

**Forest Restoration at Landscape Level in the Asia-Pacific**

*Pre-session Seminar: 25<sup>th</sup> session of the Asia-Pacific Forestry Commission*

# **Forest and Landscape Level Restoration: We need more than techniques**

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# Overview of presentation

1. Focus of presentation is on regulatory and institutional aspects of restoration.
2. Three examples from Asia are used to draw out some of the key issues (Ciamis District in West Java, the Lake Toba Catchment Area in Northern Sumatra and the Middle Hills of Nepal).
3. Common threads of successful restoration are outlined.
4. Several emerging issues are described that may be relevant in the future.

## Ciamis District (West Java)

- Trees integrated into agricultural landscape;
- Degraded government forest land on upper slopes



Strong culture of  
tree planting:  
32,000 ha private forests  
(13% of district)

# Ciamis District (West Java)

Trees harvested for  
economic gain



Industry built on timber  
from private forests:

- 360,000 m<sup>3</sup> logs annually
- >500 sawmills

# Summary-Ciamis District (West Java)

- No longer any degraded forest land in private ownership, but much government forest land is degraded
- Private farmers and government officials share a common interest in restoring forest cover on degraded private forest land
- Long standing culture of tree planting on private land
- The tenure of private land is clear and uncontested
- Government policy is supportive of forestation activities on private land
- There are economic incentives for farmers to be involved in forestation on their land
- Farmers are empowered to make all relevant decisions regarding planting and harvesting forest crops on their land

## Lake Toba Catchment Area (N. Sumatra)

- Important catchment and tourist values;
- Large and increasing area of deforested land



- No culture of tree planting on private land;
- Main efforts are in demonstrating use of trees on farm land

# Summary-Lake Toba Catchment Area

- Forest degradation is on-going, particularly on government forest land
- There is no culture of tree planting on private land
- There is little convergence of interest between farmers and government officials in restoring forest cover on deforested private land
- Land tenure of some clan lands is complex and is unclear and contested

## Middle Hills of Nepal

Nepal was well known in 1970s and 80s for its wide spread forest loss and degradation



Agricultural and grazing lands had low tree cover

## Middle Hills of Nepal

A national community forestry program commenced in the late 1970s:

- Plantations established on bare common land



- Natural forests restored from degraded condition

## Middle Hills of Nepal

Over the past 30 years:

- Community Forestry has been successful in restoring degraded land, particularly in the Middle Hills;
- There has been a substantial increase in trees on private land.

Area of community forest	>1.2 million ha (23% of the national forest area)
Number of Community Forestry User Groups (CFUGs)	17,685
Number of households involved in CFUGs	1.6 million (equivalent to 33% of the total rural population)

## Middle Hills of Nepal

- Landscape is now covered with a mosaic of agricultural land, community forests and trees on private land



- Small scale industries- private and community- have developed to process timber from CFs

## Middle Hills of Nepal

Communities now generate significant funds to spend on local development:

\$49 million across country



Income is used for: schools, water supplies, roads, loans to marginalised groups.

## Middle Hills of Nepal – changes are under way

- Out-migration is occurring from rural areas leading to abandonment of agricultural land



- Trees are invading abandoned agricultural land;
- Opportunities for further restoration, but
- Issues of food security

# Summary-Middle Hills of Nepal

- A combination of CF and private forestation has resulted in the restoration of degraded forests across much of the Middle Hills (CF has become a social movement—no longer just a govt program);
- Farmers and government officials share a common interest in restoring forest cover, but the motivation of the two groups differs;
- Tenure of both communal and private land is clear and uncontested;
- The regulatory regime is supportive of CF and private forestry;
- Community Forest User Groups (CFUGs) are recognised legal entities;
- CFUGs have been empowered to manage most aspects of their activities;
- During recent years the government has attempted to regain some power over CFUG activities and increase its influence on CFM;
- Changes in the social and economic situation in Nepal have changed the context in which restoration occurs.

## Each situation is different, but common threads can be discerned in successful examples of restoration

- There is a convergence of interests between farmers and community groups on one hand and government on the other hand that restoration of degraded forest land is desirable.
- There is an enabling regulatory framework (policy, laws, rules and regulations) in place so that key stakeholders, particularly community groups and farmers, can become sufficiently empowered to take effective control of their restoration efforts.
- Restoration has become an activity carried out by community groups and farmers for their benefit; and the benefits are real and tangible and outweigh the costs.

# Each situation is different, but common threads can be discerned in successful examples of restoration

- The application of incentives, particularly economic ones, plays an important role in encouraging community groups and farmers to participate effectively in forest restoration.
- Institutional mechanisms are available to enable community groups and farmers to be recognised as legal entities and to participate in marketing forest goods and services.
- There is a limited range of tenure categories, and thus a limited range of stakeholders with which to negotiate on restoration objectives and approaches.

# Emerging issues

- Moving from restoration for goods to restoration for a mix of goods and services:
  - Carbon sequestration and storage;
  - Biodiversity protection;
  - Watershed protection;
  - Landscape beauty;
- Social transitions are taking place in many countries (out-migration, market orientation, etc) leading to changes in rural landscapes (land abandonment, feminisation of workforce).
- Planning at a landscape level requires new policy settings and approaches to “socialise forest restoration” and mainstream restoration thinking and acting into the normal operations of a range of land owners and managers.

**Thank you**



# Forest Restoration at Landscape Level in the Asia-Pacific

*Pre-session Seminar: 25<sup>th</sup> session of the Asia-Pacific Forestry Commission*  
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## Forest and Landscape Level Restoration: We need more than techniques

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### 1. Introduction

Planning for and carrying out restoration of degraded forest land requires the integration of many issues: technical, regulatory and institutional. Restoration at the landscape level also involves a consideration of multiple mosaics—land use, tenure, vegetation cover, trends, etc. and negotiations among multiple stakeholders who often have differing interests.

The focus of this paper is on the regulatory and institutional aspects of restoration, as the technical aspects are addressed elsewhere. The paper draws on three examples of landscape level forest restoration to illustrate some of the key issues and to provide a framework for further discussion. The examples are: two contrasting situations in Indonesia (Ciamis District in West Java and the Lake Toba Catchment Area in Northern Sumatra) and the Middle Hills of Nepal.

### 2. Examples of landscape level forest restoration<sup>1</sup>

#### 2.1 Ciamis District, West Java

There is a long tradition of integrating trees into the farming systems in West Java and “people’s forests” have been an integral part of the landscape for generations (Dept of Forestry, 2008). Government initiatives since the 1970s (see Box 1) have contributed to the practice of planting forest trees on private land for commercial purposes, a practice which is currently widespread in the Province. The government has long term targets, one of which is to achieve 45% of West Java under tree cover. The Provincial Forestry Office also has a strategy to address critical lands, both government and private (Dept of Forestry, 2008).

#### **Box 1. Evolving farming and tree planting culture in West Java**

The traditional subsistence culture of the people in West Java was to have a piece of land around their home and to work on that land to achieve self sufficiency. Livelihood was based on cultivating the land with fruit trees and vegetables and perhaps rearing cattle (buffalos for the rice fields) or raising chickens. The system of mixed annual crops and fruit trees, with a minimum of land clearing, enabled people to maintain soil fertility and to farm sustainably.

With increasing population and the advent of the market economy the traditional subsistence culture has had to change and adapt. Problems of land shortage have arisen and government

<sup>1</sup> Much of the material on Ciamis District and the Lake Toba Catchment Area is drawn directly from Gilmour and Ghazali (2012a) and Gilmour and Ghazali (2012b).

forests have been cleared for cultivation or converted to other forms of land use. Over the years the government has responded to these pressures in numerous ways:

1952: Government began a programme of encouraging **planting of fruit trees** on abandoned land to improve soil protection and raise soil fertility.

1956: Agriculture and Forestry Departments ran joint **National Greening campaigns**.

1972: The Governor of West Java, initiated an **agroforestry** drive in Bogor

1975 – 1976: The **greening project of land outside government forest land** was in full swing, particularly in West Java.

1990: Forestry Department pursued **national greening activities with large scale planting of *Albizia***, targeting critical areas.

Source: Adapted from Dept of Forestry (2008)

The contemporary landscape in Ciamis District is essentially a forested one consisting of a mosaic of relatively small patches of agricultural land integrated into areas of private forest managed under both agroforestry and pure forestry regimes. The upland, steeper areas of the District tend to be state owned forest of various categories, much of which is degraded, particularly those areas which were used for crop estates, but are now abandoned. The private forests represent a mature system with the age range of trees varying from recently planted seedlings to mature trees of more than 30 years. Much of the area is managed as agro forests with underplanting of crops such as cardamom. Overall, the private forests are extremely well managed to produce a mix of timber and non-timber products. This impressive process of restoration of degraded forests on private land has been underway in the District for many decades.

The available government data indicate that there is a large area of degraded forest in the District. However, it is universally accepted by everyone (government officials including extension staff, individual farmers, farmers' groups and sawmillers) and supported by detailed field observations, that virtually all of this is in state owned land, particularly ex-crop estates, and not in private forest land.

Private forests cover 32,000 ha in the Ciamis District (about 13 % of the land area in the District) and produce on average 360,000 m<sup>3</sup> of logs per year that are processed in more than 500 sawmills in the district<sup>2</sup> (FORDA 2008) as well as by mills outside the District. Logs sourced from government forests contribute a further 49,000 m<sup>3</sup> to the local industry (FORDA 2008). By and large, there are no land use or land tenure conflicts that concern private forest land in the District.

Private forestry has received strong support from the District government. For example, in 2004, the tax on logs harvested from private forests was removed, thus providing an added stimulus to tree planting (Tiwa Sukrianto, ex-Head of FSCD, pers. com.). This is a good example of government creating an **enabling** regulatory environment (as opposed to an **enforcing** one) to achieve policy objectives.

Under a central government initiative farmers are encouraged to form farmers' groups to provide a convenient interface for interaction with District extension staff. These groups are

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<sup>2</sup> Provincial Forestry Office data (quoted in FORDA 2008) indicate that there were 538 sawmills in Ciamis District in 2006.

legal entities with bank accounts and the ability to raise loans for collective activities. In Ciamis District, farmers' groups (typically with 50-150 members) tend to function collectively for activities such as the operation of seedling nurseries. However, farmers operate individually for almost everything else, including managing their agro forests (planting seedlings, applying silvicultural techniques, etc.) and selling timber and non timber products. An average farmer might own less than one hectare of forest land (the 150 members of the Lumbung farmers' group own a total of about 100 ha of forest land).

To summarise the situation in Ciamis District:

- There is no longer any degraded forest land in private ownership, although much government forest land is degraded
- Private farmers and government officials share a common interest in restoring forest cover on degraded private forest land
- There is a long standing culture of tree planting on private land
- The tenure of private land is clear and uncontested
- Government policy is supportive of forestation activities on private land
- There are economic incentives for farmers to be involved in forestation on their land
- Farmers are empowered to make all relevant decisions regarding planting and harvesting forest crops on their land

## ***2.2 Lake Toba Catchment Area (LTCA), Northern Sumatra***

In the 12 years between 1985 and 1997 about 16,000 ha of forest in the LTCA were lost, either degraded or converted to agriculture (ITTO 2010). This is a rate of about 1,300 ha per year. It is presumed that most of this loss occurred on government forest land of various categories and that substantial loss of forest is still occurring.

One of the major constraints previously identified as limiting restoration efforts in the LTCA was unclear and conflicting land tenure. However, this is not universal, and indeed varies widely between Districts and, in some cases, within Districts. In Samosir District, a large proportion of the non government land is still held under clan ownership, although for various reasons some of this has been privatised during the past several decades, a process which is continuing, although slowly. Tenure uncertainties have impinged on attempts to introduce tree and agroforestry systems to clan land because of difficulties associated with obtaining agreement from all clan members (many of who are absentee landowners but still have the right to be part of the decision making process). In Karo District, the process of privatising clan land was completed in about the 1970s and there are now no land use or tenure conflicts. Other Districts are intermediary between these two ends of the spectrum. This is a somewhat simplified characterisation of a complex land tenure situation, but sufficient to indicate that there will not be one single approach that will be suitable for all situations. Any approach to rehabilitation will need to be tailored to the site-specific conditions, of which land tenure is one.

Unlike in West Java, the culture of the Batak and other local communities does not place a high value on integrating trees into the local farming systems in the LTCA. Consequently, many of the government's activities to encourage forest restoration have focused on: (i)

socialising the idea that tree planting and adoption of agroforestry systems on private land are good for the environment as well as good for improving the income of farmers, and (ii) demonstrating approaches to tree planting on private land that can be integrated into the contemporary farming systems.

To summarise the situation in the Lake Toba Catchment Area:

- Forest degradation is on-going, particularly on government forest land
- There is no culture of tree planting on private land
- There is little convergence of interest between farmers and government officials in restoring forest cover on deforested private land
- Land tenure of some clan lands is complex and is unclear and contested

### ***2.3 Middle Hills of Nepal***

Community Forestry has been outstandingly successful in Nepal in terms of reforesting previously degraded communal land across the Middle Hills through a mix of planting and natural regeneration. Table 1 shows the current status of community forestry in the country. This process is well documented (see Hobley 2012 for a thorough analysis of community forestry in Nepal over the past 30 years).

**Table 1: Status of community forestry in Nepal (as at 2011)**

Area of forest managed by Community Forest User Groups (CFUGs)	>1.2 million ha (23% of the national forest area)
Number of Community Forestry User Groups (CFUGs) (Most are in the hills)	17,685
Number of households involved in CFUGs	1.6 million (equivalent to 33% of the total rural population)
Average annual income per CFUG (averaged over three year period 2008-2011)	NRs 260,000 (approx \$3,500) per CFUG per year (total average annual income for all CFUGs equates to \$49 million per year)

A large part of the success of Community Forestry as an intervention can be attributed to the fact that the provision of a range of forest goods, particularly fuelwood and fodder, was a high priority for most farmers. As a consequence, they were prepared to devote resources to participate actively in restoration activities in the expectation that they would receive substantial benefits that would improve their livelihood. Management of the newly created community forests by Community Forest User Groups (CFUGs) also enabled the generation of significant income, some of which has been used to carry out needed community development activities.

Much of the management emphasis from a government perspective has always been on restoring the forest cover, i.e. there is a conservation focus, whereas the motivation of most communities has been on harvesting forest goods to improve livelihoods. These different management objectives often overlap and sometimes conflict, and have led to several adverse

outcomes. After two decades of restoration and protection some forests are now heavily stocked and questions are being raised about their long term productivity. Heavy stocking also raises questions about the likely impact on the provision of forest services such as dry season streamflow (Gilmour 2013).

While a revolution was taking place in forest cover in communal land in the Middle Hills, less well recognised changes were also taking place in private land with substantial increases in tree cover occurring across the agricultural landscape. There are many reasons for this (see Gilmour 1995 for a detailed analysis).

The overall result of the restoration of forests on communal land and the widespread increase in tree cover on private agricultural land has been a transformation of the landscape in the Middle Hills over the past 25 years. However, the context is not static and significant changes are underway:

- i. Social dynamics are changing, in particular associated with substantial outmigration from rural to urban areas and overseas. As a result large areas of agricultural land have been abandoned during the past decade. As a consequence, new opportunities arise to increase provision of goods and services from restoration of this land, but will need different approaches from those previously applied to communal and private land.
- ii. Increased road access to previously remote rural areas has increased market possibilities for forest goods—possibilities have emerged to improve economic benefit of forest restoration by moving from managing restored forests primarily for subsistence goods to managing them for both subsistence and market goods. This will require the application of different silvicultural practices and changes to the regulatory framework.

To summarise the situation in the Middle Hills of Nepal:

- A combination of community forestry and private forestation efforts has resulted in the restoration of previously degraded forests across much of the Middle Hills
- Farmers, community groups and government officials share a common interest in restoring forest cover on degraded private and communal forest land, although the motivation of the two groups differs
- Tenure of both communal and private land is clear and uncontested
- The regulatory regime is supportive of community and private forestry
- Community Forest User Groups (CFUGs) are recognised legal entities
- CFUGs have been empowered to manage most aspects of their activities
- During recent years the government has been attempting to regain some power over CFUG activities and to increase its influence on management decision making
- Changes in the social and economic situation in Nepal have changed the context in which restoration occurs

### 3. Common threads

A major conclusion from analysing the three examples discussed above is that each situation has a different context, not just biophysical, but also in terms of its historical, social, political, institutional, cultural and economic aspects. Importantly, the context is also dynamic and can change over time. A consequence of this is that approaches to restoration also need to be dynamic and tailored to each specific situation—one size does not fit all. However, examples of successful restoration do have some common features. Perhaps the most important ones are that:

- There is a convergence of interests between farmers and community groups on one hand and government on the other hand that restoration of degraded forest land is desirable (although the reasons for the commonality of interest may be different).
- There is an enabling regulatory framework of policy, laws, rules and regulations in place so that key stakeholders, particularly community groups and farmers, can become sufficiently empowered to take effective control of their restoration efforts.
- Restoration has become an activity carried out by community groups and farmers for their benefit; and the benefits are real and tangible and outweigh the costs.
- The application of incentives, particularly economic ones, plays an important role in encouraging community groups and farmers to participate effectively in forest restoration.
- Institutional mechanisms are available to enable community groups and farmers to be recognised as legal entities and to participate in marketing forest goods and services.
- There is a limited range of tenure categories, and thus a limited range of stakeholders with which to negotiate on restoration objectives and approaches.

Several of the points summarised above warrant further discussion. Incentives for forest restoration are among the most important mechanisms to encourage individuals and groups to become involved in restoration. Conversely, the removal of disincentives (such as onerous bureaucratic procedures related to harvesting and selling forest products) is equally important in enabling stakeholders to engage in restoration. Among the incentives that have been found effective are the following:

- No government tax on tree and forest products harvested for local use or sale;
- Minimum bureaucratic procedures, e.g. no formal government approval required for harvesting and selling tree and forest products, subject to conforming with approved management plans in the case of communal forests;
- Financial incentives to farmers/community groups to protect restored forests;
- Provision of seedlings to private farmers/community groups to initiate restoration.

The final point in the list of common threads also warrants some elaboration. The three examples of restoration discussed earlier illustrate initiatives across a limited range of tenure categories: private land in the two Indonesian cases and private and communal land in Nepal's case. A major challenge in restoring forest cover across large landscapes is in dealing with the complexities involved in mosaics of tenure, and hence in differing objectives and

management interests of the different land owners and managers. Additionally, in many countries, government agencies do not have the ability to exercise effective management control over government forest land, even if the tenure is uncontested. The most successful examples of restoring degraded land covering several tenure categories occur where governments have re-assigned land to community or private entities. Two examples illustrate this point. In Nepal, the government recognised the rights of communities to be allocated government forest land to manage as community forests. (In most cases the land allocated was always locally recognised as communal forest, and the change in policy removed the tenure ambiguity.) This opened the door for successful restoration of degraded government/communal land by community groups. The second example is from Vietnam, where the government instituted a large scale program to allocate government forest land to households, essentially privatising the land. This was accompanied by incentives to encourage restoration of forests for commercial purposes, with the result that substantial areas of degraded forest land were restored in a relatively short time.

#### 4. Emerging issues

##### *4.1 Moving from restoration for goods to restoration for a mix of goods and services<sup>3</sup>*

Much of the discussion surrounding restoration of degraded forest land has centred on biophysical outcomes. However, in the contemporary world, society often demands more from restoration than simply restoring forest cover. Restored forests have the potential to provide a wide range of goods and services. The sale of timber (a primary good) from restored forests to generate income is an obvious direct mechanism. However, governments are increasingly exploring indirect mechanisms such as Payments for Environmental Services (PES) to market services to provide incentives for farmers and others to engage in restoration activities.

The basic idea behind a PES approach is that external environmental service beneficiaries **make direct, contractual and conditional payments to local landholders and users in return for adopting practices that secure ecosystem conservation and restoration** (Wunder, 2005). Wunder gives examples of four types of PES arrangements:

1. Carbon sequestration and storage (e.g. a northern electricity company paying farmers in the tropics for planting and maintaining trees);
2. Biodiversity protection (e.g. conservation donors paying local people for setting aside or naturally restoring areas to create a biological corridor);
3. Watershed protection (e.g. downstream water users paying upstream farmers for adopting land uses that limit deforestation, soil erosion, flooding risks, etc.);
4. Landscape beauty (e.g. a tourism operator paying local community not to hunt in a forest being used for tourists' wildlife viewing).

Wunder et al. (2008) analysed PES case studies from both developed and developing countries. Most are in Latin America, but they include examples from China, France and Australia. They distinguish between user and government financed programs, with the former tending to be much smaller in scale than the latter. Government financed programs also tend to pursue non environmental objectives, such as poverty alleviation or regional development in addition to the main environmental objectives. Government financed programs are

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<sup>3</sup> Part of the material in this section is taken directly from Tsering (2011).

normally managed by national agencies either created for the purpose or already working in the sector. In almost all cases someone has to act as an intermediary between those who are paying for the service and those who provide the service. “*Working with providers is particularly complex logistically (and accounts for the bulk of the transaction costs) as there are usually many providers dispersed over the landscape. Someone needs to negotiate with them and/or communicate the offered payments, contract with interested providers, monitor compliance and make payments*” (Wunder et al. 2008 p.839). In almost all cases payments are made directly to land holders, though this can include individuals, cooperatives and indigenous communities.

Building such mechanisms into the restoration equation will add a further layer of complexity to the process. Particular challenges include:

- Identifying which groups in society will pay for the services in the long term
- Working out mechanisms for benefits to flow equitably to communities and individual farmers in a way that ensures no erosion of their rights or loss of their empowerment
- Agreeing on performance criteria against which to judge delivery of agreed services
- Minimising transaction costs

#### ***4.2 Social transitions and changing rural landscapes***

Many countries in the Asia region are experiencing substantial changes in the social dynamics of their rural areas with resulting changes in the rural landscapes. For example, rural Nepal is in a complex process of transition involving out-migration, particularly of the active male workforce (and resulting feminization of the agricultural workforce), urbanisation, commercialisation and monetisation of the local economy. At the same time, there are significant shifts taking place from traditional, informal local institutions to modern, formal and bureaucratic institutions often bringing state and market actors into the realm of local governance (Gilmour and Shah, 2012). The combination of these factors has led to the adoption of less intensive farming with fewer crops in the cropping cycle. A concomitant effect has been the abandonment of agricultural land, particularly marginal land. The abandonment of marginal (and increasingly not so marginal) agricultural land has led to an increase in tree cover, as much of the abandoned land has regenerated readily to trees. These changes to the overall farming systems also have implications for food security as less agricultural land is devoted to food production.

An additional implication of the urban drift described above is that the institutional mechanisms needed to manage restoration of common land (CFUGs in Nepal’s case) can be weakened, as many of the younger male members of the community leave for urban areas or overseas.

#### ***4.3 Planning across a landscape***

At the outset of this paper it was noted that landscape level planning for restoration requires the integration of technical, regulatory and institutional issues and a consideration of multiple mosaics—land use, tenure, vegetation cover, trends, etc. This implies some sort of central entity to carry out the planning function including negotiations among multiple stakeholders who often have differing interests. This is a considerable challenge. A World Bank supported

project to carry out landscape level forest restoration in Hunan Province in China developed a set of planning guidelines (World Bank 2012) which offer useful insights into what is required to take account of the many variables to be considered. The project adopted a participatory consultation and planning approach with objectives to:

- Guarantee that stakeholders voluntarily participate in the project;
- Avoid social risks and social conflicts that might be created by the project, and recommend countermeasures to prevent the risks and conflicts;
- Design technological plans for the project including selection of tree species, afforestation models, contract arrangement and follow-up management of forests in post-project stages;
- Ensure equal opportunities for groups like low-income farmers' households, poverty-stricken households, minority groups, women and so on to participate in the project;
- Build and enhance the awareness of forest resource management and strengthen commitment and capability to forest management which is key to ensuring the long-term influence of the project.

The guidelines that follow on from these objectives were implemented within a project. However, the real challenge for such approaches is to move beyond a project structure to “socialise forest restoration” and mainstream restoration thinking and acting into the normal operational modality of a range of land owners and managers.

## 5. References

Dept of Forestry (2008) Hutan Rakyat Jawa Barat: Status reset dan strategi engembangannya. (People's Forest in West Java—status and strategy for development). Balai Penelitian Kehutanan Ciamis, Badan Penelitian dan Pengembangan Hutan, Departemen Kehutanan.

FORDA (2008) Hutan Rakyat Jawa Barat. Research Status and Development Strategy. Forestry Research Institute of Ciamis.

Gilmour, D. A. (2013) Forests and water. A synthesis of the contemporary science and its relevance for community forestry in the Asia-Pacific region. Center for People and Forests in Asia (RECOFTC). Bangkok, Thailand.

Gilmour, D.A. (1995) Rearranging trees in the landscape in the middle hills of Nepal. In J.E.M. Arnold and P.A. Dewees (eds) *Tree Management in Farmer Strategies: Responses to Agricultural Intensification*. Oxford University Press, Oxford: 21-42.

Gilmour, Don and Baharuddin Ghazali (2012 a) Rehabilitation of degraded forest land involving local communities in West Java, Indonesia. Ex-post evaluation of Project PD 271/04 Rev.3 (F). ITTO, Yokohama, Japan.

Gilmour, Don and Baharuddin Ghazali (2012 b) Restoring the ecosystem functions of the Lake Toba Catchment Area through community development and local capacity building for forest and land rehabilitation. Ex-post evaluation of Project PD 394/06 Rev. 1 (F). ITTO, Yokohama, Japan.

Gilmour, D. A. and Racchya Shah (2012) Enhancing livelihoods and food security from agroforestry and community forestry systems in Nepal: Synthesis paper, ACIAR Scoping Mission.

Hobley, Mary (2012) Persistence and change: Review of 30 years of community forestry in Nepal. CF Impact Study. (DRAFT)

ITTO (2010) Restoring the ecosystem functions of the Lake Toba catchment area through community development and local capacity building for forest and land rehabilitation. Project Completion Report: PD 394/06 Rev. 1 (F).

Tsering, K. (2011) A Roadmap for watershed management in Bhutan: From policy to practice. WMD, DOFPS-MOAF, Thimphu, Bhutan.

World Bank (2012) Participatory Consultation and Planning Guidelines. Hunan Forest Restoration and Development Project (HFRDP). Social Assessment Team, SR40.

Wunder, S., S. Engel and S. Pagiola (2008) Taking stock: A comparative analysis of payments for environmental services programs in developed and developing countries. *Ecological Economics* 65: 834-852.