

Sustainable Development Update

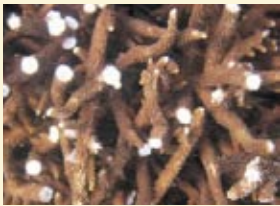
– Keeps you updated on the interactions between ecological issues and social and economic development

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Issue 1, Volume 5, 2005

“ Even before the tsunami, Asia has been the most affected region both in terms of the number of natural disasters reported as well as the number of people affected ”

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It is not tsunamis that kill the world's coral reefs

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“Ecosystem valuation that holds water”

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“... Sweden looks forward with great expectation to the Millennium Ecosystem Assessment [...]. We will all and not least the poorest among us be better off if heads of government decide to draw political conclusions from the new knowledge about the value produced and the services provided by ecosystems.”

Lena Sommestad,
Swedish Minister for the Environment, February 21, Nairobi.

After the giant wave...

The tsunami has highlighted how diversified livelihoods and complex ecosystems are more resilient to shocks.

In the midst of all the suffering and horrifying stories of families torn apart, some important insights seem to have been gained.

Insights about the vulnerability of the poor and the need for rebuilding that is ecologically sustainable is spreading in the wake of the giant wave.

More in the feature article, page 2-3



Stranded fishing boats in the Indonesian town Banda Aceh's streets after the tsunami.

Editorial:

Didn't have to wait for an even bigger catastrophe

In my last editorial, a few days before Christmas, I wrote that we didn't have time to wait for even bigger catastrophes. I argued that it's not until a catastrophe happens that things like environmental degradation, undernourishment, and lack of basic sanitation and clean water in the South turn into news in the major media of the North.

All this feels painstakingly up to date after Boxing Day's disaster in the Indian ocean. It did indeed have all the necessary ingredients to make it to the headlines. It was sudden, unexpected and even though it happened in poor Southeast Asia, a lot of people from developed countries suffered because of it.

Now many aid agencies are worried the aftermath of the tsunami will eclipse the daily struggle with hunger, disease and environmental degradation in locations like Darfur, Congo and Rwanda.

On the other hand, I have thought a great deal about the Chinese ideogram for crisis since Boxing Day. A few years ago I heard someone lecturing about this complex sign that is made up of two seemingly conflicting characters, one signifying danger, the other opportunity. Similarly, December 26 did indeed bring unspeakable danger and destruction on a biblical scale, but paradoxically it also resulted in a kind of opportunity.

In the midst of all the suffering and horrifying stories of families torn apart, some important insights seem to have been gained. Insights about the vulnerability of the poor coastal communities and, as a result, a new sense of solidarity is spreading in the wake of the giant wave. Moreover, the enormous environmental impacts of the tsunami and the role healthy ecosystems have played in saving lives seems to have raised

“Insights about the vulnerability of the poor and a new sense of solidarity is spreading in the wake of the giant wave”

the profile of environmental issues in the media. This might be of little comfort to the millions suffering and mourning since Boxing Day, but may nevertheless be an opportunity in a longer term perspective.

I'm hopeful and believe that the compassion created by the tsunami will last long and that aid won't simply vanish into highly visible, short-term projects. It must reach the silent emergencies caused by poverty, lack of food, environmental destruction and our indifference.

Unfortunately, we didn't have to wait for an even bigger catastrophe. Fortunately, people seem to be learning from it.

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Paths to a Sustainable Recovery after the Tsunami

Out of the devastation caused by the Indian Ocean tsunami an opportunity has arisen to address the underlying causes of vulnerability to such extreme events and to approach the region's recovery in an ecologically sustainable way. Key to this is community-based understanding of ecosystems and livelihoods, and cross-sectoral research that bridges the divide between relief and development, and science and policy.

Extreme natural phenomena, such as the 26 December tsunami, result in large scale disasters when they hit societies' poorest and most vulnerable people.

It is not by chance that hurricane Andrew in 1992 killed a few people in Florida, while a hurricane of comparable force killed 140 000 people in Bangladesh in 1991. For reconstruction to contribute to the sustainable recovery of the region there needs to be a clear understanding of who is most vulnerable to the impacts of this event and its ongoing implications (see Box 1). By building on this understanding recovery will not just re-create

"It is not by chance that hurricane Andrew in 1992 killed a few people in Florida, while a hurricane of comparable force killed 140 000 people in Bangladesh in 1991"

vulnerability, but rather build social and ecological resilience (see SDU 2/2002 for a definition). This will strengthen the ability of communities to withstand future shocks and stresses.

Recovery will be influenced particularly by a household's access to and security of resource entitlements, and diversity of income sources.

Ecosystems save lives and livelihoods

The dramatic environmental impacts of the tsunami and the role resilient ecosystems played in saving lives has raised the profile of environmental issues. There is now a unique opportunity to bring strategic environmental thinking into the recovery work for future disaster prevention. The landscape's ecological functions and ecosystem services constitute the foundation for building resilience to future surprises.

The destructive forces of the waves near the earthquake's epicenter in Northern Sumatra and Aceh were so great that little could have physically protected coastal communities there. However, evidence from other affected areas indicates that the clearance of mangroves and other coastal vegetation, as well as the destruction of reefs and



Signs of tsunami devastation, The Maldives Photo: FAO

dunes may have contributed to the harmful effects of the tsunami.

Tourism may create economic opportunities for local communities, yet too often it has led to the destruction of valuable ecosystems important to local livelihoods, food security and coastal protection. In many cases, the sole reliance of local communities on the tourism industry for their livelihoods has made them vulnerable to e.g. shifts in consumer preferences and natural hazards. The tsunami has highlighted how diversified livelihoods and complex ecosystems are more resilient to shocks.

Build on local capacity

To realise a sustainable recovery for the region, the challenge can be divided into three parts:

- strategic cross-sectoral research that responds to community and livelihoods needs;
- clear livelihood focus on poverty reduction;
- consideration of cross-level linkages, from local to regional levels.

Moreover, facilitating the sharing of knowledge and experience within the region is likely to be more appropriate (and cost effective) than North-South transfers.

"The tsunami has highlighted how diversified livelihoods and complex ecosystems are more resilient to shocks"

Whilst technical responses obviously play an important role in the recovery and disaster preparedness, such as the establishment of a regional early warning system, in the end, it is local communities who should be the focus of such systems, to ensure they receive information on time, have options and know how to react.

It may be more feasible to develop early warning systems which can also be applied to more frequent hazards such as floods, storms and cyclones. Such systems can be designed in ways that create resources valuable to communities

Box 1:

Who is most vulnerable to the effects of a tsunami?

Vulnerability varies over time and place. Most vulnerable in the recovery stage are:

Particular social groups:

women, the elderly, children and orphans, minorities, single-headed households;

Particular livelihoods:

e.g. fisheries, the informal tourism economy;

Socially excluded groups:

e.g. 'illegal' settlers;

The economically marginalised:

those with inadequate access to economic and social capital.

in times of non-emergencies, one example is the use of cyclone shelters as schools and community centers. Even if no hazard occurs, the investment improves the communities' quality of life in other ways.

Ecological knowledge and soft options

Traditional knowledge played an important role in saving lives in some communities, such as the island of Simeulue, west of Sumatra and on the island of Surin in Thailand.

This example of social resilience resulted in people immediately fleeing to higher ground when nature triggered warning signals, such as the rapid retreat of the tide. Increasing awareness of hazards requires the communication and application of scientific knowledge as well as its integration with indigenous and traditional knowledge.

Vulnerability assessments can identify those most affected by the loss of certain ecosystem services in order to target assistance and ecological and livelihood restoration works. Attention is now focused on the impacts on fishers. Before this event, however, fisheries was in some cases a marginal, low income livelihood. Whilst recognising community

fishing rights, supporting people to move back into economically marginal or environmentally unsustainable livelihoods reduces their resilience to future shocks and stresses.

There is an opportunity from this event to focus efforts on the so-called 'soft' options for coastal protection, such as coastal reforestation.

Evidence from restoration initiatives elsewhere, for example mangrove reforestation in Vietnam, indicates clear resource tenure and local income benefits, are critical to their success.

Securing peoples' livelihoods and the resource base that underpins them should be the priority, not abstract environmental targets or arbitrary zoning boundaries.

Adapting to an uncertain future

Strategies for a sustainable recovery of the region need to acknowledge the increasing hazard potential in coastal areas due to climate change and sea level rise.

In addition, there are several processes including tourism, urbanization, migration to the coast, industrial fisheries and intensive aquaculture which place stresses on coastal ecosystems and communities.

The tsunami opens a door for a new dimension of social development, namely a strong landscape.

In the reconstruction of physical infrastructure it is essential to make future structures more resilient to hazards and to plan for sea-level rise and other potential future climate change impacts. Immediate development concerns need to be addressed whilst at the same time reducing exposure to natural hazards

Box 2:

Factors critical to building resilient societies

- Local knowledge on vulnerability
- Reconstruction which avoids re-creation of vulnerabilities
- Communication of science in forms appropriate for decision makers
- Strategic dialogues across government levels and sectors
- External assistance that builds on local capacity
- Diversification of livelihoods and economies
- Securing the resource base that underpins people's livelihoods
- Communities should be at the heart of decision making on questions of e.g. infrastructure, retraining and alternative livelihoods, credit, and ecological restoration works



and longer-term climate change impacts. Restoration and enhancement of ecosystem services critical to livelihoods is key here, as is the need to ensure infrastructure reconstruction does not undermine these services.

Thus, the tsunami opens a door for a new dimension of social development, namely a strong landscape, which can – socially and environmentally – stand up to nature's surprises. A prerequisite for the success of this work is adaptive approaches firmly based in local institutions, participatory methods and co-management principles.

Building social resilience

The challenge of building community resilience raises important questions: Where should people rebuild their houses and how? What livelihoods are people unable to return to? What community infrastructure should be prioritised? Where should ecological restoration works be focused? Demand-driven

research and analysis can help answer these questions, respond to community needs, and support decision making.

Synthesis of existing science and understanding, and the sharing of experience from other countries affected by natural disasters, are also important areas for assistance.

Whilst the scale and magnitude of this event has severely challenged, and in many cases exceeded, local institutional capacity, future strengthening of this capacity is key to building long-term social and ecological resilience.

/Fiona Miller, Frank Thomalla and Johan Rockström, SEI

A longer version of this article is published in the html-version of this issue.

More at:

<http://www.sei.se>
<http://www.fao.org/tsunami/>

Sustainability School: Vulnerability



Vulnerability of both society and nature is receiving ever more attention as natural disasters, accidents and other unpredictable events appear to be becoming more common. It has received especial attention following the tsunami catastrophe in Southeast Asia. Vulnerability has, however, long been a concept in research

for sustainable development. In this context it is a measure of the extent to which people, societies and ecosystems risk damage from environmental or socio-economic stress or disturbances.

A vulnerability assessment can, for example, assess how large the risk is that people and the environment will be affected by climate changes and how sensitive they will be to such changes.

The fundamental goal is of course to predict and avoid risk by identifying sites, groups of people and ecosystems that are particularly vulnerable. Lately, vulnerability has often been taken up in connection with the concept of resilience, and has been described as the latter's opposite. Both of these concepts originate in different branches of science, nevertheless their research strikingly often reach similar conclusions on how one should strengthen resilience, or reduce vulnerability, in

societies and ecosystems.

A vital vulnerability lesson from the 26th of December is that coastal communities were particularly badly affected due to environmental degradation and poorly planned coastal development.

Costly insights into vulnerability

In a similar way, many have had costly insights into vulnerability following a major storm in southern Sweden. In a couple of hours the equivalent of a year's worth of logging for the whole of Sweden was felled in an area covering a twentieth of the country's forest area. This was, in part, a result of the modern-day forest industry's blind focus on fast-growing spruce and that traditional knowledge on forest management has been forgotten.

In the midst of all the turmoil, these two events may all the same lead to increased insight into how we should prepare ourselves for future natural disasters – not to mention the effects of climate change.

/Fredrik Moberg

More at:

The Stockholm Environment Institute:
<http://www.sei.se>

The Resilience Alliance:
<http://www.resalliance.org>

People in poor countries are particularly vulnerable to natural disasters, climate change, epidemics and violence. This human vulnerability was discussed during a recent international conference organised by Stockholm University and Sida. It felt uncomfortably current given what had taken place in Southeast Asia just a few weeks before the conference.



Photo: Kenneth Sund

Floods and storms are the most common causes of natural disasters around the world. Even before the tsunami, Asia was the most affected region both in terms of the number of natural disasters reported as well as the number of people affected, said

Guoyi Han, of the Stockholm Environmental Institute. He continued his terrifying story, using the cold facts of statistics: The number of deaths reported per disaster is highest in low-income nations. The number of natural disasters is increasing world-wide due to a combination of an increase in the number of extreme weather events and that many human societies and ecosystems have become increasingly vulnerable.

Are the poor victims or actors?

A panel debate held on the second day of the conference concluded that in recent years research and development co-operation has placed ever more importance on individuals as active actors with large amounts of knowledge and potential.

Thomas Hylland Erikssen from the University of Oslo, felt, however, that it is important to define just what kind of development it is that rich countries wish to support: "There is much talk about freedom, but what kind of freedom are we talking about? The freedom to become just like me? We Europeans have been telling others how they should behave for 500 years now, it is time for a de-colonisation of the mind."

Diversity reduces vulnerability for African farmers

While the conference's main theme was vulnerability, several researchers focused on the opposite of vulnerability: resilience, which is the ability to cope with change and disturbance.

One of these was Maria Tengö, from Stockholm University. She has studied small-scale farming in east Africa where environmental conditions are highly unpredictable.

As a result, farmers have developed special, locally adapted management techniques and institutions to adapt to their variable environment. One is to vary both the choice of crops and management methods instead of solely relying on a narrow range of staple crops. In this way the farmers reduce their vulnerability to disease and pests as well as to climate and market changes. On top of this, the harvests can be larger when several crops are planted, especially when conditions are variable.

"Structures of Vulnerability: Mobilisation and Resistance" attracted researchers from around the world and from a broad range of fields, such as anthropology, ecology, economics, and political science.

/Fredrik Moberg

More at:

<http://www.vulnerability.se>

The tsunami: Local knowledge and ecosystem services saved lives

Local knowledge, coral reefs and mangroves seem to have played important roles in saving lives and reducing the impacts of the tsunami.

The scale of Boxing Day's tsunami made it impossible to prevent damage. Yet among the harrowing reports from the region are those of saved lives and comparatively minor impacts of the tsunami. Local knowledge of signals of an oncoming tsunami, such as the rapid withdrawal of the sea, acted as a warning system and prevented the loss of lives in several communities. Few of these community members had themselves witnessed a tsunami; instead they relied on elders passing on their memories. Even tourists with this information were able to save lives.

The UN and governments around the world are now developing a high-tech regional warning system. This is important, though restoring local knowledge of the natural dynamics in their area, and spreading this knowledge along these coastlines, may be just as important and less costly.

How do mangroves and coral reefs help?

There have been many reports that coastlines with coral reefs and/ or mangroves experienced less damage than those without. Coral reefs act as a barrier that causes a wave to break or at least lose energy before reaching land. Mangroves create a complex matrix that also dissipates a wave's energy and holds onto soils and sediments as a wave retreats. Neither reefs nor mangroves necessarily reduce flooding in the case of a tsunami, but they can reduce its strength and thereby reduce structural damage and loss of lives.

These ecosystem services have been important in reducing the impacts of storm surges and cyclones in the past, though they have not received the same attention as following December's tsunami. We need to hold onto this attention and understanding as re-construction begins. Unfortunately, both mangroves and coral reefs are among the world's most threatened ecosystems and the tsunami damaged and destroyed mangroves, reefs, and other coastal ecosystems. This will further complicate recovery, as a large proportion of these coastal communities are directly dependent on these ecosystems for their sustenance. Loss of these ecosystem services also increases vulnerability to future disturbances.

Decreasing vulnerability to this kind of event should begin with acknowledging that they occur, that technology cannot solve everything and that local knowledge and ecosystem services are important sources of security. The tourist industry has on the other hand boasted that it will be back to "normal" by November. It seems that it has not learnt, or needed to learn, any lessons.

/Miriam Huitric

More at:

<http://www.iucn.org/tsunami/>



Photo: FAO

In the wake of the tsunami, several studies are indicating a confined effect on coral reefs in the region. However, a recently released report paints a bleak future for coral reefs, and corroborates the notion that natural disturbances are not the main driving forces of worldwide coral degradation.



Tipped over coral. Photo: IUCN

Coral reefs constitute a vital cog in satisfying the productive and consumptive needs of human societies in all tropical regions of the world. Fisheries associated with coral ecosystems generate substantial yields of commercially important species and provide em-

ployment for millions of poor fishermen, and the wave-protection provided by healthy reefs is a potential life-saver.

In the immediate aftermath of the S.E. Asian tsunami, marine biologists held their breaths, fearing the magnitude of destruction caused by the the giant wave on the coral reefs. What was first feared to be a devastating blow to the reefs of the region seems, however, to be relatively confined damage to certain sites.

Clive Wilkinson, an Australian marine biologist and editor of the annual "Status of Coral Reefs of the World" report says that "only a few areas were severely damaged, and the rest should recover rapidly in the next 5 to 10 years." The most comprehensive survey after the tsunami, conducted by Thai scientists and volunteers, covered a total of 175 sites along the

Thai west coast. 40% of the reefs seemed to be completely unaffected by the tsunami, with only 13% showing a high degree of impact. Surveys conducted in Eastern Africa, Sri Lanka and India show the same pattern. What remains to be seen, are the longer term effects that could result due to an influx of sediments and other material from the affected coastlines.

Reefs are dissolving due to human emissions

Parallell to the unfolding events in S.E. Asia, a soon-to-be published study by a team of Israeli scientists, has again judged humans to be the real culprit in this ongoing ecological drama (see also feature article SDU 6/2002). Carbon dioxide levels are higher now than they have been in the last 440,000 years, and most of this will eventually be absorbed by seawater, where it reacts to form carbonic acid. The oceans currently have a pH of about 8, but experts predict this could drop to pH 7.4 by 2100. In fact, the Israeli study warns of a hypothetical tipping point being reached in 30 to 70 years time, causing the world's corals to literally begin to disintegrate due to a reversal of the limestone-creating chemical process that has made coral reefs the dominant structures that they are today.

The authors of the report claim that action today is necessary to stave off consequences that will have a huge bearing on future generations, especially in developing countries where most coral reefs are found.

/Albert Norström

More at:

<http://www.reefbase.org/Tsunami.asp>

<http://news.bbc.co.uk/1/hi/sci/tech/4226917.stm>

Ecosystem valuation that holds water

Ecosystems are of great value to society but they will not function without water. It is therefore crucial that the role of ecosystems is included in planning and management of water resources. Now there is a new tool book from The World Conservation Union, IUCN, addressing this issue.

The new guide "*Value – counting ecosystems as water infrastructure*" describes the links between ecosystems, society and water. As ecosystems deliver goods and services to society, they contribute substantially to the incomes and livelihoods of people in a region. Neglecting these services results in financially and economically sub-optimal decisions. One way to solve this problem is to give ecosystems a financial value. A price tag facilitates for decision makers and managers to take the ecosystems into account in planning and water management. The last step the guide presents is how to embed and make this framework a standard procedure. This step involves convincing communication, changing ways of thinking, acting strategically, and balancing competing interests.

Funds for water issues

As one of the Millennium Development Goals focuses on the need for water for all people, considerable funds have been directed to water issues. But if investors don't realise and take into account the links between water, ecosystems and sustainable development the poverty alleviation goals might be undermined. The link between ecosystems and water goes two-ways: ecosystems are components in the water supply chain, for example through regulation of water flows and regulation of water quality. But they also require water resources for their productivity and integrity. The values of ecosystems for water can be defined in 4 categories:

- 1) Direct values, as water dependent raw materials,
- 2) Indirect values, as ecological services that maintain and protect natural and human systems,
- 3) Option values, the premium placed on maintaining a pool of water-based or water-dependent species,
- 4) Existence values, the intrinsic value of water-related ecosystems.



The tool book goes through different valuation methods as well as pointing to their general limitations, stating that valuations always are partial. Nevertheless, it is a tool to help make better decisions.

It is also concluded that valuations have to be used in policy and practice. This can be done by modelling different management options or through cost-benefit analysis. Finally, through communication and involvement of stakeholders the framework for decision-making can be changed.

The theoretical arguments in the tool book are well backed up with 24 case studies covering ecosystem-society linkages, valuation examples and more. One example is the river Indus in Pakistan where water consumption for irrigation upstream has led to severe ecosystem degradation downstream resulting in mass migration.

/Louise Hård af Segerstad

More at:

The tool book can be downloaded at:

<http://www.waterandnature.org/pub/VALUE.pdf>

Don't rebuild the unsustainable fisheries after the tsunami!

“Fishing activities have radically depleted the nearshore resources, down to depths of 100 m in places. ...rebuilding the fisheries without structural reform will only intensify these trends...” This is a warning from Daniel Pauly, a leading fisheries expert, to governments and aid agencies involved in rebuilding the areas devastated by the tsunami.

These waters have been heavily fished, and often over-fished, which has in the past led to conflict and demand for subsidisation. While the goal of many agencies is to get things back to normal, re-instating this fishery as it was may not be a long-term solution. Not re-instating this industry will create discontent, but in the long-term it could give these fisheries the respite they often so desperately need. Focus should instead be on creating job opportunities on land for young fishers.

Source:

Pauly, D. 2005: Rebuilding fisheries will add to Asia's problems. *Nature* 403: 457.



Aceh province, before and after the tsunami Photo: FAO

Tsunami stirred up toxic waste on Somalia's shores

The tsunami stirred up hazardous waste deposits on beaches around North Hobylo (South Mudug) and Warsheik (North of Benadir). Waste has been dumped here since the early 1980s and includes radioactive uranium waste, heavy metals, industrial waste and hospital waste.

Acute respiratory infections, dry heavy coughing and mouth bleeding, abdominal haemorrhages, unusual chemical reactions on the skin, and sudden death after inhaling toxic compounds has been reported from the area, according to the United Nations Environment Programme. The stirred up waste has also contaminated groundwater, soil, agriculture and fisheries. Although it is in violation of international treaties, Somalia seems to have been attractive to exporters of hazardous waste due to its lack of a central government and law enforcement.

More at:

http://www.unep.org/tsunami/tsunami_rpt.asp



Tamil Nadu, India, after the tsunami. Photo: FAO

Societies are as scarred as their coastlines

The physical damage and tragic loss of life caused by the earthquake and the tsunami are only its immediate impacts. Devastated communities, ruined agricultural land, salinised water tables and soils and psychological scars will leave some areas uninhabitable for years, maybe even decades, to come.

The demographics of the region are likely to change drastically. Infrastructure in many areas has been wiped out and many survivors of the earthquake and tsunami who are struggling to rebuild their homes and deal with their personal losses face disease outbreaks. Small islands were particularly vulnerable to the giant waves as their source of water is often a shallow lens replenished by rainwater. Several of the Maldives' islands no longer have freshwater. In Indonesia, Aceh province has been so badly affected that there may be too few survivors to restore livelihoods.

Source: Pearce F. and Holmes B. 2005: Tsunami: The impact will last for decades. *New Scientist* 185: 14.

Stop talking and act to save biodiversity now!

It is time to stop talking and start acting in order to fulfil the global commitment (from the World Summit in 2002) to reduce biodiversity loss significantly by 2010.

Biodiversity is not only an invaluable natural heritage. It is a critical resource upon which societies and economies depend. It provides food, wood, textiles and medicines; it is a source of aesthetic, spiritual, cultural, and recreational values; it supports ecosystem services, such as crop pollination, maintenance of water quality and soil fertility, and helps ecosystems to cope with disturbances and environmental change.

Moreover, it provides future opportunities to discover new products and technologies. Although world leaders have long known this, threats to biodiversity have clearly increased without any serious or effective political responses. This was the complaint of hundreds of scientists at a major conference recently held in Paris.

More at:

<http://www.recherche.gouv.fr/biodiv2005paris/en/index.htm>



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We welcome comments, questions, and article ideas. **Editor:** Fredrik Moberg, fredrik@albaeco.com **Want to subscribe?** Go to: www.albaeco.com/subscribe **Want to read the newsletter at our website with clickable links?** www.albaeco.com/sdu **Thanks to the following individuals for their thoughtful comments and/or assistance:** Carl Folke, Eric Langenskiöld, Mats Segnestam. **Contributors:** Miriam Huitric and Louise Hård af Segerstad and Albert Norström, Albaeco; Fiona Miller, Frank Thomalla and Johan Rockström, Stockholm Environment Institute.