report lost rice harvests, and rice paddies have been contaminated by salt water and sludge.

All irrigation systems near the coast of Aceh were severely damaged by the tsunami, where the damage was greater in secondary and tertiary canal systems than in headworks and main canals. The total irrigation area damaged is estimated at 28,000 ha in Aceh province (9.6% of the total irrigated area of 290,680 hectares) and about 3,700 ha (1.1% of total irrigated area of 327,224 ha) in North Sumatra province. Damage to irrigation systems and rice fields may cause a loss of about 143,000 ton of rice production per year. Two to three years may be needed to bring productivity back.

Public Infrastructure Damage

All flood control and coastal structures near the coast of Aceh were severely damaged by the tsunami, including up to 271 kilometres upstream within five major rivers. The Krueng Aceh River flowing in Banda Aceh was especially hard hit. Similarly, the tsunami damaged completely the seawall off the west coast.

The number and severity of destroyed public facilities are massive. Two major ports in Banda Aceh and Meulaboh are completely out of function. About 1,078 kilometres of road were destroyed and 181 bridges collapsed, hindering relief efforts. Similar conditions plague electricity and telecommunications service delivery, as well as the drainage system and urban water supply facilities. Damage to government offices and hospitals hindered a coordinated response during the first month of emergency relief.

Livelihoods

The livelihoods of hundreds of thousands of people have been affected. Examples include:

- An estimated 37,000 hectares of prawn/fish farms along the coast have been lost, diminishing investments and opportunities for small-scale businesses.
- Land tenure is now uncertain for many families who used to live in the coastal strip.
- Uncertainties regarding the future of rice farming, coconut plantations, fish farms and open sea fishing (due to damage of fishery equipments).
- Lost assets, belongings and livelihood security possibilities, especially along the coastal strip, all of which may result in higher dependency on natural resources.

Guidance is necessary to enable communities to be better informed of the likelihood of natural disasters happening, and to enable them to prepare better for future even-

Ecosystems and Groundwater Degradation

Many natural ecosystems (mangroves, coral reefs, near shore zones including fish farms, freshwater reservoirs and the coastal strip) have been heavily damaged, leaving them more vulnerable to possible future events such as high tides.

Due to wide-scale infusion of saline water and possible contaminants (e.g. from sewage) groundwater and shallow freshwater wells are now saline and contaminated by sludge. Observation of the shallow groundwater for provision of water supply for temporary shelters shows no obvious signs of improving; therefore water shortages are reported from some settlements. In this situation, the emergency restoration of domestic water supply through the drilling of deep wells, provision of portable water treatment plants and the repair of domestic water systems are required.

Core Principles for Spatial and Zoning Plan

Cities in coastal areas will need to be maintained with some adjustments on local aspects, protection from earthquakes and tsunami, and protection on conservation areas. Measures needed include:

- Construction of an arterial road from western to eastern parts of Aceh Province.
- Construction of an access road to link the southern and northern parts of Aceh.
- Development of buffer zones, fish farms and parks in locations not considered feasible for settlements from geological and environment points of view.
- Determination of environmental and building codes for zones with limited development, and building escape facilities for protection from earthquake and tsunami.
- Development of man-made constructions and natural/vegetation buffer zones in coastal areas.

Photo: Mattias Rust (small); STWI (large)



tualities. Future resettlement plans – spatial planning issues, sanitation, water and waste collection/disposal facilities – need appropriate development.

Restoring Lives and Livelihoods

This process has begun with machine and labour intensive public works to remove thousands of corpses and to clean up waste materials, debris and sludge. Barracks have been provisioned and equipped with multipurpose spaces, water supply, sanitation and access via roads. Other needed measures:

- Provide the opportunity for families to rebuild their own homes with the support of construction materials and design standards and building codes.
- Support families and communities where displaced people have taken refuge.
- Provide transparent compensation, even if past experience shows that this is the area of greatest difficulty, legally speaking.
- Focus on land offices and dispute-resolution procedures, including institutions and staffing.

Restoring the Economy

Restoring the economy will require a number of measures, including (but not limited to):

- Recognise labour intensive infrastructure investment, and purchase and hire locally.
- Recapitalize household enterprises with grants rather than loans.
- Move quickly to re-establish banking services (including proof of identity procedures).

Recovery of Water Resources Infrastructure

The recovery of water resources infrastructure is critical, including domestic water supply and sanitation, irrigation, flood con-

trol and coastal protection. Three phases will be necessary: the emergency phase, rehabilitation phase and reconstruction phase.

The emergency phase, a six-month period starting immediately after the disaster, includes emergency restoring of water resources infrastructure. The focus is on supplying clean water to drink by means of drilling of deep tube wells, repairing domestic water supply systems and improving living conditions by drainage of wet areas.

Following the emergency phase, a 1.5-year long rehabilitation phase will be needed. Domestic water supply and sanitation facilities need to be rehabilitated up to pre-disaster levels of service. Flood control will need rehabilitation to minimise damage against possible future floods, and river structures/stretchers must be normalized to at least a minimum level. Finally, rehabilitation of coastal structures to protect against tidal waters will be needed.

The reconstruction phase, a four-year period starting 2006, will need to see that domestic water supply and sanitation facilities have increased the coverage of service levels, targeted new settlement areas. Irrigation facilities will need to recover the function of irrigation systems to enable farmers to produce the paddy and other agricultural production to the existing commanding areas (before tsunami), and incentives and systems for sustainable maintenance need to be introduced. For flood control, flood management structures need to be reconstructed to the original condition, if not better, and public and private assets must be protected from possible flood damage in all river systems. Finally, coastlines must be secured against tidal waves in order to protect public and private assets at the original level or more based on spatial plan.

The general principles of the implementation program of the recovery plan in the water resources sector are as follows:

Rapid participatory damage and needs assessment: Emergency and recovery plans should be based on the rapid participatory field damage and needs assessment, and the recovery works should be based on the prioritisation drawn from the damage and needs assessment. Attention should be paid to prioritisation of those works that should be based on the needs of the local population.

Recovery plan: The prioritisation is given to: (a) improving the local working and living conditions; (b) emphasizing labour intensive infrastructure recovery works to be carried out by local people, (c) maximum stimulus for revival of local economic activity.

Spatial Planning: Recovery of coastal protection facilities should depend on the condition of the area to be protected. Where the protection areas are devastated, or the coastal geography was changed and the local people have shifted, the recovery works should be carried out in consideration of the result of spatial planning.

Financial Challenges

A cost estimate for the recovery of public infrastructure (excluding private holdings) has been made based on a grouping of three sectors under the Ministry of Public Works. These are 1) Cipta Karya, consisting of water supply, sanitation, drainage facilities and construction of barracks; 2) Bina Marga, consisting of roads and bridges; and 3) Sumber Daya Air, consisting of irrigation, flood control and coastal protection facilities. Total funds required to recover three sectors of public infrastructure (including fund required for spatial planning) under the Ministry of Public Works alone is estimated at USD 827.5 billion.

This amount will stretch Indonesian financial capacity, since it is twice the annual budget for all three sectors for the entire country. Therefore, special arrangements in terms soft loans or grants from international donors is required to fund the recovery of public infrastructures. Otherwise, it the pace of development of public infrastructures for the rest of the country will be hindered.

Funds required for each phase and period of implementation plan are as follows:

- Emergency Phase: USD 89 billion
- Rehabilitation Phase: USD 143 billion
- Reconstruction Phase: USD 596 billion

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Photo: Mattias Rust

The recovery of water resources infrastructure is critical, including domestic water supply and sanitation. Here, a toilet is visible, partly covered with sand.



SIWI and Partners Push New Water Paradigm for Food Security

SIWI's efforts to get future water-food security issues higher on the international agenda continued in April 2005, as Stockholm Water Front went to press, with the presentation of a new report on the subject during the 13th meeting of the Commission on Sustainable Development (CSD-13) in New York.

The Swedish International Development Co-operation Agency (Sida) commissioned SIWI to produce "Let it Reign: The New Water Paradigm for Global Food Security," a new report presenting recommendations for policy and decision makers with regard to sustainable food production, sustainable food consumption and ecological sustainability, for better water management.

Prepared together with the International Food Policy Research Institute (IFPRI), International Water Management Institute (IWMI) and IUCN – The World Conservation Union, it highlights key facts, conditions and trends regarding water aspects of food production, consumption and ecological sustainability. Specific policy recommendations within governance, capacity building/awareness raising and financing are offered and designed to improve water productivity and increase the possibility to produce the food needed, improve diets, and raise consumer awareness – all in an equitable and ecologically sustainable manner.

Food security issue is alarming

SIWI and its collaborating partners have focused on food security because the issue is so alarming. Food needs are increasing and food consumption is moving towards more water-consuming items. Irrigation possibilities are limited and agricultural land is shrinking. The report recommends co-ordinating efforts in different sectors so that synergies can be generated and the hu-

man livelihood improvements identified in the UN Millennium Goals (MDGs) can be achieved.

A key, paradigm-shifting premise upon which much of the report is based is that today, unlike the past, consumption preferences drive food production, which is dependent on water. Consumer food preferences in combination with new patterns in the processing and trade of food items are changing the consumptive use of water for food production and impacting the already-stressed water resources, ecosystems and the water available for other societal uses. Yet food production will always be highly water consuming, from both the "green" and "blue" water perspectives. For the projected per-capita human diet of 3000 kcal/day, water needs are 70 times greater than for basic household water needs. The human population is also growing by some 70 million people per year.

Co-ordination at the policy level is also needed since undernourishment is trending upwards – 852 million people are hungry today – while, paradoxically, malnutrition is equally rampant. These twin public health threats obstruct the ability of people to fight hunger, overcome poverty and resist disease.

Another myth-shattering revelation of the report is that the goal of eliminating hunger and undernourishment by 2025 will require as much water as that withdrawn (often unsustainably) and used in agriculture, industry and domestically today. Increased irrigation can help, but the goal can mainly be met only through improved green water use in rain fed agriculture, the report says.

To download the "Let it Reign: The New Water Paradigm for Global Food Security," visit www.siwi.org.

For more about CSD-13, visit www.un.org/esa/sustdev/csd/csd13/csd13.htm

More CSD-13 Reports from SIWI

Visit www.siwi.org to download two new reports commissioned by the governments of Norway and Sweden and prepared by the SIWI in collaboration with the World Health Organization and the Norwegian Agency for Development Cooperation for CSD-13.

Making Water a Part of Economic Development: The Economic Benefits of Improved Water Management and Services

Better access to clean water, sanitation services and water management creates tremendous opportunity for the poor and is a progressive strategy for economic growth. This report articulates the close link between water and the economy and makes the case that investing in water management and services is absolutely essential for the eradication of poverty and is a necessary condition for enabling sustained economic growth.

Securing Sanitation: The Compelling Case to Address the Crisis

In 2002 the World Summit on Sustainable Development in Johannesburg recognised the central role played by sanitation when it adopted a target to halve, by 2015, the percentage of people without access to basic sanitation. Sanitation and the means to practice hygienic behaviours yield direct benefits in terms of health, education and economic productivity. This report, the synthesis of two previously released papers, lays out the economic case for investing in sanitation.

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SJWP News

This spring, 30 national Stockholm Junior Water Prize competitions are underway across the world. The winner of each national competition, be it an individual or small team, will qualify for the international final. The final takes place during the World Water Week in Stockholm and culminates on August 23, when the prize will be presented during an award ceremony in Stockholm.

Included in the 30 countries participating are three new ones: France, India and the Ukraine.

Welcome, Per Bertilsson



SIWI is pleased to welcome Mr. Per Bertilsson to its staff as a Project Director.

Mr. Bertilsson comes to SIWI from the Global Water Partnership, where he worked with national-level implementation of Integrated Water Resources Management, particularly with focus on Africa. His career has also seen postings in different parts of the world, including Africa, South Asia and South America, in the development aid field, with a focus on water and natural resources management.

As a Project Director at SIWI, Mr. Bertilsson will work with development and management of international projects and also provide support to the Swedish Water House and the SIWI based UNDP Water Governance Facility.

“Per Bertilsson’s long experience from working in international organisations, development banks and UN agencies, together with his well established international network, will be an extremely valuable contribution to the work of SIWI,” said Mr. Anders Bertell, Executive Director.



Need the latest programme updates? Want to see who will be presenting what during the Stockholm Water Symposium workshops? Want to register on-line to attend? Would you like to have the World Water Week Programme Announcement as a PDF document? Then be sure to visit the World Water Week’s comprehensive home page at www.worldwaterweek.org. Launched in December 2004, the site provides you with easy access to all that will be happening during the week. Links to all of the collaborating partners are also included. During the 2005 World Water Week in Stockholm, August 21–27, the site will also feature videos, photos and other news from Stockholm. Bookmark www.worldwaterweek.org today and visit it on a regular basis for the latest updates on the 2005 World Water Week in Stockholm.

Available from SIWI: Reports on Water and Sanitation, Financing

Don’t forget to visit www.siwi.org to download these recently released titles:

Health, Dignity, and Development: What Will It Take?

The Swedish Water House supported the publication of an abridged version of the UN Millennium Project Task Force on Water and Sanitation Final Report, titled “Health, Dignity and Development: What Will It Take?”. The report outlines the bold yet practical actions needed to increase access to water and sanitation.



Challenges of Water Scarcity: A Business Case Study for Financial Institutions

The challenges associated with water scarcity are becoming an emerging risk of strategic importance to businesses and their financial backers around the world. This report, produced by the United Nations Environment Programme – Finance Initiative and the Stockholm International Water Institute with support from Sida and the Swedish Water House, examines the business case for improving risk management tools, which can specifically be related to the risks borne by water scarcity.

