



Forests Reborn

A workshop on forest restoration

WWF and IUCN
With representation from
CIDA, DFID, the EU, USAID, the World
Bank,
WCMC and the University of Queensland



“Develop and implement environmentally appropriate and socially beneficial programmes to restore deforested and degraded forest landscapes”
Objective 3 of the IUCN/WWF
Forests for Life strategy

The workshop was organised by Stephanie Mansourian and Stewart Maginnis and facilitated by Tom Hammond and Rod Taylor, assisted by other participants as necessary. Nigel Dudley has prepared the minutes and a field trip to "Boca de Asno" and a WWF Spain tree nursery in Alto Tajo, Ayllón y Quejigares de Brihuega was organised by Luis Molina from WWF Spain. The Forest Reborn programme is funded by both the Maurice Laing Foundation and Lafarge and arises from work initiated by the IUCN/WWF Forest Innovations project, carried out in co-operation with GTZ and funded by the German ministry BMZ.

Executive summary

The workshop took place in Segovia, Spain in July 2000 and was organized by WWF and IUCN under their joint Forests Reborn programme. It aimed to agree a framework and process, taking into account regional variations and priorities, for exploring and promoting innovative approaches to socially and ecologically appropriate forest restoration. A series of presentations provided background information and asked some questions then a series of working groups addressed the following issues:

- Development of a definition and typology of restoration
- A common agreement and understanding of the scope and context of forest restoration – broadly addressing the questions:
 - *What* is meant by restoration?
 - *Why* restoration?
 - *Where* should conservation organisations focus their efforts?
- A broad work programme.
- Identification of partnerships

What is meant by restoration?

A draft definition

Forest Landscape Restoration: A planned process that aims to regain ecological integrity and enhance human well-being in [on] deforested or degraded forest landscapes [and beyond].

A draft typology

- **Reclamation:** to recover productivity (but little of the original biodiversity) at a heavily degraded site. In time the protective function and many of the original ecosystem services may be re-established. Reclamation is often done with exotic species but may also involve native species.
- **Rehabilitation:** to re-establish the productivity of a degraded forest and some, but not all, of the plant and animal species thought to be originally present at the site.
- **Ecological restoration:** to re-establish the presumed structure, productivity and species diversity of the forest originally present on the site

The meeting drew some broad conclusions:

- Choices should be made on a landscape scale – with overall landscape benefits being more important than choices relating to individual stands or sites
- Restoration should in general be aimed at a progression towards higher forest quality from the perspectives of both ecological integrity and human well-being at a landscape scale
- Choices about restoration should therefore be made on a case-by-case basis with responses aimed at specific conditions
- The participants were open to a range of options, including some often rejected by conservationists such as tree plantations, *if* these fitted the other conditions outlined above

Why restoration? Social, environmental and economic justifications for restoration were identified.

The following key factors were identified:

- Biodiversity conservation especially outside protected areas
- Reversal of ecological simplification in degraded or intensively managed forest ecosystems
- Provision of a range of human benefits –from watershed management to economic gains
- Resilience and insurance against risk – human and environmental – such as global warming
- A pro-active approach to forest conservation encouraging new partnerships

Where should restoration take place?

- Social, economic and environmental pre-requisites for restoration were identified. These included cost-benefit analyses at various levels (local, national..) enabling socio-political environments and fragile ecosystems.

A work programme

The meeting identified some immediate research needs, focused on the following main areas:

- Collection and analysis of **baseline data** needed to plan restoration
- Assessment of **perverse incentives** that currently encourage bad forest management
- Identification of **management options** in degraded forests, new plantations and community-managed forests
- Analysis of **environmental services** and how they can be affected by restoration
- Basic research into various aspects of the **economics** of restoration

Partners

It was agreed that the Forests Reborn programme should actively seek partners within the research and development communities. Initial discussions have already taken place with CIFOR and there is continuing liaison with the University of Queensland. The representatives of the development agencies present at the meeting said that they would be prepared to consider further collaboration in the future given the outcome and the spirit of the discussions.

Presentations

The workshop included a series of introductions and presentations as summarised below.

Speaker	Subject
Stephanie Mansourian	Introduction to delegates
	Setting the scene
Tom Hammond & Rod Taylor	An outline of the agenda and a scene-setting exercise. The workshop focused on three priority issues: sharing experiences to date; reaching common understanding of current restoration issues; and determining a broad set of priority issues for restoration-related work
Bill Jackson (power point available)	Introduction to WWF and IUCN's forest restoration strategy including its role in the global forest strategy and the genesis of <i>Forests Reborn</i> .
Stewart Maginnis & Nigel Dudley (power point available)	The Scope and Context of Socially and Ecologically appropriate forest restoration: A WWF/IUCN perspective: summarising problems and the current rather simplified responses and expanding on questions of what? why? and where?
Sameer Karki & Don Gilmour (2 power points+doc available)	Influencing national legislation: Lower Mekong: Tenure equity and forest restoration. Summary of work undertaken by IUCN and GTZ in the region that has resulted in country studies in Thailand, Lao PDR, Vietnam and Cambodia and some general lessons for the wider project.
David Lamb	What? – Defining socially and ecologically appropriate forest restoration An integrated approach to forest restoration: elements to consider in defining restoration. Presentation of a model of different forms of restoration and different options for increased ecological integrity through restoration
David Lamb	Why? – The importance of appropriate forest restoration in a socio-economic and biodiversity context An integrated approach to forest restoration: elements to consider in defining restoration. Notes towards a draft typology
Michael Bazett (power point available)	Incentives for tree planting: A global study on the flow of public funds directed at tree planting.
Jayanta Bandyopadhyay	Where? Identifying restoration potential: criteria for selecting restoration priorities drawing on experience in India
Gemma Smith	Prioritising areas for restoration – a draft methodology from WCMC applied to the Mediterranean region

Available documents and powerpoint presentations are noted above.

The working groups power point summaries are available and summarized in the minutes.

Annexes include: the typology/models of restoration, participants' list and agenda.

Introduction to WWF and IUCN's forest restoration strategy

Bill Jackson

Head of IUCN's Forest Conservation Programme

Forests cover about 35 per cent of the world's land area. Between 1990 and 1995 there was a loss of 65.1 m ha in developing countries (13 m ha per year) and an increase of 8.8 m ha in developed countries. The two major threats facing forests are deforestation, mainly in the tropics, and loss of forest quality, mainly in the temperate and boreal region.

This has a number of potential impacts, for example:

- Loss of biodiversity – it is estimated that 50 per cent of total biodiversity and 80 per cent of terrestrial biodiversity occurs in forests
- Loss of ecosystem functioning – climate regulation, disturbance regulation, water regulation and supply, soil formation, erosion control, nutrient cycling, pollination, biological control, food production, raw materials and genetic resources
- Reduced human well-being – for example 2532 million m³ of timber products (roundwood, sawnwood, panels, pulp and paper) were produced from forests in 1996 along with non-timber forest products, educational, cultural and amenity use and human habitat (up to 150 million indigenous people live in or near forests)

The Forests for Life programme of IUCN and WWF has identified a range of responses to this crisis, including a goal (*halt and reverse the loss and degradation of forests and woodlands*) and a series of objectives:

1. Establish a network of ecologically representative, socially beneficial and effectively managed forest protected areas
2. Achieve environmentally appropriate, socially beneficial and economically viable management of forests outside protected areas
3. ***Develop and implement environmentally appropriate and socially beneficial programmes to restore deforested and degraded forest landscapes***
4. Protect forests from pollution and global warming by reducing polluting emissions and managing forests for resilience against climate change
5. Ensure that political and commercial decisions taken in other sectors safeguard forest resources and result in a fair distribution of associated costs and benefits

Developing and implementing ecologically and socially appropriate forest restoration is therefore an urgent priority. Forest restoration can:

- Affect ecosystem services – water supplies, local climate, soil formation and control of erosion and nutrient cycling
- Impact on biodiversity
- Change human well-being by affecting livelihoods and economic development and affecting equity and risk
- Contribute to slowing the rate of climate change

Forests Reborn

Forests Reborn is a joint initiative of WWF International and IUCN The World Conservation Union.

Programme Goal: to facilitate the promotion and implementation of forest restoration as a tool for safeguarding livelihood security, protecting biodiversity and ameliorating lost or impaired forest ecosystem functions
Programme Purpose: by June 2002, to ensure that the WWF and IUCN networks are equipped to promote and influence the effective mobilisation of private and public sector resources into socially and ecologically appropriate forest restoration initiatives

There are three generic outputs:

- **Improving the knowledge base** – The WWF/IUCN knowledge base concerning the political, social, economic, technological, institutional and environmental conditions for successful forest restoration, strengthened and developed
- **Building capacity** – Regional capacity to monitor, evaluate and learn lessons from forest restoration activities strengthened and developed
- **Linking policy and practice** – Lessons learnt from forest restoration developed as long-term strategies and communicated to WWF/IUCN networks, governments, donors and other NGOs

In practice, this means:

- Add policy value to existing projects by promoting linkages within WWF & IUCN
- Promote partnerships with key stakeholders
- Disseminate experiences and best practice on a broader scale
- Enable dialogue at national, regional and global level
- Use the outcome of dialogues to influence decision makers to mobilize resources to socially and ecologically appropriate restoration

The Scope and context of socially and ecologically appropriate forest restoration: a WWF/IUCN perspective

Stewart Maginnis and Nigel Dudley
WWF International and Equilibrium

We live in a world that has already lost a substantial proportion of its natural forests, with a range of resulting social and environmental problems. Governments have often responded to perceived problems of forest loss with simplified responses – including for example a focus on plantations and top-down solutions that alienate local communities and only produce a very narrow range of goods and services. These perceived problems have raised some important questions about what restoration means, for example with respect to:

- The role and scope of subsidies
- Realistic valuation
- Communities' role in shaping forest landscapes

As a result of concerns about deforestation and restoration, IUCN and WWF have identified forest restoration as a priority in their joint Forests for Life strategy:

*“Develop and implement environmentally appropriate and socially beneficial **forest restoration** programmes”*

The Forests Reborn project has been developed to promote this part of our strategy. However, before launching any coherent programme of work, we have to answer a series of questions:

- What? – a definition and typology of forest restoration
- Why? – identifying and explaining ecological, social and economic goals for restoration
- How? – identification of policy mechanisms and techniques
- Where? – criteria for prioritising restoration

This workshop aims to look at three of these questions: *what*, *why* and *where*.

Question 1: What is meant by Forest restoration? A suitable definition and typology of restoration are needed. The workshop should try to define the scope of the options included within the project discussing, for example, the applicability of plantations, agroforestry, secondary forests, biological corridors and single trees in the landscape..

Question 2: Why should we be working on restoration? We also need to be able to give good reasons for forest restoration including for example ecological reasons such as watershed management; social reasons such as fuelwood provision; and economic reasons – recognising the need to influence finance as well as environmental ministries. There are many practical and urgent questions to be addressed – such as whether and how money available for carbon sequestration might be used.

Question 3: What criteria are needed for selecting priority areas? A number of options exist including gap analysis, stakeholder consultations, economic criteria and the question of landscape memory.

Discussion

An important question for the future is how restoration should take place. We are not addressing “how” at this workshop, but focusing instead on more basic questions of definition and rationale, although the “how” question will have to be addressed in the practical project.

Policy and Practice for Rehabilitation of Degraded Forest Ecosystems in the Lower Mekong Countries: Project and lessons, Sameer Karki

Background

The Lower Mekong region is characterized by extensive land use change, including a sharp increase in plantations. In the past few decades, the policy context has shifted dramatically, mainly with a shift to devolution of authority. Forest resources, largely degraded, have also become more important and there is a growing recognition of the failure of central governments to protect the resource, and therefore, the need to involve local communities. The current policy shift provides an opportunity to foster better relationships between governments and local communities.

Status of forests

The forests of the Lower Mekong countries of Cambodia, Lao PDR, Thailand and Vietnam have suffered high levels of deforestation from both illegal and legal logging, expansion of agricultural activities, war and infrastructures. Estimates by FAO suggest that net deforestation is occurring in all countries at a regional rate of 1.7% per annum.

The Project (IUCN Southern Asia)

The purpose of the project is to assist stakeholders in continental SE Asia to develop and implement ecologically and socio-economically sound ecosystem rehabilitation policies and practices.

The objectives of the project were to:

- Work with key partners to improve understanding on the rehabilitation policy and practices in SE Asia
- Assist key actors to identify preferred principles and criteria for guiding forest rehabilitation programmes.
- Disseminate findings and encourage dialogue and further development of principles and criteria.
- Identify the needs and interests for additional support to forest rehabilitation programmes

The process followed was: a regional overview -> a regional workshop->national assessments-> national workshops.

Some of the Lessons Learnt

The process followed of a broad regional overview, followed by national consultations generated greater interest and political support. This also helped foster linkages and a greater understanding of the issues. Until recently, approaches to forest conservation had tended to be top-down, government-driven, with unclear goals and a series of technical impediments.

The next steps include completing the publication, developing national projects in the Lower Mekong countries and also expanding the experience to South Asia and China.

II. Tenure, Equity and forest restorations: A perspective from the Lower Mekong region, Don Gilmour

The issue of tenure is crucial if one is to involve local communities. The effectiveness of resource management depends on who uses the resource, who recognizes this user right and how it is controlled. Appropriate tenure rights are a clear incentive for good natural resource management. Tenure systems can be both formal and informal.

The issues identified under tenure include:

- rights and privileges to use and how these are regulated and controlled
- methods identified

Challenges

Most Asian countries have an informal tenurial system which most often clashes with the formal system. The process to bring these two more in line includes dealing with :

- bureaucracy and slow negotiation process,
- clash of cultures (ethnic minorities)
- lack of capacity

Discussion

The issue of incentives and externalities was raised (the fact that the forest resource was so degraded in those countries that it was no longer bringing a profit, finally prompted governments to deal with this issue). It was noted that in the short term dealing with access rights might be more effective than tackling tenure, so long as there is official recognition of those access rights. It was emphasized that the dialogue to protect forest resources included a wide range of stakeholders, including neighboring communities as well as, in some cases, the international community (in addition to the government and the community in question). A key factor is ensuring that the appropriate incentives are (identified and) in place to ensure that the objectives of forest restoration and management are good.

An integrated approach to forest restoration, David Lamb, University of Queensland

The paper gives an ecological and biophysical perspective on forest restoration. It is often hard to define – and therefore to measure and map – degradation, which is often “in the eye of the beholder”; for example in the case of farmland that once was forest, the perspective of the farmer will not be the same as someone interested in bird watching. However, in general degradation includes a loss of forest structure.

In some cases recovery can occur effectively unaided, if some key factors exist:

- The site is protected against further disturbance (e.g. fire and grazing)
- Topsoil remains
- Physical environment remains unchanged
- Species present – seed bank etc
- Species nearby
- Weeds and pests need to be excluded

On the other hand full restoration may be impossible for a number of reasons:

- It is difficult to prevent further disturbances
- We often do not know what the original forest ecosystem was like
- Many of the original species may have become extinct and exotic species become established
- Even if we know what was present prior to the disturbing event the landscape might have changed anyway (e.g. as a result of fire or lack of fire)
- We do not know enough about ecosystem ecology
- Will wildlife re-colonise? – should species be re-introduced at once or with “assembly rules?”
- Costs – and who pays?
- Landowners lack of interest

We need to distinguish between various forms of restoration. If a monoculture is established –*reclamation* – we get the structure and productivity but not the biodiversity associated with original forests. *Rehabilitation* is a halfway stage where some biodiversity is regained but not the original structure. *Restoration* could refer to a more complete regaining of the original ecosystem. (see annex for visual representation).

Some priority areas for reclamation and rehabilitation can be suggested for biodiversity purposes:

- Habitats of particular species
- Isolated islands – for endangered species at risk on the “mainland”
- In degraded areas within protected areas or in the buffer zones
- Corridors between intact fragments – “de-fragmentation”
- Mine sites (sources of downstream degradation)

Priority areas for restoration or rehabilitation might on the other hand be:

- Riparian areas
- Erosion prone areas
- Saline areas
- Firebreaks around protected areas

Areas where restoration or rehabilitation should *not* be carried out could include:

- Severely degraded sites – too expensive – need two-stage process
- Where local community is not enthusiastic
- Where agricultural land is extremely limited

Discussion

The issues of incentives to ensure the buy in and support from local communities was brought up. It was suggested that a "softer" wording might be necessary for the final aim of restoration since it is often impossible (inappropriate) to re-gain the "original forest cover". It was noted that in defining restoration it is important to distinguish between process and status.

Restoring diversity in ecological processes, David Lamb, University of Queensland

Issues relating to restoration: four broad categories impact on the options for restoration:

1. Landscape
 - How degraded and fragmented has the landscape become?
 - Are there remaining areas of intact forest?
 - Extent of degradation on the site – items (species etc) have to be imported to the site?
2. Social issues
 - Population density
 - Agricultural practices
 - Land ownership
 - Aspirations of the community
3. Financial issues
 - Funds and resources available
4. Legal issues
 - Constraints
 - Obligations

Questions to be addressed

What plant species should be re-introduced?

- Native or exotic
- Commercially useful
- Annual or perennial
- Facilitators (e.g. nitrogen fixers, weed excluders, protection from exposure)
- Keystone species (e.g. those that support any other species)
- Poor dispersers (e.g. large seed species that cannot easily colonise)
- Fire tolerant (e.g. if the site is susceptible to fire)
- Fast growers
- Mixture of life forms (e.g. palms, ferns, etc)

How should species be re-introduced?

- Seedlings – these are effective but tend to be very expensive
- Direct seeding – faster and cheaper than seedlings but only possible when there are no weed species and seeding is expensive in terms of seeds so is unsuitable for rare plants)
- Proportion of various species
- Planting all at once or following assembly rules (e.g. facilitators first)

What numbers of species and what number of individuals?

- High density planting with few species (e.g. a plantation)
- High density plantings and many species – e.g. for ecological restoration
- Low density and few species (e.g. “perch trees” – helping introduce species with birds)
- Low density and more species (e.g. “perch tree” plantings in clumps)

Each of these are examined below

▪ ***High density and few species***

Examples include traditional monoculture plantations, mixed species planting and, in tropical forests, sometimes near monoculture of pioneers

Advantages

- Commercial yield (hence large areas may be affordable)

- Some ecological services restored
- Exclude weeds
- Some biodiversity (particularly in mixed-species plantings)
- Facilitates succession

Disadvantages

- Small biodiversity gain

The issue of *mixed species* planting is summarised in more detail below.

Type of mixed species planting	Advantages apart from biodiversity gains
Native species monoculture	Known in local economy
Monocultures surrounded by buffer strips	Watershed and fire protection
Species mosaics	Higher net productivity?
Species mixtures	Higher net productivity? Improved nutrition? Improved financial returns? Reduced insect damage?
Foster understorey	Watershed protection Include other socially useful species?

Specific agroforestry options include various designs – most include high levels of plant diversity and many of the plants are common exotic agricultural species, rarely covering large areas. There are exceptions to the above (e.g. Sumatra, Kandy home gardens etc).

- **High density planting of many species**

Advantages

- High species richness on the site and high structural complexity
- Closed canopy excludes weeds
- More attractive to seed dispersers
- Faster successional development

Disadvantages

- Costly
- Difficult to get enough seed?

- **Low density and a few or several species**

Advantages

- Cheap – hence cover large areas
- Can use large-fruited species that disperse slowly

Disadvantages

- Only effective if forest exists nearby
- Recovery slow
- Can attract weeds

Trade-offs: a number of trade-offs also need to be addressed such as area versus cost; production versus biodiversity; rates of recovery versus risk; and diversity versus ecological function

Discussion:

It was noted that in order to choose the appropriate form of restoration it is necessary to know what form of degradation one is dealing with. Also, over time the context may change which makes it necessary to take on a dynamic approach to restoration rather than a static one.

Incentives for Tree Planting, Michael Bazett, Private consultant to WWF and IUCN

The paper describes a global study of the flow of public funds into private and industrial plantations; this is a challenging area as there is very limited information available. According to FAO there are now 94 million ha of commercial plantations, with 17 per cent of industrial wood coming from plantations and 10 per cent from fast-growing plantations – the last being the focus of much funding, from the public to the private sector. The proportion of timber is likely to rise to around 45 per cent in the next 30-40 years. The commercial attraction of plantations includes the relatively low wood costs, the increased ability to choose where the resource is located and the homogeneity of wood and fibre. The potential public benefits include increased domestic supply, industrial development, increase in tree cover and reclamation of degraded land.

Incentives for plantation establishment are an accepted and well-established tool in many countries, but remain controversial. They have a number of advantages in that they can:

- Kick-start an industrial sector – e.g. in Brazil and Chile
- Promote inter-regional competition – e.g. in Latin America
- Create a competitive advantage – temporal advantages that help the early developers
- Help support plantation development where private net returns are low

On the other side, there are some well-publicised disadvantages:

- Equity issues – the people who benefit most tend to be the rich
- Can lead to oversupply, foster misuse and corruption and result in increased land values (e.g. in Chile where land prices in plantations areas have increased by a factor of ten or more)

There are a number of different types of incentives. Direct incentives include:

- Direct subsidy payments for planting and establishment
- Tax exemption or reduction – Brazil provides a good example
- Freedom from income and/or land tax – examples include the USA and UK
- Cheap loans – as in the case of Indonesia

Indirect incentives also exist such as:

- Market and technical assistance, training, provision of nursery seedlings etc
- Concessions: e.g. Indonesia allocates concession land

Some examples were also presented and are summarised in the following table:

Country	Current area	Principle incentives used	Amount	Issues
Brazil	6.3 m ha planted but only 3.5 m ha accessible	Fiscal incentive programme – 1966-86 to 100% of establishment costs. Indirect incentives still for Amazon, planting falling off elsewhere	estimated 2 bn dollars in 20 years	Major resource sector developed but with poor planning and much corruption. No detailed cost benefit analysis
Chile	1.8 m ha	Decree law 701 (1974); 75% of establishment costs, additional thinning and pruning subsidies, capital gains tax reduced 50% on harvest. No incentives today. The government guaranteed that land used will never be nationalised	Minimum \$200 m but could be \$600 m	Successful low-cost producer – forestry 15% exports, 4-5% GDP. But 80% of subsidies to 3 companies, smallholders excluded and questions as to the net job creation effect. Plantations have replaced 100,000 ha of native forests.
Argentina	850,000 ha	Planting programme since 1950s but early incentives failed. In 1990s a sliding scale: < 700 ha 100%, >2000 ha 15%	\$150 m plus provided	Large low cost plantations established but with limited markets, marginal supply mainly to Europe, over-supply of short rotation pulpwood and lack of major processing plant

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Uruguay	210,000 + ha	1987 – present incentives are \$240 / hectare and \$1.97 per m ³ export subsidy.	About \$60 m	Unsustainable planting rate, over-supply, increasing land costs and decreasing returns for people coming into the programme later
Paraguay	<100,000 ha	\$650/ha; 50% reduction in land tax and exemption from state and municipal tax. Corporate tax reduction		Poor access to external markets probably will need to go into higher value woods
S Africa	1.2 m ha	No incentives	0	Contact outgrower schemes – by the two major companies (7000 farmers assisted by companies)
Indonesia	Short rotation 500,000 ha (officially 800,000 ha) Long rotation 13,000,000 ha	Direct investment, public lands	?	Conversion forestry taking place, risk of inefficient allocation of resources
New Zealand	1.7 million ha	Plantations developed by state and subsequently sold to private sector. No incentives unique to forest sector	0	Monoculture risk and continuing questions about native land claims

Suggestions for further study

- Learn from actual cases – cost benefit analyses
- Study integration of commercial and social plantations and look at options for “complex” plantations
- Appropriate design for domestic market
- Longer rotation and higher value
- Impact of incentives on ecology
- Guidelines for incentive programmes

Incentives appear to be losing their attractiveness and are now seen as probably not worth the cost and more appropriate for “social” forestry.

Discussion

Comments from the floor included that the World Bank had invested \$850 million in plantations in China and \$7 billion in total plantations development. Conversely, each cubic metre of wood from Swiss forests is subsidised around 40 CHF (\$25)

Criteria for selection of restoration areas, Jayanta Bandyopadhyay, Centre for Development and Environment Policy Indian Institute of Management, Calcutta

Ecological, economic and social issues often overlap. The highest priority should therefore be given to those areas where all three objectives can be addressed. Another important element in making decision relates to institutional opportunities – the existence of the right institution capable of implementing the restoration areas is often key to success.

Example of the problems in implementing restoration projects: In the Eastern Himalayan foothills the Buxa Tiger Reserve borders Nepal and Bhutan, containing 37 forest villages, 25,000 people and around 100,000 cattle. It was first protected in 1879 (the first reserved forest in the country) and included in Project Tiger in 1987. However there are serious social and ecological problems and an urgent need for restoration. Since 1997 the World Bank has made funding available. The local forestry department is content with the funding available for restoration but is unwilling to move the villages. The Tiger Reserve stopped commercial logging in 1987, but because the human population is still present and have had their legal livelihoods removed, they have continued illegal felling and paradoxically increased the overall rate of degradation.

Decision-making about restoration can be facilitated by a series of overlaying maps, which can help identify priority areas focusing on key issues, for example:

Bio-physical information:

- Biodiversity – identification of high biodiversity areas (including map of disturbed areas)
- Hydrological – significance with respect to e.g. moderation of run-off (including map of degraded areas)
- Climatic – importance in moderating regional climate (including map of degraded areas)

Social information is also needed, for example:

- Identification of the level of social uses of forests as an open access resource, for example for fuelwood/fodder, grazing and NTFP collection.
- Identification of forests used for recreational purposes and tourism, including urban forests.

Economic options have to be considered, for example:

- New economic options to reduce dependence on consumptive use of forests
- Promotion of new technologies for the above
- New products to reduce use of forests

Management or institutional criteria are then overlaid over the other three groups of criteria:

- Population density
- Stage of degradation
- Proximity to good forest areas
- Favourable legal status
- Collaboration with the local population

These maps can be initially at a regional level, but then have to be focussed down to a more local level. Issues are always complex. Local populations also reflect global values – these sensibilities are not confined to urban populations in the North. An important element to ensure the reproduction of experiments is the high visibility of success.

Prioritising of Target Areas for Forest Restoration: A Possible Methodology,
Gemma Smith, UNEP-World Conservation Monitoring Centre

A project of the UNEP-World Conservation Monitoring Centre was described, which aimed to identify candidate criteria for identifying areas suitable for restoration activities at a regional scale. The project also aimed to identify broad areas that could act as a focus for projects. Based on available information the Mediterranean was chosen as the main area for study, although the methodology could be applied more broadly

The methodology does not aim at decision-makers at a local level where further detail is required

In total, twelve candidate criteria were examined

- Original forest area
- Areas containing woodland that are currently without forest
- Areas of low land use intensity that are currently without forest
- Areas of low population density
- Areas on flat or gently sloping ground
- Areas in close proximity to existing forests
- Areas rich in biodiversity
- Important bird areas
- Areas around points defined as CORINE biotope
- Areas already under recognized protection
- Areas not under threat from climate change
- River catchment areas

Five were selected for the purposes of this demonstration exercise.

- Original forest area – useful priority
- Areas containing woodland that are currently unforested
- Areas of low population density
- Areas rich in biodiversity
- Areas already close to forests

A GIS analysis was used to define priority areas based on the five selected criteria. Each criteria was applied consecutively to refine the focus area

The result is a composite map showing priority areas for forest restoration. An urgent next step is to compare priority areas with the location of projects on the ground, which will help determine whether criteria were correct.

Workshops

The workshops aimed to provide background information to help draw up some general principles for forest restoration, to identify some areas requiring further work and, ideally, to set at least a draft work programme for Forests Reborn. The following section summarises key outputs from the workshops and key agreements reached by the participants.

WHAT? - Defining socially and ecologically appropriate restoration

The following definitions were agreed.

A draft definition

Forest Landscape Restoration: A planned process that aims to regain ecological integrity and enhance human well-being in [on] deforested or degraded forest landscapes [and beyond].

A draft typology

- **Reclamation:** to recover productivity (but little of the original biodiversity) at a heavily degraded site. In time the protective function and many of the original ecosystem services may be re-established. Reclamation is often done with exotic species but may also involve native species.
- **Rehabilitation:** to re-establish the productivity of a degraded forest and some, but not all, of the plant and animal species thought to be originally present at the site.
- **Ecological restoration:** to re-establish the presumed structure, productivity and species diversity of the forest originally present on the site

Some draft qualifiers were also given:

Human well-being is influenced by a range of factors including:

- Quality of life
- Economic factors
- Equity
- Risk and power relationships

Ecological integrity: a combination of biological diversity and ecosystem functions which allow the ecosystem to support life and adapt to change

Further work on the definitions may be needed

Discussion on the definition: The following discussion points were raised (those addressed during the meeting are omitted):

- “Enhance” could change to “bring back”, “improve”, “return”, “maximise”, “regain” or “optimise”
- “Ecological integrity” needs clearer definition
- Should the “planned process” include socio-economic as well as technical planning?
- Planning includes issues of time and space
- Benefits include costs
- Should the definition be limited to former forest sites?
- Discussed issue of people – “stakeholders and society”
- Reclamation should include natives and not just exotics
- Tangible benefits
- Equity should be brought into the distribution of benefits

Discussion on the typology:

- Missing from the typology
 - Socio-economic development
 - Transition over time from rehabilitation to restoration
 - The time element is unclear: there is confusion between short and long-term objectives – e.g. passing through a phase of reclamation may lead to rehabilitation and restoration
- May require “objectives” or principles for each category
- What are the trade-offs over time – who wins and who loses?
- Full valuation or at least more exclusive valuation is needed
- The typology is designed for a site – it will need some adaptation to work on a landscape scale
- Landscape approach may need to combine all three “R’s” while recognising site and national levels each requiring different participatory processes
- Link restoration to other land uses
- Field projects often address all three elements of the typology
- Splitting the definition between biodiversity and human well-being is another possible way of representing the definition – although this separates biodiversity from human well-being
- Wider perspectives also embrace long and short-term economics of restoration

WHY? Social Justifications

The working group examined what role forest restoration plays in livelihood security.

They proposed that there were a range of important issues to reconcile, including:

- Whose well-being is included
- Upstream and downstream impacts of restoration
- Rural and urban issues
- Landowners and land users
- Farmers and dairy farmers
- Women and men

There is also a need to disaggregate local interests with respect to:

- The fact that degradation is often a matter of opinion
- Landscape process needed
- The importance of equitable distribution over time

Livelihood security was seen as a key factor:

- Forests as “savings in the bank”
- Emergency reserves of food from restored forests
- Security for hunters and gatherers
- Diversification of the economy
- Transfer of nutrients from forests
- Reduced distance and time to collect fuelwood and fodder
- Provision of water
- Moderating the impact of natural disasters such as landslides and floods

Negative issues related to restoration include the following:

- Uncertainty associated with change
- Displaced communities if restoration replaces traditional land uses
- Delayed returns on investments
- Conflicts with animals (tigers, elephants, wolves)
- Possibility of reducing the water table
- Wrong choice of trees can increase fire risk

- Wrong choice can destroy sacred sites

Employment is an important factor including:

- Ongoing employment in tending and harvesting
- Negative factors such as the uncertainty of boom and bust prices for plantations products

Tenure and access issues are relevant

- Can legitimise traditional rights
- Can increase conflict with traditional systems

Health

- Can filter downstream drinking water
- Could improve diet
- Regeneration of medicinal plants is possible

Cultural values

- Aesthetic values
- Restoring sacred sites

Suggested next steps

The group identified that further research was needed on how forest restoration affects people's livelihood security and how to use this information in taking decisions on forest restoration.

WHY ? Economic Justifications

The groups divided stakeholders into 4 groups: the household/community, private sector, governments and international community and looked at the economic benefits of forest restoration for each group.

For the **householder and local community**, potential economic benefits include the following:

- Jobs
- Money
- Subsistence groups
- Marketable goods
- Infrastructure
- Social cohesion
- Skills
- Improved ecological services
- Tenure security
- Subsidy
- Equity
- Increased land values
- Avoiding negative costs of further land degradation

For the **private sector** potential economic benefits include the following

- Subsidies
- Providing additional credibility/legitimacy/labelling
- Market advantage (There is a market via certification)
- Technology transfer and skills
- Access to labour
- Access to indigenous technical knowledge
- International credit rating

For **governments**, potential benefits include the following

- Money from carbon sequestration
- Community development
- Protection of infrastructure
- Tax revenue
- International obligations
- Technology transfer/skills
- Raw materials
- Economic diversification
- Avoid potential damage and minimise risk

For the **international community**, potential economic benefits include opportunity costs associated with the following

- Stabilizing the climate
- Avoiding biodiversity loss
- Avoiding desertification
- Water security
- Avoidance of ecological refugees

Many of these benefits will only accrue over time and include issues of inter-generational equity.

WHY? Environmental Justifications

The following ecological reasons for restoration were identified:

- To protect threatened biodiversity (protected areas can never fulfil all biodiversity requirements)
- To reverse the land simplification that has occurred as a result of farming and forestry outside protected areas
- To provide environmental services (watershed management, soil protection, provision of drinking water etc)
- To improve resilience to environmental change (such as desertification and climate change)
- To maintain future options
- To enable the capacity of the forest for self-regeneration
- To create a link between biodiversity conservation, productivity, environmental services and human well-being
- To move from a defensive to a proactive conservation approach

Along with a series of *qualifiers* and *research needs*:

- Qualifiers:
 - Depends on the condition of the landscape
 - Depends on socio-economic context
- Reviews needed of:
 - Baselines of forest condition
 - Existing forest management
 - Silvicultural options to increase biodiversity in existing degraded forests including plantations
 - Silvicultural options to increase complexity in new plantations
 - Options to increase biodiversity in community-managed forests and small-scale forest management schemes as compared with large-scale management schemes
 - Environmental services and non-timber forest products in order to mainstream biodiversity
- Development of toolkits containing various combinations of silvicultural approaches – aimed at different ecological conditions (forest types) and socio-economic conditions

WHERE? Social prerequisites for restoration

Three levels of decision -

- national level enabling conditions
- criteria to select which landscapes to focus on
- where to undertake reforestation activities in a landscape
- Enabling policy and legal framework
- High-level political support
- Committed financial and human resources
- Institutional compatibility
- Civil security
- Scarcity of forest goods and services
- Social stability
- Avoid working in rapid “degradation” phase
- Local support, especially champions
- Proximity to communities who need forest goods and services

Suggested next steps:

- Pilots - decide where
- Establish partnerships and alliances
- Communications strategy
- Analysis of information gaps on social issues to identify research priorities

WHERE? Economic pre-requisites

- Are there market, policy, or institutional failures? What are the prospects of their removal?
- Policy: subsidies, other perverse incentives.
- Market: negative externalities
- Institutional: property rights/ contradiction between institutions/ poor legal enforcement/ security/

Underlying economic criteria is that benefit (including non-monetary, indirect) is greater than costs

Cost- Benefits include:

- Costs: Project cost, Opportunity cost
- Benefits: Jobs, income, tax revenue, associated/ indirect benefit, risk avoided
- Economic commitment from stakeholders
- Commitment from donors
- Protecting existing and planned infrastructure
- Reducing risk to climate change
- How many people will benefit and lose?
- Nearby a community (upstream/ downstream)
- What are the transaction costs?
- How much will government revenue increase or decrease?
- Economic commitment from stakeholder
- Potential for community development
- Commitment from bilateral agencies

Suggested next steps

- Studies on economics of restoration
- Pilot study on process through which criteria could be established (e.g. learning by doing)

WHERE? Ecological pre-requisites

The *location* of restoration activities was also discussed and a model for selection was proposed:

	High priority	Low priority
Desirability from the perspective of ecological integrity		
Desirability from the perspective of human well-being		
Feasibility		

Some possible indicators were identified (although it was acknowledged that this is an incomplete list)

- Extent to which fragmentation/degradation has occurred
- Extent to which ecotype was represented elsewhere
- Length of time after forest loss
- High biodiversity of forest species
 - Proportion of endemism
 - Proportion of rare/endangered
- Feasibility indicators
 - Presence or absence of alien/invasive species (likely to be site specific)
 - Fire
 - Grazing
 - Viability of restoration options
- Areas of the landscape where ecosystem services are in decline

In general WWF and IUCN should focus attention on the most fragile sites such as:

- Existing degraded sites
- Dry forest sites
- Coastal zones
- Mountain ecosystems
- Dry zones
- Salinised sites
- Fragmented sites

In addition, David Lamb presented a diagram summarising his presentations on restoration from an ecological perspective and Bill Jackson developed this to include a human well-being dimension. Some of the key diagrams resulting from these discussions are outlined in the appendix.

WRAP UP

Some of the future priorities identified include:

The meeting identified some immediate research needs, focused on the following main areas:

- Collection and analysis of **baseline data** needed to plan restoration
- Assessment of **perverse incentives** that currently encourage bad forest management
- Identification of **management options** in degraded forests, new plantations and community-managed forests
- Analysis of **environmental services** and how they can be affected by restoration
- Basic research into various aspects of the **economics** of restoration

Burning issues

The issue of **carbon sequestration** will need to be tackled, and fed into COP6.

The link with **poverty alleviation** and in particular in the context of the WWF/World Bank Alliance, was raised.

The opportunity for partnerships with the **private sector** on this work was highlighted.

Responses from external participants were overall very positive, including the realization that there is a large scope for collaboration on broader development issues linked to forests/restoration.