



Moving closer to nature

Lessons for landscapes and livelihoods from
the Miyun landscape, China



LIVELIHOODS AND LANDSCAPES STRATEGY - Landscape paper n°1



Ministry of Foreign Affairs of the
Netherlands

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Executive summary

Substantial efforts have been made over the last 30 or 40 years to reforest the Miyun landscape. These efforts were a response to the very urgent need to protect the Miyun reservoir and its watershed, which supplies up to 80% of the water used in Beijing, China's capital city. Over the last decades, Beijing has been facing a progressively worsening water crisis.

Much of the original broadleaf forest in the Miyun watershed had disappeared. Reforestation activities planted large areas of conifers and other species, and instituted strict controls on land and forest use, including a total ban on logging. Four years ago, however, that these strictly protected and mainly young, even-aged stands of trees were in poor condition. This was because they had not been actively managed. Around three-quarters were classified as 'sub-healthy' or 'unhealthy', with limited capacity for soil, water and biodiversity conservation.

Similarly, local communities had also become progressively disadvantaged in economic terms, as a result of the logging ban and strict regulation of their access to forests. There remained a glaring differential between the socio-economic status of the people living in the Miyun watershed area and that of the neighbouring residents of Beijing. Few income and employment opportunities were available, as cash incomes had traditionally been associated with forest products' collection. It was only possible to carry out limited collection of fuelwood and non-timber forest products (NTFPs).

It was against this backdrop that IUCN's Livelihoods and Landscapes (LLS) project was initiated in the Miyun watershed in 2007. The project responded to the paradox of a landscape which was dominated by forests which were subject to little or no active management and a livelihood situation where local communities had become impoverished, underpinned by the ever-more urgent need to ensure that the source of Beijing's rapidly dwindling water supplies was protected.

It was clear that the strict logging ban needed to be replaced with a new forest development and management strategy. This needed not just to allow for better forest biodiversity and watershed services, but also to ensure improved incomes and livelihood security for the surrounding human population. The project introduced a new set of forest management tools which represented a shift from a strictly protective and very conservative regime, to one based on sustainable use and active management by local communities. At the same time, considerable efforts were made to find other ways of strengthening livelihoods, promoting sustainable forest use, and adding value at the local level.

Although the changes that the project aims to effect in the Miyun landscape and livelihoods are long-term in nature, it is possible to discern some very positive signs as the project enters its final months. Participatory planning has resulted in a formal agreement to recognize different forest management and use regimes, harmonizing the technical information held by government foresters with local knowledge and interests. A set of 'close-to-nature' silvicultural treatments has been developed and is being implemented by local communities. This has resulted in the regeneration of natural forest and improvements in forest structure, quality and function. A permit for timber harvesting has been secured – the first such quota issued in more than 20 years. A new system of extracting fuelwood has been put in place, and significant progress has been made in reducing local fuelwood demands. Last but not least, support has been given to the implementation of cooperative arrangements for developing the market potential of forest goods and services, with the aim of increasing and diversifying local income and putting in place institutional structures that will be sustainable over the long term. A much more integrated form of landscape management and restoration has been introduced in the Miyun landscape which recognizes the multiple needs and functions of the watershed, and brings together the many different stakeholders, sectors and levels of scale which have interests in them.

The LLS Miyun project has generated important lessons about the process of working to improve landscapes and livelihoods in a watershed context. This paper documents and shares these lessons. In particular, it summarizes how the project was conceptualized and implemented, how and why this changed over time, and what its key impacts and achievements have been.

About LLS

The Livelihoods and Landscapes Strategy (LLS) is a global project of IUCN's Forest Conservation Programme funded by the Directorate General for International Cooperation (DGIS) of the Netherlands Ministry of Foreign Affairs. Its first phase ran from 2007-2011. Its overall goal has been *"the effective implementation of national and local policies and programmes that leverage real and meaningful change in the lives of rural poor, enhance long-term and equitable conservation of biodiversity and ensure the sustainable supply of forest-related goods and services in line with nationally-defined priorities"*.

LLS was intended as a direct response to two of the major challenges facing sustainable development at the time of its design in 2006:

- How to find practical ways to support governments and donors in ensuring that the benefits of national poverty reduction strategies reach the rural poor, and in particular those who are highly dependent on natural resources including forests and trees.
- How to reverse the current lack of momentum in implementing international commitments on sustainable forest use and conservation and therefore address the slippage of forest-related issues within international development.

The strategy is predicated on the belief that although these two challenges are inextricably linked, natural resource management and conservation organizations have yet to make a convincing case, on a large enough geographic or institutional scale, as to how improved resource use and conservation can make a difference to the livelihood security of the rural poor. It is hardly surprising therefore that ministries of finance and economic planning have tended to be unaware that forest goods and services remain as important as ever for many poor people and could be better harnessed to contribute to rural poverty reduction, as well as the national economy.

LLS has contributed to shaping a bold new vision of forests as multifunctional assets that can make a real difference to rural poverty, economic growth, environmental quality, human well-being as well as biodiversity conservation. It has promoted this vision among both the forest sector and decision makers in other sectors whose own goals and targets impact, or are impacted by, the state and integrity of forest resources.

What is a landscape?

A landscape is a mosaic of different types of land use such as agriculture, forests, pasture and conservation areas. Managed as a whole, a landscape serves a variety of needs for various stakeholders. The LLS vision of a landscape is of multiple and complementary land uses based on negotiation rather than centralized planning. Landscapes do not exist in a vacuum, but are influenced by a wide range of external factors including policies and economic conditions generated far outside it, land use in adjacent landscapes and perhaps remote physical features such as dams. Addressing landscape management issues always requires interventions outside as well as inside the landscape.

The strategy has four key thematic components, each addressed in a mutually integrated manner:

- i) forests and poverty reduction,
- ii) markets and incentives,
- iii) governance, and
- iv) transforming landscapes.

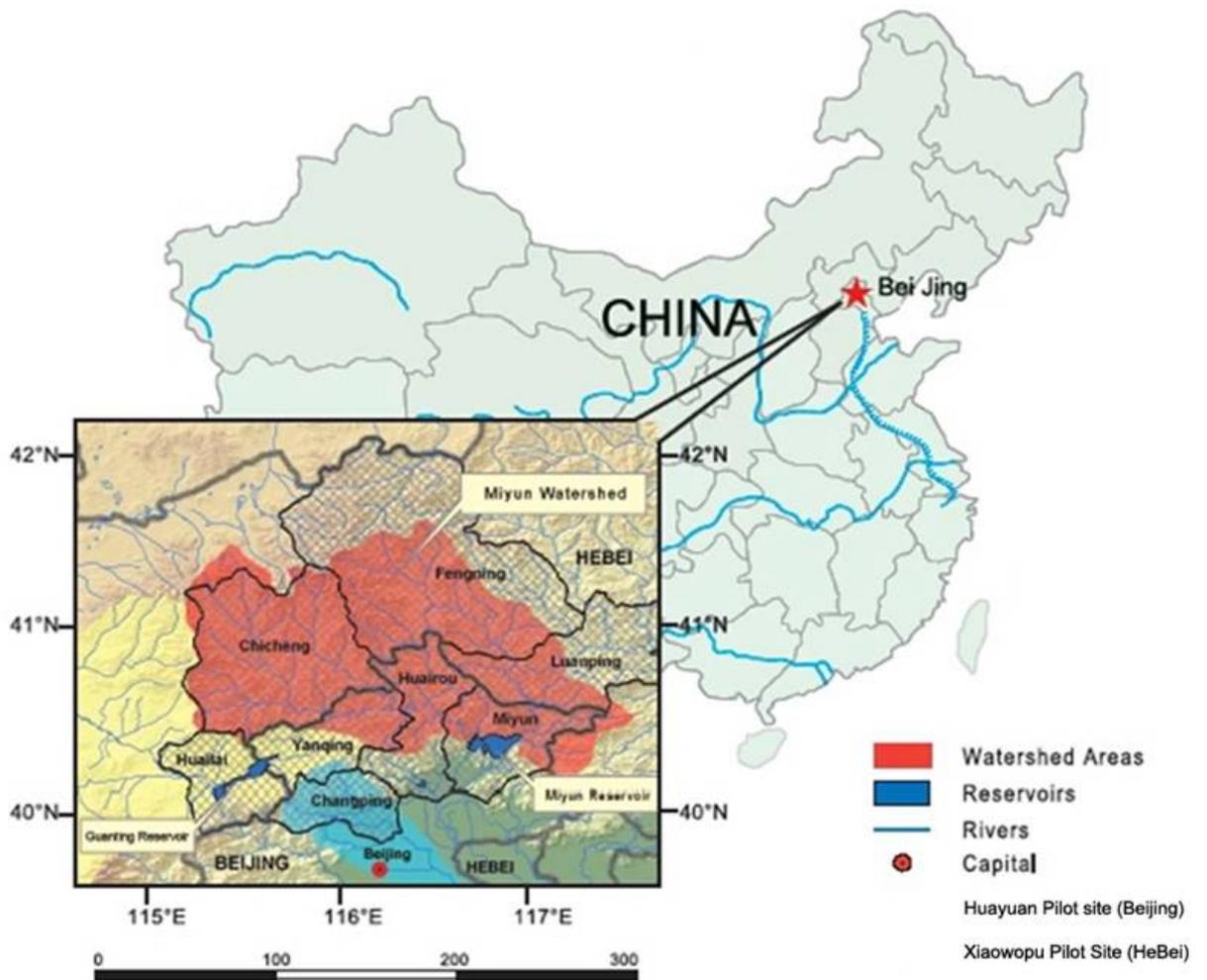
Targeted geographic interventions in nearly 30 landscapes across 23 countries in Africa, Asia and Latin America looked at the linkages between the four themes thereby avoiding their treatment as stand-alone issues.

This paper is one of a series of case studies, exploring and reporting on experiences from particular LLS landscapes, collectively contributing to a host of its lessons and insights. The diversity in the landscapes is reflected in the Landscape Papers themselves, whose structures, purposes and outcomes vary depending on each respective case and context in question.

The papers draw on data and information generated over the last 5 years and in most cases, at the time of publication, successes on the ground have continued into 2012, when the first phase of the project

officially closes. With sustainability integral to the LLS project design, the work of LLS will in effect live on in each landscape and often much more widely than that, influencing local, regional and international practice and policy in the manner already detailed and reported in the LLS Landscape Papers, Thematic Papers, Thematic Briefs and Research Papers.

Location of the Miyun watershed



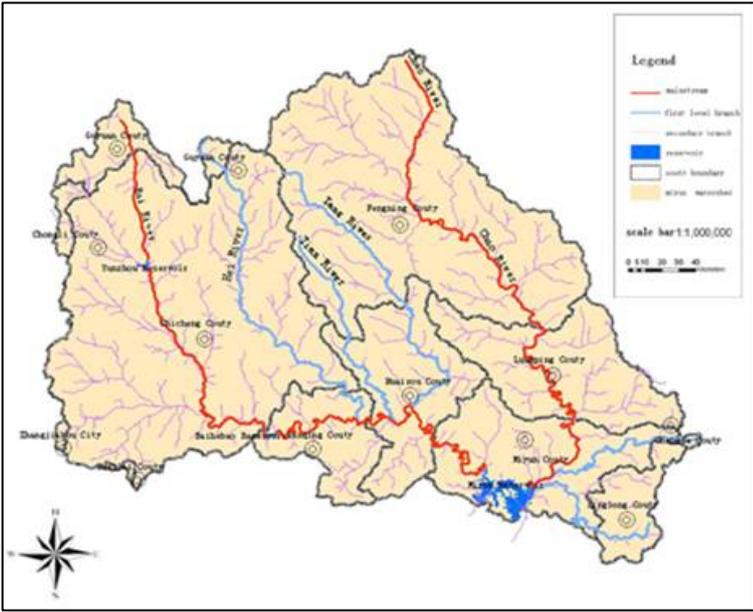
Introduction

The landscape

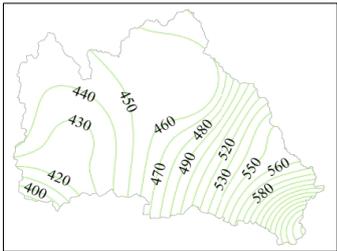
The Miyun watershed is located to the north of Beijing, China’s capital city. It has a total area of 15,788 km². The area to the immediate north, west and east of the reservoir covers most of Miyun Province in Beijing Municipality, while the northern two-thirds of the watershed overlap with Hebei, the neighbouring province. In total, around a million people live in the watershed area upstream of Beijing City.

The Miyun watershed lies on the dry northeast edge of the North China Plain, bordering the Mongolian Plateau. This is a fragile, semi-arid eco-zone with a mean annual rainfall of only 549 mm, and characterized by fluctuations of as much as 50% from the mean in a given year. It becomes markedly drier towards the north-west, in Hebei Province, as illustrated in the map below.

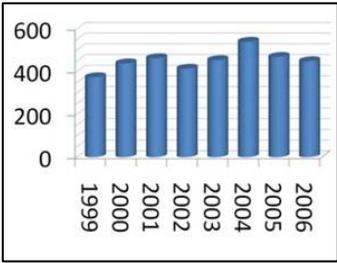
The watershed is generally understood to comprise the six sub-catchments of the Chao He and Bai He Rivers, which together feed the Miyun reservoir. These are also depicted in the map below. The reservoir has a storage capacity of around 4.4 billion m³, and is the primary surface water supply for Beijing City. It supplies between 60% and 80% of urban drinking water needs. Given the huge population reliant on the reservoir for drinking water (an estimated 17 million people), the Miyun watershed is one of the most important water protection areas in the world.



Hydrology of the Miyun watershed



Mean precipitation (mm)



Beijing precipitation (mm)

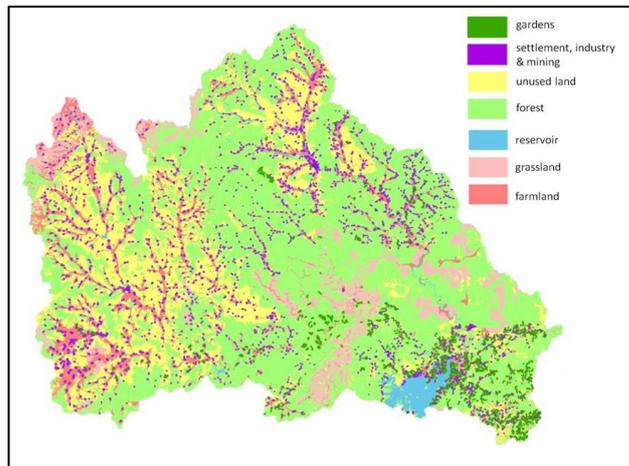
Beijing has been facing a progressively worsening water crisis over recent years.¹ The average annual renewable freshwater supply available per person is less than 300 m³, only one-eighth of the national average and less than one-thirtieth of the global mean.² Water shortages are becoming ever more frequent, and for some time there has been great concern about the city’s future water security. While the

¹FAO (2003). Review of World Water Resources by Country. Water Reports 23, Food and Agriculture Organization of the United Nations (FAO), Rome.

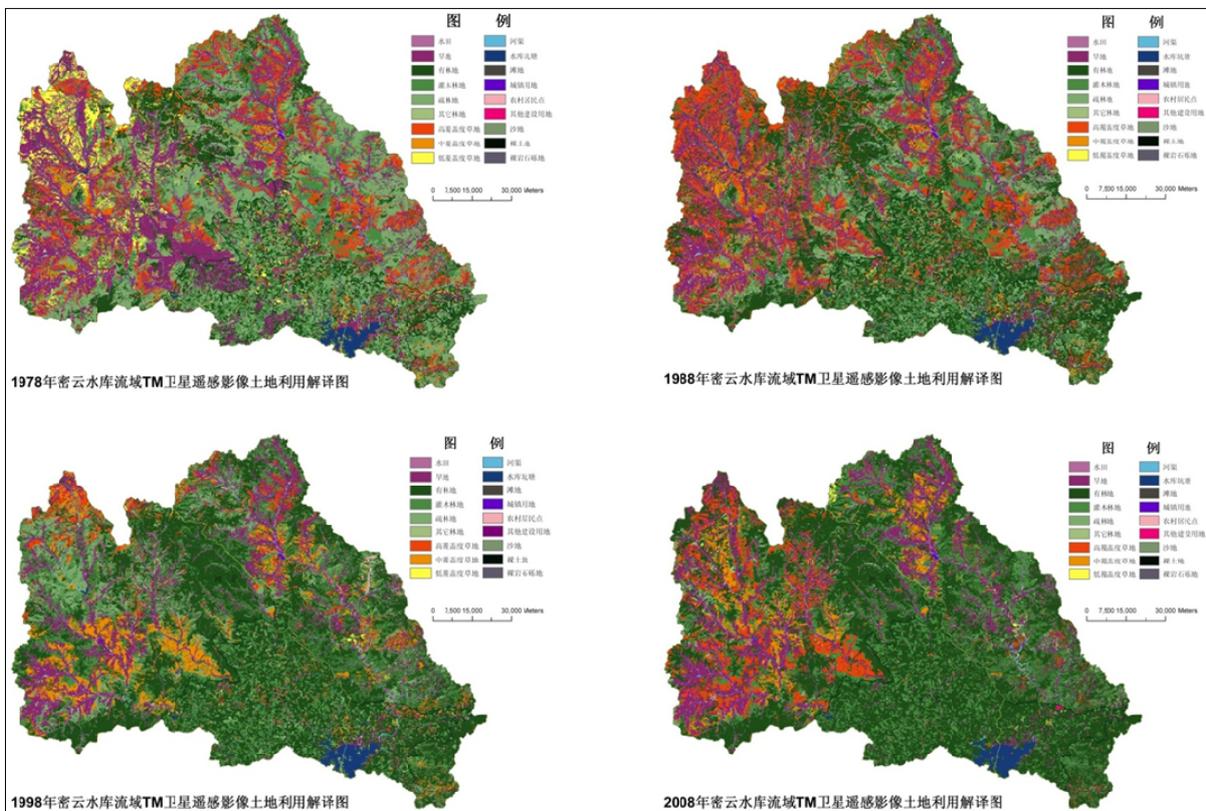
² Peisert, C. and E. Sternfeld (2004). “Quenching Beijing’s Thirst: The Need for Integrated Management for the Endangered Miyun Reservoir”. China Environment Series 7: 33-45.

looming water crisis in Beijing is caused in part by the rapidly growing demand for water in both the city and upstream areas, there has been increasing recognition over the last few decades that the environmental status of the watershed itself has a significant impact on downstream water supplies.

Formerly covered with mostly mixed broadleaf forests, over the past century, the vegetation of the watershed has undergone considerable change. In part, this is a result of rising human population, changing settlement patterns and more intensive land-use practices. It is, however, also due to reforestation and land-conversion policies and programmes instituted by the government (these are outlined below, in the section on Governance and policies). These programmes have substantially increased forest cover over the last 30-40 years.



Miyun land use today



Land-use changes in the Miyun watershed 1948-2008

As the map above shows, much of the watershed (around 65%) is now covered by forest, comprising a mixture of natural (around three-quarters) and planted (around one-quarter) broadleaf, conifer, mixed and shrubland forest. Around 70% is designated as protection forest. However (as we will describe in more detail later in the document), a logging ban and very conservative forest management system mean that community access to most of the forest in the Miyun landscape for livelihood benefits has been severely restricted. Forest areas are interspersed with patches of grassland, farmland and gardens. Numerous towns and villages dot the landscape, mainly concentrated around rivers and streams.

Main stakeholders

There are four broad categories of stakeholder in the Miyun landscape:

- **Upland communities:** these comprise the 1 million or so, mainly rural, residents of the Miyun watershed. Their main interest is in maintaining and improving an adequate and secure livelihood base, at the same time as conserving the lands and resources upon which they have long depended.
- **Downstream water users:** these comprise the 17 million residents of Beijing City, and associated industries, businesses and institutions. Their main interest is in securing current and future water supplies and other ecosystem benefits (e.g. clean air and biodiversity), as well as enhancing the forests' recreational values.
- **Government administrators:** these comprise the many different agencies that are responsible for setting and implementing policy, running programmes, and governing land, resource and development processes in Beijing City and the Miyun watershed. This stakeholder group includes various levels of administration (from village committees, through county and municipal governments, to central line agencies), as well as diverse sectors (including forestry, water, rural development, infrastructure and economic planning). Their main interests are to maximize or optimize watershed management according to the spatial or sectoral mandate and development goals that they have been charged to deliver.
- **Researchers and academics:** these comprise the universities, research institutes and think tanks that generate data about the Miyun watershed to support decision and policy making. Their main interests are in shaping the project interventions and policy debates surrounding the landscape.

These stakeholder groups participated to different degrees in defining the landscape within which the LLS project would work, and in setting its goals. They also had varying opinions about what the Miyun landscape comprised, and to what ends it should be managed. A key point to note, which is elaborated below, is that the project started with a relatively narrow concept of stakeholders (primarily upland community members and village committees, and the Government Forest Department), landscape (one site in the watershed) and project goals (developing a more active technical forest management system). This concept widened considerably over the course of the project, meaning that it was necessary to progressively extend the range of institutions and agencies with which the project worked, and to integrate a much broader view of the landscape, and of the goals and activities of the project.

The goal of the landscape project

Although a large proportion of the Miyun landscape is covered by forests, around three-quarters of these are classified as 'sub-healthy' or 'unhealthy'. Over 40% are aged below 10 years. Consequently, they have only limited capacity for watershed protection and biodiversity conservation; in other words they are unable to adequately fulfil the functions for which they were originally established. The current logging ban and lack of active forest management have also resulted in their generating few local economic or livelihood benefits.

This situation provided the main impetus and rationale for the LLS Miyun project, and highlighted the major landscape and livelihood problems to be solved: a forest management regime which was undermining biodiversity, livelihood and watershed protection values. It was clear that the strict logging ban and conservative management regime needed to be replaced with a forest development and management strategy that would not just allow for a better protection of the watershed, but would also maintain and improve forest health, and ensure better incomes and livelihood security for the surrounding human population.

The goals of the LLS Miyun project were driven largely by the pre-existing goal³ and eight strategic outcomes⁴ which had already been set for IUCN's global Livelihoods and Landscapes Strategy and its country-level projects. It was, however, necessary to modify these principles to suit the local context. The specific conditions and needs of the Miyun landscape shaped how such overarching aims were translated into a series of project-specific activities and intended results. A problem analysis and stakeholder analysis were conducted which provided the opportunity to ensure that local knowledge, perceptions and needs were factored into project planning. The stated goals of the project were, however, largely decided by the project team (the project is led by IUCN, and its main partner is the Beijing Forestry Society and Beijing Municipal Bureau of Parks and Forestry), albeit with close involvement of the local government and other departments. There was not a significant degree of stakeholder involvement in setting the goals of the LLS Miyun project.

The scope of the project underwent considerable modification over time. Although there was little change in its overall goals, the means of reaching these goals required some rethinking. This occurred largely as a result of a growing realization that the practical realities of working at a landscape level did not – as had been previously assumed – simply require a site-specific, purely forestry-oriented approach, but instead demanded a much broader and more integrated view. The following section describes in more detail how an evolving understanding of the Miyun landscape resulted in important changes in the way in which the project was conceptualized and developed.

How the landscape concept was developed and stakeholder participation was extended

Initially, the project landscape was defined by the project team in terms of village forest areas and user influence at the pilot-site level, and by the hydrological boundaries of the Chao He sub-watershed at the wider level. When the LLS Miyun project started, it focused on a single site –Huayuan Village in Miyun County. It was also concerned primarily with administrative and technical issues: addressing the problems that arose because of the logging ban and the very conservative and restrictive forest management

³[t]he effective implementation of national and local policies and programmes that leverage real and meaningful change in the lives of rural poor, enhance long-term and equitable conservation of biodiversity and ensure the sustainable supply of forest-related goods and services in line with nationally-defined priorities.”, LLS Project Proposal

⁴[1] Poverty/extreme poverty reduced by 25% in three rural areas where the strategy has programmatic activities; [2] household incomes, including those of the poorer social clusters, increased by 50% in one-third of the areas where the strategy has programmatic activities; [3] arrangements that facilitate sustainable local trade in forest products for the poor available in at least three countries where the strategy is active; [4] at least one set of best practice guidelines for the investment in, and management of a forest-related commodity adopted by a major multinational corporation or other investor and promoted as a recognized industry standard or investment criteria; [5] national and sub-national tripartite activities on law enforcement and governance demonstrably reduce by one-third the estimated rates of illegal logging in at least three rural areas where the strategy has programmatic activities; [6] the area of land under some form of secure tenure for local populations over forest-related resources increased by 25% in at least five of the rural areas where the strategy has programmatic activities; [7] a 10% net area increase in forest-related, locally-negotiated multifunctional land uses in at least five rural areas where the strategy has programmatic activities; [8] decision makers from government (both land-use and non-traditional ministries), civil society and the private sector demonstrate commitment to adopting the concepts, recommendations, tools and approaches generated by the strategy's activities in at least three countries. LLS Project Proposal

regime. The main stakeholders and participants in project activities at the pilot site were the village committee, and at the national policy and decision-making levels, the Central Forest Department.

It soon became apparent that the project's initial use of the term 'landscape' was neither universally nor clearly understood by all those involved. There is no Chinese language equivalent term for 'landscape', although the terms 'catchment' and 'watershed' are quite widely understood. As the project evolved, increasing reference was made to the Miyun 'watershed', rather than the Miyun 'landscape' – which is much more widely understood in China, in both conceptual and management terms.

Common understanding and new terminology for the project 'landscape' did not however translate into unanimous agreement by stakeholders on the actions that would be required to improve watershed functions and values. The Miyun landscape is, in reality, a mosaic of different land uses, ecological zones, administrative boundaries and livelihood patterns, which come together in the wider watershed. Different stakeholders had various perceptions of the size, nature and location of the landscape that needed to be managed, and of the approach that should be adopted.

The main variations in stakeholder perceptions of the landscape encountered in the LLS Miyun project fall into three categories: those who saw it from an administrative view, those who viewed it from a natural resources use view, and those who adopted a land and resources management view. For example, village communities tend to focus on forests in terms of the presence and abundance of the locally-important goods and services that they are allowed to benefit from. Village committees and county/municipal authorities primarily see the landscape in terms of administrative boundaries. From a Forest Department view, the Miyun watershed is seen as a mosaic of forests categorized according to particular classifications, functions and management regimes. Meanwhile other sectors and line agencies see the watershed through various filters, according to their own mandates and development goals: in terms of its farming potential, water resources features, communication networks or marketing chains, to name but a few.

With this rethinking of the 'landscape' concept, there also came recognition that it would be necessary to broaden the working definition of both its physical elements and of project stakeholders. It became clear that effective landscape restoration and livelihood improvements in the Miyun watershed would depend on taking an integrated approach, incorporating multiple institutions, levels of scale, and changes in policy and on-the-ground activities.

Rethinking the geographical scope of the landscape

Within a short time it became obvious that work at a single site would not be sufficient, either to identify the kinds of changes that would be needed to strengthen livelihoods and landscapes in the Miyun watershed, or to adequately demonstrate the range of activities that would ultimately be required to achieve these goals across the watershed. While many of the issues and problems that were identified in Huayuan Village are common across the whole Miyun landscape, different villages, counties and administrative regions also have different needs, constraints and opportunities.

The project team realized that developing a single management model that could be replicated across the whole watershed alone would not be sufficient. Rather, it would be necessary to demonstrate how forest management models could be adapted and tailored to the needs and conditions of different areas and contexts. For this reason, in 2009, a second pilot site was added: Xiaowopu Village in Hebei Province. This enabled the project to extend its coverage to incorporate the second province of the watershed, which displays markedly different socio-economic conditions and policy frameworks from Miyun County. Now it was possible to take into account the shared landscape and livelihood issues that are repeated across the whole watershed, as well as to identify the way in which the situation – and the required responses – varied in different places.

Rethinking the institutional and stakeholder scope of the landscape

As the project's understanding of the landscape evolved in spatial terms, so it quickly became clear that even though it was concerned primarily with forest ecosystems, solving forest-related landscape and livelihood problems required a definition of the institutional and stakeholder landscape which extended beyond the Forest Department and village committees. Local forestry-related issues are in part caused by – and in turn require responses from – policies and actions which originate at county, provincial and central levels, and from many sectors other than forestry.

Planning at different levels of scale, involving different sectors and stakeholders



Participatory planning



A village team



Bringing together sectoral agencies at the country and provincial level

The project began to work with decision makers across Miyun County, Hebei Province and Beijing Municipality, rather than just at central and village levels. It also made efforts to include representatives from the line agencies responsible for water resources, rural development and planning and with the Development and Reform Committees – instead of focusing its efforts only on the Forest Department. Although the watershed and its problems require solutions from very different perspectives, all of these stakeholders have an overriding concern with improving livelihoods in the Miyun watershed – and thus, at some level, a shared interest. For this reason, it was obviously vital that multiple stakeholders and institutions should be brought together by the project – alongside Forest Department and village committees – to develop an integrated watershed management approach and solutions.

Rethinking the intervention scope of the landscape

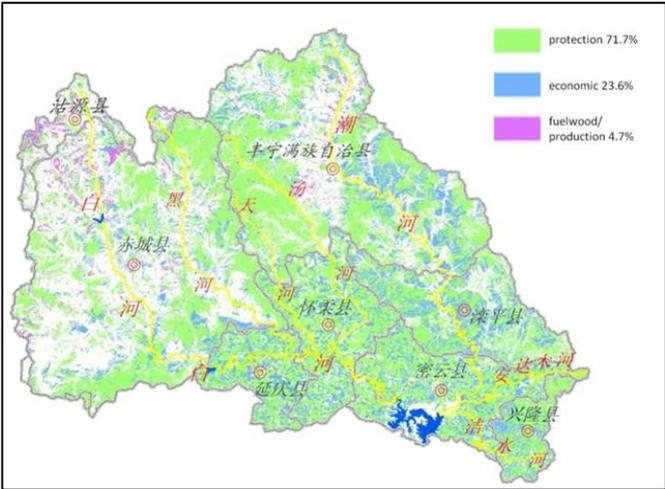
A third area of evolution in the landscape concept was the growing recognition that improving forest landscapes and livelihoods in the Miyun watershed requires more than just effecting changes in technical forestry management practices and the local-level application of national forest policy and laws. Perhaps, it was realized, the LLS Miyun project should be implemented more from an integrated watershed management approach than as a strict forestry project. A diversity of activities would be required to put in place the conditions necessary and, together sufficient, to achieve improved forest landscapes and livelihoods. For this reason, the project activities started to incorporate additional work on participatory forest planning processes, multi-stakeholder dialogues, policy advocacy, and alternative livelihood opportunities.

Key topics: baselines, and how they evolved over the course of the project

Biodiversity and landscape

The baseline situation

As the map here shows, much of the Miyun watershed – around 65% overall, 80% in Huayan Village and 71% in Xiaowopu Village – is covered by forest. The forest remains, for the most part, natural, albeit in the process of regenerating. Only about a quarter comprises planted species. It is dominated by broadleaf and mixed forest, with substantial areas of degraded shrubland remnants. In general, there is a relatively higher proportion of planted forest in Miyun County (reflecting a higher historical level of investment in tree planting), while regenerating natural forest dominates in Hebei Province.



Mixed forest



Larix principis-rupprechtii plantation



Conifer-broadleaf forest



Pinus tabulaeformis plantation



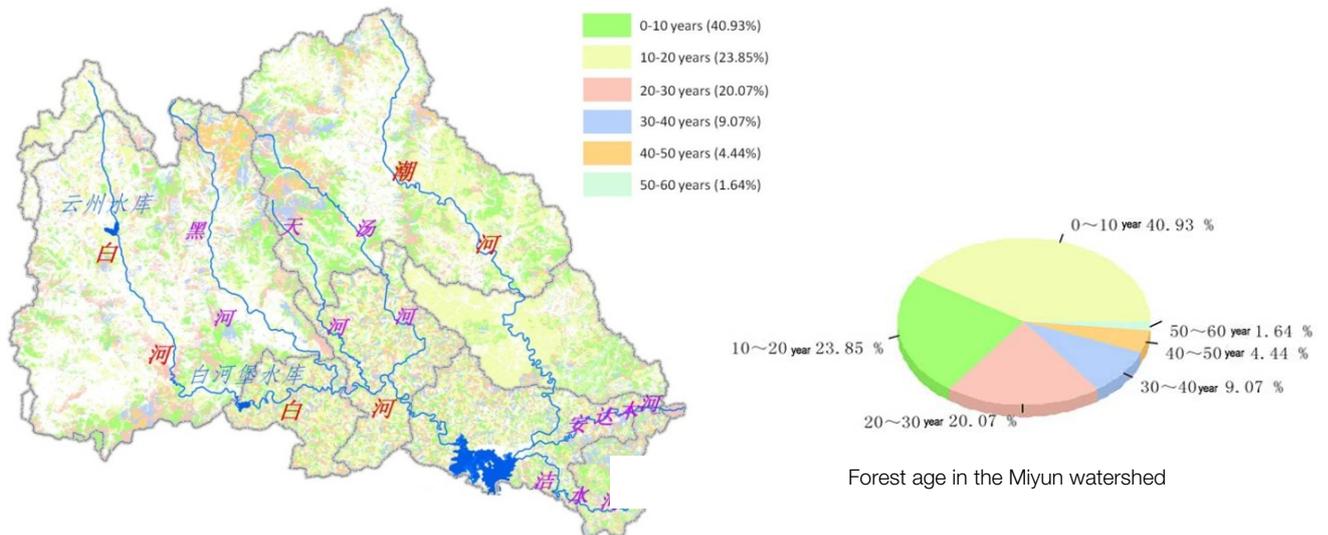
Fruit tree orchard



Populus davidiana forest

More than 70% of the forests in the Miyun landscape are designated ‘protection’ forests, as illustrated in the map below. This means that human access and use are strictly controlled, and that they are managed to safeguard important ecosystem services such as watershed protection, soil and water conservation and biodiversity. While in reality, people are still extracting a limited amount of fuelwood and non-timber forest products (NTFPs) from forests, the fact that most forests are protected implies that very few direct benefits accrue from them.

What is notable is that the vast majority of both plantation forests and areas of natural forest regeneration are relatively young and even-aged stands, as illustrated in the map below. More than 40% are less than 10 years old, and around 95% are below 40 years. This is because large-scale afforestation and reforestation programmes have been implemented in the area since the 1970s, the period during which most of the current forest cover in the watershed was established.



Forest types by function in the Miyun watershed

As already noted, at the start of the project there was no active management plan for the forests in either of the two pilot sites. Forest regimes were determined by Central Forest Department policy, which at the time was defined by a logging ban, strict protection, and a general lack of human intervention either in forest management or forest use. To all intents and purposes, forests in the Miyun landscape were being 'left alone' in management terms. Even the planted forests had been subject to little silvicultural treatment.

Apart from afforestation, forest management in the Miyun watershed was confined to fire prevention and pest control, carried out by local 'forest wardens' employed by the government. While the local forester system has been developed partly to respond to the need to maintain some kind of oversight on forests, it is also seen as a way of distributing income at the local level. Beijing Municipality was the first in the country to establish a 'Forest Ecological Compensation' programme, involving nearly 47,000 forest wardens maintaining an area of 674,000 ha of forest in more than 100 townships and 10 districts and counties. The total expenditure is set at RMB 24 per *mu*,⁵ which covers the wardens' salaries (currently RMB 400 per month), management and protection expenses.⁶

Landscape restoration through improved techniques used to manage forests (or, more accurately, introducing an active management regime for the first time) was a major aim of the project. The intention was to develop and apply silvicultural practices which would improve the quality, structure and function of forests – in particular increase indigenous species, enhance re-growth, and provide a more conducive environment for biodiversity conservation. At the same time, sustainable utilization and the selective harvesting of trees and forest products was also envisaged as a means of providing tangible benefits for local communities.

⁵ This is the standard unit of area used in China; 1 hectare = 15 *mu*.

⁶ *Circular on Establishing a Mechanism for Enhancing Ecological Forest' Environmental Benefits*, Beijing Municipal Government.

Monitoring change

The project established biodiversity baselines in both pilot sites, recording fauna and flora species and their richness, as well as noting rare and endangered species. Forest resource baselines were carried out to indicate forest areas, composition and health. Some of the steps involved in conducting biodiversity surveys and forest inventories are illustrated in the photographs below. At the landscape level, a detailed study was carried out on land use and land-use change, and on the key biophysical and social characteristics of the watershed.



Carrying out a rapid assessment of biodiversity



Marking the location of rare and endangered plants



Identifying plant specimens



Setting up quadrats



Measuring tree diameters at breast height



Carrying out forest inventory surveys

A series of indicators have been formulated to measure landscape improvement over the course of the project. These incorporate both quantitative and qualitative measures. They include indicators which are designed to track the effects of silvicultural treatments, including changes in forest structure, numbers of tree species, and proportion of indigenous species. Qualitative indicators of landscape improvement are based primarily on resulting changes in local livelihoods, and are described in the next section.

Outcomes

One important outcome of project activities has been the development of new forest management plans in the Huayan and Xiaowopu pilot sites as a result of village-based participatory planning. Use and management zones have been agreed for water protection, tourism and forest exploitation, informed both by community needs and by the technical surveys that were carried out to document forest status, resource availability and biodiversity. The management plans were developed by the technical staff of the project and its partners before being reviewed at village meetings, and then submitted to the Forest Department for approval and endorsement. In effect, this process and the resulting plans have acted to harmonize the technical information held by the government Forest Department with local interests and knowledge. Like the silvicultural treatments described below, the result of this planning is referred to as a 'close-to-nature' forest management action plan.

In Huayuan Village, the participatory forest management plan has been approved by the Forestry Bureau of Miyun County and the Beijing Municipal Bureau of Forestry and Parks. Thanks to the project's efforts, the Forest Department also authorized a small harvesting quota for timber of about 100 m³ in 2008 – the first permit to be issued in more than 20 years. The Huayuan participatory forest management plan, developed as a result of village-based planning, reflects a more balanced set of water protection, recreation and local needs.



Selecting and marking “target” trees



Selecting and marking ‘reserved’ trees



Cutting down ‘disturbance’ trees

A second outcome of project activities has been the introduction of improved forest management practices at the two pilot sites and beyond. A set of silvicultural treatments for each of the major forest types found in the Miyun watershed was developed by the Beijing Forestry Society and its partners. These have as their objectives improving the naturalness of forest stands over time through marking target trees and identifying those portions of the stand that can be removed because they are in competition with target trees. The treatments, carried out by local community members, are illustrated in the photographs above. So far, they have been applied to about 80 ha (or 36 plots) in Huayuan Village. The treatments are referred to as ‘close-to-nature’ silviculture, because they aim to modify forest structure and species composition towards those that existed in the landscape in the past. IUCN has supplemented the application of these treatments with surveys of rare and endangered species. The results of the surveys have influenced the selection of areas for treatment and the marking of trees and plants for retention.

As forest management activities have only recently started, forest and biodiversity monitoring is still in its very early stages. It will be some time before any meaningful time-series data can be collected which will indicate the extent to which activities have been successful in forest restoration and biodiversity conservation terms. Perhaps the most salient indicator of progress in landscape restoration so far is the adoption of ‘close-to-nature’ forest planning and management practices, and the increasing acceptance of this approach at national policy and planning levels.

Another important indicator of progress in landscape restoration is the development of participatory village forest management plans. As described above, the pilot sites have undergone a change from a very conservative approach to forest protection based on little or no on-the-ground management at the site level, to an active and participatory form of forest management which both involves and benefits local communities. This management model will no doubt evolve and change over time, to adapt to changing needs and circumstances and also as the concepts of participatory planning and active forest management gain greater acceptance among decision makers.

Socio-economy and livelihoods

The baseline situation

The box below describes the socio-economic characteristics and status of the two project pilot sites, as these are the areas for which the greatest volume of data are available. It is however worth noting that the pilot sites are in many ways representative of the conditions prevailing in the wider landscape. There is relatively little variation in livelihood sources between rural villages in the Miyun watershed (although, as we describe below, there are significant differences in the distribution of income and wealth within villages and between Miyun County and Hebei Province). The conditions in Huayuan and Xiaowopu illustrate the livelihood situation in the project landscape: households that face limited income-generating opportunities, and pursue a mixed livelihood strategy based on some combination of farming, paid employment, small business and forest products utilization.

Local livelihoods and socio-economy	
Huayuan Village, Miyun County	Xiaowopu Village, Hebei Province
<p>Huayuan Village has 227 households and 658 people. As farmland is very limited in the area, each household has access to an average of only 4 mu, which is primarily used to produce crops for home consumption (10% of production is usually sold).</p> <p>Farming and livestock production is mainly the work of women, leaving men free to seek cash income outside the farm. There has been a significant out-migration of the population in search of employment, reflecting the poor job opportunities in the immediate village area. 'Folk culture' tourism, although relatively new, is growing in importance as a source of local income.</p> <p>While around three-quarters of income in the Village comes from off-farm employment, 17% is generated from farming.</p>	<p>Xiaowopu Village spans nine natural villages, comprised of 233 households or 734 people. Some 150 residents work outside the village, two-thirds of whom are engaged in seasonal work and one-third of whom are engaged in year-round employment.</p> <p>There has been a significant out-migration of the population in search of employment, reflecting poor job opportunities in the immediate village area. Those who remain in the village are mainly old people, women and children.</p> <p>In addition to paid employment, the local socio-economy of Xiaowopu Village depends mainly for income on the cultivation of maize, and the collection and sale of forest products (especially wild apricots, <i>Prunus sibirica</i>).</p> <p>While just over half of the total income earned in the village comes from farming, around a third is generated from outside employment.</p>

The current restrictions on logging and forest use mean that two categories of forest product utilization dominate: fuelwood harvesting, and non-timber forest product (NTFP) collection. As illustrated in the photographs below, a huge diversity of non-timber forest products are collected by communities in the Miyun landscape, which are used for a wide range of purposes. Although forest products do not account for a major proportion of village and household cash income, they do generate some earnings, and are a particularly important source of basic household needs such as fuel, food and medicines. These products are particularly important for the poorest households.

Watershed communities depend to a great extent on fuelwood for their heating needs – for example through the traditional *kang* bed system.⁷ Demand for fuelwood is high, especially during the long, cold winter months when temperatures remain well below zero. In addition, a wide variety of NTFPs are harvested for food, medicines and to make various handicrafts and utility items. NTFPs also provide an important, and much-needed, source of cash income – although high demand within the household means that there is typically relatively little surplus available for sale. The utilization of NTFPs for commercial purposes is described in detail in the next section.

How non-timber forest products are used in the Miyun watershed



Extracting the kernels from wild apricot (*Prunus sibirica*)



Stems of *Vitex negundo* are used for making baskets



Leaves of *Iris lactea* are used for making glutinous rice dumplings

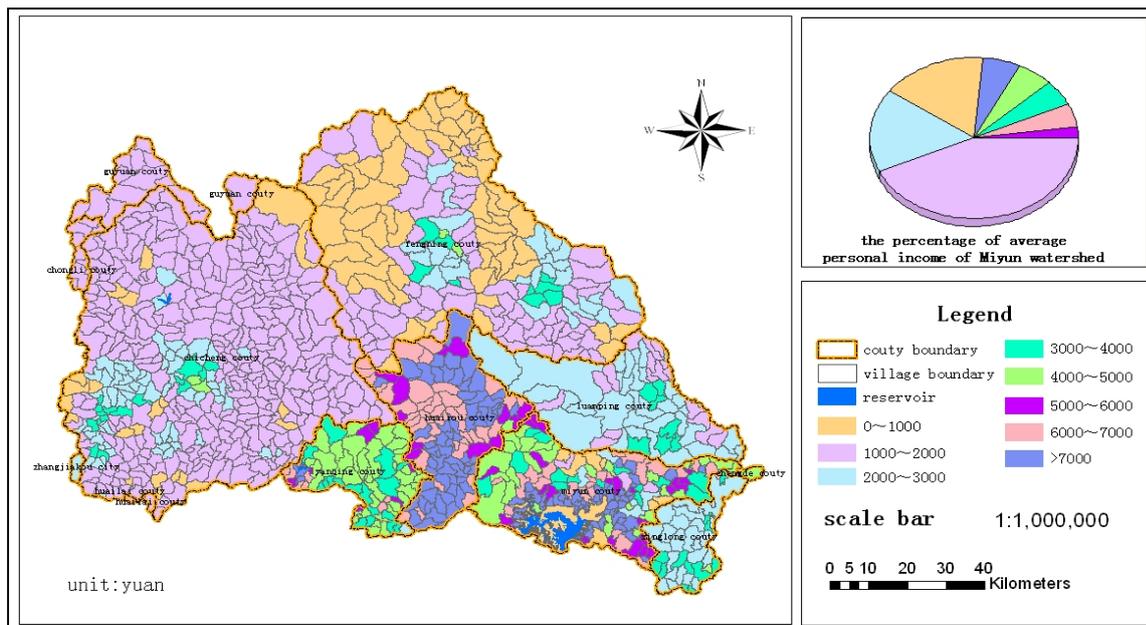


Leaves of *Tilia mandshurica* are used for making steamed bread

Although there is some degree of similarity between the livelihoods of different villages in the Miyun watershed, it is important to highlight the socio-economic differences that exist between Miyun County and Hebei Province. Miyun County is more densely populated, its infrastructure and facilities are better-developed, and its closer proximity to Beijing means that residents tend to have relatively better access to markets and income-earning opportunities. It is also blessed with higher rainfall and better farming conditions.

As the map below illustrates, there is a marked difference in average annual income between the two administrative regions of the Miyun watershed. Whereas the vast majority of villagers in Hebei Province earn less than RMB 3,000 per year (about US\$450), per capita rural income tends to be much higher in Miyun County.

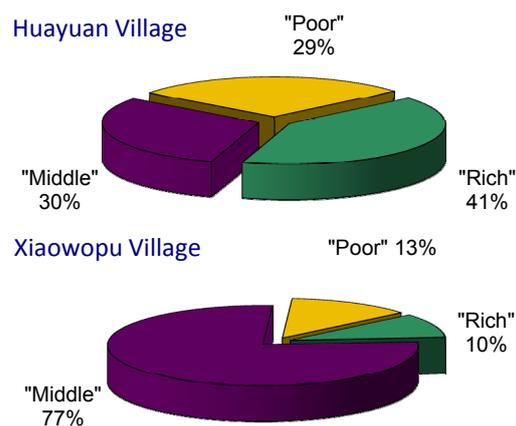
⁷The *kang* bed is a heated sleeping platform widely used in villages in northern China. The heat from a stove is directed through flues under the bed, and used to heat its surface.



Distribution of annual per capita rural income in the Miyun watershed

These cross-boundary differentials are apparent in the annual per capita income figures for the project's two pilot sites. Households in Huayan Village in Miyun County have an average income of RMB 4,500 (about US\$675), as compared to RMB 1,100 (US\$160) in Xiaowopu Village. Within the village, too, there is a marked differentiation in wealth and socio-economic status.

The wealth ranking baselines in the two different pilot sites point to another aspect of the socio-economic status of villagers. These wealth rankings are those of the village communities concerned, incorporating their *own* perceptions of wealth, poverty and relative socio-economic status. They cannot be compared directly, as they represent different categorizations of 'rich', 'average/medium' and 'poor' households. What they do however show is how villagers perceive the distribution of wealth within the community.



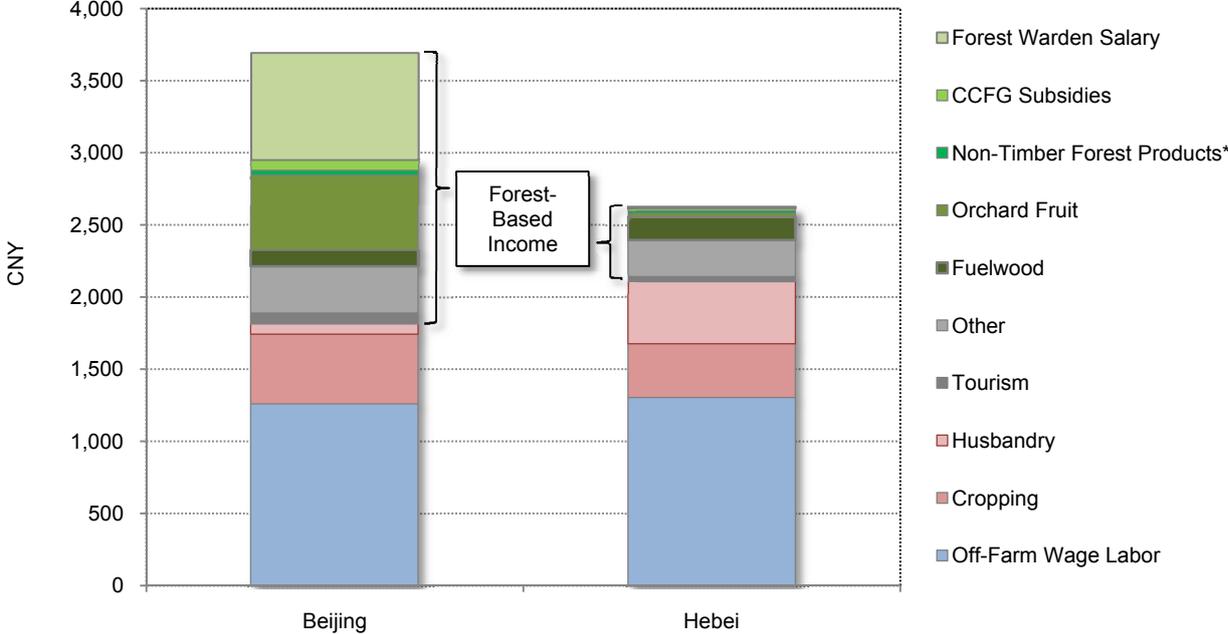
Wealth ranking in Huayan and Xiaowopu

As the charts show, both the project pilot sites display a considerable variation in wealth between households. Although households in Huayan Village are generally better-off in income terms than those in Xiaowopu Village, there appears to be a much greater inequity in the distribution of income and wealth and a higher incidence of poverty, according to local perceptions.

The results of a recent study on the economic value of afforestation investments in the Miyun watershed⁸ provide important additional insights into these figures. These found that the majority of variation between per capita household income in Beijing and Hebei is accounted for by forest-based income sources. As illustrated in the graph, forest-based income sources contribute an average of 43% of household income for Beijing households, compared to 15% for Hebei. Beijing villagers have greater income generated from

⁸Bennet, M. and X. Yang (2011). *An Economic Analysis of Landscape Level Forest Restoration in the upper Miyun Watershed under the Beijing-Hebei Cooperation Framework*. Report prepared by Forest Trends for the IUCN Livelihoods and Landscape Project, Beijing.

the forest compared to Hebei, mainly due to Beijing government-driven subsidies (forest warden salaries) and higher incomes from orchard harvests due to proximity to urban markets. A closer look at the non-cash incomes such as fuelwood value shows that the Hebei population has greater reliance on the forest to provide these basic functions for their livelihoods. From this perspective, it is obvious that the forest provides an important safety-net for the poorer population (Hebei).



Average household per capita income by component -- 2009 Beijing and Hebei Household Survey Sample

Monitoring change

A socio-economic and livelihoods baseline was conducted at the start of the project for each of the pilot sites. This was later extended to cover the entire watershed area. The baseline utilized questionnaire-based and Participatory Rapid Appraisal (PRA) techniques (such as resource maps, wealth rankings, focus group discussions, key informant interviews and so on). These are illustrated in the photographs below.

Topics of discussion and information-gathering included forest dependency, forest tenure and use regimes, and participation in forest-based activities, as well as more general data on the nature and composition of local livelihoods and the role of forests in them. The baselines provided a good understanding of the diversity of livelihoods that are dependent on the forest landscape at the local level, and also yielded important information for the subsequent development of participatory village forest management plans.



Working with communities to understand the local socio-economy and livelihoods

Monitoring of livelihood status involves tracking both quantitative and qualitative indicators. The quantitative indicators focus primarily on changes in the amount and distribution of cash income. The qualitative indicators look at changing forest use and management practices, such as the location of fuelwood collecting sites and regimes, awareness of and focus on indigenous species, and varying forest dependency. They also encompass other aspects of people's livelihoods and socio-economic circumstances, and the changing role of forest income and products. Particular attention is given to disaggregating the findings according to the socio-economic status of respondents, with a special focus on women and the poorest.

In 2010, *kang* bed renovation activities were systematically evaluated. Then, six months before the LLS project was due to be completed, at the end of 2010 and beginning of 2011, surveys were carried out to evaluate their broader livelihood and socio-economic impacts in Huayuan Village. Given the infancy of project activities, the situation in Xiapoing Village was not evaluated. Surveys involved fieldwork, supplemented by broad stakeholder consultation. As far as possible, follow-up visits were made to households from whom information had been collected in the poverty and socio-economic baselines, although care was also taken to include a representative range of wealth rankings, and to ensure that surveys involved both households that had been directly involved in project activities, and those that had not.

Outcomes

Project activities have already led to some positive changes in people's livelihoods, although (as is the case with biodiversity and landscape aspects of the project), it is as yet too early to discern any major changes. Many of the project's livelihood interventions only started in 2008 or 2009.

A fuelwood survey and training sessions were implemented relatively early in the project. The survey aimed to understand how people use fuelwood, in order to both reduce demands and improve the sustainability of harvesting. After information was collected about what species people use for fuelwood, how much they collect, and where they go to harvest it, the findings were fed into a series of training and awareness activities. These are helping to change fuelwood harvesting practices, with a decreased focus on indigenous species and ecologically sensitive areas, combined with new harvesting techniques and the introduction of energy-efficient heating technologies.

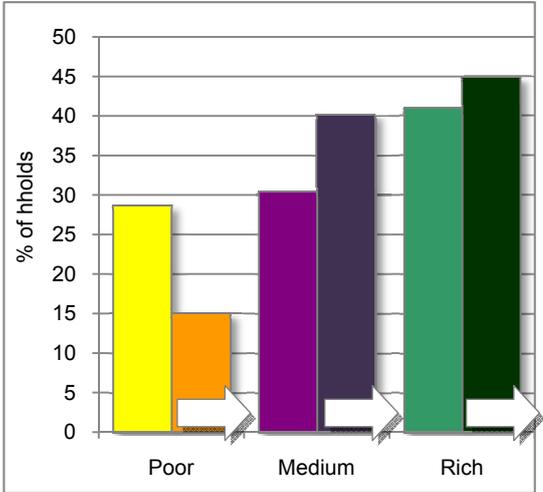
A new system for harvesting fuelwood has been negotiated and put in place as a result of the participatory forest management planning process that has resulted in 'close-to-nature' silviculture. Local fuelwood harvesting has been organized around the application of the silvicultural treatments. Forest warden leaders have been trained in forest harvesting techniques, with the expectation that they will train others in how to collect fuelwood in the agreed 'close-to-nature' way. In addition, IUCN and the Beijing Forestry Society have assisted with the renovation of traditional wood-heating systems for *kang* beds, to make them more energy efficient, thereby reducing overall demand for fuelwood. These new tools and activities together provide for a better way for local people to use the forests at the same time as supporting watershed protection and forest conservation.

The results of the *kang* bed evaluation showed that participants have markedly decreased their consumption of fuelwood, reducing fuelwood use by an average of 36% (or 850 kg) per bed per year – representing a cost saving of RMB 1,170 or US\$172. The energy-efficient *kang* beds also generate more heat (about 1-2° during the cold winter months), as well as reducing reliance on local indigenous fuelwood species (particularly Mongolian oak) and increasing the use of farm waste (mainly corn cobs). A particularly interesting measurement has been the reduction in carbon dioxide emissions that has resulted from more efficient energy use: if a village of 200 households upgrades its *kang* beds, it can achieve carbon dioxide emissions reductions of 244 tCO₂e (worth between US\$854 and US\$1,953).

The livelihood and socio-economic evaluation showed that although it was difficult to establish a clear causality between project activities and direct income effects, a significant proportion of villagers

perceived that they had benefited in indirect ways. Examples include perceptions of greater empowerment to take a greater role in decision making, increased self-confidence to express their views, improved relationships within the community, raised awareness about environmental issues, and new job and employment opportunities.

Between 2007 (the baseline, and start of the project) and 2010 (when the evaluation was conducted), village income and its distribution changed. On the one hand, there was little change in the structure and sources of villagers' income (mainly farming, fruit trees, forestry, animal husbandry, tourism, outside employment and government allowances). The overall income being earned by households had however increased in real terms. Another notable shift, as illustrated in the graph, was changes in the distribution of income and household wealth ranking. There has been a sharp decrease in the number of households classified as 'poor' (by almost a half, to under 15% of the village), while the proportion of medium and rich households has grown (by one-third and 10% respectively) and now comprises the majority of villagers (40% and 44% respectively).



Wealth ranking in Huayan 2007 & 2010

One key challenge, when evaluating socio-economic impact, is that of attribution. Over the last four years, Huayuan Village has seen a rapid increase in infrastructure development as well as a sharp rise in tourism, and growth in associated market, income and employment opportunities. It would seem that the LLS project has provided a means of maximizing or enhancing local benefits from these on-going developments, and enabling individuals (particularly poorer or more vulnerable groups) to benefit – rather than being the sole cause of improved socio-economic status and decreased incidence of poverty.

Responses to the introduction of 'close-to-nature' forest management approaches have been mixed. After three years of project activities many people in Huayuan are still not very familiar with the term or the concept, or with the associated regulations and management practices. Just over half of survey respondents gave their views on the new forest management practices; two-thirds of these expressed support and said that they felt it had been beneficial to the village. Those who had been directly involved believed that their technical skills had also improved.

There is also little evidence of changing forest utilization practices as a result of the regulations associated with 'close-to-nature' forest management. Although forest use and firewood consumption levels have decreased, this is only in part due to project activities. There has, overall, been a shift away from forest dependence that is associated with the broader development of the region, and the new market opportunities that have opened up (a much higher number are now, for example, engaged in off-farm employment). Overall, just under two-thirds of villagers believe that the LLS project has directly improved the local ecological environment and landscape, and enhanced forest utilization opportunities and associated income and employment.

Although there do not appear to be any discernibly negative impacts of the project on the poor, one unforeseen change should be noted. This is both an interesting phenomenon, and may also require some modification and adaptation of the project's approach in the future. Due to the project's activities, including the influx of 'outsiders' and 'technical experts' into the pilot sites, the introduction of new ideas and technologies, greater local empowerment and participation in decision making, and many other factors, the pilot villages have become more 'sophisticated' in their expectations and aspirations. There is decreasing interest in 'small' projects and low-income initiatives and a greater demand for more 'advanced' interventions.

In effect, the perceived opportunity costs of taking part in 'development' activities (including, for example, forest management activities) has increased and villagers have become much more selective about the new activities that they are willing to become involved in. One way in which this has influenced the project design has been to stimulate greater thinking about how to further empower community members to take control over forest management in the longer term, including better responding to market opportunities. New activities have been introduced which focus on supporting the development of cooperatives as a mechanism to utilize, manage and market forest products. These are described in the next section.

Markets

The baseline situation

Key NTFP products which are traded from the Miyun landscape and sold in local markets include mushrooms, medicinal plants and Chinese hawthorn (used to make juice). A significant proportion of sales take place through middlemen. Middlemen however tend to offer very low prices, as local households lack the mobility, market knowledge and economies of scale that would enable them to negotiate better deals. Villagers are not maximizing the income-earning potential or value-added from the sale of local forest products.

It is also important to mention tourism. Tourism (particularly that associated with 'folk culture') is growing in the Miyun watershed area, particularly Huyuan Village, thanks to its natural landscape and cultural attractions, as well as its relatively close proximity to Beijing and other urban centres. In 2004, Huayuan was selected as a pilot village in Miyun County for 'folk culture' development. While the tourism industry remains dominated by outsiders and, at the local level, is subject to 'élite capture' (particularly by those who have the means and connections to enter into business, and who run home stay facilities), it does generate local income – both directly and indirectly. Indirectly, for example, tourists provide an important



Harvesting mushrooms from the forest



Cleaning fresh mushrooms



Selling mushrooms to tourists

market for NTFP, as illustrated by the photographs below.

Monitoring change

Baseline market surveys were carried out at the start of the project, and are illustrated in the photos below. A notable finding was that tourism was relatively more important in income terms to the more affluent sectors of the population, while NTFP collection played a much greater role in the income of the poor.



Market inventory to identify livelihood alternatives and value-added

Another important result of the surveys was that – contrary to what had been assumed in the design of the project – it was difficult to identify substantial, or viable, opportunities for generating additional income or value-added through NTFP sales. For this reason, the project has shifted its work on markets to activities which are aimed at securing payments for forest environmental services (such as tourism, water and carbon), and improving the local organizational base for forest product harvesting and sale.

Outcomes

Although measures and indicators for market-based interventions have been established, it is too early as yet to determine whether the income generated has increased in the pilot sites. One would however expect this to be the case. Not only have project activities substantially enhanced local access to forest products, thereby increasing the potential surplus available for sale, but they have also started to work on new market-based opportunities to generate income from forests (such as through tourism and payments for other forest environmental services) and to improve the prices and marketing arrangements for the sale of forest goods and services (such as through support to cooperatives).

The project has carried out some work on supporting tourism development at the two project sites – especially focusing on Huayan Village, where there is already a small tourist market. The aim is to increase the flow, and distribution, of tourist-related income coming into the village. Some of the timber harvested from the forest management quota which was allocated to the village, and from silvicultural operations such as thinning, has been used to build about 1 km of tracks and walkways in the forest. Support has also been provided for the publication and distribution of promotional materials, and linking up with local TV to publicize the site. Tourists coming to the area (primarily for ‘folk culture’ activities) now also visit the forest. In 2009, Huayuan was named the Most Beautiful Village in Beijing Municipality.

Payment for Forest Environmental Services (PFES) is an interesting and emerging area on which the project has recently begun to focus. The idea is that villagers should be able to benefit in material and cash-income terms not just from the physical products that forests yield (such as timber, fuelwood or NTFPs), but also from the services they provide. When these services are economically or commercially valuable to other offsite populations, local villagers should be rewarded and compensated for conserving the forest that generates them. Although there has in the past been some recognition of these principles (many of the ‘eco-compensation’ and subsidy schemes described in the next section of this document embody something of the principles of PFES), there has not to date been any clear system for developing such reward schemes based on market or user-pays principles which are based on giving clear and long-term incentives for landscape restoration and conservation.

The project team has been working with the Beijing Forestry Society and the Sino-German Forestry Project⁹ on identifying the potential for PFES in the Miyun watershed, as well as advocating with provincial and national decision makers to establish the enabling institutional, policy and legal frameworks for them

⁹ The Sino-German Technical Cooperation Project, “Miyun Watershed Protection and Management (MWMM)”.

to be developed. A separate project, funded by Nokia, has been secured by IUCN to supplement LLS funding and to sustain these activities beyond the lifespan of LLS. This focuses on watershed and biodiversity service payments, and may also incorporate carbon-based payments (especially through REDD/REDD+).

To date, information has been gathered and consultations have been convened between various stakeholders to determine how the current system of 'eco-compensation' needs to be improved, what ecosystem services the forests of the Miyun landscape provide, which local land and resource-use practices need to be compensated. PFES also form the focal topic of the multi-stakeholder dialogues that the project has initiated.

Recent legislative changes have enabled the introduction of cooperatives in China, as local organizations to facilitate better local-level organization and collective action on production and marketing. The project has worked to support the development of cooperatives in the two pilot villages. In some instances farmers' cooperatives were already in place before the project, in which case LLS has helped improve their operating capacity and efficiency. The LLS Miyun project is also providing assistance with the establishment of new farmers' cooperatives where none currently exist.

While at one level these are envisaged as possible mechanisms to provide a local organizational base for forest management and harvesting in the future, they are also seen as key organizations for the development of forest markets. Cooperatives provide the opportunity not just to mobilize joint action, but also to empower village communities to reach wider markets, negotiate better prices for the forest goods and services they produce, and achieve economies of scale which are not possible for the individual or the household. They are also a very important strand in the project's exit strategy and in the long-term sustainability of project activities: the aim is to improve local capacity to participate in forest decision-making and to maintain activities over the long term.

Governance and policies

The baseline situation

A series of reforms have been implemented in China's forestry sector over recent years; at the time of writing they are still ongoing. The new collective tenure system is based on the 'allocation of four rights': rights to ownership, management, disposition and profit. The aim is to establish a new system of collective forest management which involves multiple managers, with shared rights, responsibilities and benefits. Reform of State-owned forest, on the other hand, is intended to maintain State-owned assets but to clarify property rights, define responsibilities, separate resources and enterprises, and devolve on-the-ground management.

There are two different types of 'ownership' relating to forests in China and in the Miyun landscape: namely, 'forest ownership' and 'land ownership'. The former refers to who owns the forest or trees: forest may be State-owned, collectively owned, individually owned or jointly owned. In contrast, the latter refers to the actual land that the forest is located on: this may be State-owned or collectively owned (meaning that local townships or villages own collective forest land on behalf of the local residents), and use rights can in addition be allocated to State or collective institutions, enterprises or individuals. All of these tenure systems are represented in the Miyun landscape.

Side by side with these tenurial arrangements, forests are classified according to their management regime and function: as ecological (and therefore protected) forest or as commercial forest (comprising timber, fuel and economic forests). More than two-thirds of the forest in Miyun landscape is designated as 'protected', with only a small proportion (around one-quarter) allowing for 'economic' or 'production' uses. In reality, legal forest utilization possibilities are limited to fuelwood and non-timber forest product collection, as a logging ban has been in force since the mid-1980s, even though these 'protection forests' were in fact old plantation forests originally planted for economic purposes.



A village forest warden



Villagers engaged in ecological restoration works



Paying subsidies for environmental improvements

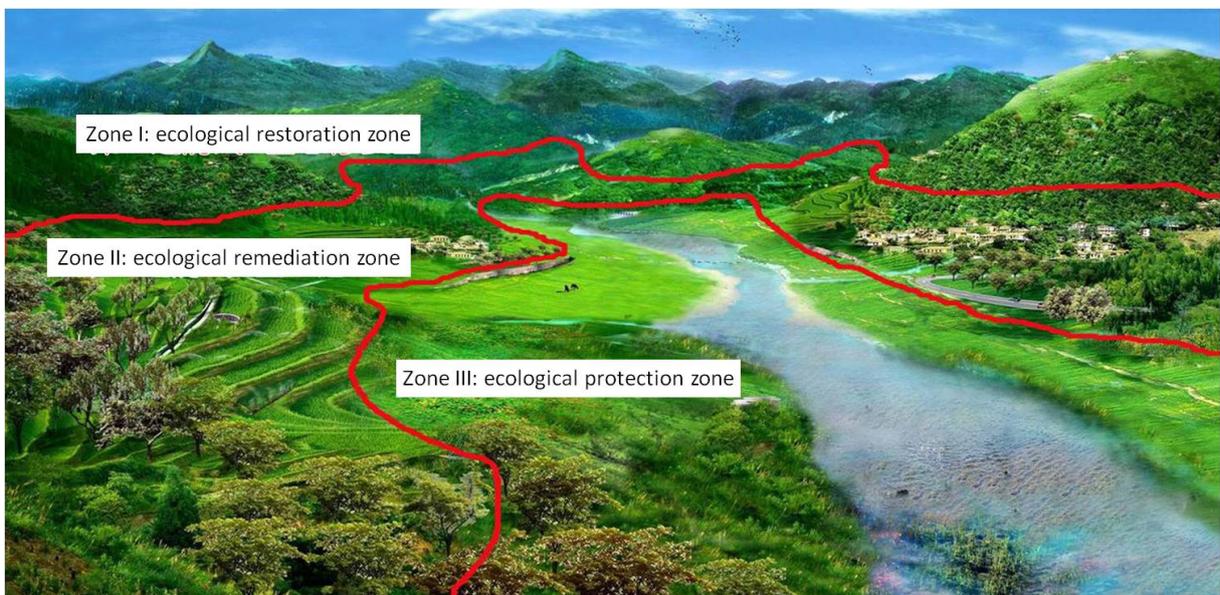
Reforestation of the Miyun watershed: from the uplands to the reservoir

In addition to the logging ban and forest restrictions in place, since the 1970s a series of enactments and policies have been implemented to protect the land and resources of the Miyun landscape. Illustrated in the photographs above, these have focused primarily on reforestation, land conversion, and establishing a series of restrictions on land use and resource exploitation. Most involve the provision of short-term subsidies for land restoration or conservation, and are driven as much by social income distribution goals as by environmental mandates:

- Under the nation-wide 'Conversion from farmlands to forest/grassland' or 'Grain for Green' programme, the central government provides food and cash subsidies for a period of two years to households who convert farmland or barren lands to forest. The subsidy is set at RMB 20 and

50 kg of grain for every *mu* of converted land. In addition, households secure 'ownership' of the converted area via contracted management rights which can be extended up to 70 years and then renewed; they can also be legally inherited and transferred. To date, work has been carried out in seven counties and districts in the Miyun watershed, with a population of just under 300,000,000 households. These activities have resulted in the conversion of 36,700 ha of farmland to forest and 33,300 ha of afforestation on barren hills.

- In a special local variation of the programme, in 2001 the government of Miyun County announced that it would completely abandon cereal growing, and instead develop perennial crops, mainly fruit trees. Funds were made available to compensate those affected. The government has also taken the step of reducing the area under rice in Miyun County and Hebei Province and replanting it with maize, so as to reduce the use of water for agriculture. Irrigated farming has decreased, and has been almost entirely discontinued.
- From 1995, Beijing Municipality started compensating Chengdeh and Zhangjiakou Cities in Hebei Province for the protection of the Miyun watershed. Currently the annual payment is US\$2.5 million, of which US\$1 million goes to Zhangjiakou. The funding provided is used only for specified purposes, including the construction of soil and water conservation measures and subsidies for farmers who convert paddy fields to dry farmland, forestland, or grassland.
- Since 2000, the 'Eco-Migration' programme has encouraged the relocation of households who live in ecologically-sensitive or degraded upland areas. Between 2000 and 2004 almost 2,500 persons in the Miyun landscape were relocated, and some 30,500 people between 2004 and 2007.
- Other programmes and campaigns which have contributed to tree planting in the Miyun landscape include the Beijing-Tianjin Sandstorm Control, Taihang Mountain Afforestation Project and Afforestation in Barren Hills Suitable for Forest. All involved some system of local compensation or payment in return for tree planting or land-use changes.



Management zones in the Miyun watershed

Overlaying these programmes and policies, protection zones for the Miyun reservoir and watershed were established under a series of regulations enacted in 1995 which place certain restrictions on land use and production activities. These watershed management zones are illustrated above.

According to the 1995 regulation, protection zone 3 is basically marked by a ring-road around the reservoir. The management regime in this ecological protection zone is characterized by nature-based and engineering approaches to enhance water treatment and quality in the riparian zone. In protection zone 2, ecological remediation principles have been put in place. These include improving rural water treatment facilities, reducing pollution, and developing more ecological land-use and livelihood practices. In protection zone 1, spanning much of the upland area of the watershed (and the LLS pilot sites), ecological restoration is being achieved by reducing the impact of human activities, and returning land and resources to a 'back-to-nature' status.

The table below describes how these government-led forestry and land management regimes and restrictions on land use and resource exploitation have actually been implemented in the project's two pilot sites, and affected local communities, over the last four decades.¹⁰

¹⁰ Extracted from Deng Wei Jie, 2008, *Huayuan Socio-Economic Baseline* and Liu Jing Lan, 2009, *Xiaowopu Socio-Economic Baseline*.

Huayuan Village, Miyun County			Xiaowopu Village, Hebei Province		
Before 1977	No forest in the area, except barren mountains and some degraded shrubland	1986		Tenure of old trees confirmed, with farmers given logging rights – but logging must be approved by the county-level Forest Bureau or above	
1977	Tree planting started, focusing on Chinese pine, larch and poplar	1992		‘Three Fixed Policy’ for forestry implemented, with villagers allocated private hill lands	
1982	Local households contracted to manage poplar forest as part of farmland, small areas of private trees also established	2000		‘Green for Grain’ programme implemented. 437 <i>mu</i> of farming land cleared for forest, subsidized at the rate of RMB 160/year	
1994	Contracted poplar forest was transferred to collective management, while private trees remained under the control of villagers	2001		Wild apricot forest contracted to villagers through auctions, with 95% of households obtaining the right to manage and use apricot forests	
1995	Poplar trees were tended and thinned for the first time; about 600 trees were felled, but no villagers benefited from this	2002		Implementation of enclosure and prohibition policy, forbidding all activities which alter grassland, forest and vegetation. Forest management and utilization activities were reduced, impacting on local income	
2001	Second tending and thinning of trees, focusing on Chinese pine; again, no villagers benefited	2002		Implementation of grazing prohibition policy, impacting on local livelihoods	
		2005		‘Ecological emigration’ policy implemented, resettling villagers	
2004	The ‘eco-protection’ programme was launched by Beijing Municipal Government, and 64 villagers were employed by the government as forest guards	2007		Collective forest tenure reform carried out in the form of ‘equalized shares’. More than 40,000 <i>mu</i> of forests collectivized, and managed by the Village Committee	
		2008		Special forest tenure policy implemented for individual trees, enabling villagers to secure utilization and logging rights for any trees planted after 2004	
Current forest tenure arrangements	Private trees: those belonging to local households, planted on very small areas allocated by the government in 1982. Collective forest: includes forest owned by the administrative village unit (mainly comprised of planted Chinese pine, and oak and birch in the natural shrub land areas) and that owned by the ‘natural’ village (mainly comprised of planted larch and poplar, and oak found in natural shrub land areas).	Current forest management arrangements		Collective forest: more than 40,000 <i>mu</i> , of which the economic species (wild apricot) were auctioned to individual households in 2001. Other species have also been transferred to individual households for management and protection, but cannot be utilized. Distributed at a rate of one share per person, but managed by the Village Committee. All logging activities are forbidden. Forestland tenure has been confirmed, and certificates will be issued. State-owned forest: are non-commercial forests, managed through the employment of local foresters. There are 16 full-time foresters, paid RMB 1,600 a year, and 13 seasonal foresters who are mainly responsible for fire protection.	

Outcomes

As the preceding section describes, at the start of the project, forest governance arrangements in the Miyun landscape were dominated by a centralized, top-down form of protective forest management. Although this protective management regime was largely respected by local villagers, more locally-driven forest management responses were in evidence, side by side with ‘official’ forest policies and practices.

Village members tended to utilize the forest resources which lie closest to their settlement, and work together to safeguard them from outsiders. Although in one sense it was possible to discern a near open-access form of NTFP utilization, this was only open-access within the immediate village user group.

The most overtly problematic area of policy and law at the outset of the project was undoubtedly the logging ban. Although strictly enforced throughout the watershed, it is important to emphasize that the regulation has been interpreted slightly differently in Miyun County and Hebei Province. The policy in Hebei Province was more flexible and less protective, meaning that people were more likely to be allowed to use the forest – although there was less investment by the government in forest restoration and tree planting. In contrast, in Miyun County, forest policy and law were implemented much more rigorously and rigidly, and there were much higher levels of investment in forest restoration and tree planting. During the course of the project, a major achievement has been the achievement of a logging quota for Huayan Village, and it is hoped that this will in turn stimulate additional changes in the allocation of forest management rights to communities in the broader Miyun watershed.

Another significant change in governance which has occurred as a result of the project has been the introduction and official acceptance of participatory Village Forest Management Plans. This represents a radical departure from the forest planning and management regimes which were being followed at the start of the project. Directly involving local communities in forest planning and management has helped to empower and benefit them. Equally importantly, there are signs that higher-level decision makers at provincial and central levels are becoming more convinced of the wisdom, and beneficial effects on forest management, of taking a more active and participatory, and less restrictive and exclusionary, approach to forest management.

Institutions

As noted above, the project initially operated within a fairly limited institutional context. Efforts were focused on working with village committees (at the local level) and the Forest Department (at provincial, municipal and national levels). This document has already described how, in line with the evolving understanding of 'the Miyun landscape', over the course of the project there has been a major shift in the institutions involved in project implementation. The main change has been a shift from working primarily with village committees and the Forest Department, towards a much more inclusive approach which brings in other line agencies and sectors, focuses on improving cross-boundary cooperation between Miyun County and Hebei Province, and fostering better linkages between different levels of scale. A particularly important point to emphasize is that many of these institutions had not formerly worked together in the context of integrated watershed management – each had traditionally been more concerned with focusing solely on its own specific spatial or sectoral development mandate.

The area of cross-boundary cooperation bears further explanation, as it has been touched on only briefly in earlier parts of the document. Beijing Municipality/Miyun County and Hebei Province face differing socio-economic conditions, which remain a source of friction, given the role of Hebei Province as watershed services' provider and that of Beijing Municipality as a water consumer. In some cases this has led to divergent opinions, or even conflict, between the two regions. Since two-thirds of the Miyun watershed area belongs to Hebei, the quantity and quality of water reaching the reservoir depends considerably on land and resource-use systems in this province. The fact that general levels of development and income remain low in Hebei as compared to Beijing Municipality, and yet that the restrictions placed on land and resource uses means that the residents are effectively subsidizing the maintenance of Beijing's water supplies, remains a major source of tension.

Multi-stakeholder dialogues (MSD) are one tool which has been used by the project to foster better cross-boundary cooperation, as well as greater integration between sectors and levels of scale. From 2008, the project started organizing a MSD process, based around the concept of integrated watershed management. In early 2008, a research programme was launched to build a Geographic Information

System (GIS) for decision making across the whole watershed. This was followed, early in 2009, by a series of multi-stakeholder meetings between government water, forestry and planning agencies from Beijing and Hebei. The meetings reviewed the GIS research findings, and began to exchange views on strengthening cooperation. Participants agreed to work together to develop a common learning platform, and to form a liaison group to work together on watershed management. The LLS project team (IUCN and the Beijing Forestry Society), together with the Beijing Hydrology Society, agreed to support it.

In December 2009, the MSD process was formalized. During the course of 2010 a meeting was held, endorsing Payment for Forest Environmental Services as the key focus of this platform and dialogue process. These actions have provided a solid start in establishing a functional, long-term MSD which involves multiple sectors and levels of scale in a process of joint planning and action – the development of PFES as a mechanism for improved watershed management, to be implemented inter-sectorally and through cross-boundary cooperation between Beijing Municipality and Hebei Province.

At the local level, too, the LLS Miyun project has resulted in the formation of new forms of organization and institutions. Within pilot Villages, new forest management teams have been set up, involving close collaboration between the Forest Department, village committees and local community members. The support provided to village cooperatives, also represents an important contribution towards the development of new local-level organizations that are concerned with forest management, use and marketing in the Miyun watershed. It is hoped that by strengthening these mechanisms for collective action, the project will result in structures that are much more robust and sustainable over the long term, after the project has ended.

Impact: how the project leveraged change

Making the economic case for investing in forest management

Important progress has been made in demonstrating and articulating the economic and development rationale for investing in watershed forest management. At the start of the project, watershed reforestation, afforestation and forest management were primarily seen as forestry and hydrological issues. As LLS comes to a close, there is now increasing recognition by both government decision makers and village landholders that poverty, livelihood and economic concerns are all impacted, and drive the success (or failure) of these processes.

Such arguments are influential with ‘development’ decision makers and financial planners. This is particularly important in the context of efforts to capture the benefits and more equitably distribute the costs of upper-watershed management, primarily via the development of payments for ecosystem services which reward upstream farmers for generating economic benefits to downstream or offsite urban dwellers and industries. The evolving framework of cooperation between Beijing Municipality and Hebei Province is a critical foundation for improving the management of the Miyun watershed, and thereby strengthening the livelihoods of both upstream farmers and downstream water users.

In 2011 the project commissioned a study to look at these economic costs and benefits, and to contribute towards the development of a more comprehensive framework within which to organize and evaluate watershed investments and to ensure that they are made in the most cost-effective manner.¹¹ Even though the study was not able to comprehensively quantify two of the major benefits (soil erosion and sedimentation control, and tourism), it found that that the net economic benefits¹² of afforestation investments in Hebei Province outweigh the costs, and generate important values for both upstream and downstream stakeholder groups. The net present value¹³ of watershed afforestation is estimated at approximately CNY 239 million (US\$37 million) under the 2009-2011 plan, and CNY 1 billion (US\$154 million) under the draft 2012-2015 plan.¹⁴ Of this, downstream watershed ecosystem services are valued at CNY 14 million (US\$2 million) under the 2009-2011 plan, and CNY 53 million (US\$8 million) under the draft 2012-2015 plan. Upstream socio-economic benefits are estimated to be in the neighbourhood of CNY 294 million (US\$45 million) under the 2009-2011 plan, and CNY 1.5 billion (US\$231 million) under the 2012-2015 plan.¹⁵

Other studies show a similar picture. For example, recent work carried out by the Chinese Academy of Forestry and Beijing Municipal Bureau of Landscape and Forestry¹⁶ calculates the stock value of Beijing’s natural forest capital at CNY 19 billion (US\$3 billion), and the annual flow value at CNY 62 billion (US\$9.5

¹¹Bennet, M. and X. Yang (2011). An Economic Analysis of Landscape Level Forest Restoration in the upper Miyun Watershed under the Beijing-Hebei Cooperation Framework. Report prepared by Forest Trends for the IUCN Livelihoods and Landscape Project, Beijing.

¹²Quantified upstream benefits include fuelwood, non-timber forest products, timber and government payments to households (for afforestation work such as land preparation, planting and the raising of planted trees). Quantified downstream and offsite watershed benefits include soil water retention, forest canopy rain interception, forest water filtration and carbon sequestration.

¹³Over 25 years, at a 10% discount rate.

¹⁴These plans are entitled “Beijing-Hebei Cooperation on Ecological Water Source Protection Forests Development and Forest Protection (2009-2011)” and “Beijing-Hebei Ecological Water Source Protection Forests Development Plan (2012-2015)”, respectively.

¹⁵It should be noted that the total value of afforestation investments cannot be reached by summing the upstream and downstream benefits presented, as these include transfer payments between upstream and downstream groups.

¹⁶Wu, S., Hou, Y. and G. Yuan (2009). “Valuation of Forest Ecosystem Services and Natural Capital of Beijing Metropolitan Area: A Case Study”. Paper presented at XIII World Forestry Congress, Buenos Aires; Wu, S., Hou, Y. and G. Yuan. 2010. “Valuation of forest ecosystem goods and services and forest natural capital of the Beijing municipality, China”. *Unasylva* 234/235(61): 28-36.

billion) or just under 7% of annual GDP. The vast majority of the economic flows yielded by forest ecosystem services accrue to other sectors (CNY 42.4 billion or US\$5.6 billion), including downstream water flow and quality benefits worth CNY 14.2 billion or US\$1.9 billion to the water sector.

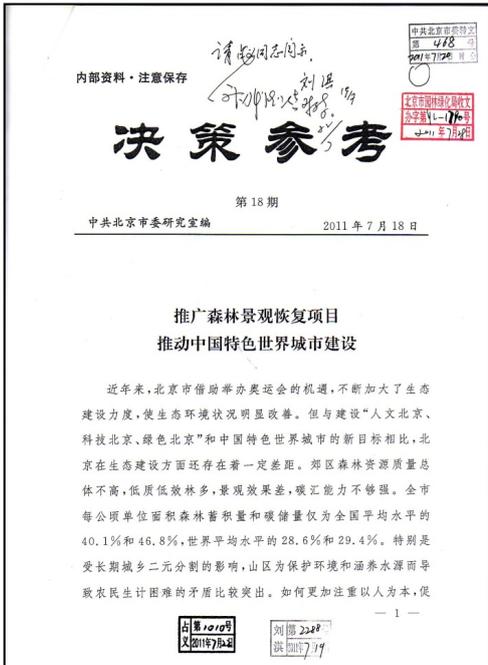
Scaling up the landscape experience

The LLS Miyun project has reinterpreted the boundaries of the landscape it is dealing with in several respects over the course of the project. As described earlier in the document, it moved from a single-site focus to a whole-watershed approach. This scaling-up was driven largely by the recognition that the issues that the project aimed to address required a much more integrated, holistic and broader-scale approach to landscapes and livelihoods in the Miyun region. It also responded to the poor understanding among project partners of the term 'landscape', and the lack of an appropriate equivalent in the Chinese language. Alongside this geographical scaling-up, it was also necessary to scale up the level of stakeholders, agencies, sectors and disciplines involved in the project.

Simultaneously, the project team has experienced a scaling-up of its understanding of the livelihoods and landscape concept, and of the actions that are required to implement it. At the beginning, the project was based around a particular (and rather limited) model of how to restore landscapes, based mainly on a technical forestry approach. At the same time it has become apparent that both the partners and the communities we work with have experienced something of a shift in perception and aspirations. We have seen a more integrated approach to forest management develop, which involves both a much higher level of stakeholder participation and brings in a far greater (and more integrated) range of goals and technical skills. They have progressively moved towards a much greater acceptance of an approach to ecosystem conservation which is based on the interaction of many different processes and interests. Among the village communities in the pilot sites, we have already mentioned the emerging shift in people's aspirations as regards livelihoods, opportunities, and future goals.

A key aim of the LLS Miyun project is to demonstrate an integrated approach to the landscape and livelihoods in a watershed context which can be adapted, replicated and taken up in other watersheds of the country. So far, however, the project's external influence is still in its infancy and it has not yet served as a model for replication in other landscapes, or by other agencies and donors. The project is however active in sharing information, lessons and techniques, and some individual initiatives (such as greater consideration for biodiversity and livelihoods and the kang bed restoration) have been taken up by the Sino-German Forestry Project and the Beijing Forestry Society for use in other sites.

We have made efforts to publicize and share the experiences and insights gained during the course of the project with others working in China. We are especially closely engaged with our 'sister' project, the Sino-German Forestry Project, and have learned a lot from them in terms of the 'close-to-nature' approach to forest management they originally developed – this approach has been adopted and used in the LLS Miyun project. In 2008, an international workshop was organized with UK Forestry Commission and SFA to officially introduced the concepts of FLR to Chinese foresters (mostly from northern China at that event), as well as launching the FLR Handbook, a useful tool for implementing FLR. In 2011, a national workshop was organized with SFA and BFS, to discuss gaps and opportunities to link FLR with on-going forest management work in China, which attracts over 160 foresters from across the nation.



Influencing government

Both local and national governments have been key partners in the project from the outset. In addition, due to the key role of the government in China at most levels of forest management, we have engaged in a lot of advocacy to stimulate a shift towards a more active, inclusive and sustainable form of forest and watershed management. This has showed some success: for example, after a lengthy process, the county government approved a logging quota for one of our pilot sites. The participatory village forest management plans prepared under the project have also been approved and endorsed by the municipal government. A series of expert panel meetings have been arranged to present evidence that a more participatory approach to forest management is scientifically sound, and is good for both forests and local livelihoods.

Our series of multi-stakeholder dialogues has also provided an important measure to scale up the pilot site experience to the entire watershed, and from which to influence government. Based on the watershed database established and researches on key topics of common concerns (PES, impacts/benefits of afforestation programmes), stakeholders have started to grasp the implication of the Miyun restoration initiatives at the landscape level. They have also been encouraged to discuss research results in relation to their own departmental functions so that a more integrated approach to forest restoration and watershed management can gradually emerge. Perhaps the greatest opportunity to influence government is not just via the conventional mechanisms of presentations and workshops, but by ensuring that multiple government agencies and sectors are engaged in the actual implementation of the project. Therefore, a policy advice, entitled Advice on Promoting FLR in Miyun Watershed was submitted to the Beijing government and was well received.

The party secretary of Beijing municipal government, Mr. Liu Qi, recognized and appreciated the achievements of LLS and its leverage projects and recommended to the Beijing Municipal Parks and Forestry Bureau to come up with a scaling-up plan following the Miyun model. It is hoped that the policy advice can trigger important support from the government that will give the multi-stakeholder dialogue process a more established and clarified mandate and greater sense of empowerment.

In addition, great efforts were made to present the results from the LLS Miyun project to various policy and decision makers at national and international levels, and help them to better understand project results and implications. We have organized field trips to pilot sites, workshops and roundtables involving a wide range of government agencies – such as various line agencies in Miyun watershed and departments of the State Forestry Administration. We have also supported the State Forestry Administration's participation in a number of international policy dialogues – such as one held in London in 2009. In 2010, the project was also invited to make a presentation to the influential UK-China Forestry Working Group. In 2008 the Director General of the State Forestry Administration, Madame Li Nuyun, visited the project site, this was followed in 2010 by a visit from the Vice Mayor of Beijing Municipality. With a successful joint FLR workshop with SFA in 2011, it is hoped that FLR concepts can be integrated into the nation's forest management work from the ground level up – a potential scale – sideways to other landscapes across the country.

Influencing global thinking

The LLS Miyun project has been able to share its experiences and information with other countries – as well as learn from their experiences. The 2008 Forest Landscape Restoration workshop (mentioned above) exposed both our project findings, and us, to participants from other countries, including Thailand and India. At this workshop we also engaged in cross-learning with Scottish colleagues from the UK Forestry Commission, including a site visit to the Miyun watershed.

The LLS Miyun project was selected as one of the three case studies presented in a Forest Landscape Restoration film that was commissioned by the UK Forestry Commission. In 2008 a UK Minister (Hillary Benn, the then Secretary of State for Environment, Food and Rural Affairs) also visited Huayuan Village. LEAD International held their last training course in Beijing, and visited the LLS Miyun pilot site with participants.

We have also supported our partners, the Beijing Forestry Society to present the LLS Miyun project to the Vice Mayor of Beijing. Our project partners have also shared experiences from the Miyun watershed at other international venues: examples include workshops held with Korean and German colleagues. Most recently, the project team has formed a partnership with China's Renmin University and Wageningen University in the Netherlands, who are aiming to carry out a comprehensive study on Forest Landscape Restoration.

The project has also taken the opportunity to ensure that experiences from the Miyun landscape are shared through IUCN's global policy and information networks. We presented the LLS Miyun experience at the Barcelona World Conservation Congress in 2008. We participated in a series of multi-stakeholder dialogue writing workshops organized by the IUCN Strengthening Voices for Better Choices project, linking up with colleagues from other countries.

What we have found out: reflecting on insights gained and lessons learned

The major causes of landscape degradation in the Miyun watershed – lack of active forest management, low local participation and benefits, and weak inter-sectoral and cross-boundary cooperation – have been identified. Tools have been developed to address them which so far appear to be quite successful, and to resonate with both government decision makers and local communities. However these tools and approaches still need to be further tested, modified and improved, and there is still a long way to go.

As we enter the final stages of the LLS Miyun project, we seek to consolidate our achievements to date. An overriding concern is to make the transition from developing and testing new approaches to mainstreaming them within the landscape management policies and practices which govern the Miyun. We have already made significant steps forward in this respect, but now need to ensure that activities gain a permanence which will enable them to be continued, and improved upon, after the end of the LLS project.

We have only worked in a tiny area of the Miyun landscape, and we have only scratched the surface in terms of the new institutional, stakeholder, technical and market arrangements that need to be put in place. Until there is major policy change regarding the approach to forest management (including technical management aspects as well as utilization possibilities, local participation and benefit distribution) followed within the Miyun landscape, and that policy is reflected in implementation across the watershed, forest degradation is likely to continue. There is a need to extend and adapt the LLS approach in other parts of the Miyun watershed, and to expand the institutional partnerships that are formed to implement it.

This, in turn, rests largely on the acceptance and uptake of this more integrated approach to watershed management by key decision makers in the State Forestry Administration, Beijing Municipality and Hebei Province; the latter two have been the key target participants in the Miyun watershed MSD process. It should certainly be in their interests to do so, and is definitely within their institutional remit and mandates. We therefore recognize, as we wrap up this phase of LLS activities in the Miyun watershed, that we must focus our attention on making the case for the approach we have been piloting, demonstrating and communicating its benefits to landscapes and livelihoods, and working to influence policy making and decision making at the highest levels. The economic arguments described in the previous section will be particularly important in advocating for the continuation of sustainable forest management, local involvement, and market-based schemes and financing mechanisms such as Payments for Forest Environmental Services.

During the course of the LLS Miyun project we have also learned a number of valuable lessons. It is appropriate that we end by listing the six most important of these. This is both to serve as a reminder to ourselves as well as to share them with others who may be implementing similar activities in the future either in the Miyun watershed or in one of the other 4,000 watersheds which supply drinking water to 655 cities in China:

1. **'Landscape' is not always the most appropriate terminology.** The project's understanding of the 'landscape concept', and how to operationalize it in a Chinese context, has developed substantially since the outset of the project. It also seems that our greater understanding, and the way in which this has been reflected in project implementation, has had a significant impact on our Chinese partners' ability to conceptualize, realize and operationalize a more integrated approach to watershed management.

- 2. The importance of inclusivity and integration.** Our initial, rather narrow, approach to landscapes and livelihoods in the Miyun watershed and to the spatial, institutional and operational requirements for addressing them would not have enabled us to meet our goals. At the same time, the restrictive and non-participatory approach to forest management and environmental conservation that has dominated land and resource policies and interventions in the Miyun watershed to date has undoubtedly acted as a major constraint to landscape and livelihood improvements. Broadening the range of beneficiaries and benefits involved in landscape management is key to a successful intervention. An integrated package of solutions, implemented across diverse institutions and levels of scale, is required to address complex landscape problems which involve multiple stakeholders and interest groups.
- 3. Leveraging small changes can have big effects.** However imperfect the *status quo*, it provides an important building block for effecting change. In the Miyun landscape, it would neither have been acceptable nor effective to merely reject the current systems, policies and institutional structures for forest management. Rather, the key lay in seeking ways to work within them to foster the changes in attitude, approach and techniques which would allow them to realize their goals in a better, more equitable, and more sustainable way. Although landscape and livelihood improvements involve a complex series of issues, inter-linkages and relationships, small changes which act to improve the implementation of existing policies can generate huge impacts. The obvious example from the LLS Miyun project is finding improved ways of achieving the pre-existing policy goals of forest protection and watershed conservation, but in a way that is based on a more participatory and inclusive approach, and on sound scientific and technical principles – especially securing logging quotas, introducing a participatory planning process, and establishing new silvicultural techniques.
- 4. It is necessary to balance landscape and livelihood approaches and goals.** The LLS Miyun project has demonstrated, and reinforced, the importance of linking tangible livelihood improvements with landscape restoration and conservation. As the material gains from sustainable landscape management have become more apparent, especially at the local level, so there has been a much greater willingness to engage in the land and resource activities that are necessary to achieve it. At the same time, sustainable landscape management cannot be built on livelihood improvement alone. Technical forestry solutions, although possibly over-emphasized at the start of the project, have proved key to its success – and are a prerequisite for generating livelihood benefits and greater local participation.
- 5. There is great value in adopting adaptive management and learning approaches.** Adaptive management, combined with a learning approach, has been key to the LLS Miyun project. Being able to reflect, learn and act on new insights, and having a project design which enabled us to change our planning accordingly, has been critical to the coherence of the project, as well as to its wider credibility and acceptance among our partners. Key examples are the changes in the conceptualization of the ‘landscape’ and its implications on the scale, institutions and stakeholders involved in the project, and the introduction of activities not envisaged at the start of the project such as MSD and PFES.
- 6. Long-term sustainability depends on simplifying and mainstreaming new approaches.** The time-frame of the LLS Miyun project – three years, plus a one-year no-cost extension – will be inadequate to achieve landscape-level changes. Addressing landscape and livelihood issues in most contexts, and most definitely in the Miyun watershed, requires long-term actions which extend well beyond the

conventional project lifespan. The project period permits little more than a testing of possible approaches in a limited area. It is certainly not sufficient to permit the level and continuity of activity that is required to ensure that they are replicated and institutionalized at the whole-landscape level. The project's experience has made it clear that it is of critical importance to formulate an exit strategy which explicitly tackles sustainability and mainstreaming issues. This is for example reflected in our efforts to support the development of guidelines for 'close-to-nature' forest management and establishment of local forest management teams, foster a multi-stakeholder dialogue process, support the development of farmers' cooperatives and establish Payments for Forest Environmental Services. This is in addition to our growing focus on advocacy with high-level decision makers in government and with other donor projects, so as to leverage these new approaches into other programmes and projects in the Miyun watershed and beyond.



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