

Sustainable Development Update

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“ Ecological science must become more pragmatic and focus more on designing ecosystems to provide human benefits. ”

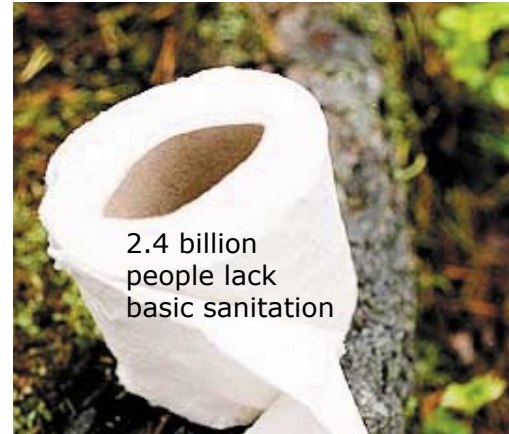
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Poo where you eat

People prefer to discuss other things at the dinner tables and world summits. But the management of human excreta is crucial to sustainable development.

Instead of providing water borne sewer systems to the developing world many sanitation scientists advocate urine diversion and dry composting of human excreta for reuse in agriculture. This is called “ecological sanitation” and is said to be cheap, water efficient and non-polluting.

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2.4 billion people lack basic sanitation

Feeding China

Can it be done without undermining the environment?

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More worth alive than dead!

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Editorial:

Childish thoughts about the future

I read in a new report from the World Health Organization that environment-related hazards kill more than three million children under the age of five every year.

Only 10% of the world's population are in this age group, yet 40% of the environment-related disease burden falls on them. And children in poor communities are worst off. This is crazy. Why aren't people in a constant temper tantrum when hearing things like this? A small part of me wants to behave really childish and throw down on the floor yelling, screaming and kicking.

I remember a few years ago when somebody told me that the equivalent of a jumbo-jet full of children crashing every four hours die from water or sanitation related diseases. I had of course heard about these problems before. But it was not until I heard the jumbo-jet analogy that it became really obvious to me. I had recently become a father for the second time so I was of course particularly amenable.

Kids are not just little adults. Their organs and immune systems are developing, they live and play close to the ground and have less knowledge to protect themselves. No wonder “children” and “future generations” are buzzwords in the environmental jargon. It is even in the definition of sustainable development that we shouldn't “compromise the ability of future generations to meet their needs”.

Now the number of child deaths in the new

WHO-report painstakingly shows us all that environmental concerns are much more than a vague responsibility for forthcoming generations. It's already this generation, my kids and your kids, that suffer. It should be a wake-up call for the world.

Many people within the environmental movement have spent a lot of time fighting against things, like pollution, logging and mining. But fighting means winners and losers. When it comes to our children's future we can't afford losers. We need collaboration.

I might be naive, not to say childish, but I think that one way of accomplishing that kind of a teamwork is to appeal to the kid in all of us. Or as a 12-year-old girl representing an environmental children's organisation put it at the 1992 Earth

“When it comes to our children's future we can't afford losers. We need collaboration.”

Summit in Rio: “Here, you may be delegates of your governments, business people, organizers, reporters or politicians – but really you are mothers and fathers, brothers and sister, aunts and uncles – and all of you are somebody's child.” “I'm only a child yet I know if all the money spent on war was spent on ending poverty and finding environmental answers, what a wonderful place this earth would be.” So childish. So brilliant.

/Dr. Fredrik Moberg, Editor

“As a consequence of the apparently scientific subject matter, and the media's reluctance to engage with the topic, most biodiversity content is disseminated to the already evangelical – the environmental choir. The result is that even high-level Biodiversity messages rarely make it beyond the scientific community, and when they do make it into the public domain ... they are often framed by media in terms of obscure academic squabbles, rather than considered debate. This further reduces public trust in the value of biodiversity.”

Tim Kitchin, in a discussion paper, part of a biodiversity communication project of the Royal Society for the Protection of Birds.

<http://www.glasshousepartnership.com/branding.pdf>

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Flushing away the Millennium Development Goals

Water borne sewer systems not a sustainable solution, sanitation scientists say

The world cannot combat poverty, unless action is taken to combat the problems of water and sanitation. The UN targets mean that every day in the next 12 years another 400,000 people must get access to basic sanitation. However, many warn that large water borne sewer systems could be disastrous for communities in the developing world and their environments. Now many sanitation scientists recommend composting sewage instead. This is called "ecological sanitation" and is said to be cheap, water efficient and non-polluting.

Only in India 100,000 tons of faecal matter is deposited in the open every day. Just imagine the total amount in the developing world. A huge and smelly pile for sure. Don't laugh. This lack of basic sanitation is causing a number of problems for people throughout the world. It is not only associated with smells and embarrassment. Almost 6,000 children die each day from diarrhoeal diseases related to lack of adequate sanitation and safe drinking water.

While people prefer to discuss other things at the dinner tables and world summits, the management of human excreta is crucial to sustainable development in both rich and poor countries. "We are entrenched in a global sanitation crisis, but no one wants to talk about it. Until excrement can be discussed without squirming or giggling, we will not resolve this crisis", says Arno Rosemarin of the Stockholm Environment Institute.

He is one of a growing number of sanitation scientists warning that large sewer systems could be disastrous for communities in the developing world and their environments. The alternative they propose is "ecological sanitation", or EcoSan. It is

Box 1 : The challenges for global sanitation

2.4 billion people lack basic sanitation

2.8 billion with basic pit latrines (storage of faeces underground)

1 billion people have flush toilettes, 70 % of which are not properly treated

90 % of sewage effluent in towns of developing countries lack treatment

1.1 billion lack access to safe water

1 billion are undernourished

part of an ecosystem approach (see SDU 5/2002) to human waste disposal that involves composting sewage. And proponents say it is a cheap, water efficient and non-polluting method that also prevents diseases.

Notwithstanding, there are still several unsolved aspects, such as cultural objections to handling human excreta and problems with large-scale handling of excreta in urban areas.

Millennium Goals down the drain

Most people are aware of the water crisis and know that a large part of the people in the world lack safe drinking water. However, far less attention has been given to the problems associated with the disposal of human excreta in developing as well as developed countries. Flushing the toilet seems too easy. In the western world we seldom think of how much water it consumes and how huge problems it can create in the receiving waters. This neglect has also been reflected in the international meetings on sustainable development, but a change is to come. The sanitation crisis has been a central part of several recent international meetings.

The Millennium Development Goals agreed on at the UN-Millennium Assembly, and the Plan of Implementation agreed on at the World Summit on Sustainable Development in Johannesburg in September, 2002, oblige countries to halve the number of people without access to drinking water and basic sanitation by 2015. Sanitation was also together with water and human settlements one of the main themes of the 12th meeting of United Nations Commission on Sustainable Development (CSD) in New York this spring.

However, the advocates of ecological sanitation disagree with the United Nations targets to connect more than a billion people to sewers in the next decade. Allowing for population growth, that means connecting 400,000 people every day for the next 12 years. They say too much attention is put on conventional water intense sewer systems that are too expensive, polluting and use a lot of water that could be set aside for other purposes. With modern sanitation we are flushing away 15,000 litres of water per person and year. Ecological sanitation on the other hand requires a minimum of water and is therefore especially suitable in water scarce areas.

The dangers of inadequate sanitation

There are many health risks associated with a lack of sanitation. According to the UN twice as many people are dying from diarrhoeal diseases as from HIV/AIDS in China, India and Indonesia. With poor sanitation the occurrence of human parasites increase. Today about 1 billion people are infected with roundworm and

700 million with hookworm.

Moreover, many people that have access to basic sanitation are connected to septic systems and sewage treatment plants that discharge into the environment with little or no treatment. In this sense, far more than 2.4 billion people lack access to effective and sustainable sanitation. It has been calculated that only 30% of the 1 billion people served by sewage systems have advanced end-of-the-pipe treatment. This leads to pollution of streams, lakes and coastal zones.

Instead, proponents of EcoSan want to recycle sewage so it can fertilise fields without harming human health or the environment. However, the excreta must first be properly sanitised. EcoSan uses modern techniques to make human



Proponents of Ecological Sanitation want to recycle the nutrients from human excreta for use in agriculture. Illustration: www.ecosanres.org

excreta harmless through dehydration and decomposition. The method chosen to destroy pathogens and parasites will depend on climate, groundwater tables, amount of space and intended use of the sanitised excreta. The technology for ecological sanitation includes toilets that store and compost the sewage, community systems that separate urine, faeces and washing water and recycle them separately. There is even technology for fermenting sewage to make biogas for cooking.

Poo where you eat?

EcoSan is also promoted as a means of securing food supplies. On average a person produces 35 to 50 kg of faeces and 500 litres of urine per year.

This "waste" we all produce contain lots of nitrogen, phosphorus and potassium. These are all important plant nutrients and essential for growing the food we eat. Human excreta also contain many essential trace elements. As farmers harvest their fields the nutrients are also removed. In the western world we mostly replace these lost nutrients by applying mineral fertilisers of fossil origin and flush away

the “untouchable” nutrients contained in the excreta. Unfortunately, the reserves of phosphorus and potassium are decreasing in the world and production of nitrogen fertilisers requires fossil energy. Many chemical fertilisers contain high levels of heavy metals like cadmium (that can damage the kidneys).

This is why EcoSan proponents talk about “closing the loop” and start recycling the nutrients from human excreta for use in agriculture again. In this respect, human manure can entail increased crop yields and help alleviate poverty and malnutrition of poor farmers unable to af-

ford commercial fertiliser. The composted faeces act as a soil conditioner, which increases water-holding capacity, improves soil structure and releases nutrients at the rate plants need them.

The use of human excreta is not a new phenomenon. It has by tradition been re-used for crop fertilisation in many countries for thousands of years, especially in China and Southeast Asia. When the first WC was installed in Sweden in the late 19th century there was an intense debate. The health authorities wanted people to use WC:s but the farmers protested as it would end the utilisation of nutrients from

urine and faeces in agriculture. Farmers even called the latrine content “a mine of wealth”.

/Fredrik Moberg

More at:

Webpage of EcoSanRes, an international programme on ecological sanitation:
<http://www.ecosanres.org>

“Pure Water”, Sida’s new water and sanitation strategy:
<http://www.sida.se/Sida/jsp/polopoly.jsp?d=1250&a=24424>

SDU-Feature 2

How to feed China without undermining the environment?

China has experienced a period of extreme economic growth. This has improved the life for many Chinese, but changing lifestyles and new food preferences in combination with continued population growth put increasing pressure on the environment. The potential scale and impact of China’s environmental crisis and food shortage are immense. The increased demand for food import has already started to affect global trade patterns and the global environment, experts say.

China’s GNP growth for this year’s first quarter was over 9%. The population is growing by 11 million annually and more and more people are improving their standards of living. By 2003, China had become the world’s biggest coal consumer and second biggest consumer of petroleum and power.

China’s increased affluence has also led to a more westernised diet: more pork, poultry, eggs and beef and more beer to drink – all of which require grain. Demand for grain-fed livestock products is boosted further by urbanisation since urban meat, dairy and poultry consumption is much higher than rural averages. At



the same time, the production of China’s major crops – wheat, rice and corn – has fallen dramatically in four of the past five years. China’s harvest shortfalls have



“When China turns to the world market for grain, it will need 30, 40, 50 million tons, more than anyone else in the world imports,” says Lester Brown of the Earth Policy Institute. All photos on this page: Corel Corp.

so far been covered by its once massive stocks of grain, but now Chinese wheat buying delegations are buying up the world surplus, leading to increased wheat prices worldwide. “When China turns to the world market for grain, it will need 30, 40, 50 million tons, more than anyone else in the world imports,” Lester Brown of the Earth Policy Institute pointed out already a year ago.

China may soon also have to import rice and corn. In 2003, the Chinese rice harvest fell by 20 million tons, and corn harvest fell by 15 million tons. Annual world rice exports total 26 million tons, making it difficult to cover both China’s 20 million ton shortfall and other countries’ rice imports, says Lester Brown.

Water shortages

Food production is a water intensive process and water is one of the limiting factors to increasing crop yields. Thanks to electric and diesel-driven water pumps, aquifers are being emptied at an alarming rate. The FAO estimates that 70% of China’s food is produced on irrigated land.

Unfortunately, much of the water used for irrigation is wasted, lost through canal leakage, spillage, seepage and evaporation. In areas around Beijing, 1000-meter

wells must now be drilled to reach fresh water, according to a recent report by the World Bank. The World Bank warns that the situation “will soon become unmanageable, with catastrophic consequences for future generations”. On top of this, raising of livestock for dairy or beef is among the biggest water user in the world, because the feedstock of cattle are often in themselves irrigated crops e.g. maize, wheat, alfalfa and soy.

However, China is not acting like a country that is suffering from water shortages. The government is subsidizing water to farmers, and water conservation efficiency within industry is low compared to many other countries.

In China, desert expansion has accelerated with each successive decade since 1950. More than 20,000 villages have already been abandoned or have had their farm economies seriously impaired due to invading deserts.

Political instability

China is not alone. More than half of the world’s nations are already facing water shortages and the number of water refugees is expected to rise. In the long term, this in combination with climate change effects can lead to decreased food secu-

city. Research from the International Rice Research Institute in Manila shows that crop yields can drop by 10% for every 1° C temperature rise. UNEP has already issued warnings that global warming could lead to dramatic drops, by a third, over the next hundred years, leaving billions to starve. This in turn could mean more political instability.

Urbanisation and industrialization

Another critical factor is loss of arable land. Grain harvested area in China has fallen from 90 million hectares in 1998 to 76 million hectares in 2003. The sprawl of cities into rural areas and severe soil erosion due to deforestation have forced farmers to rely on gains in yield rather than area expansion for food production.

The increasing number of cars in China is also problematic. If every other Chinese owned a car (as is the US average), there would be 600 million cars in China, more than the world's total of 450 million. The roads, parking lots and petrol stations required would consume much of China's agricultural land. The 2 million new cars sold in 2003 meant paving over an area roughly equal to 40,500 ha.

Moreover, many farmers have been forced to migrate to cities to find other means of supporting themselves. Tra-

ditionally, planting of winter wheat and summer corn was always done, but now many villages no longer have enough able-bodied workers to do this, making it even more difficult to double-crop land.

What can be done?

It is estimated that in 2025, China will need to produce 170 million more tonnes of grain compared to today's 380 million tonnes. To do this, 25-30 million hectares of land extra will need to be irrigated. With a growing population and a very rapid industrialisation, this equation will be a difficult one.

China is hoping to solve its water problems by making reality of a much-criticised project first proposed in 1958. It is a gigantic water diversion project called the South-North Water Transfer Project (SNWT). It will link North China's largest rivers, the Huang (Yellow) river, the Hai River, and Huai River (collectively known as the 3H- rivers) to the Yangtze River, moving over 40 million cubic meters of water through three canals to the North. However, the 3H-rivers are all heavily polluted and over-allocated and the project will force more than 250,000 people to relocate.

It seems, as the only way for China to be able to feed its growing population

will be to increase its grain imports. This will affect all of us. As harvests fall, more countries are likely to restrict their grain exports, leading to higher prices and less consumption. The security risks are real, with grain poor countries unable to get a hold of enough grains to feed its populations, political instability may become a reality. This calls for swift action by the world's leaders, figuring out how to increase water efficiency worldwide and come up with new energy politics to tackle the problems of climate change.

/Caroline von Post Carlsson

More at:

"China at the crossroads" (article in SDU 6/2002)

<http://albaeco.com/sdu/07/htm/main.htm>

"China's Shrinking Grain Harvest: How Its Growing Grain Imports Will Affect World Food Prices" (article by Lester Brown):

<http://earth-policy.org/Updates/Update36.htm>

"Environmental Neglect Threatens Food Crisis, Expert Warns":

http://www.unwire.org/News/328_426_23531.asp

SDU-In brief

"New plant diversity treaty will be crucial for the sustainability of agriculture"

An international seed treaty that gives legal force to the conservation of the world's major agricultural seeds recently entered into force. It is intended to ensure that plant genetic resources for food and agriculture are conserved and sustainably used, and that benefits from their use are equitably and fairly distributed.

Only 150 crops feed most humans today and just 12 crops provide 80 per cent of global food energy. However, almost 10,000 species have been used to produce food and fodder since the beginning of agriculture. Many scientists warn that this loss of genetic variability makes the world's agriculture increasingly vulnerable to factors like diseases, changes in climate and market failures (see SDU2/2004). In the light of this the new Treaty intended to ensure that plant genetic resources for food and agriculture are conserved and sustainably used is much welcomed. The Treaty's negotiations spanned seven years and it now contains sections on general provisions, farmers' rights, supporting components, and financial and institutional provisions, and recognises the need for close links with the Convention on Biological Diversity (CBD).

"This is a legally binding treaty that will be crucial for the sustainability of agriculture," says director of FAO, the UN Food and Agriculture Organisation, Jacques Diouf.

Must support conservation of seeds in fields

However, critics warn that the treaty will be just a piece of paper if it is not backed by substantial funds from the rich world to support conservation of seeds in farmers' fields where they could be continuously developed, not just in seed banks.

Plant genetic resources for food and agriculture are defined in the Treaty as "any genetic material of plant origin of actual or potential value for food and agriculture". These biological resources are crucial in feeding the world's population. Many poor people spread risks across many different species and



Critics say the new treaty must also support conservation of seeds in farmers' fields where they could be continuously developed, not just in seed banks. On the picture: a field genebank of yam (*Dioscorea* sp.) in Southern India. Photo: Corel Corp.

varieties rather than relying on a few staples that may become vulnerable to disease, pest outbreaks, climate changes, and market failure. Plant diversity also provides the genetic information necessary for plant breeding as well as diversity for a varied diet.

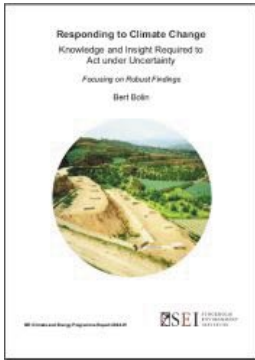
In this respect, the future of agriculture depends on international cooperation to conserve the crops and their genes that farmers all over the world have developed and exchanged over 10,000 years. The fifty-five countries that have already ratified the Treaty will now continue and develop the legislation and regulations it needs to implement the Treaty. The challenge is now to ensure that the treaty becomes operative in all countries.

/Fredrik Moberg

More at:

<http://www.fao.org/newsroom/en/news/2004/47027/index.html>

A rapid change in attitudes towards global climate change among people and politicians is necessary if the industrial and developing countries are going to secure sustainable development. This is stated in a report by Professor Bert Bolin, founding father of the UN climate advisory body (IPCC).



The Hollywood blockbuster "The Day After Tomorrow" depicts an extremely abrupt global climate change where warming paradoxically leads to an ice age in the northern hemisphere in a matter of days, all due to a shut-down of the Gulf Stream. The film has been commented by scientists around the world and reviewed in renowned scientific journals like *Nature* and *Science*. No serious climate scientist believes in the scenario presented in the film, but most of them agree it

presents a remarkable opportunity to communicate what they do know about abrupt changes in both climate and ecosystems.

It is important to define what we mean by "abrupt changes", according to Professor Bert Bolin, founding father of the IPCC. "When climatologists or Earth System scientists talk about abrupt changes they are talking about changes that occur over a matter of years or decades, not days or weeks. A few decades may seem like a long time to most people but from the perspective of the development of the global society it is rather rapid and adjustments are difficult."

Abrupt changes

In a recent report from the Stockholm Environment Institute (SEI) Professor Bolin develops his thought about climate change in general and abrupt changes in special. He says most of the basic facts about climate change have been known for a decade or more. What the world needs now is a rapid (not to say abrupt) change in attitudes towards global climate change among politicians and the general public, if the industrial and developing countries are going to secure sustainable development.

The desire for industrialisation and increased welfare in developing countries is also identified as a major problem, as it entails rapid increase of fossil fuel use and increasing emissions of greenhouse gases. It is, however, the industrial countries that will have to take the lead in emissions reductions, Bolin says. "Global inequities, the slow response of the global socio-economic system and unwillingness to take the warnings of a forthcoming change of climate seriously, still stand in the way for major mitigation efforts". He also concludes that the inaction of the global society must be overcome soon, because in the long run, costs will be less the sooner major measures are taken.

/Fredrik Moberg

More at:

Download the whole report at:
<http://www.sei.se/pubs/bolin.html>

More about the science behind the Hollywood film "The Day After Tomorrow":
<http://www.igbp.kva.se/cgi-bin/php/frameset.php>

The continued decline of sea turtles will have serious economic consequences for coastal communities in developing countries. In fact, marine turtle tourism generates almost three times as much money as the sale of meat, leather and eggs, according to a new report.

Sea turtles are in serious decline in many areas. Nesting beaches are converted to holiday resorts, turtles and their eggs are over-harvested for food, and turtles are accidentally caught and killed by commercial fishers. Out of the world's seven marine turtle species six are endangered or critically endangered. But does it matter, except from an ethical perspective? Yes, say the conservation organisation World Wildlife Fund (WWF) in a new report "Money Talks: Economic Aspects of Marine Turtle Use and Conservation". It concludes that the continued decline of sea turtles will have serious economic consequences for coastal communities in developing countries.

Worth more alive than dead

In fact, marine turtle tourism generate almost three times as much money as the sale of meat, leather and eggs, according to the new report. The report is the first global assessment of the economic value of sea turtles. It shows that the worldwide decline in sea turtle populations jeopardises jobs, tourism, and coastal economies, especially in developing countries, two-thirds of which have sea turtles.

Moreover, these reptiles have an irreplaceable value as ecological resources as they provide important ecological functions. Evidence for this is shown in e.g. Florida Bay where overexploitation of the green sea turtle and other seagrass grazers such as dugongs and manatees has contributed to outbreaks of disease and die-offs in seagrasses. Turtles are also important indicators of the health of coastal and marine environments and have immeasurable worth as cultural assets.

According to report findings sea turtles are often worth more to local communities alive than dead. The WWF-crew compared the returns generated from their meat, eggs,



A new report from WWF claims sea turtles are worth much more money alive than dead. Photo: Janice Blumenthal 2004.

and shells with that generated from tourism at a total of 18 locations in Africa, Asia, Latin America and the Caribbean. The average annual income from dead turtles or egg collection was \$582,000 whereas the average annual income where turtles are tourist attractions was some \$1.65 million. About 175,000 people take sea turtle tours annually to more than 90 sites in some 43 countries. In Costa Rica's Tortuguero National Park, the biggest and most established site, marine turtle tourism brought in \$6.7 million a year. This kind of ecotourism, which began to flourish in the late 1980s, is critical to the future of sea turtles, WWF says.

"Developers, politicians and community leaders should start to see marine turtles as a valuable asset, generating revenue and jobs," said Carlos Drews, WWF's regional coordinator for marine turtle conservation in Latin America and the Caribbean. "Tourism and turtle protection may in fact increase their economic value."

/Fredrik Moberg

More at:

<http://panda.org/downloads/species/turtlereport4.pdf>

Ecological science must become more pragmatic and focus more on designing ecosystems to provide human benefits. This was concluded by a group of scientists from the Ecological Society of America (ESA) in a recent report called "Ecological Science and Sustainability for a Crowded Planet".

We live in an increasingly human-dominated world where human modifications of the environment will continue to increase. With this in mind a group of scientists propose a new research agenda centred on finding ways to maintain ecosystem services, that is, the benefits that natural ecosystems provide humans, such as the cleaning of air and water, stabilising of soils and pest control.

There are three means of doing this: conserve existing ecosystems, restore damaged ecosystems or design systems that generate desired ecosystem services. The authors conclude that management and science must focus more attention on the latter in the future. Designing systems involves mixing technological innovations with natural ecosystems. Examples provided are vegetated rooftops to reduce the impacts of water run-off in urban environments and the redirecting of river water to coastal dune water tables to replace the water extracted for drinking water in Dutch cities. In order to develop this field the authors want science to focus on research identifying ecosystem services and understanding ecosystem functioning.

The report also calls for the sharing of ecological knowledge and states that ecology in developing countries must be related to improving the quality of life. This requires building networks among ecologists in developing countries and ensuring that policy makers have access to ecological information.

Are "designer" ecosystems the solution?

Scientists have had mixed reactions to this conclusion. For some it is still a revelation that ecological science needs to incorporate humans as a component of "their" ecosystems. Others are more sceptical about depending on human alternatives to ecosystems and with reason given that "whenever humans have tried to design or modify ecosystems in the past, it has usually resulted in disaster". Even though the group of scientists does not propose substituting designed for natural ecosystems they



"Designing" ecosystems goes beyond restoring a system to a past state to create ecological communities that optimises the delivery of human benefits. On the picture: recent tree plantings in Bolivia as an anti-erosion measure on farmer's land. Photo: FAO

fail to report the severe limitations of our knowledge of how our complicated natural systems work. This has two important implications:

- 1) The services provided by designed systems will be limited by our limited knowledge and will, therefore, encounter the same obstacles as when restoring ecosystems.
- 2) As a policy paper, this article will reach readers with different backgrounds, many of whom are inevitably ignorant of ecosystem services and their dependence on these. These readers might misinterpret the conclusions to mean that ecosystems can simply be re-designed after exploitation.

Nevertheless, the authors have provided another opportunity to increase awareness of society's dependence on the environment that it is, often carelessly, exploiting. Moreover, in an increasingly human-dominated world it will not always be possible (ecologically, economically, politically) to conserve or restore functional ecosystems. So, there might be a growing role for designed systems whether we like it or not.

/Miriam Huitric

More at:

Ecological Science and Sustainability for a Crowded Planet.
<http://www.esa.org/ecovisions/ppfiles/EcologicalVisionsReport.pdf>

Sustainability School: Masking Environmental Feedbacks



We are aware of the negative impacts of many human activities on natural systems like lakes, forests, seas and wetlands. We also know that these natural systems provide the natural resources and ecosystem services that

we all depend upon for our health and welfare. Still, at least in western society, our economies and societies do not seem to suffer much from these impacts.

Part of the answer lies in our ability to mask environmental feedbacks. These are the signals from the environment indicating that it has changed, for example reduced fish catches. Masking occurs when environmental signals can be ignored due to for example technology, subsidies or the global market. In the case of fisheries, technology such as engines and sonar, allows fleets to travel further from the coasts and exploit deeper and increasingly dispersed stocks. Where fishing is uncontrolled it would normally lead to reduced catches due to over-fishing, but if new technology is

introduced previously inaccessible catch might become within reach. And this can even lead to booms in catch. Even if such booms are mostly temporary they can attract many new fishers, who invest in new vessels and equipment. This is where subsidies come in. They artificially lower the real costs and risks of fishing. A main incentive for this subsidisation is to increase income. This is particularly true for export fisheries that can be important sources of foreign exchange in developing countries.

Likewise, the global market masks feedbacks for both fishers and consumers. High market prices can mask reduced yields from fishers by maintaining their income. Moreover, if a fishery collapses in one country, or its prices are too high, an importer can simply import from a different country. Consumers are rarely aware of this switch.

Masking of environmental signals can thus result in over-capitalisation (huge loans due to investments in expensive technology) of the fishery, which leads to economic dependence on a steady catch, regardless of the ecological reality in the water. This is not to say that technology is inherently bad, only that it must be properly managed to follow natural dynamics of the ecosystems.

/Miriam Huitric

More at:

http://www.ihdp.uni-bonn.de/html/publications/workingpaper/wp02m.htm#_Toc417096392



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