



**Mountain forests**



# NEWS

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Dear readers,

Mountain regions have been in the focus of international interests starting from the Rio Summit in 1992 to the International Year of Mountains 2002 (IYM 2002) and beyond. Mountain forests represent almost one third of the world's closed forest area and they fulfil a multitude of functions. They are ecologically complex and biologically diverse, and contain nearly half of the world's biodiversity hot spots. However, mountain forests have come under increasing pressure in many parts of the world. The demand for timber, firewood and water as well as agricultural land and recreation areas has grown with the increase in population and industrialisation in lowland and urban areas. This led to overexploitation of resources and environmental degradation, particularly in the Tropics where upland forests are disappearing at an alarming rate. However, due to the differences between mountain areas on different continents and regions, "sustainable development of mountain forests" means different things in different contexts. Threats and opportunities must be analysed on a regional level, while considering the needs of both the highland and the urban/lowland population. Mountains are an important living and working space - about 52 % of the world's population lives in, or in the direct vicinity of mountain areas. Mountains are not isolated ecosystems; highlands and lowlands are interlinked and connected in complex ways. Social, cultural and natural assets of mountains are equally important to people living in the highlands as to lowland inhabitants who benefit from mountain resources. Policies and laws to protect ecosystems and support mountain people are vital for the sustainable development of mountain regions all over the world.

The theme of this issue of ETRN News is Sustainable Development of Mountain Forests. The introduction gives an outline on IYM 2002, conventions and partnerships for sustainable mountain forest development, as well as current policy trends and key issues. The different contributions provide a valuable overview of the present status of upland forest and the ecological, socio-economic and technological implications of sustainable development of mountain forests, particularly in developing countries. The articles are presented in 4 thematic sections; specified in the introduction.

Several authors in this issue of ETRN news emphasise that the support and interest from the international community and organisations will be critical for the future development of mountain forests. However, to enable policy makers to make decisions, reliable sources of information on the roles of mountain forests, their ecology and potential use, as well as the socio-economic background and the populations of mountain regions, backed up by research, are required. National awareness and policy in support of the sustainable management of mountain forests and upland areas will be crucial for the fate of mountain forests. The coming years will also reveal whether action follows the broad range of IYM conferences and meetings, conventions and partnerships. Let's remember that 2003 has been called "The International Year of Fresh Water". More than half of humanity depends on water from mountainous areas as drinking water, for irrigation, energy production, as well as for transportation. This important interlinkage could help to give mountain issues the necessary long lasting effect.

We hope that you will enjoy reading this issue and that you will find it a useful source of information; and please remember that ETRN CU always welcomes comments, and contributions for future issues.

We are grateful to Birgit Habermann and Jean-Pierre Sorg for editing this issue of the ETRN News. Please note the themes and deadlines for the next issues on the back cover.

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Cover illustration: Photographs by Gerhard Glatzel and Birgit Habermann

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EC NEWS

**FP 6 INCODEV CALL THEMES AND DEADLINE FOR PROPOSALS 2003**

**Closure: 11 September 2003 17:00 hrs**  
(Brussels time)

Proposals for Coordinated Actions; Specific Targeted Research and Extension Projects (STREPs) and Specific Support Actions (SSA's) are invited on the themes below.

Please note that the total budget for the INCODEV programme is quite limited, and is intended to support very good research projects which will truly benefit INCODEV target countries. SSAs may be submitted by one legal entity, either based in one of the INCODEV target countries, or in one of the EU member or associated states. All other projects should be submitted by a minimum of three different organisations from different countries in the same Region (ie Asia; Latin America; or the ACP states); together with three different organisations (legal entities) from different countries in the EU or associated states - *this means a minimum of six organisations in total!*

*Please note that the guidance notes for the proposal evaluators are available, and should be studied when you prepare a proposal, together with the other relevant documents, which may be downloaded from:*  
[http://fp6.cordis.lu/fp6/call\\_details.cfm?CALL\\_ID=37](http://fp6.cordis.lu/fp6/call_details.cfm?CALL_ID=37)

A. Developing Countries

A.2.1 Managing *humid and semi-humid Ecosystems*. - includes research on ecosystem dynamics to develop policy options and management strategies; focus on: opportunities for enhanced economic productivity and limits to sustainable

production; sustainable water management at river basin scale; forest ecosystem restoration and reclamation techniques.

A.2.2 *Reconciling multiple demands on coastal zones*

**CALL FOR EXPERTS**

The EC DG Research would like to invite experts, particularly from Developing Countries, to register themselves in the FP6 database for evaluation, review or monitoring experts.

You may apply and be registered in the database individually without the recommendation of an organisation. To register, please go to the address <https://emmfp6.cordis.lu/> and click on the link "Register as an expert".

The Experts helpdesk can be contacted by sending an email to [fp6-experts-helpdesk@cec.eu.int](mailto:fp6-experts-helpdesk@cec.eu.int).

**Second call for FP6 thematic sub-priority 1.1.6.3 'Global Change and Ecosystems'**

On 3 July, the EC DG Research published the second call for proposals for Global Change and Ecosystems.

This call includes some interesting topics for forest related research, including:

integrated water resource management; forecasting models for changes in biodiversity and ecosystems (focus on European ecosystems); invasive species threatening European environment; desertification (international cooperation with relevant regions in Africa Asia and Latin America is encouraged here); natural disasters, including forest fire, floods and landslides (potential for international cooperation); sustainable land-use

management; multifunctional use of agriculture and agroforestry; forecasting models on climatic change; etc.

An overview of funding opportunities for forest-related research; and a complete overview of the call, with forest-related research opportunities in bold has been published on the ETFRN website at:

[http://www.etfm.org/etfrn/eucomm/6fp/index\\_call\\_global2.htm](http://www.etfm.org/etfrn/eucomm/6fp/index_call_global2.htm)

The work programme, call text and other relevant documents can also be downloaded from this link, as well as from the link to the CORDIS website below.

[http://fp6.cordis.lu/fp6/call\\_details.cfm?CAL\\_L\\_ID=78](http://fp6.cordis.lu/fp6/call_details.cfm?CAL_L_ID=78)

If you would like to receive the ETFRN reading guides to the call as Email attachments, please send a message to the ETFRN Coordination Unit with the subject: 'global change 2nd call reading guide'.

**Closing Date(s):**

Deadline for Integrated Projects (IP), Networks of Excellence (NoE), Specific Targeted Research Project (STREP), and Coordination Action (CA) is **9 October 2003 - 17:00 hours Brussels time.**

Deadline for Specific Support Action (SSA) is **9 October 2003 and 17 February 2004 - 17:00 Hours Brussels time.** (please see also point 12 of the call text).

IP and NoE are evaluated at 2 stages which means that only an outline proposal of about 20 pages needs to be submitted before 9 October 2003, the indicative date for the second submission after positive evaluation in the first round is 17 February 2004.

**ETFRN NEWS**

The results of the **information meeting on EC funding sources for forest research in the Tropics, Subtropics and Mediterranean**, held in Brussels last 4 February 2003, are available on the ETFRN website as well as on CDROM. Thanks to the generous support of the UK's DFID Forest Research Programme, as well as the EC DGRResearch, the CDROM is available free of charge. If you would like to receive a copy, please send a message to the ETFRN CU.

At its Annual meeting held in Florence last March, the **ETFRN Steering Committee** discussed the ETFRN Mission and objectives; the results of the external evaluation; and plans for the future after the current funding phase ends on 31 December 2003. It was agreed that the ETFRN CU and the ETFRN Executive Committee should take the lead in exploring and developing proposals for this purpose, responding to the relevant calls published by the EC.

The Steering Committee recommended that the draft for the **revised Mission and Objectives for ETFRN** should be widely circulated for comments. They will be posted on the website, and circulated on the ETFRN Email list. *Comments are welcome; please send them before 1 September 2003.*

The VITRI - ETFRN - IUFRO-SPDC **workshop on dryland rehabilitation in Sub Saharan Africa (TACCD A)** was held in Finland last 30 June - 4 July. Background documents, results of the preceding E-discussion, agenda for the workshop are available on the ETFRN website; workshop results will be added soon.

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**INTRODUCTION**

This issue of ETFRN News on "Sustainable Development of Mountain Forests" presents an overview on the current status of upland forests and the ecological, socio-economic and technological implications of sustainable development of mountain forests, particularly in developing countries. The introduction gives an outline on the International Year of Mountains 2002 (IYM2002), conventions and partnerships for sustainable mountain forest development, as well as current policy trends and key issues. The articles presented in section I and II deal with structure, dynamics and management of mountain forests and non timber forest products (NTFPs). On the issues of policy and politics for conservation and development several case studies are presented (section III), as well as examples of existing multi- and bilateral partnerships for sustainable mountain forest development (section IV).

**SUSTAINABLE DEVELOPMENT OF MOUNTAIN FORESTS WHOSE CLAIMS, WHOSE ISSUES AND WHOSE BENEFITS?**

By Birgit Habermann

Mountains cover about 1/4 of the Earth's terrestrial surface. Approximately 12% of the world's population live in the highlands; 40% of humanity lives in adjacent medium- and lower watershed areas. (FAO, 2000)

But what do mountains mean to the world's population, half of which depends on mountain resources, particularly fresh water? How much willingness is there to compensate the stewards of mountain resources, rural amenities and landscape values for their invaluable services? How will the integrity of mountain ecosystems be safeguarded, and the damage caused by over-use and exploitation of mountain resources repaired?

Can a balance be found between conservation of biodiversity and peoples' livelihoods in highly populated and sensitive mountain ecosystems; the needs of mountain communities and the urban/lowland population; and the productive capacity of mountain forests; their protection and protective functions?

**Mountains forests of the world**

Mountain forests represent almost 1/3 of the world's closed forest area. As can be seen in table 1, mountain forests are diverse and widely spread over all continents. 48% of the world's total terrestrial surface lies above 500 m; 27% above 1 000 m; 11% above 2 000 m; 5% above 3 000 m; and 2% above 4 000 m (Messierli and Ives, 1997)

Different issues arise in different contexts: in most European mountain regions rural amenity values, the protective function of mountain forests and timber production are at the centre of debate, whereas mountain regions in developing countries face problems of severe land degradation, deforestation, conflicts of land ownership, as well as exploitation of resources through high demand for fuel wood and agricultural land, unsustainable forest practice, and through timber logging and mining by lowland based companies. Kassahun Embaye (p.54) reports on the situation in Ethiopia, where people are heavily dependent on subsistence farming and wood products from the forests. Yet they are forced to compensate for declining land productivity by expanding farm- and grazing land into forested areas. The FAO's State of the World's Forests Report (FAO, 2003) points out that mountain areas in developing countries are characterised by multiple land use systems. There is a high demand for pasture areas, wood (as the main fuel) and non wood forest products (NWFPs) from the forests. Forests are often overexploited, but sometimes mountain forests are also valued as sacred groves containing sites of religious or spiritual importance, thus conserving and promoting rare/uncommon woody plant

Table 1: Mountain forest types by area and by dominant region, source: UNEP-WCMC (2000).

Mountain forest types	Total area		Main regions
	'000km <sup>2</sup>	%	
Tropical and subtropical moist mountain forests	2237	25	Tropical Andes, Central America, East Africa and Madagascar, Southeast Asia
Tropical and subtropical dry mountain forests	534	6	Southern Africa, India
Temperate and boreal deciduous conifer mountain forests	2762	30	North America, Europe, Central Asia, Himalaya
Temperate and boreal deciduous conifer mountain forests	1317	14	Central Asia, Northeast Asia
Temperate and boreal broad-leaved and mixed mountain forests	2247	25	North America, Southern Andes, Europe, Himalaya, East Asia
<b>Total</b>	<b>9097</b>	<b>100</b>	

species as reported by Binggeli et al for the Ethiopian Highlands (p. 37).

For industrialised countries, the FAO report describes a different situation: Mountain forests are over mature and underexploited; often not economically viable to harvest; and wood has been replaced by other fuels. Consequently the protective function of the forests is impaired and new management strategies such as community forest management are required, as has been practised for centuries in parts of Europe. Zimmermann gives an account of the current situation in Switzerland, reporting on the main problems in relation to mountain forest which include guaranteeing and improving stability; controlling forest expansion; and using mountain forests in a sustainable manner.

In both cases mountain forests play a crucial role in providing various functions and services to mountain communities and adjacent lowland settlements. However, these

multifaceted interlinkages between highlands and lowlands, the complexity of mountain societies, the remoteness and harsh environment of mountain areas as well as the increasing dependency on goods and services externally imported require an equally multifaceted and trans-disciplinary approach to mountain forest research and development planning.

**IYM2002 commitment to action ?**

The International Year of Mountains 2002 was proclaimed in 1998 by the General Assembly of the United Nations based on an initiative from Kyrgyzstan. The mission statement of IYM2002 was as follows (FAO, 2000): *"The International Year of Mountains promotes the conservation and sustainable development of mountain regions, thereby ensuring the well-being of mountain and lowland communities."*

Compared to Agenda 21 (Chapter 13, Managing Fragile Ecosystems: Sustainable Mountain Development) there was a much stronger focus on mountain communities and a more people-centred approach. A wide range of activities focused on mountain people and communities as the primary target groups of activities. It was emphasised that IYM observance should be action-oriented through the promotion and initiation of events, income-generating activities for poverty reduction, activities supporting indigenous people or other vulnerable groups, but also through sustainable use of natural resources and preservation of biological diversity and ecological systems. The website (<http://www.mountains2002.org>) provides valuable information on the events and the outcome of IYM2002.

A major success of IYM2002 was the increased awareness for mountains national committees were formed in 78 countries, some of which have been extraordinarily active throughout the entire year. International highlights have been the 'High Summit 2002: International Conference around the Continents' Highest Mountains' in May, and the 'Bishkek Global Mountain Summit' in Kyrgyzstan in October. However, the success of IYM2002 should be measured by the amount of active follow-up at different levels. In spite of a number of declarations and conventions (see [www.mountains2002.org](http://www.mountains2002.org)), and numerous conferences and international and national committee meetings, the question remains how much commitment to action is actually transferred into visible results for mountain communities. Following the Bishkek Global Mountain Summit an interesting debate on declarations and their relevance to mountain communities took place on the Mountain Forum list server (<http://www.mtnforum.org>). Criticism arose regarding the large amount of money spent on such meetings and the lack of participation of the people concerned. It is not realistic to expect long public plenary discussions during

such conferences, yet more participation of local organisations and representatives of mountain communities is desirable. Development workers, scientists, researchers, NGOs or mountain people are depending on financial inputs, and declarations can be very supportive for obtaining these, but the people concerned have to be given a voice to take part in the creation of these conventions. Specific international declarations on mountains will be helpful to justify the importance of supporting mountain communities, but they will only lead to sustainable development if subsidiarity becomes a core principle of development planning and implementation in mountain areas.

**Actors for mountains**

Actors for mountain forests and mountain people are international organisations and networks, national governments and decentralised authorities, donor organisations, major NGOs; research institutions, mountain people and communities themselves. Some of the organisations and networks active in IYM2002 and involved in follow-up activities are mentioned below:

The Mountain Agenda was created prior to the Rio Earth Summit (UN Conference on Environment and Development in 1992) to enhance the position of mountains on the global environmental agenda through creating awareness among decision-makers, experts, and the general public. It is an informal group of people with professional interests in sustainable mountain development, drawn from the academic and development cooperation communities (<http://www.cde.unibe.ch/programmes/global/glo22.html>).

Networking has significantly increased since the Rio Earth Summit, especially since the Mountain Forum was established in 1995 as a decentralised network to carry out a wide array of activities connecting and

empowering mountain supporters throughout the world (<http://www.mtnforum.org>). It aims to promote global action towards equitable and ecologically sustainable mountain development through information sharing, mutual support and advocacy. The network comprises thousands of people, professionals and organizations from over 100 countries.

The Mountain Institute ([www.mountain.org](http://www.mountain.org)) is a nonprofit scientific and educational organization committed to the preservation of mountain environments and advancement of mountain cultures around the world. Its mission is to advance mountain cultures and preserve mountain environments. Its objectives are to conserve high priority mountain eco-systems, to increase environmentally and culturally sustainable livelihoods for mountain communities, and to promote support for mountain issues through advocacy, education and outreach.

So far the only international centre specifically devoted to integrated mountain development is ICIMOD (International Center for Integrated Mountain Development, [www.icimod.org](http://www.icimod.org)). It was set up following widespread recognition of the alarming environmental degradation of mountain habitats and consequent increase in impoverishment of mountain communities in the Hindu Kush-Himalayan (HKH) Region in the 1970s. The primary objectives of ICIMOD are to help promote the development of an economically and environmentally sound mountain ecosystem and to improve the living standards of mountain populations in the HKH Region. ICIMOD works mainly at the interface between research and development.

#### **Conventions and partnerships a step forward**

IYM2002 has facilitated the creation of a significant number of new partnerships and conventions regarding mountains whilst also successfully strengthening existing ones. Leading documents are the 2002 Tokyo Declaration for the International Year of

Mountains (United Nations University, <http://www.unu.edu>), the 3rd European Mountain Convention at Inverness, Scotland (Euromontana, [www.euromontana.org](http://www.euromontana.org)), the Alpine Convention (CIPRA, [www.cipra.org](http://www.cipra.org)), and the 4th International Consultation on Mountain Forests in Pamplona, Spain (European Observatory of Mountain Forests and FAO, <http://www.eomf.org>; <http://www.fao.org>).

Within the Alpine region a major success of IYM2002 was the ratification of all 8 protocols of the Alpine Convention by the governments of Austria, Germany and Liechtenstein in December 2002, and the selection of Innsbruck for the placement of the permanent secretariat of the convention. The Alpine Convention contains protocols on conservation and landscape management, mountain farming, regional planning and sustainable development, mountain forests, tourism, soil protection, energy and traffic. The Alpine Convention tries to find a balance between the protection of the Alps and the necessary impulses for economic development. A similar initiative is underway in the Carpathians and major progress is to be expected in 2003.

At the 8th meeting of the Subsidiary Body on Scientific, Technical and Technological Advice of the Convention on Biological Diversity in March 2003, mountain biological diversity was the main theme. In the preparatory document (UNEP/CBD, 2002) it was stated that there was an urgent need for "information on the linkages between the livelihoods of population inhabiting mountain areas and the status of mountain biodiversity on the one hand, and policies and activities impacting mountains being carried out away from the mountain communities". The document concludes that qualitative data on mountain biological diversity, and biological inventories and monitoring initiatives will be important to develop indicators of ecosystem change.

The Bishkek Mountain Platform was a key outcome of the Bishkek Global Mountain Summit. The purpose of the platform is to provide guidance to governments and others on how to improve the livelihoods of mountain people, to protect mountain ecosystems and to use mountain resources more wisely. It aims at achieving a UN resolution on sustainable development on mountain regions and pledges a long-term commitment and determination to the fate of mountain regions, protecting mountain ecosystems, promoting peace and economic equity, and providing support for current and future generations of mountain people.

Prior to that, the International Partnership for Sustainable Development in Mountain Regions was presented and officially launched at the World Summit on Sustainable Development (WSSD) in Johannesburg by FAO together with the United Nations Environment Programme and the Government of Switzerland, on behalf of 15 members of the IYM Focus Group. It builds on existing collaboration among members of a growing network of concerned organizations and people that have already been working together to implement Chapter 13 of Agenda 21. The newly launched Partnership is a flexibly structured alliance including several UN agencies, private sector, non-government organizations (NGOs) and the academic and research community. A secretariat for this partnership will be established at FAO in order to continue the work started in IYM2002.

#### **Policy trends and key issues**

In European countries mountain policies have been established over the last three decades and have become an important measure of European Community policy (Dax, 2002). The main measures aim at compensating less-favoured production and living conditions in mountain areas. According to Dax (2002) recent trends point more in the direction of an integrative approach trying to apply a

stronger territorial viewpoint towards mountain policies. This approach was inspired by regional policies in several European countries such as Austria and Switzerland, and partly developed by alternative groups in remote mountain areas of France and Spain.

Forest policy instruments exist in many countries worldwide. According to Beck and Suda (2000) the most prominent economic tools for mountain forestry are financial incentives, either indirect in the form of tax reductions or as direct subsidies paid to motivate forest owners to carry out forest management activities voluntarily. The authors point out that the financial resources are mainly state budgets. In developing countries foreign financial aid from donor countries is added to that. Subsidies are mainly offered for private investments, such as plantations or afforestation, thus benefiting large companies or individual landowners rather than disadvantaged mountain communities. Hence, without more attention to subsidiarity and sustainable livelihoods, as well as appropriate certification schemes, the gap in sustainable mountain forestry investment remains. In sector III of this newsletter, Kassahun Embaye (p. 54) makes a strong statement for approaches that provide motivation for tree planting and forest protection by local people. He proposes to introduce financial incentives for forest establishment on a local level instead of investing in large scale plantations and tree promotion projects in developing countries. Zingerli (p. 45) addresses the conflict of biodiversity and conservation interests versus the livelihoods of poor and marginalized mountain communities. She reports that in Vietnam, in a traditional top-down approach, forests have been classified at the central state level and the policy framework applied identified mountain communities as being solely responsible for forest degradation. Peter (p. 47) reports a similar scenario for the Dominican Republic where government policies failed to protect mountain forests by

expelling and criminalizing local forest users. In a case study of Mexico, Mitchell (p. 49) describes both the conflicts but also the benefits of the traditional collective landownership and management in two communities in the Sierra Norte of Oaxaca. In both communities there is a forest conservation ethic, which can now be combined with modern forestry techniques sustainable forest management becomes feasible with low-intensity logging and NTFP collection. Mitchell states that the key to forest use and protection rests with an empowered citizenry, and he emphasises the importance of encouraging democracy in forest-dependent mountain communities.

A well known example of collaborative management of mountain forest resources on a local level is Nepal, where the government has been promoting a community-based management paradigm since the 1980s. Institutional, legislative and regulatory changes increasingly recognized the customary usufruct rights of local people and their active role in managing the natural resources. Bhim Adhikari (p. 56) however reports that community forestry in the Mid Hills failed to contribute significantly to the livelihoods of very poor and marginalized sections of the community. Better off households and local elites were more favoured by the system than poorer households. The author proposes to address equitable systems of benefit distribution and cost sharing instead of supporting a focus on a highly protective silvicultural regime aiming at high timber output. Forest management policy needs to be directed at increasing alternative forest products (such as NTFPs) of high value for poorer households. Equally important in many mountain areas is agroforestry, as mentioned by Sorg et al. for the case of the walnut-fruit forests in Kyrgyzstan (p. 63).

As stated by Beck and Suda (2000), it is necessary to develop methodologies for the valuation of forest goods and services.

Economic arguments are needed to justify public and political support of mountain forestry. In a recently published report on the future of mountain societies (The Panos Institute, 2002) it was emphasised that the first challenge was to value mountain resources; goods such as water, biodiversity, and forests are traditionally perceived as immeasurable; but based on an extensive evaluation of the environmental services and other conservation benefits that mountain areas provide for lowland and urban areas, new environmental economic tools can be developed to place monetary values on these goods. International action will be necessary to elaborate innovative financing mechanisms to ensure that a fairer share of the benefits is returned to mountain communities. Sectoral, integrated, regional development policies, and the definition and protection of property rights are equally important (Mountain Agenda, 1997). To guarantee sustainability it has to be ensured that compensation payments go directly to mountain communities and that their role as stewards of mountain forests is recognised. Empowerment and decentralisation are crucial issues - there has to be a "reasonable distribution of responsibilities between governments, public agencies, and scientific, multilateral, community and private organisations. Subsidiarity should be a guiding principle, with public structures responsible only for tasks that cannot be satisfactorily devolved." (Mountain Agenda, 1997).

#### Conclusion:

After the IYM2002, much work remains to be done, but a hopeful step in the right direction has been taken. Awareness for the importance of sustainable development of mountain forests has been raised, and the economic and ecological benefits of mountain forests have been at the centre of debate in many places.

In research, however, a more integrated

## HIGHLAND FORESTS

*By David Blakesley and Stephen Elliott*

approach will be required, with less focus on forestry as an isolated discipline. Research has to address the needs of resource users; respond to their demands; and respect the value of local knowledge. The broad scale of land use issues in mountain areas ranges from agriculture, conservation, protective functions, water sources, to (eco-)tourism and recreation purposes. Building on the strong networks among foresters (and the existing legislative and institutional structures in forestry) a more integrated, trans-disciplinary and people-centred approach will have to evolve to achieve a more sustainable development of mountain forests in the long run.

Equally important is the valuation of environmental functions and goods provided by mountain forests and mountain communities; the selection of adequate criteria and indicators for sustainable mountain forest management; and the establishment of adequate compensation mechanisms and policy instruments. Sustainable development aims at promoting harmony between humanity and nature mountain ecosystems are particularly fragile, and mountain communities are often in a disadvantaged and underprivileged position. Given the necessary support, mountain people will be in a better position to achieve sustainable, harmonious living with their unique environment.

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Destruction of tropical forests is widely acknowledged as one of Earth's most serious environmental problems. The consequences of this on-going environmental disaster, including degraded water catchments, losses of biodiversity and worsening rural poverty have been well documented. Particularly at risk are the seasonally dry forests of Southeast Asia's highlands. Despite levels of biodiversity, which often match those of many tropical rain forests, the seasonally dry tropical forests of Southeast Asia's monsoonal belt are thought to be more endangered than equatorial rainforests. In response to this problem, several countries in the region have banned or restricted commercial logging in remaining areas of primary forest and added former logging concessions to their already extensive protected areas systems. Now, the problem is that even these so-called "protected" forests are often too degraded to meet the need for healthy, natural forest that is capable of supporting viable populations of wildlife. It is becoming increasingly apparent that attempts to protect remaining forest are not enough. To save Southeast Asia's tropical forests, destruction must not merely be halted, but actually reversed.

Restoration of highland forests is urgently needed across the region to ensure a sustainable future for both wildlife and local people and to fulfil national policies and international commitments to maintain the diversity of life on our planet. Ecological restoration is rapidly becoming an important tool in conservation biology, to conserve biodiversity, restore environmental services (e.g. water supply, biological control and so on) and to provide benefits for people (e.g. food, firewood, medicinal plants and so on). WWF and IUCN have proposed the

all-encompassing concept of 'Forest Landscape Restoration', which aims to re-establish ecological integrity and enhance human wellbeing in degraded forest landscapes. In order to be successful, such an approach requires an effective technique to rapidly restore forest ecosystems to degraded areas.

In response to these issues, the Forest Restoration Research Unit (FORRU) of Northern Thailand's Chiang Mai University, in collaboration with Britain's Horticulture Research International (HRI), has been adapting the 'framework species method', to restore seasonally dry forests to degraded watershed sites in the mountains of Northern Thailand. This method was first conceived in the wet tropical lowland rainforest of Queensland, Australia (Goosem and Tucker 1995). The basic structure and functioning of forest ecosystems are rapidly re-established by planting mixtures of 20-30 carefully selected native forest tree species (both pioneer and climax simultaneously). Subsequently, biodiversity is restored by the planted trees attracting seed-dispersing animals into planted sites. The essential characteristics of framework tree species are therefore: high field performance (survival and growth rate) in degraded sites; dense, spreading, crowns that shade out herbaceous weeds and provision of resources that attract seed-dispersing wildlife (e.g. fruits, nectar, nesting sites and so on) at an early age. In areas susceptible to wildfires during the dry season, an additional consideration, is resistance to burning or recovery after fire such as coppicing ability etc.

Framework species should also be easy to propagate in nurseries by local people with simple technologies. They should have reliable seed availability; preferably rapid and synchronous germination and rapid growth of seedlings to a plantable size (50-60 cm) in less than a year. High quality seedlings are important, as they have the best chance of surviving in hostile deforested environments.

Consequently it is essential that good horticultural practices are adopted.

Selecting candidate framework species for FORRU's field trials required extensive background studies. Germination trials and monitoring of early seedling growth were carried out on 400 tree species indigenous to Doi Suthep-Pui National Park (DSPNP). A detailed study was carried out of tree flowering and fruiting phenology, involving 100 tree species and descriptions, drawings and photographs have been made of fruits and seedlings of potential framework species. An herbarium collection of dried seedling specimens was established, along with computer databases of seed, fruit and seedling morphology. Germination was tested and seedling performance was monitored in the nursery and after planting out in degraded areas. This enabled compilation of species production schedules. DSPNP is itself a location of recognised conservation importance, due to its high diversity of tree species. With more than 600 tree species suited to a wide range of soil and climate conditions, DSPNP could provide a valuable seed source for forest restoration projects outside of the park.

Planting trials in 1995-1997 enabled identification of some species likely to perform well in degraded sites. Without such basic background information, it would have been very difficult to make sensible choices as to elect candidate framework species for more extensive field trials. Based on all these studies, framework species have been planted in field plots annually since 1997 in partnership with an Hmong hill-tribe community resident within DSPNP. FORRU helped the villagers to establish their own community tree nursery to test the practicability of the new nursery methods developed in the research nursery, in a village environment. The planting trials were designed to provide a quantitative assessment of the degree to which various tree species meet framework species criteria

and helped to establish appropriate standards for the selection of tree species for forest restoration. Canopy closure can now be achieved within 2-3 years after planting. Weeds have largely been replaced with a carpet of leaf litter and wild pigs, deer and other wildlife have been observed in the planted sites.

Our core research program is sponsored by the Biodiversity Research and Training Program (a Thailand Government fund) and Britain's Eden Project. Demand for the information generated by FORRU has become overwhelming. New knowledge arising from the research is being disseminated to a wide range of groups/individuals involved in forest restoration, by a complementary project "Education and training for restoring tropical forest biodiversity" funded by Britain's Darwin Initiative. Through our forest restoration newsletter, we are able to reach people across Southeast Asia. We feel optimistic about the future of forest restoration and efforts to reverse the decline of Earth's tropical forests.

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### RESTORATION OF THE NATIVE WOODY-SPECIES DIVERSITY, USING PLANTATION SPECIES AS FOSTER TREES, IN THE DEGRADED HIGHLANDS OF ETHIOPIA

By Eshetu Yirdaw and Olavi Luukkanen

#### Introduction

The highlands of Ethiopia, in contrast to most mountain systems outside Africa, are very suitable for human habitation. As a result, 88% of the population, 95% of the cropped land and about three fourths of the livestock is found on highlands. This population pressure on the highlands accompanied by sedentary agriculture, extensive cattle herding activities and socio-political instability, has resulted in heavy deforestation, forest fragmentation, loss of biodiversity and impoverishment of ecosystems in general. Despite the heavy depletion of forests that has taken place in the hill and montane zone, it is still this area that contains most of the remaining closed forests and it is also this zone which is presently being deforested most rapidly.

Although there are still sizeable forests in the southwestern highlands, the remnant natural forests in the central and northern highlands are found only as isolated small patches at inaccessible locations and around the numerous churches and burial grounds. Deforestation has eroded the biological diversity to such an extent that some plants are faced with local extinction. Some of the remnant tree species in the northern and central highlands are endangered, since they are found as isolated individuals, and their ability to form viable populations is very much in doubt.

The potential of fast-growing forest plantation species to enhance the recruitment, establishment and succession of native woody species in the degraded

Ethiopian highlands was studied. The naturally-regenerated woody species diversity and ground layer vegetation cover were studied in plantations of *Eucalyptus globulus*, *Pinus patula*, *Cupressus lusitanica*, *Grevillea robusta*, and *Juniperus procera*, and in surrounding natural forests in Wondo Genet, Menagesha and Chancho, Ethiopia. A comparative study was conducted of native woody species diversity in eucalypt plantations at Menagesha where there was a remnant natural forest, and at Chancho where natural forests were absent. Furthermore, the canopy photosynthetic photon flux density transmittance of the five forest plantation species and the growth of native *Podocarpus falcatus* seedlings in canopy gaps of plantations were investigated.

### Results

At Wondo Genet, a total of 53 naturally regenerated tree and shrub species belonging to 31 families were recorded in the understorey of the plantations; important indigenous timber species were also represented. Trees accounted for 72% of all naturally-regenerated woody plant species. In eucalypt plantations at Menagesha and Chancho, a total of 22 and 20 woody species belonging to 18 and 17 families were found and, out of these, trees accounted for 68 and 55%, respectively. About 77 and 83% of the woody species found in the adjacent natural forest were also represented in the understorey of plantations at Wondo Genet and the eucalypt plantation at Menagesha, respectively. However, the relative abundance of species in the plantations and the adjacent natural forest varied considerably. The understorey woody plant density in plantations was up to 8,325 stems/hectare. There was no significant variation in understorey woody species richness among plantations. The herbaceous ground cover percentage in *G. robusta* and *P. patula* stands was considerably higher than that observed in *C. lusitanica* and *J. procera*

stands.

Woody species richness and abundance at Menagesha were on the average 2.4 times and 5.7 times higher, respectively, than the corresponding values at Chancho, and these differences were significant. This result demonstrated the crucial role of the remnant small patches of natural forests, as a source of diaspores for the restoration of the woody species diversity in degraded areas of the Ethiopian highlands.

Canopies of *E. globulus*, *P. patula* and *G. robusta* transmitted about three times as much photosynthetic photon flux density as *J. procera* or *C. lusitanica* plantations. In contrast to *J. procera* and *C. lusitanica*, *E. globulus* and *G. robusta* had relatively open crowns, higher crown-bases and lower leaf area indices, and, as a result, their canopies had a higher photosynthetic photon flux density transmittance percentage as well as higher below-canopy red/far-red ratio and temperature.

The mean height and root-collar diameter of *P. falcatus* seedlings decreased steadily from gap centre towards gap edge and further to the plantation understorey. As the gap size decreased from 668 m<sup>2</sup> to 449 m<sup>2</sup>, the height and root-collar diameter of *P. falcatus* seedlings decreased by 27% and 19%, respectively. In general, opening of gaps in plantations of heavy-shading tree species seems to increase the herbaceous layer ground cover, enhance the colonisation and growth of native woody species and, consequently, may also increase the floristic diversity of mono-specific plantations.

### Conclusions

The density of naturally-regenerated woody plants in plantations was over three times the usual planting density in Ethiopia, indicating a high potential of forest plantations for restoring the natural forest ecosystems on

degraded lands at a comparatively low cost. In order to fully re-establish the diverse and economically valuable natural forest, complementary measures such as enrichment planting of missing primary forest species may be required. Silvicultural treatments like thinning, pruning and canopy opening (e.g. narrow strip clear-cuts) in plantations of heavy-shading tree species such as *Cupressus lusitanica* and *Juniperus procera* are likely to increase the herbaceous layer ground cover and promote the regeneration and growth of spontaneously established native woody species. The small isolated remnant natural forests are the only native woody species refuges left in many parts of the highlands, and they are also the only source of diaspores. Therefore, the linkage between plantations and natural forests should be realised and hence the conservation of these natural stands should be given high priority. Although there is a lack of quantifiable practical standards for biodiversity evaluation, natural forest stands near a restoration site can initially provide baseline data for the evaluation of the extent and rate of woody plant recruitment and establishment in plantations.

This article is based on the following Ph.D. thesis:  
Eshetu Yirdaw 2002. Restoration of native woody-species diversity, using plantation species as foster tree, in the degraded highlands of Ethiopia. University of Helsinki, Tropical Forestry Reports 24, Helsinki.

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### MARCOTTAGE DE TIGES RAMPANTES ET INDUCTION DU DRAGEONNAGE : DES TECHNIQUES A CONSEILLER EN ZONES MONTAGNEUSES ?

Layering creeping stems and induced suckering: recommendable techniques for mountainous areas?

By Ronald Bellefontaine

La régénération " naturelle " (par semis, rejets de souche, drageons, marcottes) est parfois jugée trop lente ou trop rare. La régénération artificielle (plantations) l'a souvent supplantée. Les mécanismes qui régulent l'apparition naturelle de marcottes ou de drageons ont été peu étudiés. On n'en connaît guère plus en ce qui concerne l'induction par diverses techniques de ces

deux types de régénération asexuée. Quelques observations au Niger (400mm/an) montrent une relative fréquence de cas de marcottage naturel en saison des pluies (Karim et al. 2002). Quant au drageonnage, naturel ou provoqué, il n'est connu qu'en zone tempérée pour les peupliers, certains fruitiers, merisiers, ailanthes, etc.

Pour les arbres poussant près de leurs limites naturelles, latitudinales et altitudinales (en montagne notamment), où la survie des semis est problématique, certains types de rejets (souche, collet, racine) et les marcottes peuvent devenir significativement importants pour la régénération des peuplements. Quand les conditions écologiques se dégradent, par exemple en Afrique en passant de la forêt humide aux steppes, le nombre d'espèces ligneuses diminue, mais la proportion d'espèces qui produisent des marcottes, des drageons et des organes souterrains contenant des réserves trophiques (broussins, lignotubers) augmente. Il n'est pas absurde de faire la même hypothèse quand les périodes de sécheresse physiologiques et édaphiques augmentent, en passant des forêts tempérées vers les forêts boréales, ou de la plaine vers les sommets. La capacité à produire des rejets à partir de la tige principale ou de sa base (gourmands, rejets de souche, voire stolons, rhizomes), de branches (marcottes) ou de racines (drageons) dépend de plusieurs facteurs. L'utilité d'une meilleure compréhension des facteurs physiques, physiologiques, génétiques, écologiques qui favorisent ces processus est nécessaire.

#### Une stratégie d'occupation de l'espace à mieux utiliser sur fortes pentes

Le drageonnage et le marcottage se produisent  
i/ chez un assez grand nombre d'espèces,  
ii/ à des moments précis de leur développement ontogénique

iii/ et dans certains milieux ou stations.

Pour de nombreuses espèces (peupliers, diverses Rosacées, etc.), des différences génotypiques expliquent l'existence de clones plus drageonnants que d'autres. Les réserves en carbohydrates (amidon, glucides solubles) dans le collet ou dans le système racinaire primaire (Clair-Maczulajty 1985) jouent un rôle important. Différents facteurs influencent aussi le drageonnage, par exemple la suppression de la dominance apicale, les saisons, la période de coupe, la lumière, la couverture du sol avec ou sans rémanent, les feux, etc. La densité de drageons un an après l'exploitation de *Populus tremuloides* est souvent extraordinaire. Ils émergent souvent dans les vingt premiers mètres, mais on en a observé à 80m : sur alisier torminal (Alignon 1999) et merisier (Fernandez et al. 1994). Certaines espèces drageonnent abondamment et avec vigueur, d'autres n'adoptent cette stratégie qu'avec parcimonie. Sur près de 600 espèces recensées actuellement, on relève également quatre cas pour les gymnospermes et cinq pour les Eucalyptus !<sup>1</sup>

#### Intérêts en zones escarpées

Dans les zones montagnardes et les espaces sylvo-pastoraux arides, repérer des racines traçantes d'espèces drageonnantes et induire au moment le plus opportun (de la saison et du développement ontogénique), par diverses techniques appropriées, l'apparition de drageons permettrait de coloniser l'espace à peu de frais (Bellefontaine et al. 2000). Il en va de même avec le buttage de tiges rampantes (Karim et al. 2002). Par rapport aux rejets de souche qui épuisent et contribuent à la longue à la mort de la

<sup>1</sup>Liste d'espèces drageonnantes, en cours de publication ; contactez : ronald.bellefontaine@cirad.fr

souche, les drageons et les marcottes lorsqu'ils s'affranchissent de l'arbre-mère rejoignent le peuplement en s'étendant territorialement et densifient la couverture végétale au moindre coût. De plus, ils assurent la pérennité de l'ensouchement et le rajeunissement du système racinaire, sans parler des bienfaits qu'ils procurent pour lutter contre l'érosion. La PVN est une méthode économique permettant de ne pas dépendre des pépinières, n'exigeant aucun entretien, ni arrosage (gain de temps et d'argent), ni transport sur comme pour les plants.

La (re)végétalisation par îlots de pentes abruptes pourrait faire appel aux espèces fixatrices d'azote à haut potentiel drageonnant. Par la PVN, les propriétés génotypiques sont fidèlement reproduites (production clonale de fruits; propagation de clones fourragers à feuillage à haute teneur en matières azotées). C'est aussi une technique à utiliser pour les arbres dont les semences montrent une dormance très profonde et nécessitent alors pour germer dans la nature une conjonction rare de phénomènes climatiques.

#### Conclusions

La PVN présente un intérêt bien réel, qui consiste à produire des ligneux à (très) faible coût, spécialement dans des conditions écologiques difficiles (sols inertes, climats arides, zones montagneuses) et en zone sylvo-pastorale. La connaissance de la PVN est insuffisante. Maîtriser les processus naturels de la PVN des espèces principales pourrait être un objectif de la recherche. Des observations pratiques et des études fines doivent être débutées sur des espèces-pilotes (drageonnant abondamment et si possible fixatrices d'azote). Parallèlement, on devrait tester les possibilités d'induction (à faible coût) du drageonnage et la réaction de boutures de racine en milieu naturel. Il est cependant indispensable de continuer à coupler ces

modes de PVN avec la reproduction sexuée si le climat le permet afin de maintenir un patrimoine génétique varié.

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**SNAG DECAY, VEGETATION AND TREE REGENERATION IN A PROTECTION FOREST EIGHT YEARS AFTER *PICEA ABIES* DIE-BACK CAUSED BY *IPS TYPOGRAPHUS***

By Andrea D. Kupferschmid Albisett & Walter Schönenberger

**Introduction:** Many mountain forests prevent or mitigate damage that natural hazards (i.e. snow avalanches, rockfall, debris flow) or adverse climate would otherwise cause to people or assets. The protective ability of mountain forests is mainly provided by the presence of large trees. Trees can stop falling stones, or at least reduce their velocity. Trees affect the snow structure and prevent the formation of mechanically weak layers, and therefore can prevent the formation of snow avalanches.

Stand destruction by storms or bark beetles does not imply an immediate loss of the protective effect. Snags (i.e. dead standing trees), stumps, logs (i.e. stems of uprooted or broken trees) and treefall mounds may act as barriers for avalanches and rockfall. The protective effect of these stumps and logs gradually declines over time, whereas the protective effect of the new tree regeneration increases.

However, as far as snag stands are concerned, little is known about both tree decay and tree regeneration. It is unclear for how long the dead trees have a protective effect and how long it takes for natural regeneration to form a new protection forest. The question arises whether such snag stands can be left unharvested without constituting a safety hazard for the next years.

**Study site:** 100 ha coherent protection forest was killed by a European spruce bark beetle

outbreak (*Ips typographus*) on the Gandberg in the northern Swiss Alps after a windthrow event (storm Vivian) in 1990. The outbreak peaked in 1993, when about 20 ha of montane and subalpine Norway spruce (*Picea abies* Karst.) mountain forest died in the Gandberg alone. The resulting snag stands were not harvested. This constitutes an exception in Switzerland, as most snag stands are cleared in the attempt to decrease the bark beetle outbreaks.

**Methods:** Since 1994, the Swiss Federal Research Institute WSL maintains 24 permanent plots of 1 m<sup>2</sup> each to study the long-term vegetation succession and tree regeneration in the snag stands of the Gandberg. In 2000, the decay process of snags was observed along four 5 m wide and 100 m long strip transects. In 2001 tree regeneration and plant cover were recorded in 128 transects (size 2 m x 10 m).

**Stand structure:** The main factors explaining the susceptibility to bark beetles were the uniformity and high density of the Gandberg forest compared with other mountain forests. The average growing stock (i.e. living timber volume) was 704 m<sup>3</sup>/ha and the basal area was 75 m<sup>2</sup>/ha.

**Decay:** In 2000, 4-8 years after tree death, none of the dead trees was uprooted, but 75% of the trees were found broken regardless the time since stand death (1992-1996) and the diameter of the snags. An important event was a storm in 1999 (called Lothar), which broke about 30% of all trees. This indicates that exceptional events can determine the time of snag breakage. Most logs lay parallel or diagonal to the contour lines. This fact ensures efficient slow down of rolling stones or even stone retention. However, this also caused undesired accumulations of stones and other logs behind logs which may break when logs decay in the future. Anyway, these piles of

more or less horizontally lying logs can provide effective protection against avalanche release. Thus we conclude that at least so far, the risk of avalanches, erosion and rockfall would be higher if the snag stands of the Gandberg were logged. We assume that the unharvested snags, stumps and logs will provide effective protection against natural hazards for about 30 years. Afterwards, tree regeneration will have to provide protection against rockfall and avalanches.

**Vegetation and tree regeneration:** Prior to tree death, the ground vegetation in the Gandberg forest was patchy and dominated by mosses and *Oxalis acetosella* (Galio-Abieti-Piceetum association). Hardly any tree saplings were present. Shortly after tree die-back, *Picea abies* seedlings established after the good seed production of the few surviving trees and the trees of surrounding stands in 1993/94 and 1995/96. However, the ground vegetation changed in the first 4 years after tree death into a raspberry brushwood (*Rubus idaeus*). Underneath the 1.5 m high *Rubus* plants moss still covered 40% of the soil surface, *Oxalis acetosella* 25%, fern 28%, *Epilobium angustifolium* and *Rubus fruticosus* 7%. Probably because of this dense vegetation cover (e.g. light competition and smothering with litter), the mortality of the *Picea abies* saplings was 25% each year, regardless the age of the saplings. Nevertheless, about 2'000 *Picea abies* saplings of a mean height of 15 cm, 2'000 *Acer pseudoplatanus* and 500 pioneer trees per ha (such as *Sorbus aucuparia*, *Betula pendula* and *Salix caprea*) were present on the Gandberg eight years after tree death.

The large amount of bark litter which partly covered the soil surface after tree death had no effect on *Picea abies* germination and survival. In the subalpine snag stand, 30% of all *Picea* regeneration was already on coarse woody debris. In future, when the logs have lost their protective effects (in about 30

years), the broken snags will become important as nurse logs for further tree regeneration. This is a reason to leave the snag stands unharvested in cases where abatement of the bark beetle infestation seems hopeless.

**Future tree growth and protection effect:** Destroyed protection forests need a rapid restoration of the tree cover to maintain their protective effect. However, natural tree regeneration proceeds slowly in mountain forests. 8 years after tree death, it is therefore not clear whether speeding up tree regeneration with planting would have been advantageous. Mathematical modelling of such an unharvested snag stand will be used to simulate the development of tree regeneration for 50-100 years after tree die-back. Based on these simulations, a potential deficiency in amount and size of protective regeneration can be quantified within bounds, and if required, afforestations or mechanical protection measures such as avalanche barriers and rockfall fences can be recommended before damage occurs. The development and application of such a tree regeneration model is the core of the PhD work of Andrea D. Kupferschmid.

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**LONG TERM DEVELOPMENT OF PROTECTION FORESTS: COMBINING MODELS OF FOREST DYNAMICS WITH MODELS OF NATURAL HAZARDS**

*By André Wehrli, Walter Schönenberger and Peter Brang*

**Introduction**

Forests are an important cover type in the Alpine landscape. In the Swiss Alps, they cover 23-43% of the landscape (Brassel and Brändli 1999), depending on the region. At least 10-30% (Brassel and Brändli 1999) of those forests are considered as protection forests, the primary function of which is the protection of people or assets against the impacts of natural hazards such as snow avalanches and rockfall (Brang et al. 2001). Many villages in the Alps depend on protection forests. They would become uninhabitable, or at least temporarily inaccessible, if the protection offered by forests were insufficient. In the Swiss National Forest Inventory, evidence of moving snow was recorded on 37% of the plots in mountain forests, evidence of rockfall

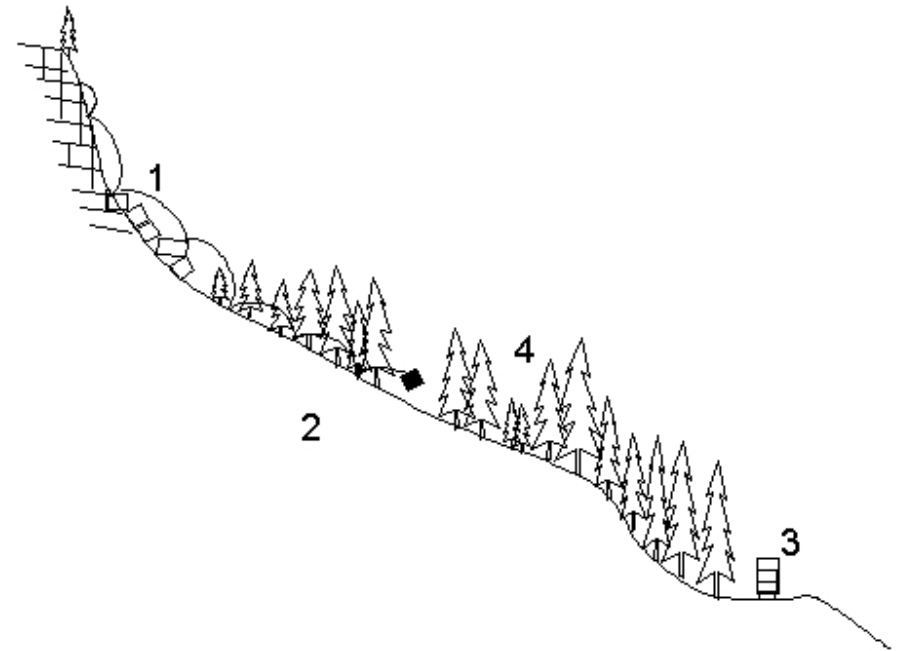
on 31%, and evidence of erosion on 16% (Mahrer et al. 1988).

In publicly owned French mountain forests, the dominant natural hazards were torrent erosion (65% of the area), snow avalanches (14%), rockfall (10.5%) and landslides (10.5%) (Sonnier 1991). Despite obvious differences in methodology, such figures clearly reveal the importance of protection forests in the Alps.

During the past decades, the importance of protection against natural hazards in the Alpine landscape has increased. Remote mountain areas that were formerly avoided during winter are now expected to be permanently accessible for tourists, settlements have been spreading into areas that were considered unsafe by our ancestors, and transports crossing the Alps (using roads, railways and power lines) have strongly increased (BUWAL 2001).

The maintenance of the effective protection provided by forests is costly, but still much cheaper than creating and maintaining artificial defense measures (Brang et al. 2001). Maintaining protection forests requires a long-term perspective since trees grow slowly at high altitudes. For instance, established tree seedlings need up to several decades to provide any protective effect against natural hazards. To evaluate different management options, including measures to promote tree regeneration, the long-term development of the "protection forest system" (Fig 1) is currently investigated in a project at the Swiss Federal Research Institute WSL. The project aims (i) at estimating the long-term effects of different levels of tree regeneration on the long-term protective effect of forests protecting against natural hazards, (ii) at identifying early-warning indicators of insufficient tree regeneration, and (iii) at establishing critical levels of regeneration, for the indicators identified.

Fig. 1. The protection forest system .  
 1 natural hazard (rockfall as an example),  
 2 terrain,  
 3 assets and people at risk,  
 4 forest.



**Methods**

A system dynamics approach is used to meet the objectives (fig 2). This involves the selection of, mainly existing simulation models of forest dynamics and natural hazards. These are adapted if necessary, and applied to several case studies. Each study area includes protection forests and infrastructures at risk beneath, and covers an altitudinal gradient of 300-1000 m. The

areas selected represent forest site types which occur frequently and are thus relevant in Swiss protection forests.

The methodological focus of the project is on coupling existing simulation models for forest dynamics and natural hazards (i.e. rockfall and snow avalanches). Since both forest dynamics and natural hazards depend on

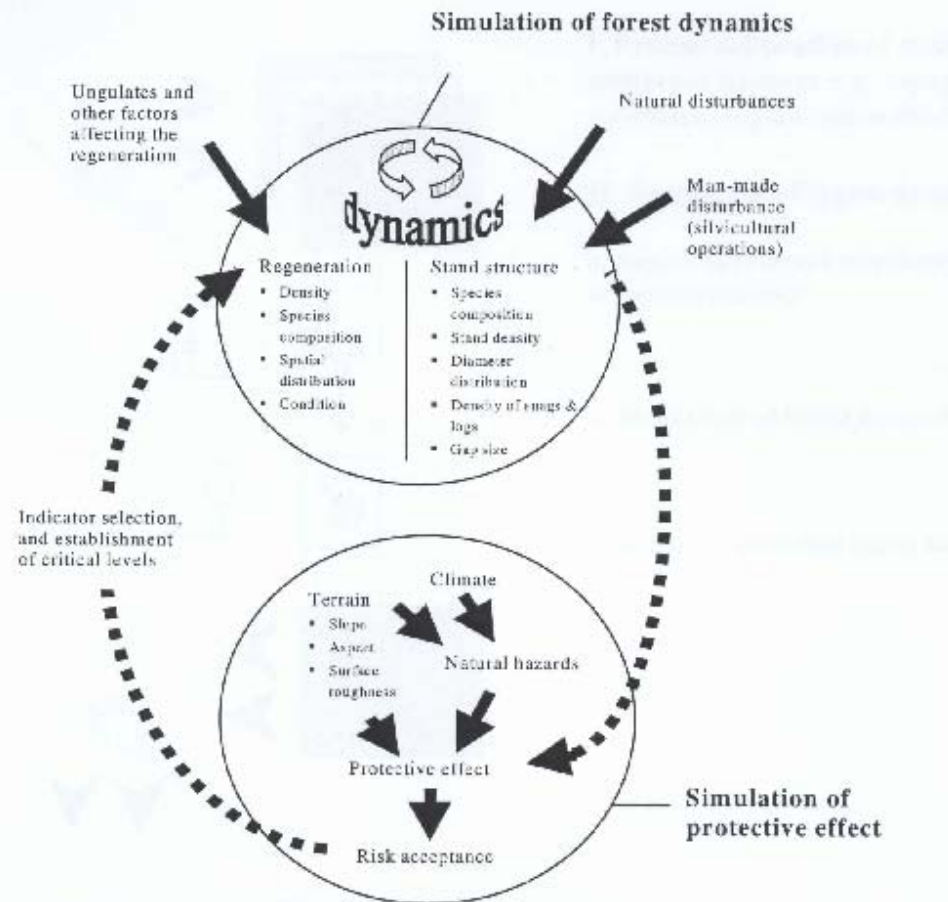
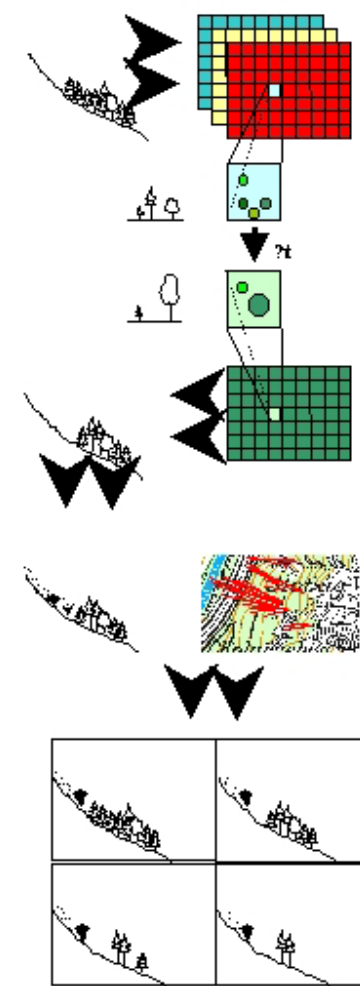


Fig. 2: Conceptual model of the "protection forest system"



**I. Precise delineation of study areas in GIS** (different features e.g. topography, stand structure, regeneration etc.)

**II. Simulation of forest dynamics:**

- Export of relevant structure data to the model of forest dynamics
- Simulation of forest dynamics in patches
- Import of modelled stand structure data to GIS

**III. Simulation of natural hazards:**

Analysis of modelled stand structure for the probability of natural hazards (rockfall and snow avalanches)

**IV. Establishment of critical levels of regeneration using different scenarios of regeneration and damage potential**

Fig. 3: Proposed procedure for coupling a model of forest dynamics with a model for the probability of natural hazards using a GIS

topographic features, a geographic information system (GIS) will be used as (i) a tool to compute input variables for the model of forest dynamics, as (ii) data base to manage the spatial information data as well as (iii) a tool to perform the analysis of the probabilities of natural hazards.

The forest patch model FORCLIM (Bugmann 1994) is currently tested for its capability to realistically simulate different features of stand structures. The results are quite promising so far. We plan to initialize FORCLIM with data recorded on the study sites, and to simulate stand dynamics during several decades or even centuries. The simulated stand structures will be imported in a GIS where they will be analyzed for the probability of natural hazards. In this way, long-term effects of forest dynamics on risks caused by natural hazards can be estimated, in particular effect of low levels of tree regeneration on those risks (Fig 3).

In a last step, critical regeneration levels will be established. This will be done by conducting multiple model runs for each site. Thus, a data base of (i) the target variables indicating the regeneration levels, and of (ii) related long-term probability of natural hazards will be generated. The target variables with the highest correlation with the probability of future natural hazards will be selected as candidates for indicators. To establish critical levels of the candidate indicators, the estimated probabilities of occurrence of natural hazards will be compared with levels of risk acceptance taken from hazard-zone mapping in Switzerland. In an iterative procedure, the levels of critical regeneration will then be defined.

#### Expected results

Since the project has strong transdisciplinary aspects, it is expected to provide different outputs:

First, our scientific knowledge of the "protection forest system" will increase. Regeneration indicators that are related to long-term forest dynamics and site specific target values for these indicators should become available for protection forests. The increase in scientific knowledge, in turn, will contribute to a refinement of the Swiss guidelines for managing mountain forests (Wasser and Frehner 1996), e.g. by integrating the regeneration indicators and target values developed. This will make tending protection forests more cost-effective and efficient.

For the single case studies, several products are expected such as maps of the probable stand development for the next 50-100 years, hazard maps for the next 50-100 years and an estimation of the future effective risk for the single sites under different scenarios (e.g. different regeneration level, different silvicultural treatment, different damage potential). This will enable forest managers to take preventive cost-effective measures to ensure public safety in the long-term.

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### FOREST CONVERSION, SOIL DEGRADATION AND SUSTAINABLE DEVELOPMENT OF TROPICAL MONTANE CLOUD FORESTS IN GUATEMALA (ALTA VERAPAZ)

By Michael Markussen & Gerhard Gerold

#### Introduction

The tropical montane cloud forests of Guatemala need to be protected for to their high number of ecological functions and endemic flora and fauna. They were classified by the World Bank as vulnerable and biogeographically unique. Therefore they obtained a high conservation priority. To guarantee the sustainable development of the tropical montane cloud forests in Guatemala it is necessary to identify sustainable land use systems. The integration of protection of natural resources and sustainable land use is a practical way to protect the forests and to assure the livelihoods of the population.

#### Objectives

A complete land use potential and landscape structure evaluation is carried out, with special consideration for the resource "forest" and "soil", in order to recommend protected areas in the montane cloud forests in the Department Alta Verapaz. Forest conversion processes will be studied in addition to research on the soil resources potential. The main objectives are the quantification of the changes in landscape structure and the parallel analysis of the land use dynamics, as well as the determination of the usage potential within the context of the degradation processes, soil evaluation and soil hazards. This should contribute to the achievement of following goals: ability to prioritise for the selection of protected areas; formulation of measures for order to avoid future soil degradation; spatial evaluation of landscape ecology in the tropics under consideration of protected area selection; evaluation of the influence of colonisation, deforestation and land use as well as the analysis and valuation of conservation strategies such as segregation and integration. The inclusion of the partially investigated soil quality and soil differentiation within the nutrient turnover in the tropical mountainous cloud forests can be used as a basis for the selection of biological protected areas as well as for recommendations for forestry cultivation.

#### Material and Methods

Forest distribution and spatiotemporal changes are determined by studying and evaluating satellite images (LANDSAT-TM 5 and -TM 7) dated 14.04.1986 and 23.01.2000, as well as aerial views from 23.01.1964, 14.02.1991 and 20.01.2000. The changes of the chemical, physical and biological soil parameters through deforestation and intensive land use will be determined on the basis of the following analyses:  $C_t$ ,  $C_{org}$ ,  $N_t$ , pH ( $H_2O$ , KCl und  $CaCl_2$ ), conductivity, P, effective cation exchange capacity (CEC<sub>eff.</sub>: Na, K, Mg, Ca,

Mn, Fe, Al, H), total nutrient contents (Na, K, Ca, Al, Cu, Mg, Mn, Zn, Fe, Cr, Co, Ni, P, S, Mo, Cd, Ti, Pb), grain size distribution, bulk density, water content etc.

The microclimate is an important factor for the description of changes in land use in Alta Verapaz. Consequently we have installed three climate stations to collect primary data to determine the differences between habitats in terms of the habitat climate (primary forest, secondary forest, milpa-System [corn-bean-cultivation]). The study area is located in the Sierra Yalijux in Alta Verapaz, Guatemala (15 22,432'N / 90 04,266'W).

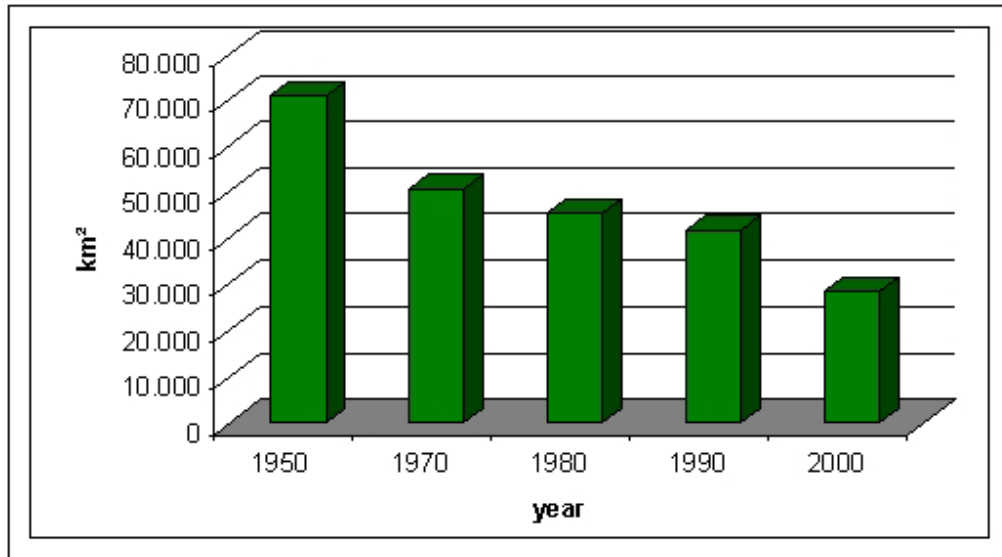
**Preliminary results**

Both the convention on biological diversity and the AGENDA 21 call for the determination and

monitoring of ecosystems and habitats. Furthermore the Agenda 21 demands the implementation of a monitoring system for the continuous control of soil degradation with the objective to improve the living conditions in the adjacent areas. At the investigation site in Guatemala a lot of changes took place concerning forest conversion, soil quality and microclimate. The soil quality declines through increasing land use intensity and duration of land use. Soil degradation as a result of agricultural use is high.

The contents of carbon and nitrogen for example reduce strongly: primary forest > milpa 15 years > milpa 25 years > milpa 60 years > secondary scrub > fallow land. A marked increase of soil temperature was measured after logging. This affects the

Fig.1: Forest surface area in Guatemala 1950-2000. Sources in detail see Loening & Markussen (2003)



composition of soil organisms. The high relief leads to extreme strong slopes where in spite of natural and anthropogenic hazards no one gives up the land use.

The forest area changed in a conspicuous and dramatic way between 1950 and 2000 in Guatemala. The loss of primary forest due to deforestation will be clear when we see the forest cover change: in 1950 65 % of the total land area of Guatemala was forested and this decreased in 2000 to 26 %. This requires proactive decisions in order to stop a further decline of forested land.

It is very important for the sustainable development of mountain forest to invest in human capital. This investigation (compare Loening & Markussen 2003) shows that environmental education is a chance to improve ecological awareness. The paper concludes that for the case of Guatemala strengthening the rural non-farm sector and human capital formation should be regarded as key elements of a development strategy that tries to combine biodiversity conservation within a framework of sustainable economic growth and poverty alleviation.

**Perspective**

The resource 'soil' is of major importance especially regarding the discussions about biodiversity, however world-wide this has not been paid sufficient attention. Forest conversion and soil degradation strongly affected the biodiversity of flora and fauna. Forest conversion is leading to loss, changing and fragmentation of habitats. Soil degradation will lead to changes of the soil functions, reduction of biological diversity and lower yields and consequently to an expanded demand of agricultural areas (=forest conversion). Taking these effects into account it is necessary to include the resource 'soil' in the national biodiversity strategy of Guatemala.

**Acknowledgements**

These activities are funded by the Deutsche Forschungsgemeinschaft (DFG) through the project "Valuation and Conservation of Biodiversity", GRK 642/1. It is an ongoing project since October 2000 with comparable investigations in the tropical montane cloud forests in Guatemala and in the national park "Lower Oder Valley" in Germany.

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**WATER AND ELEMENT BUDGET OF A LOWER MONTANE FOREST IN SOUTH ECUADOR**

*By Wolfgang Wilcke*

The nutrient budget of forest ecosystems informs about the future direction of their development and the degree of human impact. Since 1997, we - soil scientists of the University of Bayreuth and the Berlin University of Technology, Germany and the National University of Loja, Ecuador - have been working in a lower montane forest in south Ecuador as a member of a research group including botanists, zoologists, climatologists, geographers, soil scientists, and hydrologists. The group is funded by the German Research Association ("Deutsche Forschungsgemeinschaft").

Our soil scientific subproject aims to (1) examine nutrient concentrations, storage, and turnover rates in the soil and nutrient concentrations and fluxes with litterfall, (2) quantify and model the water fluxes, (3) assess the chemical composition of precipitation, litter leachate, and surface water, and (4) set up a water and element budget of three microcatchments. Our work provides baseline information concerning the water and nutrient cycles in a native forest to assess long-term changes and the impact of land use.

We selected three microcatchments (MCs) on a 30-50° slope at 1900-2200 m above sea level (a.s.l.) near the road linking the Ecuadorian cities of Loja and Zamora on the Amazonas-oriented slope of the eastern cordillera of the Andes. Within each selected MC, one transect with a vertical altitude difference of 10 m was chosen for the installation of the scientific equipment. The transects were located on the lower part of the slope at 1900-1910 m a.s.l. (transects MC1, MC2/1, and MC3) and in MC2 also at

1950-1960 (MC2/2) and 2000-2010 m a.s.l. (MC2/3). At each of the five transects we collect throughfall, litterfall, and soil solution and measure the soil water content and oxygen supply. On the three lower transects, we additionally collect stemflow. Rainfall outside the forest is measured on a clear-cut area. Ninety degree V-weirs were installed at the outlet of each microcatchment to register the surface water flow. The soil cover was characterized with the help of numerous sampling pits. Furthermore, we studied the nutrient release from the soil in laboratory experiments. Water and litter samples are collected weekly since 14 March 1998.

The dominant soil types were Humic Dystrudepts, i.e. acid, humus-rich, shallow, young soils occupying 38, 60, and 28% of the surface of MC 1, 2, and 3, respectively. The organic layer consisting of more or less decomposed plant debris that covers the mineral soil had a large mass (20-430 t ha<sup>-1</sup>) and a large nutrient storage (N: 0.59-11.5, P: 0.02-0.38, K: 0.07-1.3, Ca: 0.06-1.9, Mg: 0.04-0.68 t ha<sup>-1</sup>). Small litterfall (8.5-9.7 t a<sup>-1</sup>) was larger than in other tropical montane forests and similar to that in Amazonian lowland rainforest indicating that our study forest is relatively productive. Average macronutrient concentrations in litter were high (N: 19-22, P: 0.9-1.6, K: 6.1-9.1, Ca: 12-18, Mg: 3.5-5.8 g kg<sup>-1</sup>). The mean residence times of nutrients in the organic layer increased in the order Mg (7.0 years) < Ca (8.0) < K (8.5) < P (11) < N (14) < S (15) when calculated as the ratio of element deposition with litterfall to element storage in the organic layer and was < 12 years for N, P, and S in the incubation experiment under optimum conditions. Turnover rates were lower at the acid sites than at the weakly acid sites. There were no indications of N, P, Ca, K, and Mg limitation for plant growth because mean nutrient-use efficiencies (the inverse of the concentration, N: 48-54, P: 682-1139, Ca: 62-122, K: 128-178, Mg: 183-289) were low.

Between 3 April 1998 and 2 April 1999, the first and already completely evaluated year of measurement, 2193 mm of rainfall were recorded of which between 28 and 56% were lost by evaporation of intercepted water. Less than 1.1% of the rainfall reached the soil as stemflow. Mean cloudwater deposition rates in the three MCs were low, ranging between 4 and 18 mm a<sup>-1</sup> indicating that our study site is located below the zone where forests are heavily impacted by low clouds. Between 27 and 57% of the rainfall left the catchments in streamwater. Evapotranspiration ranged between 325-375 mm a<sup>-1</sup>.

The volume-weighted mean pH was 5.3 in rainfall, 6.1-6.7 in throughfall, and 5.5-6.8 in the stemflow. The median of the pH of litter leachate and stream water was 4.8-6.8 and 6.8, respectively. Element concentrations in throughfall and stemflow were higher than in rainfall because of leaching from the leaves and dry deposition. Net throughfall was positive for most elements except for Mn, Na, and Zn. Dry deposition of base metals was similar as in temperate forests and contributed up to 55% to the total element input into the studied lower montane forest. During the first monitored year, we observed mean accumulation rates of 1.1 kg Ca, 4.5 kg K, 20 kg N, 0.5 kg P, and 1.3 kg S ha<sup>-1</sup> while Mg was depleted by 1.4 kg ha<sup>-1</sup>. Our results demonstrate that the studied forest ecosystem is characterized by small inputs and outputs indicating that the forest is close to pristine steady-state conditions. It is therefore a suitable reference site for comparison studies in which the impact of land-use is evaluated. Currently, the available funds guarantee to continue the study at least until January 2005 but further continuation is possible. This will result in the first long-term data row for ecosystem fluxes of such a forest that allows for assessing long-term trends and the impact of repetitive climatic phenomena such as the "El Nino Southern Oscillation".

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**LAND USE AND SUSTAINABLE LIVELIHOODS IN THE NORTHERN MOUNTAINS OF VIETNAM: IMPROVING MARKET CHAINS FOR UPLAND PRODUCTS**

*By Le Thi Phi, Elaine Morrison and Sonja Vermeulen*

Many of Vietnam's poorest communities live in mountainous areas, especially in the central and northern highlands of the country. Although subsistence agriculture is the mainstay of their livelihoods, cash income from marketing upland products is a vital component too a component that could bring better living standards to many if used to full advantage. The problem facing most local residents who grow or gather upland products, including commodities from agriculture, forestry plantations or the wild, is the very low farmgate prices that they receive. Participatory research with communities in the northern highlands, using the Market Analysis and Development (MA&D) approach developed by FAO and partners, has demonstrated that the causes of these low prices are not simply local, but due to a whole series of constraints along the commodity chain.

However, very little is known about the actual structures of markets for upland products. A joint research project, supported by Sida and conducted by the NTFP Centre of the Forest Science Institute of Vietnam and the International Institute for Environment and

Development (IIED), aims to determine how the market structures and dynamics for upland agricultural and forest products can be improved in order to support producers' livelihoods. This is an action research project, which is including representatives of producers, traders, district and provincial officials throughout the process. Later stages of the research will consider equity issues, in particular looking at the opportunities for the poorest and most marginalised members of communities to benefit from improved marketing.

So far, the research project has focused on four upland districts in Quang Ninh province, investigating the market chains for a wide range of products from cinnamon to timber to medicinal plants and fungi. The market chains of some of these products (e.g. rice grown in Dam Ha) are fairly simple, with similar prices in different producer areas, a small number of traders, and a clearly defined domestic market. Other products, such as star anise and groundnuts, have complicated, highly dynamic market chains perhaps better described as market webs. Of course, these differences have important implications for the strategies that producers and policy makers might be able to use to improve farmgate prices, though a full discussion of this variation is beyond the scope of this article.

The research into the market chains of different products in Quang Ninh also revealed some broad problems across the range of commodities studied:

A lack of efficient information flow both along commodity chains and between producers in different geographical areas

Ineffective implementation of policies to support upland farmers (such as farmers and traders having to pay taxes from which they are exempt to officials who misuse the policy for their own gain)

Lack of fora in which discussion between different actors in the chain can take place, and hence lack of space to develop options for

market development. Lack of feedback to policymakers regarding the impacts, use and misuse of policies.

Our action research has responded to this by setting up a series of workshops at district level to bring together all of the different groups involved in the market chains of key products: upland farmers/ producers, commune authorities, middlemen/ women, traders, wholesalers, retailers, state forestry enterprise staff, and governmental policy makers and implementers. Of course, these kinds of workshops require considerable preparation and careful facilitation to be useful. The two workshops that have been held so far, in Ba Che district and Hoanh Bo district, have led to the following outcomes: Improved understanding of market structure by all actors involved in marketing of upland products.

Improved understanding of policy and institutional constraints to efficient marketing by provincial and district officials.

Improved understanding of the current and potential roles of marketing in upland livelihoods.

Indication of where further collection and improved analysis of information may help the provincial and district officials to implement upland development policies.

Identification of measures to be taken to remove policy and institutional constraints to efficient marketing.

Improved understanding of weaknesses of poverty alleviation programmes and identification of how assistance may be provided to the households for their livelihood improvement.

Participants in the workshop have appreciated the way on which the forum has been set up to allow them to air their views and to be exposed to the views of others a number have commented on just how much they had learned about the prevailing market system and why other actors behave as they do. Certainly these kinds of workshops seem to

be a useful tool to ensure more direct civil society inputs into district-level policy. However, some people remained marginalised from this kind of dialogue, for any number of reasons, including their social status or simply lack of information. This has contributed to a new proposal for further action research: to explore how the benefits of improvements in market opportunities can be shared more equitably, in particular to reach the poorer households in any village or district. This phase of the research is recently underway.

For further information, or for a copy of the full report on market chains and constraints in Quang Ninh, please contact the authors:

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**COMMERCIAL HIMALAYAN  
NON-TIMBER FOREST PRODUCTS**

*By Carsten Smith Olsen*

**Introduction**

The Royal Veterinary and Agricultural University (KVL) in Denmark has been involved in research on commercial non-timber forest products in the Himalayan region for the past decade. Research is particularly focused

on the trade in medicinal and aromatic plants and the importance of this trade to rural livelihoods. Nepal is the case country for resource base studies while products are followed along the marketing chain to the wholesaler level in India. Research began with an initial three-year investigation into the trade at district level; this has since been followed by a project focusing on the economic importance of commercial medicinal plants at the national level in Nepal, and an in-depth resource base study at the village level. A new long term project to study the dynamics of the trade and patterns of household dependency is presently being prepared. This paper presents a brief overview of results, on-going analysis and planned initiatives.

**Markets**

In general, the trade in commercial medicinal and aromatic plants is well-established. Hundreds of thousands of harvesters collect a wide range of products from all vegetation types in Nepal in all development regions; almost everything is harvested in the wild. The harvesters usually sell to the hundreds of local traders located in district towns; these then sell to the tens of central wholesalers in the cities of Nepal who sell to the regional wholesalers in India. Almost 95% of the traded amounts go to the India; there is also a minor export directly to Tibet and a small domestic demand for a limited number of species. The export to third countries is minuscule.

Analysis of market structure and function show that there are large variations in prices paid to harvesters across the country; it appears that there is considerable competition among local traders in Eastern Nepal while this is not the case in Far-Western Nepal. In general, however, the harvester income is higher than reported in the popular media: harvesters receive from 30-60% of the regional wholesaler price in India. Findings also indicate that the price

received by harvesters is fairly constant as Indian price fluctuations are absorbed by local traders and wholesalers. There are also indications that while the market for medicinal plants is functioning, central wholesalers may be acting as a passive oligopsony and thus to a large extent control the market.

### People

There is quite limited information available on who harvest commercial medicinal plants and what factors determine their involvement in this activity. Findings indicate that return to labour in dedicated harvesting is comparable to other income generating activities. Furthermore, in upland harvesting, on-going analysis indicates that poorer households are most involved in harvesting and that their involvement is determined to a large degree by the amount of household surplus male labour in the agricultural off-season. Due to the strenuous nature of upland dedicated harvesting, it appears that most households move out of this activity if labour can be put to other uses with comparable returns to labour.

### Species, vegetation types and domestication

Initial work focused on establishing the relationship between commercial non-timber forest product species and vegetation types. Species are harvested in all vegetation types, from private trees on agricultural land in the lowlands to alpine meadows. While there is widespread conviction that harvest of commercial species is resulting in over-exploitation and even threats to many species, there is no hard evidence of this. Current research is focused on evaluating the impact of different harvesting regimes on populations of some of the key commercial species in order to establish sustainable harvest rates. Research also indicates that, for accessible valuable species in areas with high population density, farmers are domesticating species by integrating them in agricultural production systems.

### Legislation and policies

Initial work focused on establishing an overview of nominal and functional forest law in relation to commercial harvesting of medicinal and aromatic plants. This was followed by detailed analysis of the non-timber forest policy process in Nepal and options for improving rural incomes from non-timber forest products. It is argued that policy formation, implementation and field reality are only weakly connected: choices of policy tools do not correspond to aims in policies, and field reality is not regulated in the envisioned direction by policy tools. It is concluded that pressure from outside the forestry sector is needed to bring about significant changes in favour of rural collectors.

### The future choices

KVL, in collaboration with the Institute of Forestry in Nepal and the Natural Resources Management Sector Assistance Programme under the Ministry of Forest and Soil Conservation, is finalising a proposal to conduct long term research on community based forest and tree management. This will include the establishment of permanent sample plots and permanent village sites; the aim is to study the dynamics of forest and tree management over time. It is also being considered to start a project with the aim of generating basic data on the distribution of the most important commercial medicinal plant species, and relating this information to the network of protected areas in Nepal. An annotated bibliography of commercial medicinal plant species in Nepal is being prepared.

To download a pdf file of the list of publications resulting from the research outlined above, please visit the Tropical Forestry Group's homepage at [www.flec.kvl.dk](http://www.flec.kvl.dk).

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### Nepal

The existing policy framework for NTFPs in Nepal provides several opportunities for the utilization of these resources. The forest Act of 1993 and the Forest Regulations of 1995 recognize community forest user groups (CFUGs) as self-governing and autonomous entities and entitle these groups to the right to management, control, harvest and sale of community forest resources, as well as to collect royalties on the forest products that were previously paid to the government.

### Notions of NTFP harvesting systems

The harvesting system of NTFPs in the Mountains of Nepal is traditional and basic, harvesting is destructive and regeneration not seriously considered. The immediate market demand is what largely dictates the harvest: local collectors gather the herbs in response to orders from the local traders. Post harvest handling is frequently poor, resulting in lots of losses in collection, storage and transport. For these reasons collectors generally have a weak bargaining position with the traders.

The harvesting season depends very much on the types of NTFPs collected, the life cycle of the plants and their visibility. Major factors are also the immediate cash need, the availability of labor, and the advance taken by the collectors in the previous year from the local traders. Many harvesters prefer collecting during the rainy seasons (monsoon), because it is easy to uproot root or rhizome yielding NTFPs. However, it increases the likelihood of root decay, and products harvested during monsoon may not contain the target agents at all or not at a proper level.

The harvesting technique depends on which parts of the plants are collected: for rhizomes, roots and tubers, whole plants are uprooted without leaving any part of the propagules. Harvesting is then sometimes so intense that more than 80 percent of the plants are

**ON THE SUSTAINABLE MANAGEMENT  
OF NON-TIMBER FOREST PRODUCTS  
(NTFPS)  
IN THE HIGH MOUNTAINS IN NEPAL**

*By Netra Bhandari and Christoph Kleinn*

### Introduction

Non-Timber Forest Products (NTFPs) of the Nepal Himalaya are of critical importance to hundreds of thousands of rural people as sources of nutrition, health care, raw materials and cash income. NTFPs are an important source of revenue for Nepal: the first NTFP trade survey in Nepal found that approximately 42,000 tons, representing more than 125 different NTFPs were traded in 1995, amounting to a value of more than \$26 million (Subedi 1999). The national and international demand for NTFPs has been increasing constantly. As a result local people, collect as much NTFPs as they can, and sell them, usually at low price, to local traders. Sustainable production of many valuable NTFPs is seriously affected by over-harvesting and premature harvesting. This lack of management leads to a loss in diversity, quality, and availability, affecting in turn the local collectors who depend heavily on NTFPs to meet their basic needs.

This paper describes harvesting practices for sustainable NTFP management in the mountains of Nepal.

### Existing policy on NTFP harvesting in

removed. This can affect the soil surface and may even cause erosion. Jatamansi (*Nardostachys grandiflora*) harvested areas in the mountains of the Karnali zone exhibit widespread sheet erosion.

For many forest products such as pine needles, firewood and fodder collection, local people have developed own systematic rules and regulations. The decision on the time for the collection and the duration of the collection is usually made by the female collectors in a village. However, for herbal NTFPs, and particularly for those which are only recently commercialized, there are no such indigenous rules, yet local people have good knowledge on biology, use, ecology, habit and habitat of NTFPs, which can help in defining sustainable management schemes for those resources.

Experiences of two decades of community forestry practices in Nepal show that communities can manage their forests efficiently; they preserve their forests and use them for their benefits in a sustainable manner. NTFPs are usually not included in the Community Forest User Groups (CFUGs) operational plan and these groups are therefore not authorized to harvest and commercialize NTFPs, according to the Forest Act (1993) and the Regulation (1995). It is therefore recommendable that CFUGs include NTFP harvesting, management and sale provision in their operational plan. Many Community Forest User Groups (CFUGs) have set some management rules for NTFPs defining the season, method and period of harvesting as for other forest products. A few CFUGs have carried out enrichment plantation and domestication trials of high-value NTFPs in Community Forests. This *in situ* conservation and production program is certainly contributing to sustainable management of NTFPs.

Few institutions working in NTFPs such as the Asia Network for Sustainable Agriculture and Bioresources (ANSAB) have developed some rules of thumb for the appropriate harvesting of

root yielding plants: collectors leave some pieces of roots or rhizomes underground and leave about 20% of the cover to ensure regeneration. These methods have been followed by a few project-supported CFUGs in Humla district of Nepal. One of the major issues is that the actual NTFP resource base and its productivity are unknown and methods to estimate it are not well developed.

#### What are Options for the Management?

Collecting NTFPs has generated considerable employment opportunities in remote rural areas where the majority of the villagers are poor. However, if, for their livelihoods, collectors simply need to collect as much as possible, some valuable NTFPs will soon disappear from the natural reserve. As most rural people are unaware of the need for sustainable level of harvesting, conservation education and participatory action research on sustainable forest management can be a good tool to make people more self-reliant and aware of how to use their local resources in a sustainable manner and more profitably.

The forestry program should be targeted at different levels, from improving living standards to changing the attitude of the people. Planning and control of harvesting operations by introducing more efficient harvesting methods and systems are essential for the sustainable management of the resources. It could include establishing incentive systems for NTFP collectors, reducing harvesting waste, improving post-harvest handling, and providing training and skill improvement for the appropriate harvesting techniques.

There are ways to exploit the non-timber resources with a minimum of ecological impact. To achieve this, however, we need to assess the NTFP resource base and need to collect information on growth and yield characteristics of the populations; and regeneration survey and periodical harvest adjustment should be done. Additional

measures such as enrichment planting should be brought into practice where possible.

#### References:

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**NO TREE \_ NO BEE, NO HONEY \_ NO MONEY: SOCIAL AND ECOLOGICAL IMPACTS OF FOREST USE IN THE SOUTH WESTERN PARTS OF ETHIOPIA**

By Ingrid Hartmann

In the past decennia the forested areas of Ethiopia decreased from originally 40% of the total area of the country to 3 %, with well known catastrophic consequences for nutrition and drinking water supply. Therefore the various Ethiopian governments established different afforestation and forest protection programmes during the last years - with varying resonance among the population. While people usually agree with the idea, the rigidity and occasional inconsistency or inequitableness of the measures sometimes leads to high tensions between different forest users.

Thus on the one hand in the South Western highland forests wood cutting is completely forbidden to small scale farmers, but the establishment of tea and coffee plantations in the same forests is allowed. One of the farmers comments as follows:

"The forest is our dress, it is our shelter. We want our children to inherit it. If they clear the forest, the rainfall will stop and desertification will appear. Even the government does not pay attention. They prevent us from clearing by axes, they themselves do it by machines."

As beekeeping is the main source of cash income in this region (example here is the Sheka Zone), there is a special conflict, as the beekeepers are completely dependent on the rainforest as their bee flora. With the traditional beekeeping that is practised here, working groups of farmers go into the forest for several days at the beginning of the dry season to hang beehives on trees deep in the forest, far from the villages. At the end of the dry season the farmers groups return to the forest to harvest the honey. Every farmer has individual use rights on special trees in the forest, on which he can hang his bee hives, and which can be inherited from father to son or from husband to widow. Use rights on bee trees have been respected in the country since hundreds of years. Even when farmers themselves extended their farms into the forest areas, they did not fell these trees. Nowadays, these traditions are often ignored during massive wood logging or the establishment of large plantations. This causes great anger among the people, not only because of the disrespect of traditional rights, but also because of urgent economic needs. In some regions, the destruction of the bee flora through plantation establishment leads to a reduction of the number of settled bee hives of about 50% compared with the former situation and consequently, to a similar reduction of honey yields.

"Most of them use honey as their main cash income. Any payment is covered during

honey harvest. Now their household income is decreasing to the limits of their capacities".

Due to the lack of land rights and small political power of the "kebeles" (farmers' organizations) forest areas and even communal grazing land is often established without the agreement of the farmers, sometimes even without their knowledge.

The decrease of honey yields has especially unfavourable effects on the living conditions of women. This is due to the fact that for most women the only source of income is the production of honey wine.

The members of the Add'o-Clan are most affected by the consequences of deforestation. They are forest dwelling people, who are socially outcast because of their nutritional habits - eating Gureza monkeys. As they do not keep livestock and only have small plots of arable land, they are almost completely dependent on the forest. The women gather the fuel wood that is sold on the local markets, the men live on beekeeping, hunting and trapping. Deforestation increases the distances for transporting fuel wood and also decreases the number of wild animals, which are an important part of the Add'o-Clan's diet. Higher physical stress and worse nutrition are the consequences.

To compensate for the consequences of reduced incomes, the farmers of this region now try to cope in the following ways:

- Reduction and intensification of livestock
- Intensification of the farming system
- Establishment of their own honey bee flora
- Modernization of bee keeping

To find the right solutions to the severe problems to preserve the forests is paramount, as otherwise this area might end in the same harmful situation as other regions in Ethiopia. Beekeeping might be one sector to generate income and protect the forest as well. That's

why people say: "No tree - no bee, no honey - no money."

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### PRESERVATION, RESTORATION AND UTILIZATION OF VIETNAM MOUNTAIN FORESTS

*By Nguyen Duc To Luu, Central Forest Seed Company of Vietnam, Drs Martin Gardner & Philip Thomas, International Conifer Conservation Program, Scotland, Dr. Jan McPherson Dick, Center for Ecology and Hydrology, Scotland*

Mountain regions represent 48% of the area of Vietnam and are habitat for a diverse and unique flora with 7,000 to 12,000 plant species. At the same time millions of people belonging to various ethnic groups live in the Mountain regions. Shifting cultivation, logging of timber, exploitation of forest products have all seriously reduced the forest area and degraded forest quality. Recently the Vietnam government launched a 5-million ha reforestation program to increase forest cover of Vietnam from 33% to 45%. The Central Forest Seed Company (CFSC) of Vietnam has been designated the main seed supplier for the program. The company has 40-years experience and produces more than 50 tons of seeds and 10 million seedlings for forest plantation programs annually. CFSC has regional centers (seed enterprises) located in the 8 eco-regions of Vietnam carrying out the task of seed supplier in each region as well as management of improved seed sources for priority species.

As the main seed supplier in Vietnam the Company has concentrated on long-term conservation and development of genetic

resources. Early in 2001 CFSC started a collaborative project with UK partners under the UK-funded 'Darwin Initiative'. Together with the International Conifer Conservation Program (ICCP based in Royal Botanical Garden of Edinburgh, RBGE) and the Edinburgh based Center for Ecology and Hydrology (CEH) the work is focusing on conservation and development of coniferous trees in mountain areas of Vietnam. In these areas conifers are key species for forest plantation and reforestation. By applying new inventory methods and propagation techniques the project promotes the use of conifers in different ways including timber, resins, essential oils, incense, mushroom production.

In the first 2 years of the project assessment surveys for conifers were carried out both in the North and South of Vietnam. A number of rare and valuable conifer species including flat-needle pine (*Pinus krempfii*), 5-needle pine (*Pinus dalatensis*), Himalayan yew (*Taxus wallichiana*), water pine (*Glyptostrobus pensilis*), Vietnam golden cypress (*Xanthocyparis vietnamensis*), Taiwan redwood (*Taiwania cryptomerioides*) have been assessed against IUCN criteria (1994) for their conservation status. The diversity of mycorrhizal flora accompanying the conifers was studied and the potential to produce edible mushroom assessed.

Most of the threatened conifers produce very few viable seeds and the seeds are extremely difficult to collect due to the rarity of the trees. Therefore, vegetative propagation methods for selected species were developed. Rooting success of over 80% has been obtained for many species including the rare *Xanthocyparis vietnamensis*.

Future work of the project will be to develop proposals for utilization and commercialization of potential conifer species and their associated mushrooms; hopefully bringing economic, social and environmental benefits to people in the mountain areas of Vietnam.

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### CONSERVATION OF ETHIOPIAN SACRED GROVES

*By Pierre Binggeli, Desalegn Desissa, John Healey, Matt Panton, John Smith and Zewge Teklehaimanot*

The Ethiopian Highlands have been largely deforested for decades and in the North of the country probably for centuries. Today, only small islands of forest or woodland or even just single large trees dot the landscape here and there. All traditional Ethiopian religions have been responsible for the conservation of most of these patches of relict natural vegetation. By far, the majority of these groves have been preserved by the Orthodox Church, the dominant religion of the Highlands.

In 2001 a Darwin Initiative (U.K.) funded project was initiated between the University of Wales and the Ethiopian Wildlife and Natural History Society in conjunction with the Ethiopian Orthodox Church and the Alliance of Religions and Conservation. This three year project will promote sustainable development through participatory conservation of the biodiversity of the forests preserved on sacred lands, and their establishment as a resource of value to alleviate local poverty.

During the first year of the project, representative sites retaining semi-natural woody vegetation throughout the Ethiopian Highlands were investigated. Rapid Biodiversity Assessment (RBA) of the woody

plant species was carried out at each site in conjunction with semi-structured questionnaires designed to assess usage of the woody plant resource by the local communities and the clergy in particular. Most of the relict groves are less than two ha in size and often just ½ ha, with the occasional monastery covering up to 20-50 ha. They are found between 1400 m and 3000 m a.s.l. Despite their small sizes, these stands harbour on average 41 species of woody plants (range: 21-68). On average 26.0 (range 10-55) species, roughly 2/3 of the total, were used by the local communities. In the RBA we also counted individuals of each species encountered. Out of the 223 recorded species 42 species were consistently rare or uncommon, i.e. usually had fewer than 5 individuals per RBA, and over ¾ of these species were used by local people.

The majority of the investigated sacred groves are under threat mainly because of the lack of natural regeneration, often due to overgrazing, but also to unsustainable tree harvesting (e.g. for timber and fuel in particular). Furthermore, there appears to be no tradition in the Ethiopian countryside to grow trees from seeds (not a single of our 339 informants had ever grown a tree from seed), thus a traditional replanting system does not exist to replenish existing groves. However, there is in most local communities a strong desire to protect and even expand their church and monastery woodlands.

This study provides evidence that outside expertise and resources will be extremely valuable in enabling local church communities to look after their sacred groves as well as conserve and promote rare/uncommon woody plant species. Current and future phases of this Darwin Initiative project will deal with these issues.

For further information visit our web site: <http://members.lycos.co.uk/ethiopianplants/sacredgrove> or contact:

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## ASSESSING HIMALAYAN BIODIVERSITY

By Siddhartha B. Bajracharya

The Himalayas form the highest and one of the youngest mountain systems in the world. The Himalayan regions are one of the main repositories for the biodiversity of mountain regions. Different topographical gradients and changes in climate over a short distances have assisted to create a multitude of local mountain habitats. These areas are also characterised by difficult access and fragile ecosystems. Poverty and high dependence on fuelwood as the source of energy for cooking and heating has caused deterioration in the quality and quantity of forest cover and often contributed to soil degradation, erosion, landslides and flooding.

The Nepal Himalayas are no exception. The environment is already heavily utilised by people to fulfil their needs such as fuel, food and shelter. This has led to deforestation and loss of prime habitats of endangered wildlife. There are many current initiatives at national and international levels to conserve these Himalayan ecosystems. However, it is often difficult to assess the extent to which biodiversity is being destroyed or conserved. Estimating precise rates of loss, or even the current status of species, is challenging, because no systematic monitoring system is in place, and much of the baseline information is lacking.

In order to address this, a three-year project was developed in 2002 by the King Mahendra Trust for Nature Conservation, Nepal; the UNEP-World Conservation Monitoring Centre, Cambridge; and Edinburgh University, Scotland. The aim of the project is to improve the effectiveness of conservation area management in Nepal by improving the capacity of managers of protected areas to assess status and trends in biodiversity. The Darwin Initiative managed by the UK's Department for Environment, Food and Rural Affairs supported the project. The Darwin Initiative was established at the Rio Summit in 1992 and aims to help safeguard world biodiversity.

The Annapurna Conservation Area in Nepal was selected for this project. The conservation area, a relatively new type of protected area designation in Nepal, was established to conserve biodiversity of the Annapurna Himalaya region through careful integration of development activities. In the last 15 years, the Annapurna Conservation Area Project (ACAP) has evolved from an experimental Integrated Conservation and Development Project (ICDP) model to become the largest protected area in Nepal. There is a unique opportunity as well as a monumental challenge to maintain biodiversity whilst incorporating sustainable development. The involvement of local communities in conservation through various local institutions has proved successful in the area. However, there is very limited scientific evidence to measure and quantify the level of success.

Integration of biological and social science has been regarded as indispensable in assessment of a community-based conservation programme. Therefore, an integrated biophysical and social survey was designed and carried out recently in the conservation area as an initial contribution to the Darwin project. A biophysical survey was conducted to analyse the present wildlife and plant status, and current pressures on forest resources. Distance-time transects were

established outwards from village communities to measure commensurate changes in the level of human input. Variables such as tree density, species diversity, regeneration, evidence of wildlife, grazing livestock, and signs of fodder and fuelwood collection were recorded.

A complementary social survey was conducted in the same villages to examine effectiveness of community-based conservation at a community level. A questionnaire survey was conducted to measure the economic losses due to crop damage and livestock depredation by wildlife. A structured interview was applied in the villages to gather information on conservation awareness, local attitudes toward conservation, resource use patterns, effectiveness of the conservation area regulation, relationships between people and protected area and perceived benefits of conservation. Various participatory tools such as social mapping, seasonal calendars, and matrixes were used to gain further insight on biodiversity conservation.

The initial results of data analysis are promising. The impact on forests of fuelwood and fodder harvesting by local communities has been significantly reduced, thereby improving the forest condition. The plantation of fast growing indigenous fuelwood species such as alder (*Alnus nepalensis*), increased awareness on the need for conservation, changes in attitude and behaviour of local communities on resource use, together with the introduction of fuelwood saving devices, have had a cumulative effect in reducing pressure on forest. A villager from the study area said "the majority of the villagers are now sufficient in their farm fuelwood.

Therefore, even those who do not have farm trees have easy access to wood in the forest".

The traditional economy of these communities was herding, hunting and slash and burn agriculture adapted to rugged highlands and

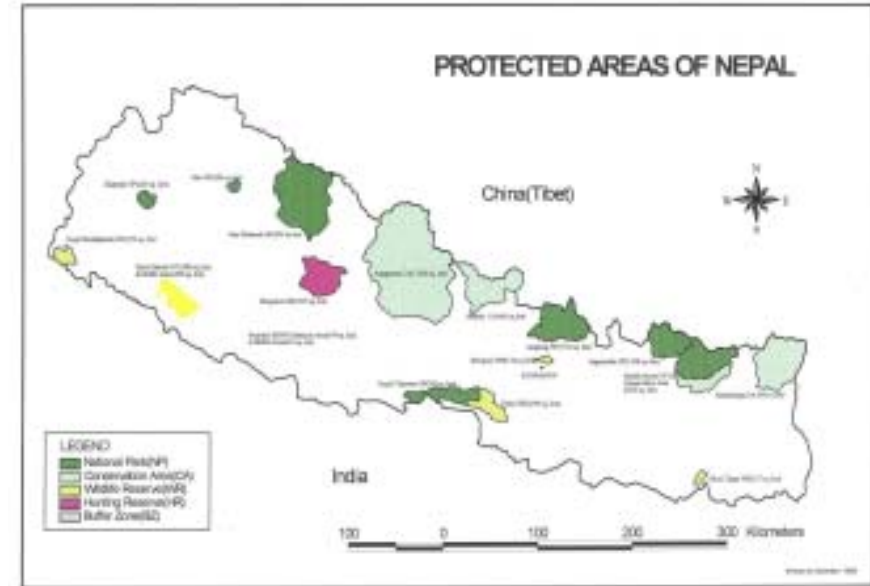
high forest (Messerschmidt 1976). While this may have been true even two decades ago, it is not the case at present. The local Conservation Committees are able to control the hunting in the area effectively. Consequently, there are increases in wild animals such as barking deer (*Muntiacus muntjak*), Himalayan Tahr (*Hemitragus jemlahicus*), Mainland Serow (*Naemorhedus sumatraensis*), Asiatic Black Bear (*Ursus thibetanus*) and Rhesus Macaque (*Macaca mulatta*). On the other hand, there is also an increase in crop damage, principally by the Rhesus Macaque (*Macaca mulatta*), the Indian Porcupine (*Hystrix indica*) and barking deer (*Muntiacus muntjak*). A majority of the respondents (98%) in the study area reported crop damage by these wildlife. However, livestock depredation by wildlife was reported only by 30% of the total respondents. Most of the livestock killing took place in forests. Occasional killing of livestock by wild carnivores becomes inevitable when wild predators share their habitat with livestock.

Despite these problems, the local community residing in the conservation area strongly feel that integrated conservation is beneficial. This has resulted in encouraging participation of the local community in the conservation. More than 98% of the total respondents reported their involvement in various conservation activities, which range from planting trees for fuelwood and fodder on their farms, regular village clean-up and involvement in conservation committees in their village. The higher rates of participation of women in conservation are equally promising and remarkable.

These initial results imply that Himalayan biodiversity can be protected and conserved. This leads to realisation of a need for more scientific research in the area to quantify these trends. Thus, as a next step of the Darwin project, a team of staff from the King Mahendra Trust for Nature Conservation will be trained in the UK on biodiversity assessment techniques. The trained team of

staff will then follow up the survey and train further staff in biodiversity monitoring at ACA in Nepal. Some of this work will use geographic information system (GIS) technology to integrate and analyse spatial data to expand the knowledge bases in the mountain ecosystem.

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**DEGRADATION OF JUNIPER FOREST  
 IN THE HINDUKUSH HIMALAYAN  
 REGION OF CHITRAL DISTRICT,  
 NORTHERN PAKISTAN**

By Aziz Ali

Chitral district, Pakistan, lies in the remote and isolated Hindu Kush mountain region. It remains isolated at least five months in winter by heavy snowfall on its two gateways - Lawari Pass (3200 m) in the south and Shandur Pass (3720 m) in the north. The rural people depend largely on traditional subsistence agriculture, producing cereals and raising some livestock.

**Juniper**

Juniper is one of the oldest tree genera in the world. Many of its close relatives have been

found as fossils. It grows extremely slowly: only 1 mm diameter and 25 mm height per year.

Junipers are extensive in dry temperate regions and sub-alpine scrub forests of Afghanistan, Iran, Arabia, Syria and some parts of Europe. They are common at 1500 - 4200 m in the inner dry ranges of Himalayas from Nepal to Afghanistan and western Tibet. In Pakistan, juniper forests are found in Chitral, Gilgit, Kurum Agency, Kaghan Valley and Balochistan Province.

Four Juniper species are commonly found in Chitral: *J. communis*, *J. recurva*, *J. excelsa* and *J. turkistanica*.

*J. communis* is a common and gregarious species, found between 2400 to 4250 meters elevation. It is a dense shrub, some times a small tree procumbent at a high elevation. The berries are blue-black and ripen by October of the following year.

*J. recurva*, also called weeping blue Juniper,

is a gregarious shrub often covering a large area either in pure stands or mixed with *J. communis*. It has very long underground or creeping stems. From these creeping stems rise numerous short erect branches, which are thick and almost impenetrable. This species can easily be identified by its drooping branchlets, glaucous blue foliage and reddish brown heartwood.

*J. excelsa* is a large tree commonly found above 2400 m.

*J. turkistanica* is a small erect tree, found between 4000 to 4250 m, with somewhat longer cones and seeds than that of *J. excelsa*.

The importance of Junipers can be judged by their social, economic, environmental and ecological values. The forests meet many domestic needs of the mountain communities such as construction material, fuelwood, thatch, fencing material, grazing for livestock and household medicines. Juniper cover in the watersheds of Chitral protects against desiccating winds, absorbs rainwater, reduces runoff and regulates the flow of streams. The importance of Juniper forest is also substantial because of the unique associated flora and fauna. Plant species associated with Juniper forests in Chitral include Rawe (*Ferula narthex*), Katch (*Allium sp.*), Tulipa sp., Soi (*Eremurus stenophyllus*).

Many fauna species are associated with Juniper forests: Kashmir markhor (*Capra falconeri*), Himalayan ibex (*Capra ibex*), snow leopard (*Panthera unica*), black bear (*Selnomctos tibetanus*), Blandford fox (*Vulpes cona*), Pollo's cat (*Felis manul*), wolf (*Canis lupus*), Himalayan snow cock (*Tetraogallus himalayensis*), chukar (*Alectorius graeca*), Sakar falcon (*Falco cherrug*), Agama lizard (*Agama cancasia*) and snakes.

In the past, the upper dry and barren mountains of Chitral were covered with thick and healthy Juniper forests. The people used to collect dead and fallen materials from nearby forests for timber and fuel. With the

increase of population (2.5%/year), land was fragmented and the natural resources, including forests, came under severe pressure. The pressure further intensified after 1969, when Chitral state was abrogated and included in the North West Frontier Province as a district. The centuries-old traditional system of managing natural resources was shattered and the provincial government took over the management of all natural resources in the district. The people who were once responsible for controlling, managing and caring for the forests became the enemy of the forests and other related natural resources, as they lost much of their usufruct and ownership rights. Since then, the forest in general and Juniper forests in particular have suffered severe degradation, denudation and depletion.

Despite the continuous efforts of some NGOs like the Aga Khan Rural Support Program (AKRSP)- a project of Aga Khan Foundation working for poverty alleviation and sustainable management of natural resources through community participation in northern Pakistan; IUCN, WWF and the local government forest and wildlife department, the message of conservation, sustainable management of natural resources and their importance for future generations, has not yet been inculcated to the major segment of the mountain society.

All rural households and almost all urban ones in Chitral are dependent on fuelwood for heating and cooking. All the accessible Juniper forests in the district have been clear felled during the past few decades. Their sparse remnants can be seen in various localities of Chitral.

Junipers are extensively lopped, primarily for extracting ash from the young branches, which is used locally in preparation of snuff (naswar) - an addiction of many villagers. This practice injures the trees and allows entry of various pathogens, particularly the wood-rotting fungus that damages the whole

tree.

Juniper is the slowest growing tree species with very poor regeneration. Young seedlings usually come up under mother trees or inside shrubs, where seeds scattered by wind or birds find a favourable seedbed. The seedlings are extremely tender and survive only on humus inside the partial shade and shelter of thorny shrubs and or lower branches of the older Juniper trees. They are very slow growing and barely attain a height of 10 cm at the end of the first growing season. Only about ten percent of the seed is viable and the survival percentage of seedlings is extremely low due to aridity and high biotic pressure.

#### Some suggestions for conservation

Junipers are the most vulnerable tree species in Chitral and need immediate attention from the government, NGOs and international environmental agencies. Chitral's Junipers can only be conserved if the causal factors -ruthless and indiscriminate cutting, lopping, burning, over- exploitation and destruction of their natural habitat- are checked, and the underlying causes which compel the poor mountain communities to overuse the forests are addressed promptly.

The only immediate protection of the Juniper remnants is through legislation banning the cutting. Juniper is the only conifer which has natural coppicing ability and the degraded Juniper forests can be replenished within a decade through a complete ban on green felling and lopping. At the same time, the increasing demand for fuelwood, timber and fodder should be met by bringing more barren lands under irrigation and encouraging tree plantations involving local communities. Alternative sources of energy, such as electricity, LPG and kerosene, should also be provided to the community at a subsidised rate.

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**SUSTAINABLE MANAGEMENT OF MOUNTAIN FORESTS: AN ECOLOGICAL IDENTIFICATION OF BIODIVERSITY HOTSPOTS ON MOUNT CAMEROON, SOUTH WEST PROVINCE, CAMEROON**

By Daniel Pouakouyou

The fragility of mountain forests and the increasing reliance of adjacent communities on mountain forest resources for their livelihoods, have brought the sustainable management of these ecosystems under close attention in recent years. In tropical areas where the desire to preserve the remnant natural habitats often conflicts with the increasing needs to open those lands to other uses, striking the right balance is an increasing dilemma.

The Mount Cameroon area in the South-West Province of Cameroon is possibly the last mountain in West and Central Africa where the continuum of natural vegetation remains almost unbroken from sea level to the sub-alpine vegetation at the summit (4,070 m). In 1994, as a result of this extended vegetation gradient and the high level of endemic species that it supports, Mount Cameroon was put on the list of Centre of Plant Diversity by IUCN and WWF. Within Cameroon, this area is currently receiving considerable attention from politicians and decision-makers.

The mountain, a huge repository for globally unique biodiversity is under constant threat - both man-made and natural. Natural causes arise from bush fires that regularly push down the tree line, and also from millions of tonnes of lava that are often poured on the slopes of

this huge active volcano. Prominent anthropogenic causes to the genetic erosion include the expansion of CDC plantations and the proliferation of smallholder farms as the human population increases. Added to these threats is the extraction of key economically important species for timber, bark, fuelwood and other useful forest products. From the late eighties onwards there has been a growing concern that unless appropriate management regimes are developed, such selective extraction will result in exploitation well beyond the natural recovery rate for many species.

The exploration of the Mount Cameroon biodiversity richness started as early as 1862-4 when Gustav Mann and Hooker first ascended the mountain for botanical collections. Several other expeditions of different scales and purposes followed afterwards, but the full scale of the area's richness was not established until 1988 when a British funded genetic conservation project was set up at the foothill of Mount Cameroon in Limbe. By 1994, the project had metamorphosed into the Mount Cameroon Project, a multi-partner project with the goal of sustainable biodiversity conservation on the mountain. Under this remit a series of inventories in discrete areas to assess the forest structure, species composition and wherever possible the productive potential was conducted. Most of these inventories were conducted using traditional tree plot methods. The resulting data, however, proved insufficient for the development of a comprehensive land use strategy. Another survey technique, called Rapid Botanical Survey (RBS) was identified and conducted to supplement existing information.

Hawthorne and Abu-Juan's (1995) work in forest reserves in Ghana was the source of this survey technique. The concept emanated from the recognition that traditional tree plots often fail to capture the wider floral diversity. As the minimum recordable diameter is usually set in advance during the tree plot

designs, species of smaller size, epiphytes and herbs are often left out. The RBS approach allows the collection of all plant species and the consequent definition of the vegetation types to which a conservation value can be attributed. The process of establishing the conservation value of an area commenced after the collection of field data. Each species received a conservation status using available data on the distribution, ecology, local abundance, taxonomy, life history, interaction with ecosystem and economic importance. The combination of the conservation status of different species occurring in an area allowed the development of a Genetic Heat Index indicative of the conservation value.

Using this technique and other available information, the vegetation on Mount Cameroon was partitioned into different conservation priority areas. This zonation ranged from areas with no conservation value at all, to areas with extremely high conservation importance. Areas ranked as of no conservation value corresponded to either large industrial plantations or to areas that had been opened up to small farming systems in which the natural vegetation has been completely suppressed. Those with extremely high conservation importance were areas of the lowland forest that had escaped disturbance and interestingly, sections of montane savanna where bush fire is a permanent threat. Within these two extremes were areas that received a conservation value from low to very high.

As a tool, the RBS technique has contributed significantly to the broader goal of identifying and prioritising conservation areas. But on its own, it's not enough to guarantee the changes needed for sustainable resource use. This requires designing an appropriate management regime for the different conservation scenarios. However on Mount Cameroon, with many different areas subjected to conflicting land use options, that is a particular and on-going challenge.

Nevertheless, there are grounds for optimism. Cameroon has subscribed to a number of international agreements and has in place a range of policy frameworks that together allow decision-makers to direct the management of forest resources. The emphasis is not only on resource sustainability, but also on poverty alleviation, particularly for those who depend on forest resources for their livelihood. But the ultimate goal of pro-poor conservation can only be achieved when policies are converted into locally accountable management frameworks with sufficient resources to put the policies into practice. In the case of Mount Cameroon region, the recent government decree creating a Technical Operation Unit is undoubtedly a key step towards this direction. For it to work however, support and interest from the international community will remain a critical factor.

Dr Daniel Pouakouyou is a Forest Ecologist and had worked for the DFID component of Mount Cameroon Project from 1994 to 1998. He pioneered the Rapid Botanical Survey technique on Mount Cameroon in 1997.

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**CHANGING THE RULES OF THE GAME: FOREST MANAGEMENT IN THE MOUNTAIN DISTRICT OF BA BE, VIETNAM**

*By Claudia Zingerli*

During the second half of the 20th century, Vietnam's forest cover diminished from 43% in 1943 to 29% in 1997. According to the official land use plans, land designated as forest area is, however, more than 17.6

million hectares or 54% of the country. The government's aim is to increase the forest cover by five million hectares to 14 million hectares until the year 2010. Forest policy in Vietnam is legally established through government decisions and decrees for forestland allocation or programmes such as the Five Million Hectares Afforestation Programme. Land tenure reforms and forest development programmes represent the government's and international donor agencies' latest attempts to come to terms with progressing deforestation in Vietnam's mountain areas. They are currently being implemented throughout the country. Their policy processes are characterised by confusion, conflicts, and collision of interests as the new policies have thoroughly changed the rules of the game. The period when forestland in the mountain areas could be appropriated freely and was used for agricultural purposes has come to an end. Stricter rules and obligations are now enforced. Since the ratification of the two Decrees no. 02/1994 and 163/1999 on "Forest Land Allocation and Leases for Long Term and Permanent Use by Organisations, Households and Individuals Aiming to Develop Forestry Production" the forests have been classified into three types which determine the use and prospects of the respective forests. The classification types are as follows: 1) special-use forests, set aside from agricultural and forestry production for the protection of floral and faunal genetic resources; 2) protection forests, allocated to households and organisation with the obligation to protect the medium critical and less critical watershed forests; 3) production forests, allocated to households and organisations for reforestation and agroforestry production. These classification exercises were predominantly carried out at the central state level and cause controversies and conflicts when implemented in the mountain localities.

Ba Be district serves as an example for changing rules in forest management in a

situation of livelihood struggle and social marginalisation in Vietnam's northern mountain regions. The district lies in the northern mountain province of Bac Kan and hosts Ba Be National Park, which is considered one of the biodiversity hotspots of Vietnam. The National Park represents an example of the tropical evergreen broadleaf forest on limestone mountain and is one of few shelters for some of the last populations of two highly endangered species of primates. The total area of its core and buffer zone is 23,000 ha. Prior to its establishment in 1992 it was declared a protected area in 1979, but the economic difficulties and food shortage during the late 1970s and 1980s outweighed any attempts to protect the forests. Forestland was transformed into rice terraces or upland fields. Between 1983 and 1998, forest cover was reduced from 84% to 65% of the total core zone area. Attempts are now made to reverse this trend, largely at the expense of livelihood security of local residents. With the new forest management guidelines forest policing in the National Park area has become more rigorous. The National Park management board requires the local people to carry out protection services without adequate compensating. Moreover, with the new forest classification system some of the local residents' fields and bamboo plantations came to lie in zones classified as special-use forest, meant to be set aside for conservation, research and tourism purposes, which hardly benefit the local residents. Numerous households have herewith lost their legitimate right and command over the forest area where they have been cultivating upland crops or fruit and forest trees for decades. The changing forest management rules in in Ba Be district have caused a situation of great uncertainty for many of the local population of the ethnic groups of Tay, Dao and H'mong. Whether they will be allowed to benefit from the investment in the land in the future or not is not clear to them. This is problematic because some depend almost entirely on the forest for their livelihoods. As a consequence,

they seek new cultivation areas in marginal places hidden from sight. Some are criminalised by the new rules of the game. Social marginalisation is progressing. In sum, the new policy regulations did not reduce the pressure on the remaining mountain forest. They have increased the struggle over resources in the mountain areas in the absence of limited assistance and alternatives to upland farming.

There is little scope for the mountain communities of Vietnam to express their interests and to be consulted as equal partners in the policy process. On the contrary, the current policy frameworks rather identify them as the villains solely responsible for forest degradation. Their struggle for livelihood security is identified as being confined to mountain areas alone. There is little attempt to take into account the difficulties caused by ongoing political-economic changes and the historically tense relationships between policy-makers and the ethnically distinct mountain population. The problem of progressing deforestation in Vietnam's mountain areas is far from being solved. It reveals shortcomings of the policy frameworks, such as controversial problem definitions, inadequate consultation with the forest resource users, and insufficient compensation payments. The struggle in sustainable forest management in Vietnam reflects not only technical and bureaucratic flaws but results also from restricted political participation and under-representation of the interests of direct resource users struggling for their livelihood security in mountain areas.

This article is an extract from the author's doctoral thesis entitled "Vietnam's Mountain Problematique: Debating Development, Policy and Politics in Mountain Areas". Empirical data for the thesis were gathered between August 2000 and July 2001 in three mountain villages of Ba Be district. The study of mountain forest management was part of a broader research question concerning the

relationship between people and the mountain environment in a period of rapid policy and economic change. The thesis explores the discursive plurality of mountain development problems and how they are translated into policy frameworks for sustainable mountain development.

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**PINE FORESTS IN THE DOMINICAN REPUBLIC - A UNIQUE RESOURCE BETWEEN ALL FRONTS**

*By Henning Peter*

The Dominican Republic has a long tradition in deterioration and degradation of its natural forests.

Having arrived in the new world the Spaniards exploited what was called Santo Domingo<sup>2</sup> mahogany, mainly coming from the low-lands and lower hills of the Hispaniola island for centuries. The central mountains of the Cordillera Central with altitudes of up to 3,000 m. a. s. l. are covered by endemic pine forests (*Pinus occidentalis*). These were not interesting for exploitation due to difficult access and - in comparison with mahogany - lesser wood quality.

After the mahogany resources had been exploited the run on the mountain forests began, primarily from the 1930s onwards (Dotzauer 1993). Until the mid 1960s big saw-mill industries exploited the pine forests to such a degree that the Dominican Republic was in the position to export pine timber

<sup>2</sup>Santo Domingo, the capital of the Dominican Republic, stands as synonym for the Hispaniola island.

(Russo 1987). In the wake of the saw-mills migrant farmers invaded the mountainous areas practising slash-and-burn agriculture.

Faced with the threat of loosing the country's last significant forest resources, the government undertook different measures to reverse this development.

Large areas of the Cordillera Central were declared national parks and the 1967 forest legislation prohibited almost every forest use. Stories about peasant farmers who were put into jail for having cut branches of trees on their own compounds (Kustudia 1998) are typical examples of the government's understanding of what should be done with the remaining natural forests. Total protection seemed to be the only response, even for private tenure.

At the same time various efforts were undertaken to reforest degraded agricultural land, pastures and waste land (Geilfus 1997/98).

The Dominican Republic is not the first case which reveals that this kind of policy does not work.

Why should farmers reforest if they are not sure that they could harvest their plantations one day?

Despite heavily subsidized attempts during the last three decades, reforested areas remain insignificant. The Ministry for Environment and Natural Resources reports a total amount of 36,000 ha for artificial forest plantations (SEMARENA 2001). Nowadays the Dominican Republic imports wood products for a corresponding value of about US\$ 250 million.

Why should farmers protect their natural forest resources if they are not allowed to gain some benefit from them?

In consequence, more and more forest areas suffered from gradual degradation through exploitative cuttings as well as from gradual

transformation into agricultural crops and pastures.

After a favourable period at the end of the 1990s when the government allowed and even fostered forest management, the new government first prohibited all forestry operations in 2000. Since mid 2001 forest management is allowed again, but on a very limited scale. Although officially stating a policy of encouraging a prosperous development of the forestry sector this does not reflect reality. A private forest owner still has to wait up to 6 months for approval of the management plan and the management operations are then strictly controlled by government officials under often-ambiguous criteria.

With the general public the government campaigns worked well. Until today the greater part of the Dominican population, in particular in the big cities, is convinced that forests should serve primarily for environmental services and that cutting trees is a crime.

On the other hand, there are three groups of private forest owners. One, and this is the majority, intends to harvest today all what is possible due to the above mentioned unstable government sector policy and lack of expertise in and incentives for sustainable management techniques.

The second group includes a huge number of smallholders who, nonetheless, possess significant forest areas. Under the current scheme - the management plans must be elaborated by a forestry professional and, in consequence, are expensive - forest management is not viable for them. Thus they continue transforming their forests into agriculture.

The third one is a small proportion of forest owners who have an interest in managing their forests on a sustainable basis. They harvest and reforest at the same time and undertake efforts to organize and develop the private forestry sector.

All in all, these are not very promising conditions for the survival of the endemic pine forests of the Hispaniola island. At the moment there are 125,551 ha of *Pinus occidentalis* left on private properties and 176,949 ha inside the National Parks (SEMARENA 2001).

PROCARYN, a Dominican-German development cooperation watershed management project tries to reverse this trend.

Through promoting and co-financing reforestation of smallholders' properties and supporting forest management that meets internationally recognized standards, the project is on the way to improve the situation at grassroots level. The experiences gained are foreseen to feed national sector policies. A permanent exchange and co-operation with the forestry administration as well as with the forestry chamber which represents the private sector are examples for important strategic partnerships which encourage the discussion on sustainable forest management. First attempts to initiate forest certification according to FSC standards will demonstrate to the general public that forest management can generate economic benefits and guarantee that the ecological functions a forest owns will be conserved.

The project is convinced that its way of protection through ecologically sound and socially sensitive management is the only possibility for *Pinus occidentalis* forests to survive in the long run.

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## ECOLOGICAL DEMOCRACY IN THE SIERRA NORTE OF OAXACA, MEXICO

By Ross E. Mitchell

### Introduction: Setting the Research Agenda

La Cumbre, about 20 kilometres from the city of Oaxaca in southern Mexico, is gateway to one of the world's richest pine and oak forest ecosystems. Often shrouded in a blanket of clouds, La Cumbre belongs to the municipality of Santa Catarina Ixtepeji (2,532 inhabitants, Census 2000; 1880 m.a.s.l.), one of two research communities selected for my dissertation field research. The other

community is Santa Maria Yavesia (460 inhabitants, Census 2000; 2000 m.a.s.l.), about 45 minutes from Ixtlán. Both belong to the Sierra Norte, or Sierra Juárez mountain chain - the Northern Mountains of Oaxaca. The Sierra Norte region is also the most ethnically diverse state in Mexico with 17 distinct language groups.

Field research on "Ecological Democracy and Forest-dependent Communities of Oaxaca, Mexico" ([www.re.ualberta.ca/students/graduate/students/Mitchell.asp](http://www.re.ualberta.ca/students/graduate/students/Mitchell.asp) for further details) was carried out from May through December 2002. Ecological Democracy may be thought of as an alternative democratic model that attempts to incorporate all interested citizens into decision-making, and strives for the equitable distribution of ecological amenities such as water, air, plants, and trees. Main issues include: (1) the degree to which perceptions of threats to local control over forest resources, and any environmental degradation that may ensue, can politically motivate rural people in mountain communities; and (2) whether rural political involvement leads to increased access to, or control over, forest resources.

### Sustainable Forestry and Local Democracy in the Sierra Norte

As in most rural communities of Mexico, the natural environment is an integral aspect of the daily life of communities such as Ixtepeji and Yavesia. Previously, most economic benefits obtained from Ixtepeji's almost 19,000-hectare forest went to a parastatal company (FAPATUX) that was granted a 25-year timber harvesting concession. Much of Ixtepeji's forests were selectively logged under the mistaken notion that smaller, often stunted, pine trees left would adequately regenerate once the high quality large trees were removed. When Ixtepeji regained control of its forest resources in 1983, new methods favouring natural regeneration and planted pine trees were tried.

Today, logging operations are done with relatively little ecological damage. Forest products not only include timber but also many non-timber products: ornamental wild plant collection, wild mushroom harvesting, spring bottled water, pine resin tapping, and provision of ecotourism services. Local women participate and even direct many activities, and all of these are under the authorization of the Ministry of Environment and Natural Resources (SEMARNAT). Carefully prepared plans have been produced with the assistance of community forest workers and a professional forester. Ixtepeji's forests were certified in 2001 by SmartWood/Rainforest Alliance on behalf of the Forest Stewardship Council (FSC).

Still, many challenges remain. For example, illegal deer hunting has continued even under constant community vigilance. Over half of the timber harvested is sold as roundwood due to insufficient capacity in the community sawmill. Yet the community is cognizant of these issues and is working to improve its forest management practices.

Unlike Ixtepeji, Yavesia has persistently refused to commercially log its forests. Many Yavesia residents express their understanding of how their water, soils, and forests are inextricably linked, and must be preserved forever. As one resident explained, "There is an ecological tranquility here that you can't find in many parts of the country. Mexico is destroying its forest resources, but here in Yavesia we have always conserved our forests ever since our ancestors left us this natural heritage."

Yavesia shares the same 27,000-hectare land base with Pueblos Mancomunados, a cluster that includes two other municipalities, Amatlán and Lachatao, and five smaller towns. Unfortunately, Yavesia has never been comfortable with this shared land arrangement. Most residents justify their continued struggle to achieve autonomy and one-third of the land base (9,140 hectares) as

necessary to protect their forests. They say they have no intention to engage in commercial logging but want to focus instead on water production and ecotourism. Still, firewood collection, charcoal production, small-scale logging by local carpenters, ecotourism, and bottled spring water production all impact the local forests. Many trees are suffering from mountain pine beetle infestations, and at least two forest fires have occurred near Yavesia's town centre over the past 30 years due to agricultural or lime production activities.

Ironically, perhaps, both Ixtepeji and Yavesia have earned regional, national, and international awards in the past two years. Most recently in November 2002, both communities were publicly awarded the prestigious World Wildlife Fund's (WWF) "Gift to the Earth" for good care of their forests.

But what about democracy? Democracy is part of their daily lives, not as just doublespeak of politicians for election purposes. To participate in local leadership helps build community and maintain traditional practices. Yet many rural residents I spoke expressed a high level of distrust in democracy given Mexico's political history. Others said Ixtepeji and Yavesia enjoy a pure form of democracy, although with limitations. One crucial limitation is that most women do not vote, do not participate in elections, and do not take part in common resource decision-making. Still, many women are involved in key aspects of daily life such as health and education committees, water treatment plants, and mushroom cooperatives. In my forthcoming analysis, these and other democratic and non-democratic factors will be examined.

#### Lessons Learned

If we consider democracy as the freedom to participate in decisions regarding livelihood, not only lifestyles, then governance in Ixtepeji and Yavesia seems to be pointed in the right

direction. They are working toward more inclusive, ecological management. In both cases, deeply held concerns for the forests are being played out in democratically unique ways. So what does Ecological Democracy look like in Ixtepeji and Yavesia? There are at least four key areas worth pointing out.

First, cooperation: these two mountain communities have a shared tradition of strong cooperative relationships, collective land ownership and management, and cultural patterns that reinforce long-held decision-making mechanisms. Second, ecological awareness: communities such as Ixtepeji and Yavesia have a strong forest conservation ethic; many are acutely aware of their responsibility that the forest is for all to use, including visitors and future generations. Third, integrated forest management: modern forestry techniques are being combined with new strategies for increased sales of forest products and services, both timber and non-timber. Communities such as Ixtepeji are taking full advantage of technological advancements such as the Global Positioning System (GPS) for mapping purposes, without losing sight of traditional knowledge and skills. Fourth, forest diversification: both low-intensity logging and non-timber forest products provide opportunities for all community residents to get involved and earn extra income; both offer environmental services as part of their sustainable development strategy.

This research may show that the key to forest use and protection rests with an empowered citizenry. Mountain communities are generally well placed to determine what is ultimately best for them and their environment. If democracy can be encouraged to flourish in forest-dependent mountain communities, then nature and people alike may have a good chance to thrive.

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### SUSTAINABLE DEVELOPMENT OF MOUNTAIN FORESTS IN AN INDUSTRIALIZED COUNTRY: NEW CHALLENGES FOR SWITZERLAND

By Willi Zimmerman

#### Current problems in mountain forests

The Swiss landscape is shaped by the Jura and the Alpine mountain ranges, which make up two thirds of the entire country. Mountain areas and mountain forests are therefore characteristic elements of Switzerland's geography. Mountain forests play a very important role. Without the protection afforded by the mountain forest, large areas of Switzerland would either be completely uninhabitable or habitable only with the help of very expensive avalanche, rock fall, and landslide and torrent protection structures. Since the early 20th century, the stringent and consistent implementation of mountain forest policy in Switzerland has been working for the conservation of the existing area of mountain forest. With the help of extensive state-funded incentives, it has, moreover, been possible to significantly improve the quality and stability of the mountain forest. Despite these entirely positive interventions, it cannot be claimed, however, that all of the problems associated with Switzerland's mountain forest have been resolved.

At this point in the early 21st century, Switzerland faces the following three main problems in relation to its mountain forest:  
- Guaranteeing and improving stability

- controlling forest expansion
- using the mountain forest in a sustainable manner.

### Sustainable forest use as a new challenge

For around 15 years now, mountain forest research in Switzerland has mainly focused on the predominantly scientific topic of stability maintenance. This has prompted, for example, the compilation of an extremely useful manual for practitioners. More integrative studies on processes of environmental and socio-economic change in the Swiss mountain areas, have revealed the interlinkages between a diminishing mountain agricultural sector and an uncontrolled expansion of mountain forest areas. At this interface, new challenges for Switzerland regarding the sustainable management of mountain forests arise. The problems concerning the sustainable use and development of the mountain forest are relatively under-researched.

To get a more comprehensive and better picture of the current problems in the Swiss mountain forests, we suggest to work with an understanding of the concept of sustainability as defined in Agenda 21 and in the Rio follow-up process. In the context of the mountain forest, this means that economic, ecological and social factors must be taken into account with respect to its use. An exclusively formal consideration of these three dimensions is not sufficient, however; what is also needed is the setting and achievement of operational and quantifiable targets, equal prioritising and balancing of these three target dimensions, and a reciprocal respect of their objectives (one partial objective must not be fulfilled at the cost of another). In terms of the use and development of the mountain forest, this means that these must simultaneously reflect the principles of:

- economic performance/efficiency
- ecological responsibility
- social solidarity

- These objectives are universal.

They constitute an imperative for state forest policy and for the owners, managers and users of the mountain forest. They are suitable for the analysis, monitoring and evaluation of the current state and future development of the mountain forest, whereby the focus of development is based on the positive steering of the three target dimensions.

### Possible approaches for the concretization of sustainability

While these requirements and objectives are widely acknowledged, they need to be concretized and operationalized if they are to become more than mere general pronouncements. In the context of various research projects, it is examined how these vague and diffuse concepts can be rendered more concrete and hence also operational, i.e. be made into a useful tool for both forest policy and forest use.

In attempting to respond to this question, it is suggested to make use of two approaches which differ in appearance but are similar in terms of content and orientation (cf. diagrams see p 54).

The first approach involves the use of the triangle that is now standard in sustainability assessments and is based on the three areas or target dimensions of society, environment and economy. This approach highlights the three-dimensionality, equality, mutual dependency and overlapping of the three target dimensions particularly well. With the second approach, the analysis grid is formed using a hexagon representing the six Helsinki criteria, which were established at the second Ministerial Conference in Helsinki in 1993. They provide general guidelines for the sustainable management of forests in Europe. The six criteria are: 1) maintenance and appropriate enhancement of forest resources and their contribution to global carbon cycles, 2) maintenance of forest

ecosystem health and vitality, 3) maintenance and encouragement of productive functions of forests (wood and non-wood), 4) maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystem, 5) maintenance and appropriate enhancement of protective functions in forest management (notably soil and water), 6) maintenance of other socio-economic functions and conditions. These criteria were formally developed and approved by Forest Ministers and forest experts originating from as many as twenty different European countries. This approach towards sustainability assessment is more directly tailored to the forestry sector; it uses the sector's terminology and also accommodates integrative, comparative and evaluative approaches. What both approaches have in common is that they work with criteria and indicators, which help in concretising systematic analysis and evaluation and also facilitating comparison. With these two approaches, the specific research challenge lies in the generation of the most expressive criteria and quantifiable indicators possible. Using the criteria, the three areas of society, environment and economy are subdivided into objects, facts, phenomena etc., with the help of which the main areas can be described, divided and then quantified using indicators.

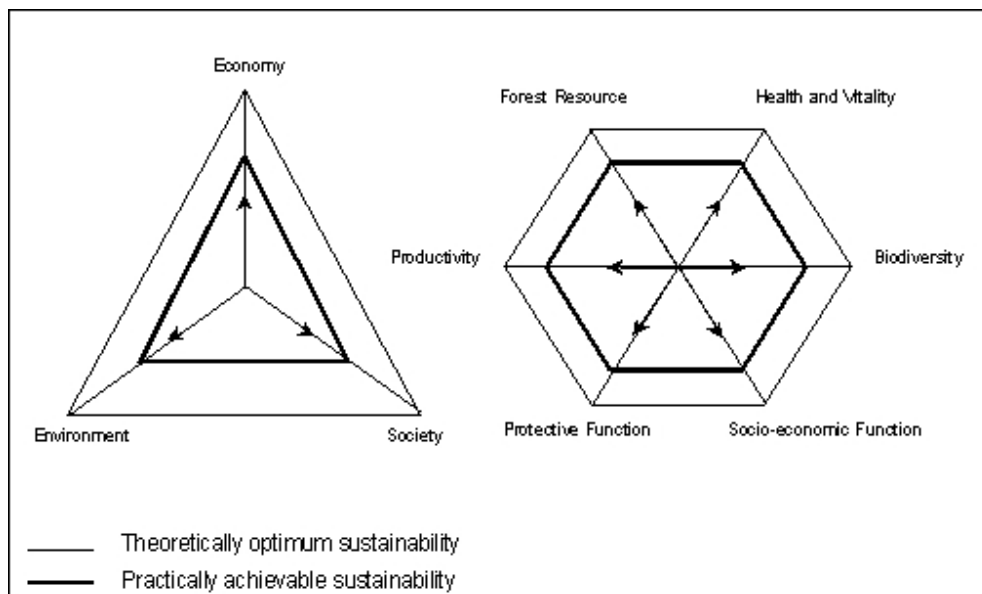
They answer the question as to what should be measured. As opposed to this, the indicators represent the actual measurement instrument: they assist in answering the question as to how the measurement should be carried out. Thus, while the criteria are the object of the measurement, the indicators constitute the actual measurement instrument.

Similar theoretical and methodological concepts to improve the sustainable use of forests have been elaborated for other continents (cf. e.g. Tarapoto and Montreal processes).

### Core question: which criteria and indicators are the "right" ones?

The selection of both the criteria and indicators is a valuation-based process, thus they cannot be objectively defined for once, for all and for everywhere. While, with the so-called "triangular approach", the selection of criteria and indicators is completely open, with the "hexagonal approach", an internationally recognized set of criteria and indicators exists which must, however, be tested and adapted for a) country-specific and b) forest-specific sustainability assessments. Given that the mountain forest is dealt with rather marginally in the context of the Helsinki criteria, with this approach it is necessary to develop and test an independent set of criteria and indicators. International comparisons and the analysis of local or regional case studies can also provide useful inputs as part of this process towards a "sustainable use of the mountain forest".

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**THE NEED FOR MARKET-DRIVEN SUSTAINABLE MOUNTAIN FOREST DEVELOPMENT IN DEVELOPING COUNTRIES: FOCUS ON ETHIOPIA**

By Kassahun Embaye

Mountain forests are inherently fragile and sensitive to disturbances and land use changes due to the generally moderate to steep slopes, relatively shallow soil, exposure to wind and higher rainfall than in the plains. The increasing population in most developing countries is largely dependent on subsistence farming and extraction of timber and fuel from forests, and has been compensating for declining land productivity by expansion into forest land.

Thus, mountain forests need to be protected and used in a sustainable way. This requires conservation-oriented management, which may depend on economic incentives (subsidies, taxes, grants, markets, etc.) Countries in Europe and America (e.g., France, Switzerland) and some developing countries in Asia, such as China, have protected and developed their mountain forests through various economic incentives - unlike the situation in many developing countries, such as Ethiopia, that do not have the financial resources and economic structures to support them. For example, about one million ha of bamboo forest is being destroyed in Ethiopia because there is no incentive to protect it in the absence of a nearby market to sell the products (Embaye, 2000).

Conventional, top-down measures have been generally unsuccessful in countering

deforestation. A strategy to gradually commercialise subsistence farming and enable the people to make a living from processing and marketing of forest and agricultural products is more likely to be successful. This requires the creation of mutually supporting and self-sustaining production-processing-marketing systems in forestry and agriculture.

**Ethiopia: new approaches needed for sustainable development of mountain forests**

Mountains, most of them at elevations higher than 1500 m and some over 4600 m, cover about half of Ethiopia. Most mountain areas have lost their forest cover and the remaining are endangered, as deforestation has been accelerating. This has resulted in severe environmental deterioration and decline in land productivity, and recurrent drought and famine. Many developed countries and international aid organisations have provided assistance to Ethiopia to solve its deforestation-related problems. However, deforestation and land degradation are still continuing, reinforcing each other in a vicious circle.

Past attempts of Ethiopia and its supporting partners to solve the deforestation problems were based on the assumption that forests were cut down by the ever-increasing population to satisfy its demands for wood and food. It was believed that deforestation could be slowed down if individual rural households would be planting trees on their own land and for their own use, and if the government would reforest the denuded landscapes. Various projects were initiated to raise awareness among the rural population on the usefulness of forests and the adverse consequences of deforestation, and programmes were started to promote tree planting by the rural population such as woodlots, community forestry, social forestry, farm forestry. The government also established fuelwood plantations near some

big cities using a World Bank loan. However, the results were unsatisfactory. The seedlings died soon after planting for lack of protection and maintenance and the fuelwood plantations were severely damaged by frequent illicit cutting and overgrazing.

About 85 percent of Ethiopian families are dependent on subsistence farming, in uncertain land tenure conditions and with poor access to markets. A land tenure system that assures use rights now exists in Ethiopia, but will need some improvements. The denuded public land should be distributed to families for tree planting, forest protection and sustainable use. The farmers will also need assurance that their forest products can be sold at a reasonable price. This could be guaranteed by establishing forest-based industries (e.g., wood industries) and services such as biomass-based electricity generation in the different parts of the country. These in turn require exploration and creation of markets for the products and services. Farmers could be motivated to respond positively and quickly through financial incentives at least in the early phase of forest establishment, as is the case for example in some European countries. The sustainability of the forests after establishment could be ensured through harvest regulations and clear, agreed management responsibilities. Thus, support for sustainable forest development in Ethiopia should be directed towards a strong forestry sector through establishment of mutually supporting and sustaining forest production, processing and marketing systems. Planting trees outside the forestry sector should be encouraged as a supplementary activity.

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**POVERTY, EQUITY AND RESOURCE SUSTAINABILITY: INSIGHTS FROM COMMUNITY-BASED FOREST MANAGEMENT IN THE MID HILLS OF NEPAL<sup>1</sup>**

By *Bhim Adhikari*

**Introduction**

Community forestry (CF) is one of the major policy initiatives for the forestry sector in the middle hills of Nepal built upon the principle of devolution of power and authority to local communities. CF in Nepal can be justified on the basis of immediate energy supply, fodder and litter benefits to local communities, enhanced control over localised environmental degradation, important spin-off effects in forestry-based farming system (Byron, 1991) and supporting livelihoods of the poor. Devolution of forests has been underway in Nepal since 1990 under which national forests are handed over to the local communities under community-based property rights regime. For the last two decades, forest user groups (FUGs) have proliferated throughout the country and

<sup>1</sup>This paper is based on a research project on economics of community forestry in Nepal funded by the South Asian Network for Development and Environmental Economics (SANDEE). For information about the survey, or to obtain detail version of the paper, please contact SANDEE or author directly on the address below.

concept of Nepal's CF program itself has even been exported to different parts of the world (Nightingale, 2002). However, despite this success, sustainable management of, and equitable access to, CF have not been a universal result (Malla, 2000). Some recent studies indicated that CF in the mid hills is not able to contribute significantly to the livelihoods of very poor and marginalized sections of the community due to its failure to take into account equity and distributional issues (Adhikari, 2002). This study, therefore, intended to explore whether and how the CF program is actually helping the rural poor households and environmental conservation and highlight additional institutional measures that ensure equitable and sustainable forest management in the mid hills of Nepal.

**Research sites, method and survey design**

This study was undertaken in two selected districts of the mid-hills where CF intervention has been implemented for the last two decades. The middle hill region occupies the great central belt of the Himalayan mountain system in Nepal where the country's origins and character are mostly rooted and comprises about 30 percent of the whole area of the country. In order to address the research questions posed in this study a total of eight FUGs were selected in Kavre Palanchok and Sindhupalanchok districts where the CF program has been implemented for the last two decades. All user households were divided into three different income groups i.e. poor, middle wealth and richer households. Primary data on household level variables and use and management of CF was collected through a household survey of 309 households for a period of 4 months from September-December 2000. Economic analyses were performed in terms of use of different forest products such as firewood, tree fodder, cut grass, leaf litter, medicinal herbs and plants, timber and some other direct and tangible benefits to estimate household level income from CF.

**Results**

Analysis of household level benefits from CF quantified the income from CF for three different income groups. The analysis revealed that both annual gross and net income from CF are higher for richer households than that for poorer ones. It reveals that better off households are actually benefiting more from CF than poorer households, contradicting what is usually claimed in common property literature. Poorer farmers traditionally depended on local forests for firewood and other non-timber forest products (NTFPs). However, with the formalization of property rights access of poorer households to forests was reduced due to a restricted management regime. Moreover, CF management plan are more oriented towards production of timber and other intermediate forest products (tree fodder, cut grass, leaf litter etc.) that serve the interests of wealthier households. While the subsistence value of NTFPs has long been recognized, these resources did not feature in forest management planning, and there has always been competition between national needs and the local use of forest resources in Nepal and elsewhere (Falconer, 1990; Gautam and Devoe, 2002). Evidence has shown that in many cases the level of extraction of forest products, particularly fuel wood, small wood and NTFPs has been reduced following the establishment of CF. Changing the institutional arrangements on common pool resources, therefore, may alter the direction of incentives, which might decrease the access of poorer and marginalized households to the local commons.

Equity aspects of community-based resource management are largely ignored since there is no compensation mechanism to the losers despite their cooperation and contribution to the improvement of resource base. I reconsider the issue of persistent socio-economic inequality in communities and

argue that restricting the access of poor people through changes in property rights structure in common pool resources is likely to increase the level of poverty unless specific measures of compensatory transfer schemes are in place to safeguard the interests of the most vulnerable section of the community.

**Conclusion and policy implications**

The results clearly show differences in both gross and net income derived by households. FUG members with big land holdings and ownership of livestock, benefit more from intermediate forest products such as leaf litter for composting, fodder and grass products. Compared to larger land and livestock holders, extraction of various intermediate products by poorer households is little and restricted to certain products with generally lower, and probably no benefits for landless households (see also Richards *et al.*, 1999 for similar sort of findings). There is a risk that CF focuses on the long-term accumulation of timber and ecological services values in order to meet the need of rural elites, whereas this might reduce opportunities available for the poor. A highly protective silvicultural regime, of the sort that is practiced in most CFs, is more likely to lead to early closure of forest, which might reduce the harvest of NTFPs by the poorer households. While there are many positive changes to protect the forest and local watersheds through CF, an assessment of the benefits and costs faced by different income groups provides an indication whether the existing benefits and costs sharing arrangement is equitable. Though poor people would be more disadvantaged without common property access to forests than the less poor, conservation measure that promotes regulated or formal systems of forest management pose a dilemma.

One of the important implications of this study is that interventions seeking to reduce poverty in a forest dependent rural economy need to improve both productivity of forests and

distribution systems. Since poor people do not get substantial benefits from agriculture related forest products, forest management policy needs to be directed at increasing alternative forest products, mainly NTFPs that play a significant role in supplying livelihood needs. Equally important is supporting and empowering FUGs in various aspects of CF management that especially focus on poorer forest-dependent communities in the mid hills so that their interests are adequately represented in forest planning and management decisions. Since this study could not compare pre and post impact of CF on household income, a further comparative study on this issue may help to understand complexity involved in poverty, inequality, forest dependency and sustainability of regulated forms of forest management.

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## MAKING SELF HELP GROUPS A PLATFORM FOR FOREST PROTECTION: A CASE STUDY FROM INDIA

By Om Prakash Tripathy

### Introduction

There are many miles to go for the practical devolution of power to the rural poor, who could be able to manage their own resources effectively and efficiently. The present study reveals how a small village managed to reassert control over the only legally demarcated village forest, managed by Jungle Surakhya Committee (elected forest councils) which is somewhat similar to the Van Panchayat in Northern India. The present study will indicate the implication of the blending of the informal micro finance institution to that of the more pragmatic forest resource conservation activities and the livelihood support system of the poorest of the poor living in mountainous terrain. It focuses on the challenges and the danger in implementing such a combined project in an area where the members were mostly from the poorest of the poor strata of the society.

The village Sagar Pali of Dist. Kalahandi (Orissa, India) is situated on the deep interior of the mountainous forest, where no communication facilities exist. The village is known for poverty and starvation death, and

heavy dependence of the people on the forest resources.

Due to the women's involvement, there was a felt need for starting up a thrift and credit programme for the poor women of this area. The constitution of Mahila Sanchaya Samiti (women self help group) assisted in maintaining contacts with the neighboring village groups who had a role to play in protection of the surrounding forest from the clutches of the timber mafia. The forest department informally constituted a committee of women members with in the village from the SHG and the group interns selected 2 women members as president and secretary to keep the record of the activities and coordinate with other SHGs in the areas.

This strong Mahila Mangal Dal has established effective control over management of the village forest, as collection of fuel wood, fodder, and water is almost exclusively women's work in these hilly areas. Decisions about when to open the forest for grass, leaf and fire wood collection, the rules for collection, the fines for violation etc, were taken by the Mahila Sanchaya Samiti and communicated to the Sarpanch (president) of Jungle Surakhya Committee. The women's control over the forest use decisions enables them to ensure that forest product collection does not conflict with periods of heavy agricultural work.

The integration of the financial aspect with the social and community aspect requires specific effort and the existing structure of the PRI should be made flexible to integrate the activities of JFM/CFM under the umbrella of PRI. The sustainability of the credit and saving activity depends upon community participation. There is a need for linking the existing forest rules and regulation to a user defined easily managed and client owned subsidiary system.

### Forest protection committee - providing hope

The institution of self-help groups and the forest protection committee within it has helped to provide sustainable livelihood opportunities to the villagers and to prevent the excessive exploitation of the forest by the external forces. The groups decide the terms of rules and regulations and the penalty system for violations. Although the committee enjoys considerable autonomy in decision making, the local forest officials help in identifying the species which should be protected by the groups and the steps that should be taken. The committees have managed to balance the maintenance of ecological services such as soil fertility and water conservation by preventing of grazing, and collecting forest products necessary to support local livelihoods.

### Possible threats - time to delimit the boundary

The wide spread success of the forest protection committee in the area has resulted into the quick generation of faith among the villagers and it has resulted in declining faith in the forest department. As most of the time the forest department officials are engaging in mass felling of tree under the grab of the forest protection act, such community forest management continues to be widespread and is growing outside any formal legal framework on all categories of legal forestlands. The excessive influences of the moneylender also create hurdles in the path of forest conservation.

### Merging the traditional approach (Thenga pali / Van Samiti) with that of more pragmatic new one.

One of the unique ways of protecting the village forest as practiced in many parts of Orissa is the Thenga Pali system, which derived its name by the rotational method of protecting the forest by holding a stick in hand. Each household has to protect the forest on a rotational basis and it will be decided on the village meeting. The concept of Thenga Pali has been incorporated in the

new system with the exception that now women play a more important role to play by the women.

#### Cost sharing and Sustainability

Cost sharing of the whole project through group contributions and by mutual agreement between the projects implementing agency can be carried out in consent with the group members and the village community. Organized and acutely forest dependent women who had initiated the forest protection on their own will be worst affected if there will not be any prefixed cost sharing and benefit sharing measures undertaken.

#### Conclusion

The over all finding of the study indicates that this is user-friendly and easily replicable idea of forest protection. The success of the micro credit movement has brought about enough solidarity and unity among the rural poor and in matter of community action the groups can be effectively utilized. There is an urgent need for addressing the legal purview of the whole activity and finding out a more flexible law for it.

#### List of local term

Jangle surakshya committee- it is committee to protect the forest.

Mahila Sanchaya Samiti- it is a common groups of women constituted for saving and credit purposes.

Van Panchayat- locally elected council consists of local people for protection of the forest.

Sarpanch- head of the locally elected council.  
Sarpanch pati- husband of the women  
Sarpanch, who play a lead role in every decision-making activity of the women.

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### SHARING OF KNOWLEDGE AND CAPACITY ON MOUNTAIN FORESTRY: INTERNATIONAL MASTERS PROGRAMME MOUNTAIN FORESTRY IN AUSTRIA

By Birgit Habermann

Austria is a country characterised by its mountains - almost 70% of Austria's landscape is mountainous (Hovorka, 2002a), and 47% of the land is forest area, most of it in the mountains (Austrian Forest Report, 2001). About 50% of all farms are in these mountainous areas (Hovorka, 2002b). Most of the farmers are also forest owners - in Austria 50% of the forests are owned by small scale farmers (Austrian Forest Report, 2001). Until the 1960ies remote mountain areas were poor, and migration to urban areas was high (CIPRA, 2001). However, with the increasing importance of mountain tourism, a widely held interest in maintenance of cultural landscape in the mountains developed. Dax (2001) mentions, that "in recognition of the importance of what was now called the multifunctionality of mountain farming, a Special Programme for Mountain Farmers was launched in 1972 to reduce the risks of land abandonment and outmigration in mountain areas". A shift in the regional policy paradigm resulted in the concept of "endogenous regional development", a special initiative for mountain areas set up in 1979. Today there is a general consensus in Austria that mountains should receive special attention and this is also reflected in national policies. Compensation mechanisms for mountain farmers have become feasible through sectoral policies or programs and support from structural programs, as also mentioned by Dax (2001).

This background explains the long tradition in mountain forest research existing at the University of Natural Resources and Applied Life Sciences (BOKU) in Vienna. Especially in the field of mountain risk engineering BOKU is one of the leading research institutions, and the university staff is actively involved in research activities both in the Alpine region and internationally. It was therefore decided to offer the first International Masters Programme in Mountain Forestry at BOKU in the run of the International Year of Mountains 2002. The importance of higher education and research in mountain forestry has been emphasised by the global efforts in mountain science and research during the last decades. Although there was a common consent about the lack of appropriate degree programmes, higher education systems failed to meet the demand for postgraduate education in mountain forestry so far.

Preparatory work started already in 2000 and was intensified after the draft proposal for the currently offered "Master of Science in Mountain Forestry" was presented to a group of international experts during a workshop in Vienna in 2001. The resulting curriculum emphasises interdisciplinary work, learning by doing, intercultural communication and teamwork, participatory thinking and bottom-up approaches. The educational aim is to enable graduates in Mountain Forestry to recognise and solve problems occurring in mountain forest management, taking specific ecological, ethical, technical, social, economical and political conditions of mountain systems into consideration. The main objective of the programme is to teach the students to recognise and manage specific technical or ecological problems in a sustainable way, while taking local people's needs and requirements into account.

The programme lasts two years and is attended by students from mountainous countries all over the world. Teaching language is English, and special emphasis is put on interactive teaching, as most of the

students are experienced professionals who can contribute from their own practice. Most of the students come from international organisations and regional NGOs, governmental departments, research organisations/universities in mountainous regions/ countries, that do not offer adequate academic training programmes in mountain forestry. It is therefore important to discuss the specialities of different mountain ecosystems in the world, as well as appropriate management strategies and technologies, and to enable direct contact with local forest owners, farmers and forest companies in Austria.

As published in Habermann (2003), during the period from August 2001 to August 2002, 255 students from more than 50 countries world-wide have requested information about the MSc Mountain Forestry at BOKU. With regard to their countries of origin more than 43 % were from South Asia, about 27 % from Africa, and 10 % from EEA countries and North America. It was reported that the countries with the highest rates of requests were Nepal and Ethiopia, due to existing co operations and the particular high demand for higher education in mountain forestry in these two countries. Many mountainous countries are still among the least developed countries, and most of the world's conflicts take place in mountainous areas (The Panos Institute, 2002). Ultimately the educational sector is severely affected, and consequently there is also a lack of resources and funding for research and higher education. Through in forestry the human capacity exists, higher education in forestry does not sufficiently take into account the specialities of mountain ecosystems and societies, and many forest schools still mediate traditional top down approaches that are mainly timber oriented and tend to ignore the realities of work in the field, where the needs and demands of local people decide on the success of sustainable natural resource management (Habermann, 2001). Today more than ever, research strategies and scientific development have to

be demand- and user-oriented, and foresters, researchers and scientists working in the mountains need a thorough inter- and trans disciplinary background to ensure both conservation and sustainable use of mountain resources, and to understand the complexity and needs of mountain societies.

As stated in earlier publications, international cooperation has to progress to achieve long term changes in capacity building in mountainous countries - to guarantee access to education facilities for both European and international students first of all the funding situation has to be improved. The 6th Framework Programme launched in autumn 2002 will hopefully provide scope for an improvement of international cooperation in Sustainable Development of Mountain Forests, as well as the International Partnership for Sustainable Development in Mountain Regions (an outcome of the World Summit on Sustainable Development in Johannesburg, 2002).

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**RESEARCH FOR SUSTAINABLE DEVELOPMENT OF THE CONIFER FORESTS OF BHUTAN**  
*EXPERIENCES WITH THE CORET PARTNERSHIP BETWEEN THE INSTITUTE OF FOREST ECOLOGY AND A RESEARCH CENTER IN BHUTAN*

By Georg Gratzel\*; Phuntsho Namgyel

Bhutan is a country of forests: 64.4 % of its area is covered with forest. These forests are a major source of livelihood for the people: more than 79 % of Bhutan's population are practicing subsistence farming (MOA, 2002). These farming practices are largely dependent on forests: without nutrient transfers from the forest to the agricultural system, farming would not be possible in Bhutan (Roder et al, 2002, Roder et al, 2002, in press). The forests are an important source of income generation for rural people through selling of non-timber forest products (Namgyel, 1996). Bhutanese forests are critical resources for house construction and have to satisfy high per capita fuelwood consumptions (Wangchuk, 1998). They protect the watersheds of the country and, last but not least, add a substantial amount to the country's gross domestic product (GDP): Around 10 % of the GDP is generated by forestry (Planning Commission, 2001). Major forest products and NTFP's (resin and essential oils) accounted for about 20 % of Bhutan's exports (NEC 1997).

Temperate conifer forests cover 24 percent of the total area of Bhutan (LUPP, 1995). Within these forests, the uppermost forest belt is formed by monospecific stands of *Abies densa*, covering 8.6 percent of the country's area. Below this zone, and above the cool broadleaved forests mixed conifer forests form a forest belt extending from 2500 m to 3200 m altitude in most of Bhutan (Grierson and Long, 1983).

Forest management policies in Bhutan acknowledge that, if forests were not to go through a process of deterioration similar to some of Bhutan's neighbours, a systematic forest management program would have to be put in place (NEC 1997). This management program is based on a balancing of conservation and economic development goals through long-term, sustainable multi purpose forest management. The policy stresses the need to manage forest resources in a systematic and scientific manner. This requires a sound knowledge base on the ecology and dynamics of these forests, knowledge which was largely missing (Dhital, 1999, MacKinnon, 1995, Gratzel et al, 1997). In order to mitigate this situation, the **Conifer Research and Training Partnership (CORET)**, a research and training partnership between the Institute for Forest Ecology, UNI BOKU, and the Renewable Natural Research Centre Jakar in Bhutan was started.

The main objectives of CORET are improvement of the livelihood of the people of Bhutan by carrying out human capacity building in forest research and by conducting research on temperate conifer forest ecosystems in Bhutan as a contribution to the basis for sustainable land-use and nature conservation.

**CORET human resource capacity building components**

Generally, research in and with developing countries undergoes a paradigm shift from being based on and dominated by academic or economic needs of the North towards research which responds to the needs of the developing countries. This creates and enhances ownership of knowledge, thereby achieving sustainability in terms of problem solving capacity. The latter goal requires a strong human capacity building component as an integral part of the research. In the CORET partnership, human capacity building has five components: (1) on the job training,

(2) in-country training courses, (3) trainings abroad, (4) twinning arrangements and (5) the international masters course in mountain forestry.

Particularly the twinning of Bhutanese and Austrian students proved to be a successful way of symmetrical, mutual learning. Studies were carried out jointly including field work in Bhutan, and data analysis/report writing in Austria. The international masters course in Mountain Forestry at UNI - BOKU provides ideal possibilities for combining the on the job training and the in-country training courses held in the framework of CORET with a formal education.

#### CORET research in the conifer forests of Bhutan

Setting of the research agenda is done in a participatory manner in collaboration with the major stakeholders and the concerned research officials. In phase one of the CORET partnership which is finished mid of 2003, the main clients of the research were the Forest Resources Development Division and the Nature Conservation Division in the Department of Forest Services. In a participatory process, the research agenda was developed. Some of the main problems of forest management could be addressed. Particularly in the conifer forests, which are managed using natural regeneration, the frequent lack of regeneration after logging operations provides one of the major challenges to be solved through sound silvicultural practices. We tried to close knowledge gaps on resource requirements of tree species and in their characteristics concerning competition with understorey species. In a study on light requirements of the main tree species in the conifer belt of Bhutan, we quantified shade tolerance of tree seedlings as an essential requirement for prescribing silvicultural interventions (Darabant et al, 2002). A second factor crucial for achieving tree regeneration after logging is dispersal of seeds. This is

addressed by a study on recruitment distances of the main tree species in the conifer forest. A study on regeneration of *Picea spinulosa* aimed at providing insight into factors influencing regeneration of this species. Problems with competition of tree seedlings with bamboo species were addressed through two studies (Gratzer et al, 1999, Gratzer et al, 2000).

Questions of habitat dynamics are crucial for management concepts for nature conservation. In a study on the dynamics of *Abies densa* forests with an understorey of the bamboo *Thamnocalamus spathiflorus* var. *bhutanensis*, the driving factors of forest dynamics are characterised.

Pathogens and insect pests are not only disturbance agents in natural forests but also interfere with the various demands and interests of society on forests. They represent major constraints for forest management and conservation. Through a study on the association of blue-stain fungi with the Eastern Himalayan spruce bark beetle, one of these problems was addressed (Kirisits et al, 2002).

Results of these studies are used by forest management planners and forest managers. During the last years, community forestry in Bhutan gained considerable momentum, both on the legislative and the implementation level. With this, the focus for the next phase of the CORET partnership will be increasingly geared towards the needs of farmers and forest user groups.

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### ORECH\_LES: BIODIVERSITY AND SUSTAINABLE MANAGEMENT OF KYRGYSTAN'S WALNUT\_FRUIT FORESTS: DEVELOPMENT OF NEW SILVICULTURAL APPROACHES

By Jean-Pierre Sorg, Bronislav Ivanovitch Venglovsky and Kaspar Schmidt.

#### Occurrence of walnut-fruit forests in Kyrgyzstan

Walnut-fruit forests are found on the slopes of the eastern Fergana Valley in the south of Kyrgyzstan, a central Asian country. These are dominated by walnut trees (*Juglans regia* L.) and a wide variety of other fruit-bearing species, such as apple (*Malus* spp.), pear (*Pyrus* spp.) and stone fruit trees (*Prunus* spp.). The walnut-fruit forests originally covered an area of about 600'000 ha. Today, the figure is around 30'000 ha (Müller and Vienglovsky, 1998). In spite of this huge decrease, south Kyrgyzstan still boasts the largest naturally-occurring area of walnut-fruit forests in the world (Hemery and Popov, 1998).

The walnut-fruit forests are owned by the state, and are managed by state forest enterprises. In 1945, the entire area of walnut-fruit forests became a protected zone. This action significantly reduced the number of ways in which the forest, especially the timber, could be utilised. The attempt to conserve the walnut-fruit forests by ensuring their complete protection has influenced the Kyrgyz forest policy up to the present day.

#### Significance of the walnut-fruit forests

The walnut-fruit forests are characterised by their remarkably high biodiversity on all levels (ecosystem, between species, within species, genetic diversity). In the forests, there are more than 5000 plant species, including around 180 various woody species, and

about 150 bird and 40 mammal species. This genetic diversity is of international significance, as walnut-trees and a wide range of other fruits of world-wide economic importance originate in the mountains of central Asia and their forests.

Many forest products enter the regional economy, including non-timber forest products (especially nuts and fruit, mushrooms etc) and to a lesser extent, timber products. At the time of the Soviet Union, nuts and fruit were systematically gathered and industrially processed. In addition, other issues of regional importance are the forest's role as a place of relaxation and as a focus for the gradual growth in tourism; the regulation of the water balance, and protection against erosion offered by the forest.

The forests and the products contained within them offer substantial potential for the rural development of surrounding areas, a potential which could be harnessed better in the future. The local population uses a wide range of various forest products, albeit to varying extents (Messerli; 2002). Many products, such as firewood, which has become increasingly important since Kyrgyzstan's independence due to the massive increase in the price of coal, are still gathered primarily for personal use.

The sale of forest products such as walnuts provides an important source of additional household income. Often, forest products can be part-processed on farms; this generally leads to a considerable increase in profit for households in the surrounding areas. Examples of such products are dried fruit, herbal teas, or wild fruit jams.

#### Current management problems in the walnut-fruit forests

Since the breakup of the Soviet Union and the independence of Kyrgyzstan in 1991, the country has undergone a very severe

economic and political transition process. State subsidies to the forest authorities have been slashed. Today there is scarcely enough money to ensure sustainable forest management. At the same time, current economic problems are leading to energy shortages, and are reducing the earnings potential for the population. This means that in the walnut-fruit forest area, almost everyone is forced into subsistence farming. These changes bring about increased pressure on the forests from various angles. Increased forest use and the decline of effective forest protection and management only go to show that sustainable management of the walnut-tree forests cannot currently be guaranteed. (Müller and Sorg, 2001)

Today, many walnut and mixed stands are in a silviculturally-deplorable state. This is mostly due to the extremely restrictive nature of the policy for issuing felling permits throughout the whole walnut-fruit forest region, and to intensive forest grazing. Grazing is actually forbidden in these forests but is widespread in many areas and wholly unregulated. Many natural stands are too old and are beginning to show the first signs of decay (e.g. rotten wood is widespread). The production potential of these stands is minimal and they are no longer economically viable. The plantations, most of which were established for nut production, are often too dense and the tree crowns too weakly developed for optimal nut yield. In order to tackle these problems, new approaches to silviculture have to be developed.

#### Aim and expected results

The long-term aim of the project is that:

A new, dynamic and creative silviculture will be applied in the walnut-fruit forests. In this way the needs of the local population and the Kyrgyz society will be met in a sustainable way.

The following results are expected at the end

of the project (December 2006):

- The key institutions will have a scientifically well-grounded basis at their disposal for making management decisions.
- Selected forest enterprises will apply the new silvicultural methods.
- Agroforestry approaches will be known within the forest service, will be identified as such and will be included in the planning of forest management.
- An international seminar on new methods of managing walnut-fruit forests will be held in 2004 or 2005, during which the results of the project will be presented and discussed.
- The key stakeholders (local people involved in forest management, the relevant administrative bodies, decision-makers) in the area of selected forest enterprises will be aware of the new silvicultural methods.
- The staff of the project will have more detailed and broader knowledge, in particular in the field of agroforestry.
- The ORECH-LES project will be part of an international network of experts on management of walnut-fruit forests and their species.

#### Methodology, an overview

New silvicultural and agroforestry methods will be developed by researchers in close co-operation with forestry practitioners and locals. This will involve supporting the partner's co-ordinated activities in the following three areas:

**Applied research:** Gathering of available knowledge and production of new knowledge

**Training and consultancy:** Transfer of the knowledge

**Practical implementation:** Application of knowledge and identification of new research questions

Activities in these three areas will allow the results gained to be put into practice quickly.

The close co-operation between researchers, forest practitioners, and the local population means that ideas and relevant research questions arising from work in the field can be fed back into the research. In this way, a dynamic knowledge cycle will be set in motion, which will facilitate continuous silvicultural development. This transdisciplinary approach is new in Kyrgyzstan. Our experiences during the pilot phase of the project have shown that this working style is valued equally highly by scientists and practitioners (Sorg et al., 2000).

For further information please contact:

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**KNOWLEDGE AND STRATEGIES OF LOCAL PEOPLE IN FOREST MANAGEMENT. A RESEARCH PROJECT CONTRIBUTING TO THE DEVELOPMENT OF PARTICIPATORY APPROACHES TO FOREST MANAGEMENT IN THE WALNUT-FRUIT FORESTS IN KYRGYZSTAN.**

By *Kaspar Schmidt*

Globally rare natural forests of walnut (*Juglans regia*) and fruit-bearing tree species such as apple, pear, hawthorn and cherry plum occur in the mountain ranges of Central Asia, in particular in Southern Kyrgyzstan. Pressure on easy accessible forests by a variety of stakeholders has increased since 1991, as the economic changes have resulted both in difficulties in obtaining energy supplies other than fuelwood and in reduced opportunities for salaried employment. Hence, the conservation and sustainable management of the walnut-fruit forests in the long term is currently uncertain and new visions, new approaches to forest management are urgently needed. Given the range of resources of these forests, the different forms of forest use (gathering of NTFPs and fuelwood, agroforestry, grazing and haymaking etc.) and the interest of mountain communities in these forests a multipurpose management with active participation of local people seems to be particularly promising for the future.

Since the early nineties local people have become increasingly involved in the use and management of the walnut-fruit forests. Some of the leshozes have adopted a system of paid leases according to which some user rights for delimited forest plots are transferred to local farmers. A system in which no money is expected to exchange hands has been developed by the Kyrgyz-Swiss Forestry Sector Programme (KIRFOR) and its local partners in the framework of their CFM

project (collaborative forest management). In this case the leaseholders get the right to harvest all fruit growing on the leased plots and to use or to sell a defined amount of dead branches. In return they are responsible for forest protection and agree to other work, such as the establishment of plantations or the maintenance of orchards.

The development of such more participatory approaches to forest management in a post-Soviet context raises a lot of questions, as participation in the sense of a partnership of the relevant stakeholders and bottom-up decision making are new concepts for former Soviet republics. Our research project addresses some of the questions raised with a focus on local knowledge and forest management strategies of local people. The research objectives are the following:

1. to determine the knowledge of local farmers involved in forest management in the fields of silviculture and agroforestry and to identify their forest use practices and management strategies for the leased forest plots
2. to identify factors influencing forest use practices, local knowledge and the development of innovation in silviculture and agroforestry
3. to determine the role of forest resources and forest products for the livelihood of local people who are involved in forest management
4. to determine likely consequences of an increased participation of local people in forest management for the biodiversity of the walnut-fruit forests
5. to identify the potential and constraints for the implementation of sustainable forest management involving local people
6. to explore ways to implement multipurpose forest management involving local people and taking biodiversity conservation into account

The research is conducted in and interdisciplinary research group consisting of two Kyrgyz PhD students focusing on

socio-economic aspects (cf. objective 3) and on biodiversity conservation (cf. objective 4), a research assistant and a Swiss PhD student. In this way, the project also contributes to the scientific capacity building in Kyrgyzstan.

Four leshozes have been selected as research sites in order to capture the variation of some factors which are supposed to have an influence on people's attitude towards forests and on forest management in the zone of the walnut-fruit forests, such as human pressure on forest, the leasehold system (CFM, other long term leases) and the ethnic composition of the communities. Within the sites local households which are involved in forest management have been selected on the basis of other relevant criteria such as the wealth of the households or the nature of their forest plots (close forest, agroforestry systems, etc.). The main methods used for information gathering are: semi-structured interviews and PRA tools to capture local knowledge and forest use practices, income estimations based on recall interviews to get a better understanding of the role of forest resources in local people's life and ornithological studies in forest stands which are managed at different intensities for the study related to biodiversity conservation in these forests.

It has been postulated that local people can contribute to the sustainable forest management of the walnut-fruit forests with their knowledge and forest use practices, provided that sound and fair management arrangements between the leshozes and local people exist. This hypothesis will be reviewed on the basis of the research findings and critically discussed in the light of the identified potential and constraints for the implementation of sustainable forest management involving local people under the post-Soviet circumstances prevailing in Kyrgyzstan. This will allow to develop recommendations as to how the participation of mountain communities and the multi-

functionality of forest management can be strengthened and how the responsibility for forest management can be shared by the key stakeholders in the future all being important steps towards the sustainable management of the walnut-fruit forests in the long term.

### Acknowledgement

The research project is funded through the Research Fellow Partnership Program (RFPP), an SDC funded initiative managed by the Swiss Centre for International Agriculture (ZIL ETHZ), and receives additional support from the Kyrgyz-Swiss Forestry Support Programme KIRFOR, the Forest Institute of the Kyrgyz Republic, CIFOR's research programme on Adaptive Collaborative Management (ACM), British Council and the ORS Award Scheme.

Nurlan Akenshaev, Mahabat Karajeva, Nurbek Mamatov and

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**SUPPORT AND COLLABORATION  
SOUGHT ON THE SUPPLY OF  
CUTTINGS OF DIFFERENT CLONES /  
HYBRIDS OF ARBORESCENT WILLOW**

I am looking for the support & collaboration on the supply of cuttings of different clones / hybrids of arborescent willow (*Salix alba*, *S. fragilis*, *S. acmophylla*, *S. excelsa*, *S. nigra*, *S. humboldtiana*, *S. matsudana*, *S. daphnoides*, *S. caprea*, *S. purpurea*, *S. amygdaloides*, *S. cardiophylla*, *S. gooddingii*, *S. laevigata*,) for introductive & adaptive trial in India, followed by breeding work for developing site-matched & end use specific clones under short rotation forestry .

The concerned scientists of different countries are kindly requested to contact me so that further formalities with regard to the IMPORT of plant material / cuttings can be worked accordingly.

Thank you very much for paying due consideration to help me for the cause of forestry research. The cooperation rendered , will be duly acknowledged in our ongoing research project on GENETIC IMPROVEMENT ON WILLOW.

Dr N. B. Singh  
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Deptt. of Tree Improvement & Genetic Resources  
College of Forestry  
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By Jelle Maas

2002 was the UN International year of mountains. Information is available at <http://www.mountains2002.org/>. It includes the UN general Assembly resolution on mountains, outcomes of the Bishkek Global Mountain Summit and several issue papers.

Mountain biological diversity was one of the items on the agenda of the 8th Meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA8) to the Conservation on Biological Diversity [www.biodiv.org](http://www.biodiv.org). Official documents, including 'Status and trends of, and threats to, mountain biological diversity' and 'Proposed elements for a programme of work on mountain biological diversity' are available in Word and PDF at [www.biodiv.org/convention/sbstta.asp#](http://www.biodiv.org/convention/sbstta.asp#)

The International Centre for Integrated Mountain Development (ICIMOD), was set up in 1981 to help promote the development of an economically and environmentally sound mountain ecosystem and to improve the living standards of mountain populations, especially in the Hindu Kush-Himalayan Region. ICIMOD works mainly at the interface between research and development and acts as a facilitator for generating new mountain-specific knowledge of relevance to mountain development [www.icimod.org](http://www.icimod.org).

ICIMOD also serves as the Secretariat for the Swiss-funded Asia Pacific Mountain Network [www.icimod.org/iym2002/apmn.htm](http://www.icimod.org/iym2002/apmn.htm) and the Mountain Forum [www.mtnforum.org](http://www.mtnforum.org).

The European Observatory of Mountain Forests [www.eomf.org](http://www.eomf.org) was established on the request of the European Federation of Local Forest Communities (FECOF) as a permanent independent forum for the development, monitoring and evaluation of the sustainable management of mountain forests.

The Global Mountain Biodiversity Assessment

[www.unibas.ch/gmba/](http://www.unibas.ch/gmba/) is a global network on mountain biodiversity research under DIVERSITAS, an international global change research programme on biodiversity.

The International Mountain Society [www.mrd-journal.org/about\\_mrd.htm](http://www.mrd-journal.org/about_mrd.htm) publishes the quarterly journal Mountain Research and Development together with the United Nations university [www.unu.edu](http://www.unu.edu) ([www.mrd-journal.org/index.htm](http://www.mrd-journal.org/index.htm)). This international peer reviewed journal specifically devoted to the world's mountains, has been published since 1981.

The Mountain Research Initiative (MRI, <http://www.mri.unibe.ch/>) strives to achieve an integrated approach for observing, modeling and investigating global change phenomena and processes in mountain regions, including their impacts on ecosystems and socio-economic systems. It is an initiative of the International Geosphere Biosphere Programme (IGBP), [www.igbp.kva.se](http://www.igbp.kva.se), International Human Dimensions Programme (IHDP), [www.ihdp.uni-bonn.de/](http://www.ihdp.uni-bonn.de/), UNESCO MAB [www.unesco.org/mab/](http://www.unesco.org/mab/) and Global Terrestrial Observing System (GTOS), [www.fao.org/GTOS/](http://www.fao.org/GTOS/).

Several additional links may be found in the introductory article to this issue (p. 5 - 11).

The Collaborative Partnership on Forests [www.fao.org/forestry/foris/webview/cpf/index.jsp?siteId=1220&langId=1](http://www.fao.org/forestry/foris/webview/cpf/index.jsp?siteId=1220&langId=1) was established in April 2001, following the recommendation of the Economic and Social Council of the United Nations (ECOSOC). It includes 13 international organizations (CIFOR, FAO, ITTO, CBD, GEF, UNCCD, UNFCCC, DESA, UNDP, UNEP, ICRAF, WB, IUCN). It was set up to foster increased cooperation and coordination on forest issues and support the work of the United Nations Forum on Forests (UNFF) [www.un.org/esa/forests/index.html](http://www.un.org/esa/forests/index.html) and its member countries.

**INTERNATIONAL PLANT GENETIC RESOURCES INSTITUTE**

*Vavilov-Frankel Fellowships 2003*

IPGRI has established the Vavilov-Frankel Fellowship Fund to commemorate the unique contributions to plant science by Academician Nikolai Ivanovich Vavilov and Sir Otto Frankel.

The Fund aims to encourage the conservation and use of plant genetic resources in developing countries through awarding Fellowships to outstanding young researchers.

The Fellowships will enable the applicants to carry out relevant, innovative research outside their own country for a period of between three months to one year. The research should have a clear benefit to the home country, preferably in areas of the applicant's future research. Awards can be held concurrently with other sources of support.

In 2003, a total of US\$40,000 will be made available for awards. The maximum award per Fellow will be US\$20,000 which is intended to cover travel, stipend, bench fees, equipment, conference participation or any other appropriate use. Such research should be linked to innovative topics related to the conservation and use of plant genetic resources such as new conservation technologies and strategies, socioeconomic and human aspects of conservation and use, germplasm management, forest genetic resources, policy development, genetic erosion assessment and mitigation and conservation and utilization of specific crops. Work solely on plant breeding or molecular characterization will not be selected. Fellows are encouraged to present the results of their research at an international conference. This can take place within one year of termination of the Fellowship.

Applications for the year 2004 are invited from

developing-country nationals, aged 35 or under, holding a masters degree (or equivalent) and/or doctorate in a relevant subject area. Application forms in English, French and Spanish may be obtained from:

Vavilov-Frankel Fellowships, IPGRI,  
Via dei Tre Denari 472/a,  
00057 Maccarese (Fiumicino),  
Rome, Italy;  
Fax: (39)0661979661  
or Email: e.clancy@cgiar.org

Http://www.ipgri.cgiar.org/training/vavilov.htm  
Applications can be sent by mail, fax or email.  
Applications must be received at IPGRI by 15 November 2003

Applications must be in English, French or Spanish and should include a covering letter, completed application form, full curriculum vitae, research proposal (maximum 1000 words which should include a clear statement of objectives, feasibility, methodology, materials, justification of the relevance to plant genetic resources, and possible outcomes or impacts), a letter of acceptance from the proposed host institute and a letter of support from the home institute. The successful applicants will be informed by 31 March 2003 and are required to take up their Fellowships before 31 December 2003. IPGRI is an institute of the Consultative Group on International Agricultural Research (CGIAR). IPGRI is a Future Harvest Center: <http://www.futureharvest.org>

**Small Grants Programme for Operations to Promote Tropical Forests**

The Small Grants Programme for Operations to Promote Tropical Forests (SGP PTF) is a European Commission (EC) funded initiative implemented by the United Nations Development Programme (UNDP) and executed by the SEAMO Regional Centre for Graduate Study and Research in Agriculture (SEARCA).

The SGP PTF has recently issued the first set of formal Calls for Proposals through a series of workshops and media releases. In addition details of these Calls, Guidelines for Applications and more detailed information with respect to SGP PTF operations can be obtained at the recently launched website available at <http://www.sgpptf.org>

Please feel free to share this information with interested colleagues and to include information of this development in your own media announcements.

Mark Sandiford  
Regional Programme Coordinator  
EC/UNDP SGP PTF  
SEARCA College  
Laguna 4031  
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Fax No: (63-49) 536-2477  
Email: [mark.sandiford@undp.org](mailto:mark.sandiford@undp.org)

**EC CALLS FOR PROPOSALS**

The European DG for Research have several calls for proposals that are relevant for tropical forest research, under the 6<sup>th</sup> framework programme (FP6), for information and links for calls that are open, please see EC news on page one.

**17TH INTERNATIONAL BOTANICAL CONGRESS**

*18 to 23 July 2005 in Vienna, Austria*

We wish to announce the availability of the First Circular for the 17th International Botanical Congress to be held 18 to 23 July 2005 in Vienna, Austria (nomenclature sessions 13 to 16 July). The First Circular and additional general information are available on our congress website <http://www.abc2005.ac.at/>. Specific details or clarifications can be obtained through e-mail from the Secretary-General: [office@abc2005.ac.at](mailto:office@abc2005.ac.at).

Please see the registration form in our website, fill in the requested information, and return the form (preferably electronically) to:

Dr. Josef Greimler  
Secretary-General, IBC 2005  
Institute of Botany, University of Vienna  
Rennweg 14  
A-1030 Vienna, Austria  
e-mail: [office@abc2005.ac.at](mailto:office@abc2005.ac.at)  
Phone: +43-1-4277-54123  
Fax: +43-1-4277-9541

**Please note the deadline for proposals for symposia: 30 September 2003.** The Second Circular will be distributed in the summer of 2004.

**CONGRESS ON 'GLOBALISATION, LOCALISATION AND TROPICAL FOREST MANAGEMENT IN THE 21<sup>ST</sup> CENTURY'**

*22 to 23 October 2003*

Roeterseiland, Amsterdam, the Netherlands  
Website: <http://gp.fmg.uva.nl/agids/agids/globalisation.html>

**Background**  
Globalisation and localisation have altered the actors involved in forest management. The role

of the nation state has eroded, while that of the private sector and civil society is on the increase. Forest management is no longer in the hands of a single entity (whether government, NGO or local community), but increasingly the product of negotiations and joint actions between players at the global and local level. Consequently, the start of the 21<sup>st</sup> century is marked by new forums for stakeholder negotiations, alliances and joint actions for the protection and co-management of forest resources. These can be found at the global level (e.g. the World Bank/WWF Alliance for Forest Conservation) and at the regional level (e.g. the Amazon Cooperation Treaty and the Guiana Shield Initiative), while numerous partnerships for the protection and co-management of forest resources emerge at the global-local interface between international donors, government agencies, national and international NGOs, private sector actors, research organisations and communities.

International agreements and initiatives were not able to curb deforestation. The question now rises as to whether and under what conditions the new alliances and partnerships will be able to put sustainable forest management understood as deliberate efforts to maintain the forests' ecological values, production services and their role as source of livelihood for the rural poor into effect and play a role in improving the living conditions of 500 million people who depend on forests for their livelihoods.

**Objectives**

- To bring together current knowledge on and experience with the potential of new markets (for certified forest goods, CO<sub>2</sub> emissions and ecological services) and global-local partnerships, and their effects on tropical forest conservation, management and poverty alleviation.
- To identify 'lessons learnt' and conditions for successful and effective market initiatives and multi-scale partnerships.
- To discuss opportunities and bottlenecks in

relation to new markets and multi-scale partnerships for the livelihoods of forest-dwelling people and communities at the forest fringe, including potential exclusion of stakeholders under the new management arrangements.

- To define recommendations for policy and research on tropical forest management in a globalising environment.

**Participants**

Scientists and students in human geography, anthropology, economics, development studies, environmental sciences, tropical forestry, etc.; representatives of development agencies, environmental organisations and other NGOs; policy makers at national and international level, natural resource and forestry professionals.

**Preliminary programme**

The two-day congress programme will include plenary sessions, regional and thematic workshops and a poster session.

Day one will focus on markets and the potential of responsible trade, certified forest products, new financial mechanisms for forest conservation and the trade in forest values for improving the livelihoods of forest-adjacent communities. Proposed mini-symposia/workshops on this day include:

1. The feasibility of payments for ecosystem services in the conservation of tropical forests
2. Opportunities for forest markets to benefit local low-income producers.
3. Greening logging companies: the potential of timber certification

Day two will focus on global-local partnerships for sustainable and collaborative forest management, paying specific attention to the role of local communities and science. Proposed mini-symposia/workshops are:

1. The Guyana Shield Initiative as a proposal for a global-local partnership for sustainable forest use
2. Global-local partnerships for conservation and sustainable use

3. A learning perspective on partnerships in collaborative forest management

Keynote speakers include the following persons:

1. Catrinus Jepma (RUG/UvA) who will speak on carbon crediting and sustainable forest management
2. Marcus Colchester (WRM) will give a lecture on global networking for community forestry
3. Melissa Leach (IDS) will highlight whether globalised science does work for the poor (a new book on this subject with James Fairhead will appear this summer)
4. Arturo Escobar (University of North Carolina) will synthesise the presentations and elaborate on the need for new models of political dialogue and interaction

**Expected outputs**

Planned publications include a pre-congress background document, a summary document with ideas for follow-up projects, research proposals and "lessons learnt" about the significance, opportunities and constraints of multi-level and multi-stakeholders partnerships for forest conservation and management; proceedings; and refereed journal articles.

**Sponsorship**

This congress is being organised with support from several organisations based in the Netherlands. Core funding comes from the Amsterdam Institute for International Development (AIID) and the University of Amsterdam and additional financial support from the International Agricultural Centre (IAC) in Wageningen and Oxfam-Netherlands (Novib). Organisational support is also provided by Tropenbos International, the Centre for Latin American Research and Documentation (CEDLA) and the Institute for Environmental Studies (IVM, Free University). The pre-congress background document is sponsored by the European Tropical Forest Research Network

## Other News

(ETFRN) and will be published as the ETFRN News Summer Issue (No 39). The congress will merge with the seminar organised in the framework of the IAC training programme "Leadership and Adaptive Management in Forest Environments".

If you are interested in becoming involved providing financial assistance in support of Congress, for instance to enable the participation by more scholars and practitioners from developing countries or a wider dissemination of congress results.

### Contact

Dr Mirjam A.F. Ros-Tonen.  
Amsterdam Research Institute for Global Issue and Development Studies (AGIDS)  
University of Amsterdam  
Email: m.ros@frw.uva.nl

### Further information

Information about the social programme, hotel accommodation, congress fees and how to register can be found at <http://gp.fmg.uva.nl/agids/agids/globalisation.html>

## INTERNATIONAL AGRICULTURAL CENTRE (IAC) WAGENINGEN, THE NETHERLANDS

### TRAINING PROGRAMME ON LEADERSHIP AND ADAPTIVE MANAGEMENT IN FOREST ENVIRONMENTS

Duration: 1-11 weeks

Period: September- November 2003

We are pleased to inform you about this year's IAC training programme on collaborative adaptive forest management (CAFM) and biodiversity conservation (BC). The course is designed for managers, co-ordinators, senior staff, policy-makers, trainers and researchers, involved in the policy and practice of collaborative forestry and nature management. They wish to renew, broaden and strengthen

their professional and leadership qualities and share experiences with colleagues from other countries and continents, and are committed to critically assess their own work and environment.

### Course Focus

Collaborative adaptive forest management aims at achieving a balance between the conservation and utilisation of forest resources in the pursuit of rural development and sustainable livelihood in complex and dynamic environments. Therefore, foresters who work in CAFM need a balance of social and technical skills and insights. In response to this need the programme covers the following broad areas of interest: collaboration and decision-making between stakeholders, integrated land use, sustainable adaptive forest management, biodiversity conservation, poverty reduction, equity and empowerment. Training is based on experience-based and task-oriented learning, which participants and resource persons develop together.

### Outline of the programme

The training programme offers five short courses and one seminar, addressing different aspects of collaborative adaptive forest management. Although each of the courses is designed to stand alone, the programme permits various combinations. The full course program comprising all six elements provides a comprehensive package on collaborative forest management and biodiversity conservation. The programme consists of the following short courses:

- Professional qualities for facilitation and collaboration in NRM, 8-19 Sept.
- Leadership, organisational change and interactive planning for adaptive forest management, 22 Sept-3 Oct.
- Design, management and evaluation of collaborative forestry programmes, 6-17 Oct.
- Congress on 'Globalisation, localisation and tropical forest management in the 21<sup>st</sup> century, 21-24 Oct. (in collaboration with University of Amsterdam and Tropenbos

## Other News

International)

- Sustainable forest management and biodiversity conservation, 27 Oct-7 Nov.
- Integrated land use planning & environmental impact assessment, 11-21 Nov.

More information and application forms can be obtained from our website or from the address below:  
IAC, P.O. Box 88, 6700 AB Wageningen  
The Netherlands  
Fax: + 31 317 495 395  
E-Mail: [Training@IAC.AGRO.NL](mailto:Training@IAC.AGRO.NL)

## 1ST WORLD CONGRESS OF AGROFORESTRY Working Together for Sustainable Land-use Systems

27 June to 02 July 2004 Orlando, Florida, USA

### Background

Agroforestry began to attain prominence in the late 1970s, when the international scientific community realized its potentials in the tropics and recognized it as a practice in search of science. During the 1990s, the relevance of agroforestry for solving problems related to deterioration of family farms, increased soil erosion, surface and ground water pollution, and decreased biodiversity was recognized in the industrialized nations too. Thus, agroforestry is now receiving increasing attention as a sustainable land-management option the world over because of its ecological, economic, and social attributes.

Agroforestry research and development are, however, at a crossroads today. The potential of the practices has been amply illustrated, but the investment in a science base has not reached a level that can meet the demand for technology delivery. It is time, therefore, to evaluate progress, assess available options, and design strategies for the future.

### Program

The overall Congress theme is "Working

Together for Sustainable Land-use Systems." Plenary, concurrent, and poster sessions will be organized around five major topics:  
Improvement of Rural Livelihoods  
Enhancement of the Environment and Landscape  
Agroforestry Science and Education  
Policy, Social, and Institutional Issues  
Agroforestry: The Next 25 Years

### Who Should Attend

Academics  
Development Professionals  
Environmental Consultants  
Extension Specialists  
Farmers/Land Owners  
Government Officials  
Land Managers/Consultants  
Natural Resource and Forestry Professionals  
Non-Government and Private-Voluntary Organizations  
Policy Makers  
Private Sector Representatives  
Scientists  
Students

### Congress Objectives

To provide a global forum for agroforestry professionals to share knowledge, experiences, and ideas.  
To plan future strategies in agroforestry research, education & training, and development.

### Expected Outputs

Planned publications include a state-of-the-art compendium, a summary document, a book of abstracts, and refereed journal articles. A declaration that embodies the essence of Congress deliberations will be developed as a tool for discussions with policy makers and donor agencies to advance the cause of agroforestry worldwide.

### Sponsorship

The Congress is being organized as collaborative effort by a diverse group

## Other News

institutions worldwide. Current sponsors the Inter-American Institute for Cooperation Agriculture (IICA); Mars, Inc.; University of Florida/IFAS; and the World Agroforestry Centre/ICRAF. If you are interested in becoming involved in this effort providing financial assistance in support of the congress, please contact P.K. Nair.

### Co-Chairs:

Dennis Garrity, World Agroforestry Centre/ICRAF, Nairobi, Kenya  
Gregory Ruark, USDA/Forest Service, National Agroforestry Center, Lincoln, NE, USA  
Howard-Yana Shapiro, Mars, Inc., Hackettstown, NJ, USA

### Contact Information:

Technical Program and Sponsorship  
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Director, Center for Subtropical Agroforestry  
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PO Box 110410 Gainesville, FL 32611-0410, USA  
Tel: 1-352-846-0880  
Fax: 1-352-846-1277  
E-mail: pknair@ufl.edu  
Web Site: www.sfrc.ufl.edu/pknair

### Congress Logistics

Mandy Padgett, Conference Coordinator  
Office of Conferences & Institutes,  
University of Florida/IFAS,  
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E-mail: mrpadgett@mail.ifas.ufl.edu  
Web site: http://conference.ifas.ufl.edu/

### LIST SERVER

**On people, land management and  
Ecosystem Conservation**

*PLECserver 25 November 2002*

PLECserv- a free list-serv has been recently set up by the United Nations University Project on

People, Land Management and Ecosystem Conservation at <http://c3.unu.edu/plec>. The PLECserv objective is to inform the scientific and professional community concerned with rural development and conservation in smallholder farming regions of the developing world, by calling attention to recent publications, new research methodology, and developments in agrobiodiversity, in the study of farmer innovation and farmers' technical knowledge, and in development practice and thinking generally. The first issue of PLECserv will appear early December 2002, and will be twice-monthly from then on. You are welcome to subscribe PLECserv either through the web form or by email. To via email, send email to [plec-request@list.unu.edu](mailto:plec-request@list.unu.edu). In the body of the message, type subscribe [password] [digest-option] [address=<address>]. [password]: Optional. Your password must be given to unsubscribe or change your options. When you subscribe to the list, you'll be reminded of your password periodically. [digest-option]: Optional. 'digest-option' may be either 'nodigest' or 'digest' (no quotes). [address=<address>]: Optional. If you wish to subscribe an address other than the address you send this request from, you may specify "address=<email address>" (no brackets around the email address, no space around the equal symbol, no quotes).

### INTERNATIONAL PH.D PROGRAMME SUPPORTS TEAMWORKA

Giuliana Deflorio from Italy has been taking part in the international Ph.D. programme in Freiburg "Forestry in Transition" for one year and "feels quite at home". The aim of the programme which is funded by the DAAD (German Academic Exchange Service) and the DFG (German Research Council), is to make Ph.Ds more attractive and competitive on an international level. The programme provides foreign Ph.D students with the possibility to finish their project within three years.

## Other News

The programme offers intensive academic guidance to the participants. Another programme objective is to assist participants to develop scientific qualifications by offering language courses, workshops about scientific working methods and discussion platforms to facilitate an exchange of knowledge. As not every participant knows sufficient German, the main language is English.

Giuliana participated in a one-week seminar dealing with "techniques of presentation". She feels a lot more secure for when she has to present her project. This spring the IPP is going to offer its participants courses in "scientific writing" and "time-management". Hoang ho Dac Thai from Vietnam is visiting a German course two times a week together with three other IPP-students. In this small group of four students the rate of success is high and moreover everybody enjoys meeting and getting to know one another.

Giuliana does her research at the Institute for Forest Botany and analyses the effects of wood decomposing fungi. Her professor and a second professor from the Institut of Forest Utilization provides her with scientific advices. The IPP programme secures academic supervision through two professors right from the start. Moreover the IPP finances a student assistant for her laboratory and field work. It is also possible to invite guest scientist for a short period of time to complement the scientific research. This gave Jelena Tomicevic from Serbia the possibility to work together with a Professor from her home-university.

Giuliana was in Australia for two months. She learned a lot about research methods at one of the few scientific institutions that deal with her topic. IPP made this possible. She is glad for the experience and recommends everybody to make use of this opportunity. After returning she presented her research concept at the monthly IPP discussion-platform and discussed it with the other participants. "Through the different

points of view everyone learns from the others", says Giuliana Deflorio. This scientific exchange among the students participating in the IPP is of great importance. Esther Muschelknautz, the coordinator of the programme, says, that it took a while, before participants were willing to examine a topic completely different to their own. But now they are very motivated and believe in the advantages of the IPP-network. At the moment the coordinator is organising a four-day trip to the Biosphere Reserve "Pfälzer Wald".

In addition to the opportunities, which the programme offers, the participants have to report on their progress on a regular basis. By most of the students this pressure is seen as an incentive, to structure and plan their research. The participants have to present their results every year in milestone-colloquies in front of a bigger audience, for example.

The programme is funded for three years and is supplied with a budget of Euro 175 000 per year. The maximum number of Ph.D students admitted to the programme is 30. There are still ten places left. As a structural programme it does not offer scholarships. The participants have to look for a scholarship or other financial source themselves. Graduates with an above average Diploma or Masters degree can apply to the programme. The next application deadlines are the 15<sup>th</sup> of July 2003 and the 15<sup>th</sup> of January 2004.

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**GRASSROOTS PEOPLE'S ORGANISATIONS AND FOREST RESOURCES DEVELOPMENT: THE PROSHIKA CONCEPT**

Since 1976, Proshika, a non-government development organization working throughout Bangladesh has been conducting participatory sustainable development through empowerment of the poor. Proshika has been working to improve the access of the poor to public land, water and forest resources through people's participation in natural resource management. To this end, Proshika has been facilitating grassroots people's organizations (Trinomul Janasangathans), supporting them with training and education, credit, technical assistance and marketing programmes.

Under the Social Forestry Programme, Proshika planted about 2.5 million seedlings with active participation of 2317 organized groups (20 persons on average) with food assistance by the World Food Programme (WFP) between 1991 and 1998, and from 1997 to 2001 about 3.4 million seedlings with 1974 groups, with financial assistance of the EU food security project. Proshika also implemented forestry activities with financial assistance by the Heinrich Böll and Ford Foundations. It has played a significant role in protecting the rapidly degrading natural sal forest in the central region of Bangladesh with involvement of the grassroots organizations of the poor.

Proshika has learnt several lessons in the quarter century of its activities:

Participation of grass-root people is the best means for regeneration and protection of forest resources.

Environmental awareness and commitment are the key concern for natural forest protection and regeneration.

Organizing, training and technical assistance to grassroots groups are effective means for capacity building of poor people.

Organized group members are able to run tree nurseries if trained in appropriate techniques

of nursery development.

Benefit-sharing arrangements are essential for effective management and sustainability. Natural forest protection activities require small amounts of financial assistance.

Substantial income and employment is generated through nurseries, pruning and thinning materials and selling trees.

Groups can efficiently provide reliable land information on tenure and land use and produce an effective sketch map of their environment; ensure fuelwood supply in the local market; and ensure better nutrition through planting improved varieties of fruit species.

Policy advocacy can help incorporate the concept of participatory forest management for natural forest protection in government forest policy.

In 1997, Proshika started social forestry programme in the Chittagong Hill Tracts region of Bangladesh, since these uplands are being mismanaged, resulting in soil degradation, erosion and silting up or disappearance of many streams. The forest coverage has been increased through this intervention with active participation of the organized groups. Government should complement this result by strengthening the land rights of the people and enacting a pro-people forest law. The beneficiaries appreciate the social forestry project for its contribution to income generation, fuelwood, timber, fodder, fruits, herbal medicine, environmental conservation, training and social empowerment.

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**ENVIRONMENTAL RESEARCH FOR SUSTAINABLE DEVELOPMENT: A REVIEW AND OUTLOOK ON AUSTRIAN CO-OPERATIONS WITH (SUB-)TROPICAL AND MEDITERRANEAN PARTNERS**

In November 2002 a conference for Austrian researchers and their counterparts in (sub-)tropical and Mediterranean partner countries took place in Vienna. It was organised by the Austrian National Node of ETFRN based at the Institute for Forest Ecology (University of Natural Resources and Applied Life Sciences, BOKU). The purpose of the conference was a review and open discussion on the future of environmental research in partner countries of Austrian research institutions, NGOs and the Austrian Development Co-operation (ADC).

On the first day, a broad spectrum of best-practice projects was presented to the audience. The topics ranged from biodiversity, sustainable use of natural resources, appropriate technologies to research partnerships for development. After this review of past and present work, the second day of the workshop was dedicated to discussions on visions for future development. Working groups focused on financing, interdisciplinary participation and the role of stakeholders, profiling and focus, and capacity building. As a result of this discussion process, a strategy paper on the future role of Austrian environmental research with (sub-)tropical and Mediterranean partner countries was formulated.

This strategy paper particularly emphasises the need for long term networks and partnerships, as well as the establishment of long term national funding programs linked with international programs. Further more the integration and harmonization of the funding systems of various donors is requested in the paper, as well as more emphasis on demand driven research, open exchange, and sharing of research results. Research agendas should be jointly formulated by decentralised and

participatory, south based and proactive. Finally it was emphasised, that more consideration of ethical and cultural aspects, as well as gender issues, would be required. For a follow-up on the outcome of this conference, it would be necessary to initiate a workshop series on specific topics, and to establish working groups, as well as a coordination unit for environmental research and development in Austria.

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**FOREST COVER MAP OF INSULAR SOUTHEAST ASIA**

A new forest cover map of insular Southeast Asia at a scale of 1:5,5 million has been recently published by the Global Vegetation Monitoring Unit (IES/GVM) of the European Joint Research Centre at Ispra, Italy.

This map is one result of JRC's TREES project and reflects present possibilities of regional (and sub-regional) mapping of tropical forest cover from satellite images of coarse spatial resolution. The map has been produced from SPOT4-VEGETATION satellite images of the years 1998 2000 and of a spatial resolution of 1km by 1km.

The new forest cover map has been designed to provide an overview on forest cover at the beginning of the year 2000 for the sub-region of insular Southeast Asia, including Papua New Guinea (PNG). At such scale the map may serve as a reference, as base layer for further detailed forest mapping and assessment, and for regional vegetation modelling. The map has not been designed to provide the detail and accuracy required for most local forestry applications.

## Other News

The thematic focus of the map has been put on the differentiation between 'forest' and 'non-forest', although further distinction has been introduced for evergreen montane and lowland forests, swamp and mangrove forests. An indication on the extent of the burnings on Sumatra, Borneo and PNG in 1997/98 is given by the non-forest classes.

A paper copy of the map can be obtained from JRC and the digital data set is available from [http://www.gvm.jrc.it/Forest/asia/carto\\_sea2000.htm](http://www.gvm.jrc.it/Forest/asia/carto_sea2000.htm).

The map data set has also been integrated into a new global land cover database for the year 2000 (GLC2000) prepared by JRC. The GLC2000 SE-Asia and global datasets are available from <http://www.gvm.jrc.it/glc2000/ProductGLC2000.htm> free of charge for non commercial users.

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### HIMALAYAN RESOURCES INSTITUTE (HIRI)

#### Background

Himalayan Resources Institute (HIRI) is a Government-registered, action-oriented and non-profit making Non-Governmental Organization (NGO) registered in District Administration Office, Bharatpur, Chitwan, Nepal (Registered No. 57/057/58), established in 2000 in Bharatpur, Chitwan, Nepal with the objectives of serving the Himalayan people and the World through scientific communication on research and development of Himalayan resources, their conservation and promotion and sustainable utilization. HIRI is concerned with the exploration, economic utilization, conservation and management of Himalayan ecosystems based on past human experiences,

activities and their achievements at present. HIRI also coordinates with different scientific institutions and individuals of the Himalayan regions and the world in scientific research and development related to the Himalayan biodiversity. HIRI has already conducted several such scientific communications with the scientific institutions and individuals of Nepal and the world regarding Himalayan Biodiversity. HIRI's mandate is research and development on Himalayan resources to alleviate poverty within a sustainable development framework. The very conception of HIRI is deeply rooted in worldwide concerns about the over-exploitation and destruction of Himalayan resources. In its focus on environment and sustainable development, HIRI's activities significantly contribute the spirit of Agenda 21st of the Earth Summit at Rio. HIRI develops, provides and promotes appropriate technologies and other resource based solutions to benefit people and their environment. HIRI is dedicated in enhancing the contribution of Himalayan resources to livelihood security, food security and ecological security for life on Earth.

#### Vision

The vision of HIRI is to improve human welfare through the sustainable use of Himalayan resources.

#### Mission

The mission of HIRI is to promote education, research, extension, and services on the sustained economic utilization, restoration and conservation of Himalayan ecosystems. The premise of HIRI is that problems of Himalayan resources conservation and management cannot be solved by technical solutions alone. HIRI programs therefore emphasize the integration of the biological and social sciences and promoting professional, disciplinary and land use boundaries. HIRI believes in the development and use of Himalayan resources to raise the socio-economic condition of the rural and urban people and the country. It intends to

## Other News

conduct need-based programs depending upon the availability of local resources.

#### Objectives

HIRI's objectives include:

- 1.To carry out action-oriented people's participatory research, training and developmental programs in different issues related to the Himalayan resources (biological, physical and human resources) for conservation, management and utilization of natural resources.
- 2.To create awareness at different levels about the roles of Himalayan resources in sustainable development by establishing information exchange system and proper co-ordination, networking and sharing on Himalayan resource.
- 3.To compile, preserve and promote indigenous knowledge, skill and technology on Himalayan resources to speed up the process of sustainable development.
- 4.To conceptualize and develop ideas and implement joint programs in collaboration with local, national, regional and international scientists, conservationists, managers, decision makers, planners and relevant institutions.
- 5.To organize meetings, workshops, seminars and conferences on Himalayan resource and to suggest, recommend and support in policy making and to assist in implementation of action plans.
- 6.To publish information, education and communication (IEC) materials those are relevant to biodiversity conservation and sustainable development and can be used by both the scientific community and the majority of rural people.

#### HIRI's program of works is divided into three areas:

1. Research,
2. Development and
3. Extension

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### UGANDA SEEKS EXECUTIVE DIRECTOR FOR NATIONAL FORESTRY AUTHORITY

The Government of Uganda has embarked on a major reform of the forestry sector. As part of this reform a new National Forestry Authority (NFA) will be established as the successor institution to the present Forestry Department. A launch date in early 2004 is planned. The Executive Director is being recruited before this date to contribute to the launch of the new organisation, prior to assuming responsibility for its day-to-day operations.

Closing date for applications is 8 August 2003

For more details please see:  
<http://www.etfrn.org/etfrn/opportunities/nfajob.htm>

or contact: [gasterk@ugandaforests.org](mailto:gasterk@ugandaforests.org)

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By Bert van der Linden

**PLANTAS ÚTILES DE LA AMAZONIA COLOMBIANA**

*Perspectivas de los productos forestales no maderables*

D.C. López, R.L. Camacho (2000)

This Spanish publication of the Amazonian Institute for Scientific Research SINCHI of the Colombian Ministry of the Environment, in collaboration with the Herbarium of Colombian Amazon (COAH), presents an overview of 665 non-timber plant species known for their uses and benefits to (local) communities in the Colombian Amazon. The overview provides information on types of use and distribution of the listed plant species, as well as commercial aspects of the products, such as actual local, national and international markets, and perspectives and considerations. The publication contains extensive annexes with tables and herbarium photos of all listed species.

ISBN: 958-96878-4-9, 133 p.  
 PRODUMEDIOS  
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 Tel:+57 288 5338

**LINKS BETWEEN BIODIVERSITY, CONSERVATION, LIVELIHOODS AND FOOD SECURITY**

*The sustainable use of wild species for meat*

S. Mainka and M. Trivedi (2002)

This Occasional Paper of the IUCN Species Survival Commission no.24 contains the proceedings of a workshop held in Cameroon in October 2001 as a first step towards

implementation of IUCN Resolution 2.64 on the unsustainable commercial trade in wild meat. It provides the communiqué and a summary of the discussions held and contains the background information presented to participants at the workshop, such as perspectives on food security and livelihoods, sustainability and impacts of wild meat harvests, current and potential institutional responses. Results and conclusions of the workshop are included.

Available from:  
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 Email:books@iucn.org  
 Website: www.iucn.org/bookstore

**FOREST CARBON AND LOCAL LIVELIHOODS: ASSESSMENT OF OPPORTUNITIES AND POLICY RECOMMENDATIONS**

*CIFOR Occasional Paper no. 37*

J. Smith and S.J. Scherr (2002)

This policy report, jointly produced by CIFOR and Forest Trends, examines the potential benefits to local livelihoods from participation in forest carbon projects, as well as the possible threats. Different project options, such as multi-species, community-based reforestation and multiple-use agroforestry, are evaluated in terms of their capacity to meet criteria of the Clean Development Mechanism (CDM) of the Kyoto Protocol, an international instrument that has been created for trading carbon emissions offsets produced in developing countries, and sustainable development. The report distills lessons learned from experience in pilot carbon projects and social forestry on how carbon

projects can enhance local benefits, and suggests conditions necessary for project success.

The report also builds on expert discussions held at a workshop on this matter in Italy in 2000, and includes results from new forest carbon projects and other forest market activities by low-income producers. The study points to the opportunities that are emerging to structure new ecosystem service markets so that they benefit a much wider group of people, particularly low-income forest-dwellers and rural residents, than has been true for commercial forestry in the past.

ISSN: 0854-9818, 45 p.  
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 The paper is published on the web in downloadable format at  
 Http://www.cifor.cgiar.org/publications/papers

**STRENGTHENING LIVELIHOODS: Exploring the Role of Beekeeping in Development**

N. Bradbear, E. Fisher and H. Jackson (2002)

In September 2000 the International Symposium on 'Sustainable Livelihoods: exploring the role of beekeeping in development' was the first to expand the sustainable livelihoods agenda into the field of beekeeping in development. The Symposium was organised by Bees for Development and received financial support from the UK DFID's Livestock Production Programme. This publication is an outcome of the symposium. It emphasises that beekeeping is an important

occupation and part of rural life worldwide. In communities where access to income is limited, small-scale beekeeping can contribute significantly to livelihood security, and yet the practice of beekeeping is underplayed in both policy and planning. This book challenges the marginalisation of beekeeping in rural development and asks whether a sustainable livelihoods approach can offer a way forward. Contributions are included from beekeeping development practitioners, development practitioners, and social scientists. Case studies are presented from around the world, including Cameroon, The Caribbean, India, Tanzania and Zambia.

ISBN 1 898807 01 9, 122 p.  
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**UNDERSTANDING AND CAPTURING THE MULTIPLE VALUES OF TROPICAL FOREST**

*Proceedings of the International Seminar on Valuation and Innovative Financing Mechanisms in support of conservation and sustainable management of tropical forest*

P. Verweij (ed.) (2002)

This book addresses the multiple values of tropical forests and new financing mechanisms to capture these values. The chapters reflect contributions to the international seminar 'Valuation and innovative financing mechanisms in support of conservation and sustainable management of tropical forests'. The seminar was organised by Tropenbos International in cooperation with the European Tropical Forest Research

Network (ETFRN) in March 2002.

The first part of the book deals with the economic valuation methods of tropical forests and whether or not the magnitude of services forests can provide to mankind are exaggerated or not. Studying the multiple values of tropical forests has become a window for understanding the insufficiency of current revenues for conservation and sustainable forest management. Innovative financing mechanisms are being developed with the aim to increase these revenues in turn for sustainably produced goods and forest services. The second and last part of this book is dedicated to various examples and a review of current innovative financing mechanisms. The final chapter contains the policy and research recommendations that resulted from the seminar workshops. The policy recommendations were also presented at the Global Biodiversity Forum and CoP-6 Biodiversity.

ISBN: 90-5113-064-3, 140 pages  
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Email: tropenbos@tropenbos.agro.nl.  
(also downloadable version available)

**PEOPLE AND FORESTS**

*Opportunities for improving livelihoods, alleviating poverty, and safeguarding the environment through sustainable forest management*

The German Facharbeitskreis Waldwirtschaft, an informal panel of professionals on sustainable forestry issues, hosted by the German Agency for Technical Cooperation (GTZ), has published a brochure with recent approaches to technical cooperation in the

forest sector with corresponding case studies. It provides a brief overview on the state and implications of the international forest policy dialogue and insight into the work of selected projects in partner countries. It is meant to raise awareness on the complexity of sustainable forest management in the age of globalisation and to reveal the diversity of demands on technical cooperation in the sector. This diversity is reflected in the project examples ranging from community-based forest management at local level to national forest policy advice and in the different perspectives from which the projects are described.

Published in 2002 by Facharbeitskreis Waldwirtschaft  
c/o GTZ  
Dag-Hammarskjöld-Weg 1-5  
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**GLOBAL NEWSLETTER ON UNDERUTILISED CROPS**

The International Center for Underutilised Crops (ICUC) of the University of Southampton, UK focuses its activities in three areas: knowledge based information and dissemination on under-utilised species; research and development, concentrated in the areas of South Asia and sub-Saharan Africa in the context of sustainable livelihoods, and human resources development for the promotion and sustainable production of under-utilised crops. ICUC publishes a newsletter to disseminate news on the use of under-utilised crops worldwide in order to strengthen (national) programmes. The newsletter contains information on organisations concerned with under-utilised crops, networks, crops news, recent meetings, forthcoming events, publications of interest, under-utilised crops on the Internet, useful databases and useful addresses.

as PDF - Files.

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**ENHANCING RESEARCH CAPACITY IN DEVELOPING AND TRANSITION COUNTRIES**

*KFPE (2001)*

This publication provides a variety of experiences, discussions, obstacles, strategies and tools to promote research capacity in developing and transition countries. It is a compilation of contributions to an international workshop held in Switzerland in 2000, organised by the Swiss Commission for Research Partnerships with Developing Countries (KFPE). The book is divided in five parts. Part I presents general contributions on the subject addressing the challenge of enhancing research capacity in developing and transition countries. Part II contains contributions on lessons learnt from research experiences in different contexts. In Part III attention is paid to the experience gained with the "Development and Environment" Module of the Swiss Priority Programme for the Environment (SPPE). Part IV focuses on strategies and tools used by funding agencies to strengthen research capacity in developing and transition countries. Finally, Part V provides an overview of donors' main activities related to research for development.

ISBN 3-906151-49-2, 316 p. Geographica Bernensia, Bern  
The following Parts of the Book are available

Part I: The Challenge of Enhancing Research Capacity in Developing and Transition Countries  
Part V: Overview of Donor's Main Activities Related to Research and Development  
The ordinary Price is 25 Swiss Francs or 15 US\$, and free of charge for institutions in developing and transition countries  
[http://www.kfpe.unibe.ch/key\\_activities/workshops/conf2000.html](http://www.kfpe.unibe.ch/key_activities/workshops/conf2000.html)

**THE OVERSTORY BOOK**  
*Cultivating connections with trees*

*G.R. Elevitch and K.M. Wilkinson (2001)*

This book contains user-friendly, practical information for designing, installing and predicting financial returns from agroforestry and farm forestry practices. Over 300 agroforestry plants are featured. Text, tables and figures detail species uses, habitats, and products including nuts, fruits, spices, cultural and medicinal uses, animal fodder, timber, honey production, wildlife habitat and more. Moreover, the book provides a great number of sources of additional information that can be consulted on the subjects dealt with in this book, i.e. other books, but also websites.

ISBN 0-9702544-1-5, 430 p. Available as a book or as a searchable CD with live web links. The book and/or CD can be ordered by money order to  
Permanent Agriculture Resources  
P.O.Box 428  
Holualoa, HI 96725  
USA or by phone/fax, providing credit card number and exp. Date at 808 324 4427/4129. The book/CD can also be ordered from the website at [www.agroforestry.net](http://www.agroforestry.net). Prices: book: \$39.95 plus shipping; CD: \$16.95 including shipping; book+CD: \$49.95 plus shipping; book + CD: \$49,95 plus shipping.

**SEEDING SOLUTIONS**

The Crucible II Group is a group of individuals that share a passion for plant genetic resources but disagree on many controversial subjects like intellectual property and rights of farmers. This group publishes a series called Seeding Solutions.

Volume I: Policy options for genetic resources: People, Plants, and Patents revisited, brings readers up to date on what has changed, scientifically, politically and environmentally, since the first publication in 1994 of People, Plants, and Patents, the book that summarised the major issues related to the ownership, conservation and exchange of plant germplasm. Volume I offers policymakers a clear description of the facts, the fights and the fora relevant to genetic resources. The book explains why germplasm is important and how it relates to trade negotiations, intellectual property disputes and national and international food and health security. Volume II: options for natural laws governing control over genetic resources and biological innovations, discusses legal mechanisms to address three main points: (1) the need to conserve and exchange germplasm for the benefit of present and future generations; (2) the need to encourage innovation in the conservation and enhancement of germplasm; and (3) new options for securing and strengthening the rights and interests of indigenous and rural peoples in their role as creators and conservers of biological diversity.

ISBN 0-88936-926-7 (Volume I), 0-88936-958-8 (Volume II)  
Published by:  
International Plant Genetic Resources Institute  
Via delle Sette Chiese, 142  
00145 Rome  
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Website: <http://cgiar.org/ipgri>.

**HANDBOOK FOR THE FIELD ASSESSMENT OF LAND DEGRADATION**

*M.A. Stocking & N. Murnaghan (2001)*

This handbook presents simple, non-technical indicators for assessing land degradation in the field. It shows how to calculate indicators such as those of soil loss and explains the interpretation of results and, in particular, how combinations of different indicators can give conclusive evidence of the severity of land degradation. The focus of the book is on understanding the farmer's interaction with the land, and how environmental protection, food security and the well being of rural land users may be assured.

The book can be used as a training manual for field workers as it contains detailed figures, photographs, worked examples and sample forms based on techniques validated by professionals in Africa, Asia and Latin America.

ISBN 1 85383 831 4, 169 p.  
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Website: <http://www.earthscan.com.uk>.

**THE MIRACLE TREE  
The multiple attributes of Moringa**

*L.J. Fugli (ed) (2001)*

This booklet provides an overview of the many

attributes of the Moringa tree, whose thirteen known species are native to Africa and South Asia. The tree was well known to the ancient world and it has been rediscovered as a multi-purpose tree with a tremendous variety of potential uses. The best known species is probably the *Moringa oleifera*, a fast growing tree from sub-Himalayan Northern India, but now widely distributed worldwide in the tropics and sub-tropics. The information presented in this booklet was collected from many sources: fieldwork, articles written by people researching Moringa, individuals and organisations promoting various uses of the tree. The book also contains information on the cultivation of the tree.

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Website: [www.churchworldservice.org](http://www.churchworldservice.org).

**ADAPTIVE MANAGEMENT, FROM THEORY TO PRACTICE  
SUI Technical Series Vol.3**

*J. Oglethorpe (2002)*

In this volume 14 papers are presented dealing with the subject of adaptive management. The papers were presented at two workshops held in 1999. The papers examine adaptive management from a number of perspectives, ranging from discussions of the theory behind adaptive management to case studies illustrating how the concept is applied in local management regimes. Some papers provide an insight into the practical applications of adaptive

management in community-based management of forests. Others look at the role of modern technologies in facilitating decision-making in community-based management of natural resources.

ISBN: 2-8317-0526-6, 166 p.  
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Website: [www.iucn.org](http://www.iucn.org).

**FRUITS FOR THE FUTURE**

The International Centre for Underutilised Crops (ICUC), based in the UK, has been undertaking a DFID-UK funded project called "Fruits for the Future". Fruits for the Future is a 3 year project which aims to facilitate technology transfer to farmers through media, by distributing extension manuals emphasising products, marketing and processing as well as production. Monographs and annotated bibliographies will be produced to collect and summarise existing research, in order to make better use of existing research results and identify possible gaps in the knowledge base for further research.

A group of fruit species has been selected on basis of their regional or global importance, because there are no comprehensive compilations of information already in existence, and because of their suitability for adaptation, income generation, nutrition and food security, diversification and use in agroforestry systems. The species are: *Ziziphus mauritiana* (Ber), *Tamarindus indica* (Tamarind), *Dacryodes edulis* (African Pear), *Adansonia digitata* (Baobab), and *Annona* species. Taxonomy, properties, uses, breeding and many aspects of these species

## Publications

are described in books, field manuals and factsheets that are free of charge to developing countries.

For any of these publications ICUC can be contacted through:

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Highfield, Southampton SO17 1BJ

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Email: A.Hughes@soton.ac.uk

Annotated bibliographies for the above species are available at [Http://www.soton.ac.uk/~icuc/frunut.htm](http://www.soton.ac.uk/~icuc/frunut.htm).

### REUNION SOBRE INVESTIGACION FORESTAL EN AMERICA LATINA

#### Memoria

Research and the exchange of information in Latin America is of great importance for the development of forestry in this region. Therefore FAO and IUFRO organised a joint meeting about forestry research and about information on forestry in the region. The meetings were held in November 1999 in Curitiba, Brazil. The results of the meeting are presented in this publication

The meeting on forestry research comprised four sessions dealing with the progress made and actual situation of forestry research in the various subregions of Latin America. Papers were presented and workgroups were composed that dealt with some important issues concerning forestry research. The results of the workgroups were later presented in the meeting.

For further information contact:

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### FOREST ECOSYSTEM SERVICES: Can they pay our way out of Deforestation? Discussion Paper for the GEF

*R. Nasi, S. Wunder and J.J. Campos A. (2002)*

This paper discusses the economic and social value of forest ecosystems to man, and whether economic valuation of forest ecosystem services is the solution or just a tool to stop deforestation, principally in the tropics. The paper provides a brief overview of what are and what represent forest ecosystem services. Then the issue of price and valuation is addressed, and why despite the values of forest ecosystem services forests and their services are still lost. Finally, the paper provides a number of incentives/tools to make conservation more attractive than any other uses.

### EUCALYPTUS

#### Medicinal and aromatic plants - industrial profiles, Volume 22

*John J.W. Coppen (2002)*

Eucalyptus, a genus of about 800 species, is a multiproduct crop par excellence. It is grown for timber, pulp and fuelwood, but also has medicinal and aromatic properties. This book draws on the knowledge and experience of experts in their fields to present an up-to-date account of the genus of Eucalyptus. The book contains chapters on botany, environmental and ecological aspects, cultivation, genetic improvement, chemistry, bioactivity, oil

## Publications

distillation, formulations and legislation, and international trade and markets. The chapters are complemented by appendices, which provide further practical help and advice.

ISBN: 0-415-27879-1, 450 p.

For further information contact:

Taylor & Francis

11 New Fetter Lane

London EC4P 4 EE

United Kingdom or

29 West 35th Street

New York NY 10001

USA.

Website: [www.tandf.co.uk](http://www.tandf.co.uk).

### EXPLORING BIOLOGICAL DIVERSITY, ENVIRONMENT AND LOCAL PEOPLE'S PERSPECTIVES IN FOREST LANDSCAPES

#### Methods for a multidisciplinary landscape assessment

*CIFOR (2002)*

This publication presents a new approach, which was developed during a study of seven communities in the forest-rich upper portion of the Malinau watershed in East Kalimantan, Indonesian Borneo. A village-based survey collected a wide range of qualitative and quantitative information about the judgements, needs, culture, institutions and aspirations of the communities, and examined general perceptions of the landscape. A parallel field survey assessed sample sites and recorded soil, vegetation and other site characteristics through both scientific and indigenous approaches. The final methods reflect a mixture of judgements, compromises and reactions to trials over many months. The book brings together a suite of effective methods for decision-makers requiring guidance on how to deal with the needs of local communities and biodiversity in landscapes.

SISBN: 979-8764-88-9

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Website: [www.cifor.cgiar.org](http://www.cifor.cgiar.org).

### NATURAL HISTORY BOOK SERVICE Catalogue

This new edition of the twice-yearly Catalogue provides a world-wide overview of natural history and environmental publishing. It contains over 3600 titles, organised into the following subject areas: Mammals, birds, reptiles and amphibians, fishes, invertebrates, insects, palaeontology, marine and freshwater fauna and flora, general natural history and travel, plants and botany, biology, evolutionary biology, ecology, habitats and ecosystems, conservation and biodiversity, environmental science, earth, physical and planetary sciences, sustainable development, data analysis and statistics, and finally a section of references. The Catalogue provides additional information to titles through symbols, which indicate special offers, suitability for type of users, stocks etc. The catalogue provides also titles and information on video and CD, or whether or not it is suitable for field use.

The Catalogue is also available on the Internet [http:// www.nhbs.com](http://www.nhbs.com) and offers the possibility to search for a particular book, using keywords, subjects or geographical area. Moreover, many titles have fuller descriptions in BookNet and can be conveniently called up by stock.

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### GSI NEWSLETTER

The Guiana Shield Initiative (GSI) is an ambitious ecoregional project, carried out by the Netherlands Committee for IUCN with the aim of setting up a sustainable financial mechanism to conserve the unique intact ecosystems of the Guiana Shield. The Newsletter provides information on its activities. No. 5 of June 2002 presents an overview of activities organised at the Guyana Shield Conservation Priority Setting Workshop, held in April 2002 in Paramaribo, Suriname.

The website provides more information on the Initiative and can be found at [www.guianashield.org](http://www.guianashield.org).

There is also a discussion form to post your comments.

For additional information contact GSI:

Email: [gsi@nciucn.nl](mailto:gsi@nciucn.nl)

The GSI Secretariat is currently based at the Netherlands Committee for IUCN in Amsterdam with the intention of moving the secretariat to the region once the initiative has been established.

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### PROSOPIS POLICY BRIEFS

HDRA is an organisation based in the UK that researches and promotes organic gardening, farming and food. It has published policy briefs to identify a number of important gaps in current knowledge on Prosopis.

For more information HDRA can be contacted

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Website: [Http://www.hdra.org.uk](http://www.hdra.org.uk).

### WHY GOVERNMENTS CAN'T MAKE POLICY

#### *The Case of Plant Genetic Resources in the International Arena*

*M. Petit et al (2001)*

This study emerged from an alarming and growing concern about the slow progress of international negotiations on issues of genetic resources. The purpose of the study was to clarify issues and to inquire whether or not the complexity of the interrelationships among different international fora might contribute to the obscurity of the policy debates on genetic resources at both the national and international levels. The study is intended to provide the reader with an explanation of why national positions in international negotiation fora are diverse, sometimes conflicting and almost always rigid.

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### THE FIRST DECADE OF THE GEF *Second Overall Performance Study*

The Global Environment Facility (GEF) was established in 1991 to forge cooperation and

## Publications

to finance actions that address critical threats to the global environment. During its first decade GEF allocated \$4.2 billion, supplemented by \$11 billion in co-financing.

On request of the GEF Council a comprehensive assessment was made by an independent team of experts of virtually all aspects of the GEF's operation. This report examines the impact of the GEF's financial support to countries for biodiversity conservation, climate change mitigation, protection of international waters, the phase-out of ozone-depleting substances, and the prevention of land degradation. The report reviews GEF policies, its organisational structure, and its performance in helping implement international environmental conventions. The report concludes with a range of recommendations intended to help guide the GEF as it continues to address global environmental challenges.

For more information contact:

GEF  
1818 H Street  
NW, Washington DC 20433  
USA.

Tel: 1.202.473.0508.

Fax: 1.202.522.3240/3245

Website: <http://www.gefweb.org>.

### TROPENBOS - CAMEROON DOCUMENTS

#### *Document 8 13*

The Tropenbos-Cameroon Programme (TCP) is a research programme executed under the joint responsibility of the Ministry of Environment and Forests of the Republic of Cameroon and Tropenbos International now ended. The general objective of the TCP is to develop methods and strategies for natural forest management directed at sustainable production of timber and other forest products and services. Results of various studies are

presented in Tropenbos-Cameroon Documents.

**Farming systems in the evergreen forest of southern Cameroon: shifting cultivation and soil degradation.** Document 8: Due to significant agricultural pressure on forest land in Southern Cameroon the shifting cultivation component of the farming system practices are believed to represent a greater threat to forest conservation than timber exploitation. Between 1995 and 1997 a study was made on this agricultural system, with the objective to reduce destructive effects of shifting cultivation on the forest by proposing to farmers complementary and/or alternative sedentary practices and by providing information to be utilised for the sustainable forest land use in Southern Cameroon.

**Phytomasse et cycle des nutriments dans la forêt tropicale dense humide du sud Cameroun.** Document 9: A study of biomass and internal nutrient cycling was carried out in the humid tropical forest in southern Cameroon. The objective of the study was to quantify the biomass accumulation and nutrient cycling in these forests. The results of this work should contribute to the development of a forest management plan promoting sustainable forest management and land use.

### Hydrology, erosion and nutrient cycling in a forest ecosystem in south Cameroon.

Document 10: A 5-year hydrological study has been carried out in south Cameroon. The study aimed to assess the impact of land use changes on the hydrology and erosion in rain forest and to quantify basic ecological processes, such as biological production, water and nutrient cycling and accumulation of phytomass and nutrients. The results of the study should contribute to the development by the Tropenbos-Cameroon Programme of a land management plan promoting sustainable land use.

## Publications

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**Plant-animal relations: effects of disturbance on the regeneration of commercial tree species.** Document 11: This 3-year study was carried out to determine the role of animals in the regeneration of commercial tree species through the dispersal of their seed. The overall objective was to find an answer to the question how logging and other human activities such as hunting and gathering influence the regeneration of tree species through the disturbance of plant-animal relations.

**Insect pest incidence on timber tree species in natural forest in south Cameroon.** Document 12: The study focused on forest-insect relations, especially on insect pests of actual and potential timber tree species growing in tropical rain forest of South Cameroon. The general objective of the study was to generate information on actual and potential insect pest problems in natural production forest, which should be taken into consideration while designing any management system directed at sustainable timber production.

**Environmental assessment as a new tool for sustainable management?** Document 13: An application in south Cameroon rain forest region. Environmental assessment (EA) has been little applied for tropical forest management so far. It is believed that EA can be a useful tool for sustainable development of these forests. In this study a short presentation of its rationale is given, and the results of a trial to implement this tool in a south Cameroon forest region is described. The trial comprised two levels: a master management plan, and two village territory management plans. The document describes the approaches and techniques that were applied, with special attention to the negotiation process with stakeholders. Main results and drawbacks are reviewed and evaluated, and a renewed framework for further integration of EA in sustainable forest management is proposed

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