

Sustainable Development Update

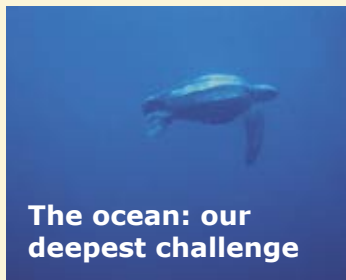
– Keeps you updated on the interactions between ecological issues and social and economic development

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Issue 4, Volume 4, 2004

“The Amazon Basin and Sahara Desert both belong to the Earth’s Achilles’ heels.”

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The ocean: our deepest challenge

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How to slow the consumption locomotive?

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“To my surprise, when people stopped spraying, yields didn’t drop – and this was across 600 fields in two different districts over two seasons. I’m convinced that the vast majority of insecticides that rice farmers use are a complete waste of time and money.”

Entomologist Gary Jahn, on a set of experiments in Bangladesh which demonstrate that insecticides can be eliminated and fertiliser applications reduced without lowering yields.

www.scidev.net/Features/index.cfm?fuseaction=readFeatures&citimid=306&language=1

The globalised food

What we eat and how it is produced are increasingly disconnected. Global trade has changed the mix of inputs to food and feed, and this affects food security and the perceptions of sustainability in both poor and rich countries.

In the future we must stop focusing on production increases alone, and not take the work of ecosystems for granted.

[More in the feature article, page 2-3](#)



Food production has become more and more globalised

Editorial: Dead dodos do no good

It has been called the silliest bird that ever lived. The dodo. Notorious for being slow, stupid and fat. When the Portuguese first came to the Island of Mauritius in the 16th century, they found a great number of these swan-sized birds that couldn’t fly or run at any great speed. Furthermore, the flesh was reasonably good to eat and by 1680 there wasn’t a single dodo left in the world.

The dodo is not unique. Over 100 bird species have disappeared during the last two centuries. Extinction is without a doubt a natural process; the fossil record shows that on average one bird species dies out every 100 years. However, during the last 200 years the extinction rate has been at least 40 times greater than this due to human impacts. Ok, so what? If the Dodo had not gone extinct, to what degree would that have altered our life today? Why preserve species that are of no practical use to humans?

Birds are often appreciated for their colours, splendour, song, and varied behaviour, but they also provide critical services, such as seed dispersal, pest control and pollination. Many bird species are also early-warning environmental indicators. Like canaries in the coalmines, they alert us to the vulnerability of other plants and animals.

Moreover, when somebody claims that a species has no practical use to humans, it really means that we don’t know any practical use given our current state of understanding. Still, species are often involved in complex interactions with many other

species, some of which may in turn be ecologically and/or economically important.

Researchers have found that the loss of the dodo might have permanently affected the forest structure in their habitats, as dodos were important seed dispersers. Furthermore, there are scientists stating that the dodo has been fully misrepresented when described as plump and immobile, claiming that it was really a fast runner. On top of everything, it

We may find out too late that a species had a particular use, after it has become extinct

has also been shown that the dodo’s extinction was not only due to over-hunting and the bird being too stupid to protect itself. The destruction of their forest habitat and the destroying of nests by alien cats, rats, and pigs, which the sailors brought with them, might well have been even more important factors.

We already know of uses for thousands of plant- and animal species. In the future we may find out too late that a species had a particular use, after it has become extinct or is in severe danger of becoming so. Our ecological ignorance might lead us to think that a species are useless to us, when, in reality, it might be indirectly linked to our well-being. We simply don’t know what we are losing. One thing is for certain, though. Dead dodos do no good.

/Dr. Fredrik Moberg, Editor

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Around the world in a meal

What we eat and how it is produced are increasingly disconnected

What we eat and how it is produced are increasingly disconnected. This globalisation of food production is a wonderful reality for those who can afford the exotic products and year-round supply of previously seasonal products it provides. But whereas globalisation represents access to diversity, free access to markets, economic growth and development to some people, it means abuse of the poor and of the environment to others. Will globalisation of food production help us feed a growing world population in a sustainable manner?

Global trade demands production in large quantities, which has promoted intensification of farming to increase production. Intensification of agriculture involves mechanisation and specialisation at the farm level. This is made possible by technology and by increasing the amounts, and types, of inputs used on the farm including: fossil fuel, fertilisers, pesticides, herbicides and feed.

In other words, this increased productivity is largely a result of inputs from beyond the farm. This has also increased the use of exotic inputs, such as fishmeal fed to animals reared in Europe including pork in Sweden and salmon in Norway (Box 2). Sweden has been proud of producing most of its feed, however, 80% of the components are imported (1). This means that "Made in Sweden" is often a misnomer (1).

Production of large quantities of commodities often involves merging small-scale farms into large-scale farms that produce monocultures. This is often carried out by large corporations and pushes many poor people off the land forcing them onto marginal land and/ or to cities, with both social and environmental consequences (2).

Box 1: Virtual water – the hidden water behind your food

Virtual water is the water embedded in traded commodities. Virtual water content of a few selected products in m³/ton:

Potatoes	160
Maize	450
Milk	900
Wheat	1 200
Soybean	2 300
Rice	2 700
Poultry	2 800
Eggs	4 700
Cheese	5 300
Pork	5 900
Beef	16 000

Source: IGBP

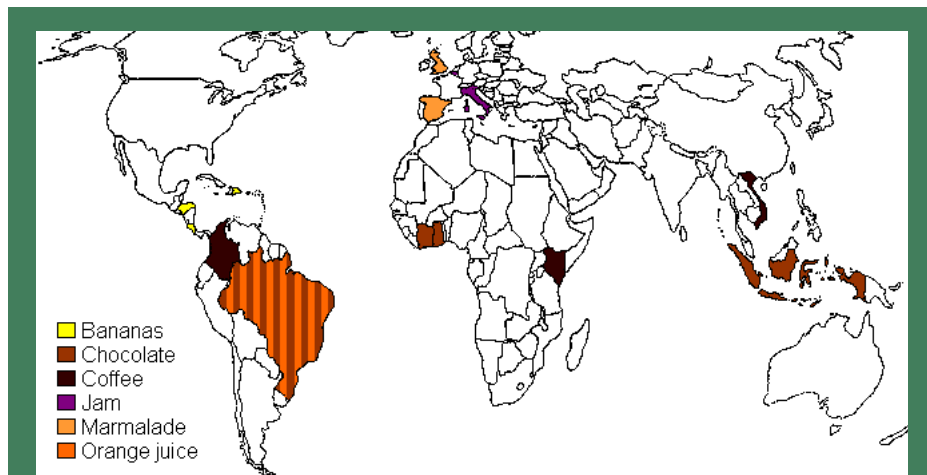


Fig 1: (Inter-) Continental Breakfast. The map indicates the producing countries for some common breakfast components in Europe: bananas, chocolate, coffee, jam, marmalade (from Spanish oranges processed in the UK) and orange juice.

Food security?

Increasing amounts of land in developing countries are being used to produce export commodities (2). This means that this increase in production is not being used to solve food scarcity or insecurity.

Globalisation can be a form of insurance in case of, for example, local crop failures. It is unlikely, however, that the poor can afford this type of insurance so crop diversity may be a better insurance but this is not conducive for trading on the global market. Instead, the demand for large amounts of standardised products has resulted in the "monoculturation" of agriculture and aquaculture. This refers to the concentration on a few species and varieties.

Globalisation could also reduce land degradation by ensuring that appropriate crops or livestock for local environmental conditions are used. There are, however, many reports of land degradation, such as clearing the forest in the Amazon for soy culture and mangroves throughout the tropics for shrimp aquaculture. This also leads to marginalisation of the poor as their land is taken and converted into large-scale farms (2).

Agricultural subsidies

Trade liberalisation and globalisation should result in equal trading opportunities for all and there has been pressure by this policy's supporters, such as the World Bank and IMF, on nations not to subsidise their agricultural sectors. Nevertheless, western countries continue to heavily subsidise their agricultural sectors. This artificially lowers their production costs, and therefore the market price of their produce, which can then out-compete products from countries that do not subsidise their agricultural sectors, often the case in developing nations. Furthermore, the mass-production of few species has contributed to surpluses in production at national and even global levels, as has

been the case for coffee and bananas and this has caused declining market prices (2). Both of these crops are important for many developing countries. Lowered prices increase the pressure to further reduce production costs.

An additional subsidy, albeit indirect, are the externalities of intensive agriculture such as salinisation, nutrient leakage and lost ecosystem services, which are unpaid for.

Box 2: The global pork chop



Intensively reared pigs are fed industrially produced feed. Feed is usually composed of grains and protein components (oilseeds, fishmeal, palm seed and soy)(1).

With the increased production of pork, countries increasingly depend on imported feed components. In Sweden the main components (and their main source) in feed are: grain (Sweden), soy (Brazil), palm seed (Malaysia) and fishmeal (Baltic and North Sea) with coconut (Indonesia) and rapeseed (Europe). Each of these components is, in turn, industrially produced in large-scale monocultures or fished by industrial fishing fleets.

Intensive agriculture and aquaculture have direct and indirect environmental and human health impacts. Clearing of land clearly changes the ecosystem services provided, usually reducing the number of services provided as monocultures focus on provision of a single good (the crop). As a result of the intensity of farming fertilisers are needed to replenish soils and the use of water can compete with surrounding ecosystems and communities as well as lead to salinisation of the soils and water. Monocultures and high density of animals in animal rearing make them prone to rapid spread of disease. Agrochemicals and antibiotics are used to prevent this. Together with nutrients, these leak into the surrounding

ecosystems and waterways with environmental and human health implications. Consumers are, in other words, paying too little for coffee and bananas at the expense of people and nature.

Geographically de-linked

We in the rich part of the world are often geographically de-linked from the production of the food we eat, just as farmers are from the farm inputs' sources. As consumers and as part of the global community we need to ask ourselves if we have chosen a production chain that we are happy with? The focus on increased production alone, taking the work of ecosystems for granted, often results in negative side effects and vulnerabilities. Changes are taking place at, and beyond, the production sites faster than their effects can be studied. In addition to the environmental and social impacts, there are the conditions under which animals are

raised, such as pork eating fish and never seeing the light of day, and the climate effects of increased transportation.

Yet the feedback from the environmental and social impacts of these vulnerabilities is either not picked up or deemed less important than market changes at the national or global scale, which is the scale at which policy is made. In many cases, individual countries are often unable to take measures to control these externalities, as this would increase their costs relative to other producers.

It seems then, that the global market is not equipped to deal with its social and environmental externalities. In this sense, globalisation can become a dangerous driver.

Alternatives are, however, emerging. Certified ecological (organic) farming and socially fair trade use production methods that address farming's externalities. This is a growing market but will de-

pend on consumer demand, and therefore their awareness of, these products to have a bigger effect.

/Miriam Huitric

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SDU-Feature 2

Where's the brake, anyway? Slowing the consumption locomotive

The Worldwatch Institute is probably the lead commentator on how well – or badly – humans are treating the biosphere. So what topic did they choose as the focus of their 30th anniversary issue of The State of the World report this year? 'The consumer society' – that is, the global patterns of production and consumption which are the underlying cause of environmental damage.

According to Worldwatch Institute: "[t]here is little evidence that the consumption locomotive is braking." Or rather - the locomotive is only just picking up speed: in China, for example, auto sales doubled in 2002, and doubled again in the first half of 2003. Similar figures abound for other emerging economies including India, Russia and other Eastern European states, and Middle Eastern states such as UAE. These populations are joined by very wealthy groups of elite consumers in otherwise economically poor countries across Asia, Africa, and Latin America.

Of course, even with explosive growth in consumption levels, none of these can keep pace with the true Olympians of consumerism: Western Europe, Japan and

(permanent gold-medallist in the consumption stakes) the U.S. For its 5.2 % of the global population, the U.S. flexes its muscles atop the consumption podium with 31.5% of all consumption expenditures; Europe takes silver with its 6.4% of the world only managing a measly 28.7% of overall consumption (see box 1).

Such record-breaking consumption has brought the global economy to levels of production five times greater than those achieved in the post-war decade. The impact tolls of all this consumption hardly bear repeating: climate instability, ecosystem pressures (already leading to complete collapse in some instances), soil loss and degradation, ground water depletion, loss of productive land, toxics accumulation...is a reasonable shortlist. And yet the rising tide has not lifted all boats: these populations of consumer-athletes are not joined by an increasingly large portion of the world. For example, sub-Saharan Africa spends less on consumption in real terms than it did two decades ago.

Innumerable meetings no commitments Sustainable production and consumption became an explicit sustainable development theme for the worlds' governments when it was given a chapter of its own in



Agenda 21, the framework for sustainability agreed at the Rio Earth Summit in 1992. Being an 'explicit theme' does not however mean ...being an explicit priority. After Rio innumerable meetings have taken place to discuss SPC: national, international, policy, research, advocacy...even business. And yet no-one could really say there was any great culmination of commitment in time for the World Summit on Sustainable Development, in Johannesburg in 2002. In fact, the WSSD's answer to Agenda 21, optimistically entitled the Plan of Implementation, mandates nothing more impressive than to "...[e]ncourage and promote the development of a 10-year framework of programmes in support of regional and national initiatives to accelerate the shift towards sustainable consumption and production to promote...". Right now, UNEP and UN DESA are working together to give this 'framework of programmes' real meaning for governments, consumers and producers. But the tricky question remains: does their framework of programmes have its foot on – or even near – the brake of the consumption locomotive? Here's a spot-difference-test that gives us some idea:

- At the Oslo Ministerial Roundtable on SPC in 1995, the biggest meeting on this subject after Rio, delegates called for, "[g]reater precision in the definition of key concepts, as well as a delineation between levels, patterns and distribution of consumption."

Box 1: Consumer Spending and Population, by Region, 2000

Region	Share of World Private Consumption Expenditures	Share of World population
	(percent)	
United States and Canada	31.5	5.2
Western Europe	28.7	6.4
East Asia and Pacific	21.4	32.9
Latin America and the Caribbean	6.7	8.5
Eastern Europe and Central Asia	3.3	7.9
South Asia	2.0	22.4
Australia and New Zealand	1.5	0.4
Middle East and North Africa	1.4	4.1
Sub-Saharan Africa	1.2	10.9

Source: Worldwatch Institute

· And here's what the delegates at the meeting in Marrakesh in 2003 to launch the 10-year framework came up with as a main conclusion: "... clearly defining sustainable consumption and production is key." Does it sound like the brake lever might still be out of reach?

What does the brake look like?

And does anyone know what the brake even looks like? It has to be asked why the intergovernmental community finds it so hard to settle on a comprehensive framework for SPC. Even the promising ones they have, e.g. UNEP's Consumption Opportunities framework, they can be shown to ignore. A report prepared for ProSus Norway (Program for Research and Documentation for a Sustainable Society) recently noted, with regret, "[a]t the moment, we probably cannot expect much more from ... the future of sustainable consumption governance [i.e. the

current intergovernmental process] than the continuation of business as usual."

Maybe the ideas of unfettered economic growth, materialist consumerism, and global justice construed in terms of personal ownership of material goods – which are the totems of the global political discourse, and thus out-of-bounds for the intergovernmental debate on sustainable consumption – are themselves the actually the main causes of unsustainable consumption. Even if we can't find the brake, maybe we should at least take our foot off the accelerator?

And in fact, the most important question is not so much, where's the brake, but 'what are we doing on the consumption locomotive anyway and where do we think we're going?' As Worldwatch puts it, rounding off their report: "Lurking beneath the growing dissatisfaction with the consumer society is a simple question: what is an economy for?"

/John Manoochchri

More at:

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SDU-In brief

The Sahara Desert and Amazon Basin – "Achilles' heels" in Earth's armour

What do the Amazon Basin and Sahara Desert have in common? They are intricately linked by dust and climate and both belong to a group of "hotspots" or "Achilles' heels". The hotspots are critical regions that, if stressed, could trigger large-scale rapid changes across the entire planet, according to Professor John Schellnhuber who spoke at the EuroScience Open Forum in Stockholm last month.

Dust from the Sahara Desert fertilises the Amazon, increasing the abundance of life there, said Professor Schellnhuber, Science Ambassador of the International Geosphere-Biosphere Programme (IGBP) and Director of the UK-based Tyndall Climate Centre. "This process has been going on for thousands of years and is one reason why the Amazon Basin teems with life".

Both regions are also being affected by climate change, though in opposite ways. It is predicted that global warming will reduce rainfall in the Amazon initiating a major dieback of the forests. Once begun, this process will be extremely difficult, if not impossible, to reverse. Deforestation through human land use is also exacerbating the process. For the Sahara, though, current climate models predict that global warming could trigger a greening of the desert, reducing the amount of dust that it produces.

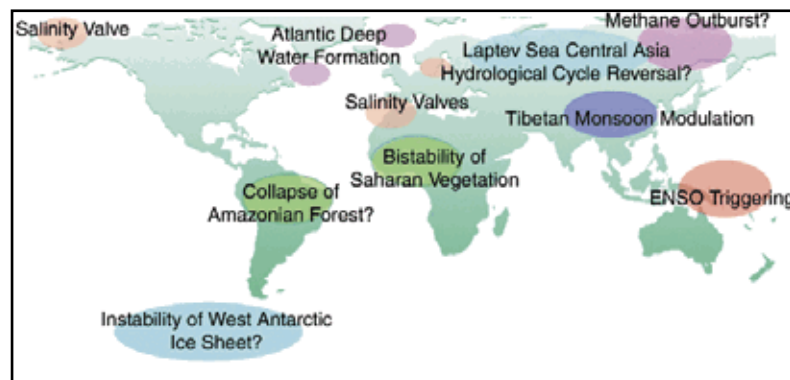


Human behaviour is also directly influencing the ancient relationship between the two regions. Four-wheel drive vehicles are churning up the Sahara Desert causing a surge in the amount of dust produced. This sounds like a good thing for the Amazon, and in the long run the extra dust may offset the impact of a greening of the desert.

"On the other hand, global dust is becoming a major problem in terms of climate change," Schellnhuber continued. "As with many regions of the world, we don't know which areas will be 'winners' and which will be 'losers'. My sense is that the Amazon will be a major loser".

Critical thresholds

The relationship between the Amazon and Sahara illustrates the



The hotspots or 'achilles heels' of the world are like the 'vital organs' of the Earth. If they are not kept in good health large-scale rapid changes could be triggered. Image: IGBP

complexity and intertwined nature of the Earth System. Both these regions belong to a family of around a dozen "Achilles' heels" across the planet that act like massive regulators of Earth's environment. According to Schellnhuber, these hotspots are critical regions of the Earth that, if stressed, could trigger large-scale rapid changes across the entire planet. "The Earth is in many ways similar to a human body. All parts of the planet are interconnected and, just like the heart, lungs and brain etc, the 'vital organs' of the Earth must be kept in good health," he says.

A good example is the North Atlantic Current (dependent on "Atlantic Deep Water Formation" in the figure above), the ocean circulation pattern responsible for bringing warmer air to northern Europe. The collapse of this current could lead to a large regional shift in climate. Other examples include the Asian monsoon system and the West Antarctic Ice Sheet.

However, according to Schellnhuber, not enough is known about these vital areas to be able to predict when critical thresholds are reached. "We have so far completely underestimated the importance of these locations. What we do know is that going beyond critical thresholds in these regions could have dramatic consequences for humans and other life forms".

/Susannah Elliott

More at:

"Abrupt Changes: The Achilles' Heels of the Earth System", article published in Environment Magazine (April 2004): <http://www.igbp.kva.se/uploads/EnvironmentArticle-AbruptChanges.pdf>

Too much is happening too fast beneath the oceans surfaces. Professor Boris Worm, a leading German marine biologist, was in Stockholm recently to present his current research on the connection between biological diversity and ecosystem services. Most datasets, independent of locality, show the same negative trends of decline in marine biodiversity threatening one of the world's most important sources of protein.



Boris Worm

The decline of the Baltic Cod population and the degradation of coral reefs are not isolated marine problems. These are symptoms of a global mismatch between the expected and attainable ecosystem goods and services, a misunderstanding of ocean ecosystem basic characteristics.

– To continue transforming global ocean ecosystems blindly is both irresponsible and dangerous, Worm states.

When synthesising huge amounts of datasets, Worm and his research team found that industrial fisheries have depleted entire communities of large oceanic predators worldwide. The analysis, published in the scientific journal *Nature* last year, suggested 90% of large predator fish have been cleared from the seas in the past 50 years or so. These effects are further compounded by habitat destruction, eutrophication, and climate change, implicating a global transformation of the oceans ecosystems.

Biodiversity matters

Unfortunately, we still know too little about how marine



The crowded fishing harbour at Madras, India. Photo: FAO

ecosystems really work and the existent knowledge is not synthesised. One exception is a synthesis made by Professor Worm and colleagues a few years ago. It showed that biological diversity matters to the sustainability of fisheries (e.g. areas with higher species numbers were not as easily overfished) and that marine ecosystem functions are vital to our food supply, economies, and human health. Most of this important ecosystem, covering 70 per cent of the Earth, remains poorly protected from human impacts, and is changing rapidly as a result. Worm suggests a precautionary strategy of ecosystem management with the main goal to maintain marine biodiversity. In detail this implicates a strong reduction in fishing pressure, an increase of the proportion of Marine Protected Areas, in particular in marine hotspots, and an adaptive management approach.

/Sara Borgström

More information:

Professor Boris Worm personal website:
http://www.dal.ca/~bworm/Boris_Worm.htm

Till death do us part. More than 12,000 species of plants and animals are currently threatened or endangered. Now a new study has found that a further 6,300 associated species are expected to be lost when their hosts go extinct.

Up to 50 percent of species on earth are predicted to be lost in the next 50 years. This is bad enough. Now an international group of scientists claim that current extinction estimates need to be recalibrated by taking species coextinctions into account. The research group, led by Lian Pin Koh and Navjot Sodhi of the National University of Singapore, claim in the journal *Science* that the loss of a species upon the loss of another has up till now been widely overlooked although it remains a critical process.

The team used mathematical equations to calculate that more than 6000 affiliate species are “co-endangered” with host species currently listed as endangered. Examples include pollinating Ficus-wasps and Ficus, butterflies and their larval hostplants, and ant-butterflies and their host ants; organisms associated with and uniquely adapted to their host. At least 200 affiliate species have historically been lost through co-extinction, according to the new study. In some settings, the loss of a single species might lead to multiple extinctions. The study's authors exemplify this with the army ant (*Eciton burchelli*), found in Central and South America, on which about a hundred species depend.

So what?

Many of these assorted species might not seem very important at first glance, but in spite of being unloved they are often important species that perform critical functions in their ecosystems. Although heavily dependent on their hosts these species are often involved in complex interactions with many other species, some of which might be ecologically or commercially important.

The threat of co-extinction adds to a long list of threats that face the world's plant and animal life. As such, these new findings have implications not only for theoreticians



The domino effect: more than 6000 affiliate species are 'co-endangered' with host species currently listed as endangered.

who calculate the number of endangered species, but also for local conservation and management decisions. For instance, it becomes obvious that in order to prevent a host species going extinct and any potential domino effect, entire habitats and the complex interactions between different species need to be considered in conservation strategies.

The Earth is now losing species at a rate not seen for 65 million years, since the extinction of the dinosaurs. And for the first time in the geological history one species – humans – are in one way or another responsible. The ethical concerns about ending any evolutionary line that goes back billions of years are reasons enough to halt this loss of species. But recent research has also demonstrated that the loss of biodiversity can impact the capacity of both natural and managed ecosystems to deliver goods and services, which are essential to human well-being. We are getting a grasp on the quantity of biodiversity loss, but we still know too little about its ecological, economic and cultural effects.

/Fredrik Moberg

More at:

Press release and additional material for the *Science* article:
<http://darwin.zoology.gla.ac.uk/~vsmith/papers/coextinction/>

What do non-timber forest products, chainsaws and consumers have in common? Two recent studies looking at Brazil nut harvesting in the Amazon demonstrate the complexities of sustainable resource extraction.

The Brazil nut is a non-timber forest product (NTFP). That is to say that its harvest does not entail the cutting down of trees. During the 1990s, many studies found that NTFPs could fetch higher prices than timber. This work was largely stimulated by the rapid rate of deforestation taking place around the world, and promoted the replacement of timber for NTFPs as a means of conserving forests while supporting peoples' livelihoods. In the case of the Brazil nut, this seems to be working. Over 20% of the population in the Peruvian Amazon were found to be directly or indirectly involved in its harvest, which accounted for about half of their annual income (1).

Brazil Nuts and Chainsaws

Both of the studies show the need for in depth understanding of the Brazil nut's ecology and ecosystem as well as how the socio-economic system interacts with the forest. That is, how people use the Brazil nut and the forest, which is in turn a reflection of their needs. A survey of the Brazil nut trees across the Brazilian, Peruvian and Bolivian Amazon found that young trees were missing from Brazil nut stands (2). The authors concluded that over-harvesting was preventing germination of enough Brazil nuts and this could affect production in the future (2), and could have ecological implication in the forest ecosystem.

Furthermore, Brazil nut harvesting only accounted for half of the annual income, meaning that people needed to supplement their incomes. This was mainly done with agriculture and timber extraction and, to a lesser extent, fishing, hunting and other employment (1). Like the Brazil nut, fishing and hunting are NTFPs, while logging and agriculture involve deforestation and can degrade surrounding forests. Timber extraction provided greater revenue than agriculture. An interesting, albeit worrying, finding was that harvesters with larger groves of Brazil nut trees were more likely to be involved in timber extraction as their production allowed the investment in a chainsaw, while



The Brazil nut

those with fewer trees, and therefore poorer, supplemented their incomes with agriculture.

Consumers and the State of the Amazon

Based on these findings, extraction of nuts needs to be reduced (2). This will negatively impact livelihoods unless alternative products are found and/ or if the market price of Brazil nuts rises. Silvertown (3) reminds the reader of the role of consumers in determining the outcome of efforts for sustainable extraction. To prevent harvesters from switching to damaging activities, consumers would need to pay a higher price for this product. The Brazil nut is, however, easily substitutable with other nuts. Consumer awareness and interest will be important to allow such changes. The consumer would win diversity and a good conscience from their contribution to conserve the Amazon as well as maintaining peoples' livelihoods.

This issue is in no way limited to Brazil nuts, and again shows the importance of including the consumers in the production cycle. The harvesting of NTFPs is definitely a way forward for sustainable use of forests, but the harvesting of products must be based on the ecosystems' and the users' needs. Increasing consumer awareness will ease the introduction of NTFP harvesting, as many of these products are exported to markets abroad.

/Miriam Huitric

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Sustainability School:

Tragedy of the Commons



In 1968 Garrett Hardin popularised the term 'The Tragedy of the Commons' using the medieval commons tenure system for grazing as an example.

A herder grazing his or her animals on the commons, which were accessible to all herders, reaped all of the benefits from his or her animals on the commons

but shared the cost of overgrazing of the commons. Under such conditions, each individual will aim to maximise what he or she can appropriate from the land so as not to 'lose-out' to a fellow user. Hardin concluded that land degradation of the commons was inevitable as each individual acted independently and recommended either privatisation or nationalisation of the commons to prevent this.

However, Hardin's argument rested on two key assumptions: that there was no information on the state of the resource and no communication among users, which are rarely the case. Hardin's commons were in fact open access. Open access occurs where there are no property rights or rules at all and it is widely accepted that under such circumstances 'The Tragedy of the Commons' will indeed arise.

Since 1968, many have gone on to show that it is possible to collectively manage shared resources. That is, common pool problems can be solved by voluntary organisations rather than by centralised governmental regulation or privatisation of the resource.

Governing the commons

Elinor Ostrom, at Indiana University, is maybe the most well known researcher behind the "revisiting" of the tragedy of the commons. She has described many examples of commons where use rights have been assigned to a group of resource users rather than to individuals or the state.

Examples include communal tenure in meadows and forests, irrigation communities and other water rights, and fisheries. Ostrom has, after studying several long-standing and viable common property regimes, outlined a set of "design principles" common to each of the cases. These include clearly defined boundaries, monitors who are either resource users or accountable to them, graduated sanctions, and mechanisms dominated by the users themselves to resolve conflicts and alter rules.

/Miriam Huitric

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The Sustainable Development Update focuses on the links between ecology, society and the economy. It is produced by Albaeco, an independent non-profit organisation, in cooperation with the Center for Transdisciplinary Environmental Research (CTM) and the Department of Systems Ecology, both at Stockholm University; the Beijer International Institute of Ecological Economics; the Resilience Alliance; and the Stockholm Environment Institute (SEI). It is produced with support from Sida, the Swedish International Development Cooperation Agency, Environment Policy Division. **Feedback:** 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:** Louise Hård af Segerstad, Carl Folke, Eric Langenskiöld, Mats Segnestam. **Contributors:** Sara Borgström, CTM, Susannah Elliott, IGBP, John Manoochehri, University of Surrey, UK, Miriam Huitric, Albaeco.