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The IUCN Forest Conservation Programme Newsletter Issue 37 2008

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Agriculture and Productivity – conservation imperatives

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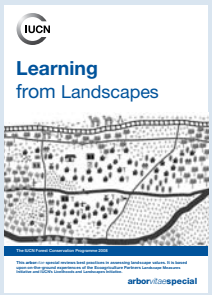
This **arbor***vitae* is also available in French and Spanish on our website at www.iucn.org/forest/av

Readers respond:
If you have a comment on something you have read in a recent issue of **arbor***vitae*, we'd love to hear from you. You can send a message to: jennifer.rietbergen@wanadoo.fr

Dear IUCN,
I congratulate you on issue 36 of **arbor***vitae* dealing with rights-based approaches to forest conservation. I encourage you to dedicate a future issue to the flip-side of that topic, namely the responsibilities of communities to forest conservation, and how they can be helped to realize those responsibilities.
Yours sincerely,
David Waugh
Director, Loro Parque Fundación
Canary Islands, Spain



Accompanying this issue of **arbor***vitae* is the latest '**arbor***vitae* special', part of an occasional series that is designed to provide more in-depth analysis on particular topics relating to forest conservation. This edition, *Learning from Landscapes*, looks at the use of landscape approaches to reconcile conservation and development objectives.

This **arbor***vitae* special, as well as previous editions in the series, can also be downloaded from the Forest Conservation Programme section of www.iucn.org.

Buitenlandse Zaken
Ontwikkelings samenwerking

DGIS is the Development Agency of the Ministry of Foreign Affairs of the Netherlands

Editorial

The conservation community has tended to shy away from dealing with agricultural productivity. At best conservationists have offered vague words about how ecosystem functioning and biodiversity underpin food production and hopeful messages of new win-win solutions for both consumers and conservation; at worst they have indulged in 'anti-production' rhetoric, warning that we are set to repeat the mistakes of twentieth-century agriculture. Clearly mistakes have been, and are still being, made with poorly conceived policies and incentives driving the conversion of large areas of forest land, the indiscriminate use of pesticides and fertilizers and over-abstraction of rivers and aquifers. Nonetheless, increases in agricultural productivity have meant that globally the number of food-insecure people has fallen from 37 percent in 1970 to 17 percent, according to IFPRI. Indeed, without the dramatic increases in agricultural productivity that have been achieved over the past 50 years, we would now need an extra 300 million hectares – an area equivalent to 10 percent of the world's current forest cover – to feed the global population.

In the twenty-first century, conservation goals have to be tackled within the urgency of ensuring food security for a future global population of nine billion people. The puzzle to be solved by conservation is how this can be done whilst safeguarding ecosystems, forests and water resources.

As the current debate on reducing emissions from deforestation and degradation shows, the reality is that the fates of forest and agricultural land are inextricably linked. Pressure on both is growing, and in turn threatening loss of biodiversity and of the capacity of watersheds to support water security for people. The recent hikes in the price of oil seem to be part of a long-term trend rather than just temporary spikes, and the changing economics of how we satisfy our basic needs for food and warmth mean that production will spill over into marginal productive land where the conservation stakes are often higher.

This issue of **arbor***vitae* looks at some of these trends and what they mean for forests. The message seems to be clear – conservationists will need to pay more attention to agricultural productivity issues and work across the sectoral divide to develop sustainable, realistic strategies for the future.

Stewart Maginnis & Mark Smith
Stewart is Head of IUCN's Forest Conservation Programme and Mark is Head of IUCN's Water Programme

news in brief

Exorcizing witch-weed? Scientists at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) have made a breakthrough in the fight against witch-weed, or Striga, Africa's biggest cereal crop menace. It is estimated that witch-weed inflicts some US$7 billion's worth of damage every year on key food crops such as sorghum, maize, millet and rice. Dr Dionysious Kiambi, a molecular geneticist with ICRISAT, reported, "Through marker assisted selection, we have determined the precise segments of the sorghum genome known to confer Striga-resistance and have transferred them to farmer-preferred varieties through conventional breeding with very promising results". ICRISAT hopes to replicate its on-station results on-farm, and if these prove successful, the research institute is optimistic about helping to boost yields, food security and farmer incomes across Africa.
Source: www.afrol.com, 8 August, 2008

Pollinators to get protection help: The Global Environment Facility (GEF) has launched a new project worth US$26.45 million to better protect bees, bats, butterflies and birds that are essential to crop production. The decline and collapse of important pollinator populations such a honey bees have become a major concern within recent times. It is estimated that 35 percent of the world's crops rely on pollinators (which even include mosquitoes), making farmers and consumers strongly dependent on these species.
Source: www.enn.com, 11 August, 2008

Forest handed back in Australia: In August, the Australian state of Canberra handed over the country's largest remaining tract of tropical rainforest to its traditional Aboriginal owners. The 1,800 square kilometres of the McIlwraith Range land, formerly a pastoral farming lease, is to be loaned back to the government as a national park, jointly managed by several local indigenous groups and government-employed rangers.
Source: www.planetark.com, 7 August, 2008

Agriculture and conservation – finding positive linkages in Uganda

Planting cabbages near Mt. Elgon National Park

Barbara Nakangu and **Edmund Barrow** of IUCN describe a project that is seeking to promote secure rural livelihoods while helping conserve a National Park.

The Mount Elgon ecosystem in eastern Uganda is one of the sites of the Livelihoods and Landscapes initiative of IUCN's Forest Conservation Programme. Here, the initiative is working with the Benet – an ethnic group of people whose livelihoods have been directly linked with Mt. Elgon for hundreds of years – they are amongst the main original peoples of the area. Until the early 1980s, the Benet were settled and living inside the forest, since before it was gazetted as a forest reserve. Here, they had agricultural gardens, grazed their livestock, collected medicines, gathered food, and hunted game meat – all inside the forest. Most of this was done on a sustainable basis, though land-use pressures were increasing. However, this came to an end in 1983 when the Ugandan government declared Mt. Elgon a National Park and decided to evict and resettle the Benet people outside the forest.

Recent population and land-use pressures amongst the rural communities have now intensified resource-use conflicts within the Mt Elgon landscape. Overexploitation in areas to which the Benet were resettled has led to severe deforestation, soil degradation, landslides, flash floods and silting of water bodies. As a consequence, the Benet face frequent crop failures, increased food shortages and reduced soil fertility. They also lack vital energy resources such as firewood, and have reduced livelihood options. These impacts have in turn catalyzed encroachment and degradation of Mt. Elgon National Park resources, as well as the natural resources outside the protected area, within the Benet landscape itself.

Within this complex situation, the Livelihoods and Landscapes initiative is seeking to promote a positive interaction between the development of sustainable livelihoods on the one hand, and the conservation of the landscape processes on the other. Some of the activities being undertaken include:

promoting soil and water conservation and integrated soil fertility management: The initiative, with its partners, will support local communities to improve the productivity of their land though soil and water conservation and integrated soil fertility management. As well as training farmers in soil and water conservation techniques, the initiative will promote on-farm tree planting using, where appropriate, indigenous and useful trees such as medicinal and fruiting varieties.

supporting income-generating activities for women as incentives for promoting land productivity and restoration: Working through two local community-based organizations (KACODA and KADLACC), the initiative will promote activities that can help women increase their earnings and motivate them to make both conservation and livelihood-related investments. Handicrafts and backyard vegetable gardens are promising enterprises that the initiative will promote. In the case of handicrafts, the women will be able to use raw materials obtained from the National Park, through collaborative management agreements with the National Park Authority. The initiative is also planning to strengthen the women's ability to evaluate and respond to market opportunities.

promoting multi-purpose trees compatible with the landscape: Given acute land shortages and competing land-uses, the initiative is working through the local government to promote multi-purpose trees that produce both goods and services such as income, fodder, food, soil fertility improvement, etc. Emphasis will be put on tested and adapted species, which include avocados, citrus fruits, passion fruits and indigenous species (such as *Prunus africana* which is a globally important cure for prostrate cancer).

The Mt. Elgon landscape needs to benefit the livelihoods of rural people in order to continue to provide conservation and catchment benefits for present and future generations. Conservation and livelihood objectives are inextricably linked – and both must support each other. The Livelihoods and Landscapes initiative and its partners are helping to make those links.

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The high stakes of high food prices

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Rising beef prices are threatening forests

David Kaimowitz of the Ford Foundation weighs up the likely costs of high food prices for forest conservation.

The more profitable it is to raise cattle and grow crops in places that currently have forests, the more likely it is those forests will disappear. It's as simple as that.

For most of the last forty years, global food prices declined steadily. That was bad news for farmers but good news for forests. The returns to agriculture became so low that farming probably would have disappeared entirely from many tropical regions if it weren't for subsidies and the fact that many poor rural families had no other option.

Those days are gone. Emerging markets for biofuels and greatly improved diets in China, Brazil, and India have pushed up the demand for foodstuffs, while decades of neglect of agriculture and poor resource management have kept down supply. So food prices are going through the roof.

That makes it much more profitable to burn down forests to raise cattle and grow soybeans in the Amazon and put in oil palm plantations in Southeast Asia and Central America; and it may eventually lead to sugar cane, maize, and other crops expanding deep into the forest. High maize prices make it more expensive to use corn to produce chicken, eggs, milk, and beef, and may encourage producers to revert to extensive livestock systems that use large areas of pasture to feed cattle, instead of maize.

All this will make it much harder to conserve forests and will greatly raise the cost of any efforts to lower carbon emissions by reducing deforestation. And it will become increasingly difficult to defend large protected areas that don't have strong roots in local cultures and economies.

Theoretically, the new context could also open fresh opportunities to promote viable small farms with diversified, environmentally friendly production systems, particularly given the high prices of fuels and fertilizers. Small farms with perennial crops, woodlots, forest fallows, trees in crops and pastures, and limited agrochemical use can maintain much more biodiversity than most conservationists realize. However, to achieve that potential would require much more proactive and more equitable agricultural and rural development policies than we've seen so far in most developing countries.

To develop effective strategies for conserving biodiversity and other natural resources and improving rural livelihoods in the new context will require much more high-quality information and analysis than is currently available. Among the most problematic aspects of the declining interest in agriculture and rural issues in general in recent decades has been a marked reduction in data collection and research about rural areas and in the number of well trained and highly motivated people going into those fields. As a result, to some extent we are driving blind based largely on our conventional wisdom and recollections about how things worked in the past, and our thinking definitely has not caught up with the rapid pace of change.

Higher food and fuel prices combined with the cumulative effect of long-term trends in rural societies pose fundamentally new threats and opportunities for environmentalists. For the most part environmentalists don't understand these aspects very well and are ill-prepared to address them. The old approach of simply establishing more and larger parks will be costlier and less likely to succeed. The same applies to strategies driven by purely biological or ecological considerations. Prices matter more than ever – and the stakes are very high.

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Biofuel – a waste of space?

Rudy Rabbinge of Wageningen University, the Netherlands,
argues that the biofuel boom is a backward step in our efforts to increase agricultural productivity.

Globally, agricultural productivity has increased dramatically over the last fifty years. Despite a doubling of the world's population, per capita food production has increased by 30 percent since 1960. These gains have been driven by improved technologies – pesticides, fertilisers, irrigation and improved varieties. 'Green revolutions' in the productivity of small grains (wheat, maize, rice) were seen in Europe and the US in the 1950s, and in Asia in the 1970s, while yields in Latin America have increased more steadily. Sub-Saharan Africa is the only region not to have seen a sufficient productivity increase – here per capita food availability has decreased. There are a multitude of reasons for this, underinvestment in agriculture being an important one.

Today, our ability to feed the world's growing population may be jeopardized not only by threats to the natural resource base (chiefly from overgrazing, unsustainable land management, and deforestation), but also two important trends. The first of these is the dramatic increase in the global consumption of meat and other animal products. Economic growth in countries such as India and China are bringing dietary changes, as more people can afford to eat meat. The dairy industry is also booming in these countries – in fact India is now the biggest dairy producer in the world. This trend towards increased animal production requires more grains and therefore more agricultural land; as an illustration, producing one kilogram of beef requires eight kilograms of wheat. This trend is not one that can easily be 'managed' and if it continues as predicted, global 'feed security' may become a serious problem. It is also putting the squeeze on food security as competition for good agricultural land hots up. However, when the most sophisticated agriculture is used on the best land, that problem may be overcome.

The second trend that is undermining global food security is the current boom in biofuel production. Driven largely by the rising oil prices, the rapid expansion of biofuel crop production is in turn partly responsible for the increase in food prices as land-use switches from food to fuel. Government policies in the US and Europe are also behind these trends, as they set required quota or provide subsidies for biofuel use. The highest value use of maize is now as an ethanol feedstock, not as food or livestock feed. This is pushing up the price of these crop commodities, with widespread ramifications for consumers around the world. It needs to be borne in mind that, as with livestock production, biofuel production is a relatively inefficient use of land and wasteful conversion of solar energy. In the Netherlands, for example, meeting the EU target of 5.7 percent biofuel use in transportation would require 1.4 million hectares of rapeseed – that same amount of oil could cover the energy costs of 100 million Dutch people's daily food consumption.

Maize encroaching on forest inThailand. The highest value use of maize is now as an ethanol feedstock, not as food or livestock feed

If we look at the output value per unit production area of various agricultural products, fuel represents the least valuable use of land. I have drawn up a ranking to illustrate the range in per-hectare value of agricultural products. Thus, in order of the most valuable use of land, the products line up as follows: pharmaceuticals, fragrances, flavours, flowers, fruits, vegetables, food crops, fodder, fibres and fuel. From this listing, it can be seen that commercial farmers looking to maximize the economic productivity of their land would be better switching to high-value, land-intensive pharmaceutical crops rather than biofuel crops. This would also ease the pressure on food crop production – with obvious benefits for global food security – and on forests.

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What's in store?
The future of agriculture and its impacts on forests

In July, the World Business Council for Sustainable Development, with support from IUCN, published a report entitled Agricultural Ecosystems: Facts and Trends (downloadable at www.wbcsd.org) in which they summarize the status of world agriculture and the challenges that lie ahead. **Jamie Gordon** of IUCN spoke to **Eva Haden** at WBCSD, who coordinated the project, about some of the issues covered in the report and what they might mean for agriculture and forests in the future.

Forest in a mixed landscape can do much for agriculture: conserving wild relatives of crop plants; securing water supplies, providing dietary supplements. What can agriculture in such a matrix contribute in terms of better use and conservation of forests?

Good practice in agriculture can contribute, directly or indirectly, to the health and conservation of forests by, for example, producing more food with less land and therefore relieving pressure from land conversion, establishing wildlife habitats, using minimum tillage, using more water-efficient crops and maximizing on-farm recycling of nutrients. But these benefits can be extended to other ecosystems other than forests too, such as wetlands and urban ecosystems.

Does it make any sense to promote biofuel production against a background of rising food prices and pressure on the remaining high biodiversity land we have?

Biofuel production is not the only reason food prices have been increasing in some regions. In 2007-2008, only 5 percent of the global cereal use was for biofuels production, compared to 83 percent for food and feed. Yes, there is competition for land-use to provide fuel, food, fibre and forest products, but biofuel production should share the same concerns as any agricultural management system. This means that biodiversity concerns are the same, and farming management systems and stewardship approaches are needed for biofuels production too, such as integrated crop management, and conservation agriculture.

You note that the expectation placed on farmers to 'conserve soil, enhance biodiversity and protect water supplies,' may require compensation. We are beginning to see Payments for Environmental Services (PES) make an impact on forest management. Has there also been progress in agriculture?

Yes there has, and I'd like to reference the United Nations Food and Agriculture Organization's 2007 'The State of Food and Agriculture' report that focuses essentially on paying farmers for environmental services. Beyond the provisioning services such as food (that we mostly already pay for), services such as pollination and clean freshwater supply are being valued and paid for in some cases. A well-known example is that of Vittel (Nestlé Waters) paying local farmers in France to use less nitrates and pesticides to ensure clean water downstream can be bottled. Also, the value of honey bee pollination to U.S. agriculture is more than US$14.6 billion – and as bees are becoming scarcer, bee keepers have significantly increased their costs (I recommend watching Nature Inc. episode 1 [see www.natureinc.org/fruit.htm]. As a key provider and benefiter of ecosystem services, agricultural ecosystems will surely be involved more and more in such deals in the future.

You need a little more than one litre of water to produce a calorie of food. And when you ship 1 kg of beef around the world, you're actually shipping about 16,000 litres of water.

Finally, at the policy level, getting joined-up thinking between the forestry and agricultural sectors won't be easy and this year we saw the Doha Development Round in Geneva collapse. What are the policy challenges that lie ahead?

Getting into regulatory and policy frameworks is a messy business, and I don't think the fact that this Doha Round was unsuccessful is particularly good for anyone. Now if we start adding the ecosystem element into these policy decisions, it will add to the complexity. For example, take water: You need a little more than one litre of water to produce a calorie of food. And when you ship 1 kg of beef around the world, you're actually shipping about 16,000 litres of water. In the WBCSD's 'Water Scenarios to 2025', we say that by 2020, there could be 'virtual water trading' just as there is carbon trading today. In fact, that could be good news for some of the world's poorest farmers who are in water-abundant regions…

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The 'hidden' farmers in Thailand's forests

Planting garlic in an area classified as forest in Thailand

Andrew Walker of the Australian National University looks at why a campaign for community forestry has back-fired in Thailand.

Most people who live in or near Thailand's forests are farmers who grow rice for household consumption and depend on an array of cash crops and off-farm labour to meet household expenses.

Yet millions of these farmers have insecure title to their land because they farm within areas declared forest reserve, national park, wildlife conservation zone or protected watershed. This lack of formal tenure often results in regulatory restrictions and expensive or unobtainable credit.

NGOs and activist academics, convinced that people and forests can co-exist, have waged a campaign for community forest legislation that would recognize local tenure rights. Some success was achieved when, in 2007, the Thai government passed a Community Forest Act. However, Section 37 of the Act stated: "living or farming in community forest areas is strictly forbidden." This only served to reinforce the demarcation between forest conservation and human activity and did little for farmers in forest reserves.

Campaigners reacted with anger and dismay and the Act is now the subject of a challenge in the Constitutional Court. But were the seeds of these restrictive provisions to be found in the community forest campaign itself?

This campaign has been characterized by what I have called 'arborealization'. This is the process whereby agricultural livelihoods are portrayed as forest livelihoods, where farmers are portrayed as forest dwellers, and, ultimately, where rights to manage forest are given priority over rights to agricultural land. In other words, arborealization means not seeing the farmers for the trees.

I suggest two main reasons why campaigners adopted this arborealized approach. First, they wanted to respond to the common charge levelled by state agencies that farming in Thailand's forest zones is environmentally destructive. Rather than challenging the scientific legitimacy of these often exaggerated claims, activists responded by selectively emphasizing low-impact, subsistence-oriented and forest-friendly forms of agricultural production, especially long fallow shifting cultivation. Agricultural intensification and commercialization were largely left out of the picture.

The second reason was that many campaigners for community forestry often held strongly anti-commercial views and felt that the individualism of the market undermined the communal forms of resource management that they championed. Inevitably, they were drawn to aspects of local resource management where non-commercial and communal arrangements were salient, such as the management of 'sacred forests' or the regulation of fallow lands. They were much less interested in the bulk of the agricultural sector where individual household ownership and management of land prevailed.

Despite the rallying cry that people and forests can co-exist, the campaign placed primary emphasis on the communal management of forest, rather than farmers' rights to agricultural land. The complex realities of contemporary agricultural systems simply did not fit the campaign's arborealized image of rural livelihoods.

Well meaning forest sector reform is likely to be unsustainable if not based on a realistic understanding of the way people use land, water, and forest resources. The Thai campaign for community forestry defended people's rights in terms of a selective image of their livelihood. This has turned into a regulatory straightjacket. When a piece of legislation designed to strengthen the resource rights of forest-dwelling farmers ends up making farming illegal in those very forests, something has gone badly wrong.

Andrew Walker is the co-author (with Tim Forsyth) of *Forest Guardians, Forest Destroyers: The Politics of Environmental Knowledge in Northern Thailand* (University of Washington Press, 2008). The concept of 'arborealization' is discussed in detail in Andrew's 2004 paper 'Seeing farmers for the trees: community forestry and the arborealization of agriculture in northern Thailand', *Asia Pacific Viewpoint*, 45: 311-324.

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Convergence of food, fuel and fibre markets: driving change in the world's forests

Don Roberts, **Andy White** and **Sten Nilsson** set out the main factors responsible for the growing pressure on land, and forests in particular.

Converging demand, converging markets

The converging global demand for land to produce food, fuel and fibre will likely lead to a large-scale land grab, and forest lands are likely targets. Indeed, forests will increasingly be converted to industrial agricultural use to meet these burgeoning demands. Using conservative estimates, future demand for land will equal at least 515 million hectares: 200 million hectares for agriculture, 290 for bioenergy production (including fuelwood), and 25 for industrial tree plantations. This is far more than is available. After accounting for built areas, cultivated lands, forests, non-vegetated areas, parks, mountains and grasslands for meat production, there are only between 250 and 300 million hectares of land available for producing biomass. The additional 200 million hectares required to meet future demand can only come from forests (see http://cofi.org/library_and_resources/annual_convention/2008/pdf/Don%20Roberts%20-%20CIBC%20World%20Markets.pdf).

The global expansion of biofuels is driven by increased concerns about environmental, economic, national and political security. These concerns are also behind the ambitious targets for biofuel use being set by many countries, including some of the largest economies. China, for example, is aiming to put into place some 30,000 MW of biomass-fired power generating capacity by 2020. The Chinese government, conscious of the need not to let biofuel production displace food production, is supporting cellulosic ethanol production – i.e. using wood or grass-based feedstock, rather than say maize or sugar cane. The government has also targeted 13.3 million hectares of marginal lands to be devoted to supporting the bio-energy sector. For Brazil, some analysts forecast that annual ethanol output from sugar cane will grow from roughly 18 billion litres in 2006 to over 40 billion litres by 2015. In Indonesia, the palm oil industry already has 6.5 million hectares of plantations across Sumatra and Kalimantan. Some observers predict this area will reach 16.5 million hectares by 2020. And finally, following rapid expansion stimulated by a combination of subsidies and minimum renewable fuel content targets, the US is now the world's largest producer of biofuel, principally from maize.

Because food and fibre are now converted into fuel on such a large scale, one way to understand what the 'biofuel boom' means is to consider the convergence of markets for these three commodity groups.

These three markets will converge in the sense that their primary feedstocks will tend to trade on the basis of their 'energy equivalency'. Thus, as substitute feedstocks for biofuel production, maize and woodpellets will move towards being similarly priced on the world market. For the forest sector, biofuel represents a new meaningful user of wood, particularly lower quality wood. This increase in demand will put upward pressure on wood prices until, as expected, they reach a price floor which reflects the wood's energy equivalency. In most parts of North America, the price of sawdust/shavings approximately doubled between 2005 and early 2007.

As well as feedstock costs (which account for up to 80 percent of biofuel production costs), the other key variables driving the economics of biofuels are the price of oil (the main substitute), regulations (which stimulate demand) and the conversion technology. At present, all of these variables are in a state of flux, notably the price of oil. Historically, the observed pattern has been that when crude oil prices fall below $60/barrel, interest in building biofuel plants falters in most countries (except for Brazil), and sparks when oil hits $70/barrel and above. The rocketing oil prices of recent months thus go a long way in explaining the rapidly growing interest of governments in both developing and developed countries in setting targets and providing subsidies for biofuel production.

The use of wood in biofuel production has the disadvantage of more expensive processing costs, relative to other feedstocks such as sugar and maize. However, those costs are coming down. Wood has other advantages, including longer and cheaper storage, lower transportation costs, less intensive use of inputs, and established collection systems.

Eucalypt plantation in Brazil. Wood-based biofuel production could boost developing country economies – but at what price?

It is estimated that an additional 20–25 million hectares of land will be required for intensive industrial plantations to meet global demand in 2020

Although the capital costs are still higher for processing wood, the variable costs may be lower, thus making wood a competitive feedstock.

What does this mean for forests?

Price increases in wood feedstocks should stimulate increased production and, as mentioned above, it is estimated that an additional 20–25 million hectares of land will be required for intensive industrial plantations to meet global demand in 2020. However, due to possible decreases in the supply of land for forestry, the effects will be most felt in the southern hemisphere where lower land costs combine with higher crop yields and lower labour costs. This is a potential opportunity for nations that have a natural biological advantage, which has not been realizable in traditional agriculture due to trade restrictions.

There is already ample evidence for this shift. In the last several years, the pressure to develop biofuels and non-food oils has resulted in an explosion of foreign-owned plantations in developing countries. A Chinese company, ZTE International, has committed to investing US$1 billion to establish a three-million-hectare biofuel plantation in the Democratic Republic of Congo. In Tanzania and Mozambique, the Swedish companies Atlas Copco and Sekab have announced plans to develop over 400,000 hectares of land for bioenergy production. A similar project is underway in Ethiopia as the German company, Flora EcoPower, begins investing US$77 million in the Oromia regional state as part of a purchase of over 13,000 hectares of land for biofuel production. In Lao PDR, Stora Enso, the international paper and packaging company, recently commissioned a feasibility study for establishing 35,000 hectares of Acacia and Eucalyptus plantations in Savannakhet and Salavane provinces. Such large investments indicate that these corners of the world are now valuable places for foreign companies, despite the distances and potential political risks involved. As a result, rural and forest land prices in many parts of the developing world are increasing dramatically.

New carbon markets and their influence on forestry will also present a number of risks, including: renewed and even increased state and 'expert' control over forests; support for anti-people and exclusionary models of forest conservation; violations of customary land and territorial rights; unequal and abusive community contracts; and land speculation and land grabbing. As land becomes an increasingly scarce commodity, it is questionable whether natural forest management will be competitive when matched against the fuel and food sectors.

These problems may be exacerbated as biofuel feedstock (wood-based or otherwise) production is likely to be at the 'extensive margin' of forested areas as harvesting and planting is extended into more remote regions in response to higher absolute wood prices. This may not be such good news for forest dependent peoples, who are often amongst the poorest, particularly those with weakly defined property rights. Shifts to biofuel production will leave them vulnerable to displacement.

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Andy White is the Coordinator of the Rights and Resources Initiative, an international coalition working to encourage greater global action on forest policy and market reforms to increase household and community ownership, control and benefits from forests and trees.

Sten Nilsson is Acting Director of the International Institute for Applied Systems (IIASA), an expert on international forests and global forest sector analysis, and Fellow with the Rights and Resources Initiative.

IUCN is a Partner in the Rights and Resources Initiative coalition, which is coordinated by the Rights and Resources Group.

Forests and food security

Selling shea fruit on the roadside, Burkina Faso. Forest products can be an important source of income for poor families

Mike Arnold examines the linkages between forest ecosystems and the food security of the rural poor.

The links between forests and household access to food supplies are numerous, and include the indirect environmental impacts of forests on the capacity of land to produce food. More directly, forests and forest trees are the source of a variety of foods that supplement and complement what is obtained from agriculture, and of a wide range of medicines and other products that contribute to health and hygiene. Forest products not only fill seasonal and cyclical gaps in food availability, they also act as a safety net in times of shortages due to drought, floods, illness, or other emergency situations. Access to wood fuels affects the availability of cooked food. Sale of forest foods and other forest products can contribute to the income of households that are nutritionally at risk, enhancing their ability to purchase food and inputs into their food production systems.

As populations have grown and agriculture has spread into forest areas, forest foods and other forest products have increasingly come from tree stocks and tree-dominated habitats that coexist with agriculture, as well as from closed forests. Forest fallow, farm bush, the trees that farmers maintain or establish on their land, and tree resources on other land have widely become major sources of forest foods, fuels and income.

Although research in the field of ecosystems and food security for the rural poor is limited, the case appears strong for conservation organizations to work on these linkages. But these can be quite complex. While forest foods and income are known to be widely important in helping the poor 'cope' with poverty (*poverty alleviation*), they are perhaps less likely to provide a pathway out of poverty and chronic long term shortages of food (*poverty reduction*). We therefore need to guard against promoting dependence on such low-value sources of food and income where they can become a *poverty trap* for those involved. Interventions need to be designed to complement and not undermine the capability of households to meet some of their needs through their own production and income.

Understanding the local context is critical. Initiatives to increase the productivity and usefulness of wild food resources need to be closely focused on meeting the actual nutritional and health needs of user populations, and on changes in these needs. In many situations use of forest foods continues to be important and sometimes increasing. Where use of forest foods is declining, this may reflect availability of better alternatives, cultural changes, resource depletion, erosion of traditional knowledge, or reduced availability of labour and other entitlements to use such resources.

Access is as important as availability, and access by the poor to resources that can yield forest foods and income is still widely constrained by weak and ineffective political and institutional arrangements in support of local control and management of forests. Thus, a comprehensive engagement in this issue would require addressing these constraints.

There is much scope and urgent need for more research into the linkages between ecosystems and food security in order to influence more sustainable policies and practices. This research is likely to be most effective if it is designed as part of an overall livelihood strategy to improve the wellbeing of rural poor households.

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Mike is an independent consultant and this article is based on a paper he prepared earlier this year for IUCN: 'Managing Ecosystems to Enhance the Food Security of the Rural Poor: A Situational Analysis prepared for IUCN'. [http://cmsdata.iucn.org/downloads/managing_ecosystems_to_enhance_the_food_security_of_the_rural_poor__mike_arnold_final.pdf] For more information, contact Georgina Peard, Conservation and Poverty Reduction Officer, georgina.peard@iucn.org

Bushmeat: another looming food crisis?

Robert Nasi of CIFOR calls for more reasoned thinking in tackling the bushmeat issue.

What is the 'bushmeat crisis'?

Historically, hunting pressure has contributed to the extinction or near-extinction of many species (Right whale, Great auk, Eskimo curlew, Passenger pigeon…). Recent research suggests that the current scale of hunting in tropical forests will lead to further extinction of many forest mammals, and that malnutrition is likely to increase dramatically if the issue is not promptly resolved.

The people who will suffer most from declining wildlife resources are the millions of people across Africa, Latin America and Asia living in and around forests. These are often the poorest and most marginalized people, typically lacking the education and skills to easily find alternative employment, and the access to capital or to agricultural markets to find alternative livelihoods or food sources.

How did it get to this?

The bushmeat crisis results first and foremost from an unmanaged common resource being unsustainably harvested because of inadequate governance and policy frameworks.

For rural people without access to capital, land or livestock, the harvest of wild meat often offers the best return for labour input. Bushmeat is easily traded and transported, costs little to preserve and has a high value-to-weight ratio. And these days, people have easier access to both forests and firearms.

In many cases the policies designed to address the problem border on the absurd. In Central Africa, laws recognize user rights and allow for traditional hunting but forbid, among other things, hunting during the night or with metallic snares, effectively outlawing most of the local hunting practices. The policies are often weak because they are based on flawed research. Links between wildlife trade and livelihoods or ecosystem functions are either poorly understood or not properly taken into account. And research is also compromised by its frequent association with animal welfare groups that represent external rather than local interests.

What now?

The bushmeat crisis is a complex problem demanding complex solutions. Here are three to start with.

First, acknowledge that different cases and species require different solutions. There have been successful programmes to reduce hunting to sustainable levels, most of which have revolved around a combination of national parks, community reserves, private sector co-management and regulation of demand. For example, in Sarawak (Malaysia) the 1998 Wild Life Protection Ordinance banned all commercial sales of wildlife, allowing local people to hunt for their own subsistence. The law was extensively promoted, vigorously enforced (in markets, craft shops, pet stores and restaurants) and has proven to be very effective. This, however, is just one example, and what is good for Peter is not necessarily good for Paul.

In many cases the policies designed to address the problem border on the absurd.

Second, there is an urgent need to remove the stigma around bushmeat. The aura of illegality is unhelpful to the policy process, and is preventing a sound assessment of management requirements. To legitimize the debate, there is a need to separate the commercial interests of entrepreneurs practising what they know to be an illicit activity with high commercial value (e.g. rhinoceros horns or tiger bones) from the efforts of poor rural populations to exploit what, for many, may be the only source of income or food for their families.

Third, following on from the issue of legitimacy, resolution of the bushmeat crisis can only be the product of strategies that seek to reinforce local rights. To argue that livelihood issues are more pressing than conservation issues is merely to acknowledge that the decisions regarding what resources to conserve and what to consume will ultimately be made by those whose lives are directly affected by the resource, and in whose best interest it is to achieve sustainable management of the resource.

Currently, those who exploit the wildlife resource have little ability or incentive to manage it sustainably. We must provide an acceptable framework for this economic activity that is supportive of local cultures and leaves decision-making in the hands of local people. Only if the local hunter is bestowed with some right to decide what, where and how he may hunt – as well as the knowledge to understand the consequences of his decisions – will he embrace his responsibility to hunt sustainably.

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For more details, see Nasi, R.; Brown, D.; Wilkie, D.; Bennett, E.; Tutin, C.; van Tol, G.; Christophersen, T. 2007. *Conservation and Use of Wildlife-Based Resources: The Bushmeat Crisis*. Secretariat of the Convention on Biological Diversity, Montreal, and Center for International Forestry Research (CIFOR), Bogor. Technical Series no. 33. http://www.cbd.int/doc/publications/cbd-ts-33-en.pdf

Biodiverse farming systems: the key to reconciling agriculture and conservation

Bioversity is working to connect cocoa producers with gourmet chocolatiers, to improve local incomes and support tree diversity. Here villagers in Nicaragua are making chocolate from their cocoa beans, under the guidance of an expert chocolate maker. They had never tasted their own chocolate before.

Emile Frison, Director General of Bioversity International, highlights the importance of biodiverse agriculture for biodiversity conservation.

In almost all discussions of biodiversity and the importance of conserving it as a matter of enlightened self-interest, one thing is missing: agriculture. Indeed, agriculture is all too often seen as the enemy of biodiversity. Furthermore, very little attention has been paid to the diversity of agricultural ecosystems. In the past, agricultural biodiversity, including the very important diversity contained within the wild relatives of crop plants and livestock, has been considered almost exclusively as a source of traits that can be used to improve varieties and breeds. This remains true, but agricultural biodiversity can also deliver other benefits that are every bit as important.

Better nutrition through dietary diversity is perhaps the most obvious of these, but it is not the only one. Diverse farming systems are much less vulnerable to outside impacts such as pests and diseases or climatic shocks. As a result, and especially in fragile environments where the poorest people depend on agriculture, the wider use of agricultural biodiversity can prevent the need to bring more wild land into production. In those environments, using biodiversity in this way, to create productive, resilient systems is likely to be a far better bet than attempting to introduce a simplified system based on improved varieties and breeds, which furthermore require high levels of inputs to deliver on their potential and are more vulnerable to shocks.

Agricultural biodiversity also offers opportunities for income. Forest dwellers have long harvested species from the wild, for their own use and to sell for cash. These endeavours can undoubtedly be improved by further research and development. Market chains, for example, often do little to support the primary producers. Selecting better individual specimens and perhaps enhancing their cultivation and harvest – the first steps towards domestication – can improve yields and incomes, which in turn adds value to the forests and thus helps to protect them against encroachment and destruction.

Cacao provides a beautiful example of the ways in which tree diversity can be harnessed to improve livelihoods, thus protecting the ecosystems in which it grows. The demand for interesting new kinds of chocolate among upscale shoppers is exploding, and smallholder farmers are likely to be the source of almost all cacao beans because there really aren't great economies of scale to be harvested. At present, however, the initial processing of the beans is erratic, and the connections between growers and those demanding consumers are weak. Bioversity has been working with small farmers to help them raise the quality of the beans they supply to industry. And we have been working with industry to expose gourmet chocolatiers to the depth of diversity found on smallholdings. Meeting in the middle, all parties should benefit, not least the consumers who drive the process. Almost as an afterthought, the diversity not only of *Theobroma cacao* but also of the many other species that make use of the mixed agroforestry in which it is grown, is conserved and protected.

More diverse agroecosystems also enhance other ecosystem functions with benefits that go beyond the farm, including improved pollination, increased soil fertility and reduced erosion.

I am hopeful that with new insights and continuing research, the two aspects of biodiversity – agricultural and biological – will mutually reinforce one another and, in so doing, contribute to the sustainable increase in production that will be essential to nourish human development and at the same time prevent the wholesale destruction of remaining ecosystems.

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Drylands – neither basket case nor bread basket

Basket of jujube berries, an important dryland fruit

Masego Madzwamuse, **Edmund Barrow** and **Caterina Wolfangel** of IUCN consider the untapped potential of drylands as productive landscapes.

Drylands cover over 40 percent of the Earth's surface and play a critical role in conserving biodiversity and feeding the world. Many of the world's national parks are found in drylands; in Kenya over 70 percent of the country's parks are in dryland areas. And, while drylands are often thought of as 'wastelands', they actually account for 43 percent of the world's cultivated areas – including inappropriate cultivation techniques that degrade the soil and, in the case of irrigation, leave the water table depleted and saline. At the same time, a disproportionately high percentage of the 2 million people who live in drylands are food insecure – and this is likely to get worse with climate change.

However, little attention has been paid to drylands by national governments or the international community. Outside assistance tends to be limited to short-term humanitarian relief during times of famine, or simplistic development solutions that ignore the harsh realities of dryland environments. We don't seem to have learned from the last half-a-century of flawed efforts to bring a 'green revolution' to drylands. The fact is that crop production will always be a limited opportunity for these areas, as rainfall is low, unpredictable and erratic and surface or groundwater is inadequate for irrigation. The Turkana pastoralists of Kenya know this well – they have some of the fastest maturing varieties of sorghum in the world, yet even for them, cultivation is opportunistic; livestock is their mainstay. Similarly, efforts to settle drylands peoples, for ease of service delivery and support, have been less than successful, and have contributed to further environmental degradation as people are concentrated in relatively small areas, way above the carrying capacity (for fuel, fodder, etc.) of the surrounding lands.

So what are the ingredients for success to develop these regions of this world? First, we need to respect and build on the immense knowledge of local people for drylands management. Understand why they have complex common property systems for land and resource (water, trees, pasture, salt) management that can cover large territories. Understand why they place more emphasis on livestock than on crops. Understand how they manage for the dry and drought times. Build on those systems and support them with 'modern and scientific knowledge' to improve productivity, and create market opportunities.

Opportunities for sustainable development in dryland areas do exist:

Many natural products come from drylands – and many of these are tree-based. These include gums and resins, vegetable oils, dyes and many medicinals. For instance, Sudan is the world's largest producer of Gum Arabic, and the arid lands of the Horn of Africa produce the highest quality frankincense and myrrh in the world. Developing these kinds of products will require a commitment to equitable benefit-sharing mechanisms, if they are to contribute to local livelihoods.

The world still needs milk and meat – and livestock in drylands are the most efficient converters of biomass for human use (milk, meat). Improvements in pastoralist livestock management should build on and support customary pastoralist land management and should be based on extensive systems that include grazers (cattle and sheep) and browsers (camels and goats).

Pastoralism is compatible with wildlife conservation. Dryland peoples should be better able to benefit from conservation through community conserved areas and tourism, and not have their best lands alienated in the name of conservation.

Governments need to start by reflecting the true value of drylands in economic data and national accounts, so that they are recognized as valued-lands not valueless lands.

An adapted version of this article was published on BBC website: http://news.bbc.co.uk/1/hi/sci/tech/7456973.stm

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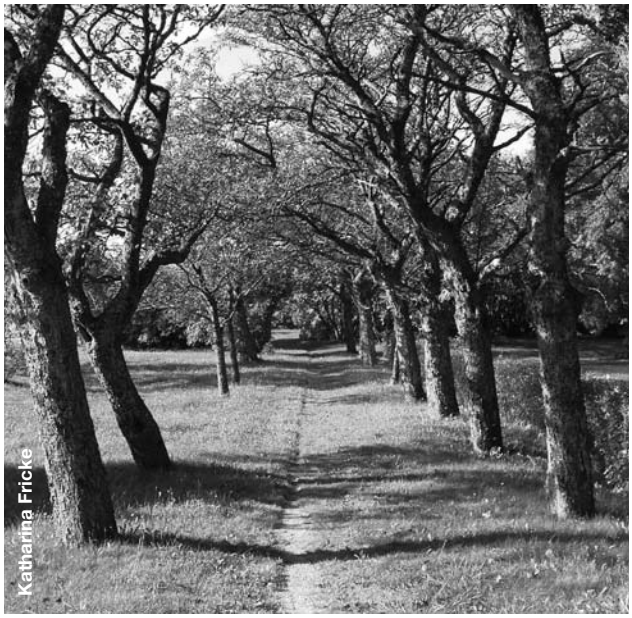
SENSOR: forecasting the sustainability impacts of European land-use policies



Landscape in a SENSOR case study site, Estonia

David Edwards of Forest Research in Scotland describes a new set of tools for assessing EU land-use policy options.

The potential for conflict between forest conservation and agricultural productivity can be influenced greatly by new EU policies, such as reforms to the Common Agricultural Policy (CAP) or introduction of new targets for renewable energy. Yet the evidence available to policy-makers on the likely impacts of such policies is far from complete. To address this problem, over the last five years the EU has invested substantial funding in the development of a suite of computer-based models to support policy-making for different sectors and at different strategic levels and spatial scales.

One of the most innovative and ambitious of these initiatives is 'SENSOR' ('Tools for Environmental, Social and Economic Effects of Multifunctional Land Use in European Regions'), a four-year project, coordinated by the Leibniz Centre for Agricultural Landscape Research in Germany, which has brought together teams of researchers from 36 institutes in 15 European countries, as well as China, Brazil, Argentina and Uruguay. The aim is to develop 'Sustainability Impact Assessment Tools' ('SIAT') that support ex ante assessment of new policies on six land-use sectors: agriculture, forestry, nature conservation, transport infrastructure, energy and tourism.

The SIAT model uses 'response functions' to quantify how the key variables that constitute a given policy option (e.g. direct income support to farmers), and other drivers (e.g. oil prices and demographic changes), might impact on land-use patterns in Europe over the next 20 years, and in turn how these impact on the values of 40 different sustainability indicators (e.g. employment, GDP, and nitrogen surplus). To help interpret these changes, the indicators have been weighted and aggregated to express impacts on nine 'Land Use Functions'. The current and future values for each indicator and function are then displayed on maps of the EU broken down into 570 administrative regions. A further step allows the sustainability risks of each policy option to be expressed in terms of the 'sustainability choice space' that is available within legal limits, scientific thresholds, and political targets, allowing policy-makers to choose the best option, and back up their choice with better evidence.

A prototype SIAT has now been developed and used to analyse impacts of options for CAP reform. Preliminary results suggest that liberalization (reduction in farm income support and in the level of protection of EU agricultural markets) would have a strong negative effect on agricultural production, incomes, and land prices. The effects would vary across regions, with areas of intensive animal husbandry reacting differently to arable regions. These impacts are likely to be outweighed by positive effects on other land-use sectors. However, withdrawal of land from agriculture may not lead to higher forest conservation values without specific policies being put in place.

The second policy area now being modelled is bioenergy, which will allow the user to assess impacts of shifts from fallow land to biofuel crops. For each policy area, the outputs of the tool are being validated with local stakeholders in six regions throughout Europe, and a methodology for future stakeholder engagement is being developed for use alongside the tool. As additional policy areas become modelled within SIAT, it should be of value to an increasing range of policy-makers as a decision-support tool, but also as a 'discussion-support' tool by providing a common platform for critical engagement between policy-makers and stakeholders. In doing so, SIAT may help to identify potential conflicts between interest groups, and resolve them at the policy-making stage rather than 10 years down the line.

For more information: contact David Edwards, david.edwards@forestry.gsi.gov.uk, or visit www.sensor-ip.eu. Forest Research (www.forestresearch.gov.uk) is the research agency of the UK's Forestry Commission.

Accepting change: conserving biodiversity in productive landscapes

Jamie Gordon and **Stewart Maginnis** of IUCN look at the implications of trying to conserve biodiversity conservation in dynamic landscapes.

On the face of it, there is a dilemma at the heart of managing productive landscapes for biodiversity conservation. The classic paradigm of conservation is to create spaces of institutional and socio-economic stability in which biological dynamics can dominate. The result, it is hoped, ensures permanent species and ecosystem conservation in a protected area. However, attempting to conserve forest diversity in productive landscapes entails conservation where fluctuating institutional and socio-economic dynamics have a far greater influence than can typically be tolerated in a protected area. Indeed, the resilience of productive landscapes is dependent on constant adjustment of their biophysical characteristics to those dynamics.

The logic of accepting the benefit of such change is that we also have to accept that parts of a landscape will change in their suitability to maintain biodiversity values. In any given part of a landscape, and therefore in a landscape as a whole, biodiversity values will change over time. One response to this might be to gazette small areas as mini-islands of biodiversity permanence within a landscape of otherwise changing, human-dominated habitats. This may work, but it has its problems. First, there is an equity issue. Small islands of habitat require their surrounding landscapes to be managed sympathetically if they are to maintain their biodiversity over the long term; biological corridors are an example of this. Hence biodiversity values will still have to be traded-off against other values elsewhere in the landscape. In contrast, compensatory trade-offs that might favour productivity in the gazetted areas will not be allowed. And recall that these 'other' productive values are not abstract – productivity is likely to directly relate to food on the table and money for school fees. Who decides what biodiversity values should be conserved, and at a cost to whose livelihoods, suddenly become potentially highly divisive issues with potentially perverse consequences. If farmers discover that their revenue-producing forests are to be permanently protected this is likely to be resisted and also act as a disincentive to allowing further forest regeneration.

Second there is a practical issue. Do we really have the resources to permanently insulate every high-diversity patch of habitat in every landscape against the unpredictable social and economic changes? The non-market values of biodiversity will always make them an unattractive investment when, for example, rising food and fuel prices put pressure on resources. Perhaps we need to accept that biodiversity values in a mixed landscape should not always be seen as 'non-negotiable' but very much part of the temporarily and spatially fluctuating set of trade-offs that good landscape management should be based on?

Do we really have the resources to permanently insulate every high-diversity patch of habitat in every landscape against the unpredictable social and economic changes?

There are obvious limits to this way of thinking. Temporary extinction is an oxymoron, and few would find it acceptable for the value of clean water downstream to be temporarily traded-off against the benefits of some polluting processes upstream. However, there are precedents too. Most and possibly all high-value biodiversity habitats have undergone anthropogenic change at some point – and their biodiversity values remain intact and even enhanced where disturbance creates additional habitat niches. The practice of rotation in agriculture and forest management has historically maintained diversity in landscapes; the loss of diversity in one area at the beginning of a rotation being compensated for by its return elsewhere as fallows mature. The potential of non-permanent solutions has begun to be realised in conservation planning too. The METSO Programme in Finland (http://www.metsa.fi/page.asp?Section=1191) piloted innovative schemes to compensate forest owners who agreed to set aside high-diversity forest for a fixed term. The pilot proved successful, where permanent gazetting had been problematic, precisely because forest owners did not have to permanently forego revenue from forests. Obviously, as fixed-term contracts expire, compensation needs to be reviewed, but a temporary solution which keeps all options open is better than a permanent solution that is prone to failure.

Perhaps it is time we acknowledged that not only are there places for biodiversity conservation, but also *times*.

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arbor*vitae*

The next issue of **arbor***vitae* will be produced in December 2008 (copy deadline early November) and will look at forest conservation in situations of conflict. If you have any material to send or comments please contact:
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A new global forest partnership – welcomed with warnings


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The World Bank idea of a new partnership for forests has been well received, though with a plea for a bottom-up, country-led approach.

Last year the World Bank proposed the creation of a Global Partnership on Forests that would link local and global processes and promote the reflection of local stakeholders' needs and views in international decision-making. In a break from its traditional practice, the World Bank asked the International Institute for Environment and Development (IIED) to conduct an independent assessment of the new partnership idea.

In July, IIED published the result of this assessment – which gathered the views of more than 600 forest experts who had responded to IIED's survey or participated in focus groups in Brazil, China, Ghana, Guyana, India, Russia and Mozambique or in international meetings. As part of the assessment, IIED also reviewed more than 50 existing initiatives to identify the proposed partnership's potential partners and the gaps it could fill.

The general view that emerged is that such a partnership would be a welcome initiative but that the World Bank should take a back seat in the partnership's development, as one of a number of facilitators rather than as the central 'director'.

Key recommendations, suggested by those consulted included:

- Empowering primary 'stakeholders' such as forest dwellers so that they can make their rights, knowledge and needs centre-stage;
- Improving financial flows to activities that support local needs as well as global public goods such as carbon storage; and
- Interacting effectively with other sectors such as water and agriculture, where the underlying causes of forest problems, and their solutions, are often lodged.

Daniela Gomes Pinto and Mario Monzoni of the Getulio Vargas Foundation, who helped to coordinate the extensive consultation process in Brazil, reported: "The Brazilians we consulted said a global forest partnership is needed to raise the overall profile of forests, to curb the drivers of deforestation, and to support those who wish to practice sustainable forest management. It must be globally-designed, but country-driven – a partnership for the world, not the World Bank."

The World Bank has welcomed the report, which calls for the next step to be the formation of a 'development group' of forest, environment and development leaders, mainly from the South, who can come together and contribute to the development of the initiative. They would be supported by a small group of progressive international institutions, including IUCN, in their efforts to forge a new kind of global forest partnership.

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Guides for scouting sustainable forest products

The World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) recently published two guides on the sustainable procurement of wood and paper-based products. The guides are designed to help public or private sector customers develop their own procurement policies, while also serving as a sales and marketing information tool for suppliers. The ultimate goal is to help expand the market for sustainable wood and paper-based products.

The guides are based around ten questions, covering for example issues of third-party verification, use of recycled fibres, and impacts on local communities and/or indigenous peoples. The two documents, *Sustainable Procurement of Wood and Paper-based Products: an Introduction and Sustainable Procurement of Wood and Paper-based Products: Guide and Resource Kit*, are downloadable from www.SustainableForestProds.org.