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IUCN
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Forest plantations: the good, the bad and the ugly

There's nothing quite like plantations for stirring up a heated debate in forestry circles. Some see forest plantations as the answer not only to the growing demand for timber and wood fibre, but also to the problem of natural forest loss. Plantations, they say, lessen the need to log natural forests and thus contribute to the conservation of forest biodiversity. Others, however, see forest plantations as biological deserts, water guzzlers, livelihood saboteurs and carbuncles on the landscape. Plantations, they say, actually increase pressure on natural forests by replacing diversity with monocultural monotony and flooding the market with cheap fibre that can either make natural forest management uncompetitive or, somewhat to the contrary, help raise consumer demand for wood products from planted and natural forests alike.

**Eucalyptus
plantation,
Brazil**

Alongside this rather polarized debate, a diverse group of actors from government, NGO and industry is searching for ways of enhancing the contribution of forest plantations both to local livelihoods and landscape-level forest conservation. A number of institutions, including the FSC and FAO, are currently undertaking multi-stakeholder reviews on the issue. WWF and IUCN are closely involved in these initiatives and are actively supporting efforts, such as that of The Forests Dialogue, to increase the level of knowledge, bring more balance to the debate and help develop sensible workable solutions.

Planted forests are neither inherently good nor bad; rather it is the choices we make about how to use them that determine whether they contribute to, or detract from, broader societal goals such as poverty reduction and nature conservation. Whether we like it or not, plantations are here to stay and are capable of delivering ancillary social and environmental co-benefits. Dismissing plantations as “not forests” but simply just another agricultural crop is therefore counterproductive. Whether at the smallholder or industrial level, planted forests can and ought to be managed to optimize the delivery of other forest values beyond that of wood fibre production. In this issue of *arborvitæ*, we examine plantations from a range of different perspectives and explore the wider role that they can play in forest conservation and local livelihoods.

Stewart Maginnis, IUCN and Duncan Pollard, WWF

Soy moratorium in Brazil

Brazil's soy industry agrees a two-year moratorium on forest clearing in the Amazon.

Brazil's major soy traders announced in July that they had agreed to a two-year moratorium on buying soybeans from areas in the Amazon deforested after July 24. The initiative, led by the Brazilian Association of Vegetable Oil Producers and the Brazilian National Grains Exporters' Association (which includes all the major multinationals such as Cargill, Bunge, ADM and the AMaggi Group that have set up soy operations in the Amazon), "seeks to reconcile environmental conservation with economic development," the groups said in a joint statement. The agreement comes after a three-year investigation by Greenpeace into the impact of the soy trade in the Amazon and is a result of increased public awareness and NGO pressure on retail and fast-food chains in Europe on the links between European food products and the destruction of South American forests due to soy expansion.

Soy has become one of the main drivers of deforestation in the Brazilian Amazon (see *arborvitæ* 28) and its cultivation has been blamed for soil degradation and water pollution. At the same time, soy is Brazil's number one export commodity. During the ban, the industry has agreed to work with government agencies and NGOs to set up a monitoring system and safeguards to ensure that the commitments are being adhered to on the ground. Environmental groups have welcomed the moratorium but warn there is still much to be done to reduce forest conversion in the area, particularly by dealing with the illegal expansion of cattle ranching into public lands in the Amazon.

Three other recent events mark further progress in the move towards sustainable soy production. Firstly, in June, the first-ever shipment of eco-friendly soy arrived in Switzerland. The soy had been produced in Brazil in compliance with the Basel Criteria, a series of guidelines established by WWF and Swiss retailer Coop in 2004 to ensure an ecologically and socially responsible production. Secondly, in August WWF presented the Paraguayan government with a "Leaders for a Living Planet" award, in recognition of its successful efforts to reduce deforestation rates by 85 percent since the end of 2004. This was achieved through the implementation of the "Zero Deforestation Law" which prohibits the transformation and conversion of forested areas in the country's eastern region, where deforestation has been driven largely by soy expansion and cattle ranching. In presenting the award, Leonardo Lacerda of WWF's global forest programme noted that soy production had actually increased since the passing of the legislation. "Paraguay is demonstrating that expansion of agriculture and exports can take place without necessarily encroaching in valuable natural forests," he said.

Thirdly, in September, the creation of the first international organization to reduce the negative impacts of soy production was announced. The Roundtable on Responsible Soy (RTRS) is an initiative of soy producers, processors and traders, as well as financial institutions and NGOs, including WWF. The RTRS has set itself the task of developing globally applicable principles, criteria, and indicators for the production, processing and trade of soy in a responsible manner, within the next 18 months.

Sources: www.planetark.com, July 25, 2006; www.independent.co.uk, July 26, 2006; www.panda.org June 27, 2006, August 30, 2006, September 4, 2006. For more information on the RTRS visit www.responsiblesoy.org.

news in brief

Forestry forensics: A pilot project launched in August will use DNA sampling to track timber and make it harder for illegal loggers to export their product. Funded by the British government the project will use basic DNA-based monitoring to identify the particular tree species of any given piece of timber. While it is sometimes easy enough to do this by eye, it can be hard to spot wood from protected species that is marked up as another common species. In announcing the project, UK Biodiversity Minister Barry Gardiner said "If this project is successful it will waymark the development of a generic DNA-based method of identification, which could revolutionise the application of CITES to timber and enable enforcement bodies around the world to really get a grip on the illegal trade in timber."

Source: www.edie.net, August 1, 2006

Spanish fires ignite suspicion: Spain suffered its most destructive forest fires in more than a decade with at least 124,000 hectares burned this summer. Two-thirds of the fires were in the northwestern region of Galicia where police arrested about 30 people on suspicion of deliberately setting the fires. Both the number and types of fires are suspicious – there have been thousands of fires in Galicia this year, many starting around urban centres. Spanish Interior Minister Alfredo Pérez Rubalcaba was reported as saying that Galicia was facing "a new typology of fires – strategic and planned, with very bad intentions." And the suspects? Everyone from warring neighbours, property speculators, people hoping for government subsidies for replanting, and unemployed firefighters seeking work. Meanwhile WWF has warned that the scale of the fires can be explained partly by the fact that those who started them know they are unlikely to be punished. "We must put a stop to the sense of impunity with regard to this type of crime," said Félix Romero, head of WWF-Spain's forest programme.

Source: www.planetark.com, August 21, 2006; www.panda.org, August 8, 2006

Thanks Franklin! The Chinese tallow tree is invading the US Gulf coast forests – as a direct result of the forest damage caused by hurricanes Rita and Katrina, according to a recent report by US Geological Survey biologist Stephen Faulkner. The two hurricanes together blew down around 13.6 million cubic metres of hardwoods and left gaps that are now being filled by the fast-growing, pest-resistant alien invader. The ornamental tallow tree was introduced to the US by Benjamin Franklin in 1772 following a trip to China. In a letter to a prominent member of the colony of Georgia, Franklin wrote: "I send also a few seeds of the Chinese Tallow Tree, which will I believe grow and thrive with you. 'Tis a most useful plant."

Source: www.newscientist.com, August 16, 2006; www.edis.ifas.ufl.edu

Pulp fiction: the low-fact financing of pulp mills

Christopher Barr of CIFOR reports on recent investigations into the lack of due diligence in pulp mill financing.

Since 1990, investment institutions have allocated some US\$38 billion to finance over 25 million tonnes/year of pulp capacity expansion in the developing world – and there are signs that a major new wave of pulp mill investments is underway. In a study released earlier this year, the Center for International Forestry Research (CIFOR) warns that a lack of due diligence in the expanding global pulp sector may lead to higher financial and operational risks than investors realize. This, in turn, could result in the construction of ill-advised pulp mills that place heavy pressures on forests in the regions where they are located. The CIFOR report, *Financing Pulp Mills: An Appraisal of Risk Assessment and Safeguard Procedures*, analyzes 67 pulp mill projects that applied for financing between 1995 and 2004 and finds that banks and other financial institutions often conduct only minimal due diligence to assess the sources of wood for pulp projects.

This is surprising, given the fact that pulp mills can involve investments of US\$1 billion or more, and wood accounts for a substantial portion of a mill's production costs. In reality, some pulp producers have vastly overestimated the volumes of wood legally available from timber plantations. So the only way they can meet production targets is through unsustainable logging of natural forests or by

shipping in wood from distant sources at a much higher cost. Most investment institutions, moreover, have very little in-house expertise on social and environmental issues and rely on information and impact studies provided by the pulp and plantation companies – leaving themselves open to misinformation.

The report cites two companies – Asia Pulp & Paper (APP) and Asia Pacific Resources International Limited (APRIL) – as cases where due diligence was sorely lacking. During the 1990s, APP and APRIL borrowed over US\$15 billion from international capital markets by telling investors that they had sustainable supplies of very low-cost fibre. However, both companies continue to rely on the clearing of natural forests in Sumatra for 60-70 percent of their wood supply, and each is still years away from meeting its own plantation development targets.

More recently, a controversy has erupted over the possible financing of two large pulp mill projects in Uruguay now under consideration by the International Finance Corporation (IFC) – the World Bank Group's private sector lending agency. In response to mounting criticism of a lack of attention to the mills' potential negative impacts on the environment and local economies, the IFC commissioned a new environmental assessment of the cumulative impacts of the two projects. While the assessment, released in March, confirms that earlier studies were lacking on several counts, it devotes very little attention to where the mills will get the substantial volumes of wood they will need – projected to reach 5.2 million cubic metres annually. The stakes in this case are very high – if these mills are built before they have a secure and sustainable wood supply, investors potentially stand to lose hundreds of millions of dollars, and taxpayers in Latin America and Europe could end up footing much of the bill.

Contact: Christopher Barr, C.Barr@cgiar.org. The CIFOR report, authored by Machteld Spek, can be downloaded at www.cifor.cgiar.org/publications/pdf_files/Books/BSpek0601.pdf

protected areas news in brief

Rhinos lost... Rwanda's last remaining East African black rhino was found dead in Akagera National Park in July. The individual, a female, had been radio-tagged for the last three years. The cause of death was to be investigated. Since then the Rwandan government is reported to be in negotiations with Kenya and South Africa to restock its national parks with the rhinos. Meanwhile, their relative, the West African black rhino was tentatively declared extinct in July after an extensive survey in its last refuges in Cameroon failed to find any sign of its presence. The Northern white rhino looks like going the same way. "The Northern white rhino is on the very brink of being lost," said Dr Martin Brooks, chair of the African Rhino Specialist Group of IUCN's Species Survival Commission. Restricted in the wild to Garamba National Park in the Democratic Republic of Congo, recent ground and aerial surveys found only four animals. "Efforts to locate further animals continue, but we must now face the possibility that the subspecies may not recover to a viable level," said Brooks.

Sources: www.allafrica.com, July 26, 2006; www.rwandagateway.org, July 29, 2006; www.iucn.org, July 7, 2006

...and found: A motion-triggered camera trap set up in a remote jungle has captured the first-ever photo of a rhino in the wild on the island of Borneo, the Sabah Wildlife Department and WWF announced in June. The rhino is believed to be one of a population of as few as 13 individuals whose existence was confirmed during a field survey last year in the so-called Heart of Borneo. A full-time rhino monitoring team was established in Sabah last year to monitor the rhinos and their habitat and keep poachers away, and the camera traps were set up earlier this year. There was good news too for the Javan rhino in September, after signs of four rhino calves were discovered in Indonesia's Ujung Kulon National Park. The signs were found by a team of biologists and local people checking on the rhinos after the recent earthquake on Java. These are the first known births for the Javan rhinos in three years.

Source: www.panda.org, June 14, 2006, September 1, 2006

Several international initiatives are currently underway to identify and support the institutional and technical requirements for sustainable forest plantation planning and management. Here we report on three related activities: the two-year FSC plantations review which has just been completed, the ongoing development of the Planted Forests Code facilitated by FAO, and The Forests Dialogue's own initiative on intensively managed planted forests. The common focus linking all three is the search for ways to help maximize the potential benefits of plantations and minimize or mitigate their negative environmental and social impacts.



FSC plantations review

Anders Lindhe, process manager for the FSC plantations review, summarizes the steps involved.

As plantations have become increasingly important sources of wood and fibre, they have also become increasingly criticized by some for their environmental and social impacts. The Forest Stewardship Council (FSC) is deeply affected by these concerns, as its portfolio of nearly 79 million hectares of certified forests (as of July 2006) includes more than 7 million hectares of certified plantations and another 30 million hectares of mixed plantation/natural forests. To maintain its high level of support from a wide range of environmental, social and economic stakeholders, FSC must ensure that the mechanisms for certification of plantations are as robust as those for natural forests.

Thus, in 2004, following a request by the FSC General Assembly, the organization initiated a review of its policies and procedures. The core of the process is a working group appointed by FSC members with balanced participation from the three membership chambers of individuals and groups

representing social, environmental and economic interests. The task of the group is to develop common recommendations that have wide support across all three chambers.

Efforts have been made to engage a wide range of stakeholders, both within and outside FSC, in consultations and dialogue. National stakeholder surveys have been conducted in Australia and Brazil. Group members and national initiatives have also organized inclusive national meetings in e.g. Chile, Colombia, Ecuador, Germany and Spain, in addition to meetings with their own constituencies. Information, documentation and opportunities to debate and express views have been provided by a specific website and a plantations e-mail forum.

The fifth and final working group meeting was held in early September, and as this issue of *arborvitæ* goes to print, the FSC Board has yet to approve the recommendations. For further information and process documentation, please visit www.fsc.org/plantations.

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research in brief

Water for carbon – a fair trade?: A study published late last year looked at the trade-offs between the carbon sequestration benefits of tree plantations and their costs in terms of reduced soil fertility and stream flow. Mature plantations were found to cut stream flow by a global average of 52 percent. The researchers' regional models of US plantation scenarios showed that the impacts of afforestation on regional climates was unlikely to offset the water losses and in fact tended to exacerbate them.

The study also cited situations where increased water use by forest plantations has actually improved water quality. In southern Australia and the African Sahel, for example, plantations are being used successfully to keep saline groundwater below crop rooting zones and in other countries plantations are being used to dry waterlogged soils and alleviate flooding. In contrast, the same characteristics of plantations can have severe negative impacts. In the Pampas grasslands of Argentina, for example, the brackish groundwater lies under shallow freshwater lenses that provide drinking water. The researchers' measurements in areas where grasslands had been converted to forest plantations revealed that the trees were eliminating the freshwater lenses. They found that the observed salinization was independent of the tree species planted but rather depended strongly on the soil texture. These kinds of costs associated with plantations need to be taken into account, say the researchers, when negotiating carbon trading agreements.

Source: *Science* 310 (5756): 1944-1947

Planted Forests Code

Jim Carle of FAO reports on how the Planted Forests Code is being developed.

FAO has been coordinating the multi-stakeholder process to prepare the Planted Forests Code to balance the social, cultural, environmental and economic dimensions in planted forest development and their contribution towards sustainable livelihoods and land-use.

The Planted Forests Code will include guiding principles for policy, legal, regulatory and other enabling conditions, and thus provide a framework for responsible planning, management and monitoring of planted forests. The Code will supplement and complement the sustainable forest management work being undertaken by other agencies and the current forest certification schemes. The Code will be a voluntary, legally non-binding instrument tailored primarily to governments and investors (public and private sector), policy-makers and planners. The scope will include the full spectrum of planning, management and monitoring activities for both productive and protective functions of planted forests.

The preparation process has involved a core technical group and expert consultations with selected member governments, private sector associations (corporate and smallholder), non-governmental (environmental and social) and inter-governmental organizations. The process is ongoing and the draft Code has been discussed at the Regional Forestry Commissions, private sector and civil society meetings throughout this year. The draft Code has been available on the internet since March and invitations made to all countries to conduct meetings to consider the Code and provide feedback by end September. Based on recommendations and suggestions from these meetings, a final draft of the Planted Forests Code will be prepared by December this year and submitted to the Eighteenth Session of the Committee on Forestry in March 2007 for consideration and appropriate action. It has been recognized by member countries that FAO and partners will need to conduct a comprehensive programme for familiarization and capacity building in implementing the Code and monitoring its use.

The draft Planted Forests Code is available in English, Spanish and French at www.fao.org/forestry/plantedforestscode.

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The Forests Dialogue on plantations

Gary Dunning, Executive Director of TFD, reports on their work to facilitate discussion and learning on forest plantations.

The impassioned debate over the environmental impacts, social costs and economic viability of intensively managed planted forests (IMPF) – the industrial-scale subset of forest plantations – has taken plantations to the forefront of international discourse on and pursuit of sustainable forestry.

The Forests Dialogue (TFD) has embarked on an initiative to create a platform and process for discussion of these issues by knowledge leaders, proponents and critics of IMPFs. TFD convened an initial, small group of experts in June 2005 at IUCN headquarters in Switzerland and challenged the group to debate and refine ideas for optimizing the future economic, social and environmental contributions from IMPFs while mitigating associated negative impacts. The group agreed that under the right conditions, IMPFs can provide a range of important benefits. The 'right conditions', while hotly debated, centred on issues of subsidies, bio-security, property rights, sustainable management standards, biodiversity, rights of communities and indigenous peoples, regulatory frameworks, and transparency.

As an outcome of this meeting, TFD now supports an ongoing dialogue group that focuses on developing knowledge on the above issues and facilitating discussion among leaders. In April this year, TFD convened the group in southern China. To provide on-the-ground context for the discussions, the participants toured lands under various government, industry and community-driven management regimes. The discussion was rich and intense. TFD will reconvene the group in Indonesia in February 2007. TFD is also working to share information and collaborate with other ongoing processes relating to plantations, including those of ITTO, FAO and FSC.

TFD is an ad-hoc group of leaders committed to the conservation and sustainable use of forests and cognizant that facilitated and supported dialogue can lead to better solutions for all interested stakeholders.

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FORIG/George Ametitsi

Promoting smallholder plantations in Ghana

Victor Kwame Agyeman of the Forestry Research Institute of Ghana (FORIG) describes an innovative approach to reforestation and poverty alleviation that is proving very popular with Ghanaian farmers.

Plantation development in Ghana started with the introduction of the Taungya system (TS) in the early 1920s. However, a wider application of the system occurred between 1970 and 1980 with the establishment of 75,000 ha of plantations within degraded forest reserves. The Taungya system is an establishment method for reforestation where farmers are given parcels of degraded forest reserve areas earmarked for conversion to plantations to produce food crops and help replant the degraded forest areas. The system is usually practised in areas where there is land shortage among forest fringe communities. Its key advantage was an almost 40 percent reduction in the establishment cost of plantations to government since farmers were responsible for almost all the labour-related activities within the first three years of plantation development.

The Taungya system was suspended in the mid-1980s due to a low success rate; only 57 percent of the total TS plantations had survived at the time of evaluation, with only 21 percent of the total area considered commercially viable. The poor performance of the TS was due to a

number of factors, including the low benefits to farmers – 75 percent of the revenue from the planted trees went to government agencies (Forestry Commission, District Assemblies and Administrator of Stool Lands) and the rest went to land owners (Traditional Authorities). Farmers only benefited from their food crops but did not receive any benefits from the tree crops. Other factors that contributed to the failure of the system included poor forest access, lack of long-term tenure and weak local community rights to ownership, participation and consultation.

In 2001, in an attempt to tackle Ghana's increasing deforestation rates, the government initiated a National Forest Plantation Development Project (NFPDP). The NFPDP had a target of 20,000 ha per annum, aimed at restoring forest cover, addressing the wood deficit situation, creating jobs and alleviating poverty within forest fringe communities, which are among the poorest communities in Ghana. The NFPDP was designed to use mainly the Modified Taungya System (MTS) in which most of the earlier shortcomings of the previous TS have been addressed.

The key changes in the MTS are the introduction of legally-binding Land Lease and Benefit Sharing agreements. These agreements were designed with the participation of the Attorney General's Department, private legal practitioners and non-governmental organizations, with support from the FAO, the African Development Bank and the UK's Department for International Development.

Under these agreements, farmers will be co-owners of the plantations with the Forestry Commission and will stay on the land till the tree crops mature, instead of being driven off after three years, as was practised under the TS. Farmers are guaranteed a 40 percent share in the plantations and 100 percent of the agricultural crop proceeds. The remaining benefits from the tree plantations will be split between the government (40 percent), the landowners (15 percent) and the forest fringe communities (5 percent).

Thus, the MTS is essentially a business enterprise with all participants (Forestry Commission, landowners, farmers and local communities) providing land, labour and capital and sharing the production, market responsibilities and risks – with net benefits shared proportionally according to the level of inputs.

Since the introduction of these agreements, the Forestry Commission has been inundated with requests from farmers to participate in the Modified Taungya System. Over 53,000 ha of plantations have been established using the MTS alone between 2001 and 2005. The current challenge for the Forestry Commission is how to secure the participation of all willing farmers.

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Plantations for people?

Can large-scale plantations be developed in ways that promote livelihoods and respect human rights? Marcus Colchester of the Forest Peoples Programme assesses the problems and possibilities.

Dayak ritual elders invoke the spirits of diversity to protect their new palm oil smallholders union

The replacement of natural forests with tree plantations has long been criticized by conservationists for the loss this implies for biodiversity. Industrial-scale monocultures of timber species, oil palms, rubber, tea, bananas, cocoa and other tree crops have replaced hundreds of millions of hectares of forests. This process is set to continue if rising market demands from developed, and increasingly from developing, countries are to be met. The loss to biodiversity has been incalculable.

The problems posed by large-scale plantations to local communities and indigenous peoples have been on a similar scale. Too often concessions or land titles have been issued to plantation companies without respect for customary rights, resulting in loss of livelihoods, undermined cultures, and, in some cases, forced resettlement. Resistance has led to conflict, repression and further human rights abuse. New employment opportunities created by the industry have rarely matched those offered by prior systems of land-use, let alone alternative more intensive land-use options favoured by landless peasants who resent the way huge national and international corporations gain access to land while they are left out. The International Labour Organization reports that plantation workers are the most exploited and the poorest in the formal rural labour sector. The most telling criticism of industrial plantations is that they deny local communities control over lands and resources, thwarting local initiatives and rights to self-determination.

New challenges, new standards: Yet plantations of all kinds are expanding. Timber plantations are set to grow to meet rising demands for pulp and paper and in the misguided expectation that they can offset fossil fuel emissions. With markets for edible oils set to double by 2020, a further 10 million hectares of oil palm plantations are predicted for South East Asia alone. Some companies hope to double this figure as they cash in on the new bio-diesel market. Pressure on forests and forest peoples is intensifying.

Widespread recognition of the problems posed by plantations and of the growing pressure from markets has led to new voluntary standards being developed in conformity with international human rights laws, aimed at steering plantations away from vulnerable forest frontiers and indigenous lands. The Forest Stewardship Council



Marcus Colchester

requires all forestry operations, including plantations, to respect indigenous peoples' land rights and secure their prior informed consent. Likewise, the newly established Roundtable on Sustainable Palm Oil requires no further clearance of primary forests and areas of high conservation value, respect for customary rights, no land acquisition without free, prior and informed consent, and fair prices for smallholders. These are important gains though these principles have yet to be widely implemented, as they are not binding and only apply to companies seeking certification.

Ways forward: Forest policy agencies such as FAO and ITTO have long agreed that for plantations to meet local needs and respect peoples' rights and initiatives, tree crops need to be diversified, to promote multiple use, flexibility, local control and strengthened local institutions. Palm oil smallholders in Indonesia are likewise calling for greater autonomy from large estates and mills, fuller engagement in price-setting, crop choice and restoration of their wider rights in land. This kind of economic and livelihood diversification is also good for biodiversity but hard to reconcile with the current model of industrial-scale monocrops. Some indigenous communities like the Ngati Tuwharetoa Maori of New Zealand have developed extensive tree plantations on tribal lands as joint ventures with government but fitting local control of forests and lands into companies' plans to expand their industrial tree crops is a tougher challenge.

Contact: Marcus Colchester, marcus@forestpeoples.org. For more information visit www.forestpeoples.org and www.wrm.org.uy.



Jim L. Bowyer, Director of the Responsible Materials Program of Dovetail Partners and Chairman of the Tropical Forest Foundation, looks at the question of what the current expansion of forest plantations means for natural forests.

Increasing interest in forest plantations as a source of wood and industrial fibre has been accompanied by increased concerns about the potential environmental impacts of establishing forest plantations on a large scale. The concerns focus on the potential loss of soil fertility and productivity under short harvest rotations, risks associated with introducing exotics, risks of catastrophic disease and insect infestations through cultivation of monocultures, and the implications of replacing natural forests and associated flora and fauna with less biologically diverse plantations. On the other hand, one of the most compelling reasons for establishing forest plantations is that wood consumption is rising at the same time as increasing efforts are underway to reduce harvesting in natural forests. Highly productive forest plantations are seen as a part of the solution to this growing dilemma. Such plantations can provide large quantities of wood and fibre from relatively small land areas, supplying a continuous, renewable stream of industrial raw materials that results in less overall environmental impact than other types of raw materials while also reducing pressures for harvesting in natural forests.

According to FAO, the area of productive forest plantations worldwide in 2005 was 109 million hectares, accounting for about 2.8 percent of the global forest area and up from 1.9

Forest plantations

threatening or saving natural forests?

percent as recently as 1990. In 2000, plantations produced about 27 percent of the wood harvested globally, despite the fact that such plantations occupied less than 2.8 percent of the forested land area worldwide. Over one-half of industrial wood is expected to come from plantations within only several decades. Indeed, some estimates foresee the need for over 1000 million hectares of forest plantations by 2050 to meet the growing demand for fuelwood and industrial wood.

Environmental Issues and Plantations

Despite the recognized benefits of forest plantations, there are also several widely-shared concerns about the possibility of massive plantation development. These concerns include:

Loss of soil productivity – Reduced yields under intensive management of short rotation tree crops have long been a concern of foresters. Recent literature suggests that this remains a major concern with numerous references to soil compaction, erosion, and degradation of physical and nutritional properties of soil. It has been observed, for example, that plantations tend to be kept in an early successional stage, with maximum removal of biomass from the site at harvest. Plantations are also said to be less efficient at trapping released nutrients, due in part to the existence of fewer roots near the surface. The result may be significant nutrient loss from sites where trees are harvested.

Disruption of local water cycles – Concerns about the impact of plantations on soil moisture and water yield are mostly related to soil moisture depletion and reduced stream flow. Plantation establishment on grassland, for example, sometimes diminishes stream flow after canopy closure, particularly during dry seasons. Research suggests that the reason for reduced stream flow is not generally a differential rate in transpiration, but primarily the interception and re-evaporation of rainfall at the crown level. Interception has been found to amount to as much as 30 percent of the rainfall, over a fairly wide range of rainfall amounts. Another concern is that certain species – mainly eucalypts which account for as much as 25 percent of the plantation area worldwide – may use far more water than species that occur in natural forests, drawing down the water table in some localities. However, available scientific

evidence indicates that although interception losses from eucalyptus and other tree species are likely to be greater than from shorter vegetation, such losses are likely to be no more than those of other tree species of similar height and planting density. One caution to these general findings is the observation that in several instances species of eucalyptus that do not naturally regulate the rate of moisture loss from leaf surfaces have been planted in areas where atmospheric demand is high and soil water is freely available; under these circumstances eucalyptus may well transpire at very high rates dictated solely by atmospheric demand.

Risks of pests and disease – Many researchers have found that plantations, and particularly single species plantations, are at much greater risk of catastrophic insect and disease losses than natural forests. This is based on the observation that the introduction of exotics tends to alter natural balances that serve to keep pathogenic organisms in check in ecosystems. On the other hand, other researchers have noted that exotics face lower risks than native species, since introduction of a species into a region that is outside of its natural range separates that species from its natural pests and can thus improve health and performance, at least in the short term. There is increasing evidence in the scientific literature that the genetic base of a forest plantation is more important than the number of species involved. For instance, it is known that establishing a monoculture from rooted cuttings poses a considerable risk over an extended time frame, whereas a plantation composed of genetically diverse planting stock does not present great risk, even if composed of a single species. Risk is also reduced by the reality that relatively short rotations coupled with intensive management allow plantation managers to react quickly to pest and disease problems, something that is often difficult in a natural forest environment. Every crop cycle offers the opportunity for planting superior genetic stock.

Impacts on biodiversity – Plantations have been described as incapable of supporting biodiversity characteristics of native forests. The typical high stocking density and lack of structural diversity are often cited as reasons for low species diversity within them, and an impressive array of comparative studies of plant and animal diversity within plantations and natural forests appears to support this. However, an increasing number of researchers challenge the contention that plantations necessarily have vastly lower biodiversity than surrounding native forests. The oft-expressed contention that exotic forests are “biological deserts” has also been disputed. Indeed, another part of the biodiversity debate involves the positive role that plantations play in restoring biodiversity to an impoverished landscape. Nonetheless, there is little doubt that plantation forests offer less plant and animal diversity than native forests within the same region. Differences are accentuated when crop rotations are short, and much reduced under management aimed at increasing structural complexity of forest plantations. In summary, while there are many documented problems associated with plantations, it appears that problems are not necessarily a given, and that proper planning and management can minimize risks.

Can Plantations Take Pressure Off Natural Forests?

Many have suggested that plantation development will take pressure off natural forests by reducing or eliminating the need for harvesting within them. However, there is considerable disagreement on this point. Sargent noted that plantations have seldom helped to protect natural forests, and that plantation development has actually contributed to natural forest loss because of a higher perceived value of plantations. In a similar vein, Sawyer suggested that production of large volumes of plantation wood tends to drive down the price of wood in general, thereby stimulating demand for wood from plantations and natural forests alike.

Such concerns have led to proposals for the set-aside of vast areas of forestland in natural or non-managed reserves, with wood production shifted entirely to privately owned forests or to intensively managed plantations. This strategy is, for example, promoted in FSC forest certification standards under Principle 10.

Some have questioned whether seeking to abandon timber production in natural forests as part of a plantation strategy is wise. Almost 50 years ago Dawkins, for example, wrote "Even where plantations are justified, it does not necessarily follow that all remaining naturally regenerated forests are best left unproductive. If they are, they may become vulnerable to destruction . . ." More recently, Sedjo and Botkin gained considerable attention from the observation that we [society] could produce all the wood we want on very little land. Less noticed was their caution that it is not necessarily a good idea to prevent any harvesting in native forests.

The Bottom Line

Despite the environmental concerns and problems associated with the establishment and management of some forest plantations, the benefits that accrue from plantations of rapidly growing trees are so significant that further development of forest plantations is virtually assured. However, it is to the advantage of everyone that forest plantations operate sustainably in every sense of the word, and that they provide the greatest possible array of benefits. It is imperative that steps be taken to address known problem areas and concerns, and international forest policy needs to be developed to counter current efforts to leave vast areas of natural forests in a non-managed state.

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Community reforestation for watershed protection in Mexico

Citlali Cortés Montaña of WWF Mexico reports on a watershed restoration programme in Mexico.

The headwaters of the Conchos river sub-basin in the Mexican state of Chihuahua encompass a mountainous region of approximately 60,000 km², dominated by large stands of mixed conifers, pine and oak forests. The water originating from the headwaters is used to irrigate more than 100,000 hectares of agricultural land and supply potable water for over 1.5 million people living in some of the most important cities of the state. Thus, the forested headwaters are crucial in ensuring stable water supplies to support vibrant ecological systems and healthy human communities downstream.

WWF's work in this area aims to improve the livelihoods of local people through the implementation of sustainable natural resource management practices. Our approach incorporates an integrated basin management vision focused on maintaining or restoring the land cover to provide environmental services such as maintenance of water quantity and quality. In order to achieve this, we are currently working with four agrarian communities (*three ejidos* and one *comunidad indígena*) that have

prioritized their development and resource management agendas through participatory processes.

As part of this work, WWF co-funded the restoration of nearly 100 ha of forest land in *ejido* Panalachi in 2005, through plantings of native pine species (*Pinus arizonica* and *P. engelmannii*) in areas that had burned in the late 1990s. The reforestation was complemented with the construction of rock check dams and soil protection barriers to minimize soil loss. WWF hopes that these activities will recover degraded forest cover and ecosystem functions related to watershed health such as soil conservation and stabilization, water capture through infiltration and improvement of water quality through on-site soil retention.

By bringing local communities, foresters and state and federal agencies together, WWF expects to create a multi-stakeholder model that can be adapted to conservation efforts in other parts of the region.

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Managing forest plantations for ecosystem goods and services

Jürgen Bauhus and Joachim Schmerbeck of the Institute of Silviculture at Freiburg University discuss how the provision of ecosystem goods and services is an important, though poorly understood, role of forest plantations.

Forest plantations make up an important component of the landscape in many parts of the world, and are playing an increasingly important role, particularly in densely populated areas, as native forests disappear or become less accessible and people become more reliant on the ecosystem goods and services (EG&S) provided by plantations. It is thus timely to ask to what extent plantations can provide different ecosystem goods and



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Check dams complemented the reforestation



© WWF Canon/Roger LeGUEN

Plantations can provide regulating services such as biodiversity conservation

services, how far they can substitute or augment EG&S from native forests, and how they may be designed and managed to optimize the provision of these goods and services.

Ecosystem services consist of the benefits that people obtain from ecosystems, and are increasingly recognized as being important to sustain and fulfil human life. The Millennium Ecosystem Assessment 2005 pointed out that 60 percent of the world's ecosystems are degraded, leading to a declining supply of their services to humanity. This increased the awareness for EG&S and brought the concept into much wider use than was previously the case. Ecosystem services are categorized by the Millennium Ecosystem Assessment 2005 in the following way:

- provisioning services – the supply of products and goods such as timber, fibre or non-wood forest products;
- regulating services – which support benefits such as air purification, water regulation, carbon sequestration, or the maintenance of biodiversity;
- cultural services – relating to spiritual enrichment and recreation; and
- supporting services – which support all the other services.

However, there is still no clear understanding of which services are being delivered by various ecosystems, and to what degree they are delivered or affected by certain management activities. While the provisioning services of plantations are relatively easy to assess, others, such as the provision of biodiversity, relaxation or cultural values, are harder to identify and their response to different management regimes is more difficult to analyze.

The management of most industrial-scale plantations is focussed on one or a few products, and the views of the people who depend on other services from the same land are rarely taken into account. These non-wood ecosystem services are generally not quantified and no mechanisms are put in place whereby plantation owners could be rewarded or compensated for management that supports these services. The implementation of such schemes would require reasonably accurate models for the trade-offs between benefits from the production services and benefits from other ecosystem services. While the principles of managing forests for EG&S delivery are known and established in the scientific literature, concrete information at the stand, landscape or enterprise level is usually missing.

For example, we know that extending the rotation length of plantations generates biodiversity benefits, by: (a) providing more time for plant and animal populations to colonize and establish themselves in plantations; (b) permitting the development of a forest-interior microclimate; (c) providing opportunities for the development of more complex stand structures; and (d) reducing the frequency of harvesting-related disturbances. However, precise details such as the extent to which particular species respond to the rotation lengthening, or the rotation lengths necessary to achieve a desired or tolerable balance between increased biodiversity function and reduced revenue, have yet to be quantified. Likewise, it is well established that thinning reduces stand-level transpiration and decreases rainfall interception in plantations. However, no models have been developed to enable us to assess how thinning intensity in different tree species at different ages affects run-off at the watershed scale. Therefore, one of the great challenges to operationalize the concept of plantation management for ecosystem goods and services beyond wood products is the development of tools and models to effectively quantify the management effects on the provision of a range of these goods and services.

This article is based on a paper to be presented at a scientific conference on Ecosystem Goods and Services from Planted Forests, as part of the International Congress on Cultivated Forests, Planted Forests and Sustainable Development, 3-7 October 2006, Bilbao, Spain, organized by the Institute of Silviculture, Freiburg University and the European Institute of Cultivated Forests and sponsored and supported by IUFRO, CIFOR and IUCN.

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Biodiversity conservation in a mixed-use plantation in Sarawak

Rob Stuebing, Conservation Officer with Grand Perfect Plantation Company in Sarawak, Malaysia, describes how they have integrated a conservation programme within their Acacia plantation.

Grand Perfect acacia nursery with planted and natural forests in background

Acacia plantations are now common features in the landscapes of many Southeast Asian countries, particularly Malaysia, Indonesia and the Philippines. Acacia plantings are developed specifically to produce industrial wood and initially followed the monoculture approach typical of plantation crops such as rubber and oil palm. More recent development models for Acacia plantations in particular have created landscape mosaics that include a complex mixture of silviculture, natural forests and traditional agriculture. An investment in technical planning can produce desirable landscape mosaic patterns that offer significant improvements in biodiversity conservation. Widespread habitat modification has occurred in the past and certainly will continue in the future, so only a portion of the total biodiversity in a large area (such as the Malaysian State of Sarawak) can be saved in totally protected areas. Thus, the focus for the future will necessitate conservation of large-scale 'gamma' biodiversity within the altered forest landscapes of mixed-use, including planted forests.

The Sarawak Government and its contractor, Grand Perfect Sdn Bhd (a consortium of three local timber companies), have embarked on a plan to develop a 230,000-hectare Planted Forest Zone (PFZ) containing extensive plantings of fast-growing *Acacia mangium* to produce a reliable source of pulp and other wood products. The development of these planted forests will be integrated with community development and conservation programmes to mitigate both the social and environmental impacts of the project. More than 30 percent of the landscape will be left forested, including about 150,000 hectares of large Conservation Areas, riverine buffers and forest remnants embedded throughout the PFZ and within most individual Acacia blocks. Already there are firm indications that a majority of the vertebrate species associated with "tall" (kerangas, swamp and lowland) forests in Sarawak can be found within these Conservation Areas. In addition, the combined Acacia blocks and their embedded forest remnants have been found to contain about two-thirds of the species found within Conservation Areas. The biodiversity within maturing Acacia from four to seven years after planting, along with their regenerating forest patches, mirrors the species richness found in secondary forests.



An environmental management plan regulates land-use and the activities of subcontractors under a set of conservation rules, to minimize or rectify the environmental damage arising from the physical development of the planted forests. Grand Perfect's biodiversity management plan contains prescriptions for inventory monitoring and assessment of biodiversity, and for recruiting and engaging with local traditional communities in conservation activities such as those mentioned above. Sufficient technical expertise is sourced through partnerships with local, regional and international institutions which have research interests in tropical biodiversity, and can thus provide empirical data for management in exchange for the opportunity to work in one of the most species-rich areas of the world. Successful biodiversity conservation at the landscape level may eventually open the door to international certification of this approach, and provide a model for long-term planning of planted forests in Sarawak, Malaysia and the wider region.

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Fast-wood: towards a holistic approach

Antti Marjokorpi, of the Finnish-Swedish pulp and paper company Stora Enso, describes their approach to fast-wood plantations.



© Stora Enso

The Veracel plantation in Brazil is embedded within the landscape mosaic

Fast-wood is the cornerstone for the pulp and paper industries in many countries. Although primarily established for intensive wood production, well-managed fast-wood plantations also produce benefits that reach beyond their original purpose. To ensure that these benefits are widely achieved, Stora Enso aims at a holistic approach in its ongoing and new plantation operations.

Stora Enso's approach puts fast-wood in the local land-use context and aims to make economically viable wood production compatible with local livelihoods and the conservation of native ecosystems. Landscape-level planning is an essential means of accommodating plantations within other land-uses, but its successful implementation requires capacity and mechanisms from the local authorities and other stakeholders. Well-designed plantations also create opportunities for private landowners to diversify the use of their properties without conflict with other crops and while supporting conservation of valuable ecosystems on their lands. Large-scale conservation and active restoration of the Atlantic rainforest in north-eastern Brazil by an integrated fast-wood and pulp mill company,

Veracel, in collaboration with conservation organizations, is an illustrative example of the positive influence a plantation can have both locally and regionally.

Fast-wood does not grow in a vacuum. Sound land-use decisions need to be based on truly participatory processes and the generation of benefits from the grass-roots to the national level. An environmental and social impact assessment (ESIA), for example, is an important tool for stakeholders to express their concerns and involve themselves in decision-making. In China, a comprehensive ESIA that was recently carried out by the United Nations Development Programme for Stora Enso Guangxi Forestry has set a new benchmark for development of fast-wood projects. The ESIA report is publicly available from www.undp.org.cn/downloads/otherlocal/FinalESIA.pdf.

Sophisticated planning and management tools as well as appropriate silvicultural practices are a natural part of any modern plantation operation. Forest certification and related chain-of-custody certification has had a positive influence on plantations by harmonizing management practices and publicly promoting sustainable plantation management.

Fast-wood can be a vehicle towards sustainable land use, improved local welfare and other benefits, but that is not automatically the case. A variety of local circumstances makes it unrealistic to expect that one approach would fit all conditions. However, the basic elements of sustainable plantation forestry are widely recognized and the question now is whether and how they are applied.

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Potlatch Plantations, USA: focus on connectivity

A new report by the National Wildlife Federation, a US-based NGO, highlights ways in which plantation managers are integrating biodiversity and non-timber values into their plantation systems. One of the cases quoted is that of Potlatch Corporation, which manages over 200,000 hectares of forest lands in Arkansas. These forests include intensively-managed native loblolly pine and natural stands of pine, sweetgum and oak species. Potlatch is managing the forests with the long-term objective of creating a landscape mosaic with a more balanced cover type distribution. A key element of their landscape-level approach is the assurance of connectivity. An inventory in 2005 identified places that were more than 0.8 km from existing connectivity features (such as stream management zones or riparian areas) and corridors of at least 91 metres wide were established in these areas to connect them to the larger landscape.

In 1995, Potlatch signed a Habitat Conservation Plan with the US Fish and Wildlife Service, committing to the conservation of habitat for the red-cockaded woodpecker (RCW), an endangered species that was living in older natural stands of loblolly pine on company forestlands. Potlatch is now planning to create a 5,670-hectare contiguous RCW conservation area with recruitment sites containing artificial cavities.

Source: *The Possibility of Plantations: Integrating Ecological Forestry into Plantation Systems*. National Wildlife Federation, US. The report can be downloaded at www.nwf.org. See review on page 16.



Supporting smallholder plantations in Vietnam



Sander van den Ende of the WWF Greater Mekong Programme reports on a new initiative to support the certification of smallholder plantations.

In Vietnam we see the same paradox that exists in many other developing countries – the poorest people live in the most biodiversity-rich areas. These areas are also often the least accessible or desirable for agriculture and are coming under increasing threat from population pressure and forest exploitation. While the root causes of these issues seem daunting, a timber market mechanism such as that offered by the Forest Stewardship Council (FSC) could help improve the management of the forestry assets of the poor and enable them to capture more benefits themselves. Vietnam is well-positioned for this opportunity as the country is rapidly emerging into the global economy and attracting increasing foreign direct investment in the forest sector.

Over the past 7 to 8 years, all efforts at certifying natural forests under state-owned management in Vietnam have so far not resulted in an FSC certificate. In contrast to this, the recent certification of a joint stock company, was carried out independently of outside assistance and motivated by internal corporate policies. This company manages monoculture plantations planted on lands which are designated as 'barren and degraded' by the Vietnamese government. These areas are also often only inhabited by poor communities. These communities manage small plantations which are the result of large-scale national

reforestation programmes that have often been criticized for their failure to select appropriate species, silvicultural systems, and establishment and management techniques. Yet in spite of these criticisms, the smallholder plantations which have resulted are now increasingly being utilized as a resource to produce raw material for wood and to provide sawn timber for the export of garden furniture. The presence of a reported 750,000 hectares of scattered acacia and eucalypt plantations, and 450 furniture-exporting manufacturers (96 of which sell FSC furniture), offers the opportunity for communities to benefit from the added value and market access that FSC group certification could bring.

With this opportunity in mind, WWF is currently working with IKEA to ensure that IKEA's suppliers will be able to source increasing amounts of FSC-certified *Acacia mangium* and *Acacia* hybrids (*Acacia mangium* X *auriculiformis*) in Vietnam. The current project has just started and will work with a Vietnamese joint-stock company which, as is typically the case, manages a medium-sized plantation under its own lease and is increasingly sourcing its raw materials from land under smallholder management, i.e. the result of national reforestation programmes. The changeover to FSC and related financial considerations of the investors will test the option of lengthening the rotation length and increasing the areas under natural regeneration. The process of FSC certification financed directly by industry participants and extended to communities through their voluntary participation, will increase smallholder security over the existing resources, improve their management skills, market access and power of negotiating fair prices in the market place. The communities also have the option of applying for their own group certificate. The ecological benefits will come from stable long-term land-use systems that do not further forest conversion and can incorporate sufficient natural habitats and watershed protection services. Lessons learned can eventually be transferred to the natural forest settings. Can FSC certification help diminish the paradox, alleviate poverty and protect existing biodiversity? WWF and IKEA think so.

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WWF news in brief

Just published: *The Keep It Legal* manual and *Responsible Purchasing of Forest Products* guide by WWF's Global Forest & Trade Network (GFTN). Available on www.panda.org/gftn, these publications offer guidance to organizations wanting to develop or strengthen their responsible purchasing policies and address difficulties arising from the possible trade in illegal forest products.

Subsidies for industrial plantations: turning controversy into opportunity

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Andy White of the Rights and Resources Group, Gary Bull of the University of British Columbia and Stewart Maginnis of IUCN consider how plantation subsidies can be better targeted to support forest conservation and local livelihoods.

The vast majority of the world's plantations have been established, either directly or indirectly, with a subsidy. In many tropical countries governments have paid more than 75 percent of establishment costs and given tax breaks for maintenance, infrastructure and other inputs. In addition, governments have commonly allocated public land, for free, or at an undervalued rate, to industry, as well as technical back-up and research support. These subsidies have undoubtedly been key drivers in the rapid growth of plantations globally.

Subsidies for plantations have long been controversial and are frequently criticized for being ineffective, inequitable and economically inefficient. However some have argued that plantations reduce pressure on natural forests and governments ought to provide more vigorous support to the plantation industry (Victor and Ausubel 2000).

Our research has found that:

- the terms subsidy and plantation remain ill-defined, muddying the waters and making difficult a sensible public policy debate. There is a general trend towards use of hidden subsidies (e.g. tax reductions or rebates) making it even more difficult to ascertain the true financial, social or environmental costs.
- current best estimates suggest that the total amount of direct subsidies to industrial plantations is at least US\$2 billion per year. While this may appear small compared to the roughly US\$400 billion a year for agriculture, it exceeds the less than US\$0.5 billion of ODA spent on forest conservation each year (Khare et al 2005).
- the market distortions caused by these subsidies diminish incentives to invest in and conserve natural forests. Top plantation countries have dramatically captured a growing share of the global forest products market over the past 40 years, contributing to a major price decline for almost all forest product categories.

Recognizing that the forestry sector competes in a world where most other sectors are subsidized we suggest ways in which governments could improve the design and targeting of its subsidies. Subsidies are increasingly inconsistent with global trading arrangements – and for these reasons governments, industry and conservation organizations need to better understand and agree on subsidy regimes that support forest conservation and contribute to social development.

In sum, we recommend two priority areas for subsidy:

1. Payments for ecosystem services provided by community forest owners and the restoration of degraded forest; and
2. Technical and financial support to community and other small-scale forest businesses – since they are such strong contributors to local employment and economic development.

Finally, we recognize that in a global market individual governments will be reluctant to suspend current programs or alter them significantly until other countries are forced to do the same. This dilemma calls for international consideration and action. In particular we recommend a global dialogue to:

1. prepare guidelines for subsidy design and implementation, building on the new code for planted forests co-ordinated by FAO (see separate article by Jim Carle in this *arborvitæ*);
2. identify promising plantation policies and business models that effectively promote forest restoration and local community enterprises that can help reduce poverty; and
3. develop standard typology for forest subsidies and other non-market incentives.

Global concern on poverty, global forest loss and the WTO negotiations all combine to make better understanding of, and agreement on, the appropriate role of subsidies an urgent priority for governments, industry and civil society.

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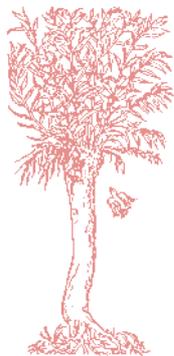
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IUCN news in brief

Staff changes: Sandeep Sengupta, IUCN's managing editor of *arborvitæ* has left IUCN to embark on a PhD. Many thanks Sandeep for your support for *arborvitæ* and good luck with your studies! Michelle Laurie of IUCN's Forest Conservation Programme will take up the IUCN managing editor responsibility. Welcome to the *arborvitæ* team Michelle!



arborvitæ

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Back issues of *arborvitæ* can be found on: www.iucn.org/themes/fcp/publications/arborvitae/avnewsletter/avnewsletter26_30.htm

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The editors and authors are responsible for their own articles. Their opinions do not necessarily represent the views of IUCN and WWF.

Reviews in brief

Forest plantations and protected areas

Available from: www.HaworthPress.com

Hot off the press is *Plantations and Protected Areas in Sustainable Forestry*, edited by William Price and two of his colleagues at the US-based Pinchot Institute for Conservation. Based on a 2001 symposium that explored the potential for a broader consensus on forest management in the US, the book looks at how best to conserve forests of high conservation value while meeting the growing demands for wood and wood fibre-based products. While a couple of chapters address the issue of the role of plantations in forest conservation, others focus on, for example, local community benefits from industrial plantations, forest management certification, and how to mitigate the environmental and social impacts of intensive plantations. The book is intended to help policy-makers, forest resource management professionals and business leaders work to develop practical and effective strategies for sustainable forestry.

Plantations: the good guys

Available at: www.nwf.org/wildlife/pdfs/Plantations.pdf

The Possibility of Plantations: Integrating Ecological Forestry into Plantation Systems, published by the US NGO National Wildlife Federation (NWF), presents some best practice examples of forest products companies working to integrate wildlife and biodiversity needs within their plantation systems. NWF admits that these companies are more the exception than the rule in the US and aims with this report to stimulate debate on what is possible in plantation forestry in the US and beyond. The authors note that the greatest growth in plantation establishment and management in the US is in the south of the country, where the highest levels of terrestrial biodiversity are also found. They also point out that this plantation growth has been accompanied by much forest conversion and together these changes have major implications for rare forest types and endangered species in the area. The report outlines some of the management strategies that can help increase biodiversity at the stand and landscape levels. These strategies are based on maintaining connectivity, landscape heterogeneity, stand structural complexity, the integrity of aquatic systems, and variability in management actions. The report illustrates how these strategies have been put into practice by highlighting six case studies from the US, Canada, Brazil and South Africa. Finally the report explores the potential role of plantations in carbon sequestration and in relieving the pressure on natural forests through 'biodiversity offsets'.

Under new management

Available from: www.earthscan.co.uk

Governments are increasingly divesting themselves of their forest plantations, transferring the management operations and sometimes ownership into private hands. *Plantations, Privatization, Poverty and Power: Changing Ownership and Management of State Forests* looks at these trends in seven countries: Australia, Chile, China, India, New Zealand, South Africa and the UK. Editors Mike Garforth and James Mayers pull together these case studies and provide readers with four overview

chapters that examine the opportunities, challenges and solutions for the privatization of plantations. They do a good job of synthesizing the key elements of successful ownership transfers, with guidance on how governments can best ensure that the new owners or managers continue to serve the public interest. On the whole, they argue, the experience of countries that have undergone changing ownership and management of forest plantations has been positive. These include the joint forest management experience in India, village and household entrepreneurship in China and the expectations of successful transfers to rural South African communities. However, they warn, transfers can also go astray and be used to concentrate plantation power and privilege in too few hands. Unwanted outcomes, such as job losses, forest cover loss and a decline in management quality need to be anticipated, where possible, and addressed. Most importantly, say the editors, the practitioners involved need to have absolute clarity of purpose and dedication.

Plantations in tough environments

Available from: www.publish.csiro.au

A recent book from CSIRO (Australia's Commonwealth Scientific and Industrial Research Organisation) looks at the potential for planted forests in saline environments to provide environmental services such as salinity mitigation and carbon sequestration, as well as commercial wood production. *New Forests: Wood Production and Environmental Services*, by Sadanandan Nambiar and Ian Ferguson, is based on 15 years of trials in Australia's Murray-Darling Basin, where large-scale reforestation is being planned as part of the country's goal of achieving 3 million hectares of new plantations nationally by 2020. The book addresses key issues such as the selection of the most appropriate species and technologies, the optimal mix of environmental services and commercial goods, and whether the likely net benefits justify the change in land-use and the commercial investment. The authors provide information that is intended to be relevant to plantations in saline environments in other parts of Australia and elsewhere.

Condolences

WWF and IUCN mourn the terrible loss of lives following the tragic helicopter crash in Nepal which caused the deaths of 24 people including senior Nepalese government leaders in forestry and conservation and seven WWF staff as well as other overseas conservation specialists. The helicopter was returning from an inauguration ceremony in which the government of Nepal handed over management of the Kanchenjunga Conservation Area to local communities. WWF and IUCN send sincere condolences to all families, friends and colleagues of those who perished. The crash has meant a personal loss for so many, as well as a huge blow for conservation in Nepal. A book of condolences has been set up at www.panda.org/nepal/condolences.