

Annex 1: Management Options for Tree Planting and Country Experiences

1. Government Managed Plantations/National Programmes

Traditionally a forestry sector role, policy makers have generally accepted that government ownership and direct management of forest resources are not the best solution to ensure sustainable forestry. They have been **expensive, sometimes reliant on external loans, encouraged little public participation, and failed to address the root causes of forest loss and degradation.**

Increasingly, **government roles in tree planting are shifting towards the long term conservation and maintenance of environmental service functions of forests** (watershed protection, genetic conservation), meeting the needs of forest dependent communities, and contributing to poverty alleviation through social forestry (fruit, fodder, medicine, fuel, and other NTFPs) and supporting the private sector in the production of forest goods in non-forest areas.

Thailand

- Extensive rehabilitation of watersheds in Chaing Rai was begun early in the 1990s, by the Royal Forestry Department (RFD) due to a drastic decline in forest cover and soil fertility, through its use as a traditional gateway to Myanmar and southern China. In one village, **agricultural land was taken without consultation with, or compensation to, the farmers concerned, and the land was planted with pine, with negative impacts on undergrowth biodiversity**, and could not be used for traditional forest grazing. In another, a local NGO negotiated co-management arrangements between the villagers and RFD. The villagers were paid to plant trees and to take care of the reforested area, but at the end of the project period, **the villagers lost this income and were no longer allowed to use the forest** (Neef and Schwarzmeier, 2001).

Vietnam

- The 5 Million Hectare Program, aimed to establish 2 million hectares of protection forest and 3 million hectares of production forest from 1998 – 2010, focuses on the regeneration of barren hills. The program is top-heavy, ambitious and expensive, it **gives little consideration to who and what the trees are for, and its implementation increases pressures on traditional land use systems** reliant on these lands. The area is likely to be reduced to 3 million hectares to better reflect the land suited to reforestation and current development plans (Lang, undated).
- In Ba Vi National Park, forest land was transferred to communities and individuals, but they have not been included in park planning processes. Park managers specified **inappropriate species** for planting programmes, mainly *Eucalyptus* and *Acacia*, which **have eroded the natural biodiversity and destabilised the environment through lowering the groundwater tables and reducing soil fertility. The trees do not provide the products which the villagers need to support their livelihoods** (Neef and Schwarzmeier, 2001).

China

- The ‘Three North’ Shelterbelt Development Programme began in 1978 aiming to establish 35 million hectares of plantation by 2050. The programme was established for environmental protection and the first phase is claimed to have brought desertification under control in the region. However, desertification is increasing at a greater speed than its control, as its **root problems have not been addressed**. China’s **forestry sector still cannot meet the needs of national economic development, or ensure the conservation of environmental services**, particularly since the logging ban following heavy flooding in 1998 (Shi Yuanchun, undated).

2. Private Plantations

Private sector participation is increasing and includes small firms and large companies (leased state land), individuals and households (private land), and partnerships (enabling company access to private land). It is supported by market-based incentives (subsidies, compensation, cheap loans, tax exemptions), the promotion of markets for non-timber forest benefits, and certification. In reflection of the changing roles, forestry authorities are restructuring.

2.1 Leased State Land

Industrial plantations tend to focus on fast-growing, short-rotation exotic species, for which old growth forest is often cleared. Sites for plantations have been allocated in areas considered to be unoccupied, often resulting in the loss of access to forest dependent communities who have relied on the resource for several generations.

As demand for forest goods continues to rise, production for export and domestic use increases, with 10 companies found to produce 40% of global turnover of forest products, with 50 companies controlling over 140 million hectares of the world’s forests through ownership and leases (Mayers and Vermeulen, 2002). Yet as these companies grow, their reliance on one or a few products becomes more vulnerable to changes in demand.

Some companies continue to invest in areas where they can benefit from low-cost inputs for high returns, and are influential enough to encourage favourable policies and avoid compliance with existing legislation. Others are beginning to respond to pressures for ‘corporate social responsibility’ in order to enhance their relationships with a wide group of stakeholders (Mayers and Vermeulen, 2002), resulting in a move towards partnerships with communities and smallholders, supported by respective governments and other third party stakeholders, such as NGOs, banks, and certification bodies. As a recent trend, it is difficult at the present time to assess whether their expected benefits can be realised.

Thailand

- Industrial plantations were encouraged in the reforestation of degraded areas within National Forest Reserves, with the aim of meeting the domestic wood supply for the wood processing industry, housing and fuel wood. **Investors took advantage of the cheap long-term land leases but planted commercial trees (eg. *Eucalyptus*) designated for the pulp and paper industry, in some cases clearing old growth forest.** Investment focussed on planting new trees on empty land, **regardless of**

recognition of indigenous communities, who in many cases already occupied the land, sometimes for generations, encouraged by former government policies (Neef and Schwarzmeier, 2001).

2.2 Private Land/Farm Forestry

Farm forestry reflects the changing policy trends within the sector, growing in popularity following the recognition that future timber and wood products will originate outside forest areas rather than within natural forests. The examples below indicate that **in the past, financial incentives have benefited large landowners, and other support has not been effectively targeted.**

As a reforestation strategy, farm forestry is sustainable, cost-effective, and promotes local entrepreneurship. However, upscaling constraints are evident in small land areas and high production costs, lack of access to credit, and distance to markets, but these can be significantly reduced through enabling government policies, incentive systems and other support services, and the creation of partnerships between smallholders, the government and the private sector (Pasicolan, 2003).

Costa Rica

- From the 1970s to the 1990s, **financial incentives for reforestation became the main forest policy tool towards creating plantation resources. The forest industry and larger landowners benefited whilst smallholders lost out.** However this stimulated the formation of smallholder forestry organisations, leading to the establishment of JUNAFORCA (National Smallholder Forestry Assembly) in 1991. One achievement was to change the incentive system to allow eligibility of small land parcels. Smallholder forestry has almost reached economic viability, but smallholder investment into processing, or sawmill owner investment into forest lands is limited (Mayers and Bass, 1999).

Scotland

- **Private sector tax gains** in the early 1980s attracted high-rate taxpayers to invest in forestry through upland plantings, **benefiting existing large (generally absentee) estate landowners**, and greatly changing the pattern of land ownership, **at the expense of tenant farmers**, effectively preventing the emergence of rural economies, and limiting land management possibilities. The formation of the Scottish Parliament in 1999 led to the identification of reforms to enable communities to reclaim access to and management of woodlands (Mayers and Bass, 1999)

Vietnam

- In the Plain of Reeds, Mekong Delta, changing policies have resulted in the destruction and rehabilitation of the natural *Melaleuca* forest. From the mid-1990s, **land sales gave resource-rich farmers the opportunity to accumulate larger areas**, and to set land aside for reforestation, which, along with planting by State forest enterprises, led to a revival of the forests. Having sold their land, some families became landless, and others who could not afford to plant trees have suffered yield losses due to rodents, living in the forest, invading the fields at harvest time (Neef and Schwarzmeier, 2001).

Pakistan

- The government distributed seedlings to farmers on an annual basis, but with limited success, as it has not generally targeted the population most in need of assistance. However, **substantial on-farm afforestation is taking place by farmers themselves encouraged by wood prices**. It is estimated that this contributes up to 80% to national timber and fuel wood production. Constraints faced by farmers are related to materials and marketing, that are not addressed in the annual government planting plans (Mayers and Bass, 1999).

India

- The Farm Forestry Programme of the 1970s and 80s encouraged farm lands to grow fuel wood and fodder, to reduce social pressures on natural forests. The programme made assumptions of the tree species important to people's livelihoods, but farmers planted eucalyptus for poles or urban fuel wood, rather than meeting the needs of the poor. However, it **demonstrated that farmers can meet raw material needs given the right incentives**, but the government was unprepared for the high demand, and was not able to assist farmers with marketing, and the consequent collapse of the timber markets forced many farmers out of business (Mayers and Bass, 1999).

2.3 Company/Smallholder Partnerships

Deals between companies and communities **can be a stepping stone to improved business and livelihood opportunities**. They allow companies secure access to land and labour, and continuous supplies of wood, whilst communities (community groups, individual family) gain employment, technology, infrastructure, social services, income and access to a range of forest products.

However, some expectations of partnerships are still to be proven, as the activities are supplementary to livelihoods, they have not raised communities out of poverty, and poorer or landless families are not always able to benefit. **Partnerships are constrained by weak community tenure, and international market pressure for short-term profit-making, and economies of scale**. Major challenges include the high transaction costs for the company in interacting with a large number of scattered individuals or groups, and for the community in running effective systems for group decision-making (Mayers and Vermeulen, 2002).

India

- Private sector activities on state forest land are not supported, and the areas of land that an individual can own is limited, and therefore, companies must buy fibre from smallholders. **Companies now develop and supply high quality clone seedlings, and buy fibre on the open market, allowing smallholders to benefit from the increased competition** (Mayers and Vermuelen, 2002).

South Africa

- **Smallholders grow trees using seedlings, credit, fertiliser and extension advice from companies who later buy the product for pulp**. This provides about 10% of the mill throughput and is more expensive than wood from other sources, but it provides fibre that would otherwise be inaccessible and allows economies of scale to be reached. This type of scheme has contributed substantially to household income, but has not raised households out of poverty (Mayers and Vermeulen, 2002).

3. Social Forestry

3.1 Joint Forest Management

Joint forest management (JFM) **emerged following forest policy reorientation towards conservation and meeting the requirements of forest dependent people.** It requires forests to be managed **through partnerships between the forestry sector and communities, necessitating changes of attitude,** both within communities, and forestry departments, **and a hand over of responsibilities to community organisations.** Changes for communities include the need to organise, to overcome conflicts and to work with the forestry department, and for foresters, the need to communicate with local people, and to share decision-making powers.

India

- In line with devolution policies, joint forest management (JFM) operates through Village Forest Committees, integrating forestry into other sectors of development. An estimated 14 million hectares of forest is under JFM, and in some areas forest cover appears to have increased, leaving villagers in a good position to receive considerable benefits. However, whilst the relationship between foresters and communities has improved, **transfer of power to village organisations is not evident,** leading to requests for a strengthening of JFM through the incorporation of community forest concepts that would increase the legitimacy and power of the communities, and ensure rural livelihoods and forest rehabilitation (Khare et al., 2000, Biswas, 2003).

3.2 Community Forestry

For centuries, villagers around the world have used and managed forest and woodland areas as common resources. The **concepts of community forestry,** therefore, are not new, but **have recently emerged as a forest management option in response to the failures of large-scale commercial forestry in contributing to socio-economic development.** By placing people at the centre of forestry, the role of forestry officials is moving away from its traditional one of 'policing' the forest.

Community forestry **enables local communities to take authority and responsibility for the use and management of local forests for their own benefit.** However, whilst communities develop management objectives based on their own needs, they generally require approval by forest departments, giving foresters a huge influence over the plans for the forest resource. The resulting tensions highlight the need for a review of enabling support from relevant institutions.

Nepal

- It is estimated that 61% of Nepal's forest has potential to be under community forestry management (Nelson and Tamrakar, cited in Dhital et al., 2001), however, **the process of handing areas to Forest User Groups (FUGs) has been slow, and consists mainly of unproductive or degraded forest areas** (Banerjee, 2001). The role of government forestry staff is changing, and FUGs are encouraged to become more active through a combination of local and outside knowledge (Dhital et al., 2001).
- Community forestry has **not been applied in the forest rich and heavily populated area** of the Terai, leading to the creation of the Terai Community Forest Action Team.

This is as a network to initiate community forestry to demonstrate that whilst a number of challenges are evident, many of the stated problems can be overcome (Shrestha, 2001).

Philippines

- The Community-based Forest Management Program guarantees tenure security, on-site management by residents, and exclusive privileges to harvest forest products in a given area to the people who live there, whilst promoting the investment of profits into reforestation, agro-forestry and community projects. It is practised at more than 50 sites covering approximately 150,000 hectares, with plans for an increase to the stage where domestic requirements for forest products will be supplied by communities. **Current challenges include the high level of mistrust between foresters and communities**, sustainability of donor driven projects, and the shortage of experienced extension workers willing to base themselves in remote rural areas (Pasicolan, 2003).

Laos PDR

- Village forestry is a key element of the National Forestry Action Plan, with a focus on timber production, although it is thought that until **villagers** better understand the benefits of their community forestry efforts, they **are more likely to increase NTFP domestication within private gardens** (Foppes and Ketphanh, 2001).

3.3 Collaborative Management of Protected Areas

An **increased awareness of the social, economic, environmental, and cultural costs to local and indigenous peoples who have lost access to resources in the name of conservation has led to an increasing trend of participatory approaches to protected area management**. Joint activities undertaken by protected area managers and local communities incorporate traditional forms of conservation and help to build trust between both parties.

Laos PDR

- The Protected Areas System was established in 1993, with a statement that communities be included in the management of protected areas. In many villages, traditional applications of conservation concepts are apparent, in conserving resources for spiritual values, and provide opportunities for wildlife and habitat protection. To date, local people have been involved in biodiversity assessments and field surveys, which built trust between local people, government staff and outsiders, representing the initial stage of collaborative management, and joint monitoring teams have been formed in target villages to work with Protected Area staff (Steinmetz, 2001). **The concepts adopted within this approach could be adapted to joint forest management of plantations**.

4. Agro-Forestry

Agro-forestry involves the **joint cultivation of field crops with one or more tree species**. Examples include the incorporation of trees into swidden systems to stabilise cultivation, the domestication of NTFPs through enrichment into community forests, inter-cropping during plantation establishment, and sophisticated multi-storied tree cropping systems on small farms. This system better spreads labour requirements throughout the seasons, **which can provide regular income from a wide variety of products with different harvesting times**. Other examples include:

Myanmar

- *taungya* involves planting **agricultural crops between tree seedlings in teak plantations**, permitting inter-cropping during the plantation establishment as an incentive for local people to protect the seedlings (Raintree, 2001).

Philippines

- *ifugao woodlots* involve the **cultivation of trees to protect the watershed, that made rice terraces possible**, and supplied a range of products needed by the local community. (Raintree, 2001).

Laos PDR

- In Champasak province, **gardens created under high secondary forest** encourage the regrowth of wild forest cardamom, providing a substantial income for villagers (Foppes and Ketphanh, 2001).

Bangladesh

- Farmers have developed **highly sophisticated multi-storied tree cropping systems**, capable of providing a high economic return per unit area, and crucial in view of space constraints of small farms (Rahim and Islam, 2001).

5. Urban Forestry

Trees and green spaces can help to keep cities cool, act as natural filters and noise absorbers, improve micro-climates, protect and improve the quality of natural resources, including soil, water, vegetation and wildlife, and contribute significantly to the aesthetic appeal of cities. In addition, trees contribute directly to the daily food and energy requirements of the poorest sectors of the population.

The **objective of urban forestry is ‘to cultivate and manage trees for their present and potential contribution to the environmental, social and economic well-being of urban society’** (Kuchelmeister and Braatz, (2001). It includes municipal watersheds, wildlife habitats, outdoor recreation opportunities, landscape design, recycling of municipal wastes, tree care, and the production of wood as a raw material.

Most urban forestry efforts have focused on aesthetic values within the core city areas, yet the pressures on natural resources are highest within the urban fringes exposed to spontaneous growth, where incoming migrants tend to settle. Urban forestry therefore has the highest potential for development and satisfying the needs of the urban population in such areas, and to this end **needs to be integrated into broader urban land-use decisions and development plans**.

Examples of urban forestry initiatives include:

- **fruit trees** as an important component of home gardens
- systematic tree planting along streets for **timber production** (China and Malaysia)
- tree planting along streets to help **control pollution** (Thailand)

Baltimore, USA

- The Urban Resources Initiative (URI) has **applied community forestry principles in an attempt to connect urban revitalisation with environmental restoration**. The Baltimore Community Forestry Programme operates through a city-wide community forestry association, which implements small-scale activities that address local needs and

Forestry Administration/Cambodia Tree Seed Project/DANIDA, 2005
Guidelines for Site Selection and Tree Planting in Cambodia

provide benefits to local residents. With a focus on open spaces, streets and parks, the programme requires an overall strategy that addresses the community's problems, which in this case include severe poverty, low levels of home ownership, a deteriorating educational system, and a negative community image. Activities have raised the level of self-esteem within the participants, introduced a sense of community, reclaimed derelict properties, and increased property values through increasing the desirability of the area. To better support the community initiatives, municipal institutions reviewed and redirected their approaches away from the more traditional role of managing parks and providing recreation services (Burch and Grove, 1993).

6. Special Use Forestry

6.1 Clean Development Mechanism

The Clean Development Mechanism (CDM) was established under the Kyoto Protocol. It allows governments or private entities in industrialised countries to implement emission reduction projects in developing countries and receive credit in the form of "certified emission reductions" against their national reduction targets. Developing countries can gain from the transfer of technology and financial resources, sustainable energy production, increased efficiency and conservation, poverty alleviation through income and employment generation, and local environmental side benefits.

As potential carbon sinks, **forestry activities can qualify for CDM through afforestation and reforestation**. Due to uncertainties over the role of forestry in meeting the objectives of the Climate Change Convention, decisions on forestry activities have yet to be made. Evidently, large-scale, simple forest types would be effective carbon stores, but may contravene sustainable development initiatives related to multiple goods and services from forests, and the improvement of rural livelihoods. At the other end of the scale, communities can actively participate in CDM projects through a 'bundling' system, which requires a third party to group small-scale projects, to provide an administration service, and to overcome the high transaction costs. It is crucial, therefore, that locally-accepted sustainable development criteria are established with which to evaluate project proposals.

Whilst there are no examples of CDM forestry projects, experiences can be drawn from Joint Implementation activities, although it should be noted that they may not all be eligible for CDM funding.

Brazil

- **Sustainable fuelwood and charcoal production** will replace fossil fuel use in the pig iron industry. 23,100 hectares of high yielding eucalyptus plantations will be established to supply the wood, and the charcoal will be produced using the most up to date carbonisation technology available in the country. At the time of plantation maturity, an estimated 5 million tons of carbon dioxide will be sequestered (UNEP/RISO, undated).

Malaysia

- A large-scale forestry-based carbon offset project **aims to rehabilitate 25,000 hectares of degraded areas through enrichment planting and forest reclamation using indigenous species**. It is expected that the project will sequester 4.25 million tonnes of carbon during its lifetime, over 4 million cubic metres of sawn hardwood timber, 230

jobs per year in the planting phase and substantial research and training of Malaysian students (Aukland et al., 2002).

Costa Rica

- The first developing country to launch a national carbon sequestration programme (1997), **encouraging landowners towards forestry related land uses** by providing a direct payment for environmental services, which are then sold to investors (Aukland, et al., 2002).

Mexico

- Researched and developed an integrated planning, administration and monitoring system to aggregate carbon benefits from many **small-scale activities**. Known as Plan Vivo, it provided carbon credits for sale, the funds from which were used to provide farmers with carbon payments to cover the costs of establishing **agro-forestry systems, small-scale plantations and communal reforestation activities**. Plan Vivo is being used in India, with plans for additional projects in Mozambique and Uganda, and developments to the system aim to ensure its compatibility with the requirements for CDM (Aukland et al, 2002).