Submitted by:

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Signature:

Asia-Pacific Network for Sustainable Forest Management and Rehabilitation

Pilot Project of Multifunctional Forests

Mid-Term Evaluation

August 2013

Wangyedian Forest Farm, Chifeng Municipality
Inner Mongolia Autonomous Region
People's Republic of China

Contents

Tables and Figures

Abbreviations

APEC – Asia Pacific Economic Cooperation Organisation
APFNet - Asia-Pacific Network for Sustainable Forest Management and Rehabilitation
GIS - Geographic Information System
GPS - Global Positioning System
M&E - Monitoring and Evaluation
NWFP - Non-Wood Forest Products
RMB - Renminbi (Chinese currency)

Plant nomenclature

Hazel – *Corylus heterophylla*
Japanese larch – *Larix kaempferi*
Korean pine - *Pinus koraiensis*
Larch – *Larix principis-rupprechtii*
Mountain poplar – *Populus davidiana*
Pine or Chinese pine – *Pinus tabulaeformis*
White birch – *Betula platyphylla*

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Lu De –Assistant Executive Director, APFNet Secretariat, Beijing
Huang Kebiao – Program Officer, APFNet Secretariat, Beijing
Wang Baoxiang - Project Director and Head of the Wangyedian Forest Farm
Li Wenchen – Project Executive Director and Deputy Director of the Forest Farm
Ma Chenggong - Project Coordinator
Lei Xiangdong – Forest Management Expert, Chinese Academy of Forestry
Cheng Ruichun - Chifeng Forest Research Institute
Liu Yuejun – Chifeng Forestry Bureau - International Projects Section
Lu Zhaoxia – Interpreter, Chifeng Forestry bureau

Best wishes to you in for success in the remaining project period and into the future.

R. E. Stevens

1 EXECUTIVE SUMMARY

In brief
Design – assessed as meeting APFNet requirements and is appropriate for the situation at Wangyedian Forest Farm. No major recommendations are made for design modification.

Implementation – To date, implementation is in line with the project design, on time and to a high standard. Only one major element, the training centre and associated facilities is causing concern, primarily through the Forest Farm managers having an expanded concept for this component. The project managers have made progress in securing a suitable site and are developing a staged approach in an overall plan to allow use of available and potential financing in order to meet the project time schedule.

This mid-term evaluation has been carried out over twelve days in August 2013, with five of these days spent on the project site. In this summary the key recommendation from the report are given as bullet points.

Project Design
Examination of the Project Proposal shows the project as designed meets the requirements of APFNet as set out in their guidelines for projects. No significant recommendations are made concerning the project design. As the project managers have demonstrated their capacity to implement the project to a high standard further support from APFNet seems appropriate. A second phase project could amongst other activities:

- Contribute to further development of the training and education complex which would be of national significance for training of forestry technicians, students, particularly tertiary students and education for the general public.
- Consolidate and further develop the close-to-nature forest management methods and co-management activities to serve as a training/demonstration base.

Sustainable Forest Management
This component has been well designed and implemented under the guidance of Professor Lei Xiangdong. The close-to-nature forest management method is appropriate in the Wangyedian Forest Farm situation. The initial plot sampling, training, tree selection and currently the harvesting, have all been done to a high standard. Specific recommendations for this component are:

- Young larch plantation site with considerable regeneration. At the time of first thinning it is suggested that significant gaps be made to give new regeneration of the mentioned species scope to become established to commence the development of a multi-aged stand and thus cater for stand stability as well as providing a more continuous availability of trees of harvestable size into the future.

- Older larch forest. To overcome the lack of regeneration, enlarged gaps and enrichment planting will be necessary to commence the close-to-nature process in these forests.

- In the interests of maintaining good forest nutrition in the long term, removal of bark and particularly branches with leaves should be reconsidered. Expecting bark removal in the forest may not be practical but branch and tree top removal mainly for fuelwood should not be done, at least not until leaves have dried and fallen from the branches to be removed.

Enrichment planting. Whilst enrichment planting makes good sense in theory, in practice it needs careful implementation to achieve acceptable success. Most of the issues relate to the gaps available for planting being too small to allow the planted seedlings to become established. Lack of adequate follow up maintenance/weeding is also a problem. To maximise the chance of success in the long term:

- Keep data on gap sizes at the time of planting to allow follow-up evaluation and to learn what minimum size gap is needed for future success in different forest types and with different species. Photographs of gaps and seedling quality at the time of planting give a good record. Measure sample gaps in two directions at right-angles and record GPS coordinates on the photos for later gap identification.

- Ensure weeding or liberation of the planted seedlings is done regularly as the already established shrubs and grasses will give significant competition to the planted seedlings.

Animal production in the forest. Trial raising of chickens and Tibetan pigs in the forest is being done and meeting with success. However some caution is needed.

- Any scaling up of activities such as chicken or pig raising in the forest should be done only after careful observation to determine the impact on the forest health, particularly on establishment of natural regeneration. Some fenced exclusion plots established adjacent to the trial animal sites would serve to show the regeneration potential compared to the grazed sites.

Pruning. Some pruning has been done in young larch forest and more is planned. Reconsideration of this activity is suggested.

- Unless the market offers a premium price for pruned stems which will result on a return for the investment in pruning, pruning should not be done except for access in very dense stands, for fire protection or for other reasons not connected with improved stem value. If farmers prune trees to collect fuelwood, they should be requested to do well it well, close to the stem without causing stem damage.

Genetics. This project has introduced improved quality seed and some species but not commenced any genetic improvement. A genetic improvement programme has the benefit of breeding trees with greater production potential and also allows selection for adaption to the local site conditions particularly in a situation of climate change.

- A simple tree genetic improvement programme would be a good investment for the Forest Farm. Some guidance in developing a plan and some training in hybridising techniques for the important species may be needed but the Forest Farm technicians could implement the programme developed.

Nursery containers. Plastic bags are currently used in the nurseries. Development of a good plant root system is very difficult with these containers.

- In order to improve the quality of seedlings grown in the nursery and help with long term survival under drying conditions, the use of root trainer containers which promote good root distribution and air pruning of roots, should be considered. These types of containers combined with a shorter nursery period and therefore plants with smaller shoots, should result in plants with considerably better survival prospects, particularly in the longer term.

Co-management
The co-management component of the project has proved successful in that the villagers generally have a good appreciation of the value of the forests to them both environmental benefits and as a source of income through NWFP collection. Therefore they realise that it is to their advantage to play an active role in protecting the forests.

The project's initiative to involve private enterprise in plant production and labour organisation for forest work have both proved successful and provide important employment for workers who do not migrate for work.

Non-wood forest products
Wild and artificial mushroom production has become an important industry in the Forest Farm area. A factory is available to process the available mushrooms. The project is continuing to investigate new species of both mushrooms and medicinal plants.

Project management
The computer management systems developed are of a high standard and are being used by the project managers.

Numerous reports and publications have been produced to document project activities and for publicity. These are also of a high standard.

Training of project staff and villagers has been done both by visiting experts and by Forest Farm staff.

One planned activity which is behind schedule is the training centre and associated interpretive and tourist facilities.

- Training centre. The Forest Farm managers need to continue development of an overall plan for new facilities including all elements mentioned in the project design as well as public accommodation and other appropriate aspects. A plan showing stages and costs needs to be available to facilitate funding schedules and to give a clear overview of potential sources of funding.

- The Sino-German Afforestation Project in Tianshui, Gansu has recently developed a high quality training and public education facility to be opened in September 2013. (For information see www.tsfepc.com Tianshui Forest Experience Pedagogic Centre). The key managers involved in this initiative in Wangyedian should visit this new centre before finalising their plans.

Monitoring.

- An evaluation of the socio-economic impact of the project by socio-economic specialists would be very informative and helpful in formulating further projects. A mid-term socio-economic evaluation would have been useful to guide and modify, if necessary, implementation over the remaining project period. However as only one year of implementation now remains, this should be done as part of the final evaluation of the project.

Finances.

- An audit of the project finances by independent auditors should be done as soon as possible to ensure that the project's finances are in order. This will be of benefit and assurance for both the project managers and for APFNet.

2 INTRODUCTION AND EVALUATION STUDY APPROACH

From August 4th until August 15th the writer carried out a mid-term evaluation of the Pilot Project of Multifunctional Forests, this being one project under the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet). Five days were spent on the project location at Wangyedian Forest Farm. During this time the following activities were carried out:

- Site visits and discussion on representative forest management demonstration sites.
- Interviews with village leaders, group leaders and individual farmers involved in co-management activities.
- Visits and discussions with nursery and factory managers involved in plant production and non-wood forest product (NWFP) processing.
- Inspection of computer management systems and discussion on their suitability.
- Inspection of project documents and publications.
- Discussions with project managers on their project implementation experience and plans for the remaining project period.

The approach to assessing the co-management aspects of the project was to conduct key informant interviews, concentrating the limited time available on village and group leaders as well as some individual farmers. The time available was not sufficient to allow extensive data collection and analysis therefore the observations and conclusions in this report are more informed subjective rather than objective.

Based on the information gained through this information gathering process, this report and assessment is presented. The Terms of Reference are included as Annex 1

3 PROJECT DESIGN

3.1 APFNET REQUIREMENTS

Formation of *The Asia-Pacific Network for Sustainable Forest Management and Rehabilitation* was proposed by China at the 15th APEC Economic Leaders Meeting in Sydney, Australia in September 2007, and was formally launched in September 2008 with the following aims:

Mission[1]
The mission of APFNet is to help promote and improve sustainable forest management and rehabilitation.

Objectives
The objectives of APFNet are to:
a) Contribute to the achievement of the aspirational goal of increasing forest cover in the APEC region by at least 20 million hectares of all types of forests by 2020;

b) Help to enhance forest carbon stocks and improve forest quality and productivity by promoting rehabilitation of existing but degraded forests and reforestation and afforestation of suitable cleared lands in the region;

c) Help to reduce forest loss and degradation and their associated emissions of greenhouse gases by strengthening sustainable forest management and enhancing biodiversity conservation; and

d) Help to increase the socio-economic benefits of forests in the region.

[1] APFNet Strategic Plan 2011 – 2015, APFNet 2011

More specifically:

Goals and Objectives of APFNet Projects[2]

APFNet projects aim to summarize, demonstrate and disseminate best practices in sustainable forest management and rehabilitation in the Asia-Pacific region to fulfill the three main objectives of APFNet as follows:

- to promote forest rehabilitation, reforestation and afforestation to help to achieve the goal of *increasing forest coverage in the APEC regions by 20 million hectares of all types of forests by 2020.*
- to strengthen sustainable forest management, improve forest quality, increase carbon sequestration, and mitigate climate change.
- to enhance biodiversity conservation and improve the productivity and socio-economic benefits of forest ecosystems.

3.2 DESIGN - PILOT PROJECT OF MULTIFUNCTIONAL FORESTS

The design outlined here is the design given in the Project Proposal and agreed in the Project Agreement between APFNet and the Wangyedian Forest Farm on 21/08/2011. The project will run for three years from that date. The project design is presented here in summary only and more fully elaborated, as appropriate, in later sections of this report. For the detailed design document see 'Project Proposal - Pilot Project of Multifunctional Forests, April 19, 2011 (APFNet 2011)'.

Goal

The overall goal of the project is to build a pilot and demonstration of sustainable forest management for China and Asian-Pacific Region with orientation of multi-function forest combing economic, ecological and social benefits together, and make a contribution to the sustainable forest management in Asia Pacific Region.

Specific Objectives

- To construct demonstrate sites of multifunction forest with different forest types;
- To formulate protection and collect plan for non-timber forest products;
- To construct demonstrate sites of community co-management in the forest farm;
- To promote sustainable forest management and improve capacity building in the forest farm;
- To build the Multifunction Forestry Training Centre.

Activities

- Forest inventory and planning in the forest farm;
- Formulate multifunction forest management plan;
- Construct Pinus tabulaeformis plantation, Larix Pinus plantation, and natural secondary forest demonstration sites;

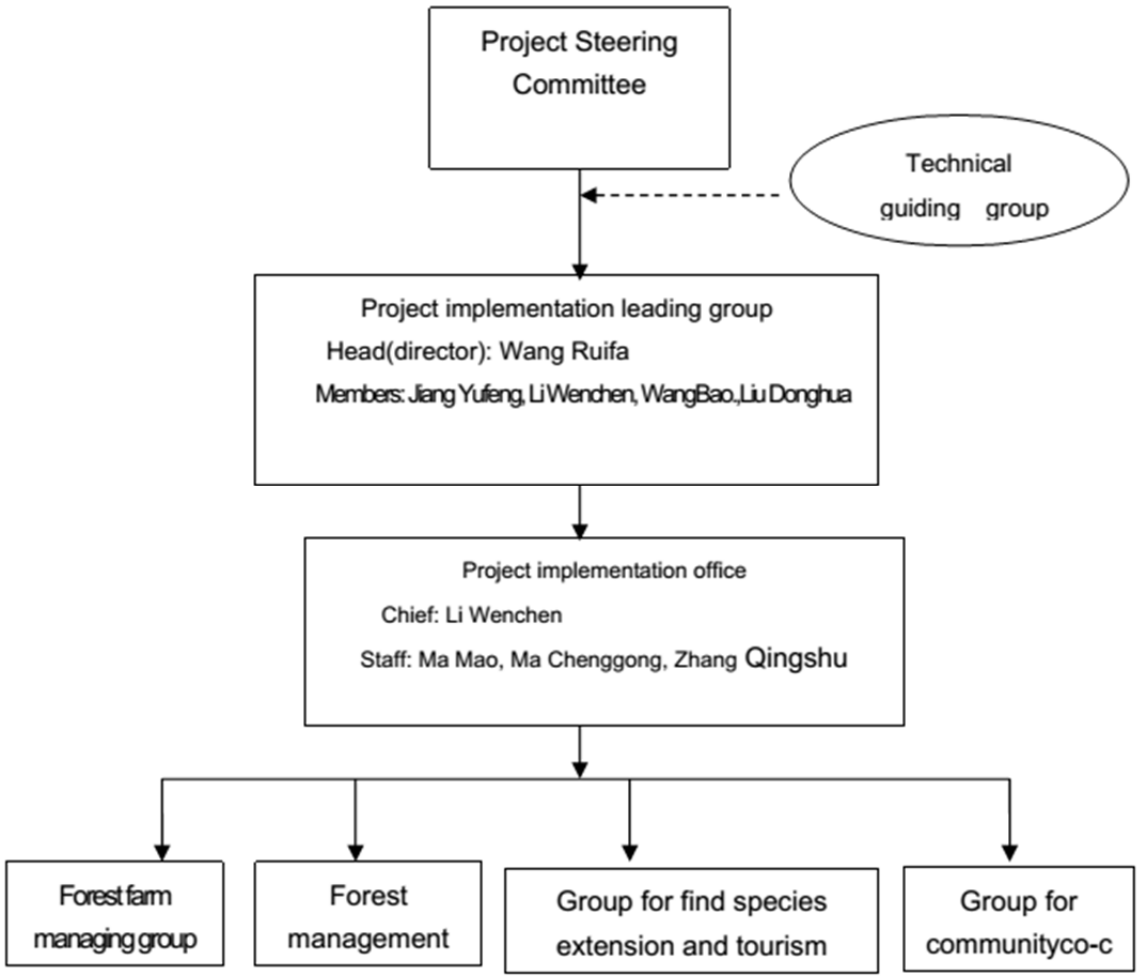
[2] Guidelines for Project Management, APFNet 26 February 2012

- Non-timber forest products inventory and exploitation;
- Formulate community co-management mechanisms through non-timber forest products exploitation;
- Training staff to promote capacity building of the forest farm;
- Build a Multifunction Forestry Training Centre, training 200 technical personnel, 400 forest farmers yearly;
- Establish a forest farm website to popularize and publicize project achievement.

Expected Outputs

- Construct 1 forest resource information management system, 1 general affairs information management system of forest farm, 1 financial information management system;
- Construct 6,000 acres close-to-nature management forest with different forest types;
- Exploit non-timber forest products, e.g. edible fungi to promote forest multifunction management.
- Construct demonstrate sites of community co-management in the forest farm;
- Build the Multifunction Forestry Training Centre, training 200 technical personnel, 400 forest farmers yearly.

Figure 1 Project Organisation and Management Arrangements



The above table is from the Project Design document. Mr. Wang Ruifa is Project Director and Head of the Wangyedian Forest Farm. Li Wenchen is a Deputy Director of the Forest Farm. Ma Chenggong is the Project Coordinator.

The Chifeng Forestry Bureau assigned the Wangyedian Forest Farm as the Project Executing Agency.

Finances

The overall investment is USD 1,500,615, out of which:

- USD 1,176,000 or 75.0% of the overall investment is provided as a grant by the APFNet;
- USD 324,615 or 25.0% is from the counterpart Forest Farm, comprising cash funds and material contribution.

3.3 COMMENTS ON PROJECT DESIGN

Part of the design process is for the design to be reviewed by the project appraisal panel invited by APFNet. As could be expected the design does cover the main elements of the goals and objectives of APFNet projects (see Section 3.1) with particular emphasis being placed on the following aspects:

Forest rehabilitation through sustainable forest management. Close-to-nature management has been introduced through training and field demonstration in three forest types,
Improved forest quality will result from the application of close-to-nature management and associated progressive thinning,
Increased carbon sequestration through development of multi-layered and multi-aged forests,
Enhanced biodiversity through encouragement of natural regeneration and enrichment planting,
Improved productivity through multiple species and age class development combined with increased management of non-wood forest products,
Socio-economic benefits are flowing from the villagers greater use of non-wood forest products and the increased employment resulting from forest management, nurseries and product processing which are a consequence of the more intense forest management,
Mitigation of climate change will result primarily from the greater species diversity and increased age range of species which result from the close-to-nature management methods.

The design has multiple elements the major aspects of which are:

- Development, training and implementation of a computer based forest management system including GIS. This necessitated software development as well as a new field inventory plot system.
- Formulation, training and implementation of a forest management system new to the forest farm technicians.
- Development and introduction of office and financial management systems.
- Investigation and introduction of non-wood forest products including mushrooms and medicinal plants.
- Development of a co-management relationship and related activities with a demonstration village and to a lesser extent with other villages
- Introduction and training of a forest labour working team.
- Nursery development and upgrading of nursery standards.
- Capacity building through staff training.
- Construction and renovation activities in nurseries, recreation facilities, and training centre construction.
- Associated management aspects such as reporting, publications, training and hosting of national experts.

Overall design. This project has is a wide range of activities giving quite a challenge for the project managers and staff to implement in a three year period. Development of the computer based management systems, design and implementation of the forest management interventions, identification and implementation of expanded exploitation of non-wood forest products, particularly fungi/mushrooms all have been largely implemented but very little time remains for consolidation, fine tuning, and to fully appreciating the outcomes. In this regard the close-to-nature interventions will take some years to start to show real benefits.

Implementation of a forestry project over a three year period gives insufficient time for full consolidation and realisation of the impact of the forest management aspects. A consolidation or follow-up phase would allow further development of most initiatives commenced in this project.

Target groups. The main target groups are the Forest Farm staff and the local villagers who are neighbours of the Forest Farm. The design has resulted in considerable benefit to these beneficiaries. Further details are provided later in this report.

Replicability and associated aspects are discussed in Section 6.3.

4 PROJECT IMPLEMENTATION STATUS

This section follows the outline presented in the Project Logical Framework which is a summary of the project's goals, objectives, expected outputs and activities. The Framework as presented in the Project Proposal is reproduced in Appendix 1.

By the end of Project Year 2 (August 2013), the project managers have made very considerable implementation progress as summarised in Table 1. They are on track to complete implementation by the end of Year 3, according to the Project Design. See Annex 5 for the list of remaining activities. More detail on the status of the various project elements is given in Section 0 Discussion.

Table 1 Project progress summary to end of Project Year 2

Activities	Percentage implemented	Planned completion date	Estimated Completion Date	Comment
Output 1: Design and planning of multifunctional forest management and establishment of demonstration forest				
Activity 1.1 Survey on design and planning of multifunctional forest	100%			
Activity 1.2 Drawing up management plan of multifunctional forest	100%			
Activity 1.3 Establishment of demonstration forest of close-to-nature transformation of Chinese pine plantation				
Sub-activity 1.3.1 Background survey for demonstration forest of close-to-nature transformation of Chinese pine plantation	100%			
Sub-activity 1.3.2 Technical design for close-to-nature transformation of Chinese pine plantation	100%			
Sub-activity 1.3.3 Training and implementing of transformation of Chinese pine plantation	100%			
Sub-activity 1.3.4 Set up close-to-nature transformation demonstration forest, regular management forest, comparison forests and signboards of Chinese pine plantation	60%	2013.07	2014.03	Harvesting to complete and enrichment planting to be done up to spring 2014
Activity 1.4 Establishment of demonstration forest of close-to-nature transformation of larch plantation				

Sub-activity 1.4.1 Background survey for demonstration forest of close-to-nature transformation of larch plantation	100%			
Sub-activity 1.4.2 Technical design for close-to-nature transformation of larch plantation	100%			
Sub-activity 1.4.3 Training and implementing of transformation of larch plantation	100%			
Sub-activity 1.4.4 Set up close-to-nature transformation demonstration forest, regular management forest, comparison forests and signboards of larch plantation	60%	2013.07	2014.03	Harvesting to complete and enrichment planting to be done up to spring 2014
Activity 1.5 Establishment of natural secondary forest close-to-nature regeneration through harvesting and tending				
Sub-activity 1.5.1 Background survey for demonstration forest of natural secondary forest close-to-nature regenerated through harvesting and tending	100%			
Sub-activity 1.5.2 Technical design of natural secondary forest close-to-nature regenerated through harvesting and tending	100%			
Sub-activity 1.5.3 Training and implementing of natural secondary forest close-to-nature regenerated through harvesting and tending	100%			
Sub-activity 1.5.4 Set up close-to-nature transformation demonstration forest, regular management forest, comparison forests and signboards of natural secondary forest close-to-nature regenerated through harvesting and tending	60%	2013.07	2014.03	Harvesting to complete and enrichment planting to be done up to spring 2014
Activity 1.6 Variety high-quality breeds extension (orchard and nursery)				
Sub-activity 1.6.1 Transformation of infrastructure, signboard	100%			
Sub-activity 1.6.2 Fine variety breeds extension	100%			
Output 2 Sustainable development and utilization of non-wood forest product				
Activity 2.1 Survey and publicity of non-wood forest products	100%			
Activity 2.2 Thematic training on sustainable collection and utilization of non-wood product	100%			

Activity 2.3 Trial and demonstration of sustainable development and utilization of non-wood product	100%			
Activity 2.4 Pilot demonstration of fungus breeding	50%	2013.07	2014.05	Trial of forest cultivation of particular mushroom species
Output 3 Co-construction and management of forest farm and community				
Activity 3.1 Background survey on social and economic situation of the communities surrounding the forest farm	100%			
Activity 3.2 Trial and demonstration of cooperation between forest farm and forestry professional household	100%			
Activity 3.3 Cooperative employment supporting between forest farm and community	100%			
Activity 3.4 Cooperating under-planting and forest grazing	100%			
Output 4 Transformation of houses for management and establishment of the experiencing centre				
Activity 4.1 Transformation of houses for management and establishment of the supporting facilities of the experiencing centre	20%	2013.07	2014.05	Training centre still to be constructed
Activity 4.2 Training and study tour for staff in multi-functional forestry education and publicity experiencing centre	0%			Suggested to visit forestry pedagogy centre in Tianshui, Gansu
Activity 4.3 Establishment of ecological culture demonstration	0%			To be part of Activity 4.1
Output 5 Capacity building of forest farm				
Activity 5.1 Construction of forest farm management information system				
Sub-Activity 5.1.1 Construction of forest farm GIS and forest management system	100%			
Sub-Activity 5.1.2 Construction of administrative management information system	100%			
Sub-Activity 5.1.3 Construction of financial management information system of forest	100%			
Activity 5.2 Set up web site for the project and the forest farm	100%			

Activity 5.4 Up-grade forestry equipment	100%			
Sub-activity 5.4.1 Office, archive and network equipment	100%			
Activity 5.5 Invite experts for training	50%	2013.07	2013.11	
Activity 5.6 Idea exchange and national study tour	70%	2013.07	2013.10	
Activity 5.7 Advanced study of technical staff	0	2013.07	2013.11	
Output 6 Monitoring and evaluation to the project results				
Activity 6.1 Monitoring of forest management	40%	2013.07	2014.06	Significant monitoring and reporting done, end-of-project M&E in 2nd quarter 2014.
Activity 6.2 Monitoring of motivating development of community	40%	2013.07	2014.06	
Activity 6.3 Monitoring for social benefits of forest tourism and education	40%	2013.07	2014.06	

Finances

The following table from the Medium Term Progress Report gives a summary of the expenditure to the end of year two of the project (in RMB) and the balance of funds from the allocations for those years.

Table 2 Expenditure and remaining funds (RMB) for Project Years 1 and 2 (07/2013)

Output/activity	Expenditure	Budget	Balance
Project initiation	**200,000**	**200,000**	0
Output 1: Design and planning of multifunctional forest management and establishment of demonstration forest	**1,882,000**	**2,592,000**	**710,000**
Activity 1.1 Survey on design and planning of multifunctional	252,000	252,000	0
Activity 1.2 Drawing up management plan of multifunctional forest	30,000	30,000	0
Activity 1.3 Establishment of demonstration forest of close-to-nature transformation of plantation and natural secondary forest	450,000	1,160,000	710,000
Activity 1.4 Variety high-quality breeds extension(orchard and nursery)	1,150,000	1,150,000	0
Output 2 Sustainable collection, development and utilization of non-wood product	**110,000**	**160,000**	**50,000**
Activity 2.1 Survey and publicity of non-wood products	50,000	50,000	0
Activity 2.2 Thematic training on sustainable collection and utilization of non-wood product	30,000	30,000	0
Activity 2.3 Trial and demonstration of sustainable development and utilization of non-wood product	20,000	20,000	0
Activity 2.4 Extension of edible fungal growing technology	10,000	60,000	50,000
Output 3 Co-construction and co-management of forest farm and community	**150,000**	**150,000**	**0**
Activity 3.1 Background survey for society, resources and economy of surrounding communities around forest farm	30,000	30,000	0
Activity 3.1 Trial and demonstration of forest resources co-management	60,000	60,000	0
Activity 3.2 Trial and demonstration of cooperation between forest farm and forestry professional households	20,000	20,000	0
Activity 3.3 Cooperative employment supporting between forest farm and community	20,000	20,000	0
Activity 3.4 Cooperating under-planting and forest grazing	20,000	20,000	0
Output 4 Transformation of houses for management and establishment of the experiencing center	**2,100,000**	**3,200,000**	**1,100,000**
Activity 4.1 Transformation of houses for management and establishment of the supporting facilities of the experiencing center	1,900,000	3,000,000	1,100,000
Activity 4.2 Construction of demonstration base for ecological culture education	200,000	200,000	0
Output 5 Capacity building of forest farm management	**1,038,000**	**1,095,000**	**57,000**
Activity 5.1 Construction of forest resource management information system for forest farm	100,000	100,000	0
Activity 5.2 Construction of administrative management information system for forest farm	30,000	30,000	0
Activity 5.3 Construction of financial management information system of forest farm	50,000	50,000	0
Activity 5.4 Make webpage and development	20,000	20,000	0
Activity 5.5 Up-grade forestry equipment	665,000	665,000	0
Activity 5.6 Inviting experts for training	20,000	30,000	10,000
Activity 5.7 Idea exchange and national study tour for administrators	143,000	180,000	37,000
Activity 5.8 Advanced study of technical staff	10,000	20,000	10,000
Output 6 Monitoring and evaluation to the project results	**50,000**	**135,000**	**85,000**
General reporting	50,000	100,000	50,000
The overall reports on monitoring, verification, and evaluation	0	35,000	35,000
Office cost	**48,000**	**48,000**	**0**
Project running and management	**200,000**	**200,000**	**0**
Contingency	**30,000**	**60,000**	**30,000**
			0
Total Costs of project implementation	**5,808,000**	**7,840,000**	**2,032,000**

*Balance: the APFNet grant which is not allocated yet

5 DISCUSSION

5.1 SUSTAINABLE FOREST MANAGEMENT

Background

Sustainable Forest Management is one of two major focuses of this project. The other focus being the involvement of the local community in forest management through co-management arrangements with the Forest Farm. The project designers have chosen to focus on the close-to-nature forest management concept. This is appropriate given the goals of the APFNet programme as discussed in Section 3.3.

Close-to-nature forest management aims to use various interventions to steer simple forests, mainly pure plantations, towards a natural forest state using the power of nature, whilst still achieving useful forest production. The main intervention appropriate in this project is selective harvesting. To a lesser extent biodiversity enrichment is appropriate through introduction of useful species which would not be expected to occur naturally and by creating gaps to facilitate improved establishment of natural regeneration.

This management approach is biologically sound to resist significant forest degradation through pest and diseases or climate change. It is also appropriate for multiple use management by catering to forest product production, soil stability and catchment protection, as well as providing an aesthetically attractive forest suited to recreation and tourist uses. Significant results can take considerable time to achieve and will occur well outside the project period. Although in the conditions of the Forest Farm, over a five to ten year period obvious gains will be made.

The Forest Farm has a considerable range of forest types based on planted forests of pine and larch which have been established over a considerable period and therefore are in various staged of development. Some are already close-to-nature through good establishment of natural regeneration, some still have a long way to go.

Every situation is different. There are sites with different species combinations, different site capacity, and different natural regeneration. This gives a problem in that one rule may not apply on every site. But the principles apply everywhere. So now that these are understood by farm managers specific plans can be made for each site. Given the long history of establishment and protection, the managers must keep tight control of the forests to avoid illegal cutting by farmers who may see harvesting activity as a sign that they can now also do some cutting.

Comments

The design of this component, led by Prof Lei Xiangdong, meets project requirement and the implementation to the present has been done well. The detailed site inventory, followed by technician training and tree selection has resulted in a harvesting operation which is presently underway. The tree selection on the sites visited mostly followed the requirements and the tree felling has been done with minimal damage to remaining stems and understory.

Site specific comments

1. Young larch plantation site 1.

On this site larch has been planted at the rather close spacing of *2m x 1m.* This is a nine year old stand, survival has been good and a dense stand of approximately 4,000 stems per hectare is the result. At present there is very little opportunity for natural regeneration to establish or for enrichment planting unless some of the young planted trees are cut to make sufficiently large gaps. This would more appropriately be done at the time of first thinning. (See Figure 2)

Figure 2 Young larch plantation – very little regeneration

Recommendation. As the survey showed that 8.4 percent of trees have double stems, singling or reducing multiple stems to one good stem is one operation which could be done now and the few gaps could be considered for enrichment planting.

2. Young larch plantation site 2.

The current state of forest development on this site is very different from the similar aged larch site previously discussed. This also is a nine year old plantation planted with larch on a site previously planted with Chinese pine which was clear felled. The site survey recorded and average of 4,627 trees per hectare with Chinese pine, larch and white birch in the ratio of 6:2:2. Also noted on the site were mountain poplar and hazel natural regeneration.

Already a close-to-nature forest is developing as the pine has grown from seed from the previous crop and the larch and pine are enriched with white birch, poplar, hazel and other natural regeneration of shrub species. This has resulted in a diverse but largely even aged stand.

Figure 3 Young larch plantation – very good regeneration

***Recommendation*. At the time of first thinning it is suggested that significant gaps be made to give new regeneration of of the mentioned species scope to become established to commence the development of a multi-aged stand and thus cater for stand stability as well as providing a more continuous availability of trees of harvestable size into the future. (See**

Figure 3)

3. Older larch plantations

Although 36 years old, the larch has largely dominated this site to the extent that there is very little natural regeneration. Although this may be to a minor extent influenced by grazing, a heavy layer of larch needles was noted and this would contribute to the difficulty of natural regeneration becoming established even though spacing of the trees was not dense. In this relatively low rainfall area of China, needle decomposition is slow on south facing sites.

Recommendation. Enlarged gaps and enrichment planting will be necessary to commence the close-to-nature process in this forest.

Harvesting
While not seen, apparently the intention is that complete removal of the above ground tree is intended. i.e. branches and bark will also be removed from the forest at harvest time.

Recommendation. In the interests of maintaining good forest nutrition in the long term, removal of bark and particularly branches with leaves should be reconsidered. Expecting bark removal in the forest may not be practical but branch and tree top removal mainly for fuelwood should not be done, at least not until leaves have dried and fallen from the branches to be removed.

Enrichment planting
After completion of this round of harvesting, the main activity remaining for project implementation is enrichment planting. Nursery stock sown at the commencement of the project is ready for planting out in the coming planting seasons.

-Background.
Why enrichment plant? This adds diversity and value to the forest. Whilst the idea and intent is good, in practice good success can be difficult to achieve. If the results are not good the cost of the operation is lost and no value is added to the forest.

-Gaps.
Success of enrichment planting depends very much on having an adequate gap size as well as choosing appropriate species and doing follow up weeding or liberation of the planted seedlings. Choosing between the use of shade tolerant and light demanding species is also important. From the forests visited during this evaluation, the current gaps appear minimal to small and may make successful establishment difficult. Remember that in younger and middle aged plantations, the trees surrounding the gaps continue to grow and will make the gaps smaller before the newly planted seedling have grown sufficiently to be able to compete effectively.

Recommendations. To maximise the chance of success in the long term:

- Keep data on gap sizes at the time of planting to allow follow-up evaluation and to learn what minimum size gap is needed for future success in different forest types and with different species. Photographs of gaps and seedling quality at the time of planting give a good record. Measure sample gaps in two directions at right-angles and record GPS coordinates on the photos for later gap identification.

- Ensure weeding or liberation of the planted seedlings is done regularly as the already established shrubs and grasses will give significant competition to the planted seedlings.

- In one mature pine forest, pine regeneration was growing very close together. As some of these would normally die, some value can be obtained from the forest by relocating some seedlings to gaps or by selling some to leave better spaced trees.

Pruning
Some pruning has been done in young larch plantations and more is intended. Pruning to improve final wood quality is only economic if a premium price for pruned stems can be

expected at the time of harvesting in twenty plus years time. Also the identity of the pruned stems must be retained to allow sale of the higher value trees.

If pruning for economic return is to be done, as well as meeting the mentioned conditions it must also be done:

- timely i.e. at small stem sizes.
- progressively to a suitable height as the tree grows without affecting the growth rate.
- only on straight stems.
- accurately i.e. close to the stem without causing stem damage which would allow insect and disease attack.

Recommendation. Unless the market offers a premium price for pruned stems, pruning should not be done except for access in very dense stands, fire protection or other reasons not connected with improved stem value. If farmers prune trees to collect fuel wood, they should be requested to do it well, close to the stem without causing stem damage.

Tree improvement

A programme of genetic improvement, other than introducing new species or better quality seed, is not part of this project. Some grafted Japanese larches were seen in the nursery with the Japanese larch grafted onto local Chinese larch root stock. The use of these was discussed and so the opportunity to comment on genetic improvement is taken here.

Genetic improvement or tree breeding is not only a relatively cheap way to greatly improve forest production and value but also gives a mechanism to allow positive adapting to changes in climate. Grafting, using cuttings and tissue culture are all vegetative reproduction techniques. They give an exact genetic copy of the source tree. The resulting new trees will never be any better than the trees reproduced i.e. vegetative reproduction will give a good leap forward in that all the trees reproduced have the potential to be as good as the source trees. But no further gains can be made.

To produce better trees, sexual reproduction is needed i.e. seed. Usually individual trees with the desired qualities are hybridised and the resulting seed planted out to allow selection of new superior individuals. These can then be reproduced vegetative to allow further gains in production while the genetic improvement programme continues to develop even better individuals.

If the best characters of the local larch and the Japanese larch are to be combined, cross breeding or hybridisation is needed to produce new seed for testing as each seed is genetically different. Whilst this process can take some time it is quite cheap and the gains can be considerable. Care must be taken to avoid inbreeding and narrow genetic bases. Planting the resulting seedlings on a range of sites will give an opportunity to identify individuals which not only give good growth but are better suited to drier sites and therefore have value in adapting to climate changes.

Some deaths of old larch trees were noticed in the larch seed production area. This site should be monitored closely as these may give a clue as to which individuals are more adapted to the conditions of the site and therefore should guide future seed collection.

Recommendation. A simple tree genetic improvement programme would be a good investment for the Forest Farm. Some guidance in developing a plan and some training in hybridising techniques for the important species may be needed but the Forest Farm technicians could implement the programme developed.

Climate change and nursery stock

Improved tree genetics has been suggested in this report as one aspect of addressing climate change. But unless the resulting seedlings are well produced in the nursery and planted well, the full potential will not be realised. The use of plastic bags as containers, while seemingly a minor matter, can have a significant impact on the success of the resulting plantings.

There are two main aspects to this. The first relates to the characteristics of the species being used. Generally in drier climates local species tend to initially develop a deep and strong root system before putting effort into shoot growth. A natural species could be expected to have a root system whose depth would be twice or more the height of the shoot. Seedlings raised in containers, particularly in plastic bags and in the nursery for two years or more, tend to have the opposite shoot root ratio i.e. a shoot which is much greater in height than the depth of the roots.

Secondly *plastic bags* do not allow a good fibrous root system to develop and over time at least some root coiling will develop as roots grow around the bag trying to fine an escape hole. When planted out this poorly distributed root system has difficulty growing to depth quickly in an attempt to avoid the top soil which dries out, particularly if several dry years are experienced. Those trees with poor and shallow root systems will die first as the soil dries to deeper depths. These deaths can occur several years after planting if or when dry conditions are experienced, particularly if successive years are drier than normal.

One other issue noted which is related to root development was that in at least one nursery most seedlings, when transferred to the plastic bag, were on the side rather than the centre of the bag. This further increases the possible development of deformed root systems.

Recommendation. In order to improve the quality of seedlings grown in the nursery and help with long term survival under drying conditions, the use of root trainer containers which promote good root distribution and air pruning of roots, should be considered. These types of containers combined with a shorter nursery period and therefore plants with smaller shoots, should result in plants with considerably better survival prospects, particularly in the longer term.

Sample plots
As well as the many plots established as part of the new Forest Farm inventory system, 27 plots have been established in the forest management demonstration areas.

Recommendation. For those characteristics not being regularly measured in the inventory plots, the plots in the forest management demonstration areas should be continued to be measured to record the longer term changes resulting from the close-to-nature management. Regeneration could be assessed every two years with growth measurements at a longer interval, say every five years.

Animal raising
As part of the involvement of the villagers in the use of the Forest Farm forests, two initiatives have been introduced and are proving somewhat successful and popular. These are chicken raising in fenced areas and Tibetan pig raising. Whilst these are good opportunities for interested farmers to develop income generating activities, some caution is needed concerning potential damage to forests, particularly to natural regeneration.

Recommendation. Any scaling up of such activities should be done only after careful observation to determine the impact on the forest health, particularly on establishment of natural regeneration. Some fenced exclusion plots established adjacent to the trial animal sites would serve to show the regeneration potential compared to the grazed sites.

5.2 CO-MANAGEMENT

As mentioned in Section 2, the approach to assessing the co-management aspects of the project is informed subjective rather than strictly objective.

The arrangement foreseen in the project design has, through project implementation, resulted in a good relationship between the Forest Farm and the local community. The village people interviewed, both leaders and villagers, all spoke of their appreciation of the value of the forest to their village and to individuals both for a good environment and as a source of income. Therefore the aim of having the villagers involved in protecting 'their' forests is achieved. This is particularly so in the Andangou Demonstration Village but also applies, as best could be determined, in the other Forest Farm neighbouring villages

Forest Working Team. Interviews revealed that this project initiative is working well. Up to 100 workers have been trained and are involved in working teams doing silvicultural work in the Forest Farm forests. The Forest Farm makes a contract for each activity and provides the major equipment and also worker insurance. The teams are able to use their experience to undertake work outside the Forest Farm areas. This provides a good opportunity for employment for workers who, for various reasons, are not able to migrate for work.

Non-Wood Forest Products
An important part of this project as it is related to the success of co-management is the identification and development of NWFP to have the farmers become involved in forest use and therefore increase their income whilst at the same time serving a protection role for the forests. As well as the chicken and pig initiatives mentioned, mushroom production, both wild collection and greenhouse raising are now important sources of alternative income for local farmers. Also medicinal plants have been identified and further work is planned on intensive mushroom growing under the forest canopy and therefore retaining the 'wild' price premium for such mushrooms.

Mushroom processing factory. The collection of mushrooms has advanced from wild forest mushroom collection to development of greenhouse growing techniques with considerable income generation for the involved farmers. The local factory is able to process and sell all the available mushrooms and still has capacity for expansion. The Forest Farm has helped with provision of wood for manufacture of the medium for mushroom growing.

As well as the greenhouse production of mushrooms by farmers, the factory also buys wild mushrooms collected by farmers. These wild mushrooms bring a premium price. From discussions with village leaders, farmers and those collectors encountered in the forest with baskets of mushrooms, it is apparent that mushroom growing and wild collection are significant sources of alternative income for supplementing income from other primary production. (See Annex 6 for further details).

Seedling company. With the suggestion and technical support from the Forest Farm, a local businessman has established a nursery for production of advanced plants, mainly for the ornamental market. The nursery is on an area of 10 hectares of contiguous land which is a collection of land allocated to 30 individual households. These same households provide labour for the nursery operation and also have a share in the operation. The company is keen to identify further joint parcels of land and expand their operations.

Hazel. Hazel is an early coloniser in gaps in the forests. This plant provides good ground cover and also produces an edible nut which can be collected and sold. The Forest Farm is introducing some improved varieties of hazel which were identified during a project national study tour.

5.3 CAPACITY BUILDING

Management systems
The three computer based management systems (forest, office and financial) developed by the Beijing Forestry University for the project have been introduced and seem to be being well used. The systems are based on new software suited to the Forest Farm situation rather than using proprietary software. The project managers and the university are to be commended on developing the systems, doing the training and having the systems running in a relatively short time.

Multi-forest management station
This is the only major project aspect which is behind schedule for implementation. The facilities for training, education and tourism outlined in Output 4 of the Project Design framework have mostly not been constructed. Whilst some of the facilities for environmental education are in place and have been improved, the major undertaking of establishing a training centre which caters for public education is yet to be constructed.

The Forest Farm has ambitious plans for this aspect and has been negotiating for a site close to the new major highway which now runs from Chifeng to Beijing. The Forest Farm is well placed to establish such a centre for the following reasons:

- The improved economic circumstances of many Chinese citizens mean they are now able to travel more to rural areas.
- People have a greater awareness of and desire to visit areas of high ecological value.
- The Forest Farm has forest of a standard which is suited to ecological tourism (e.g. Maojingba) and is located on a new highway within easy driving distance of the major centres of Tianjin and Beijing.

Thus the training centre, which would be of value to the Chifeng Forestry Bureau as a training centre, also has potential for national training and national tourism. The desire to include a hotel or some form of accommodation as a source of ongoing revenue for maintenance and running seem to be an important part of this programme.

While the plan is to use the current budget funds to start on the training centre in this phase of the project, the project managers are hopeful of a further project phase and funding to allow further development.

Training.
Training is a very important part of any project particularly with emphasis on capacity building. The project has used more than ten local and national specialists to lead and advise on various project aspects. These specialists have provided valuable training to local staff and farmers during their visits. In addition, the project staff have conducted training sessions for villagers and forest workers to introduce them to the new methods and techniques introduced through the project. See Annex 4 for a list of training events run by the project.

Other.
The equipment procurement programme, the development of a project website are in place with more training of staff yet to occur.

Recommendations. The Forest Farm managers need to continue development of an overall plan for new facilities including all elements mentioned in the project design as well as public accommodation and other appropriate aspects. A plan showing stages and costs needs to be available to allow funding to be obtained and to give a clear overview of potential sources of funding.

The Sino-German Afforestation Project in Tianshui, Gansu has recently developed a high quality training and public education facility to be opened in September 2013. (For information see www.tsfepc.com Tianshui Forest Experience Pedagogic Centre). The key managers involved in this initiative in Wangyedian should visit this new centre before finalising their plans.

5.4 PROJECT MANAGEMENT

Reporting and Documentation
See Annex 3 for a list of reports and documents produced to date in the project.

Whilst very little of this material has been translated into English, an examination of a selection of reports and document shows them to be comprehensive, of a high quality and stored well for easy access. (See Figure 4) The reporting is thorough and in line with the project design requirements.

Figure 4 Document storage

Figure 5 Publications

The technical publications prepared for the farmers are similarly of a high standard. (See Figure 5)

In the field, each demonstration site has a well constructed and informative sign giving details of the site. See Figures 6 and 7). In addition general project signs have been erected on roads and a large sign is in place beside the new highway.

Figure 6 Site signage

Figure 7 Site signage

Monitoring and Evaluation
Annual and other reports have been prepared and submitted to APFNet outlining the

progress of the project. Whilst these may not all contain critical evaluation, they do present details for scrutiny by APFNet and other officials.

This report forms part of the M&E process and detailed examination of the project is planned for 2014 before the project terminates.

Auditing
The Project Proposal in Section 6.3.3 proposes annual auditing of the project finances. No independent audit has been done to date.

Recommendations.
An evaluation of the socio-economic impact of the project by socio-economic specialists would be very informative and helpful in formulating further projects. A mid-term socio-economic evaluation would have been useful to guide and modify if necessary, implementation over the remaining project period. However as only one year of implementation now remains, this should be done as part of the final evaluation of the project.

An audit of the project finances by independent auditors should be done as soon as possible to ensure that the project's finances are in order. This will be of benefit and assurance for both the project managers and for APFNet.

6 EVALUATION

In summary:

Design – assessed as meeting APFNet requirements and is appropriate for the situation at Wangyedian Forest Farm. No major recommendations are made for design modification.

Implementation – To date, implementation is in line with the project design, on time and to a high standard. Only one major element, the training centre and associated facilities is causing concern, primarily through the Forest Farm managers having an expanded concept for this component. The project managers have made progress in securing a suitable site and are developing a staged approach in an overall plan to allow use of available and potential financing in order to meet the project time schedule.

6.1 LESSONS LEARNED

Those responsible for implementing the project are best placed to assess the lessons learned. To this end, a workshop including project managers and key villagers would be useful at the completion of the project to define the lessons learned and their potential for dissemination and introduction elsewhere.

Some general observations of lessons learned at this stage of the project follow:

Close-to-nature forest management.
This component has been accepted by Forest Farm staff and a competent start has been made to its implementation. The technical issues are to some extent site specific as regards species, timing of interventions etc. But the principles of close-to-nature forest management have been well demonstrated in this project and will serve to be a useful training demonstration for other forest management professionals.

The opportunity has been taken in Section 5.1 of this report to provide some background on this component and comment on the details of implementation.

Co-management.
The successful introduction of the initiatives and the satisfaction of the villagers and Forest Farm staff indicate success in this component. The joint management arrangements are resulting in better forest protection which is of great value to the Forest Farm staff and increased income through labour and NWFP collection is being obtained by the villagers.

Involvement of private enterprise for contracted forest labour, mushroom processing and nursery production has proved to be efficient and successful and is an approach to forest management which would be of interest nationally and internationally.

Non-Wood Forest Products.
The use of national specialists for the identification of potential products (fungi, medicinal plants) with subsequent promotion and development at local level has proved successful and of value to the villagers. The project funding and Forest Farm organisation are key to precipitating the successful development of new products.

6.2 KNOWLEDGE MANAGEMENT AND DISSEMINATION

Institutional memory
Detailed record keeping and reporting through the life of the project, has provided a very comprehensive record of project activities and results, both physical and financial. The computerised forest, office and financial management systems have allowed efficient access to most project data for management, analysis and reporting. These comprehensive records will allow the details of project activities to be accessed for further use and dissemination.

Staff development
An important element of the projects has been the emphasis placed on project staff training and development. Considerable resources, both in time and finances have been directed to training or knowledge and experience acquisition for project staff and beneficiaries from farmers through to senior management.

Study tours by project staff as well as the input of national and international project experts has introducing the staff to different techniques and approaches.

Dissemination
Forest Policy. Close-to-nature forest management necessitates departures from the standard forest policy and quotas systems. If the close-to-nature management method is to be expanded to other areas, some modification of current policy is necessary. With guidance from the Chifeng Forestry Bureau, the project managers should commence preparation of documentation for proposing such policy changes.

The aspects outlined in Section 6.1 are all worthy of dissemination at provincial, national and international level. i.e.

- Close-to-nature forest management
- Co-management
- Exploitation of NWFP.

While close-to-nature forest management is being practiced in various forms in China, the co-management lessons learned in this project are particularly useful for forest managers elsewhere. Forest protection, particularly fire protection is an increasingly worrying issue for forest managers. The process of involving local villagers in forest protection through co-management and NWFPs would be of interest to many forest managers.

Through their web site, journal articles, tours, visitors, the APFNet and their proposed training centre, the project has mechanisms for dissemination of the results of their project success.

6.3 REPLICABILITY

Close-to-nature forest management principles can be applied to any managed forest and have application wherever a forest is managed for multiple uses including wood production. Whilst the species combinations and procedures are specific to the conditions existing in the Wangyedian forests, the methodology can be applied in other projects.

Similarly the co-management approach is very useful for replication in other projects and areas but the local situation may dictate modified approaches to labour engagement and nursery management.

Particular non-wood- forest products are location specific. But the approach to their development and exploitation as implemented in this project can be replicated elsewhere.

6.4 RECOMMENDATIONS

Recommendations have been given in the various sections of this report along with the associated discussion. The recommendations are collectively listed here for convenience.

Forest Management

- Young larch plantation site 1. As the survey showed that 8.4 percent of trees have double stems, singling or reducing multiple stems to one good stem is one operation which could be done now and the few gaps could be considered for enrichment planting.

- Young larch plantation site 2. At the time of first thinning it is suggested that significant gaps be made to give new regeneration of the mentioned species scope to become established to commence the development of a multi-aged stand and thus cater for stand stability as well as providing a more continuous availability of trees of harvestable size into the future.

- Older larch forest. Enlarged gaps and enrichment planting will be necessary to commence the close-to-nature process in these forests.

- In the interests of maintaining good forest nutrition in the long term, removal of bark and particularly branches with leaves should be reconsidered. Expecting bark removal in the forest may not be practical but branch and tree top removal mainly for fuelwood should not be done, at least not until leaves have dried and fallen from the branches to be removed.

Enrichment planting. To maximise the chance of success in the long term:

- Keep data on gap sizes at the time of planting to allow follow-up evaluation and to learn what minimum size gap is needed for future success in different forest types and with different species. Photographs of gaps and seedling quality at the time of planting give a good record. Measure sample gaps in two directions at right-angles and record GPS coordinates on the photos for later gap identification.

- Ensure weeding or liberation of the planted seedlings is done regularly as the already established shrubs and grasses will give significant competition to the planted seedlings.

- In one mature pine forest, pine regeneration was growing very close together. As some of these would normally die, some value can be obtained from the forest by relocating some seedlings to gaps or by selling some to leave better spaced trees.

Animal production in the forest.

- Any scaling up of activities such as chicken or pig raising in the forest should be done only after careful observation to determine the impact on the forest health, particularly on establishment of natural regeneration. Some fenced exclusion plots established adjacent to the trial animal sites would serve to show the regeneration potential compared to the grazed sites.

Pruning

- Unless the market offers a premium price for pruned stems, pruning should not be done except for access in very dense stands, fire protection or other reasons not connected with improved stem value. If farmers prune trees to collect fuelwood, they should be requested to do well it well, close to the stem without causing stem damage.

Genetics

- A simple tree genetic improvement programme would be a good investment for the Forest Farm. Some guidance in developing a plan and some training in hybridising techniques for the important species may be needed but the Forest Farm technicians could implement the programme developed.

Nursery containers

- In order to improve the quality of seedlings grown in the nursery and help with long term survival under drying conditions, the use of root trainer containers which promote good root distribution and air pruning of roots, should be considered. These types of containers combined with a shorter nursery period and therefore plants with smaller shoots, should result in plants with considerably better survival prospects, particularly in the longer term.

Demonstration forest plots

- For those characteristics not being regularly measured in the inventory plots, the plots in the forest management demonstration areas should be continued to be measured to record the longer term changes resulting from the close-to-nature management. Regeneration could be assessed every two years with growth measurements at a longer interval, say every five years.

Project management

- Training centre. The Forest Farm managers need to continue development of an overall plan for new facilities including all elements mentioned in the project design as well as public accommodation and other appropriate aspects. A plan showing stages and costs needs to be available to facilitate funding schedules and to give a clear overview of potential sources of funding.

- The Sino-German Afforestation Project in Tianshui, Ganxu has recently developed a high quality training and public education facility to be opened in September 2013. (For information see www.tsfepc.com Tianshui Forest Experience Pedagogic Centre). The key managers involved in this initiative in Wangyedian should visit this new centre before finalising their plans.

- An evaluation of the socio-economic impact of the project by socio-economic specialists would be very informative and helpful in formulating further projects. A

mid-term socio-economic evaluation would have been useful to guide and modify, if necessary, implementation over the remaining project period. However as only one year of implementation now remains, this should be done as part of the final evaluation of the project.

- An audit of the project finances by independent auditors should be done as soon as possible to ensure that the project's finances are in order. This will be of benefit and assurance for both the project managers and for APFNet.

- Phase 2 project. As the project managers have demonstrated their capacity to implement the project to a high standard further support from APFNet seems appropriate. A second phase project could amongst other activities:
    - Contribute to further development of the training and education complex which would be of national significance for training of forestry technicians, students, particularly tertiary students and education for the general public.
    - Consolidate and further develop the close-to-nature forest management methods and co-management activities to serve as a training/demonstration base.

Annex 1 Mid-Term Evaluation Terms of Reference

Consultant for Mid-term Evaluation of the APFNet-funded

Pilot Project of Multifunctional Forests

1. Background

Promoting forest rehabilitation and sustainable forest management to meet multifunctional objectives is one of APFNet key thematic priorities 2011-2015. The APFNet funded *Pilot Project of Multifunctional Forests,* executed by Wangyedian Forest Farm, Chifeng, Inner Mongolia of China, initiated since August 2011 with a 3-year duration, aims to pilot multifunction forestry under close-natural management and to motivate the local community through community co-management and sustainable utilization & protection of non-timber forest products. The project is expected to provide exemplary experiences for other economies on sustainable forest management in the Asia-Pacific region and beyond.

The project implementation has passed half way and a mid-term evaluation (MTE) will be executed by an evaluation team composed of 2 independent consultants to assess project implementation and management and to provide recommendations to the second-phase work plan and concrete activities, to ensure the successful project completion and expected objectives achieved. To this end, the MTE will serve to:

- Strengthen the adaptive management and monitoring functions of the project;
- Enhance the likelihood of achievement of the project and objectives through analyzing project strengths and weaknesses and suggesting measures for improvement;
- Enhance organizational and development learning;
- Enable informed decision-making, and
- Create the basis of replication of successful project outcomes achieved so far.

2. Responsibilities and tasks

- Development of MTE Plan as the foundation for evaluation in team work and consulting with APFNet and Executing Agency (**before June 25, 2013**);
- Conduction of evaluation, including desk work, field visit to project site in Chifeng, China in **second half of July 2013**, interviews with project stakeholders and executing partners, to acquire information and data in terms of the progress, issues encountered and extra need for project intervention;
- Development and dissemination evaluation result by **August 10, 2013**.

3. Duration

The consultant will be engaged immediately upon the completion of the selection procedure, and expected to complete the mission in a maximum of 15 working days.

A field visit to project site in Chifeng, China need to be conducted in **second half of July 2013** to meet with project stakeholders to evaluate the real situation of the project**.**

4. The expected outputs

An evaluation plan with

- Role and responsibility of MTE team and specific tasks for each MTE team member
- Clear evaluation scope (what is to be assessed)
- Evaluation criteria indicators (according what to assess)
- Proper methods & approaches of collecting & analyzing data (based on what to and how to assess)
- Other supporting documents (such as questionnaire, scoring sheets, etc.)

Mid-term evaluation report with

- Findings;
- Lessons learned and recommendations for improvement, including recommendations for the revision of project strategy, approach, outputs and activities, if necessary;
  - Recommendations for a strategy for future replication of the project approach for other types of the multifunctional forests/forest community co-management projects, for other economies in the region;
- Description of best practices in a certain area of particular importance for the project;
- Supporting documents developed for the evaluation.

5. Evaluation cost

- APFNet will pay the consultant for the service with equivalent of US$400 (four hundred US dollars only) per day before tax. The fee will be paid, based on the actual working days, to the bank account provided by the Consultant. Tax will be deducted by APFNet from the Consultant's remuneration in accordance with Tax Regulation in China.

- Round trip airfare (economy class seat) from consultant's residence to Beijing/Chifeng, China and accommodation will be coved by APFNet.

- Consultant will responsible for his/her insurance and other expense.

Annex 2 Project Logical Framework

(As presented in the Project Proposal)

	Measures	Objective assessment index for achieved results	Sources and methods of Assessment	Assumed condition
Overall objectives	Build a pilot and demonstration of sustainable forest management for China and Asian-Pacific Region with orientation of multi-function forest combing economic, ecological and social benefits together, and make contribution to the sustainable forest management in Asia Pacific Region.	Build demonstration forest of different types of multi-function management; Build forest co-management mechanism with communities and pilots;	Project proposal; Master plan; Annual plan; Project seasonal and annual progress report.	Project funds and supporting measures put in place, supporting and cooperation with local government.
Specific objectives	1. compile forest management plan; 2. establish demonstration forests of multi-functional forest management; 3. compile protection and development plan of non-wood forest products, fulfill the sustainable utilization of non-wood forest products; 4. establish forest co-management mechanism between the forest farm and the community and pilot; 5. sustainable management of the forest farm and capacity building; 6. transform the multi-function forestry management houses and forestry experiencing centre.	1.submit multi-function forest management planning; 2.demonstration forest 6000 mu; nursery transformation; 3.non-wood forest products protection and development plan 4.set up a demonstration village and 20 demonstration households; 5. upgrade office equipment, build forest resources MIS, forest farm affairs management system and financial management system; purchase protection equipment; transformation of fire break path 30 km; run web-sites of the project and the forest farm; conduct trainings. 6. Complete investment and engineering construction.	Master plan; Annual plan; Project seasonal and annual progress report; design report of forest management technology; Training materials of multi-function forest management; Equipment purchase contract; Community co-management agreement; Forest farm employment contract; Operation and relevant design documents.	Project funds and supporting measures put in place, supporting and cooperation with local government.

Expected results	1.Taking close-to-nature forest management technology, to set up demonstration forest of multi-function forest management, improve forest functions of timber production, water sources conservation, recreation and carbon sinks, and finally increase the level of sustainable forest management; 2. Set up cooperative co-management mechanism of forest farm and community, and pilot of cooperative co-construction of forest farm and professional households, to facilitate the economic development of the communities and lead the occurrence of forest fire in a dropping tendency, and finally lead the economic development of the community; 3. develop non-wood forest products such as mushrooms with high added value to promote multi-business in forested area; 4. upgrade forestry equipment and take use of forest resources IMS for management of forest resources and making decisions, take use of forest farm affairs management system and financial management system to increase the whole management level and the capability of sustainable management; 5. transform the forest training centre to increase the training capability.	1. build 6000 mu demonstration forest of multi-function forest management; 2. build on demonstration village and 20demonstration households; 3. increase the value of non-wood forest products; 4. put on operation of office equipment, forest resources MIS, forest farm affairs management system and financial management system; put in use of the patrol vehicle; transform 30 km fire break path; make access of the project and forest farm websites; 5. put into use of the training centre with the training capacity of 200 technicians and 400 local people per year.	Project master plan; Project annual plan; Project seasonal and annual progress report; Forest management technology design report; Relevant training materials; Equipment purchasing contract; Community co-management agreement; Forest employment contract; Operation and design documents and acceptance documents.	Project funds and supporting measures put in place, supporting and cooperation with local government.

Project activities	**Output 1. Design of multi-function forest management planning and establishment of the demonstration forest** 1.1 Survey for forest planning design of the forest farm(Class 2 survey) 1.2 Compile multi-functional forest management planning 1.3 Establishment of demonstration forest: Transformation of Chinese pine plantation close-to-nature 1.4 Establishment of demonstration forest: Transformation of Larch plantation close-to-nature 1.5 Establishment of demonstration forest: Transformation of natural secondary forest for close-to-nature harvesting and tending for regeneration	1.1detailed regulations of class 2 survey; Survey report. 1.2report of multi-function forest management planning. 1.3 field survey details of Chinese pine close-to-nature transformation; the transformation technology design plan; training manual; establish demonstration forest 2000 mu; set up 27 permanent sample plots. 1.4 field survey details of larch close-to-nature transformation; the transformation technology design plan; training manual; establish demonstration forest 2500 mu; set up 27 permanent sample plots. 1.5 field survey details of Chinese pineclose0to-nature transformation; the transformation technology design plan; training manual; establish demonstration forest 1000 mu; set up 18 permanent sample plots.	1.1check up detailed regulations of class 2 survey; survey report. 1.2 documentation and maps 1.3 check up related reports and on-the-spot review 1.4 check up related reports and on-the-spot review 1.5 check up related reports and on-the-spot review	1.1 support from experts of forest resources survey. 1.2 support from experts of forest planning. 1.3 support from experts of forest management 1.4 support from experts of forest management 1.5 support from experts of forest management

	1.6 Extension of fine tree varieties	1.6 complete nursery houses transformation and supporting facility construction; breed seedlings of birch, maple, larch, Korean pine, Chinese pine and spruce; go out for training for 2-3 persons.	1.6 nursery transformation design documents and acceptance report; training report.	1.6 support from experts of forest cultivation, and from operation unit
	Output 2. Sustainable development and utilization of non-wood forest products			
	2.1 Survey and publicity of non-wood forest products	2.1 background survey report of non-wood forest products, resources utilization planning, publicity manual and films	2.1 check up relevant report and audio/video materials	2.1experts of plant classification and fungus
	2.2 Thematic training of non-wood forest products	2.2 training manual of non-wood forest products development and utilization, training summery report	2.2 training manual and trainees	2.2 experts of non-wood forest products(fungus, wild vegetable, nut)）
	2.3 Pilot demonstrations of the sustainable development and utilization of non-wood forest products	2.3 summery sheet of non-wood forest products purchase, enterprise production benefits report	2.3 check relevant report and review	2.3 experts of non-wood forest products(fungus, wild vegetable, nut)）
	2.4 Pilot demonstration of fungus breeding	2.4 technology of wild fungus breeding, trial report	2.4 check relevant report and review	2.4 experts of edible fungus and patent

	Output 3 Co-construction and co-management between the forest farm and the local community 3.1 Background survey on social, resources and economic situation to the communities surrounding the forest farm 3.2 Comprehensive pilot demonstration of the co-management mechanism for forest resources between the forest farm and the communities 3.3 Pilot demonstration of cooperation between the forest farm and the forestry households 3.4 Labour employment support between the forest farm and the communities 3.5 Growing and raising underneath forest trees between the forest farm and the communities	3.1 background survey report of the surrounding communities 3.2 name list of members of co-management organization, co-management mechanism summery report, forest resources management plan of demonstration village, activities and benefits summery report, exchange and study tour plan of communities 3.3 cooperation agreement, management performance report of forestry professional household 3.4 employment agreement, training record, income record of the operation team 3.5 cooperation agreement, income record of farmers' household	3.1 check relevant report 3.2 check report and on-the-spot review 3.3 check agreements, reports and on-the-spot review 3.4 check agreements, reports and on-the-spot review 3.5 check agreements, reports and on-the-spot review	3.1 Support from township and neighbouring communities 3.2 experts of community co-management, related units 3.3 technical guidance and funds support 3.4 technical training and funds support 3.5 support of growing and raising technology

	Output 4 Improvement of the houses of multi-functional forestry managing station and establishment of the experiencing centre 4.1 Improvement of the houses of multi-function forestry managing station and establishment of the supporting facility 4.2 Training and study tour for staff in multi-functional forestry education and publicity experiencing centre 4.3 Establishment of ecological culture demonstration base **Output 5 Capacity building for the forest farm** 5.1 Set up forest resources management information system, forest farm affairs management system and financial management system for the forest farm 5.2 Set up website for the project and the forest farm 5.3 Upgrade forestry equipment 5.4 Invite experts for technical training	4.1 transform area of 200m^2, related facilities, equipment, signboards 4.2 training record, study tour summery 4.3 ecological culture information signboards; publicity films 5.1 system demand analysis report, system software, software instructions, staff training 5.2 set up website, training and appoint person for webpage update 5.3 complete upgrade of office, archive and network equipment; purchase protection equipment (1 field patrol vehicle, 6 GPSs, 2 height finders, 2 PDAs, patrol equipment for forest guard (transporting tools, clothes, equipment); 30km fire break path. 5.4 a set of training material of multi-function forestry, close-to-nature forest management, community co-management, provide training for 400 persons; submit national and international study tour report; submit advanced study certificate and report	4.1 operation design documents, acceptance report and on-the-spot review 4.2 check training record and study tour summery 4.3 on-the-spot review 5.1 check report, system display and application 5.2 browse webpage, check training summary 5.3 check equipment purchase contracts, check operation of equipment 5.4 check training material, training report and other certificate	4.1 experts of publicity and education, expert of architecture 4.2 training experts 4.3 facility of ecological culture education 5.1 capable software developing company or institute 5.2 capable software developing company or institute 5.3 authorize qualified government procurement company 5.4 experts of forest management and social forestry

	Output 6. monitoring and evaluation for the project implementation 6.1 Monitoring and evaluation of forest management result 6.2 Monitoring of facilitating community development 6.3 Monitoring and evaluation of social benefits by the project to forest tourism and forest education	6.1 submit investigation report on timber production, carbon storage, soil nutrient, bio-diversity, water source conservation, climate adjustment after cutting and 1-2 years after cutting. 6.2 submit investigation report of the project leading the social and economic development 6.3 submit investigation report on the contribution made by the project to forest tourism and education	6.1 check report and demonstration site 6.2 check report and site of community co-management 6.3 check report and the site	6.1 experts of forest management and forest ecology 6.2 experts of social forestry 6.3 experts of social forestry

Annex 3 List of Documents of Pilot Project of Multifunctional Forests

Name	Author (s)	Date	Category
Project proposal	Lei Xiangdong (Chinesee Academy of Forestry); Ke Shuifa (Renmin University of China)	May 2011	Technology
Overall plan (August 2011-July 2014)	Lei Xiangdong (Chinesee Academy of Forestry); Ke Shuifa (Renmin University of China)	June 2011	Technology
First annual plan (August 2011-July 2012)	Lei Xiangdong (Chinese Academy of Forestry); Ke Shuifa (Renmin University of China)	June 2011	Technology
Second annual plan (August 2012-July 2013)	Lei Xiangdong (Chinese Academy of Forestry); Ke Shuifa (Renmin University of China)	June 2012	Output
Annual progress Report (August 2011-July 2012)	Ma Chenggong (Wangyedian Forest Form)	July 2012	Output
Annual progress Report (August 2012-July 2013)	Ma Chenggong (Wangyedian Forest Form)	July 2013	Output
Medium Term progress Report (August 2011-July 2013)	Ma Chenggong (Wangyedian Forest Form)	July 2013	Output
Atlas 1 of the "APFNet" project	Ma Chenggong (Wangyedian Forest Form)	July 2012	Output
Investigation Report on Forest Resources of Wangyedian Forest Farm	Feng Zhongke (Beijing Forestry University)	April 2013	Technology
Multifunctional Forest Management Plan	Feng Zhongke (Beijing Forestry University)	May 2013	Output

Name	Author (s)	Date	Category
Guidelines for sample plots inventory for close-to-nature forest management	Lei Xiangdong (Chinese Academy of Forestry)	April 2013	Technology
Concise measures of close-to-nature forest management	Lei Xiangdong (Chinese Academy of Forestry)	May 2013	Output
Construction scheme of close-to-nature demonstration forests	Lei Xiangdong (Chinese Academy of Forestry)	June 2013	Output
Promotion plan of forest high-quality seeds	Ma Chenggong (Wangyedian Forest Form)	September 2011	Technology
Seedling selling record of nursery	Ma Mao (Wangyedian Forest Form)	October 2012	Output
Investigating and training summary of nursery technical staff	Ma Mao (Wangyedian Forest Form)	October 2011	Technology
Investigation Report on non-wood forest products	Zhao Guozhu (Beijing Forestry University)	October 2012	Output
Brochure of non wood forest products	Zhao Guozhu (Beijing Forestry University);Ma Chenggong (Wangyedian Forest Form)	October 2012	Output
Brochure 1 of non wood forest products	Ma Chenggong (Wangyedian Forest Form)	December 2012	Output
Brochure 2 of non wood forest products	Ma Chenggong (Wangyedian Forest Form)	December 2012	Output

Name	Author (s)	Date	Category
Planning of using non-wood forest products of Wangyedian Forest Farm	Li Xiaoyu (Chifeng Academy of Forestry)	October 2012	Technology
Agreement on development and utilization of non-wood resources	Ma Chenggong (Wangyedian Forest Form); Fang Lixing (Fiangxiang Edible Fungal Cooperative)	September 2011	Report
Records of Fiangxiang Edible Fungal Cooperative	Ma Chenggong (Wangyedian Forest Form)	September 2011	Report
Training summary of sustainable collecting and utilization of Non wood forest products	Ma Chenggong (Wangyedian Forest Form)	January 2013	Output
Promotion design on Wild edible (/medicine) fungal artificial cultivation Technology	Zhao Guozhu (Beijing Forestry University)	June 2013	Output
Background investigation Report of the social and economic condition of the communities around Wanyedian Forest Farm	Harqin Banner Bureau of Statistics	December 2011	Technology
Archives of Dahesen Nursery	Ma Chenggong (Wangyedian Forest Form)	September 2011	Report
Archives of labor cooperation project	Ma Chenggong (Wangyedian Forest Form)	September 2011	Output
Archives of the demonstration village, Dan village	Ma Chenggong (Wangyedian Forest Form)	September 2011	Output
Forest grazing archives	Ma Chenggong (Wangyedian Forest Form)	September 2011	Output

Name	Author (s)	Date	Category
Co-construction agreement of Forest Farm and specialized forestry households	Ma Chenggong (Wangyedian Forest Form); Zhan Yun (Daheshen Nursary)	September 2011	Technology
Andangou Village forest management plan	Xu Guoli, Wu Liangjun (Wangyedian Forest Form)	December 2012	Technology
Production and trade situation and development potential of non-wood forest products	Ma Chenggong (Wangyedian Forest Form)	November 2012	Output
Techniques of training and pruning fruit trees	Ma Chenggong (Wangyedian Forest Form)	January 2013	Output
Technological training on raising forest chickens (PPT)	Ma Chenggong (Wangyedian Forest Form)	January 2013	Output
Forest pest control (PPT).	Ma Chenggong (Wangyedian Forest Form)	January 2013	Output
Training documents on forest fire prevention	Ma Chenggong (Wangyedian Forest Form)	January 2013	Output
Safety operation procedures (training the labour team)	Ma Chenggong (Wangyedian Forest Form)	January 2013	Output
Soil preparation, afforestation, tending, and logging Technology	Ma Chenggong (Wangyedian Forest Form)	January 2013	Technology
Summary of training community employees	Ma Chenggong (Wangyedian Forest Form)	January 2013	Technology

Name	Author (s)	Date	Category
Training summary of community residents of the demonstration village	Ma Chenggong (Wangyedian Forest Form)	January 2013	Technology
Co-management system of Wangyedian Forest Farm and Andangou Village (community)	Ma Chenggong (Wangyedian Forest Form); Wang Yadong (Andangong Village)	May 2013	Output
Interview with Zhang Yun, the secretary of Xindian Village Branch of the Communist Party of China	Ke Shuifa (Renmin University of China); Ma Chenggong (Wangyedian Forest Form)	May 2013	Output
Notes of Fiangxiang Edible Fungal Cooperative of Meilin Town at Kharachin Banner in Inner Mongolia	Ke Shuifa (Renmin University of China); Ma Chenggong (Wangyedian Forest Form)	May 2013	Output
Practice and Exploration on the Benefits and Co-administration between Forest Farms and Neighboring Communities	Ke Shuifa (Renmin University of China); Ma Chenggong (Wangyedian Forest Form)	May 2013	Output
Forest carbon footprint and Carbon storage estimation	Ke Shuifa (Renmin University of China); Ma Chenggong (Wangyedian Forest Form)	May 2013	Output
Analysis on the Requirements, Obstacles, and Strategies of Co-administration between Forest Farms and Neighboring Communities	Ke Shuifa (Renmin University of China); Ma Chenggong (Wangyedian Forest Form)	May 2013	Output
Investigation and analysis of cognition and attitude of Wangyedian Forest Farm workers at Kharachin Banner in Inner Mongolia	Ke Shuifa (Renmin University of China); Ma Chenggong (Wangyedian Forest Form)	May 2013	Output

Name	Author (s)	Date	Category
Training summary of APFNet project	Ke Shuifa (Renmin University of China); Ma Chenggong (Wangyedian Forest Form)	January 2012	Technology
Investigation Report on Forestry in Canada	Wang Ruifa (Wangyedian Forest Form)	January 2013	Technology
Forest Health Management Monitoring Report of Wangyedian Experimental Forest Farm	Ding Guodong (Beijing Forestry University)	July 2013	Output
Monitoring and evaluation Report of Project-driven community development and forest tourism	Cheng Lihong (Beijing Forestry University)	July 2013	Output

Annex 4 Training activity list

Date	Place	Content	Training target	Number	Teachers' Names
September 2011	Yanji, Jilin Province	Larch population genetic improvement; collection and preservation of Forest tree germplasm resources; Larch genetic improvement and recent main research; Progress of elite breeding techniques on *Larix principis-rupprechtii*; Current situation and Development Countermeasures of Larch elite breeding in Liaoning; Discussion on several problems of larch promotion; Establishment and management of larch seed orchard	Nursery technicians	4	Yang Chuanping, Zheng Yongqi, Sun Xiaomei, Yang Zunmin, Dong Jian, Zhou Xianchang, Zhang Hanguo
January 2012	Wangyedian Forest Farm	Survey of Forest Resources	Forest Farm staff	120	Bai Yuru, Cheng Ruichun
April 2012	Meeting room; larch forest at Dishuihu; natural secondary forest at Dadian, Toudaogou; Chinese pine forest at Wangyudian, Xinkaiba	Technical regulations for forest resources planning and design investigation; Polygon sample setting methods; No cutting angle measuring principle and application; Tree measurement practice.	Forest Farm staff	24	Feng Zhongke, Wang Jia
April 2012	Meeting room; Dajuzi Aobaogou; Gushan Aobaoliang	Close-to-nature management technique of Pinus tabulaeformis Plantation	Forest Farm staff	14	Lei Xiangdong
November 2012	Wangyediang, Meilin, and Wujia forest ranges	Definition and classification of non wood forest products; Non-wood forest products in Wangyedian Area; Analysis and Countermeasures of production and trade of non-wood forest products of China; Development potential of non-wood forest products	Community residents	108	Li Xiaoyu, Li Kai

November 2012	Jixiangzhuang Village Primary School	Methods and effects of soil preparations before afforestation; Afforestation technology; Forest tending and management after young plantation; Timber production technology	Labour team	100	Ma Chenggong
December 2012	Andangou Village	Forest fire prevention and suppression; Forest pest control; Production and trade situation and development potential of non wood forest products; chronological training on raising forest chickens; Techniques of training and pruning fruit trees	Andangou Villager	600	Bai Yuru, Cheng Ruichun

Annex 5 Remaining Project Activities as at August 2013

SECOND ANNUAL WORK PLAN

These are the remaining activities from the second work plan planned which will be completed before October 2013. They are not listed in the Third Annual Work Plan.

Demonstration Forests

- Round off all demonstration forests with logging, slash disposal, reinforcement planting, and enrichment planting.
- Set up a mechanical fence for each permanent simple plot with the specification of each of the 72 fences is 40m*40m.

Non-Wood Forest Products

- In October, began an experiment on artificial cultivation of Zhuling (*Polyporus umbellatus*) in 0.33 ha (5 mu) of larch mixed forest.

Multi-functional Forest Management Station

- From August to October, complete the capital construction of the transformation houses of management station and the supporting facilities of the experiencing center.

Training

- From August to October, invite experts twice to train our technicians and village leaders. One training course for our technicians includes two subjects, *Close-to-Nature Forest Management* and *the Use of Management Information System*; the other for village leaders and our staff is *Co-construction and Co-management of Forest Farm and Community*.
- From August to October, organize our administrators to investigate and study three times (combined with the third annual activity): one is to a foreign country; the other two is to other provinces.
- From August to October, the main technician(s) will complete the registration and examination for advanced study.
- Modify, supplement, improve, and proofread *Report on Monitoring and Evaluating Close-to-Nature Forest Management* after obtaining results of soil sample tests.

THIRD ANNUAL WORK PLAN

Extension of high-quality tree varieties

- Spend 70,000 yuan RMB in cultivating 50,000 seedlings including larch, spruce, fir (*Abies holophylla*), Korean pine, Mongolian oak, etc at Wujia Nursery.

Sustainable Development of Non-Wood Forest Products

- Supporting edible fungal artificial cultivation by offering 10,000 yuan RMB to Fangxiang Edible Fungal Cooperative to help cooperators cultivate 200,000 mushroom-bags of *Pholiota namekio* and oyster mushroom（*Pleurotus ostreatus*）.
- Artificial cultivation experiment on wild medicine fungus. Spend 20,000 yuan RMB on planting Zhuling in another 0.33ha (5 mu) of larch mixed forests in the spring of 2014.

Co-construction and co-management between the Forest F arm and the local community

- Continue to organize the activities of co-construction and co-management and spend 20,000 yuan RMB on managing forest resources.
- Help specialized forestry households, Dahesen Seedling Co. Ltd with 10,000 yuan RMB to improve irrigation infrastructure.
- Labour Employment Support. Spend 10,000 yuan RMB on training and investment insurance fee.
- Support 10,000 yuan RMB to forest farmers to explore the forest breeding techniques suitable for local conditions.

Improvement of management stations and establish forestry experience center

- Spend 80,000 yuan RMB on training and inspection of the staff of management stations and forestry experience center.

Capacity building for the forest farm:

- Equipment. Spend 30,000 yuan RMB for purchase of equipment.

- Training. Spend 120,000 yuan RMB on domestic and overseas study (combined with the second year), 10,000 yuan RMB on advanced study (combined with the second year).

Monitoring and Evaluation

- Implementation effect evaluation: Spend 40,000 yuan RMB for the effect evaluation of forest management
- Spend 10,000 yuan RMB for community development, and 10,000 yuan for forest tourism.
- Spend 50,000 yuan RMB on project evaluation, report, and promotion (including the funds of the first and second project year).

Project management

- Spend 100,000 yuan RMB on project management.
- Spend 400,000 yuan RMB on international expert fees.

Contingency

- Allocate 40,000 yuan RMB for contingency.

Summary

The total cost of project running and management is 1,040,000 yuan RMB (including international experts' fees of 400,000 yuan RMB and carryover allowance of 35,000 yuan RMB).

Annex 6 Results of Villager Interviews

Note that these notes are not intended to be verbatim records of interviews and discussions but they do reflect the general questions asked and the responses given.

08/08/2013

Meilin Township, Jixiangzhuang Village

Zheng Xiaoming – a village leader.

Subject	Response
Village relationship with Forest farm?	Very good. The villagers realise the importance of the forests to their environment and also for forest products and so they are keen to protect the forests.
Forest Working Team. Is it important for your villagers.	Very important, particularly as a source of employment for villagers who are not able to migrate seasonally for employment. Provides up to 40% of income. Details of the working mechanisms were explained.

Qi Fujun, Team Leader of Forest Working Team.

(Interviewed at Forest Farm headquarters).

Many details of the working method provided. Points of importance are:

- Approximately 60% male, 40% female.
- Up to 40 workers per job.
- Forest Farm provides guideline, training, transport, insurance as necessary, major equipment.
- Separate contract for each activity.
- Team also does work outside the Forest Farm.
- Important regular income for those who cannot migrate for employment
- Important source of regular trained labour for the Forest Farm.

Andangou Village

Wang Yadong – village leader.

Zhang Xiuyun – a Women's Federation representative.

Subject	Response
Village relationship with Forest farm?	Two years of good cooperation. The project has been very useful for the villager and on-going cooperation with the Forest Farm is expected.

Han Wang – leader of Team 11.

Subject	Response
What cooperation/activities has your team had with the Forest Farm?	33 households. Free for all to collect in Forest Farm forest. • Management plan for village forest – tree planting, roading, fire protection. • Forest chicken raising • Mushroom collection (¥70 – 80 / day in the rainy season). Brochures provided, training, new varieties introduced. • Collection of medicinal plants.

	• Firewood collection. • Economic trees - training in pruning and shaping. • Some fuel efficient stoves provided by the project. • Forest Farm and villagers depend on each other.

Liu Fenghui – Women's Federation lady from Team 5.

Subject	Response
Involvement with the project?	• 56 households in Team 5. • Responsible for family planning propaganda and also provided project information to village women. • Collect fuelwood for Forest Farm forests

09/08/2013

Jinjiadian Vilalge

Ren Weihua

Han Guohua

Subject	Response
Number of households?	• 830 households • 7 sub-villages • 13 village groups • 6,000 mu arable land. • 80% of forest is Forest Farm forest.
Is collecting in the forest important for your villagers?	• Have a contract with the Forest Farm for regulated collecting. • At least 80% of households collect. • Important income activity for older people. • If household works hard – approximately ¥5,000/annum for collecting.
What do they collect?	• Mushrooms in pine forest. • Seeds in pine and larch forest. • Hazel, cut every 3 – 5 years to get better seed production. Branches used for baskets. • Medicinal plants – approximately 20.
Do the villagers protect the forest?	• Definitely. Forest is very important for them. • Have a village team for fire control. • Grazing ban in spring. • Village has a forest guard paid by Forest Farm.

Dahesen Seedling Company

Li – Deputy Manager

Subject	Response
What is your relationship with farmers?	With advice from the Forest Farm, the company went into a cooperative agreement with 30 households to use their contiguous land for nursery production. The company provides the inputs and the farmers work in the nursery.
What do you produce?	The most profitable market is to supply advanced plants to the major centres in Liaoning, Tianjin and Beijing. Demand is high.

Non-Wood forest products – photos

Mushroom collector – one third of his income is from mushrooms collected on the Forest farm

Women with Tilia leaves used in cooking. (Collected from the Forest Farm)

Summer and winter fuel collected from the Forest Farm

Cattle grazing on the Forest Farm.