Final Report

2BA12945
23 April 2010
Rev. 03

Sino-Forest Corporation

Valuation of China Forest Crop Assets
As at 31 December 2009

The cover photo shows a stand of Eucalyptus grandis x urophylla in Guangdong province being measured in March 2010. This stand was planted in 2005 and at time of measurement was 5 years old.

DISCLAIMER

This report has been prepared by Pöyry (Beijing) Consulting Company Limited ("Pöyry") solely for use by Sino-Forest Corporation (the "Recipient"). All other use is strictly prohibited and no other person or entity is permitted to use this report, unless otherwise agreed in writing by Pöyry.

NOTHING IN THIS REPORT IS OR SHALL BE RELIED UPON AS A PROMISE OR REPRESENTATION OF FUTURE EVENTS OR RESULTS. PÖYRY HAS PREPARED THIS REPORT BASED ON INFORMATION AVAILABLE TO IT AT THE TIME OF ITS PREPARATION AND HAS NO DUTY TO UPDATE THIS REPORT.

Pöyry makes no representation or warranty, expressed or implied, as to the accuracy or completeness of the information provided in this report or any other representation or warranty whatsoever concerning this report. This report is partly based on information that is not within Pöyry's control. Statements in this report involving estimates are subject to change and actual amounts may differ materially from those described in this report depending on a variety of factors. Pöyry hereby expressly disclaims any and all liability based, in whole or in part, on any inaccurate or incomplete information given to Pöyry or arising out of the negligence, errors or omissions of Pöyry or any of its officers, directors, employees or agents. Recipients' use of this report and any of the estimates contained herein shall be at Recipients' sole risk.

Pöyry expressly disclaims any and all liability arising out of or relating to the use of this report except to the extent that a court of competent jurisdiction shall have determined by final judgment (not subject to further appeal) that any such liability is the result of the willful misconduct or gross negligence of Pöyry. Pöyry also hereby disclaims any and all liability for special, economic, incidental, punitive, indirect, or consequential damages. **Under no circumstances shall Pöyry have any liability relating to the use of this report in excess of the fees actually received by Pöyry for the preparation of this report.**

Doug Parsonson
PRESIDENT

Steve Croskery
SENIOR CONSULTANT

Contact details:

2208-2210, Cloud None Plaza,
No. 1118 West Yan'an Road,
Shanghai 200052, PRC
Tel. +86 6115 9660 Ext 209
Fax +65 6734 6198
E-mail: steve.croskery@poyry.com

Pöyry (Beijing) Consulting Company Limited

CERTIFICATION

Pöyry certifies to the following statements to the best of our knowledge and belief:

- The statements of fact contained in this report are true and correct.
- The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are our personal, impartial, and unbiased professional analyses, opinions, and conclusions.
- Pöyry has no present or prospective interest in the subject property, and no personal interest or bias with respect to the parties involved.
- Pöyry's engagement in this assignment was not contingent upon developing or reporting predetermined results.
- Pöyry's compensation for completing this assignment is not contingent upon:
    1. The development or reporting of a predetermined value or direction in value that favours the cause of the client
    2. The amount of the value opinion
    3. The attainment of a stipulated result, or
    4. The occurrence of a subsequent event directly related to the intended use of this appraisal.
- The report has been prepared by staff consultants, retained consultants and office support personnel of Pöyry.

Doug Parsonson
PRESIDENT
ASIA-PACIFIC MANAGEMENT CONSULTING

ASSUMPTIONS AND LIMITING CONDITIONS

This report was prepared at the request of and for the exclusive use of the client, Sino-Forest Corporation. This report may not be used for any purpose other than the purpose for which it was prepared. Its use is restricted to consideration of its entire contents. This valuation represents an update of Pöyry's 31 December 2008 forest valuation that was presented in Report 54A11173: *Valuation of China Forest Assets as at 31 December 2008*.

Data describing the area of forest owned, by species, age and location were provided by Sino-Forest.

Pöyry has not viewed any of the contracts relating to forest land use rights or cutting rights or forest asset purchases. Legal matters are beyond the scope of this report and the valuation is prepared on the assumption that titles to the forest assets are according to the data provided by Sino-Forest. Maps, diagrams and pictures presented in this report are intended merely to assist the reader.

Inspections of Sino-Forest areas were made as part of this valuation. These were at specific locations selected by Pöyry and in the main species or species groups comprising the Sino-Forest estate, i.e. Chinese fir, 'other species' which are mixtures of planted hardwoods, (mainly oak) and pines, natural broadleaf, and eucalypts. The inspections were carried out in Guangdong, Guangxi, Hunan and Yunnan provinces during the period 13 to 18 December 2009 and 9 to 11 March 2010. In addition, during late December 2009 and early January 2010, 20 person-days were spent visiting log processors, markets and Forestry Bureaus in Guangdong, Guangxi, Hunan and Yunnan provinces gathering basic data and information on log prices.

This appraisal assumes that the forests visited by Pöyry in the field inspection represent the full range of conditions that exist for the species seen. Very limited yield information for Sino-Forest's estate was made available to Pöyry for the purpose of this appraisal.

Any existing liens and encumbrances have been disregarded, and the forest resource has been appraised as though free and clear under responsible ownership and competent management.

Unless otherwise stated in this report, the existence of hazardous materials or other adverse environmental conditions, which may or may not be present on the property, were neither called to the attention of Pöyry, nor did the consultants become aware of such during the inspection.

Pöyry recognises the possibility that any valuation can eventually become the subject of audit or court testimony. If such audit or testimony becomes necessary as a result of this valuation, it will be a new assignment subject to fees then in effect. Pöyry has no responsibility to update this report for events and circumstances occurring after the date of this report.

Any liability on the part of Pöyry is limited to the amount of fee actually collected for work conducted by Pöyry. Nothing in the report is, or should be relied upon, as a promise by Pöyry as to the future growth, yields, costs or returns of the forests. Actual results may be different from the opinion contained in this report, as anticipated events may not occur as expected and the variation may be significant.

SUMMARY

Sino-Forest Corporation (Sino-Forest or "the Company") is a forest management and trading company that owns and operates about 491 000 hectares (ha) of commercial forest in China.

In addition, Sino-Forest has advised Pöyry that it currently holds the land-use rights for a further 200 000 mu, or 13 330 ha of bareland and that it also owns a plantation forest of about 8 020 ha in area that is used specifically for research and development purposes. Neither this bareland nor research forest has been considered in this valuation.

The forest estate is composed mainly of Chinese fir, 'other species' a mixture of planted hardwoods, (mainly oak) and pines, natural broadleaf, eucalypts and pines. Most of the forest is situated in the Guangxi, Hunan, and Yunnan provinces of southern China.

Since 2003, Pöyry has conducted annual market valuations for Sino-Forest. Pöyry has again been engaged by Sino-Forest to estimate the market value of the tree crops in these forests, as at 31 December 2009, which is the subject of this report.

Unlike most forest owners and managers, Sino-Forest actively trades in forests. Each year the company both sells and buys forests, and accordingly the composition of the forest estate changes much more than for a business that is simply managing and harvesting a more static resource.

Over the past year, the area of the estate has increased by 156 000 ha, or 47% over the 2008 area. Areas of forest have been both acquired and sold. As at December 2009 the area weighted average age of the forest was 19.0 years compared with 15.3 years at December 2008. Sino-Forest's estate could be described as 'dynamic'.

For valuation purposes, such a dynamic forest estate requires careful review of the key components influencing wood flows and cash flows. As part of this year's valuation, Pöyry has established and measured a small number of inventory plots in the 'other' species in Guangxi, some Chinese fir in Hunan, broadleaf forest in Yunnan and planted eucalypts in Guangdong province. Some adjustments to yield tables used in last year's valuation have been made. In addition, Pöyry has sought to verify Sino-Forest's representation of the net stocked area of forest. These two factors (yield and stocked area) are the main physical features of the forest that influence wood flow, cash flow and forest value.

Pöyry has also reviewed the key financial factors influencing forest value, including log prices, forestry and harvesting costs, and the appropriate discount rate to apply to the cash flows expected to arise from the forest estate.

Pöyry has estimated the market value of Sino-Forest's tree crop assets, as at 31 December 2009, to be <u>USD2 297.5 million</u>.

This is the net present value of the cash flows expected to arise from the management and harvest of the existing tree crops over their current rotation. A

discount rate of 11.5% has been applied to these pre-tax cash flows. This is the same discount rate as applied last year. This market value does not include costs associated with the regeneration of the existing forest, nor revenues from their harvesting and sale.

Table S-1 shows the sensitivity of the tree crop value to changes in the discount rate.

Table S-1:
Tree Crop Value Sensitivity to Discount Rate

Basis of Cash Flow	Real Discount Rate applied to Pre-tax Cash Flows		
	10.5%	11.5%	12.5%
	Net Present Value (USD million)		
Single current rotation of existing forest (491 394 ha)	2 374.3	**2 297.5**	2 225.4

The market value of Sino-Forest's tree crop assets as at December 2009 has increased by USD653 million, or 40% from Pöyry's valuation as at December 2008.

Changes to the physical nature of the asset as a result of growth, changes in the area and maturity of forest owned from sales and purchases, and forecast yield, combine to produce USD647 million or 99% of the value increase. Changes in costs and log prices almost cancel each other out, with the majority of the balance of the value increase arising from a favourable change in the exchange rate, from RMB to USD, as at 31 December 2009.

CONTENTS

Appendices

GLOSSARY

Abbreviation	Meaning
AAC	Annual allowable cut
AMG	At-mill-gate
CAPM	Capital asset pricing model
CFIR	Chinese fir
CPI	Consumer Price Index
DCF	Discounted cash flow
GIS	Geographic Information System
ha	Hectare
IDR	Implied discount rate
km	Kilometre
m^3	Cubic metre
m^3/ha	Cubic metre per hectare
MAI	Mean annual increment
NPV	Net Present Value
OTHR	Other species
RMB	Renminbi
TRV	Total recoverable volume
TSV	Total standing volume
USD	United States dollars
WACC	Weighted average cost of capital

1 INTRODUCTION

Sino-Forest Corporation (**Sino-Forest**) owns and operates approximately 491 000 hectares (ha) of forest in China[1]. Two main business models are operated by Sino-Forest. The first is the establishment, management and harvest of new forests. The second is the acquisition, management and harvest or stumpage sale of existing tree crops and forests. A stumpage sale is the sale of trees while they are still standing in the forest. Here, the future harvesting of the forest is the responsibility of the eventual purchaser. This aspect of Sino-Forest's business could be described as forest management and trading.

Pöyry (Beijing) Consulting Company Limited (Pöyry) has been requested by Sino-Forest to prepare a valuation of its forest crop assets in China, as at 31 December 2009. Pöyry has previously conducted forest valuations for Sino-Forest in 2000, 2001, and 2003 to 2008 inclusive.

This valuation presents an update of Pöyry's 31 December 2008 forest valuation that was presented in Report 54A11173.

[1] In addition, Sino-Forest has advised Pöyry that it currently holds the land-use rights for a further 200 000 mu, or 13 330 ha of bareland that it will plant in the future. This land has not been considered in the forest management and cash flow modelling and does not affect the value of the existing tree crops currently owned. Furthermore, Sino-Forest has advised Pöyry that it also owns a plantation forest of about 8 020 ha in area that is used specifically for research and development purposes. No details of this forest have been provided to Pöyry and it has not been considered in this valuation.

2 PURPOSE AND SCOPE

2.1 Purpose of the Valuation Update

The purpose of the valuation is to estimate the market value of the forests for asset reporting purposes. A useful definition of "market value" is:

> *"the most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming that the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:*
>
> - *The buyer and seller are typically motivated.*
> - *Both parties are well informed or well advised, and acting in what they consider their own best interests.*
> - *A reasonable time is allowed for exposure in the open market.*
> - *The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale"*[1].

The market value of the tree crop assets is estimated as at **31 December 2009**.

The term "Market Value" is usually interchangeable with "Fair Value" as defined in International Accounting Standard 41 (IAS 41). IAS 41 prescribes the accounting treatment, financial statement presentation, and disclosures related to agricultural activity.

In IAS 41, "Fair Value" is defined as "*the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction*".

2.2 Scope of the Valuation Update

As a valuation update, the exercise has specifically addressed the following:

- Changes to the area of tree crops, by location, species and age, between 31 December 2008 and 31 December 2009.
- Acknowledgement of recent inventory data and their impact on yield estimates.
- Acknowledgement of changes in forestry and harvest related costs.
- Acknowledgement of expectations for generally higher longer term log prices.
- The relative maturity and age-class profile of the Sino-Forest estate, and the potential to harvest a large volume of wood in the near term.

---

[1] Uniform Standards of Professional Appraisal Practice, The Appraisal Institute (www.appraisalinstitute.org).

3 VALUATION METHODOLOGY

It is recommended practice when appraising real property to consider three main approaches:

- The comparable sales method (i.e. referencing the results of market transactions of other properties similar to the subject property).
- The income method (i.e. assessing the present value of the anticipated future net earnings stream).
- The costs method (i.e. acknowledging what it would cost to recreate the asset in its current condition).

It then rests with the appraiser's professional judgement to assess what weighting should be applied to the results from the respective methods.

The assessment of forest investments generally requires the examination of cash flows over a long time period. This leads to the application of discounted cash flow analysis techniques (DCF) as an indispensable part of the appraisal process. Each of the three main approaches may come to be applied within a DCF framework. Thus;

- The *cost* method may be applied with wholly young stands and especially those where relying on a discounting approach alone produces values unlikely to be supported by the market. In valuing the young stands reference is made to their costs of establishment. In order to recognise the forest owner's entitlement to a return on investment, a compounding approach may be applied, requiring the selection of a suitable compounding rate. Compounding is the inverse of discounting and there is a need to select an appropriate rate.
- The *income* method employs a conventional discounting approach. In referencing wider evidence of investors' expectations of a return on capital, one common basis for the discount rate is the Weighted Average Cost of Capital (WACC). The cost of equity may be examined within the Capital Asset Pricing Model (CAPM).
- The *comparable sales* approach may also employ a DCF framework. This is particularly necessary because such sales evidence as does exist is rarely immediately comparable on a convenient unit basis (e.g. USD/ha or USD/m^3). In order to effect adjustments it is necessary to consider relative forest maturity, and this leads back to DCF analysis. Ultimately the one parameter that can be distilled from sales and then extrapolated to a subject forest is the Implied Discount Rate (IDR). This is obtained from other contemporary transactions by relating constructed cash flows for the sold forests to their respective transaction values.

It is Pöyry's opinion that the parties to any real or hypothetical transaction involving Sino-Forest's forest assets would not attribute weight to the cost method of valuation. This method has not therefore been further addressed in this valuation.

Both the comparable sales and income approaches have been considered. Their application has shared the same forest estate model which provides the means of projecting future anticipated cash flows[2]. The distinction between the approaches has been maintained in the basis for selecting the discount rates.

The scope of the market valuation is confined to the projected cash flows arising from the existing tree crop. Previous expenditure on the forest is treated as "sunk" and is therefore excluded from the derivation of value. Perpetual wood-flows are modelled, but their financial contributions are not included in the derived market value.

A full description of Valuation Methodology is provided in Appendix 1.

[2] It is debatable whether the *income* and *comparable sales* approaches should share exactly the same basis for cash flow projection. It could be argued that the WACC employed in the *income* approach inherently assumes that the cash flows have been "de-risked" to a greater extent than commonly applies in the derivation of IDRs.

4 FOREST DESCRIPTION

Since Pöyry's December 2008 valuation, the area of forest operated by Sino-Forest's has increased from approximately 335 000 ha to over 491 000 ha. Guangxi, Hunan and Yunnan are the three largest provinces in terms of Sino-Forest's holdings. The largest change in area by province, both in absolute and relative terms has been in Yunnan, where the area of forest owned has almost tripled, from around 39 000 ha to almost 106 000 ha over the past year (see Figure 4-2).

The species composition of the forest estate has also changed over the past year. See Figure 4-2. The net area of most species has increased, with broadleaf (53 000 ha increase) and 'other species' (43 000 ha increase) representing the largest increases.

The area weighted average age of the Sino-Forest estate, as at 31 December 2009 is 19.0 years. This compares with an area weighted average age of 15.3 years as at 31 December 2008. Considering that the typical age of harvest of Chinese fir, pines and broadleaf forests in southern China is in the range 18 to 30 years, the Sino-Forest estate could be described as mature.

Figure 4-1:
Sino-Forest Area of Forest owned by Province - December 2009 and 2008

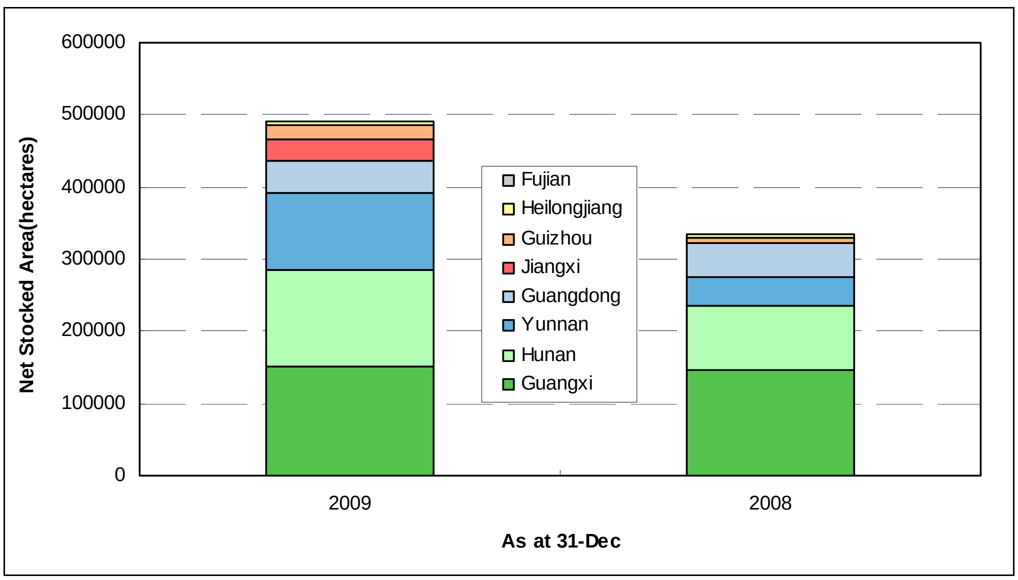
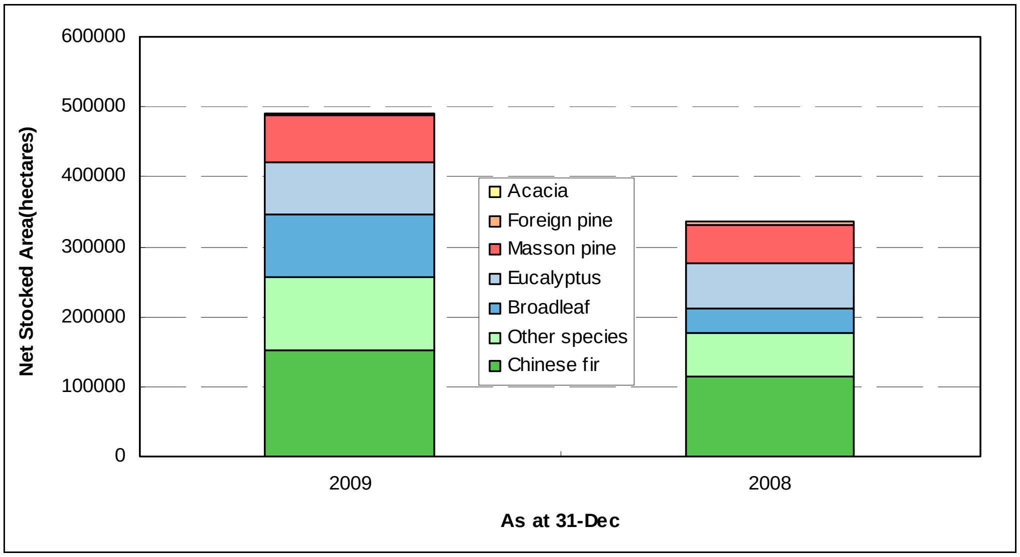


Figure 4-2:
Sino-Forest Area of Forest Owned by Species - December 2009 and 2008



Eucalypts are mainly *E.grandis * urophylla hybrids*, 'Other Species' also referred to as 'OTHR', mainly intimate mixtures of oak and other planted hardwoods, sometimes with Masson pine, most of the Broadleaf forest is second growth hardwood forest in Yunnan province, and Foreign pine is mainly slash pine (*Pinus elliottii)*.

When applied to plantation forest resources, the term "Forest Description" is a technical term. It includes all aspects of the forest's current physical condition. It also includes projections of the forests future growth performance. Further, it includes financial parameters; specifically the costs involved in growing and harvesting the forest and estimates of the prices for the products that will arise.

The following sections describe the forest resource in terms of the stocked area, the nature of the land and terrain, the species planted, and Pöyry's estimates of future growth and yield. This comprises the 'physical forest description'.

Subsequent sections outline the 'financial forest description' which details all forestry and harvesting costs. It also includes Pöyry's analysis of current and projected log prices.

The physical and financial forest descriptions are combined in a forest estate model. This allows for the modelling of the forest in terms of the physical wood flows as well as the financial cash flows.

Sino-Forest has provided Pöyry with detailed data describing the area of forest crops owned by species, planting year and location. It also specified which forests were planted by Sino-Forest and which were purchased. Based on this data, as at 31 December 2009, Sino-Forest owns 491 394 ha of forest crops.

A summary of these data is presented in the following map and figures.

Map 4-1:
Location of Sino-Forest's China Forest Assets

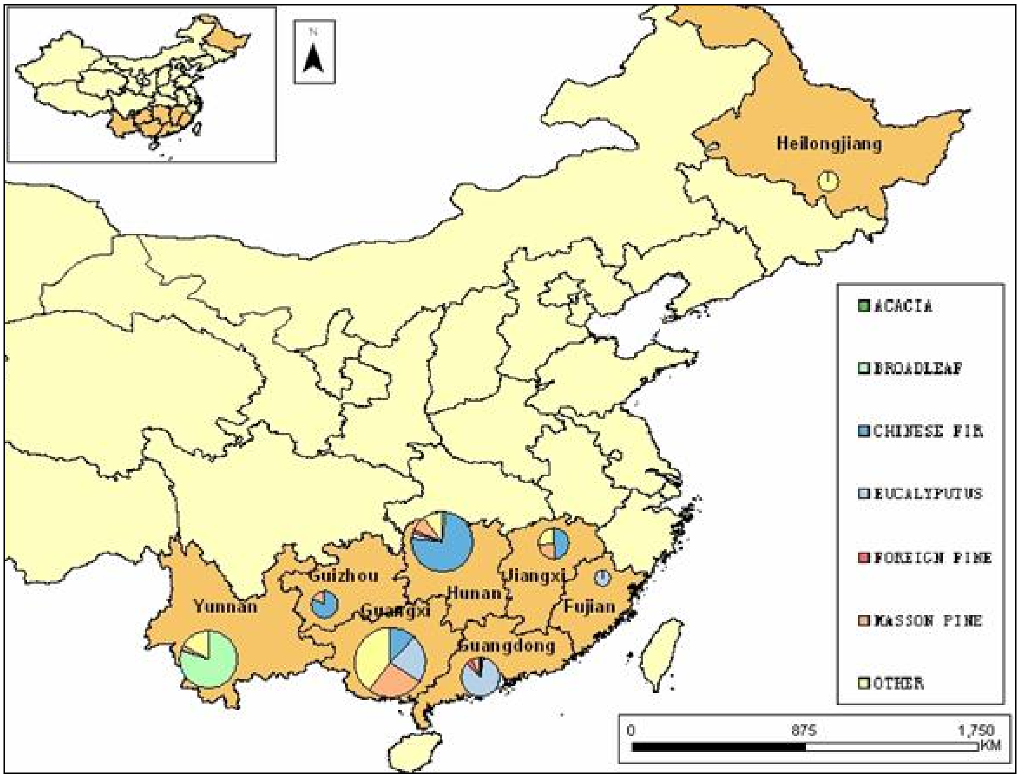


Figure 4-3:
Area of Forest by Species and Age as at 31 December 2009

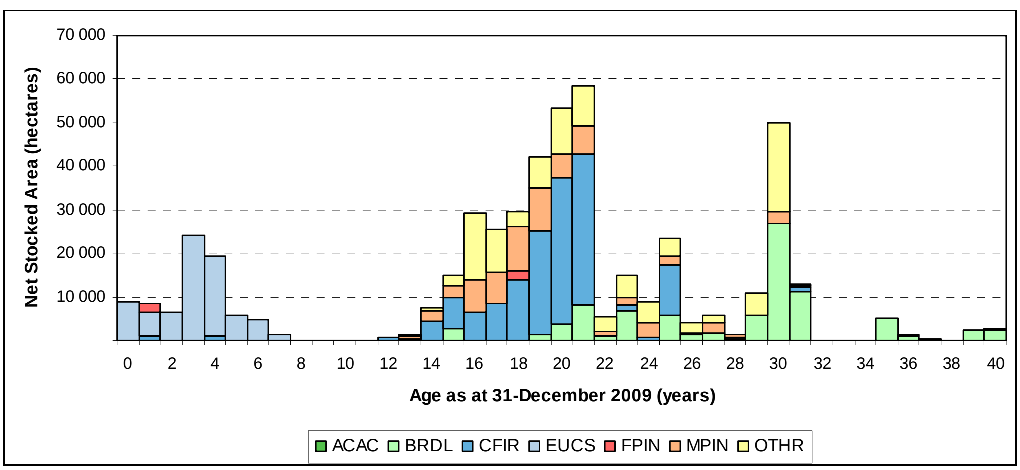
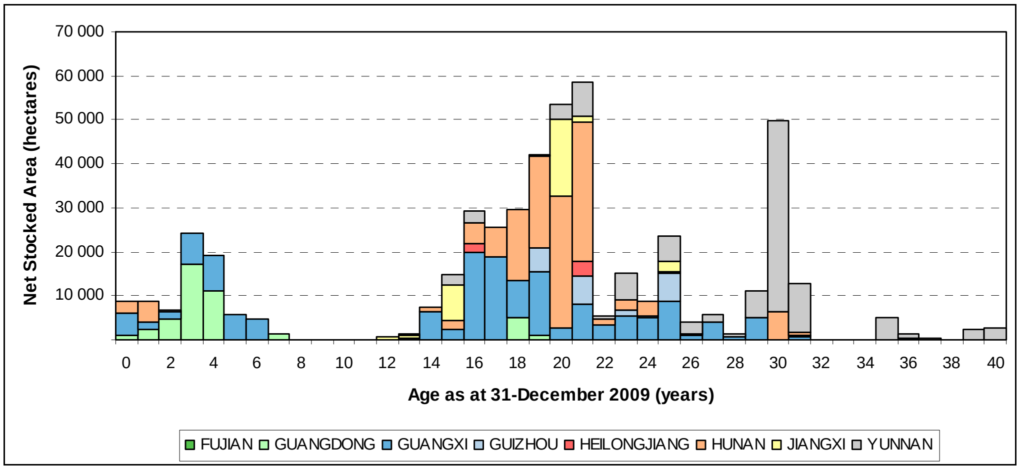


Figure 4-4:
Area of Forest by Province and Age as at 31 December 2009



4.1 Field Inspections

As part of the 2009 valuation Pöyry undertook a field inspection exercise. The main purpose of the inspection is to compare the forest description provided by the client with the actual conditions on the ground. In the case of Sino-Forest, this description amounts to tabular and map information of forest type by age and location.

Pöyry's normal approach to forest inspection is to visit different parts of the forest estate over successive valuations and thereby confirm the full forest description over a period of time.

This is more challenging in the case of Sino-Forest who not only manages and harvests forests, but also actively trades large areas of forest owned. As a result, the composition of Sino-Forest's estate can change quite significantly from one year to the next. Pöyry's comparisons of the stocked area by species, province and planting year, as at 31 December 2008 and 2009, indicates that a maximum of 53% of Sino-Forest's estate, as at 31 December 2009, could have been within the Sino-Forest estate just one year earlier. That means that a minimum area of 230 000 ha of forest was acquired in 2009.

As the Sino-Forest resource changes significantly year by year, there is a greater need for more detailed annual forest inspections and forest description reviews.

The three provinces of Guangxi, Hunan and Yunnan together contain about 391 000 ha or about 80% of the total forest area of 491 000 ha. Guangxi contains 150 000 ha, including 60 000 ha or 57% of the total 'Other Species' area. Hunan contains 135 000 ha, including 101 000 ha or 67% of the total Chinese fir. Yunnan contains 106 000 ha, including 85 000 ha or 99% of the total broadleaf forest. The 75 000 ha eucalyptus plantations are predominantly located in the Guangdong (50%) and Guangxi (44%) provinces.

The field inspections for the 2009 valuation focused on forest acquired over the past year and eucalypt plantings in a part of Guangdong that was not visited last year. Inspections in the purchased forest were in 'Other Species' in Guangxi province, Chinese fir in a county in southern Hunan that was not inspected last year, and broadleaf in Yunnan province. (See Appendices 2 and 3).

The work undertaken during the field inspections comprised:

- Establishing a small number of inventory plots to record tree measurements
- Recording GPS locations and associated land form and vegetation type
- Interviews with Forest Bureaus
- Interviews with staff at wood-processing facilities and log buyers.

Section 4.3 deals with the work undertaken to verify the stocked area of forest.

4.2 Land and Tree Crops

The following table provides some provincial statistics on area, forest cover and terrain for the eight provinces in which Sino-Forest owns forests.

Table 4-1:
General Information on Area Cover and Terrain Statistics for Sino-Forest Provinces

Provincial	Total Land Area (ha * 1000)	Assigned as Land for Forestry by State (ha * 1000)	Forest Area (ha * 1000)	Mountain %	Hill %	Flat %
Heilongjiang	45 460	20 265	17 975	18	40	42
Yunnan	38 264	24 248	15 600	84	10	6
Guangxi	23 630	13 662	9 838	62	18	20
Hunan	21 180	11 714	8 608	51	26	23
Guangdong	17 800	10 480	8 270	32	29	39
Guizhou	17 647	7 618	4 205	31	62	7
Fujian	12 140	9 080	7 650	35	50	15
Jiangxi	1 669	1 045	931	36	42	12

Note: these are provincial level statistics, not applying specifically to Sino-Forest's forest or land.

Mountain land is typically >35 degrees in slope, and flat land <15 degrees. Most commercial forest is on hill and mountain land. The nature of the forest terrain in the various provinces has been used in combination with actual local data to estimate logging costs (see Section 6.2).

Chinese fir makes up about 151 000 ha, or 31% of the total forest area. This is followed by 'Other Species' (106 000 ha or 22%) and broadleaf species (88 000 ha or 18%).

Eucalypts (*grandis* X *urophylla*) make up about 75 000 ha, or 15% of the total forest area. Of the eucalypt area, two-thirds, or 50 000 ha is forest that Sino-Forest has planted itself. The company has also planted about 2 000 ha of slash pine and 1 000 ha of Chinese fir, mostly in Hunan province.

The following table provides some general information on the three main single species.

Table 4-2:
General Information on Main Forest Types/Species in the Sino-Forest Estate

Species	Botanical Name	Native to	General Stem Form	Normal Rotation Range Years	Average Rotation Years	MAI (of TSV) m^3/ha/a
Chinese Fir	*Cunninghamia lanceolata*	China	Excellent	18-30	22	12
Other Species (mainly oak)	*Quercus spp*	Northern hemisphere cool latitudes to tropical Asia	Average to good, stem sweep and wobble common	20-40	variable	4 – 8 as stocking varies
Broadleaf – variety of species	incl Schima	Temperate and tropical Asia	Average to good, stem sweep and wobble common	20-40	variable	6 – 10 as stocking varies
Eucalypts	*E.grandis etc.*	Australia	Very good	4-7	5 - 6	In well managed forests 20+
Masson Pine	*Pinus massoniana*	China	Typically poor	15-25	20	8
Potential end-uses/Markets						
Chinese Fir	*Cunninghamia lanceolata*	Highly regarded as a construction and furniture material. Attracts high prices.				
Other Species (mainly oak)	*Quercus spp*	High value timber species used in high quality paneling, furniture making, flooring, ship building, barrels and veneer.				
Broadleaf	Schima	Suitable for range of timber uses (durable), flooring, framing, paneling. Also suited to veneer manufacture and as a pulp wood.				
Eucalypts	*E.grandis etc.*	Fast growing source of hardwood fibre for pulp and re-constituted boards (MDF etc). Some sawn and veneer. Low to medium prices.				
Masson Pine	*Pinus massoniana*	A versatile species used for construction, pit props, veneer, pulp wood and resin. Medium to high prices.				

4.3 Forest Area

Two key components of the physical forest description are the net stocked area of forest and the harvest yield or volume of logs per unit area. The product of these factors, area (in hectares) and yield (in cubic metres per hectare) are the main features of the forest that determine the wood flow over time. Accordingly it is important for the forest valuer to independently assess both the area of the forest and the likely yield.

This section presents the results of Pöyry's verification of Sino-Forest's stocked area of forest. Details of this work are provided in Appendix 4.

As described above, Pöyry used the data provided by Sino-Forest on the location, the species and age of the estate to plan its field inspection for 2009. Within the selected provinces of Guangdong, Guangxi, Yunnan and Hunan, counties were selected with regard to the area by species and age-classes that they contained. In addition, consideration was given to the counties in which Pöyry conducted its field inspections last year and where it was apparent that large areas had been acquired since the last valuation.

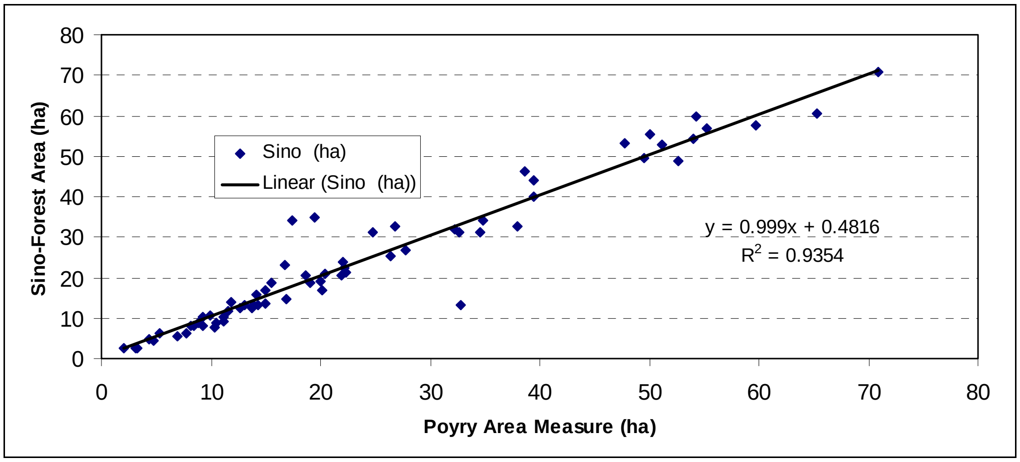
On request from Pöyry, Sino-Forest provided a set of what are termed 'cluster-maps'. Each cluster-map showed compartment (forest management unit) boundaries and stocked areas for a number (cluster) of compartments. They also showed geographic co-ordinates that allowed registration of these maps for use in a GIS. Several such cluster-maps were provided for each of the counties selected for Pöyry's field work.

Pöyry used maps representing 66 compartments for its area verification. These maps represented 1 611 ha of forest, or about 0.3% of the 491 000 ha owned. The verification was performed largely by mapping the stocked area as visible from satellite imagery, and comparing this with the compartment boundaries and stocked areas provided by Sino-Forest in the cluster-maps.

Of the 66 compartments assessed, 39 had an area difference of less than 10% and 55 had a difference of less than 20%. Compartments with a large negative difference generally result from the exclusion of non-forested patches within the compartments. Large positive differences are attributed to uncertainties concerning the locations of boundaries, i.e. where the boundaries do not follow natural topographic features such as ridges and rivers. The larger proportional differences are seen in smaller compartments since proportionally any changes in area have a greater impact.

Over the 66 individual compartments compared (Sino-Forest's compartment records and Pöyry's audit), overall the area differences are negligible at 2% (1 611 ha versus 1 580 ha), although there was some variation at the compartment level.

Figure 4-5:
Comparison of Pöyry Area Measure and Sino-Forest mapped Area



In addition, there appears to be no bias in the Sino-Forest area data. Accordingly, no area adjustments have been made to Sino-Forest's area representation of the forest crop assets owned as at 31 December 2009.

It is important to understand that this is not a confirmation of forest ownership, but rather a verification of the mapped and recorded areas of stocked forest.

The following table summarises information provided by Sino-Forest that describes the net stocked area by species or species group of its forest assets as at 31 December 2009.

Table 4-3:
Net Stocked Area of Forest by Species as at 31 December 2009

2009 Area by Species (ha)		
Chinese fir	151 311	31%
Other species	105 749	22%
Broadleaf Species	87 977	18%
Eucalypts	74 765	15%
Masson pine	67 108	14%
Foreign pine	4 397	1%
Acacia	87	0%
Grand Total	**491 394**	**100%**

For the purposes of forest modelling, Pöyry has considered each of these species or species groups as a croptype and used an average yield table for each to represent expected growth and yield[4] (see Section 4.4).

In addition, Sino-Forest has advised Pöyry that it currently holds the land-use rights for a further 200 000 mu, or 13 330 ha of bareland that it will plant in the future. This land has not been considered in the forest management and cash flow modelling and does not impact on the value of the existing tree crops currently owned. Furthermore, Sino-Forest has advised Pöyry that it also owns a plantation forest of about 8 020 ha in area that is used specifically for research and development purposes. No details of this forest have been provided to Pöyry and it has not been considered in this valuation.

4.4 Forest Yield

Yield tables are used to predict how the volume of wood per unit area changes with age for a *typical* stand for each type of forest in Sino-Forest's estate. Ideally, yield tables would be available to cover the full range of species, site conditions, stand management and other factors that influence yield across a large forest estate like Sino-Forest's. Unlike the forest area component of the physical forest description, information on the forecast growth and yield of these forest crops, was not provided. As in previous years, Pöyry has applied yield tables that it has derived itself, and which are assumed to broadly apply to the Sino-Forest estate. Pöyry has applied certain tests of the *reasonableness* of these assumed yield tables based on a process described below.

[4] Except for eucalypts where there are distinct yield tables for areas that Sino-Forest has planted, and areas that have been purchased.

This is an important difference in methodology versus valuations Pöyry undertakes in other regions such as Australia or New Zealand, where typically, detailed yield data and information are available covering the inherent variability of large forest estates.

During Pöyry's field inspection of 2009/10, a total of 75 plots were established and measured. Thirty four were in broadleaf forest, 23 in planted eucalypt forest, 9 in 'Other Species', and 9 in Chinese fir. The selection of this particular sample took into consideration the changes to Sino-Forest's estate in terms of the area, by location, species and age, between 2008 and 2009.

Despite the limited number of new sample plots available, Pöyry opted to change one of the yield tables used in the 2008 valuation. The 'Other Species' yield table was modified to increase the estimated recoverable volume at age 20 from 60 m^3/ha to 90 m^3/ha. The reason for this change along with summary statistics of all the plot measurements, is provided in Appendix 5.

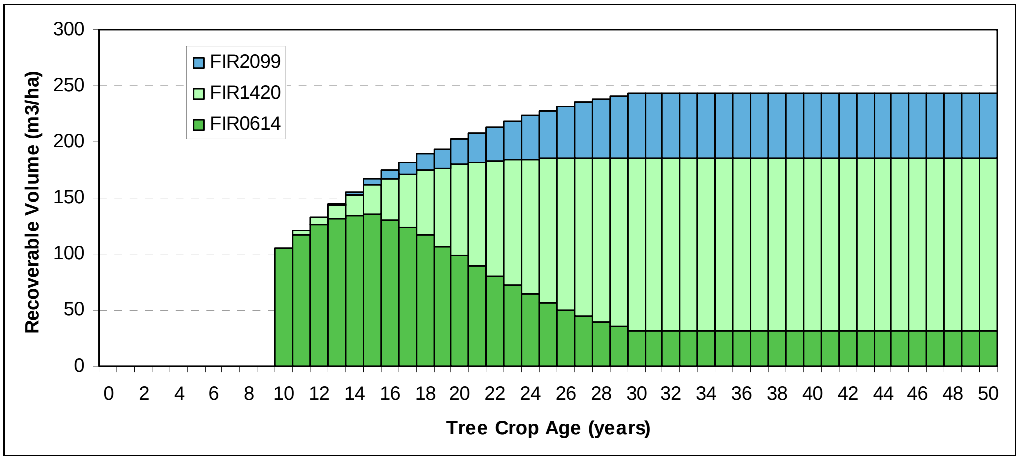
In addition, Pöyry revised the broadleaf forest yield table as we became aware of a regulation that prohibits clearfelling in natural forest. Consequently, the assumed recoverable volume per unit area from applying a selection harvest regime, reduced the yield by 50%, from 181 m^3/ha assumed in 2008, to 90 m^3/ha for this year.

Finally, while in the 2008 valuation, all eucalypt plantations in the company's estate were treated the same in terms of expected yield, in this year's valuation, Pöyry has made a separate yield forecast for eucalypt plantations that Sino-Forest has purchased. As a consequence, the yield from the 24 000 ha of purchased eucalypt forest is reduced on the assumption that growth rates in these forests is lower than that achieved by Sino-Forest in its own plantations. The company routinely applies genetic improvements and more intensive management than is typical in China. Pöyry's wood flow models assume these areas of purchased eucalypts are to be replanted (not coppiced) after harvesting, and that they then attain the same growth as the company's planted eucalypts.

The yield tables used in the 2009 Sino-Forest valuation are shown in Figure 4-6 to Figure 4-12. The figures show projected recoverable volume per hectare, by log type and age for each of the major species the company owns. The legend indicates the log type or log grade. These are defined by small end diameter (sed) of the logs, and relate to the prices shown in Table 8-2.

- 2099 refers to an sed of > 20 cm
- 1420 refers to an sed of >14 to 20 cm
- 0614 refers to an sed of 6 to 14 cm.

Figure 4-6:
Yield Table applied to all Chinese Fir Crops – 2009 Valuation



In addition to the nine new inventory plots established for the 2009 valuation, Pöyry attempted to test the reasonableness of the Chinese fir yield table applied in this year's valuation, by triangulating between the limited number of sample plots established by Pöyry as part of previous years' valuation work and general Chinese fir growth data from other sources . Based on this somewhat limited test, Pöyry found no evidence to suggest that its 2008 yield table was biased. Consequently, this yield table has been left unchanged.

Figure 4-7:
Revised Yield Table applied to all 'Other Species' Crops – 2009 Valuation

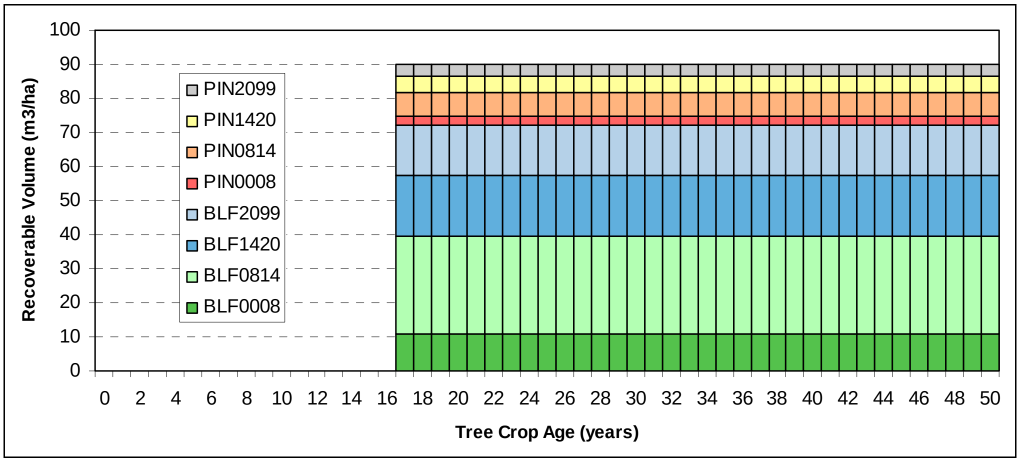


Figure 4-8:
Revised Yield Table applied to Broadleaf Crops – 2009 Valuation

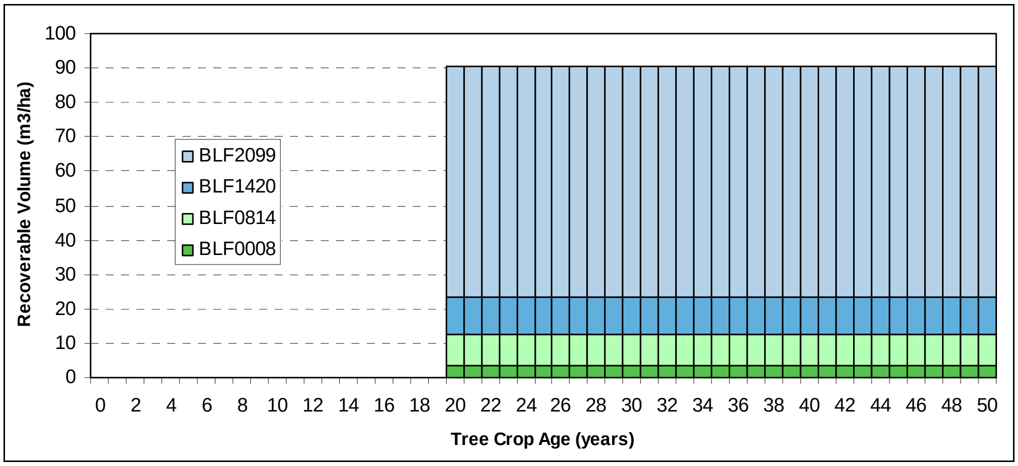


Figure 4-9:
Yield Table applied to Eucalypt Crops planted by Sino-Forest – 2009 Valuation

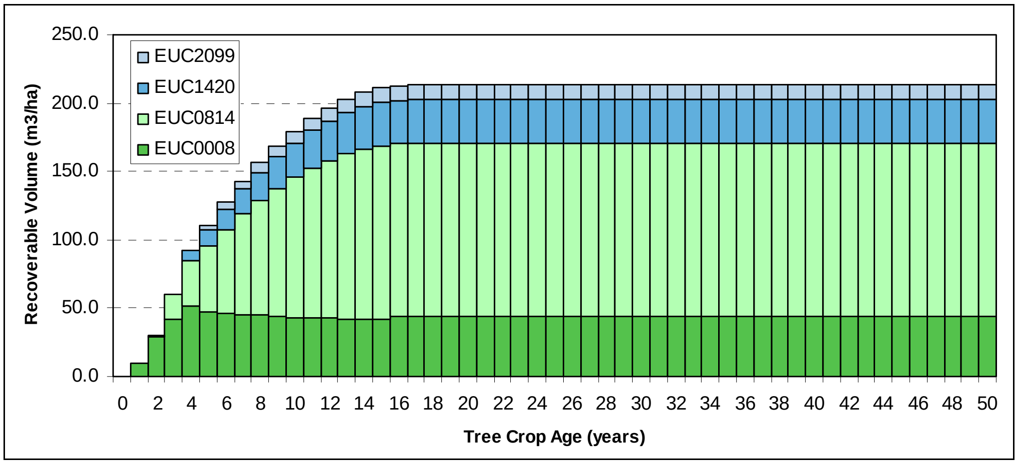


Figure 4-10:
New Yield Table applied to Eucalypt Crops purchased by Sino-Forest – 2009 Valuation

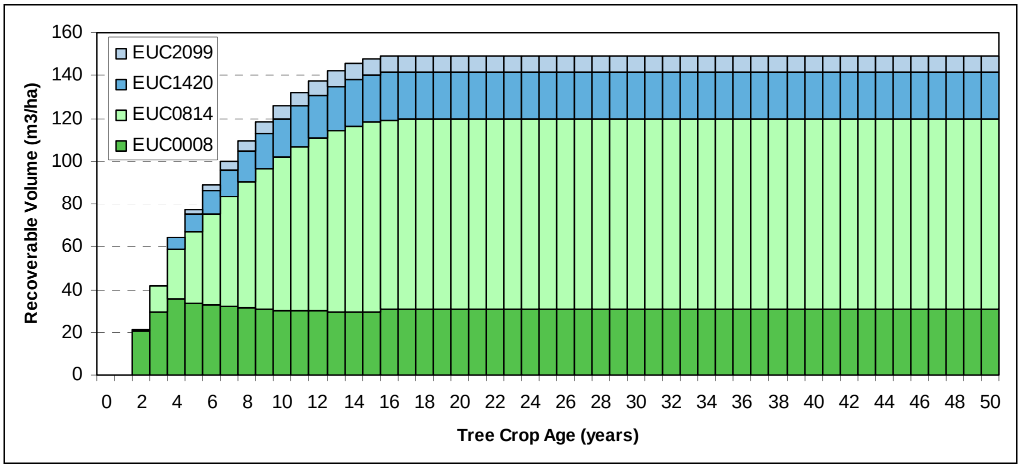
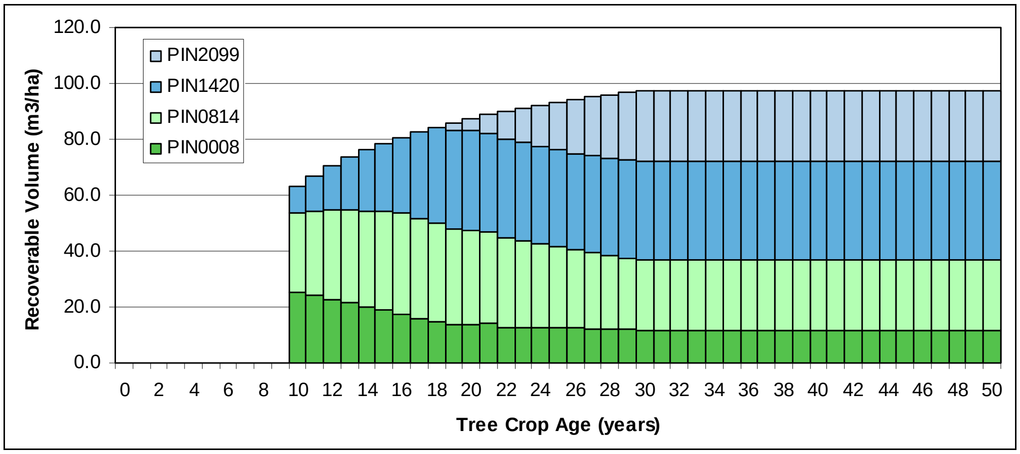
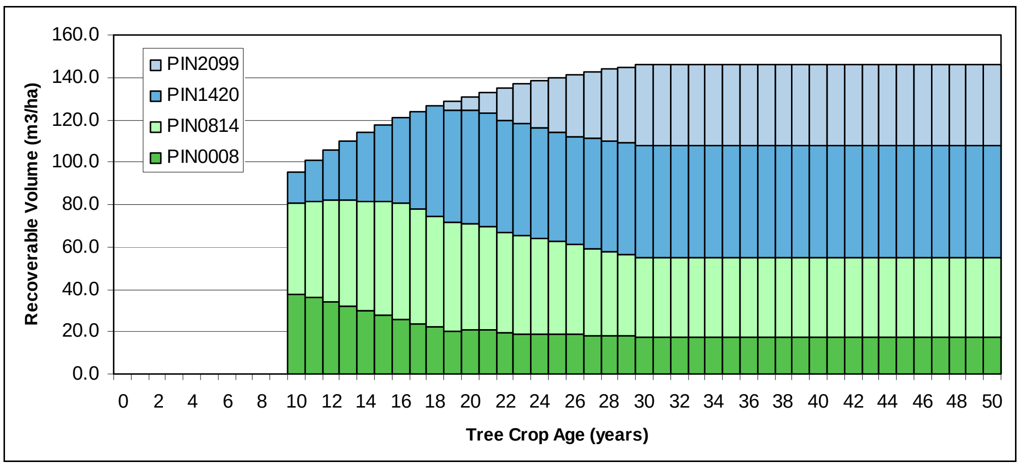


Figure 4-11:
Yield Table applied to Masson Pine Crops – 2009 Valuation



The yield table for Masson pine is the same as that applied in the 2008 valuation.

Figure 4-12:
Yield Table applied to Foreign Pine Crops – 2009 Valuation



The yield table for foreign pine is the same as that applied in the 2008 valuation.

There were only 87 ha of acacia species in the Sino-Forest estate as at 31 December 2009. This species accounts for less than 0.02% of the total area of forest. Its yield is represented as a constant 63 m^3/ha of pulp grade log from age 6 years. This is the same as the yield table applied in the 2008 valuation.

4.5 Statement on Yield Tables and Estimates of Growth and Yield

In Pöyry's forest valuations in Australasia, the Americas, Africa and Europe, the forest owner or manager usually provides Pöyry with an area description and a yield description of the forest. These descriptions are typically in the form of tables of the stocked area and associated recoverable yield expectations, by species, location and age.

Pöyry then spends some time during the field inspection phase of a valuation assignment verifying the reasonableness of these area and yield statements. The focus importantly, is on verification, in contrast to the generation or development of this forest description information.

In the Sino-Forest valuation, while Sino-Forest does provide Pöyry with tables of the stocked area of forest owned as at valuation date, it does not provide inventory information or data useful for the description of forest yield.

From the area description provided by Sino-Forest, Pöyry then selects where to focus its field inspections. The focus is typically on locations, species and age-classes that in Pöyry's opinion will contribute most to the total forest value. Where there are significant new areas of forest in the estate, Pöyry will endeavour to visit these locations and species.

As part of the field inspections, Sino-Forest provides maps of forest area and forest record information on species and age of the crops within these areas. GPS data is recorded in the field and later used in conjunction with the maps to compare areas of forest as mapped and recorded, against that independently assessed using satellite imagery. The existence of tree crops by species and age, as per the maps and forest records, are also verified as part of the field inspection process.

In the absence of yield tables to verify, Pöyry has established a small number of inventory plots and measured Sino-Forest's tree crops in locations of interest. Using these data, collected over several years, Pöyry has developed a set of yield tables that broadly describe the average growth and yield of Sino-Forest estate. These are generic yield tables, by species. Pöyry does not claim that these broad-based and generic yield tables adequately capture the full extent of variation in site and crop quality characteristics, nor in turn adequately reflect the true mean growth and yield that will be realised from the forest estate as a whole. While measures of precision of sample mean estimates suggest that the true mean yield of the whole forest, by species, is likely to be within +/-15% of the yields derived from the sample measurements, the fact remains that in comparison with most other forests, the large Sino-Forest estate is significantly under-sampled for growth and yield estimation purposes.

5 RISKS TO FOREST ASSETS

In addition to risks relating to the cash flow assumptions there are other risks associated with management of a biological resource such as a forest. In the Sino-Forest plantations the key identifiable risks include:

- Fire
- Snow/Frost
- Pest and Disease
- Storms and Typhoons

5.1 Fire

Fire has not been a major threat in South China plantation forests in the past. However, with the increase in eucalypt plantation area there is a correspondingly greater fire risk. This risk can be mitigated by the implementation of fire prevention techniques such as the construction of firebreaks inside plantations, the development of human resources trained in fire fighting and supported by physical infrastructure such as portable fire fighting equipment. Given that the resource is geographically fragmented and comprises discrete forest blocks that are generally less than 500 ha in size, the opportunity for a singular catastrophic event is remote.

It is evident from Pöyry's previous field inspections of Sino-Forest's estate that in some regions farmers have used burning as a land preparation tool in the past. Sino-Forest has previously used fire to prepare land for planting but is moving away from this practice. Their aim is to reduce the loss of soil fertility that occurs when organic matter is volatilised and lost to the atmosphere.

Recently established and young stands are at greatest risk to fire damage as they are more likely to suffer crown damage that compromises their growth. In older stands close to harvest age, the impact of fire may be less significant as much of the timber may be salvaged and marketed with little discount.

Sino-Forest has advised Pöyry that it holds fire insurance cover, but Pöyry has not viewed the policies.

5.2 Frost and Snow Damage

The risk of frost damage can be reduced by careful attention to site selection. Frost prone sites should be avoided and planting should be scheduled to coincide with favourable weather conditions.

Snow damage in southern provinces of China is expected to be a rare occurrence. However, an example of the extreme climate variations that are possible occurred in January 2008 when snowfalls in southern regions of China occurred, resulting in some forest damage across a number of southern provinces.

5.3 Typhoons

The coastal areas of Southern China suffer a number of typhoons each season during July to September. The forest damage is generally localised and confined to young age-classes, but every 20 years or so a typhoon is likely to cause significant damage. The area that is most affected is within 200 km from the coast. The risk of typhoons for Sino-Forest's plantations is generally limited to some areas in Guangxi. This risk is reduced by the high stocking rates and short rotations of the eucalyptus plantations.

The stands inspected in 2009 in Guangdong, Guangxi, Yunnan and Hunan showed no notable damage from typhoon activity.

5.4 Pests and Disease

As the area of single species plantations increases so does the potential risk of pest and disease problems. To date there appears to have been no serious pest or disease outbreaks in either Sino-Forest's plantations or any others. Bacterial wilt caused by *Ralstonia solanacearum*, has caused some mortality in eucalypt nurseries and in the field in another owner's forests in Guangxi Province. A gall wasp *Leptocybe invasa* has also caused leaf malformation in these same forests.

Bacterial wilt causes wilting, leaf drop, reduced growth and sometimes tree mortality. Seriously infected areas are treated by felling stems, sometimes removing the vegetative material, and replacing the soil in the planting holes. Attack by the gall wasp may be height related as trees over 2 metres in height appear to be less susceptible. The wasp injects its eggs into leaf tissue, which disrupts normal flows and physiology of the leaf, often resulting in the formation of galls. Although not a lot is known about the impact of the gall wasp, it is likely that photosynthesis and normal growth is affected.

Leaf eating caterpillars are controlled by the application of pesticide if levels of infestation are such that 30% of the crown is affected. Local Forest Bureaus maintain disease control stations and provide forecasts on pathogen levels and the need for control. In keeping with good forest practices, Sino-Forest plants trees produced from a number of different clones; this reduces the risk of a weakness in any one clone being propagated throughout the plantations and provides genetic diversity. The clones that have been planted to date have been assessed for resistance against disease.

6 COSTS

Forestry operations are those operations associated with the establishment and maintenance of the forest crop up until the time of harvest. Harvesting costs are covered in Section 6.2.

6.1 Direct Costs of Forestry Operations

The following table summarises the direct costs of forestry operations by main species. For eucalypts costs are shown for planted and coppiced rotations (see also Section 9.2 that discusses the assumed regeneration strategy).

Table 6-1:
Forest Operations Direct Costs (RMB/ha) - December 2009

Year in Rotation	1	2	3	4	5+
Chinese fir, Pine species, Other species, Broadleaf species					
All Land Preparation and All Year 0 Establishment Related Costs	7 230	0	0	0	0
Crop Maintenance & Tending - fertiliser, weeding, singling, thinning	0	1 320	990	0	0
Crop Protection Costs - security, fire prevention, forest health & pest control etc.	0	30	30	30	30
Eucalypt species - Planted					
All Land Preparation and All Year 0 Establishment Related Costs	5 475	0	0	0	0
Crop Maintenance & Tending - fertiliser, weeding, singling, thinning	0	2 385	2 385	600	0
Crop Protection Costs - security, fire prevention, forest health & pest control etc.	0	135	105	105	105
Eucalypt species - Coppiced					
All Land Preparation and All Year 0 Establishment Related Costs including Yr 1 singling	2385	0	0	0	
Crop Maintenance & Tending - fertiliser, weeding, singling, thinning	0	2 385	600	0	0
Crop Protection Costs - security, fire prevention, forest health & pest control etc.	0	105	105	105	105

The costs assumed to apply to the various tree crops in the Sino-Forest estate, as summarised in Table 6-1, were derived from a combination of Pöyry's in-house database and specific data obtained from interviews with Forest Bureaus as part of the field inspections. Overall, forestry costs have increased by just over 10% (in nominal terms) since 2008.

Land preparation includes all costs of planning (design), site preparation and tree crop establishment, including clearing the land of debris to facilitate planting and tree growth, hole digging, planting of seedlings (or cuttings), setting base fertiliser, refilling holes and any other operations necessary. These operations and costs occur in the first year of the rotation, and before the trees are one year old.

Crop maintenance and tending are post year 1 or post-establishment operations, typically occurring in years 2 and 3 of the rotation. They are ancillary to initial establishment and are essential to the effective establishment, development and vigorous growth of the tree crop. These operations and costs include the purchase and application of fertilisers, weeding and singling.

Crop protection costs are those costs incurred to protect the tree crops from theft (illegal harvesting and theft of logs from the forest) and fire damage, including education and public relations, training in fire suppression, and fire risk monitoring. Other than for eucalypts, Pöyry has applied a standard cost of RMB2/mu/year, or RMB30/ha/year. In the case of eucalypts, there is the additional cost of forest health monitoring and pest control. Eucalypts have been found to be more susceptible pests and disease, such as bacterial wilt and wasp attack and require more intense health monitoring and remedial operations. Security, fire prevention and pest control costs in eucalypts amount to about RMB105/ha/year.

Forestry costs have only a small impact on the market valuation which is confined to the cash flow arising only from the current crop. The highest forest operations costs are associated with land preparation and establishment and these operations are already complete insofar as the current crop is concerned. Some crop maintenance and tending costs are incurred in association with the current crop over the next three to four years, and the relatively small costs of crop protection are incurred until harvest. The small impact of direct forest operations costs on the market value of the forest crops is shown in Section 13, Sensitivity Analyses. The small impact of increased forestry operational costs this year can also be seen in the Change Analysis.

6.2 Direct Costs of Harvesting and Cartage

Direct harvesting and cartage costs are all of the direct costs incurred between the standing tree and delivery of the logs to the point of sale. In China, most harvesting operations are labour-intensive. Trees are typically felled by axe or handsaw, cut to length in the forest and then carried to the roadside by hand. The main cost elements are:

- Tracking and road making for harvesting
- Tree felling
- Delimbing the fallen tree
- Cutting the stem to log lengths in the forest (a typical length is 2 m length to facilitate hand carriage to the road. Chinese fir stems are often left longer, reflecting their lighter weight and some end-use in longer lengths).
- Carriage to a truckable roadside (commonly by hand or a combination of carrying by hand and some in-forest cartage on trolleys or motor driven tractors)
- Storage of logs
- Debarking
- Truck loading

- Cartage of logs to the mill or other point of sale.

As with the forestry operations, Pöyry obtained information on current harvesting costs during the field inspection process.

Evidence suggests that during 2009, logging costs in southern China have increased by about 8%. Pöyry has assumed a 30% increase in the harvesting cost for broadleaf crops in Yunnan province as a result of this operation being a selective harvest rather than a clearfelling operation. Based on the information obtained from field inspections and data and information from other recent projects, Pöyry constructed the following generalised cost table for harvesting in the eight provinces containing Sino-Forest's current estate.

Table 6-2:
Logging Costs by Province and Species (December 2009)

Province	Species	RMB/m^3	Province	Species	RMB/m^3
Fujian	Eucalypts	63	Jiangxi	Other Species	141
Guangdong	Acacia	63	Guizhou	Chinese fir	105
Guangdong	Broadleaf	141	Guizhou	Masson Pine	151
Guangdong	Chinese fir	95	Heilongjiang	Other Species	131
Guangdong	Eucalypts	63	Hunan	Broadleaf	141
Guangdong	Foreign (slash) pine	135	Hunan	Chinese fir	95
Guangdong	Masson Pine	135	Hunan	Eucalypts	63
Guangdong	Other Species	141	Hunan	Foreign (slash) pine	135
Guangxi	Chinese fir	95	Hunan	Masson Pine	135
Guangxi	Eucalypts	63	Hunan	Other Species	141
Guangxi	Masson Pine	135	Yunnan	Broadleaf	186
Guangxi	Other Species	141	Yunnan	Other Species	156
Jiangxi	Broadleaf	141	Yunnan	Chinese fir	105
Jiangxi	Chinese fir	95	Yunnan	Masson Pine	151
Jiangxi	Masson Pine	135			

As stated above, the three provinces of Guangxi, Hunan and Yunnan together contain about 391 000 ha or about 80% of the total forest area of 491 000 ha. Guangxi and Hunan are similar in terms of land form and terrain. Logging costs are the same. Yunnan is more mountainous, and the distance for carriage of logs to a truckable road is typically greater than in Guangxi and Hunan. Accordingly, logging costs in Yunnan are higher. Logging costs in Guangdong and Jiangxi provinces are similar to those in Guangxi and Hunan.

In addition to terrain and carriage distance, logging costs (from standing tree to logs at truckable road) vary on a per cubic metre basis with the green density of the logs, or weight per unit volume. Broadleaf species and 'Other Species' have the highest density, with the pines being lighter per cubic metre. These species are typically cut to lengths of about two metres so that they can physically be carried out of the forest by hand. Chinese fir is by far the lightest and is often carried in log lengths of up to 8 metres. It is easier than the other species to fell, delimb and carry. The cost of logging eucalypts is relatively low because these forests are much more intensively roaded and the carriage distances are quite short. Eucalypt forest land is also typically less steep and much easier to work on than the land carrying the other species.

In Heilongjiang, Pöyry has applied a logging cost of RMB131/m^3 to the 5 500 ha (1% of the total Sino-Forest estate). Although the area is remote, the terrain of the forest is reportedly easier than the hilly and mountainous forest areas of the southern provinces. A simple RMB10/m^3 cost reduction was made to the RMB141/m^3 applied in Guangxi and Hunan.

When the unit costs presented in Table 6-2 are weighted by Sino-Forest's area of forest by province and species as at 31 December 2009, the result is an average logging cost of RMB123/m^3. This compares with an area weighted average logging cost for the 2008 forest estate of RMB104/m^3. This 18% increase is a reflection of the average 8% increase in cost over the past year, the increase applied to the now selective harvesting of the Yunnan broadleaf crops, and the new area composition of the 2009 forest estate.

Among the potential effects of the global economic crisis in China is the likelihood of considerably more male labourers remaining in the rural villages in 2010. This could provide an increased supply of labourers for forestry work. In Pöyry's opinion, this may dampen the logging cost increases that might otherwise be expected. Accordingly, in the cash flow model, Pöyry has reduced the overall cost of logging from the new costs (see Table 6-2) by 10% in 2010, and 5% in 2011. (The impact of not applying this assumption is to reduce forest crop value by less than 1%).

6.2.1 Harvest Roading Costs

In this year's valuation, rather than assume that the forest is sold as stumpage, it is assumed that the forest is managed and harvested by the forest owner. Accordingly, a provision for harvest roading at RMB10/m^3 harvested has been included in the harvest related costs.

6.2.2 Cartage Costs

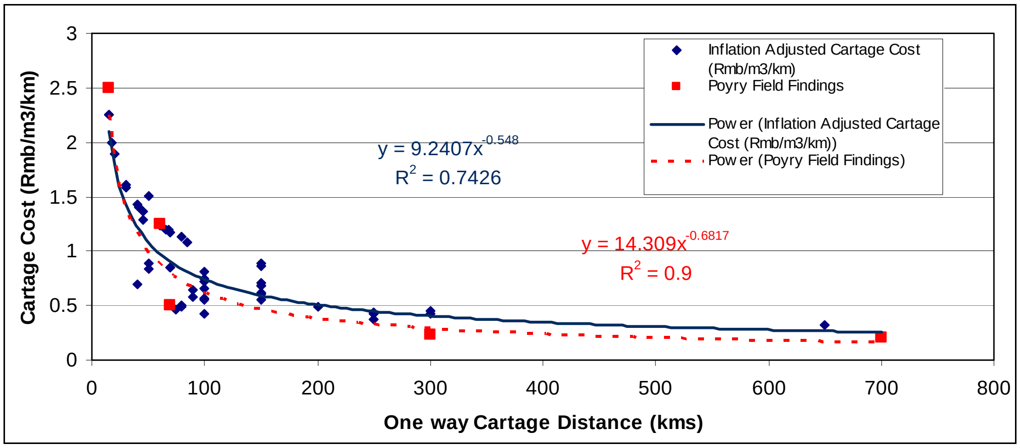
As part of the 2008 valuation, historical cartage cost data from Pöyry's in-house database were adjusted to real costs as at 2008, based on China's published CPI, and plotted against cartage distance. The resulting cost curve (Figure 6-1) was benchmarked against five data points collected during the 2008 field inspection.

The associated cost equation

$$\text{Cartage cost: RMB/m}^3\text{/km} = 9.240 * \text{one-way cartage distance (km)}^{-0.548}$$

was then applied to assumed average cartage distances for the various provinces and, in the case of Guangdong, separately for eucalypt species.

Figure 6-1:
Unit Cartage Cost on Cartage Distance (December 2008)



No cartage cost data were obtained as part of the 2009 valuation While diesel costs to the consumer have risen by around 10% over the past year in China, the cost of diesel contributes less than one-third of the total cost of running a log cartage truck. Cartage costs are assumed to have increased by about 5% since 2008.

Table 6-3 summarises the assumed average cartage distance from the forest to the point of sale, and the cartage costs applied in the forest estate model. The point of sale in every case is assumed to be at-mill-gate. The price point assumed in the derivation of log prices (see Section 8)), is also at-mill-gate.

Table 6-3:
Assumed average cartage Distance and cartage Cost for Logs (December 2009)

Province	Average Cartage Distance (km)	Cartage Cost (RMB/m^3)
Fujian	100	78
Guangdong	80	70
Guangdong (eucalypts)	60	62
Guangxi	150	93
Guizhou	150	93
Heilongjiang	150	93
Hunan	150	93
Jiangxi	150	93
Yunnan	150	93

In Pöyry's opinion, these are reasonable estimates of the average cartage distances (and costs) likely to apply to the cartage of logs from Sino-Forest's forest areas to market. As concentrated forest areas become due for harvest, wood processors are likely to establish processing plants near these resources. Sino-Forest itself is one organisation that is planning to establish plants to utilise such forest produce and reduce log cartage costs. Pöyry is also aware of other prospective participants in wood processing who are considering the same tactic.

6.3 Forestry Overheads and Indirect Costs

In addition to direct costs, all businesses incur indirect costs. These costs are sometimes called overheads. Indirects or overheads are all those costs that are not direct labour or materials or are not easily associated with particular units of production.

In the general management of the forest, units of production are usually areas (hectares) of forest that are treated in a specific way or undergo particular treatment operations. In the harvesting phase, they refer to the volume of logs that are harvested (cubic metres).

Forestry businesses overheads are usually divided into those associated with the general management of the forest estate and related forestry operations, and those more closely connected to harvesting activity.

Forestry overheads and indirect costs comprise two parts. These are the forest business management and administration cost of running the forestry business, and indirect costs associated with forestry operations.

6.3.1 Forest Business Management and Administration Overhead Cost

These are the total spend of the forest management business excluding all direct forestry operations costs, the cost of land rentals, and costs associated with harvesting and marketing activity. This provision is intended to cover the costs of:

- All staff remuneration (corporate, management, administrative etc.)
- Offices rental, power, telecommunications, and other expenses
- Vehicle running
- Information technology and software licenses etc.
- Training
- Research and development
- External professional services e.g. legal, audit, other consultancies
- Public relations and communications
- Insurance
- Repairs, maintenance and depreciation of assets
- Memberships, levies and subscriptions.

Pöyry has a considerable amount of experience in assessing forestry overhead costs in forest businesses around the world. As in last year's valuation, Pöyry has not obtained particular overhead costs for Sino-Forest's business but has considered a wider and generic estimate of the costs of running a forestry business of a similar size in New Zealand and Australia.

This cost is related to the area of forest, although there are not always economies of scale. Pöyry has applied an annual overhead cost of **RMB300/ha.** This is the same as applied in the 2008 forest valuation, and is about 80% of the current cost in New Zealand and Australia. However, a significant proportion of the total cost is in staff remuneration and running offices. These are lower cost items in China.

6.3.2 Indirect Costs associated with Forestry Operations

Forestry operations are typically accompanied by supervision and quality control costs. As a provision for this, Pöyry has incorporated an 'on-cost' of **10% of the direct cost** into the forest model. This is the same as applied in the 2008 forest valuation.

6.4 Harvesting and Marketing Overheads and Indirect Costs

Harvesting and marketing overheads are all of the harvest related costs that are not otherwise included in the direct costs. Harvesting taxes and fees are treated as an indirect because they are external impositions rather than direct costs.

6.4.1 Harvesting and Marketing Overheads

For a forestry business that is carrying out its own harvesting and marketing, there are associated overhead costs incurred. These cover the costs of:

- Harvest planning and engineering (roads and landing)
- Pre-harvest inventory
- Supervision of the harvesting operation to ensure value recovery
- Marketing, administrative and accounting costs associated with sales
- Other costs of sale such as log volume / weight measurement, scaling etc.

Pöyry has also undertaken a considerable amount of work in assessing harvesting and marketing overhead costs in forest businesses around the world. For a large business, with an annual log production over 1 million m^3, these costs are typically in the range of USD2-7/m^3, or about RMB15-50/m^3. The range usually relates to the extent to which the company uses its logs internally or sells to other parties, and the degree to which they manage their own harvesting and marketing activity internally, as opposed to contracting out that function.

Historically, Sino-Forest has generated its main revenue from the sale of stumpage (standing trees), and often associated land use rights that it has held. Increasingly however, Sino-Forest has sold 'stumpage' (the right to harvest the trees) and not the land use rights, and then undertaken the reforestation after the buyer of stumpage has harvested the tree crop. Sino-Forest has indicated to Pöyry that it intends to move into harvesting its own trees, and will progressively increase processing of the logs produced as well.

In previous valuations, Pöyry has applied a 'Log Traders Margin' effectively as a proxy for harvesting and marketing overheads. This was applied at the rate of **5% of the gross log sales price**. In this valuation, Pöyry has taken the view that because the scenario that is being modelled for the purposes of generating a wood flow and cash flow assumes a sale of the entire forest, and the ongoing management of that forest in the long-term, it is more appropriate to assume management of the harvesting operation by the forest owner. All this has meant is the replacement of the 5% of gross log sales price as a cost, with what Pöyry considers an appropriate harvesting and marketing overhead for a large forestry business in China. This has been applied at RMB20/m^3. It has also meant the inclusion in direct harvest-related costs of RMB10/m^3 for tracking and road making in support of harvesting operations. This total of RMB30/m^3 (harvesting and marketing cost plus harvest roading cost) compares with an average of RMB35/m^3 applied as the 'Log Trader's Margin' in last year's valuation.

6.4.2 Harvest Taxes and Fees

Harvest Tax

According to government policy document (Ministry of Finance PRC & State Forestry Administration PRC 2009(32)), this equates to a maximum of 10% of the log sales revenue.

Pöyry's understanding is that log 'sales revenue' is of the 'First Sales Price' and that 'First Sales Price' means the log price at the forest gate or roadside and not at-mill-gate. (The latter could mean a higher tax imposition simply because of higher log cartage costs).

Each province and county is able to set its particular harvest tax rate at any level, up to the maximum of 10%. While tax rates vary from county to county, and between forests and forest owners, Pöyry has assumed and applied the maximum rate in the cash flow and valuation model.

In addition, there are other fees payable to Forest Bureaus in relation to harvesting. These are:

Harvest Inventory & Survey Fee

A Harvest Inventory & Survey fee is charged by the third party/organisation that holds the Forest Inventory & Survey Qualification issued by the forest authority. This charge applies to the total standing volume (TSV) and ranges from RMB3/m^3 to RMB10/m^3 of the inventory total standing volume.

Pöyry has applied a standard Inventory and Survey fee of RMB6.5/m^3. Accordingly, harvest taxes and fees within the model are 10% of roadside price plus RMB6.5/m^3.

The harvesting tax and fees applied in this year's valuation average RMB66/m^3 as compared with last year's RMB52/m^2. This is a 27% increase of the assumed cost.

7 LAND RENTALS (COST OF LAND USE)

Sino-Forest pays for the land it uses for forestry purposes. These payments are in the form of annual rentals. Land rentals in China, as in other parts of the world, vary widely with the quality of the land and its uses. Some specialist forestry crops such as poplars and bio-fuel species can face rentals of more than RMB1 800/ha/year. Forestry crops typically face much lower land rentals.

During Pöyry's field investigations in 2008, information was obtained on land rentals for eucalypts. These ranged from RMB15 to RMB90/mu/year, with an average of RMB25/mu/year (RMB375/ha/year). Other information obtained by Pöyry in early 2009 indicates a range of RMB13 to 29/mu/year (RMB195 to 435/ha/year), with an average of RMB325/ha/year being paid for eucalypt forest land in southern China. This equates to a mid-point of RMB350/ha/year from these two sources, for eucalypts.

Pöyry's database and other information sought on land rentals for other species indicate a range of RMB13 to 21/mu/year.

On the basis of about 20% of the Sino-Forest estate being in eucalypts, an area weighted average rental rate of RMB270/ha/year has been calculated.

The company indicates a range of current rentals of RMB10 to 20/mu/year, or RMB150 to 300/ha/year, or a mid-point of RMB225/ha/year.

Pöyry has applied a mid-point of the range of RMB225 to 270/ha/year, or **RMB250/ha/year** to all land in the cash flow and valuation model. This is the same land rental applied in the 2008 valuation, and nearly 70% greater than the annual land rental cost applied in the 2007 valuation.

While some land rentals are pre-paid (acquired for the current rotation with the purchase of the tree crop), these pre-payments amount to a pre-payment for a land-related asset. Ignoring land rentals in the cash flow would effectively over-estimate the value of the tree crop.

8 LOG MARKET AND PRICE OUTLOOK

8.1 Supply and Demand

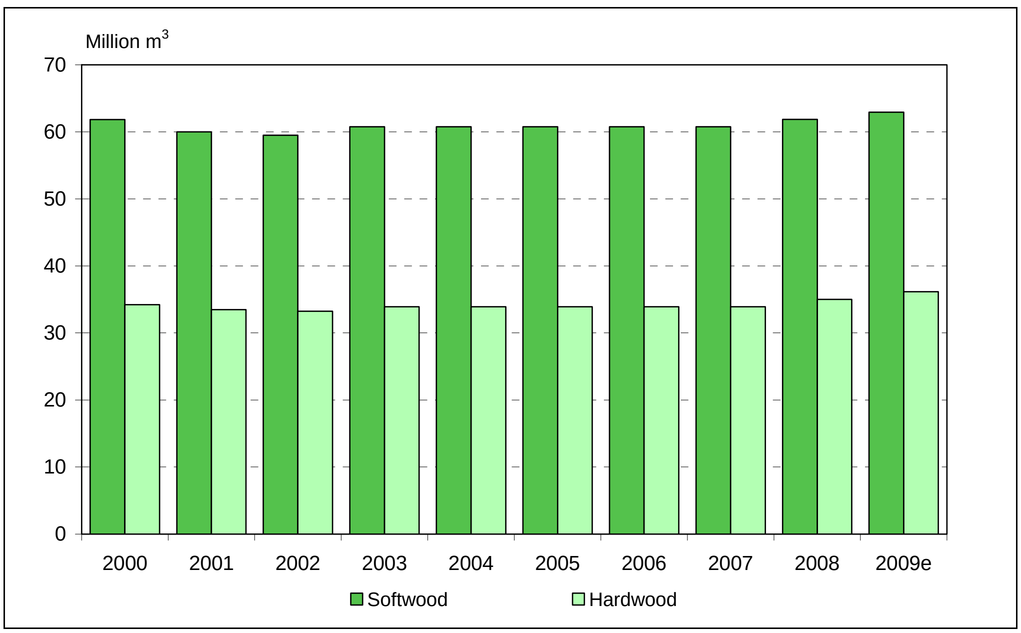
8.1.1 Domestic Log Supply

A series of floods in 1998 in China were blamed in large part on deforestation and uncontrolled harvesting programmes. It led to the central government significantly reducing timber harvests in natural forests and also increasing protection forests. Since then, the focus has shifted to plantation forests, and the total harvest has been on a gradual rise during the 2000s.

China's current commercial and recoverable log production is estimated at 100 million m³/a. Of that, softwood represents 64% (Figure 8-1). In addition, it is understood that a large quantity recovered from non-commercial log production also ends up in various industrial sectors.

In the foreseeable future, there may be moderate increases of softwood log supply from plantation forests but the growth is partially offset by continuing declines in harvesting of natural forests. As such, China's domestic softwood log supply is forecast to remain relatively consistent or increase marginally.

Figure 8-1:
China Domestic Commercial Log Supply



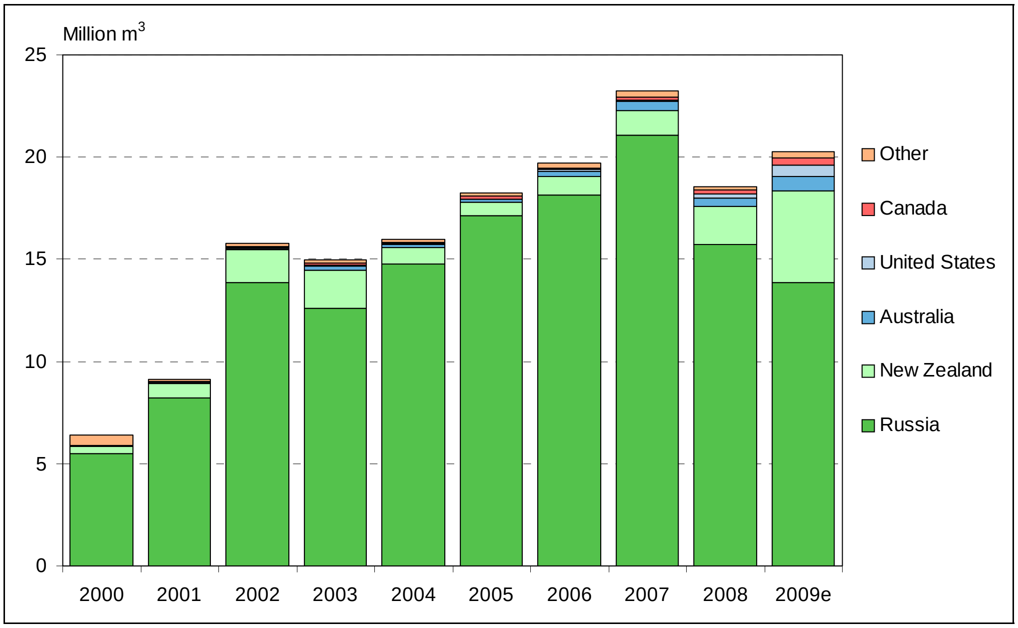
8.1.2 Log Import

Softwood

China's softwood log imports have increased exponentially over the past decade driven by the country's strong economic growth and an overall shortage of domestic wood. Russia has been the predominant supplier of softwood logs into China.

In 2009 China's softwood log import was approximately 20 million m³, 13% lower than the peak in 2007, but 9% higher than in 2008.

Figure 8-2:
China Softwood Log Imports by Origin



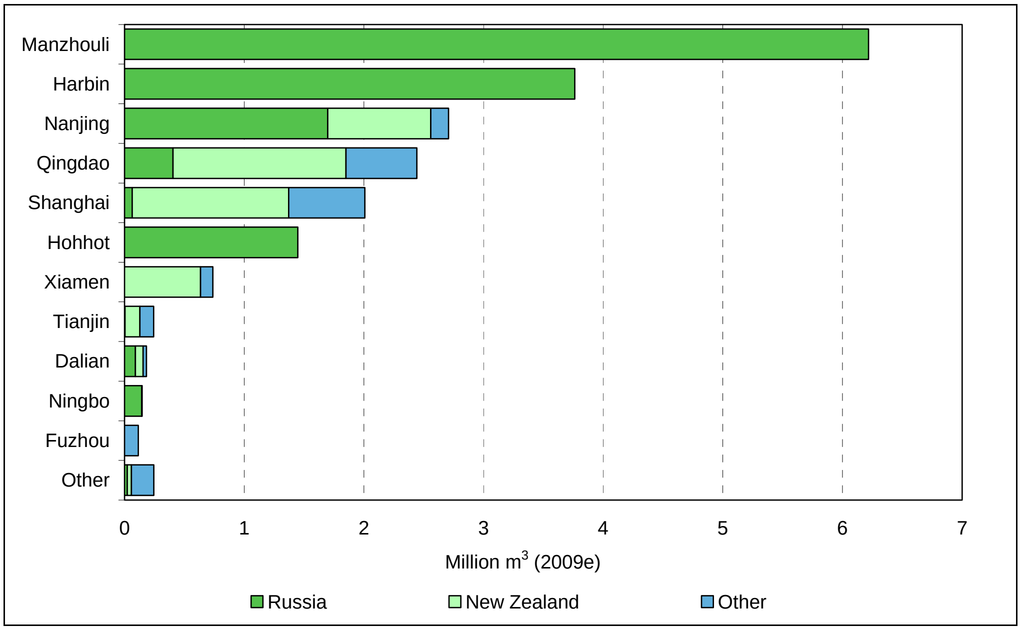
The decrease of log imports during 2008 reflected reduced volumes imported from Russia, which was triggered by the announcement of Russian log export tax rises, while the Chinese domestic demand also generally stabilised.

As an alternative to importing logs, China's softwood lumber imports increased substantially during 2008. This eventual shift is expected to continue, as the cost of imported Russian logs keeps increasing. Such structural changes have already become evident in the related industries that, until recently, relied heavily upon Russian log supplies.

Contrary to Russian supply, softwood log imports from New Zealand to China increased considerably during 2009 and were at a record high. As a result, New Zealand's share of China's softwood imports increased to 22% in 2009, compared to 5% in 2007 and 10% in 2008. Russia's share on the other hand decreased to 68% in 2009, compared to 91% in 2007 and 85% in 2008. This trend clearly indicates a partial shift from tightening Russian supply in favour of more New Zealand logs.

Figure 8-3 illustrates China's softwood log imports by district (port) during 2009. This highlights the significance of the two major Chinese inland districts for timber imports from Russia, Manzhouli and Harbin, handling the majority of China's timber imports from Russia. It also shows that Qingdao and Shanghai were the two key districts for the import of New Zealand logs, followed by Nanjing.

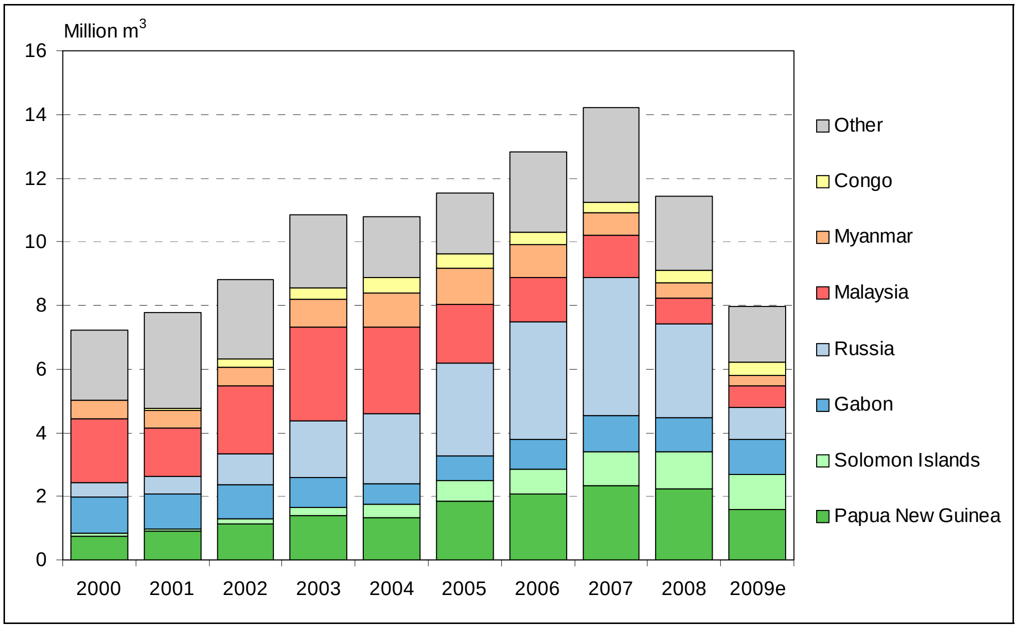
Figure 8-3:
China Softwood Log Imports by District (2009e)



Hardwood

Presented below are China's hardwood log imports by origin. The volume has dropped notably since the peak in 2007, from 14 million m³ to 8 million m³ (2009e). While the volume from Russia decreased substantially, supplies from Papua New Guinea, the Solomon Islands and Gabon have been comparatively consistent, positioning as the largest three hardwood log suppliers into China today.

Figure 8-4:
China Hardwood Log Imports by Origin



8.1.3 End-use Industry Development

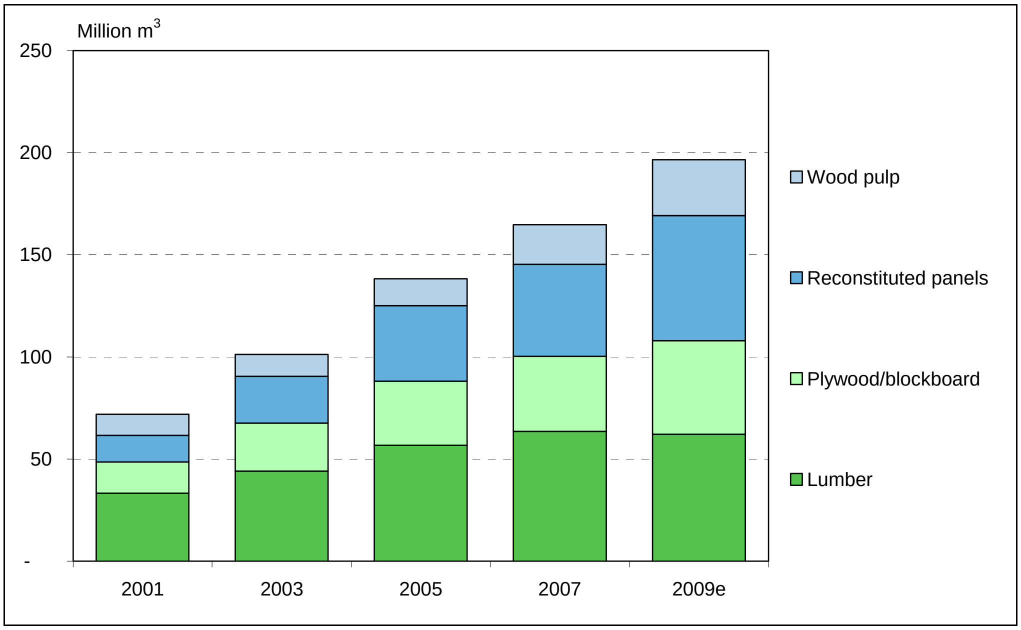
China's total domestic fibre demand, including non-industrial applications such as rural housing, mining, agriculture and fuel wood is currently estimated at 400 million m^3/year. Industrial uses represent some 40-50% of the total.

As presented in Figure 8-5, China's industrial wood consumption as of 2009 was estimated to be 200 million m^3, on a roundwood-equivalent (RWE) basis. Virtually all industries have contributed to the considerable growth experienced over the last decade.

Sawlog and peeler log demand is generated by domestic production of lumber, plywood/veneer and blockboard products. China has faced significant shortages in domestically produced quality saw and peeler logs, especially after logging bans from natural forests, and therefore depends on imported logs.

In addition, China has been unable to supply sufficient pulp fibre from its domestic sources to the pulp industry, and since 2006 has been a net importer of woodchip.

Figure 8-5:
China Industrial Wood Demand by End-use Industry



8.1.4 Demand Drivers

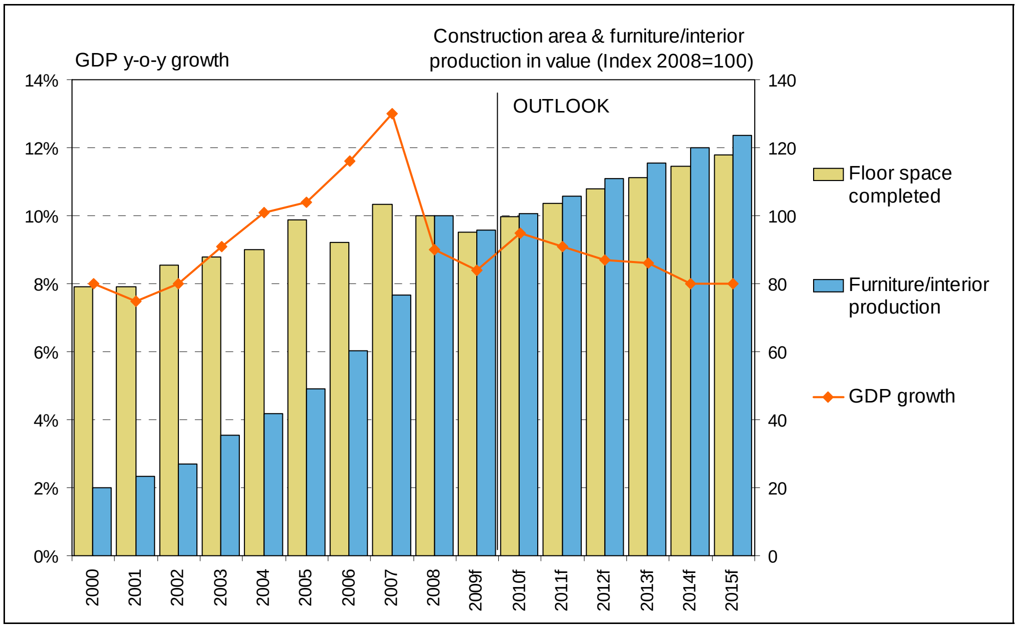
China's economic growth in recent times has been phenomenal, averaging over 9%/year over the last decade in terms of annual GDP growth. The country has become the largest wood products consumer in the Asia-Pacific region, and the production of almost all types of wood products in China has increased at an exceptional rate during this period.

Continued urbanisation, massive government-led housing programmes, expectations of improved living standards, and the privatisation of the housing system have all been and will continue contributing to the strong construction activity. This has also driven expansion of the related manufacturing industries in China, supported by the continued growth in the domestic economy and rising household incomes.

In addition, infrastructure investments by the government will continue to be substantial, leading to strong medium-term demand for wood. The Chinese Government announced in November 2008 an RMB4 trillion (USD586 billion) stimulus plan to spur expansion in the economy and help sustain growth following the global credit crunch.

The country's economic growth is forecast to slow down after the significant period of expansion during the mid-2000s. The real GDP growth in 2008 was 9.0% and, affected by the global financial downturn, the growth in 2009 was expected to be around 8.4%. While the short-term outlook for 2010 and 2011 is more positive than the previous two years, the medium-term forecast after 2012 is a stabilisation at around 8%/year.

Figure 8-6:
China Key Demand Drivers



China's construction activity was an estimated 2.3 billion m^2 in 2008 and, after a period of slowdown, is expected to reach 2.7 billion m^2/year by 2015. Investments in Chinese mills, aided by government incentives, have also led to a considerable expansion in value-added processing, such as furniture and interior decoration manufacturing.

China's interior decoration and furniture manufacturing industry has been expanding rapidly during the past decade, supported by construction industry growth, increasing household incomes and overall economic growth. China's interior decoration, furniture and flooring segments account for nearly 50% of the total lumber consumed in the country today. In particular, growth in the furniture export business has been the most significant, founded upon the country's cost competitiveness in manufacturing.

Furniture/interior decoration manufacturing activity has been slow lately due to lower demand for finished products from export markets such as the US. However, in the longer term, the industry is forecast to continue growing at a steady rate albeit more slowly than experienced in the recent past.

8.1.5 Market Outlook

The Russian Government recently postponed once again the increase of log export duties by one year until 2011. Whether Russia still increases the log export tax as planned remains very uncertain at this stage and is difficult to predict. Given the current economic turmoil globally and regionally, it seems increasingly possible that no drastic change will take place, at least in the immediate future.

However, the potentially affected industries that have traditionally relied upon Russian log supply have proactively been seeking solutions. This movement is leading to a new equilibrium of softwood log supply and demand in northern Asia, resulting in some major changes within the supply chain, as evidenced by the continued large reduction in Russian log imports into northern Asia during 2008 and 2009.

Furthermore, regardless of the tariff issues, increasing costs of production in Russia have started to have a measurable impact on supply into northern Asian markets and will continue to do so into the near future. It is Pöyry's view that China's softwood log imports peaked in 2007, after a decade of substantial increases that were fully supported by the country's strong economic growth.

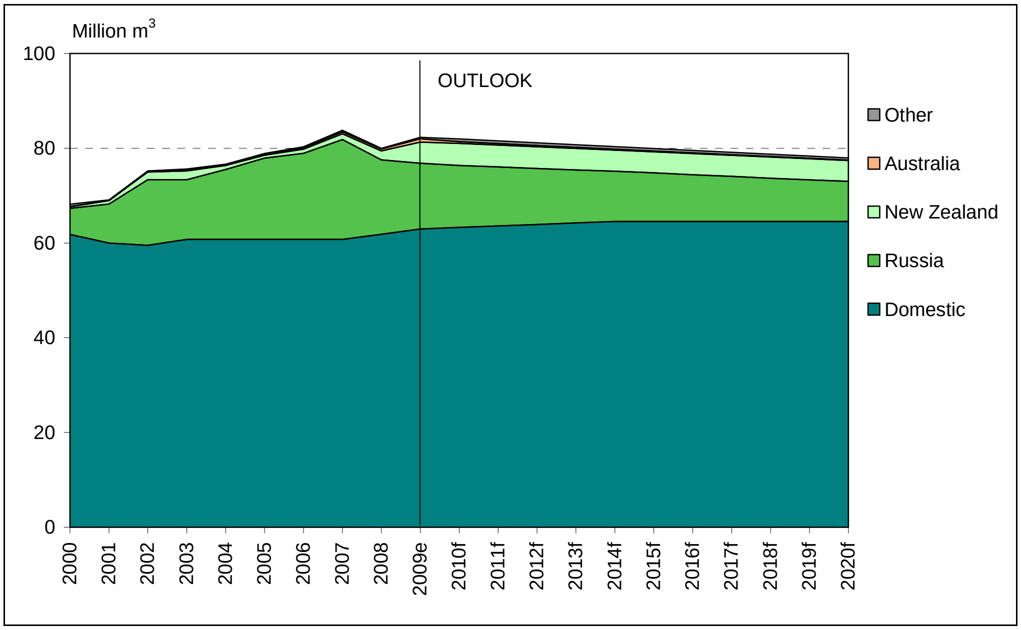
Going forward, the import of softwood logs from Russia will continue to decline as increasing production costs take effect. This Russian supply cost increase will result in other cost-competitive suppliers such as New Zealand being potentially in a more competitive position to increase their supply into these markets.

The total softwood log supply in China is forecast to decrease gradually over the next decade, as imports of semi-processed or finished wood products increase over time. Despite the continued economic growth in China, this log supply outlook is effectively capped by realistic availability of raw material supply. The gap will eventually be filled by the increased import of processed products, utilisation of hardwood, and substitution from wood to non-wood.

In terms of domestic timber supply, there will be some increases of softwood log supply from plantation forests but this is partially offset by continuing declines in harvesting of natural forests. As such, China's domestic softwood log supply is forecast to remain relatively consistent or increase moderately.

Figure 8-7 presents Pöyry's outlook for China's total softwood industrial log supply over the next decade.

Figure 8-7:
China Softwood Industrial Log Supply and Demand Outlook



8.2 Historical Prices

Figure 8-8 presents the development of imported softwood log prices from Russia and New Zealand into China, on a cost-and-freight (CNF) basis.

The prices increased considerably between 2003 and 2008, driven primarily by continued demand growth in China and high ocean freight rates. However, the global financial downturn resulted in a sharp price decline in late 2008 and early 2009. The government has since introduced significant financial stimulus plans, mainly in the domestic infrastructural areas, resulting in quick demand and price recovery, especially in the second half of 2009.

The CNF prices for imported logs are expected to continue increasing in the short to medium term as the demand remains strong, whilst supply from Russia remains tight in conjunction with the anticipated tariff issues and rising costs.

Figure 8-9 shows the development of domestic softwood log prices at several major wholesale markets.

Typically, log prices in China vary greatly depending on region, species and size. Local log sales are conducted either by direct negotiation between seller and buyer, or through large central log wholesale markets.

Domestic log prices are found to be broadly in line with the imported log price trend and are becoming increasingly internationalised. Indeed the domestic prices have been following a negative trend over the last two years, representing slower demand growth relative to the mid-2000s. However, the domestic prices did not deteriorate as significantly as imported log prices.

Figure 8-8:
China Imported Softwood Log Price Development by Origin

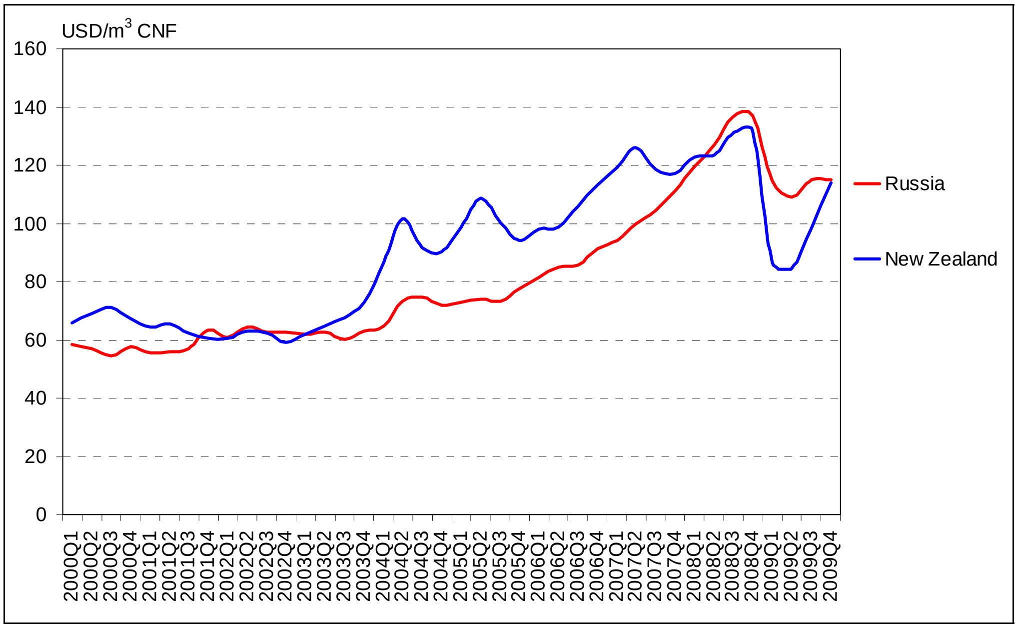
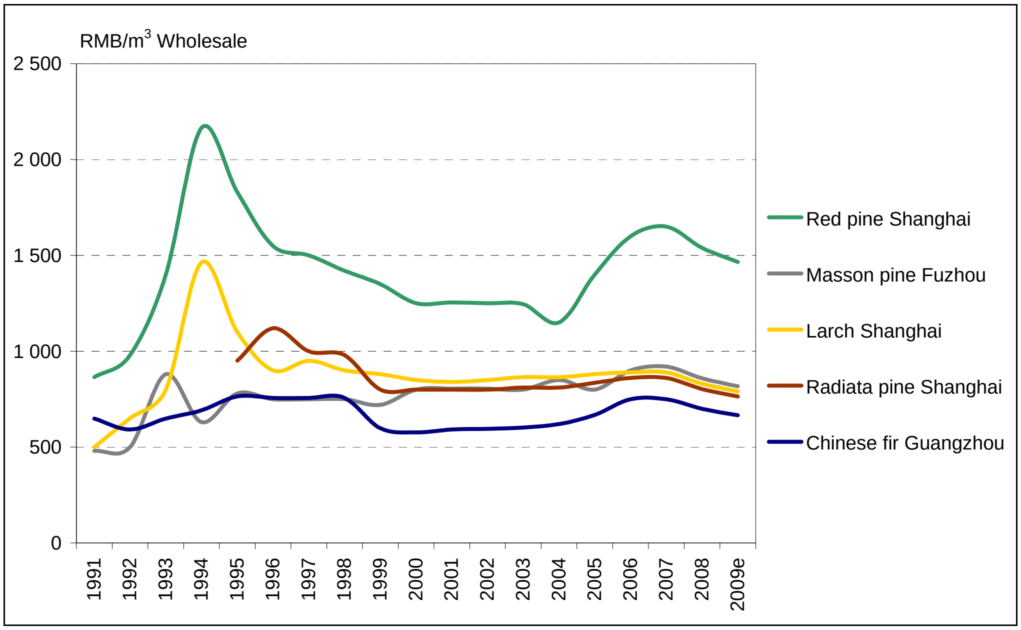


Figure 8-9:
China Domestic Softwood Log Price Development by Species/Market



8.3 Price Outlook

8.3.1 Approach

Log market analysis constitutes an important part of the valuation process. An NPV valuation is, by definition, based on expected future cash flows. Pöyry's approach to price projection involves an examination of the underlying economic and market factors that influence log demand. This includes the following:

- An analysis of key demand drivers such as construction activity.
- An assessment of the likely implications of the forecast supply-demand balance.
- An assessment of other essential variables.

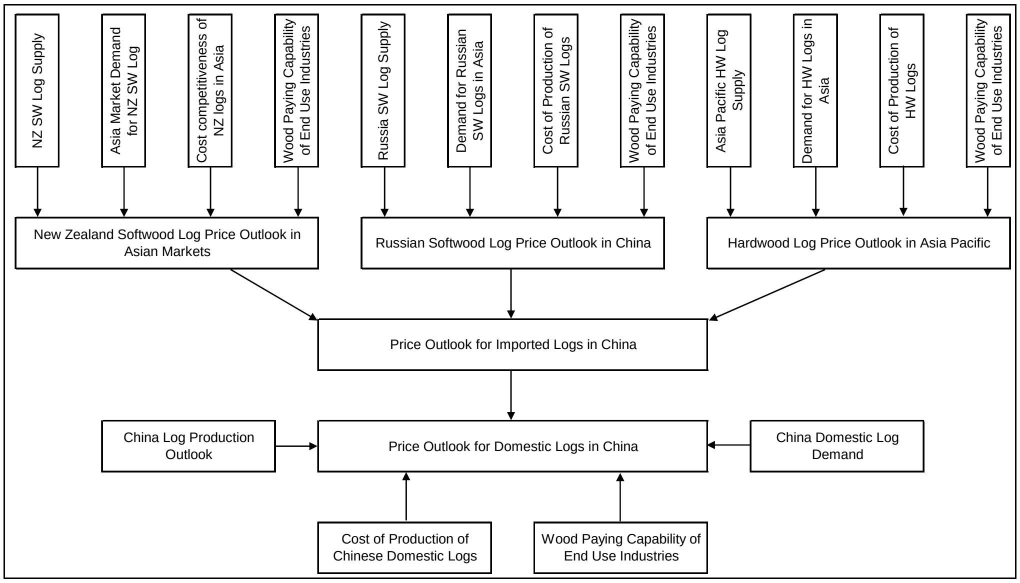
The approach also considers the following price factors:

- Historical price trends: Historical log price trends are recognised as being relevant and instructive.
- Current prices: The prices that are currently being obtained represent empirical evidence, and are used in generating near-term cash flow estimates.

In forecasting China's domestic log prices, Pöyry analyses a series of factors that affect log demand and supply, production costs and competitive forces. In carrying out China domestic log price forecasting, an informed judgement on the Asia-Pacific region's log price outlook is formed. This is primarily based on supply-demand factors and the competitive environment.

Figure 8-10 illustrates the multitude of factors influencing key log prices in the Asia-Pacific region which then ultimately affect domestic log price trends in China.

Figure 8-10:
China Log Price Forecast Methodology



8.3.2 Log Price Outlook

Presented in Table 8-1 is an overview of the key price-driving factors for the next five years.

Table 8-1:
Key Price-driving Factors, Assumptions and Impacts on Future Price

Factors	Outlook and assumptions	Impact on log prices
Domestic supply	There will be increases of log supply from plantation forests but this is partially offset by continuing declines in harvesting of natural forests. Overall, China's domestic log supply is forecast to remain relatively consistent or increase moderately.	Neutral
Domestic demand	Domestic fibre demand will continue to increase as the economy keeps growing, albeit at a slower rate than before. The short-term outlook is especially positive as the market is set to bounce back from the stagnated conditions caused by global financial downturn.	Positive, especially in the short-medium term
Cost of supply	Transport costs may further increase as fuel prices in China are expected to rise. However, operational efficiency in logging and transportation can be improved through the introduction of more sophisticated systems.	Neutral to slightly positive
Imported log and woodchip prices	Imported log prices are currently on a rise again after a considerable drop experienced in late 2008/early 2009. Strong demand factors support the short-medium term upward trend. Imported woodchip prices are presently under some downward pressure as the demand remains weak. The future trend will depend on the establishment of planned pulpmills in China (and Australia) and their fibre procurement.	Positive (sawlogs) Marginally negative (pulpwood)
Wood paying capability	Increasing market competition among wood products manufacturers effectively cap the opportunity for domestic wood products prices to significantly go up.	Neutral to moderately negative

China's log demand growth somewhat stagnated during 2009 affected by the global economic slowdown. The wood products export business in particular has suffered. Yearly-average log prices in China dropped by around 5% from 2008 to 2009.

However, healthy demand growth is expected to resume during 2010, resulting in upward pressure on log prices. Although China's domestic roundwood removals will increase relative to previous years, this increase will not be sufficient to meet growing sawlog demand.

While importing of industrial roundwood logs continues to fulfil domestic fibre demand, China's total log import volume is expected to start declining during the next decade. Proposed Russian log export tariffs will continue to affect the log supply dynamics in Asia. Furthermore, supply costs of the Russian imported logs are expected to increase as logging locations shift to more distant forests. This will drive up the prices of imported sawlogs which will also put upward pressure on domestic sawlog prices.

Regulations on harvest levels amongst the South-east Asian suppliers will suppress the amount of tropical logs available in the next five years. In addition, various measures and regulations that will be implemented to support sustainable forestry in the tropical forest-supplying countries will lead to higher production costs in South-east Asian countries.

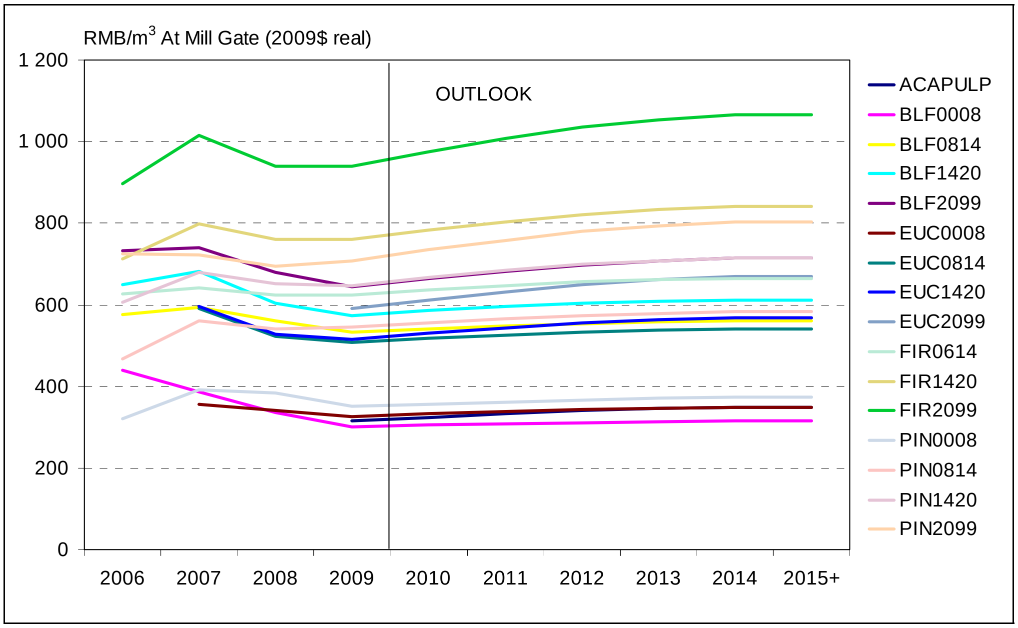
Pulpwood demand is expected to increase in the next five years as a number of large mill development plans are implemented, putting upward pressure on pulplog prices. However, generally stagnant global pulp and woodchip prices will offset the opportunity for domestic pulplog prices to increase significantly in the future. Thus, pulpwood price increases are forecast to be less significant than sawlogs.

As part of this valuation, log price information was gathered for the range of species currently owned by Sino-Forest. The sources of this information were interviews with log buyers and wood-using industries in Guangdong, Guangxi, Hunan and Yunnan, on-line log price information, and Pöyry's own China log price database.

Based on the analysis described above, Pöyry has formed an opinion on the log price outlook. This is the basis of the prices applying in the future. This sees large sawlog grades increasing in price between 2009 and 2014 at 2-3%/year in real terms, medium-sized logs increasing at 1-2%/year and small (pulp) logs at around 1.0%/year.

Figure 8-11 illustrates how log prices have trended since 2006 and the price forecast that Pöyry has applied in the valuation model.

Figure 8-11:
Recent Log Price Development and Price Outlook by Grade



8.3.3 Prices applied in the Valuation Model

Log prices used in the model are shown in Table 8-2 below. A comparison of the actual prices that applied in 2009 with those that were assumed in the 2008 valuation model, show that on a simple overall average basis, actual 2009 prices were about 3.3% higher. This effectively means that during 2009, log prices did not decrease as significantly as envisaged in December 2008. Average long-run prices remain approximately the same, in absolute terms, as those applied in last year's valuation.

Table 8-2:
Current and Future Prices applied in Valuation Model

Species and Log Grade	2009	2010 Period 1 in Model	2011 Period 2	2012 Period 3	2013 Period 4	2014+ Period 5+
	All in RMB/m^3 (At Mill Gate), 2009 Real Price					
(log lengths are 2 metres and sed range in cm as specified)						
ACAPULP	320	320	330	340	350	350
BLF0008	300	310	310	310	310	320
BLF0814	530	540	550	550	560	560
BLF1420	580	590	600	600	610	610
BLF2099	650	670	680	700	710	710
EUC0008	330	330	340	340	350	350
EUC0814	510	520	530	530	540	540
EUC1420	520	530	540	560	560	570
EUC2099	590	610	630	650	660	670
FIR0614	630	640	650	660	660	670
FIR1420	760	780	800	820	830	840

Species and Log Grade	2009	2010 Period 1 in Model	2011 Period 2	2012 Period 3	2013 Period 4	2014+ Period 5+
	All in RMB/m^3 (At Mill Gate), 2009 Real Price					
(log lengths are 2 metres and sed range in cm as specified)						
FIR2099	940	980	1010	1040	1050	1070
PIN0008	350	360	360	370	370	370
PIN0814	550	560	570	570	580	580
PIN1420	650	670	680	700	710	720
PIN2099	710	740	760	780	790	800
Simple average	**555**	**570**	**584**	**595**	**603**	**608**

9 WOOD FLOW AND ALLOCATION MODEL

The physical and financial descriptions of the forest, outlined above, are brought together in the form of input to the Forest Estate Model from which wood flows and cash flows are generated. The Forest Estate Model employs a linear programming formulation which allows constraints to be specified and applied to the management and harvest of the forest estate. These constraints include the specification of:

- Minimum and maximum harvest ages by species
- Replanting assumptions in terms of croptypes and expected future crop yields
- Levels of harvest volume (or area), in total or by defined parts of the forest estate, by species and location and period, and, where appropriate,
- The minimum and maximum volumes of particular log grades that can go to certain destinations.

With every constraint added to or incorporated in the model, and the tighter or more demanding any particular constraint, the lower the value of the forest will be. This is simply because the 'optimal solution' is more constrained, and in turn lower.

Constraints applied to the modelling of potential wood flow from the Sino-Forest estate are as follows:

9.1 Minimum and Maximum Rotation Ages

The following table shows the minimum and maximum rotation ages allowed, by species in the Forest Estate Model. A common approach is to allow a wide range of ages in the early period of the model, and then confine the range to one considered about the normal range for economic rotations of the various species. This allows reasonable flexibility to the model insofar as harvesting the various crops in the estate to meet the requirements of the other constraints.

Table 9-1:
Clearfell Age Constraints by Species and Period in Model

Species	Model Periods	Min Clearfell Age (years)	Max Clearfell Age (years)
Acacia	1 to 10	6	60
Acacia	11 to 60	6	10
Broadleaf species	1 to 10	25	99
Broadleaf species	11 to 60	25	99
Chinese fir	1 to 10	15	60
Chinese fir	11 to 60	15	30
Eucalypts	1 to 10	5	60
Eucalypts	11 to 60	5	10
Foreign pine	1 to 10	10	60

Species	Model Periods	Min Clearfell Age (years)	Max Clearfell Age (years)
Foreign pine	11 to 60	10	30
Masson pine	1 to 10	10	60
Masson pine	11 to 60	10	30
Other Species	1 to 10	17	60
Other Species	11 to 60	17	30

Period 1 to 10 is from Jan-2010 to Dec 2019; period 11 to 60 is from Jan 2020 to Dec 2069.

Almost 97% of the broadleaf forest is in Yunnan. The majority of that forest is mature i.e. currently 25 years of age or more, and theoretically ready for felling. The wide range allowed for the harvesting of this species is to allow retention of forest and permit its harvest over a long period according to other harvesting specifications listed below.

9.2 Regeneration Assumptions

The following table specifies the regeneration assumptions for each species including the TRV (m^3/ha) at a nominal harvest age for the successive rotations. TRV is expected to increase with rotation as selection and tree improvement efforts improve the genetic quality of tree stocks established, and also as a result of improved forest management and silviculture.

Table 9-2:
Regeneration by Species and Rotation – as applied in Forest Estate Model

Species	Current Crop	1st Replant to	Next Replant to	Next Replant to	Next Replant to	Next Replant to
Planted Eucalypts		COP1-EUCS	REP1-EUCS	COP2-EUCS	REP2-EUCS	REP2-EUCS
TRV (m^3/ha) at age 6	*127*	*127*	*134*	*134*	*140*	*140*
% Increase in TRV by Rotation		*0*	*5*	*0*	*4*	*0*
Purchased Eucalypts		REP1-EUCS	COP2-EUCS	REP2-EUCS	REP2-EUCS	REP2-EUCS
TRV (m^3/ha) at age 6	*89*	*134*	*134*	*140*	*140*	*140*
% Increase in TRV by Rotation		*150*	*0*	*4*	*0*	*0*
Chinese Fir		REP1-CFIR	REP2-CFIR	REP2-CFIR		
TRV (m^3/ha) at age 20	*202*	*222*	*244*	*244*		
% Increase in TRV by Rotation		*9*	*9*	*0*		
Masson Pine		REP1-FPIN	REP2-FPIN	REP2-FPIN		
TRV (m^3/ha) at age 20	*87*	*144*	*159*	*159*		
% Increase in TRV by Rotation		*40*	*9*	*0*		
Foreign pine		REP1-FPIN	REP2-FPIN	REP2-FPIN		
TRV (m^3/ha) at age 20	*131*	*144*	*159*	*159*		
% Increase in TRV by Rotation		*9*	*9*	*0*		
Broadleaf		REP1-BDLF	REP2-BDLF	REP2-BDLF		
TRV (m^3/ha) at age 625	*90*	*90*	*90*	*90*		
% Increase in TRV by Rotation		*0*	*0*	*0*		
Other species		REP1-OTHR	REP2-OTHR	REP2-OTHR		
TRV (m^3/ha) at age 20	*90*	*90*	*90*	*90*		
% Increase in TRV by Rotation		*0*	*0*	*0*		
Acacia		REP1-ACAC	REP2-ACAC	REP2-ACAC		
TRV (m^3/ha) at age 6	*63*	*66*	*69*	*69*		
% Increase in TRV by Rotation		*5*	*4*	*0*		

The level of improvement in terms of TRV at the nominal rotation age is greater for those species grown on longer rotations, recognising the greater time for research and development to produce incremental gains and an assumed associated greater level of improvement. For example, it is likely that the level of improvement between generations will be greater for Chinese fir during a rotation of 20 years than for eucalypts over a 12 year replanting horizon (planted crops are regenerated for one rotation by coppicing). Coppice rotations of eucalypts (COP1 and COP2) are likely to produce similar volumes per hectare as their planted parent crops. Subsequent rotations of both broadleaf and 'other species' crops are assumed to be naturally regenerated and likely to produce similar yields to the current crops.

9.3 Harvesting Constraints

The following table summarises the direct harvesting constraints applied in the model.

Table 9-3:
Harvesting Constraints applied in Forest Estate Model

Constraint	Start Period	End Period	TIME applies to	GROUP applies to	Sign	Quantity m^3
1	1	3	Period	GUANGDONG	<	1 800 000
2	1	3	Period	FUJIAN	<	1 800 000
3	1	3	Period	GUANGXI	<	3 000 000
4	1	3	Period	HUNAN	<	2 000 000
5	1	3	Period	YUNNAN	<	840 000
6	1	3	Period	GUIZHOU	<	550 000
7	1	3	Period	HEILIONGJIANG	<	220 000

Constraints 1 to 7 limit the annual harvest in periods 1, 2 and 3, to certain volumes. These volumes are 25% of the specific provinces Annual Allowable Cut (AAC) that is set to apply during the central government's current 11th Five-Year Plan. While this plan runs from 2006 to 2010, this constraint has been extended for a further two years beyond the end of 2010. This is intended to ensure during this early part of the model and wood flow, that Sino-Forest's share of the provincial AAC in any one year is (a) not greater than the AAC, and (b) no more than a reasonable share for any one large forestry organisation. Over these three periods of the model, the maximum percentage of any province's AAC modelled as cut by Sino-Forest is 25%. The average is 21%.

9.4 Destinations and Allocation

The model assumptions for the allowed destinations for various species and grades of logs are the same as in the 2008 valuation model. In each province two mill types are specified, one called 'Province-Sawmill (Generic)', and the other 'Province-Pulpmill (Generic)'. Very small and small-sized logs are allowed to flow to the pulpmills, and medium and large sized logs to the sawmills, all at the log prices defined for the particular grade of log as specified in Table 8-2. No upper or lower limit of supply to any mill is specified, and cartage costs are purposely set so that the harvest by province will flow to destinations only within that province.

The modelling software does permit precise specification of where wood, by species and grade, can and might flow. This can be achieved by specifying upper and lower volume limits by destination, and by varying the delivered log price and/or specifying the actual cartage cost by origin and destination. This level of sophistication has not been applied in the Sino-Forest model. Typically, in China there is a deficit in supply of logs. In addition, where there is an increase in the level of log supply, that is sustained, then commonly the wood processing investment that eventuates will see the average cartage distance and costs kept to a low level. The average cartage distances by province, as specified in Table 6-3, are considered realistic in terms of modelling likely average cartage cost and net stumpage for this valuation.

9.5 Smoothing Constraints

A large number of specific constraints were applied to control the wood flow. These ensured that:

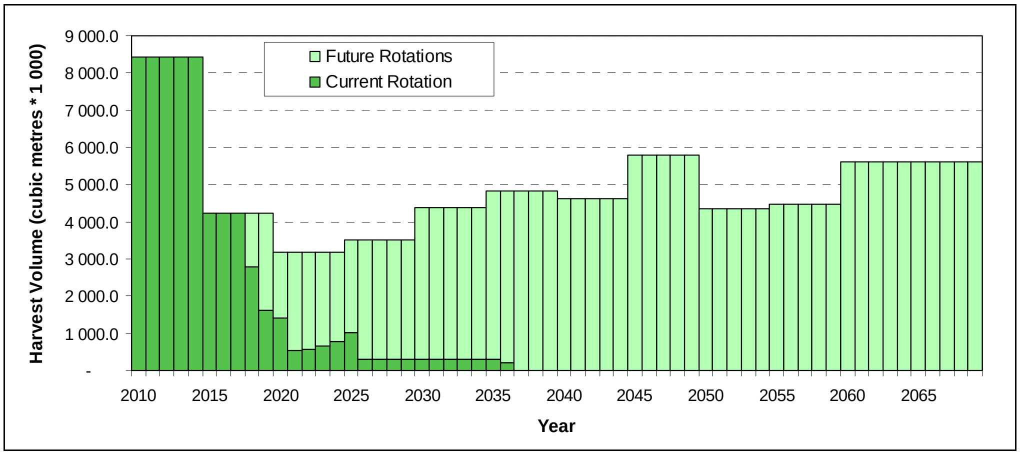
- From period 1 to 59, the annual harvest from the Yunnan broadleaf was non-declining in volume terms.
- Within each lustrum (five-year period) the total harvest volume in each year did not change.
- Between periods 5 and 6, the total annual volume harvested could not increase or decrease by more than 50%, and that between subsequent lustra, e.g. periods 10 to 11, 15 to 16, 20 to 21, and so on, the change in volume could not be more than 25%.
- Within each lustrum there were limitations on the extent to which the annual harvest within each of the three major provinces (Hunan, Guangxi and Yunnan) could change. This is to avoid there being high levels of harvest in a particular province for one or a few years, and then very little or none for one or more years, i.e. some smoothing of the annual harvest, by province.
- Within and between each lustrum there were limitations on the extent to which the annual harvest could vary by species so as to give some smoothing of the harvest by species, and avoid the situation where some species might be harvested in large volumes in some years and not in others.

Both the harvesting and the smoothing constraints seek to ensure a sensible and practicable harvest of the forest in a manner that would allow reasonable management of harvesting resources and avoid any undesirable impact on the log market.

9.6 Wood Flow

The following graphs show the results of the wood flow modelling.

Figure 9-1:
Wood Flow by Rotation



Note, the estimate of the market value of the forest is based on the wood flow and cash flow of the current rotation only.

Figure 9-2:
Wood Flow by Species

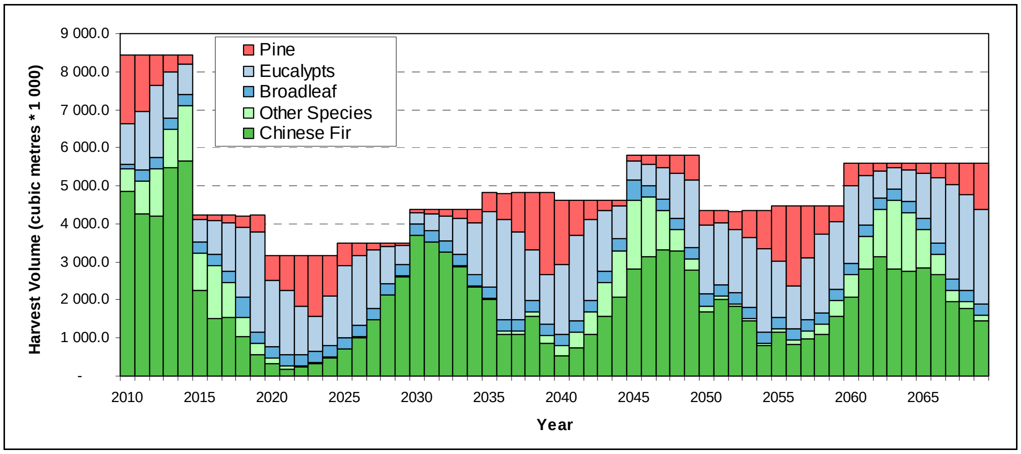


Figure 9-3:
Wood Flow by Origin

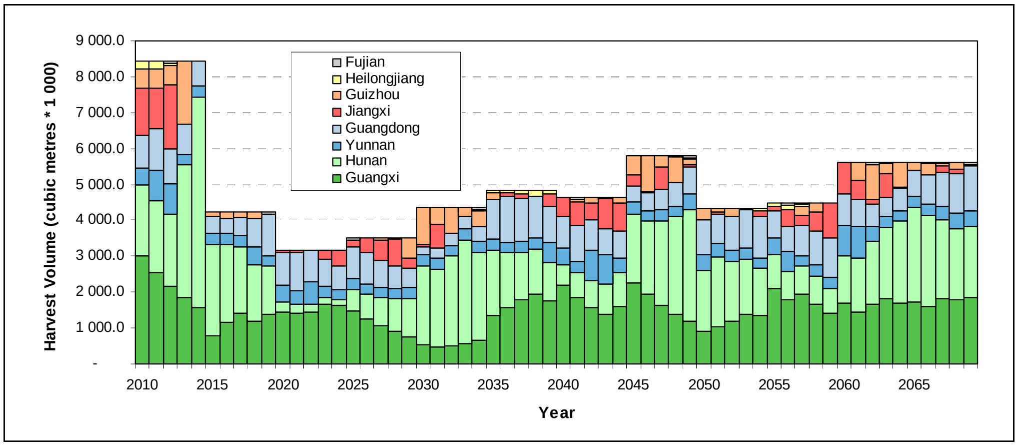
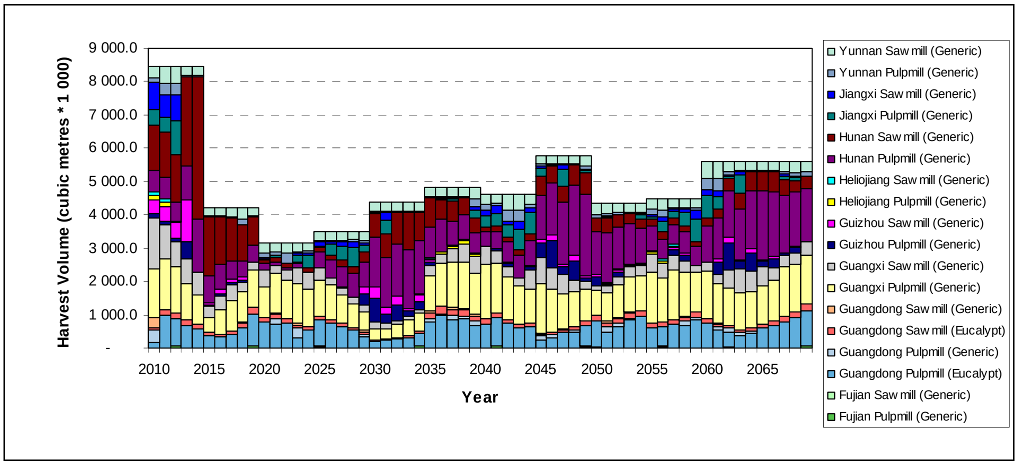


Figure 9-4:
Wood Flow by Destination



Because Sino-Forest's forest resource is relatively mature, with the capacity to produce a large harvest volume in the early periods, a high early harvest has been allowed. This is consistent with the modelling of wood flow allowed last year, although with the significantly increased area of forest owned and the increase in maturity of that forest, the levels of harvest are higher.

While this valuation does not seek to model specifically what the current owner is doing or might be planning in terms of harvesting, Pöyry typically takes some leading from the current owner's recent performance and intentions insofar as modelling the near-term harvest from the forest. Over the past three years, Sino-Forest has sold, as stumpage, 9.9 million m^3 (2007), 10.1 million m^3 (2008), and 14.2 million m^3 (2009), in total standing volume terms. Applying an average recoverable volume factor of 75% (from total standing to recoverable volume of saleable logs – the basis of Pöyry's wood flow and valuation), these volumes equate to around 7.4 million m^3 (2007), 7.6 million m^3 (2008), and 10.7 million m^3 (2009). These levels of sales have all been from a smaller base of forest area owned than what is owned as at 31 December 2009. In Pöyry's opinion, the levels of harvest modelled in the first five years are achievable, in terms of market absorption, and harvesting and wood-processing capacity, assuming that the Chinese economy continues to grow at or near 8%/year in GDP. Pöyry believes that the harvesting strategy is one that a rational forest owner of the Sino-Forest estate might follow.

This high early harvest reduces to a harvest rate that is constant in terms of the annual volume within each five-year period and restricted in the level of change between lustra. This embodies some level of smoothing of the harvest by species and by province.

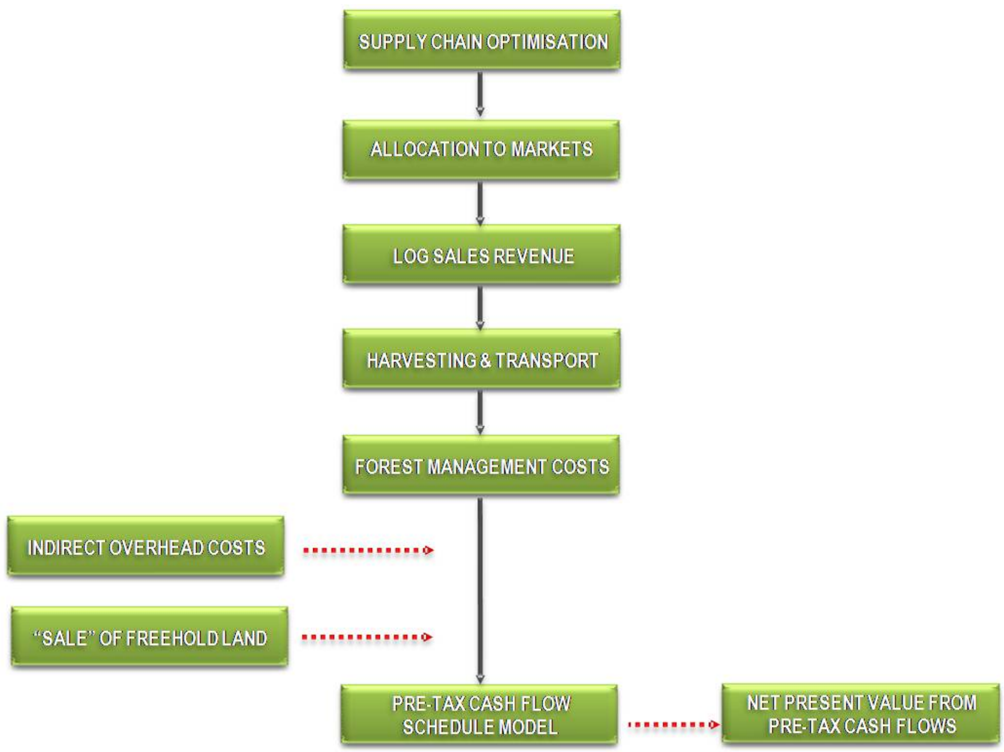
10 DISCOUNTED CASH FLOW VALUATION

10.1 Overview

The diagram below illustrates the structure of the valuation model. Generation of the initial inputs (the wood flows) has been described in the previous section. These wood flows are then optimised in their delivery throughout the supply chain to the various end-use markets. Revenue is generated at each destination, the price point being delivered at mill gate (AMG). Harvesting and transport costs, annual forest management costs, indirect overhead costs and the net cost of land-use (rentals) are deducted from this revenue to give an operating margin.

The linear programming model generates all of these costs streams, since their profile depends on the harvesting strategy and age-class structure of the forest.

Figure 10-1:
Schematic Illustration of the Forest Valuation Process



10.2 Treatment of Taxation

Astute forest investors are expected to prepare valuations on the basis of post-tax cash flows. However, in general the accessible information with which to interpret transaction evidence almost always excludes any evidence of the buyer's taxation position. Accordingly, when forest valuers have sought to derive implied discount rates, these have largely been based on pre-tax cash flows. This valuation has been based on real pre-tax cash flows to which Pöyry has applied what we consider an appropriate discount rate. This is to translate the pre-tax cash flow forecast into a net present value representative of the market value of the tree crop asset.

10.3 Scope of the Analysis

In this context, scope refers to the time span of the analysis. The forest estate modelling process can provide projections of cash flows far into the future. Providing the existing forest is replanted into productive croptypes, it would be possible to run the analysis indefinitely. Two alternatives are demonstrated in forest valuation:

- **Perpetual cash flows** - the forest is modelled as an ongoing business, where stands are replanted as they are felled. All revenue and costs associated with the sustained venture are modelled in perpetuity. In practice, the model is extended to the point where, after the discounting process, incremental cash flows are effectively immaterial. A figure in the order of sixty years is not uncommon when modelling a large plantation resource.

- **Current rotation analysis** - only the revenue and costs associated with the existing tree crop are included in the analysis.

In general, Pöyry prefers to confine the valuation analysis to the current rotation. The justification for this approach is that future rotations, which include a degree of conjecture, are excluded from the analysis. The current rotation approach is especially compelling when future rotations appear either spectacularly profitable, or especially unprofitable. In either case it could be anticipated that some modifying influence would prevail.

If subsequent rotations are unprofitable, the forest owner will look to contain costs and increase log prices. If there is no prospect of either, a rational investor will quit forest ownership.

If subsequent rotations appear super-profitable, it can be anticipated that there will be competition for the underlying land and its price will increase. When charged with a higher land price, the profitability of the tree crop, and hence its value, will decline.

The approach is consistent with wider business appraisal that generally seeks to confine the analysis to the current investment cycle, and thereby avoid unnecessary conjecture.

10.4 Timing of Cash Flows

Tree planting within the Sino-Forest estate most commonly takes place over the months February to April. By convention, stands are generally assumed to have been fully established by 30 June. The yield estimation process has generated yields that are projected to apply on the full anniversary of planting. Thus, for example, trees planted in 1990 were aged 19.5 years old on 01 January 2010, will be 20 full years on 30 June 2010, and 20.5 years on 31 December 2010. The harvest of stands planted in 1990 during the first period of the model (01 January to

31 December 2010) for example, generate yields from the particular species/croptype yield table as at age 20 years. While actual yields may be slightly less early in the year, they will be greater later in the year, and are assumed to average the mid-year yield table volume over the whole year.

Cash flows are assumed to arise on average at mid-period. Accordingly, with the first period being the 12 months from 01 January to 31 December 2010, the mid period is 30 June 2010. The first period's net cash flow has therefore been discounted for 6 months or 0.5 years, from 30 June 2010 back to the valuation date of 31 December 2009. Period 2 is from 01 January to 31 December 2011. The mid-period is 31 June 2011. Accordingly, the period 2 net cash flow has been discounted for 1.5 years, period 3 for 2.5 years and so on.

10.5 Date of Valuation

The date of the valuation is **31 December 2009**. Pöyry uses proprietary software that allows the isolation of both the cash flows arising from the current rotation and all future rotations at any point in the valuation horizon. The cash flows contributing to the Sino-Forest market valuation (current crop) arise during the 27-year period beginning 01 January 2010 and ending 30 December 2036. In fact, 95% of the market value derives from cash flows arising by 2018, and 99% by 2024.

11 DISCOUNT RATE

A valuation based on a Net Present Value (NPV) approach requires the identification of an appropriate discount rate. In selecting the rates there are two broad approaches:

- Deriving the discount rate from first principles. The most common expression of this approach turns first to the Weighted Average Cost of Capital (WACC). This recognises the costs of both debt and equity. The cost of equity may be derived using a Capital Asset Pricing Model (CAPM) method.
- A second approach is to derive implied discount rates from transaction evidence.

11.1 Discount Rate derived from WACC/CAPM

As part of the 31 December 2009 valuation of Sino-Forest's assets, Pöyry commissioned Associate Professor Alastair Marsden of Auckland UniServices Limited to prepare a report on the cost of capital for a generic forest investment located in China. Dr Marsden's full report is presented in Appendix 6.

Dr Marsden's report dated 05 January 2010 applies a WACC/CAPM approach to determine the cost of capital. He has concluded that, depending on the modelling assumptions, a range of discount rates might be proposed for a forest-owning venture in China. His derived ranges of rates are shown in Table 11-1 and Table 11-2.

Table 11-1:
Estimates of Real Post-Corporate tax WACC by Marsden*

Chinese Corporate Tax Rate	"Low" estimate	"High" estimate
Corporate tax rate = 25%	5.9%	9.6%
Corporate tax rate = 15%	6.0%	9.7%

*(denominated in USD for a generic forest asset in China)

The formulation of WACC employed by Dr Marsden was associated with post-tax cash flows and includes the cost of debt. Dr Marsden also converted his estimate of nominal post-tax WACC to an 'equivalent" real pre-tax WACC through a simple transformation with appropriate qualification as shown in Table 11-2.

Table 11-2:
Estimates of Real Pre-Corporate tax WACC by Marsden*

Chinese Corporate Tax Rate	"Low" estimate	"High" estimate
Corporate tax rate = 25%	7.9%	12.8%
Corporate tax rate = 15%	7.1%	11.4%

*(denominated in USD for a generic forest asset in China)

Dr Marsden's cost of capital estimates apply as at 09 December 2009.

The standard corporate tax rate in China is 25%. However, this can be reduced to 15% for qualified enterprises that are engaged in industries encouraged by the

Chinese Government. Assuming the highest tax rate of 25%, Dr Marsden's pre-tax corporate WACC has a mid-point of slightly less than 10.5%.

In his report, Dr Marsden mentions other (non-quantitative) factors relevant to the estimation of the cost of capital. In particular, he lists corporate governance, China's legal, institutional and bankruptcy laws and size of investment and its liquidity as factors that may warrant the application of a cost of capital at the upper end of his range.

Dr Marsden recommends *"(to the extent that such evidence is available) our estimates of the cost of capital for a Chinese forest entity be compared to implied discount rates based on transactional evidence for actual forest sales in the Chinese market."*

11.2 Implied Discount Rates

Pöyry has very little implied discount rate data for China and other than sales and purchases that Sino-Forest itself has been party to, we are not aware of any major forest transactions in China in the past year. As the commercial plantation forest industry develops and forests are transacted, empirical evidence from which to derive implied discount rates is expected to arise.

By comparison, in New Zealand and Australia analyses of implied discount rates has become a standard means for comparing transaction results and deriving discount rates to apply in forest valuation. In New Zealand, surveys of the discount rates employed by practitioners and their perceptions of the discount rates implied by recent transactions are also published.

The Convenor of the Forest Valuation Working Group of the New Zealand Institute of Forestry, Associate Professor Bruce Manley has published a series of biennial surveys of the discount rates employed by practitioners active in New Zealand and Australia[5]. The trend in the rates canvassed by Dr Manley's surveys is demonstrated in Figure 11-1. As noted in the legend within the figure, it includes not only the valuers' perceptions of IDRs, but also the discount rates that the valuers routinely *apply* in forest valuation. The broad correspondence between the IDR assessments and the applied discount rates is fundamentally sensible. It has become the increasing obligation of forest valuers to produce "market valuations" and a coincidence of the two forms of rate should therefore be expected. In some measure, all of the points are IDRs.

[5] Surveys of discount rates have been reported in the NZ Journal of Forestry in 1997 [NZ Forestry 42(4):47], 1999 [NZ Journal of Forestry 44(3):39-40], 2001 [NZ Journal of Forestry 46(3):14-15], 2003 [NZ Journal of Forestry 48(3):29-31] , 2005 [NZ Journal of Forestry 50(3):7-11] and 2007 [NZ Journal of Forestry 52(3):21-27]

Figure 11-1:
IDRs applied to real Pre-Tax and Post-tax Cash Flows - New Zealand Surveys

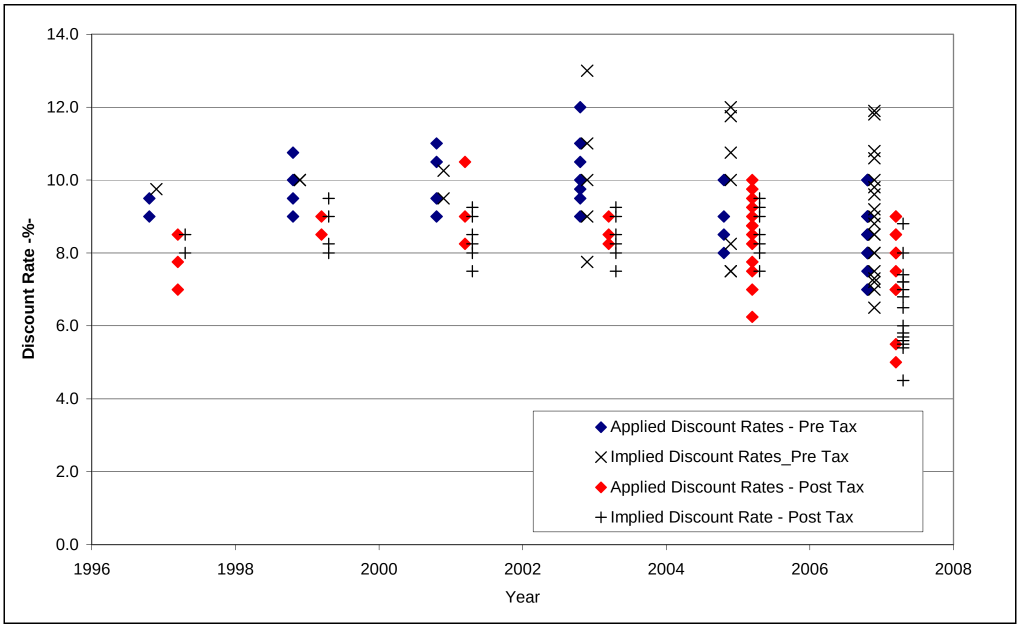


Figure 11-1 suggests that implied discount rates have shown some decline over the last two surveys. Valuation practitioners have followed suit with the rates they are applying. The results of the 2009 survey were recently published in NZ Journal of Forestry 54(4):19-23]. These results support the general trend of a lowering discount rate applied to pre-tax cash flows, with the minimum, maximum and average reported all lower than in the 2007 survey. The average of the surveyed discount rates as applied to pre-tax cash flows was 9.0% in the 2007 survey, and 8.6% in the 2009 survey.

However, compared with New Zealand and Australia, commercial forestry activity and investment in southern China is relatively new and still developing. Forestry business and the valuation of forest crop assets face some challenges, including:

- The reliability of forest descriptions
- The accuracy of yield prediction
- Achieving high growth rates in a consistent manner.

It is Pöyry's opinion that, for many forest investors, investing in plantation forestry in China would be considered a riskier proposition than investing in the industry in Australia or New Zealand.

11.3 Incorporating Risk in the Discount Rate

If forest investment in China is at present perceived to be a more risky proposition than like activity in other international counterparts, the issue then becomes how to quantify this difference. The textbook treatments of the subject make it clear that the discount rate cannot be regarded as a simple catch-all for any and all forms of perceived risk. As the discount rate may be a very blunt instrument in such a role, it is preferable instead to attempt to acknowledge risk in the development of the expected cash flows to which the discount rate is applied. However, despite this principle, standard practice by many potential purchasers is to load the discount rate where they feel unable to quantify all appropriate risks that should theoretically be reflected into the expected cash flows.

Table 11-3, below is a qualitative comparison of the key forestry risk elements in China and Australasia.

Table 11-3:
Comparison of Key Risk Elements of Forestry in China with Australia / NZ

Risk Item	Comments	Perception of Risk in China Compared to Australia / NZ
Liquidity risk	Likely to be fewer prospective purchasers and more restricted opportunity to exit forest investment in China.	Slightly higher
Valuation risk	Elements of the Forest Description, including recoverable yields (no reconciliation evidence available) and the area statement (largely because the Sino-Forest estate is such a dynamic one) are less certain. This is balanced somewhat by a positive future market outlook for logs with possibly some conservatism in the Pöyry log price forecast.	Higher
Political and Currency risk	Investment in China is of great interest both internally and to foreign investors. Politics, society and the currency is strong and stable. There is still however some concerns and perceived risks on the part of foreigners especially insofar as land based assets are concerned, where exit could be prolonged, complex and uncertain.	Higher (but may reduce over the next few years)
Stumpage price risk	China's normal demand for wood fibre is strong and is expected to continue to grow. There is a supply deficit of logs. Log prices are high and appear quite strong and stable or increasing in real terms. Logging costs have been increased in this valuation, and brought into line with current actual costs. Accordingly, there is considered to be low stumpage risk.	Lower
Growth and Yield risk	Pöyry is of the opinion that the yield tables underlying the wood flows and cash flows are reasonable. However, until there is a history of reconciliation there will be some uncertainty as to outturn in total recoverable volume and by log grade.	Higher
Land tenure risk	Prospective investors in the forest crop would likely perceive this with some uncertainty, largely due to a lack of understanding of Chinese land tenure and land use rights. Chinese land ownership is complex and is seen as an impediment to investment. As a result the Chinese Government has embarked on a programme to clarify land ownership issues over the next five years. This is likely to result in greater clarity in terms of land tenure and reduce perceived risk.	Slightly higher but likely to reduce over next few years.
Physical or biological risk	The risk of fire and forest losses in the plantation forests of southern China is considered to be lower than in Australasia. Unlike Australia and New Zealand, Southern China experiences its greatest rainfall during the summer months. The relatively small and discontinuous nature of the forests in China mean that in the event of a significant fire occurring, it is less likely that the area damaged would be extremely large. Climatic effect damage such as snow, wind, frost and heavy rainfall are not considered to be very different. China's geographic location renders it more susceptible to entry of pests and disease, although there are no reports of major forest problems or losses.	Similar

The challenge then becomes how to quantify the impact of these differences in risk elements in terms of the discount rate.

11.4 Discount Rate applied in valuing the Sino-Forest Resource

The range of rates suggested by the WACC/CAPM approach, at 7.1% to 12.8% is quite broad.

Given the current application of discount rates in the range of 8.5% to 9.0% to pre-tax cash flows in New Zealand, and the comparison of risk elements in Table 11-3, in Pöyry's judgement, an additional 2.5% to 3.0% would seem reasonable to apply to the Sino-Forest estate. This is also consistent with Dr Marsden's view that 'other factors' may warrant the application of a discount rate nearer the upper end of his estimates of the real pre-corporate tax WACC.

Pöyry has chosen to apply a discount rate of 11.5% to the pre-tax cash flows forecast to arise from the management and harvest of the current crops of Sino-Forest's forest estate. In selecting such a rate we have been inclined to recognise that investors in forestry in China will inherently be taking a long term view, and do have grounds for cautious optimism on the forest industry's future there. The fundamental factors that affect forestry performance are favourable. Importantly too, the definition of market value for the forests requires that there be not just willing buyers, but also willing sellers. If the only purchase offers to be extended involved very high discount rates, we would expect that forests would not be willingly sold.

A discount rate of 11.5% provides a margin of around 7.0% over Treasury Bond 'risk-free' real rates that have prevailed in western economies over the past 20 years.

12 VALUATION RESULTS

12.1 Exchange Rate

The cost and price data applied in the valuation is in Chinese Renminbi (RMB). The resulting cash flows generated from the forest estate wood flow and allocation model are also in RMB.

For reporting, Pöyry has assumed a USD to RMB exchange rate of 6.8172[6]. This is the published rate for 31 December 2009.

12.2 Valuation as at 31 December 2009

Pöyry has estimated the market value of the Sino-Forest tree crop assets as at 31 December 2009 to be USD2 297.474 million. This is the net present value of the pre-tax cash flows arising from the future management and harvest of the existing forest crops during their current rotation. The valuation uses an 11.5% discount rate applied to real, pre-tax cash flows.

Pöyry has also calculated the NPV of the cash flows from the forest estate assuming its regeneration after harvest and the continued use of the land for forestry. The underlying cash flow includes the costs of re-establishing and maintaining the plantation forests, and net revenues arising from their management and harvesting in perpetuity. This figure is USD2 128.806 million.

This is not an estimate of the market value. The difference between the market value and this figure, i.e. –USD168.688 million is wholly prospective. It is associated with rotations of tree crops that, as at the date of the valuation, have not commenced. (See also Section 10.3 Scope of the Analysis).

12.3 Merchantable Volume

Table 12-1 summarises the merchantable standing volume of the existing Sino-Forest plantations. Merchantable standing volume excludes:

- Areas of broadleaf younger than 20 years
- Areas of Chinese fir younger than 5 years
- Areas of eucalypts younger than 2 years
- Areas of pine younger than 5 years
- Areas of ‘other species’ younger than 17 years.

[6] OANDA.com *The Currency Site* http://www.oanda.com/currency/converter/.

Table 12-1:
Merchantable Standing Volume as at 31 December 2009

Establishment Year of Crops	Age at 31 Dec 2009	Net Stocked Area of Forest (ha)	Estimated Merchantable Volume (m^3)	Average Merchantable Volume (m^3/ha)
2009	0			
2008	1			
2007	2	6 559	186 101	28
2006	3	24 282	1 367 392	56
2005	4	18 181	1 503 082	83
2004	5	5 644	444 191	79
2003	6	4 602	416 456	90
2002	7	1 424	203 074	143
2001	8			
2000	9			
1999	10	115	8 964	78
1998	11			
1997	12	701	93 403	133
1996	13	1 175	108 946	93
1995	14	7 399	860 048	116
1994	15	12 344	1 435 881	116
1993	16	29 076	1 720 883	59
1992	17	25 427	3 000 846	118
1991	18	29 590	4 064 153	137
1990	19	40 884	6 124 134	150
1989	20	53 457	8 216 814	154
1988	21	58 501	10 100 824	173
1987	22	5 540	609 609	110
1986	23	15 030	2 143 306	143
1985	24	8 727	888 882	102
1984	25	23 598	4 242 777	180
1983	26	3 965	480 956	121
1982	27	5 662	687 765	121
1981	28	1 307	170 698	131
1980	29	11 031	1 521 786	138
1979	30	49 935	6 955 623	139
1978	31	12 847	2 336 521	182
1977	32			
1976	33			
1975	34			
1974	35	5 100	923 084	181
1973	36	1 224	205 410	168
1972	37	293	53 033	181
1971	38			
1970	39	2 420	438 080	181
1969	40	2 800	493 644	176
	Total	**468 843**	**62 006 366**	

This total 'merchantable standing volume' of 62.0 million m^3 in the forest is a notional figure. It includes the theoretical recoverable volume from the broadleaf forest at 181 m^3/ha. If that volume is reduced to 90 m^3/ha, on the basis of the requirement that areas if this croptype cannot be clearfelled but rather have to be selectively logged, then the 62.0 million m^3 figure will be reduced to 54.7 million m^3.

There is no expectation of the ‘merchantable standing volume’ being realised through immediate harvesting. The total volume expected to be harvested from the forest and sold as logs, over the modelled management and harvest of the existing tree crops (current rotation only), that is, the model upon which the market valuation is based, is 67.5 million m^3.

13 SENSITIVITY ANALYSIS

A sensitivity analysis has been conducted that addresses the main drivers of value within the current rotation valuation model. These are:

- Discount rate and log price changes (in combination)
- Changes in the level of fixed overhead costs
- Changes in the costs of production (logging, loading and log cartage)
- Changes in the level of land rentals
- *Changes in the level of forestry costs (to show that these are immaterial.)*

Table 13-1:
Log Price Sensitivity

Scenario	Real Discount Rate applied to Pre-tax Cash Flows		
	10.5%	11.5%	12.5%
	Current Rotation Value (USD million)		
5% Real Price Increase	2 594.765	2 510.716	2 431.89
No Real Price Increase (Base)	2 374.293	**2 297.474**	2 225.415
5% Real Price Decrease	2 153.821	2 084.233	2 018.94

Table 13-2:
Overhead Cost Sensitivity

Scenario	Real Discount Rate applied to Pre-tax Cash Flows		
	10.5%	11.5%	12.5%
	Current Rotation Value (USD million)		
RMB400 fixed cost/ha/year	2 345.186	2 269.288	2 198.085
RMB300 fixed cost/ha/year (Base)	2 374.293	**2 297.474**	2 225.415
RMB200 fixed cost/ha/year	2 403.399	2 325.66	2 252.744

Table 13-3:
Harvest Cost Sensitivity

Scenario	Real Discount Rate applied to Pre-tax Cash Flows		
	10.5%	11.5%	12.5%
	Current Rotation Value (USD million)		
10% Harvest Cost Increase	2 243.65	2 171.262	2 103.335
Harvest Cost (Base)	2 374.293	**2 297.474**	2 225.415
10% Harvest Cost Decrease	2 504.936	2 423.687	2 347.495

Table 13-4:
Land Rental Cost Sensitivity

Scenario	Real Discount Rate applied to Pre-tax Cash Flows		
	10.5%	**11.5%**	**12.5%**
	Current Rotation Value (USD million)		
Cost RMB350/ha/a	2 345.186	2 269.288	2 198.085
Cost RMB250/ha/a (Base)	2 374.293	**2 297.474**	2 225.415
Cost RMB150/ha/a	2 403.399	2 325.66	2 252.744

Table 13-5:
Direct Forestry Cost Sensitivity

Scenario	Real Discount Rate applied to Pre-tax Cash Flows		
	10.5%	**11.5%**	**12.5%**
	Current Rotation Value (USD million)		
50% Forestry Cost Increase	2 366.88	2 290.227	2 218.323
Forestry Cost (Base)	2 374.293	**2 297.474**	2 225.415
50% Forestry Cost Decrease	2 381.706	2 304.722	2 232.507

The valuation result is most sensitive to log price with a 5% reduction in log price, causing a near 10% decrease in forest value, and vice versa. It is less sensitive to harvest costs, with a 10% increase in the combined cost of logging and cartage causing a 5% reduction in value, and vice versa. The valuation is largely insensitive to annual overhead costs and land rental costs, with increases of RMB100/ha/year in the cost of either item causing a 1% reduction in forest value. As discussed above and shown in Table 13-5, large changes in forestry direct costs have no material impact on the valuation.

14 SUMMARY OF VALUE CHANGE

Changes to the physical nature of the asset as a result of growth, changes in the area and maturity of forest owned from sales and purchases, and forecast yield, combine to produce USD647 million, or 99% of the value increase. Changes in costs and log prices almost cancel each other out, with the majority of the balance of the value increase arising from a favourable change in the exchange rate, from RMB to USD, as at 31 December 2009.

APPENDIX 1

Valuation Methodology

1 METHODOLOGY

1.1 Outline of Valuation Methods

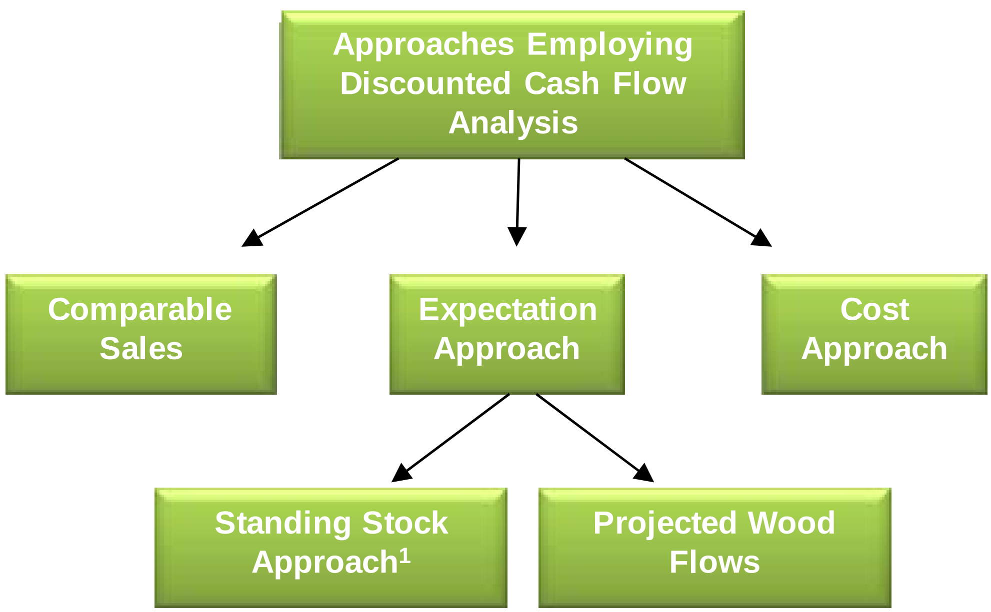
Accompanying the global expansion in planted forests has been ongoing refinement of the processes employed in forest appraisal.

Three main methods of appraisal are commonly distinguished. These are:

1. Comparable sales
2. Expectation value
3. Cost

If these methods are to be effectively utilised in forest valuation then all three of them generally require a discounted cash flow (DCF) approach[1]. A schematic representation of the relationship between the methods is shown in Figure 1-1.

Figure 1-1:
Valuation Approaches



[1] The standing stock approach is the special case where the discounting period used in the DCF analysis is zero.

1.2 Expectation Approach

The Expectation approach invariably involves DCF analysis. It provides the Net Present Value of the future net revenue stream and is commonly referred to as the "Income" or "NPV" approach[2]. As the terminology implies, this approach involves

[1] In this context, DCF is considered within its wider interpretation. This recognises that the timing of the receipt or outlay of funds must be considered. When applied rigorously, the *cost* approach involves compounding. This process is the inverse of discounting, and thereby falls within the scope of DCF.
[2] The list is not exhaustive. Other acronyms that may appear include PNW (Present Net Worth) and PW (Present Worth).

projecting the anticipated future net income stream, and then "discounting" this, at a suitable cost of capital, in order to acknowledge the lower economic value of delayed receipts.

The Expectation approach may characteristically turn to a wide reference base when selecting the discount rate. A commonly applied practice is to derive a Weighted Average Cost of Capital (WACC). This distinguishes the distinct costs of debt and equity. The latter may be derived using the Capital Asset Pricing Model (CAPM).

1.3 Comparable Sales

In principle, the most satisfactory basis for valuing forests is to turn to the evidence provided by sales transactions.

In comparing transaction results it is necessary to consider which attributes influence the value of planted forests. Important factors may include:

- Forest maturity
- Species composition
- Site productivity
- Proximity to market
- Forest terrain (and thereby harvesting system)
- Silvicultural history
- Land value.

Each of these factors may have a significant effect on forest value. Other features may also be influential. These include the standard of roading infrastructure in the forest, and the risks arising from climatic factors and pathogenic agents. Forest size may also have an influence, although there may not be a consistent trend with changing forest area.

When comparing forests and the prices paid for them, it is also necessary to consider the time at which an example sale took place. In the first instance, the timing is reflected in perceptions of current log prices and their anticipated future movement.

Given the range of factors affecting forest value, it is unlikely that forests can be found that are closely similar to the forest to be valued. This is especially the case given that forest estate transactions are not, by nature particularly frequent. Achieving a forest-to-forest match is extremely unlikely, as it would require finding forests alike in all respects, including size.

Forest appraisers commonly find that the one distillable parameter that can be most usefully extracted from transactions involving heterogeneous forest resources is the Implied Discount Rate (IDR). Derivation of the IDR involves developing a credible cash flow projection for each transacted forest, using the best information the analyst can obtain. This is then compared with the price actually paid for each resource. The discount rate at which the discounted cash flows match the purchase price is the IDR.

IDR evidence from the wider transaction base can be applied to the cashflow projections for the forest being valued.

The IDR offers a device by which differences in size, timing, markets, location, age-class, volume, operability and other relevant factors are recognised. Further, the approach also recognises that a useful method of arriving at a market comparable result is to employ the same procedure that market participants utilise in deriving and supporting their negotiating positions. For Asia Pacific forest resources, the most common method of negotiating transaction values involves DCF constructions.

The manner in which Pöyry applies the Comparable Sales and Expectation approaches may at first impression appear to be similar. Both employ a DCF formulation and refer to estimates of future cash flows. This does not imply that they can or should be unquestioningly coalesced into a single method. There is sufficient difference between them that they can potentially lead to different results.

1.3.1 Realisation Value of Current Standing Stock

This method warrants distinct discussion because it has had historical application. It recognises the potential net realisation value of the current timber content of the forest if it were cut down immediately. A value is based on the merchantable content (or "standing stock") at the time of the valuation. It is therefore a special case within the Expectation approach. Because the forest is harvested immediately, the cash flow modelling is confined to a single period. No discounting is required to recognise the cost of capital. This value is both tangible and comparatively straightforward to calculate. It does however have obvious limitations:

- For plantation forests, the timber realisation value of the stand may be very low for most of the rotation length. Despite this, the vendor will be mindful of the funds invested in each stand and are expected to seek some reimbursement.

- By the final years of the characteristic rotation, the marginal rate of value growth of the standing stock becomes considerable. An informed and rational owner will recognise the economic opportunity associated with holding the growing trees rather than selling them. Only if the purchaser's offer matches the vendor's perception of economic opportunity cost can the vendor be indifferent as to whether to hold or sell. Inherently, therefore, the vendor's perspective is based not on the current timber content but instead on the future anticipated revenue.

- For forest resources of significant size it is unlikely that the market could absorb all of the forest wood content at once without log prices being depressed.

The first effect leads to an unduly conservative valuation, while the third can lead to an overly optimistic result. It is unlikely that the two effects would exactly offset one another. Pöyry's preference in valuing forests is to avoid this method altogether, as it is unlikely to reflect either the buyer's or vendor's analysis.

1.4 Cost Method

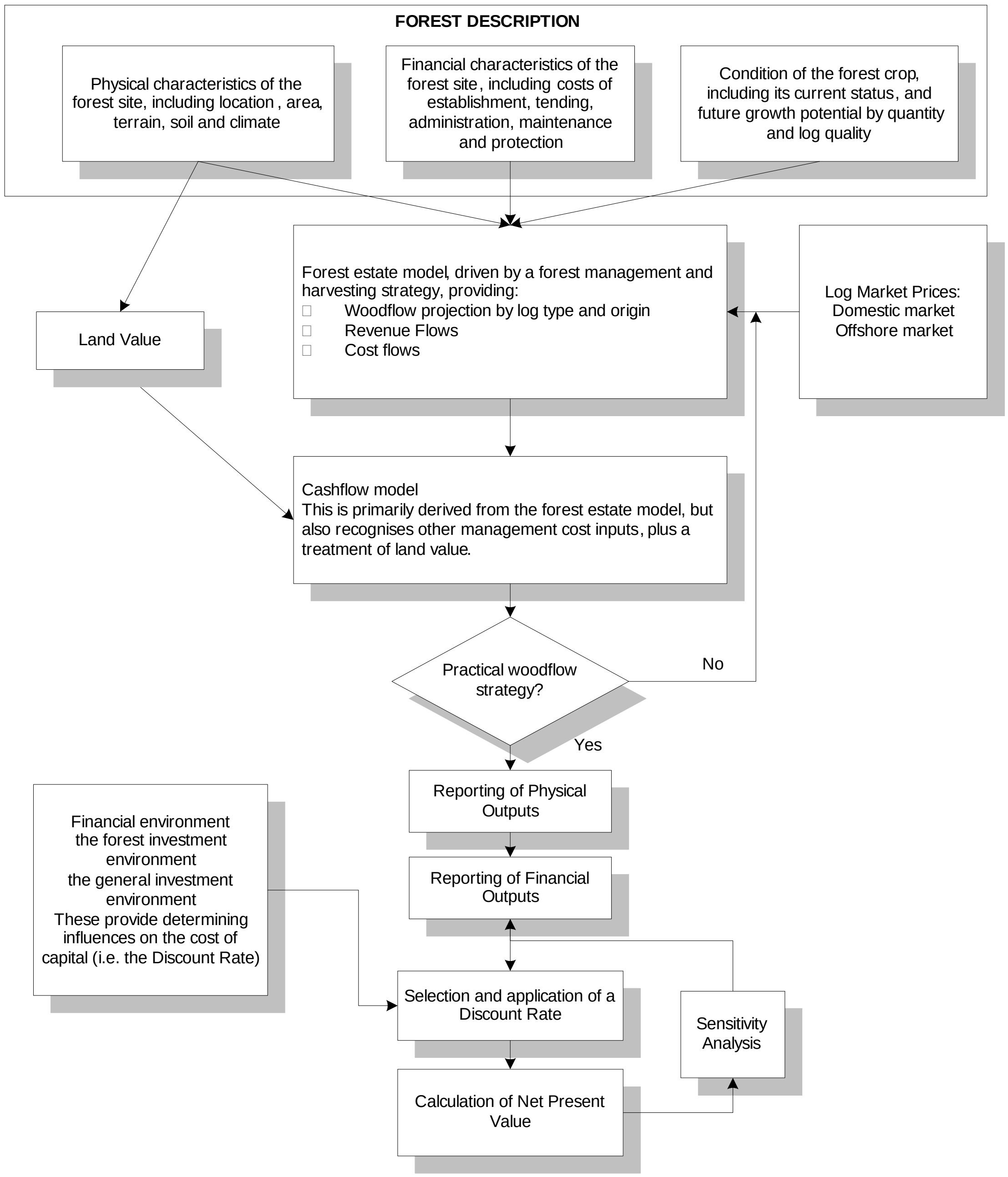
There are different interpretations of the cost approach. A straightforward version takes the costs involved in acquiring or establishing and maintaining the forest and accumulates these with compound interest from the inception of the investment to the current point in time. The forest value is therefore the price that forest owners would have to receive if they were to obtain a satisfactory rate of return on their investment to date. The method is equivalent to the accountants' concept of "capitalising" establishment/acquisition costs plus interest, although the forest valuer is more inclined to adopt assumed costs which are "standard" and current at the time of the valuation.

By using costs that are current, along with a "real" (inflation-corrected) compounding rate, the valuation is updated for inflation. The use of "industry standard" costs ensures that only costs consistent with efficient practice are recognised. Forest valuers are wary of the compounding approach, and likewise capitalisation. In the market place a "high cost" forest does not necessarily prove to be a "high value" forest and yet this is what the method implies.

1.5 Valuation Process

The process followed in deriving a value for Sino-Forest's tree crop is illustrated in Figure 1-2. The first stage of the valuation process involves assembling a comprehensive "description" of the forest. Key components of this include a land area summary and information on the growth potential of the tree crop.

Figure 1-2:
Schematic Outline of the Valuation Process



At the heart of modern forest management is a forest estate modelling system that employs a linear programming formulation to derive a credible harvesting strategy. This technology enables the collective resource to be modelled to meet various aims, including resource level constraints as well as the supply of various forest products into their end-use markets.

Following confirmation that the results of the forest estate modelling process are managerially workable, the generation of wood flows and the allocation of products to markets enables the derivation of cash flows upon which a DCF valuation can be based. Application of the discount rate to these cash flows produces a present value for the tree crop. The responsiveness of this valuation to changes in the input variables can then be tested with a variety of sensitivity analyses so as to derive a spread of potential tree crop values. This will indicate how sensitive the model is to changes in key inputs.

1.6 Other Aspects of the Valuation Process

In applying the DCF approaches, the following aspects also require consideration:

- Analysis of pre-tax or post-tax cash flows
- The period of analysis
- Terminal value
- Harvesting strategy

These aspects are discussed in more detail below.

1.6.1 Analysis of Pre-tax or Post-tax Cash Flows

Both approaches have been demonstrated in valuing planted forests. For cash flows derived on a pre-tax basis a pre-tax discount rate is applied. Post-tax cash flows should be discounted at a post-tax discount rate. If the discount rates have been consistently derived, either approach should lead to the same tree crop value.

1.6.2 The Period of Analysis

Wood flows and associated cash flows may be modelled on a perpetual basis or they may be confined to the current rotation.

Forest estate models have come to be an integral part of the forest valuation process, being applied to identify the forest's long-term supply capability. Despite this extended wood flow-modelling horizon, there has been a general tendency to confine the scope of the financial analysis to those cash flows solely associated with the tree crop that currently exists. This includes all parts of the present forest from the oldest stands to those just established. It excludes, however, trees that are yet to be planted as these are considered to be part of a new investment cycle.

Wider business appraisal practice encourages the confinement of the scope of DCF analysis to the current investment cycle. There are arguments that forest valuation should be no different. The practice of considering the performance of the existing tree crop alone lies with the general preference for avoiding unnecessary conjecture associated with costs, yields, anticipated revenues and the future discount rate.

As generally applied, the current rotation model is not to be confused with a "liquidation" or "realisation" model. Instead, the harvesting strategy for the current tree crop is assumed to be consistent with a long-term sustainable management policy, and although there will be future rotations, they will not contribute to the net present value calculation, i.e. they are "NPV neutral". In effect, all funds invested in them are assumed to earn such proceeds that the investment generates exactly the discount rate.

The current rotation model effectively assumes that through adaptive management the forest owners will seek to secure at least NPV neutrality on their reinvestment in succeeding rotations.

Pöyry finds that the current rotation model is widely applied. Furthermore the IAS41 standard encourages this approach stating:

> *"The objective of a calculation of net present value of expected cash flows is to determine the fair value of a biological asset in its present location and condition" (paragraph 21)*

> *"An entity does not include any cash flows for financing the assets, taxation, or re-establishing biological assets after harvest (for example, the cost of replanting trees in a plantation forest after harvest)." (paragraph 22)*

This does not suggest that this places the matter beyond scrutiny. In some locations the approach has found initial application in an environment where log prices have been high. Second and subsequent rotations, which included the expectation of continuing firm log prices, led in many situations to a net addition to the first rotation's NPV. In those circumstances, confining the valuation to the current rotation represented some conservatism.

With log prices having softened, and a greater uncertainty surrounding the prospects of real price growth, current rotation models are now tending to provide higher valuations than their perpetual equivalents, if the discount rate is unchanged. It may be too simplistic to assume that future rotations can indeed be made "NPV-neutral". Certainly, it may be more straightforward with some forests than others to achieve the improvement in performance required. It would seem intuitively reasonable that those forests whose next rotation may be very hard to make profitable should be valued at a lower level than those which require little adaptive management. While Pöyry would prefer to incorporate some recognition of this effect in the valuation method, it is not considered that the market's treatment of it is adequately handled by simply turning to a perpetual model.

Pöyry expects that forest valuers will continue to consider the relative suitability of current-rotation and perpetual models. Refinements to the methodology may necessarily await the availability of more empirical transaction data.

Within the valuation of Sino-Forest's tree crop Pöyry has modelled the resource over multiple rotations in order to reflect the long-term management outlook of the estate. However, the market value estimate is clearly based solely on the cash flows arising from the management and harvest of the existing tree crop and the current rotation of those trees.

APPENDIX 2

Field Inspection – Planted Forests

1 PLANTATION MANAGEMENT

The majority of Sino-Forest's estate comprises forest that the company has purchased, with about 11% being forest that has been planted by the company itself. So far, the focus of plantation establishment has been on fast-growing eucalypts (*Eucalyptus grandis and grandis x urophylla*) in Guangdong and Guangxi provinces. These eucalypts comprise nearly 95% of the 54 000 ha of planted forest. In addition, some 3 000 ha of Chinese fir and slash pine (*Pinus elliottii*) has been planted by the company, all of which is in Hunan province.

As part of the field inspections in 2008/2009, Pöyry visited, assessed and measured planted eucalypts in Guangdong and Guangxi provinces. The yield table applied to planted eucalypts in the 2008 and 2009 valuations was developed from these measurements and estimates of stand volume across a number sites and tree crop ages.

As part of the field inspections of 2009/2010, Pöyry visited and assessed plantation operations in Heyuan city in Guangdong province, a location that was not assessed in 2008/2009.

In Heyuan, Sino-Forest owns and operates a tissue culture laboratory and a tree nursery. Here, both operational and research activities are undertaken, to develop, replicate and grow planting stock for use in planting and replanting operations in Sino-Forest's plantations. The underlying vegetative stock for the eucalyptus tissue culture operation comes from 50 superior trees, selected from three provinces in southern China.

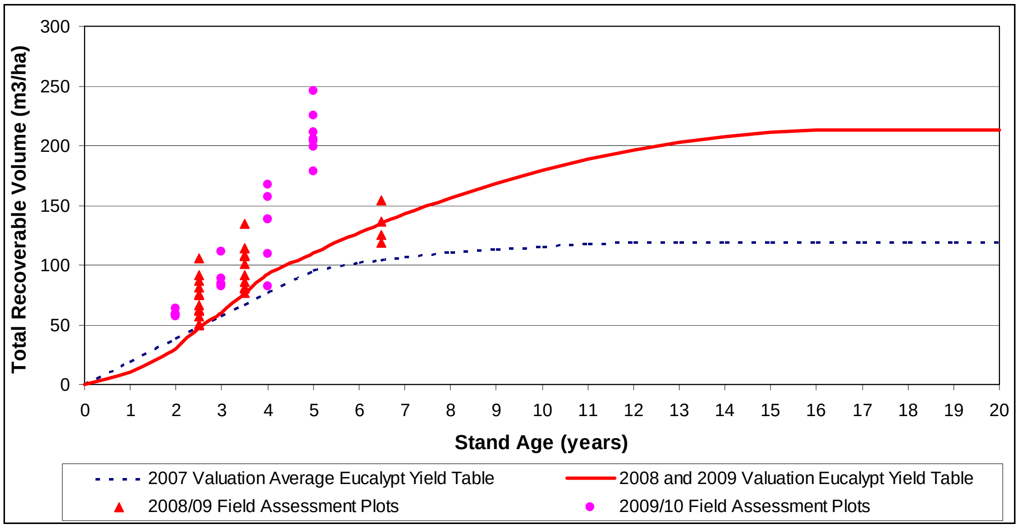
Modern controlled propagation and tending techniques are applied in the tissue culture and nursery operations, with tree stocks usually transferred to the field for planting within six months of their replication as tissue plantlets. During this year's field inspection of Sino-Forest's plantations, Pöyry:

1. Observed a recently planted stand of eucalypts that had been established at about 1 450 stems/ha. While the trees were young and still small, the establishment seemed to have been successful and well managed. The site had been well prepared, incorporating some mechanical cultivation. The majority of young trees were well spaced and alive.

2. Observed a fertilising operation in a slightly older stand. This was the second follow-up fertilising (i.e. the second fertilising after the base fertilising at time of planting) at crop age of nine months. The operation in progress appeared orderly and controlled.

3. Established and measured 23 plots in four separate stands of eucalypts. These stands ranged in age from two to five years. Calculations of standing volume, with an average from the seven plots at age five years of 260 m^3/ha, indicate very impressive growth. Measured plot volumes, translated to total recoverable volume (TRV m^3/ha) using an 80% recovery factor, are shown in Figure 1 below. Also shown are last year's plot measurements, the current valuation yield table for planted eucalypts, and the yield table applied in the 2007 valuation. All are in TRV (m^3/ha) terms.

Figure 1:
Sino-Forest's Planted Eucalypt Forest – Pöyry's Measurement Data and Yield Table



2 PHOTO ESSAY

Photo 1:
Tissue culture in laboratory

Photo 2:
Plantlet replication and early growth in laboratory

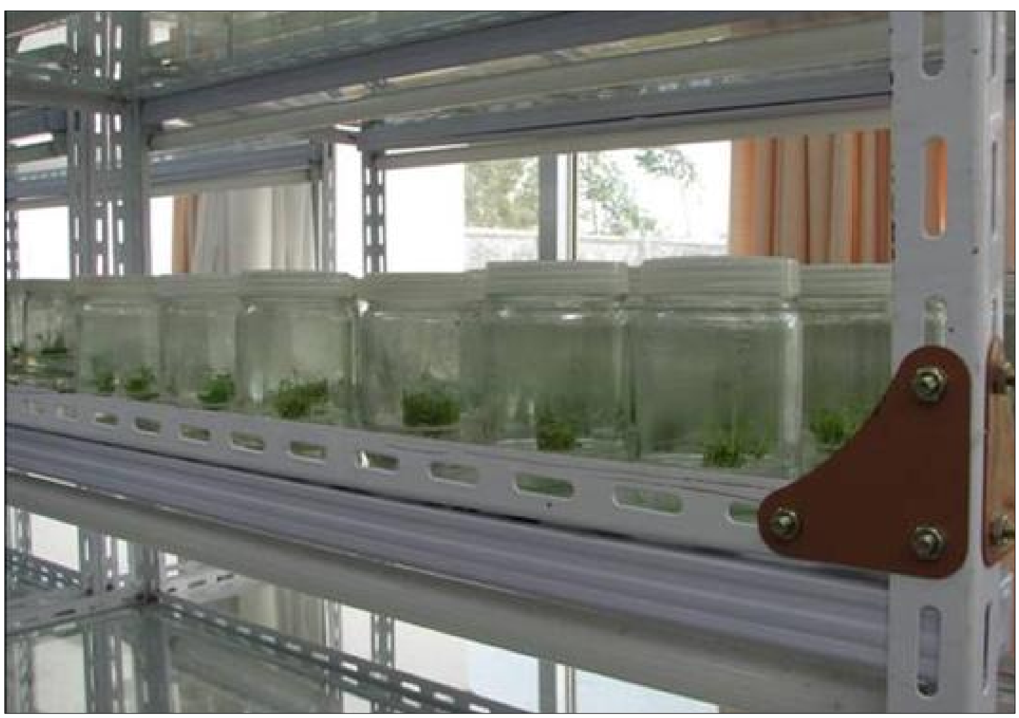


Photo 3:
Young plantlets ‘hardening off’ and growing in nursery

Photo 4:
Irrigation in nursery

Photo 5:
Fertilising operation in 9-month old eucalypts (note the small trench for fertiliser)

Photo 6:
Close-up of fertiliser application

Photo 7:
9-month old eucalypts – average height 2.5 m

Photo 8:
Using increment borer to confirm tree age (eucalyptus age 5 years)

Photo 9:
Very good stand of 5 year-old *Eucalyptus grandis x urophylla.* Estimated TSV about 260 m^3/ha at 1 785 stems/ha. Mean dbh 14.4 cm, mean height 19 m

Photo 10:
Same stand as Photo 9

Photo 11:
Same stand as photos 9 and 10. Age 5 eucalypts, mean stocking 1 785 s/ha, mean height 19 m and total standing volume around 260 m^3/ha

APPENDIX 3

Field Inspection – Purchased Forests

1 YUNNAN BROADLEAF

1.1 Introduction

Pöyry undertook a field inspection of the Sino-Forest's purchased (mixed-natural) forest estate in Yunnan Province between 12 and 17 December 2009.

Over this period, a two-person Pöyry team, accompanied by Sino-Forest staff, inspected several mixed-natural forest areas owned by Sino-Forest. Data and information were gathered relating to the local and regional natural forestry industry.

Pöyry visited eight selected Sino-Forest compartments in total, spanning two counties and four towns. Thirty-four inventory plots were established in natural broadleaf forests, ranging in age (majority crop) from young to over-mature. The majority of the natural forest was dominated by 25–40 year old age-classes. The inspections and inventory provided Pöyry with both qualitative and quantitative data and information for use in the 2009 valuation. This includes estimates of the total standing and recoverable volume of the natural broadleaf forest within the estate, supporting estimation of growth and yield.

The methodology applied in gathering the above qualitative and quantitative data is described in following sections.

1.2 Inventory

Overview

The inventory focussed on assessing the current condition, standing volume and likely recoverable volume of existing natural broadleaf forest throughout surveyed areas.

The field inspection covered two of the largest counties by Sino-Forest ownership in Yunnan Province.

The selection of broad geographic locations in which inventory was undertaken was made by Pöyry based on area, species, and age-class distribution data received from Sino-Forest. Sets of 'cluster-maps' (maps providing latitude-longitude co-ordinate points surrounding the company's acquired forest compartments) were then used to select one or two compartments for surveying and inventory within each cluster-map area visited. Each cluster-map area typically included 3-7 individual forest compartments. Pöyry staff determined which cluster maps to survey, and which compartments to survey within each cluster map. An important determining factor in selecting a compartment was the need to cover a range of age-classes and sites across the surveyed Sino-Forest areas.

Three to four individual plots were established within each surveyed compartment, depending on time and access constraints.

In order to ensure a reasonable representation of the crops assessed, some plots were located close to access roads and others at some distance. Plot centres were typically located a set number of paces (50 to 200) from a particular point. This ensured that the crop and land characteristics at the final plot centre location were random without being biased towards areas that are easy to measure. At each plot centre, circular plots of 200 m² in area (0.02 ha) were established. The following information was recorded at each plot:

- Date and time
- Location - county/town
- Compartment number
- Plot number
- Waypoint
- Average slope
- Plot size and corresponding adjusted radius
- Altitude
- GPS coordinates
- Spacing
- Age-class of the compartment,
- Comments on general site and growth conditions, etc.

Within each plot, all diameters (at breast height of 1.3 m) of trees larger than 5.0 cm diameter at breast height (DBH) were measured.

In addition, three or more trees (where applicable) were measured for total tree height within or immediately bordering the plot, with these trees representing the range of diameters in the plot.

1.2.1 Data Analysis

The field inventory data analysis is briefly described as follows:

1. Diameter and height measurements from Pöyry's field inventory were used to produce diameter-height relationships for each surveyed town (aggregation to this geographic level produced results of satisfactory statistical significance) using linear regression analysis.

2. These regression equations were then used to estimate heights for trees that were not measured for height.

3. Total standing (tree) volume (TSV) was then calculated using tree height and diameter measurements, and application of a generic natural broadleaf tree volume equation. Resulting TSV data were compared with the existing broadleaf yield table for the Sino-Forest estate.

2 PHOTO ESSAY

2.1 Yunnan Province

Photo 1:
Typical mature–over-mature mixed natural broadleaf forest compartment estimated at >30 years old (dominant age-class). The majority of commercial trees are alder (*Alnus* genus) and the more valuable oak (*Quercus* genus). The forest is scattered, with open canopy reflecting past selective harvesting history. Existing commercial trees have poor form typical of uneven-aged mixed-natural forest.

Photo 2:
Same compartment as Photo 1. Trees pictured are alder, aged 20–30 years old. Average to poor form, scattered trees, relatively low recoverable volumes.

Photo 3:
High stocked alder and oak mixed forest (mature age-class). Better form from stocking pressure and closed canopy. Approx. 2 050 m altitude. Valleys and slopes have higher stocking and standing volume than exposed ridges or deep gullies. Slopes steep up to 35 degrees. Road access via walking tracks <1 km.

Photo 4:
Middle-aged variable stocked mixed-natural forest (predominantly alder and other broadleaf species) on ridgeline. Poor form, with little recoverable volume, no management treatment visible.

Photo 5:
Large broadleaf logs from forest adjacent to Sino-Forest's compartment are trucked along village roads to market. Species here include alder and oak. Roads are generally of satisfactory quality for trucks of this size.

Photo 6:
Remote variable-stocked, mixed-natural compartment comprising south-west birch (largest trees) and other broadleaf species. Middle-aged to mature age-classes predominate. Reasonable form and volume. Minimum undergrowth, thinned. Growth condition looks good. Relatively easy harvesting conditions but several km from nearest navigable road.

Photo 7:
Reasonably stocked middle-aged broadleaf-dominated compartment off ridgeline. Form is good. Easy harvesting conditions with no undergrowth. Gentle slope and easy access (although remote).

Photo 8:
View of mature (>40 year old) mixed-natural broadleaf forest compartment. High percentage canopy cover suggests good standing volume.

Photo 9:
Sparesly stocked mature/over-mature mixed-natural broadleaf compartment. Farmlets (slash and burn agriculture) scattered throughout compartment, reducing net stocked area (represented in inventory with zero-tree plots). Seems to have been selectively harvested/coupe clearfelled in the past. Large alder and other broadleaf trees remain, with very poor form but high individual-tree standing volume.

3 GUANGXI - OTHER SPECIES

3.1 Introduction

Pöyry undertook a field inspection of a sample of Sino-Forest's purchased 'other species' forest type in north-eastern Guangxi province, on 14 and 15 December 2009.

Over this period, a two-person Pöyry team, accompanied by Sino-Forest staff, inspected two forest areas owned by Sino-Forest. Data and information were also gathered relating to the local and regional forestry industry.

Nine inventory plots were established in mature 'other species' forest. The dominant species of this forest type is oak, with schima[1] and Masson pine as significant secondary species (see table below). The inspections and inventory provided Pöyry with both qualitative and quantitative data and information for use in the 2009 valuation. The yield table for 'other species' was revised for the 2009 valuation. This is described in Appendix 5.

Table 3-1:
Composition of 'Other Species' Crop Type by Species

Species	Tree Frequency Species (%)	Recoverable Volume Species (%)
Camphor	4	2
Ceiba (kapok)	1	1
Chinese fir	2	2
Fagus	1	1
Maple	4	6
Masson pine	4	20
Oak	61	45
Schima	23	23
Chinese umbrella tree	1	0
TOTAL	**100**	**100**

3.2 Inventory

Overview

The inventory focussed on assessing the current condition, standing volume and likely recoverable volume of the 'other species' forest throughout surveyed areas.

The geographic locations of several separate groups (cluster-maps) of Sino-Forest owned compartments were selected by Pöyry, using information provided by the company. Pöyry's focus was on areas of mature forest.

The first plot within each area was located about 50 m into the stand, with the plot centre being systematically located at the end of a 30 m length of tape. Subsequent

[1] *Schima wallichii* – timber durable, hard and strong, suited to a range of uses such as panelling, flooring, framing, furniture etc, and paper pulp.

plots were randomly located throughout the stand, again with the plot centre being located at the end of a 30 m length of tape. The following information was recorded at each plot:

- Date and time
- Location - county/town
- Compartment number
- Plot number
- Waypoint
- Average slope
- Plot size and corresponding adjusted radius
- Altitude
- GPS coordinates
- Age-class of the compartment,
- Comments on general site and growth conditions, etc.

Within each plot all diameters (at breast height of 1.3 m) of trees larger than 5.0 cm diameter at breast height (DBH) were measured.

In addition, five or more trees were measured for total tree height within or immediately bordering the plot, with these trees representing the range of diameters in the plot.

3.2.1 Data Analysis

The field inventory data analysis is briefly described as follows:

1. Diameter and height measurements from Pöyry's field inventory were used to produce a diameter-height relationship for all of the plots, using linear regression analysis.

2. The regression equation was then used to estimate heights for plot trees with no actual height measurements.

3. Total standing tree volume (TSV) was then calculated using these height and diameter data, and application of a generic broadleaf tree volume equation (the broadleaf equation was used as there is no specific equation for 'other species').

4 PHOTO ESSAY

Photo 10:
Typical 'other species' forest type, containing mainly oak (Quercus species) and Masson pine. The stem form of the majority of trees is reasonably good (straight) in the lower and larger diameter part of the stem. A recovery factor of 65% from TSV to TRV has been assumed in the yield table. Pine makes up about 20% of the recoverable volume in this croptype.

Photo 11:
Typical 'other species' forest type. Reasonably good form of lower part of stem.

Photo 12:
Forest access and harvesting road leading into 'other species' forest area. This is typical of the type of access roads in the area inspected. Here a small tractor is carrying a load of short Chinese fir logs out to the truckable road for onward transport of logs to a nearby mill.

Photo 13:
Good form road into 'other species' forest area

Photo 14:
Poor form logs from the 'other species' forest type. These are small logs, mainly from the upper part of the tree stem. These logs were being chipped at the processing plant, with the larger better-form logs being sawn. This log pile includes some pine logs.

Photo 15:
Sawing of logs from 'other species' forest at nearby mill.

Photo 16:
Truck unloading (mainly 'other species' short logs) at processing plant near forest

Photo 17:
Tallying of load of logs just delivered

5 HUNAN CHINESE FIR

5.1 Introduction

Pöyry undertook a field inspection a sample of Sino-Forest's purchased Chinese fir forest type in Hunan on 17 and 18 December 2009.

One consultant from Pöyry, accompanied by Sino-Forest staff, inspected three forest compartments of Chinese fir owned by Sino-Forest. Data and information were also gathered relating to the local and regional forestry industry.

Nine inventory plots were established in this semi-mature and mature Chinese fir forest.

5.2 Inventory

Overview

The inventory focussed on assessing the current condition, standing volume and likely recoverable volume of the Chinese fir forest in the surveyed areas.

The geographic locations of several separate groups (cluster-maps) of Sino-Forest owned compartments were selected by Pöyry using information provided by the company. Pöyry's focus was on areas of semi-mature and mature forest.

The first plot within each area was located about 50 m into the stand, with the plot centre being systematically located at the end of a 30 m length of tape. Subsequent plots were randomly located throughout the stand, again with the plot centre being located at the end of a 30 m length of tape. The following information was recorded at each plot:

- Date and time
- Location - county/town
- Compartment number
- Plot number
- Waypoint
- Average slope
- Plot size and corresponding adjusted radius
- Altitude
- GPS coordinates
- Age-class of the compartment,
- Comments on general site and growth conditions, etc.

Within each plot all diameters (at breast height of 1.3 m) of trees larger than 5.0 cm diameter at breast height (DBH) were measured.

In addition, between seven and 11 trees were measured for total tree height within or immediately bordering the plot, with these trees representing the range of diameters in the plot.

5.2.1 Data Analysis

The field inventory data analysis is briefly described as follows:

1. Diameter and height measurements from Pöyry's field inventory were used to produce diameter-height relationships for each age-class using linear regression analysis.

2. These regression equations were then used to estimate heights for plot trees with no actual height measurements.

3. Total standing tree volume (TSV) was then calculated using these height and diameter data, and application of a Chinese fir volume equation.

The analyses of these data indicated that estimates of the mean recoverable volume per ha on age were close to recoverable volumes of the average generic yield table for Chinese fir. Accordingly, no adjustments were made to the yield table applied in the valuation, see Appendix 5.

6 PHOTO ESSAY

Photo 18:
Chinese fir inspection area in southern Hunan province. This area required tracking/roading before harvest, currently 15 minutes walk to roadside.

Photo 19:
Chinese fir inspection area in southern Hunan province.

Photo 20:
Chinese fir in southern Hunan province. Exhibiting very good stem form.

Photo 21:
Chinese fir in southern Hunan province. A well-stocked area with excellent tree form and tree size.

APPENDIX 4

Verification of Stocked Area of Forest

CONTENTS

1 INTTRODUCTION

The purpose of this work was to provide independent verification of the extent of Sino-Forest's forest estate.

The assessment uses a selection of Sino-Forest's hand-drawn maps which represent 66 compartments (1 611 ha), equivalent to a 0.3% sample of Sino-Forest's forest estate. Maps were registered in the GIS using coordinates provided, and the stands were digitised and overlaid on satellite data. Images of varying resolution, spanning the years 2008 and 2009 were used to verify that the plantation was stocked, the extent and shape of the plantation was correctly mapped, and the stated area was correct.

The results confirm that the selected maps were produced to a high standard. No area adjustments are deemed necessary as the area differences over the 1 604 ha assessed were relatively negligible, at 1.9%, or 31 ha. This difference is attributed to the identification and exclusion of non-forested patches within compartments.

2 SAMPLE LOCATION

Sino-Forest provided 18 hand-drawn maps with bounding coordinates of selected forest resources covering counties in Yunnan, Hunan, and Guangxi provinces in southern China.

3 AREA VERIFICATION

Plantation areas were verified using recent satellite imagery. Images were obtained that met the requirements of being cloud-free, having a relatively high pixel resolution, and data capture occurring between 2008 and 2009.

The imagery acquired consisted of six cloud-free, high-resolution ASTER scenes (15 m pixel size) captured between February 2008 and December 2009, and nine Landsat 7 scenes (30 m pixel resolution) dating mostly from late 2009. No recent cloud-free ASTER scenes were available for four areas, but coverage for them was obtained from the Landsat imagery.

The Landsat 7 data has spectral bands that make it suitable for detection of forest change such as harvesting events, but it has the drawback of having stripes of missing data resulting from an historical instrument failure event. Where possible, the stripes were filled with other Landsat data of a similar date.

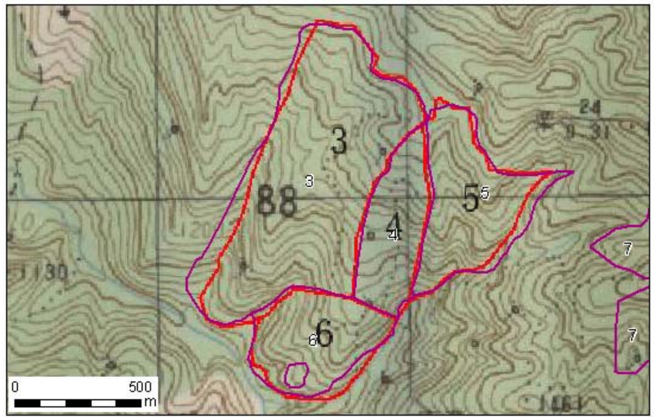
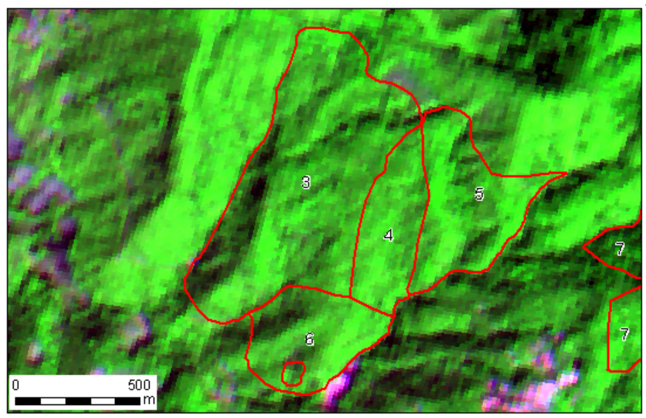
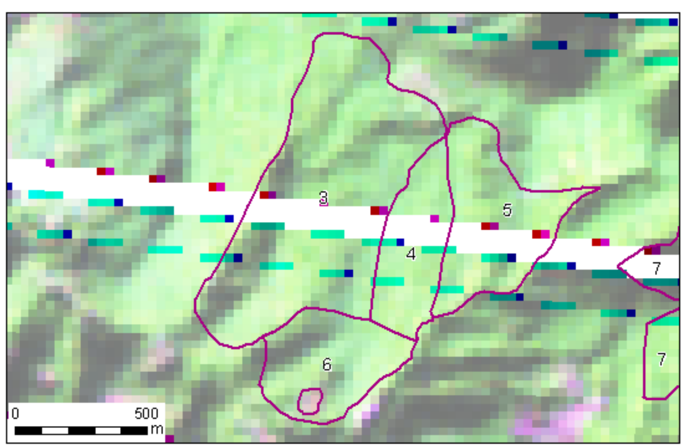
Overlapping images were registered to within one pixel of each other. False-colour composites were then prepared to distinguish areas of forest (shown in green) from non-forest (in pink or mauve).

The verification process involved five stages:

- Registering the scan maps into a GIS using the coordinates provided
- Adjusting the locations of the registered scan maps using suitable control points (e.g. river confluences and intersections of ridge lines) to ensure coincidence with the satellite imagery.
- Transfer of the hand-drawn forest compartment maps to the GIS using manual digitising.
- Cross checking and adjustment of compartment boundaries using the high-resolution imagery if necessary.
- Excluding any non-forest areas within compartments identified from the imagery.

An example of the output from this process is provided in Figure 1. The original hand-drawn map is compared here against a higher-resolution ASTER image and lower-resolution Landsat 7 image. In the original scan map, the corrected compartment boundaries (in purple) have been superimposed on the hand-drawn boundaries (in red).

Figure 1:
Example of Area Verification output

Area Reference	**Yunnan Province, Compartments 3-6**
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 17/2/2009 ** Landsat image: combination of Landsat 7 27/12/2009 and 09/11/2009 A non-forest patch in southern part of compartment 6 has appeared in the later Landsat image

4 AREA STATEMENT SUMMARY

A comparative analysis between Sino-Forest's compartment records and Pöyry's audit conducted over 66 individual compartments indicated that overall the area differences are negligible at -1.92 % (1 611 ha versus 1 580 ha), although there was some variation at the compartment level (Table 1).

Of the 66 compartments assessed, 39 had an area difference of less than 10% and 55 had a difference of less than 20%. Compartments with a large negative difference generally result from the exclusion of non-forested patches within the compartments. Large positive differences are attributed to uncertainties concerning the locations of boundaries, i.e. where the boundaries don't follow natural topographic features such as ridges and rivers. The larger differences are seen in smaller compartments since proportionally any changes in area have a greater impact.

The sample mean for the percentage differences is 2.451% with a standard deviation is 23.433.

The confidence interval for the population percentage difference is obtained from the formula:

sample mean ± confidence coefficient x standard error

The confidence coefficient is estimated from the student's t distribution, $t_{n-1,1-\alpha/2}$

For a 95% confidence interval, $\alpha = 0.05$ and $t_{66-1,\ 1-0.5/2} = t_{65,0.975} = 1.998$

The standard error of the mean = standard deviation/√sample size = 2.884

The confidence interval is therefore 2.451± 1.998 x 2.884 = 2.451 ± 5.762.

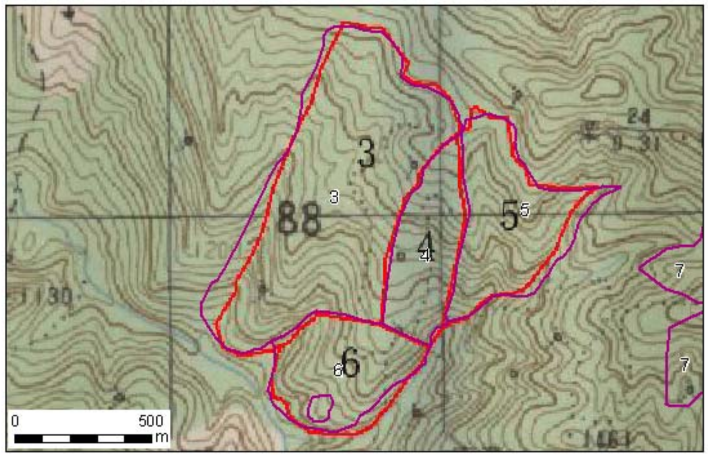
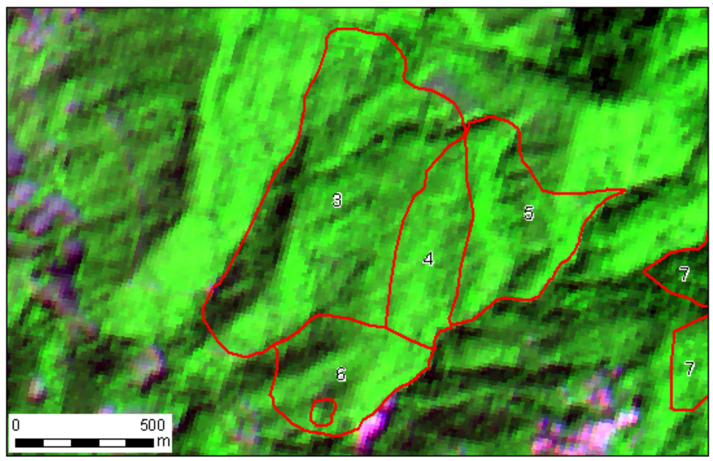
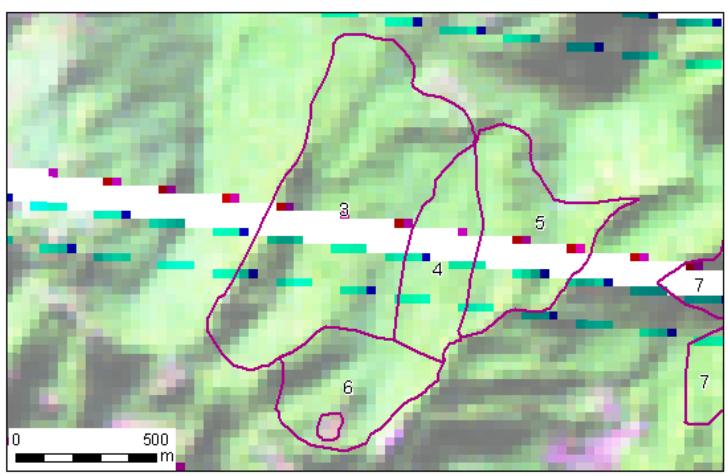
Based on the analysis presented here, one can therefore be 95% confident that the Sino-Forest areas determinations will lie between -3.311% less than to 8.213% more than those of Pöyry. For example, a planted area estimated by Sino-Forest to be 20 ha is expected by Pöyry to lie between 18.36 ha and 20.66 ha 95% of the time. This assumes that the quality and accuracy of the mapping is the same as for the analysed sample.

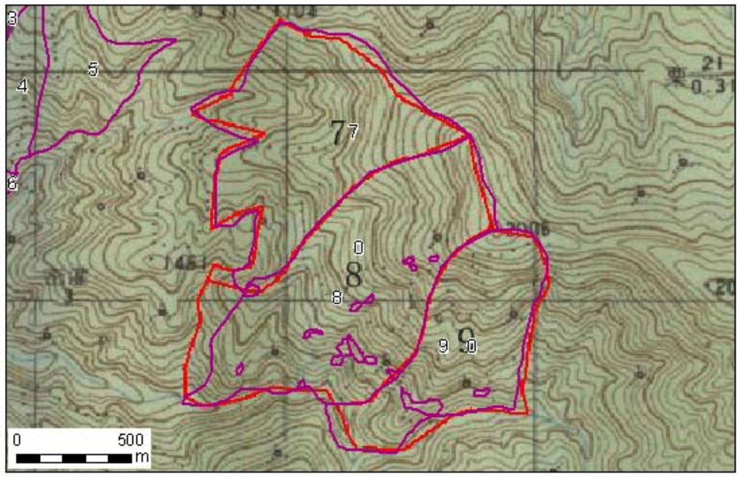
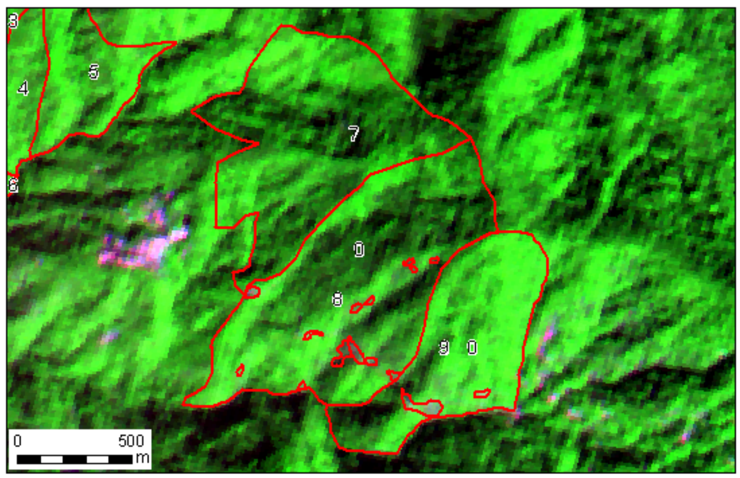
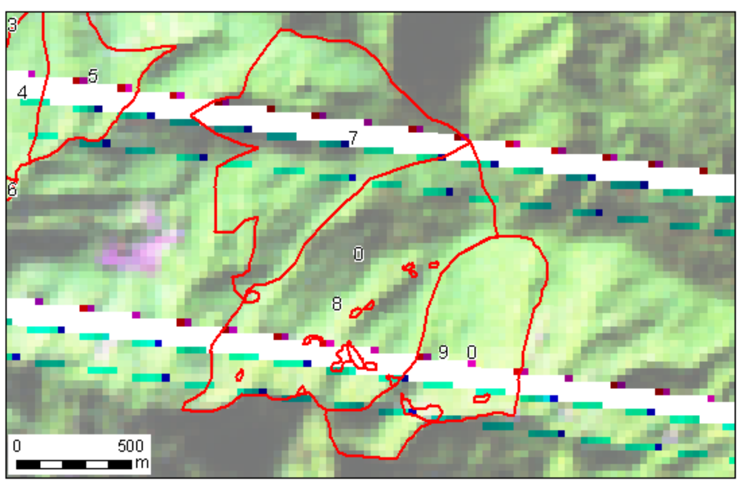
Table 1:
Area Comparison for maps

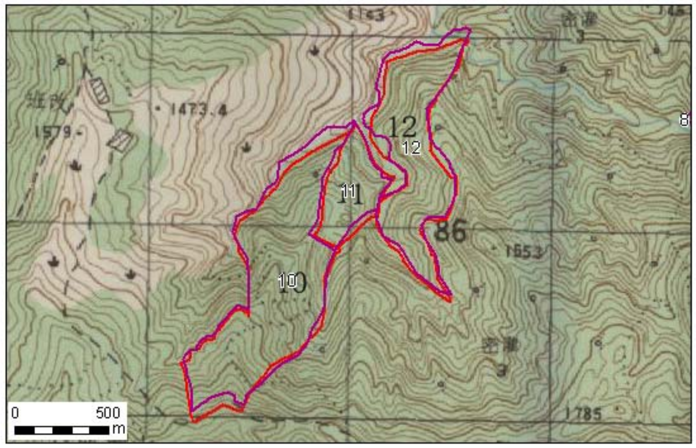
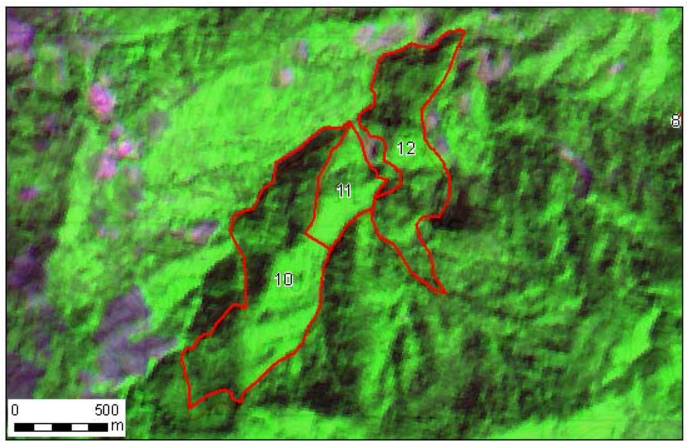
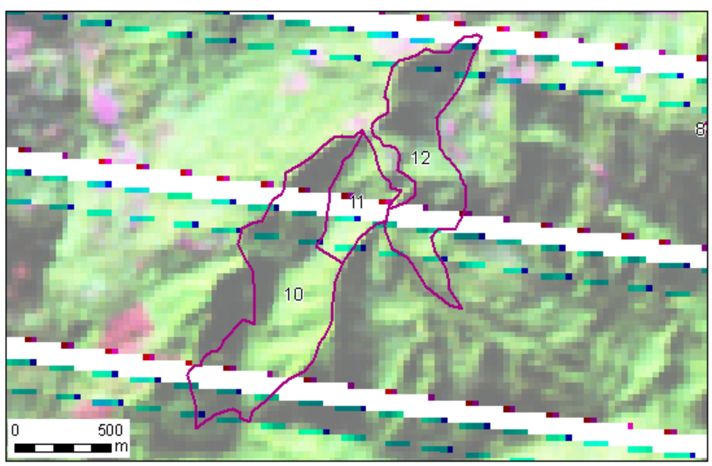
Area Reference	No. Compts	Sino (ha)	Pöyry (ha)	Diff (%)
Yunnan – A: Compartments 3 - 6	4	107.1	103.8	-3.08
Yunnan – B: Compartments 7-9	3	168.4	170.0	+0..95
Yunnan – C: Compartments 10-12	3	93.3	100.3	+7.50
Yunnan – D: Compartments 1-4	4	121	93.2	-22.98
Yunnan – E: Compartments 2-5	4	117.5	114	-2.98
Yunnan – F: Compartments 5-8	4	128.7	126.8	-1.48
Yunnan – G: Compartments 6-9	4	205.4	194.5	-5.31
Yunnan – H: Compartments 15-21	7	244.3	238.2	-2.50
Hunan – A: Compartments 10, 15, 17	3	43.4	46.9	+8.06
Hunan – B: Compartments 17, 24, 33	3	64.9	63.3	-2.47
Hunan – C: Compartments 21, 22, 23	3	34.4	35.3	+2.62
Hunan – D: Compartments 27, 41, 49	3	62.8	72.5	+15.44
Guangxi – A: Compartments 1, 2, 6, 10, 39	5	20.5	23.9	+16.59
Guangxi – B: Compartments 14, 20, 21	3	24.9	27.3	+9.64
Guangxi – C: Compartments 1, 12, 22	3	28.4	28.9	+1.76
Guangxi – D: Compartments 73, 74, 76, 78, 79	5	49.5	44.6	-9.90
Guangxi – E: Compartments 22, 34, 38, 39	4	36.0	41.8	+16.11
Guangxi – F: Compartment 1	1	53.3	47.7	-10.51
Total	**66**	**1603.8**	**1573.0**	**-1.92**

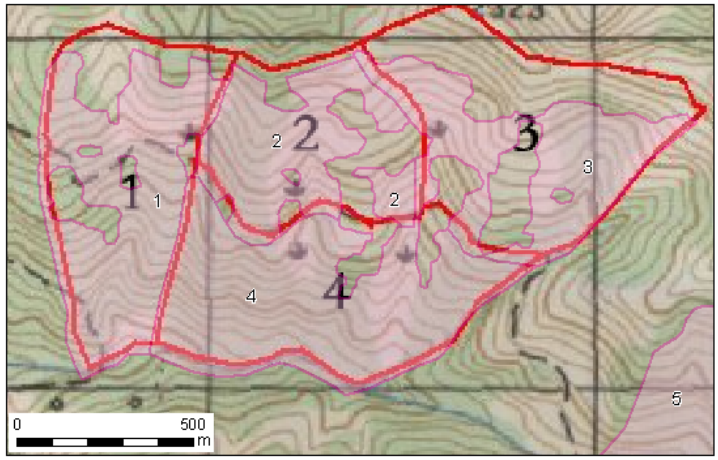
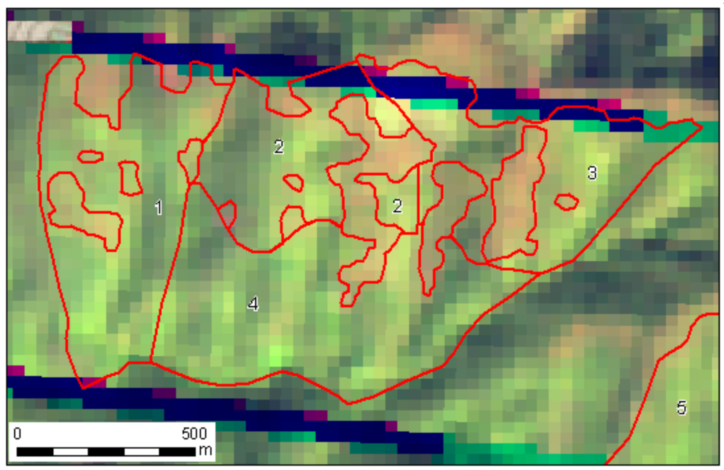
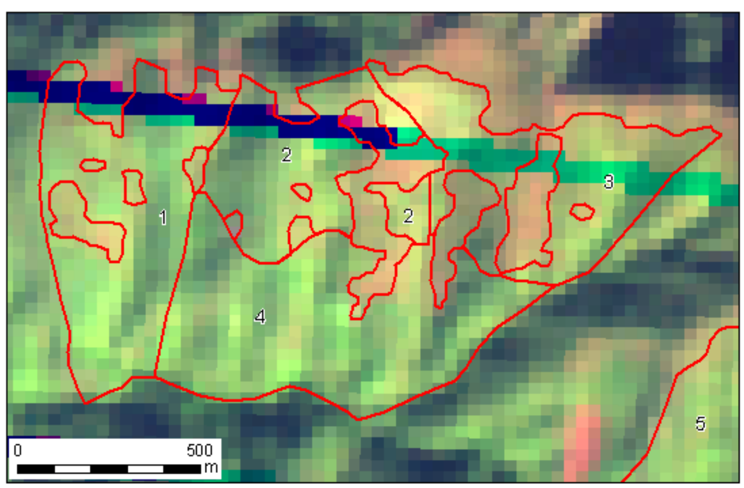
Sections 4 and 5 provide details of the individual compartment and satellite data used for the analysis.

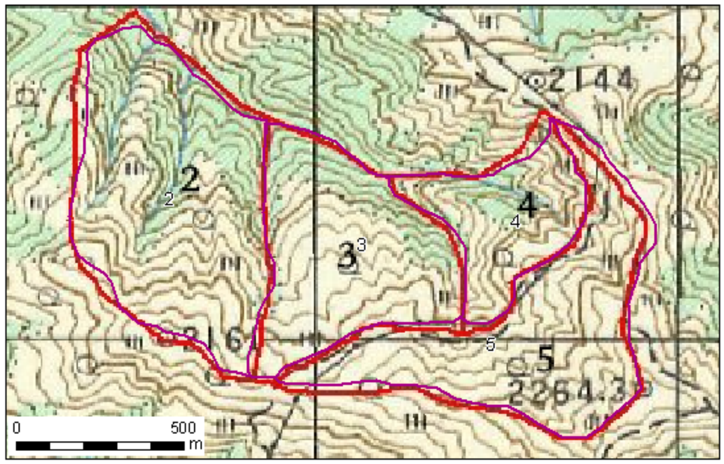
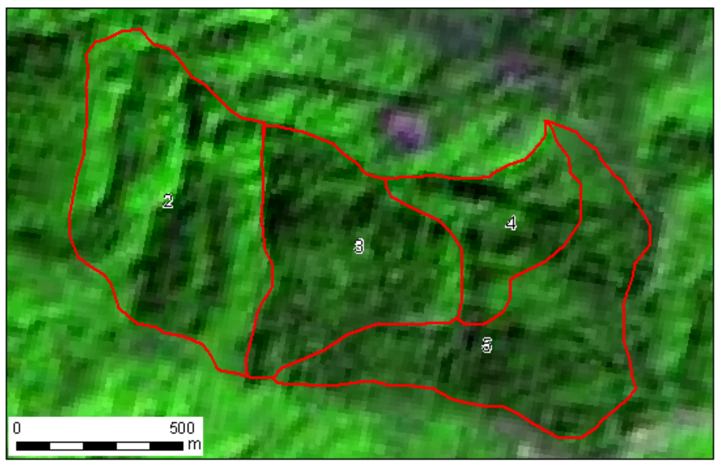
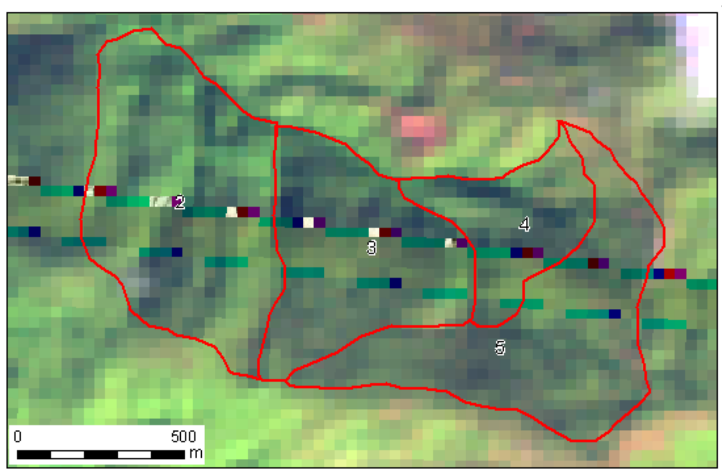
5 SATELLITE IMAGERY COMPARISONS

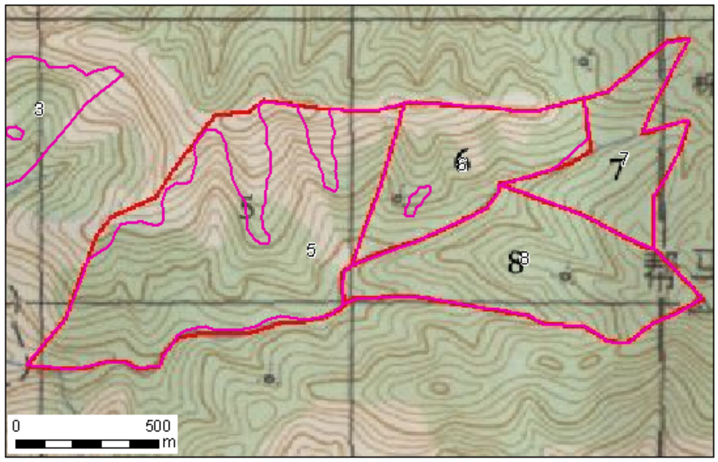
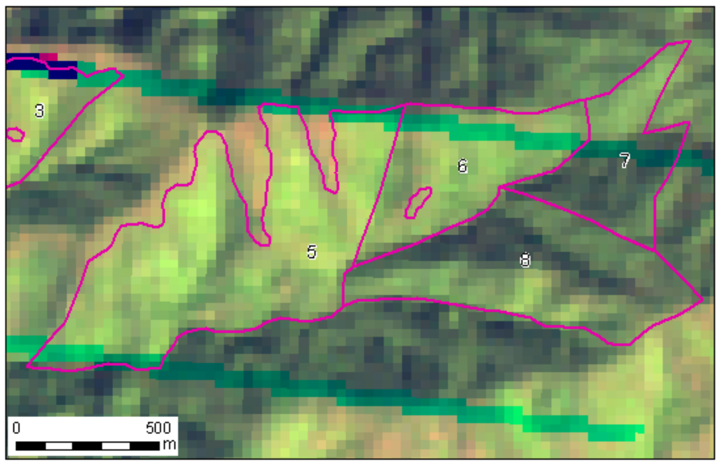
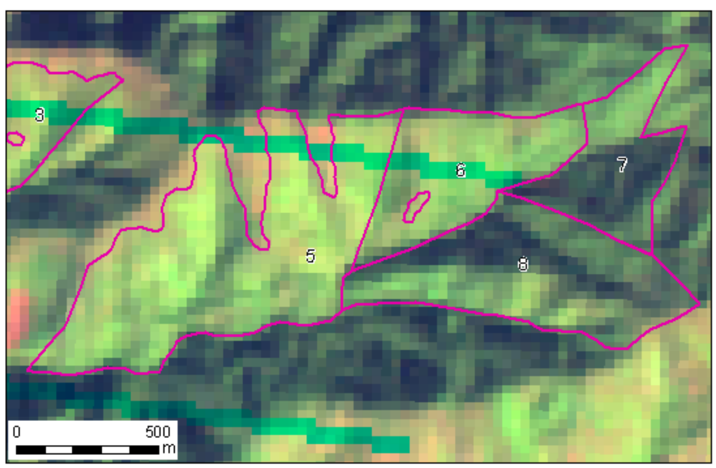
Area Reference	**Yunnan Province, Compartments 3-6**
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 17/2/2009 ** Landsat image: combination Landsat 7 27/12/2009 and 09/11/2009 A non-forest patch in southern part of compartment 6 has appeared in the later Landsat image

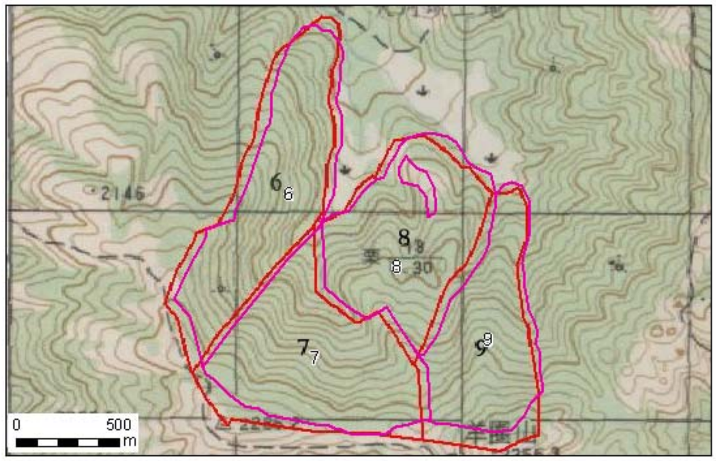
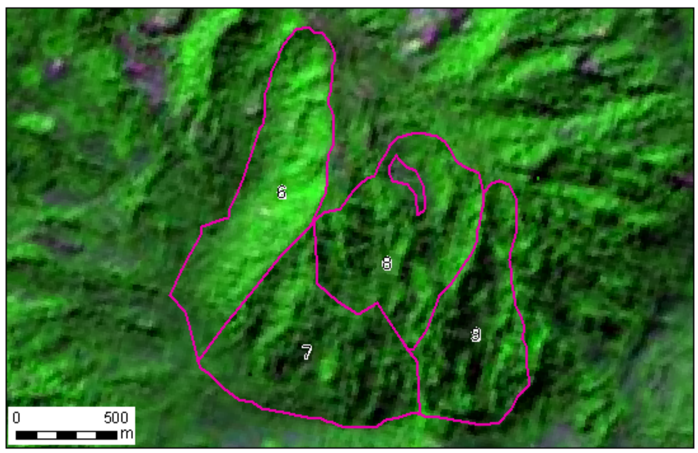
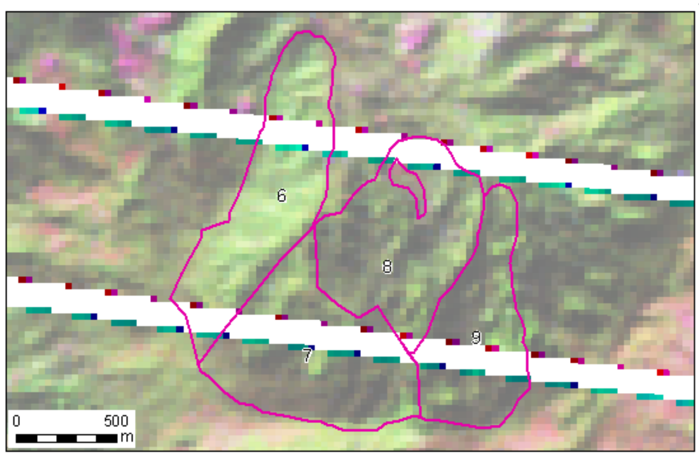
Area Reference	Yunnan Province, Compartments 7-9
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 17/2/2009 ** Landsat image: combination of Landsat 7 27/12/2009 ans 09/11/2009 Non-forest patches in compartments 8 and 9 probably represent roads and landings

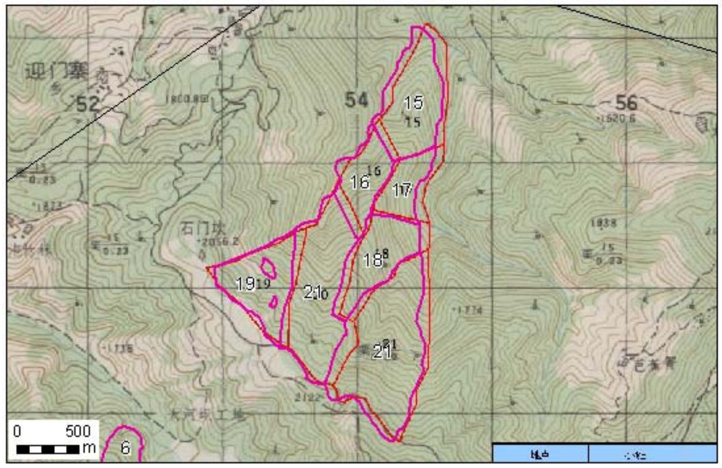
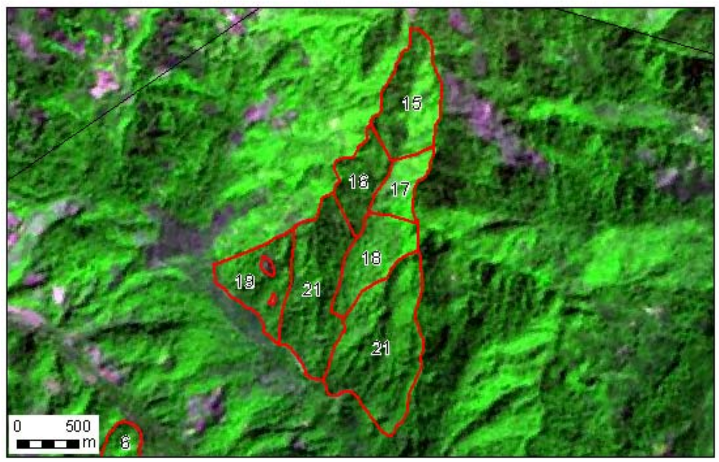
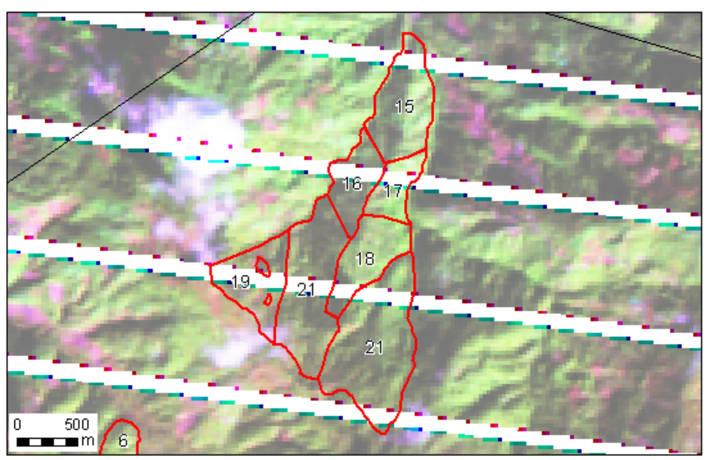
<table>
<tr><td>Area Reference</td><td>Yunnan Province, Compartments 10-12</td></tr>
<tr><td>Provided Scan Map</td><td>
</td></tr>
<tr><td>High Resolution Verification</td><td>
</td></tr>
<tr><td>Landsat Verification</td><td>
</td></tr>
<tr><td>Comments</td><td>High resolution image : ASTER 17/2/2009
Landsat image: Combination of two Landsat 7 images 27/12/2009 and 9/11/2009
Good match between scanned map and images</td></tr>
</table>

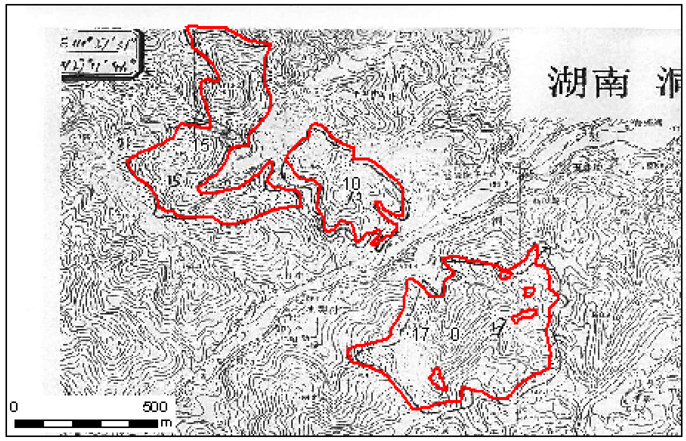
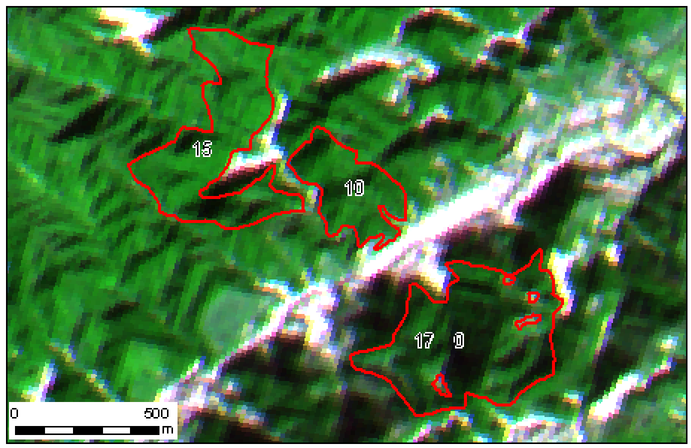
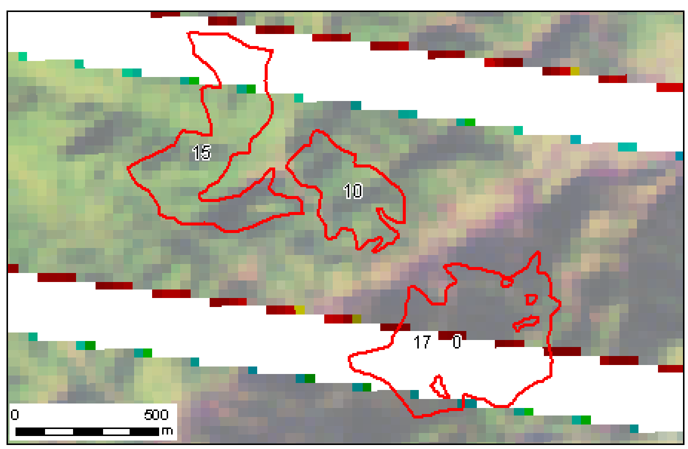
Area Reference	**Yunnan Province, Compartments 1-4**
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	*. No high resolution image available. Landsat 7 image captured on 09/11/2009 is shown **. Landsat 7 image from 27/12/2009 Note significant areas of non-forest in all compartments

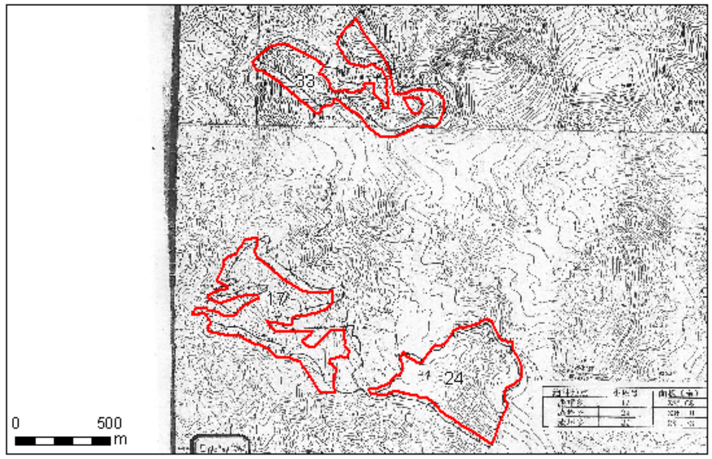
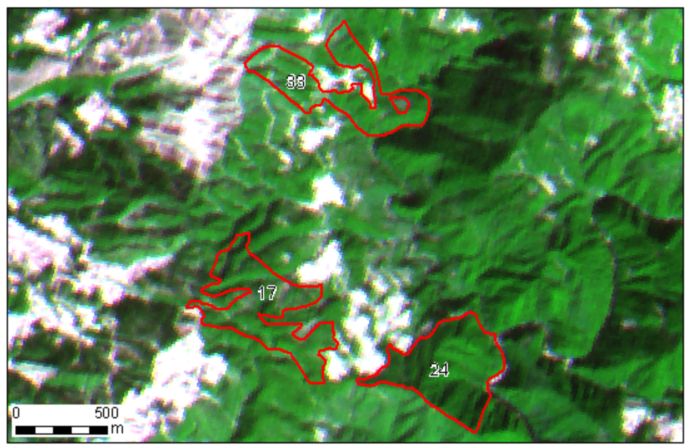
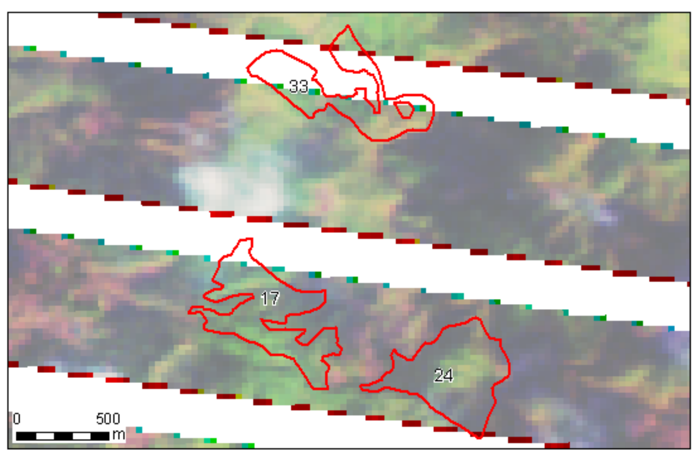
Area Reference	Yunnan Province, Compartments 2-5
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 17/2/2009 ** Landsat image: Combination of Landsat 7 images from 27/12/2009 and 9/11/2009 Close match between scanned map and images

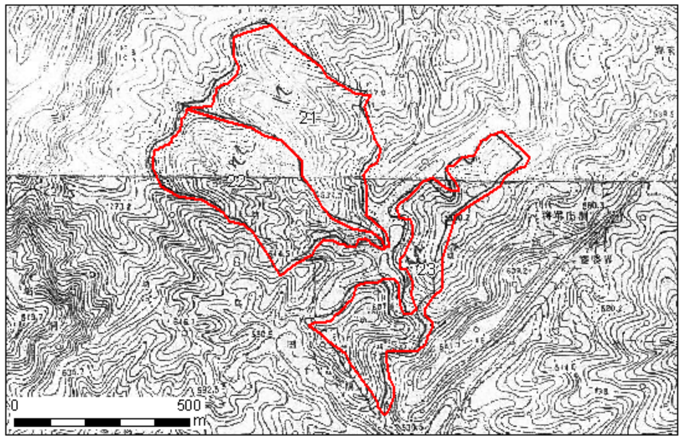
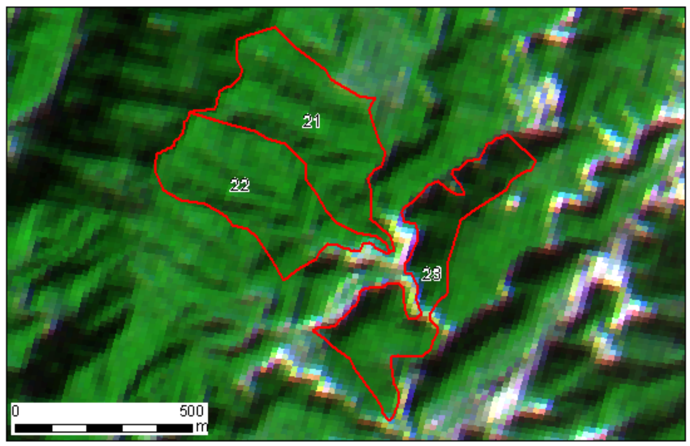
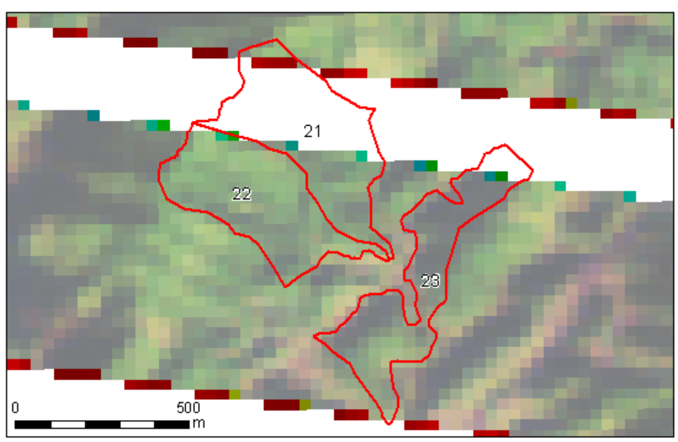
Area Reference	Yunnan Province, Compartments 5-8
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	*. No high resolution image available. Landsat 7 image capyured on 9/11/2009 is shown **. Landsat 7 image from 27/12/2009 Note absence of forest in valleys in northern part of compartment 5

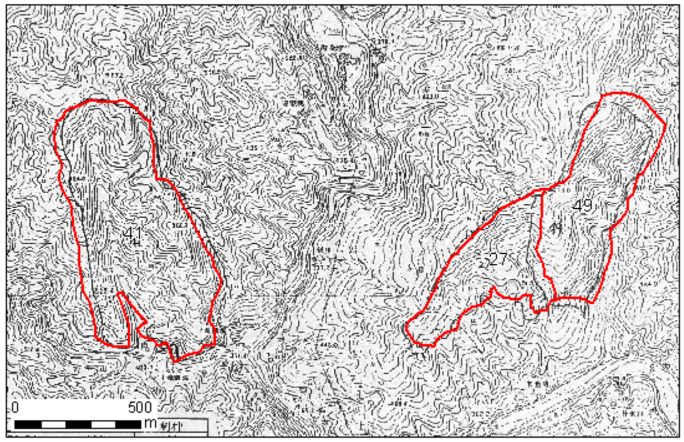
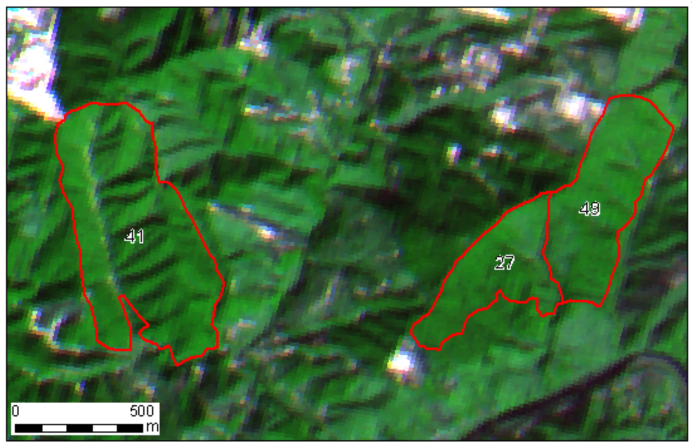
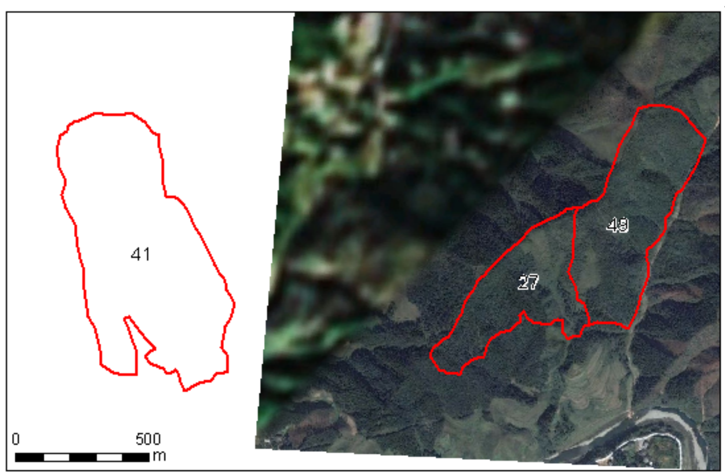
<table>
<tr><td>Area Reference</td><td>Yunnan Province, Compartments 6-9</td></tr>
<tr><td>Provided Scan Map</td><td>
</td></tr>
<tr><td>High Resolution Verification *</td><td>
</td></tr>
<tr><td>Landsat Verification **</td><td>
</td></tr>
<tr><td>Comments</td><td>* High resolution image : ASTER 17/2/2009
**. Landsat image: Landsat 7 30/10/2009
Southern boundary lies further north than shown on scan map. Non-forest patch in compartment 8.</td></tr>
</table>

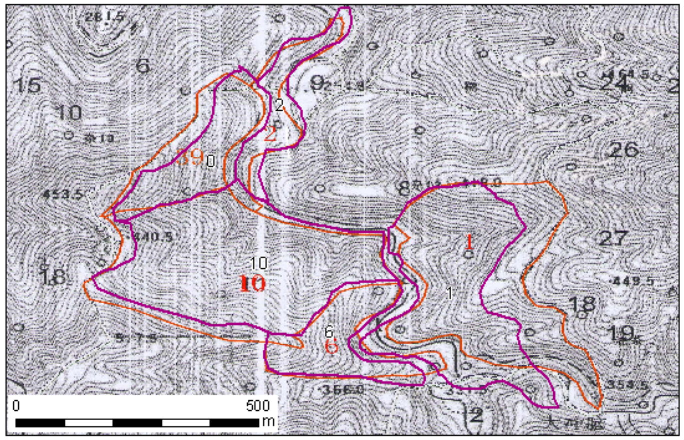
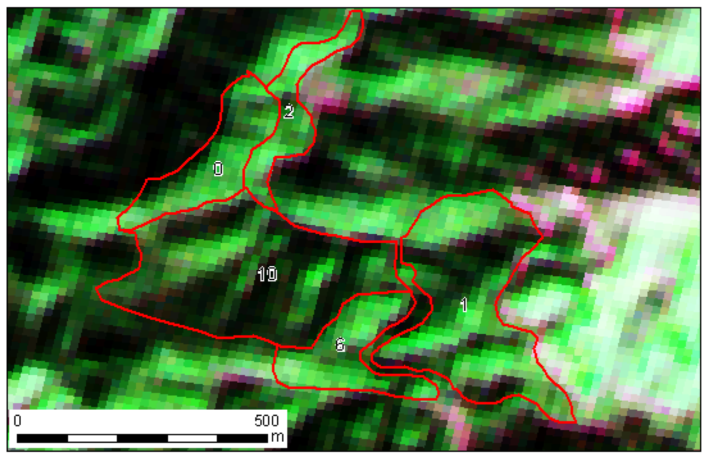
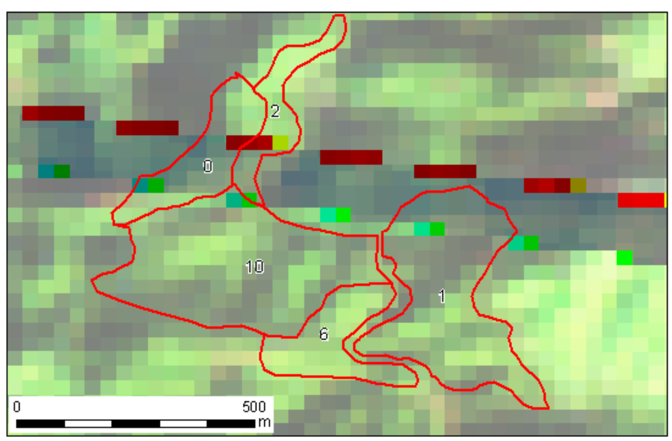
Area Reference	**Yunnan Province, Compartments 15-21**
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 17/2/2009 **. Landsat image: Landsat 7 09/11/2009 Two non-forest patches in compartment 19

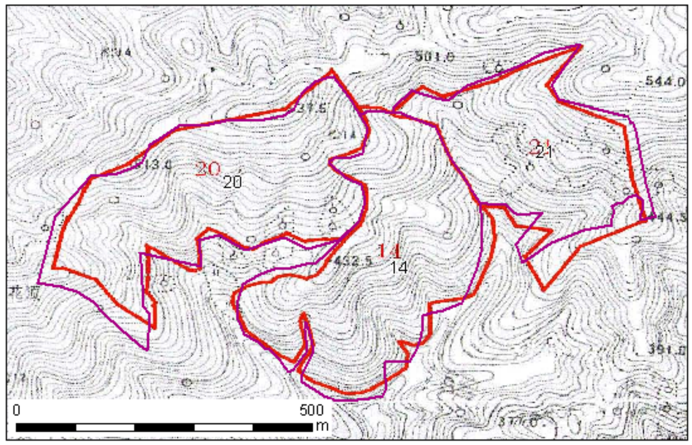
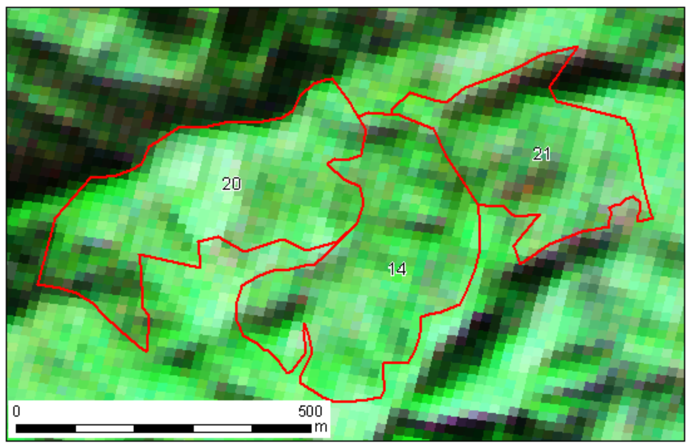
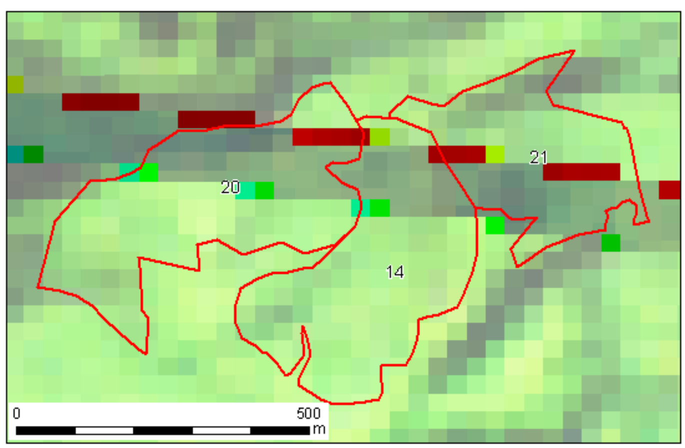
Area Reference	Hunan Province, Compartments 10, 15, 17
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 14/2/2008 ** Landsat image: Landsat 7 23/10/2009 Small patches of non-forest in compartment 17.

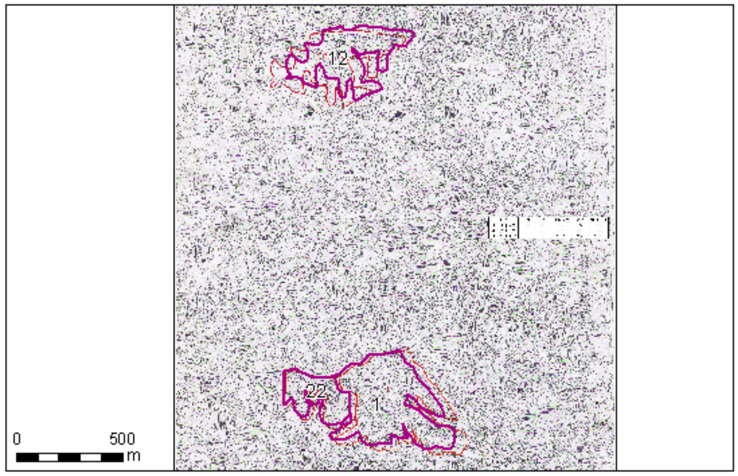
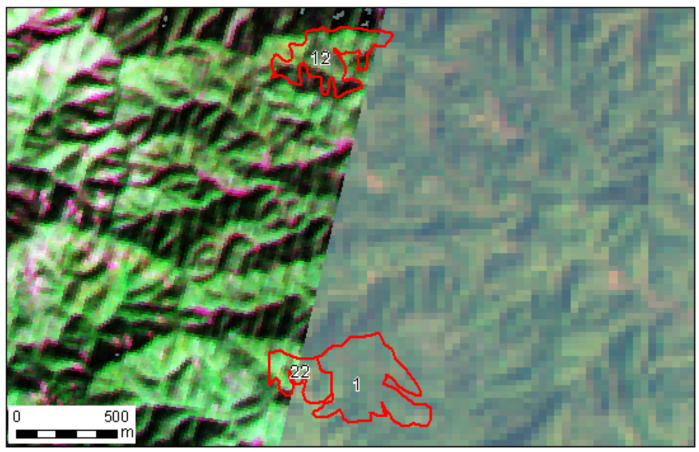
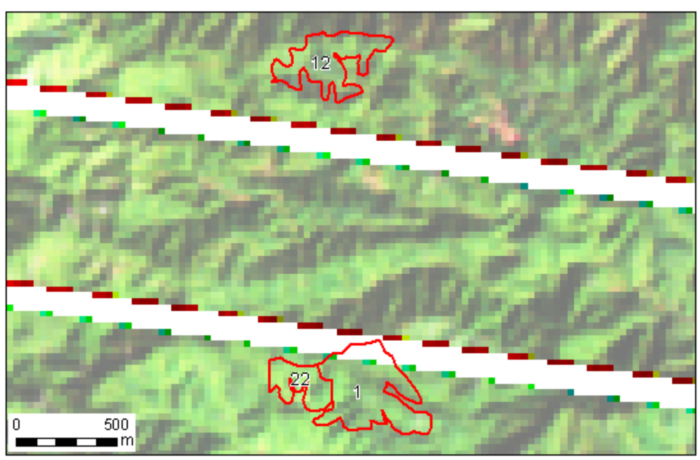
Area Reference	Hunan Province, Compartments 17, 24, 33
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 14/2/2008 ** Landsat image: Landsat 7 30/10/2009 Non-forested areas in compartments 17 and 33 have been excluded

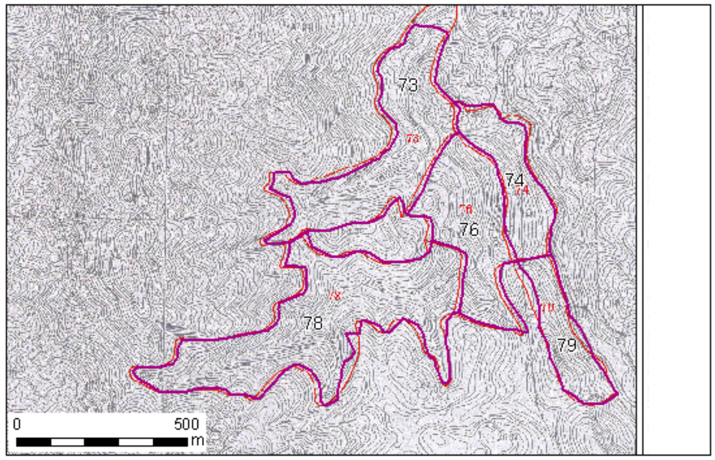
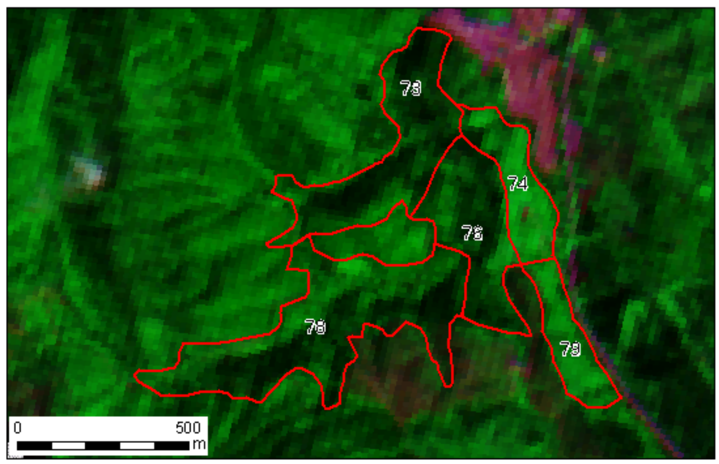
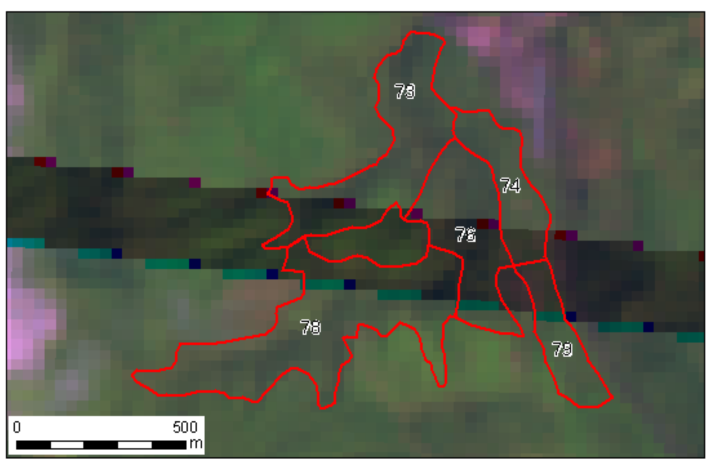
<table>
<tr><td>Area Reference</td><td>Hunan Province, Compartments 21, 22, 23</td></tr>
<tr><td>Povided Scan Map</td><td>
</td></tr>
<tr><td>High Resolution Verification *</td><td>
</td></tr>
<tr><td>Landsat Verification **</td><td>
</td></tr>
<tr><td>Comments</td><td>* High resolution image : ASTER 14/2/2008
** Landsat image: Landsat 7 30/10/2009
Close match between scanned map and imagery</td></tr>
</table>

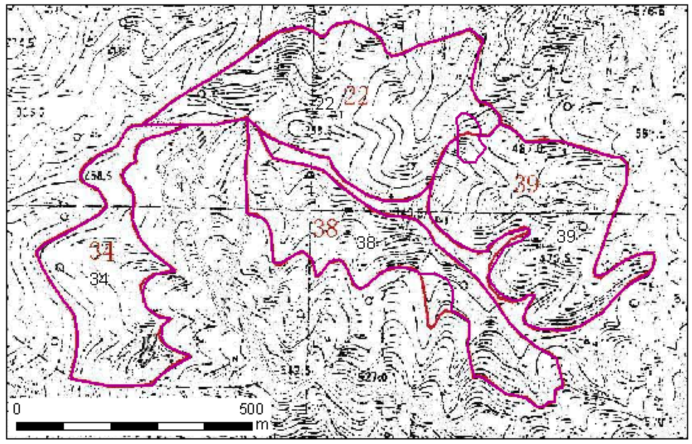
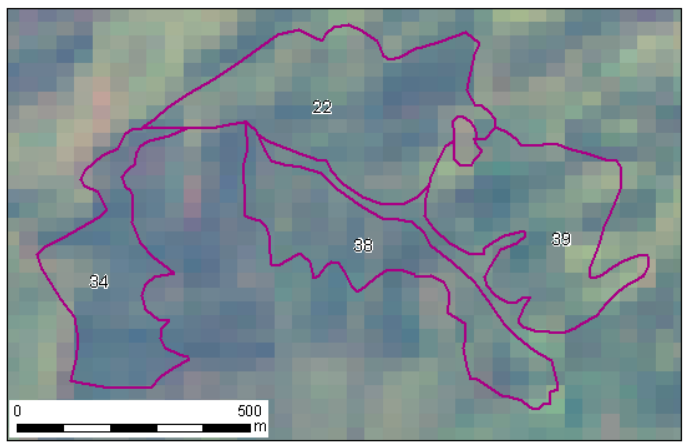
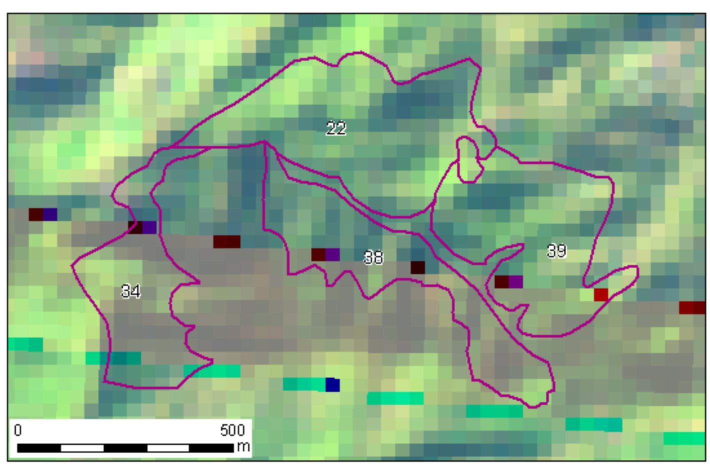
Area Reference	Hunan Province, Compartments 27, 41, 49
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 14/2/2008 ** No cloud-free Landsat imagery of suitable date available Google orthophotography of unknown age shows unforested area between compartments 27 and 48

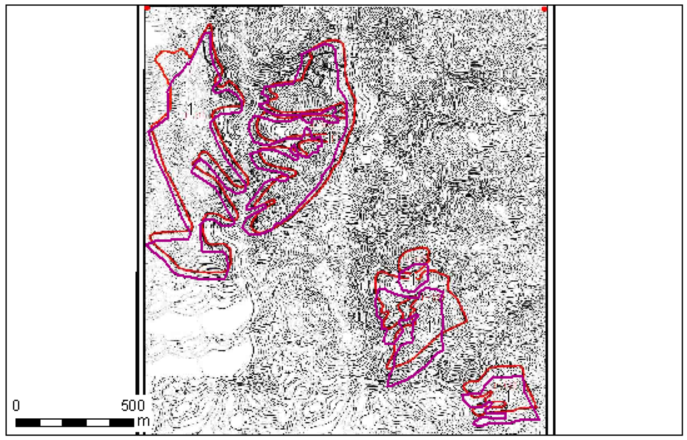
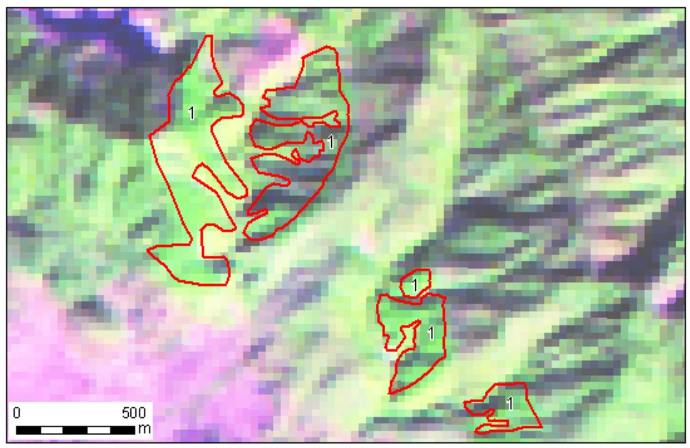
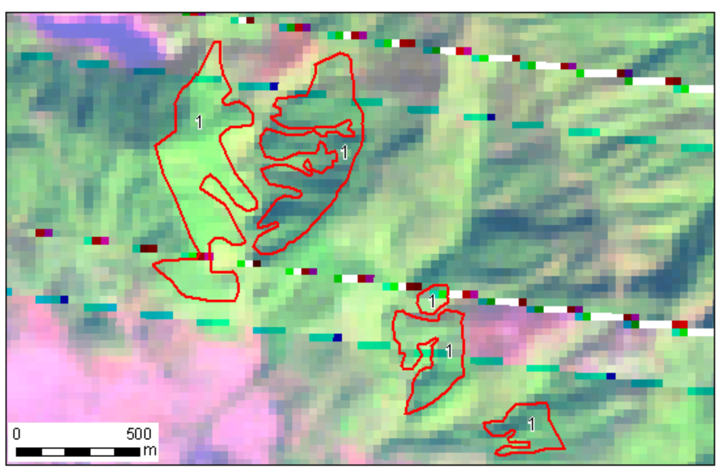
Area Reference	Guangxi Province, Compartments 1, 2, 6, 10, 39
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 24/11/2009 ** Landsat image: Landsat 7 23/10/2009 and Landsat 5 21/09/2006 Close match

Area Reference	Guangxi Province, Compartments 14, 20, 21
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 24/11/2009 **. Landsat image: Landsat 7 23/10/2009 and Landsat 5 21/09/2006 Small non-forested area in southeast corner of compartment 21 excluded

Area Reference	**Guanxi Province, Compartments 1, 12, 22**
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 24/11/2009 to the west. No recent cloud-free high resolution image available to the east. A Landsat 5 image dated 21/09/2006 is shown in the east ** Landsat image: Landsat 7 23/10/2009

Area Reference	**Guanxi Province, Compartments 73, 74, 76, 78, 79**
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : ASTER 7/4/2009 **. Landsat image: combination of Landsat 7 29/08/2009 and 17/01/2009 Image data conforms with scanned map

Area Reference	**Guangxi Province, Compartments 22, 34, 38, 39**
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* No cloud-free high resolution data available. A Landsat 5 image from 21/09/2006 is shown ** Landsat image: Combination of Landsat 7 images dated 17/01/2009 and 23/10/2009 Patch between compartments 22 and 39 excluded and boundary south of compartment 38 adjusted. . Dark area to south due to hill shading

Area Reference	Guangxi Province, Compartment 1
Provided Scan Map	
High Resolution Verification *	
Landsat Verification **	
Comments	* High resolution image : Not available. Landsat 5 image from 19/12/2006 is shown ** Landsat image: Combination of Landsat 7 17/01/2009 and 23/10/2009 Some adjustments to boundaries. Dark areas represent hillshading

6 AREA COMPARISON

Table 2:
Area Comparsion by Compartment

Province	Cmpt	Sino (ha)	Sino (mu)	Pöyry (ha)	Pöyry (mu)	Percentage difference
Yunnan	3	54.2	813	54.0	810	-0.37
Yunnan	4	13.3	200	13.9	208.5	+4.51
Yunnan	5	21	315	20.4	306	-2.85
Yunnan	6	18.6	279	15.5	232.5	-16.67
Yunnan	7	57.6	864	59.7	895.5	+3.65
Yunnan	8	70.9	1064	70.9	1063.5	0
Yunnan	9	39.9	599	39.4	591	-1.25
Yunnan	10	48.9	734	52.6	789	+7.57
Yunnan	11	13.2	198	13.1	196.5	-0.76
Yunnan	12	31.2	468	34.6	519	+10.90
Yunnan	1	31.1	467.3	24.8	372	-20.26
Yunnan	2	23.1	346.8	16.7	250.5	-27.71
Yunnan	3	34.8	522.2	19.4	291	-44.25
Yunnan	4	32.0	479.8	32.3	484.5	+0.94
Yunnan	2	44.0	659.5	39.4	591	-10.45
Yunnan	3	26.7	400	27.7	415.5	+3.75
Yunnan	4	15.6	233.8	14.2	213	-8.97
Yunnan	5	31.2	469	32.7	490.5	+4.81
Yunnan	5	60	900	54.3	814.5	-9.5
Yunnan	6	21.4	321	22.3	334.5	+4.21
Yunnan	7	13.3	200.1	32.8	492	+146.62
Yunnan	8	34.0	509.8	17.4	261	-48.82
Yunnan	6	52.7	790	51.1	766.5	-3.04
Yunnan	7	57	855	55.3	829.5	-2.98
Yunnan	8	49.6	744.5	49.5	742.5	-0.20
Yunnan	9	46.1	691.4	38.6	579	-16.27
Yunnan	15	34.2	513	34.8	522	+1.75
Yunnan	16	19	285	20.0	300	+5.26
Yunnan	17	16.9	254	14.9	223.5	-11.83
Yunnan	18	25.3	379	26.4	396	+4.35
Yunnan	19	32.7	491	26.8	402	-18.04
Yunnan	20	55.5	833	50.0	750	-9.91
Yunnan	21	60.7	909.9	65.3	979.5	+7.58
Hunan	10	8.2	122.5	8.1	121.5	-1.22
Hunan	15	14.6	219.5	16.9	253.5	+15.75
Hunan	17	20.6	309.2	21.9	328.5	+6.31
Hunan	17	23.7	355.05	22.0	330	-7.17
Hunan	24	22.4	336.19	22.2	333	-0.89
Hunan	33	18.8	281.33	19.1	286.5	+1.60
Hunan	21	12.4	185.65	12.6	189	+1.61
Hunan	22	11.6	173.75	11.6	174	0
Hunan	23	10.4	156.45	11.1	166.5	+6.73
Hunan	27	13.3	198.8	14.3	214.5	+7.52
Hunan	41	32.6	488.9	38.0	570	+16.56
Hunan	49	16.9	253	20.2	303	+19.53

Province	Cmpt	Sino (ha)	Sino (mu)	Pöyry (ha)	Pöyry (mu)	Percentage difference
Guangxi	1	7.9	118.5	8.44	126.6	+6.84
Guangxi	2	2.4	36	2.1	31.5	-12.50
Guangxi	6	2.4	36	3.1	46.5	+29.16
Guangxi	10	7.8	117	10.3	154.5	+32.05
Guangxi	39	2.5	37.5	3.3	49.5	+32.00
Guangxi	14	10.5	157.4	9.9	148.5	--5.71
Guangxi	20	8.8	132.3	10.5	157.5	+19.32
Guangxi	21	5.6	84	6.9	103.5	+23.21
Guangxi	1	13.6	204	14.9	223.5	+9.56
Guangxi	12	10.4	156	9.3	139.5	-10.58
Guangxi	22	4.4	204	4.7	70.5	+6.82
Guangxi	73	14.0	210.6	11.9	178.5	-15.00
Guangxi	74	6.1	91.6	5.3	79.5	-13.11
Guangxi	76	8.7	130	8.8	132	+1.15
Guangxi	78	20.7	309.8	18.6	279	-10.14
Guangxi	79	4.6	68.5	4.3	64.5	-6.52
Guangxi	22	12.5	186.8	13.8	207	+10.40
Guangxi	34	6.4	95.4	7.7	115.5	+20.31
Guangxi	38	8.0	119.7	9.2	138	+15.00
Guangxi	39	9.1	137.1	11.1	166.5	+21.98
Guangxi	1	53.3	800	47.7	715.5	-10.51

APPENDIX 5

Changes to Log Yield Forecasts (Yield Tables) in 2009 Valuation

CHANGES TO LOG YIELD FORECASTS (YIELD TABLES) IN 2009 VALUATION

1 OTHER SPECIES CROPTYPE

In the 2008 valuation, the area of 'Other Species' was approximately 62 000 ha. Pöyry estimated the average TRV at 60 m^3/ha, with this volume constant from age 17 years onwards. The TRV was distributed across the log size classes with about one-third each in the two smallest classes, and the balance evenly spread over the two larger log size classes. This was based on Pöyry's observations and measurements of an area of forest where stocking was low, although the size of some trees was quite large.

In 2009, this species group increased to 106 000 ha, which constitutes a 70% increase. As at 31 December 2009, the 'other species' group makes up 22% of the total Sino-Forest area. Because of the increase in area of this crop type, Pöyry chose to spend some time assessing this species group during the 2009 field assessment. Specifically, in order to obtain indicative yield estimates, Pöyry established nine inventory plots, in northern Guangxi province, in December 2009. Even with these additional inventory plots, the available inventory data is insufficient as a basis for the development of a statistically reliable yield table.

Given the data limitations, Pöyry was able to apply only very basic biometric assumptions in estimating the recoverable volume and log product mix. The results are presented below, and will require revision in subsequent valuations, when more data becomes available.

Table 1-1:
Preliminary Yield Table for 'Other Species' Crop Type

Location	Plot	Plot Size (ha)	Species	Stocking (s/ha)	Mean dbh (mm)	Mean height (m)	TSV (m^3/ha)
Northern Guangxi	1	0.02	Other	900	180	11.9	154
Northern Guangxi	2	0.02	Other	550	202	11.9	124
Northern Guangxi	3	0.02	Other	700	146	10.4	74
Northern Guangxi	4	0.02	Other	1950	149	12.3	233
Northern Guangxi	5	0.02	Other	850	213	13.6	264
Northern Guangxi	6	0.02	Other	850	168	11.5	135
Northern Guangxi	7	0.02	Other	1300	156	11.5	217
Northern Guangxi	8	0.02	Other	1350	179	11.9	271
Northern Guangxi	9	0.02	Other	900	165	11.4	129
MEAN				**1039**	**173**	**11.8**	**178**

Variance of TSV	4 888
number sample plots	9
SE of Mean	23.31
t for 9 samples (8 df)	2.306
95% Conf Limits (+/-)	54
PLE is +/-	**30%**
Applying 65% recovery factor, mean TRV =	**116**

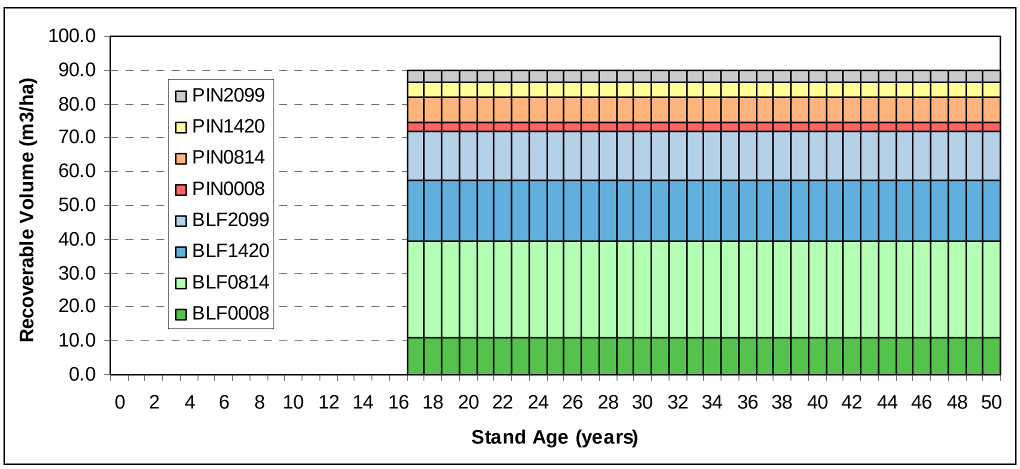
Due to the insufficient number of plots and the consequently high PLE, Pöyry has erred conservatively and reduced the assumed mean TRV by 20%, to 90 m^3/ha.

Table 1-2:
Estimated TRV by Log SED Class for the five Tree DBH Classes

DBH Class (cm)	Log sed class > 20 cm	Log sed class 14–20 cm	Log sed class 8–14 cm	Log sed class < 8 cm	Total vol of 2 m logs (m^3)
10 - 15			0.02	0.02	0.03
15 - 20			0.07	0.01	0.08
20 - 25		0.09	0.04	0.01	0.15
25 - 30	0.09	0.11	0.05	0.01	0.27
> 30	0.34	0.11	0.05	0.01	0.51

These log volumes, by sed class and DBH class, were applied as percentages to the percentage TRV by DBH class from the inventory and then applied to the estimated TRV of 90 m^3/ha.

Figure 1-1:
'Other Species' preliminary Yield Table applied in the 2009 Forest Valuation



2 BROADLEAF CROPTYPE

As part of the 2009 valuation field assessment, 34 plots were established and measured in natural second-growth broadleaf forest in two counties in Yunnan province. Analyses of the data indicated that the estimate of mean recoverable volume per hectare was close to the 181 m^3/ha (constant across age–assuming insignificant growth) of the yield table applied in the 2008 valuation.

Pöyry has this year become aware that, under current regulations, this crop type cannot be clearfelled, but must be selectively logged, with only up to 50% of the volume allowed to be removed. Pöyry has consequently adjusted the yield table for the broadleaf croptype, from 181 m^3/ha to 90 m^3/ha to reflect this constraint.

3 PURCHASED EUCALYPTUS CROPTYPE

Sino-Forest owns about 75 000 ha of eucalyptus. About two-thirds of this is forest that Sino-Forest has planted, with the balance being purchased forest. During the field inspections of 2008 and 2009, Pöyry established and measured 50 inventory plots in eucalypts. All of these were located in forest planted by Sino-Forest. The plots of 2008 were used as the basis of revising the eucalypt yield table for the 2008 valuation. In Pöyry's opinion, it is unlikely that areas of eucalypts that Sino-Forest has purchased will have benefited from the same level of tree selection and genetic improvement, or as intensive establishment management as the areas that Sino-Forest has planted itself. Accordingly, in the 2009 valuation, Pöyry has chosen to apply a different yield table to the purchased eucalypt crops. For the purchased eucalypts, a yield of 70% of the planted eucalypts has been assumed. Accordingly, at age 6 years for example, while in the areas of planted eucalypts we are forecasting a recoverable volume of 127 m^3/ha, in the purchased eucalypt crops, this has been reduced to 89 m^3/ha. More inventory data will be required to test this assumption.

3.1 Chinese Fir

Nine plots planted with Chinese fir were established and measured in southern Hunan province. These were crops aged 18 and 21 years. Data analyses indicated that estimates of the mean recoverable volume per hectare on age was close to the recoverable volumes of the average generic yield table used in the valuation for Chinese fir. No adjustments have therefore been made to the yield table for Chinese fir in the 2009 valuation.

No other adjustments have been made to yield tables applied in the 2009 valuation.

APPENDIX 6

Forest Investment Appraisal (WACC – China)

c/- The University of Auckland
Private Bag 92019, AMC
Auckland 1142, New Zealand
www.uniservices.co.nz

Auckland UniServices Limited
Level 10, UniServices House,
70 Symonds Street, Auckland
+64 9 373 7522

Investment Appraisal for Forest Investment in China

AUCKLAND UNISERVICES LIMITED

a wholly owned company of

THE UNIVERSITY OF AUCKLAND

Client
Steve Croskery
Senior Consultant
Pöyry Forest Industry Limited
2208-2210, Cloud Nine Plaza
No. 1118 West Yan'an Road
SHANGHAI 200052, P.R. China

Consultant
Dr Alastair Marsden
Department of Accounting & Finance
School of Business & Economics
The University of Auckland
Private Bag 92019
Auckland, New Zealand.

5 January 2010

c/- The University of Auckland
Private Bag 92019, AMC
Auckland 1142, New Zealand
www.uniservices.co.nz

Auckland UniServices Limited
Level 10, UniServices House,
70 Symonds Street, Auckland
+64 9 373 7522

Important Notice

Reports and results from Auckland UniServices Limited should only be used for the purposes for which they were commissioned. If it is proposed to use a report prepared by Auckland UniServices for a different purpose or in a different context from that intended at the time of commissioning the work, then UniServices should be consulted to verify whether the report is being correctly interpreted. In particular it is requested that, where quoted, conclusions given in UniServices reports should be stated in full.

Investment Appraisal for Forest Investment in China

A. Background and brief executive summary

A.1 Introduction

You have requested Auckland UniServices Limited ("Auckland UniServices" or "we") to prepare a report on the weighted average cost of capital ("WACC") for a generic forest asset in the country of China.

In accordance with the terms of our engagement we use the capital asset pricing model ("CAPM") to determine the cost of equity capital.

The cost of capital is denominated in United States dollars ("USD") from the perspective of an international investor.

This report is subject to our declaration and restrictions on the use as set out in section B and Appendix 1.

A.2 Results

In summary we conclude under the different versions of the CAPM model that we apply:

- The estimates of the **real post-corporate tax** WACC denominated in **USD** for a generic forest asset in China is between **5.9%** and **9.7%.**

Table 1		
Chinese corporate tax rate	**"Low" estimate**	**"High" estimate**
Corporate tax rate = 25%	5.9%	9.6%
Corporate tax rate = 15%	6.0%	9.7%

- The estimates of the **real pre-corporate tax** WACC denominated in **USD** for a generic forest asset in China is between circa **7.1%** and **12.8%.**[1]

Table 2		
Chinese corporate tax rate	**"Low" estimate**	**"High" estimate**
Corporate tax rate = 25%	7.9%	12.8%
Corporate tax rate = 15%	7.1%	11.4%

These cost of capital estimates apply as at 9 December 2009.

[1] The conversion of a post-tax WACC to an "equivalent" pre-tax WACC is based on a simple transformation formula. In practice, however, formal modelling of the entity's cashflows is required to determine an "equivalent" pre-tax WACC.

Our "low" and "high" estimates are not absolute lower and upper bounds of the possible range of the WACCs but rather reflect a low and high range based on estimates of the parameter inputs under the different versions of the CAPM we adopt. The lower and upper bounds for the WACC may be wider than the range of estimates provided in the tables above if we undertook additional sensitivity analysis based on different versions of the CAPM.

A.3 Impact of the recent credit crisis

As at the date of this report, financial and capital markets are still being impacted by high volatility and uncertain economic prospects.

In our view the ongoing consequences of the global credit crunch include, inter-alia:

- Significantly higher cost of capital for those firms that have high leverage and/or high degrees of operating leverage. Credit or default spreads on investment grade (BBB) debt has widened to around 4.50% - 5.00% (or more). Equity risk premiums will also have increased, at least over the short-to-medium term time horizon;

- Ongoing balance sheet risk and focus by firms and investors on "de-leveraging". Companies that have significant debt maturing in the near-term and have a weak credit rating may find it extremely difficult to re-finance their debt obligations;

- Higher than normal volatility in interest rates, commodity prices, inflation rates and exchange rates; and

- Increased regulation to address "market failure".

A.4 Limitations of the CAPM

The CAPM is a theoretical asset pricing model and we strongly recommend (to the extent such evidence is available) our estimates of the cost of capital for a Chinese forest entity be compared to implied discount rates or other evidence based on actual forest or forest related sales in the Chinese market.

We note the Chinese legal, institutional and bankruptcy laws differ to Western capital markets. In addition restrictions on the level of foreign ownership of forest assets may apply in China and in emerging markets the level of corporate governance may vary significantly between companies (see Klapper and Love, 2004, Chen et al., 2003).

Corporate governance is important as it provides mechanisms whereby outside investors can protect themselves against expropriation of assets by insiders. Corporate governance can impact on the risks that outside investors may face in respect of any expropriation of assets.

These factors together with size and other market frictions may warrant an adjustment to the cashflow expectations and/or an increment to the cost of capital for the forest if investors' property rights are not clearly defined. Where control is not obtained a minority discount and /or illiquidity discount may apply.

B. Declaration, recipients of our report, use of our advice and restrictions on the use of this report

This report has been prepared for Pöyry Forest Industry Limited ("Pöyry"). The report was written by Dr Alastair Marsden on behalf of Auckland UniServices and has been based primarily on information available up to 9 December 2009. The cost of capital estimates apply as at that date.

The current volatility in the equity and debt markets and potential for irrational behaviour by investors makes valuation and determination of a fair cost of capital difficult to determine as at the date of this report. Potential market participants may have materially different views on value and cost of capital in the current global credit crisis. Our report should therefore be viewed in this context.

Because of its special nature, our report may not be suited for any purpose other than as described in this report. We will not be liable for any loss or damage to any party other than Pöyry who may rely on our report. Appendix 1 sets out in more detail our statement of independence, qualifications, declaration, disclaimer and restrictions on the use of this report.

C. Information Sources

In preparing this report we have relied on information received from:

- Data sourced from internet websites (as referenced);
- Other articles and sources (where referenced); and
- Discussions with yourself.

In accordance with the terms of our engagement letter we have not audited or independently verified any of the information sourced or provided to us.

D. Introduction to capital budgeting and cost of capital in developing markets:

An estimate of the cost of capital is critical to value any entity or investment project using discounted cash flow ("DCF") analysis.

Investments in developing markets are generally perceived to have higher risk compared to investments in countries with a stable political and economic environment. Risks of investing in developing markets include high inflation, capital controls, political instability, corruption, poor accounting and managerial controls, an uncertain legal framework and lack of protection of investor property rights.

The alternative conceptual approaches to recognise these "risks" using DCF analysis and to value an entity in a developing country are to:[2]

- Discount 'promised' cash flows at a cost of capital that includes a risk premium for country and other idiosyncratic factors. Under this approach an increment is added to the cost of capital to recognise risk that is not explicitly modelled into the cashflow expectations; or

- Discount 'expected' cash flows based on probability-weighted scenarios. Under this approach certain specific country risks will likely result in a downward adjustment in cash flow expectations compared to the alternative approach of adding an increment to the cost of capital.

To recognise the higher perceived risk of investing in developing markets, common practice is to adopt the first approach and adjust the discount rate by adding a premium to the cost of capital that incorporates an increment for country-risk premium factors (see Keck at al. (1998), Lessard (1996)).

James and Koller (2000) argue, however, that the better (alternative) approach to capital budgeting in markets is to recognise specific project or unique country risks in the expectations of cashflows. First, with increased global integration of capital markets investors can diversify away from many specific country risks. Second, many country risks may be unique or idiosyncratic to that country and may not apply equally to all industries in that country. Third, use of the credit risk of the country to determine the cost of capital for an entity may be a poor proxy for the entity's risk.

We are not privy to the specific risks that Pöyry proposes to model in the cashflows to value the Chinese forest assets. However, the range of cost of capital estimates that we derive in this report incorporate a country risk premium.

E. Overview of the different CAPM models we apply to estimate the cost of equity for developing markets

E.1. Use of Capital Asset Pricing Model ("CAPM") in developing markets

The risks attributable to any investment can broadly be classified as:

- Systematic or non-diversifiable risk, e.g., world market risk, macro-economic risks associated with shocks to GNP, interest rates etc; and

- Non-systematic or unique projects risks. For developing markets these are often one-sided or asymmetric (and primarily of a 'downside nature').

Under the standard CAPM, risk is measured by the beta of a project or investment. Beta only captures systematic or non-diversifiable risk in the firm or project.

[2] See Chapter 19, Copeland, T., Koller, T. and J. Murrin, 2000.

We summarize below the global CAPM and the versions of the CAPM based on those proposed by Damodaran (2003) to estimate the cost of capital for an investment in emerging markets. We then apply Damodaran's versions of the CAPM to determine the cost of capital for a generic forest asset in China.[3]

E.2. Global CAPM

Under the global CAPM the expected return on equity, R_{ei}, for the company is given by:

$$R_{ei} = R_{f\ US} + \beta_{i\ US} * (R_{M\ US} - R_{f\ US})$$

In this version of the global CAPM the US market is assumed to proxy for a global integrated market and investors are assumed to hold a globally diversified portfolio. In this case, $R_{f\ US}$ is US risk-free rate and the term $(R_{M\ US} - R_{f\ US})$ represents the expected global market risk premium.

The beta of asset i ($\beta_{i\ US}$) is measured against a global market portfolio. Country risk is not accounted for in this model since it is assumed to be diversifiable.

E.3. Damodaran's Models

Under Damodaran's (2003) model the expected return on equity, R_{ei}, for the company is given by:

$$R_{ei} = R_{f\ US} + \beta_{i\ US} * (R_{M\ US} - R_{f\ US}) + \textit{Country risk premium}$$

Damodaran (2003) suggests a number of ways to the estimate the *Country risk premium*. These are:

(i) the country risk premium is set equal to the *country bond default spread*;

(ii) the country risk premium equals the product of the global market risk premium and the ratio of local equity market volatility and US (global) market volatility ($\sigma_{Local\ Equity}/\sigma_{US}$); and

(iii) the country risk premium equals the product of the *country bond default spread* ($R_{Country\ Risk}$) and the ratio of local equity market volatility and country bond volatility ($\sigma_{Local\ Equity}/\sigma_{Country\ Bond}$).

Intuitively we may expect a country's equity risk premium to be larger than the country bond default spread. We use Damodaran's approach No. (iii) to determine the *Country risk premium* for emerging markets and the market of China.

[3] Also see Pereiro (2001) for an overview of some of the different cost of capital models that may be applied to emerging markets.

The $\beta_{i\ US}$ is the equity beta for an equivalent or comparable US based project.

For individual projects, Damodaran's estimate of the *country risk premium* can be incorporated into the cost of equity in three different ways.

Model 1. The same *country risk premium* is assumed for all projects in the country:

$R_{ei} = R_{f\ US} + \beta_{i\ US} * (R_{M\ US} – R_{f\ US}) +$ *Country risk premium*

Model 2. The country equity risk premium is adjusted by the equity beta of the project:

$R_{ei} = R_{f\ US} + \beta_{i\ US} * [R_{M\ US} – R_{f\ US} +$ *Country risk premium*]

Model 3. The country equity risk premium is adjusted by a 'lambda' coefficient that measures the individual project's exposure to country risk:

$R_{ei} = R_{f\ US} + \beta_{i\ US} * (R_{M\ US} – R_{f\ US}) + \lambda_i *$ *Country risk premium*

F. Application of suggested approaches to estimate the weighted average cost of capital for a generic forest asset in China.

Damodaran's (2003) models discussed in the prior section above are used to estimate the cost of capital for the forestry sector in China.

F.1. Assumptions

Assumptions with respect to US / global risk parameters are presented in Table 3 below.

Table 3: Global risk parameters		
	US / Global	*US / Global*
	Low	*High*
Asset beta of US forestry firms ($\beta_{i\ US}$)	0.50	0.75
Risk-free rate - global ($R_{f\ US}$)	3.90%	3.90%
Market risk premium ($R_{M\ US} - R_{f\ US}$)	5.50%	6.50%
Expected US inflation	2.00%	2.00%

F.1.1. Parameter estimates in Table 3

Risk free rate

The average yield as at 9 December 2009 on long-term (10-20 yr) USD Treasury bonds was circa **3.9%.**[4] This is assumed to be a proxy for the global long-term risk free rate.

***Market risk premium* ($R_{M\ US} - R_{f\ US}$)**

The market risk premium (*"MRP")* can be estimated in a number of ways. These include simple historical averaging of the observed risk premium, forward-looking approaches, the methodology of Siegel (1992) and survey evidence.

Historical estimates

Studies on the historical market risk premium include Ibbotson (2008), who measured the historical arithmetic *MRP* for US stocks for the period 1926 - 2007 at between 7.1% (referenced to the S&P and long-term bonds) and 8.50% (referenced to the S&P and short-term bonds). Similarly, Damodaran (2009) provides a historical arithmetic estimate of the *MRP* for the US market over the period 1928 -2008 of 5.32% (stocks minus Treasury bonds) and 7.30% (stocks minus Treasury bills).

[4] Source: US Department of Treasury. http://www.treasury.gov/offices/domestic-finance/debt-management/interest-rate/yield.html, December 2009.

A recent study by Dimson et al. (2009) also provides estimates of the historical risk premium for a number of developed countries over the period 1900 to 2008. These historical estimates for 17 developed countries are summarised in the table below.

Table 4. Worldwide equity risk premiums: 1900 - 2008				
Country	**Arithmetic mean % (relative to bills)**	**Standard deviation %**	**Arithmetic mean % (relative to bonds)**	**Standard deviation %**
United Kingdom	5.8	20.0	5.0	16.9
United States	7.0	19.9	5.9	20.6
Europe	5.5	20.6	5.0	17.1
Average (17 Countries)	**6.7**	**23.1**	**5.7**	**22.2**
World	5.7	17.1	4.6	15.6
Source: Dimson et al. 2009, Tables 9 and 10.				

Forward-looking estimates and Siegel methodology

Most forward-looking estimates of the *MRP* are lower than the historical estimates of the *MRP*. For example, Fama and French (2002) generate forward-looking estimates for the US standard market risk premium of 2.6%-4.3% over the period 1951-2000. Similarly Claus and Thomas (2001) generate estimates of the *MRP* for a number of countries with a maximum of 3.0%.

Siegel (1992, 1999) argues that historical US estimates of the *MRP* have been biased upwards due to unexpectedly high inflation in the latter part of the 20th century.

Similarly, Dimson et al. (2009) consider a downward adjustment to the measured historical *MRP* is justified if there has been a long-term change in capital market conditions and investors' required rates of return in the future are expected to be lower than in the past. Dimson et al. (2009, p37) estimate an arithmetic mean of the world market risk premium of between 4.5% and 5.0% relative to bills (short term bonds) based on a decomposition of historical returns into a long term dividend yield, real dividend growth, changes in price to dividend ratios and real exchange rate changes.

Ibbotson and Chen (2003) argue, however, based on their decomposition of historical equity returns into supply factors of inflation, earnings, dividends, the price to earnings ratio, dividend payout ratio, book value, return on equity and GDP, that the forecast arithmetic MRP (relative to long-term bonds) is around 6.0% for the United States. Similarly Mehra (2003) on the equity risk premium puzzle concludes that the MRP is likely to be similar to what it has been in the past. [5]

Survey evidence

[5] The equity risk premium puzzle refers to the inability of standard economic models to explain why the *MRP* has been so high in many developed countries such as the United States.

Survey evidence generally report estimates of the market risk premium below long-term historical estimates. A summary of some studies are provided below:

Table 5: Survey evidence of MRP		
Author	**Market**	**Average MRP**
Welch (2008)	US	5.74% (arithmetic premium)
Graham and Harvey (2009)	US	4.74%
Fernández (2009)		Finance Professors
	US	6.3%
	UK	5.5%
	Australia	5.9%

Impact of the recent global credit crisis

The global credit crisis began with the collapse of the sub-prime mortgage market in the US, starting August 2007. This led to significant write-downs in the value of securitised mortgages and collateralised debt obligations held by major US and international financial institutions.

During 2008 the crisis deepened in the US with the demise of household names such as Bear Stearns, Lehman Brothers, Freddie Mac, Fannie Mae and American Insurance Group. Led by a rapid slowing in the US economy, many economies moved into a steep recession in 2008 and recorded large output losses during late 2008 and early 2009. The turmoil in financial and real markets sparked a strong response from governments across the globe to allay concerns over systemic financial collapse and to support demand to ease serious fears of a global depression.

The systemic nature of the economic shock has led to a collapse in investor confidence which is only tentatively recovering. The recent announcement of the inability of the Dubai development company to meet its short term financing commitments is a clear illustration of the fragility of any current perceived recovery. Because the shock has been systemic in nature and risks are positively correlated with market returns, investors have been unable to diversify away from these risks.

Consequences of the Global Credit Crisis

The consequences of the global financial crisis have included:

- A significant disruption to economic growth. The latest World Economic Outlook (International Monetary Fund, 2009) reports that world output growth slowed sharply from 5.2% in 2007 to 3.0% in 2008 before declining further to -1.1% in 2009. Although world output growth is expected to recover in 2010 the losses in output that have been experienced are expected to be permanent.

- A worldwide collapse in equity prices which has been followed by a partial rebound.

This fall in equity prices may be attributable to a variety of factors. These include:

- Investors' expectation of a long-run decline in corporate profitability or cash flow as a result of the decline in private sector demand;
- An increase in the market risk premium or the long-term cost of equity capital;[6] or
- Irrational pricing behaviour and over-reaction (on the downside) by investors in response to the negative economic shock of the global credit crisis.

- A significant increase in the cost of debt particularly for firms that are a weak credit risk, have high gearing and/or have high operating leverage.

On a forward looking basis, an estimate of the ex-ante *MRP* will be higher if investors' risk aversion has increased and the fall in equity prices outweighs the impact of lower forecast cashflows and profitability for firms.

The increase in market volatility can, however, be viewed in two ways.[7] High volatility may simply reflect that investors continue to require long-run observed historical risk premiums. When the credit crisis eventually passes, markets will return to normal levels of volatility and there will be no change to the long-term *MRP*.

On the other hand the impact of the credit crisis and higher current volatility may reflect a structural increase in the *MRP*, at least over the short to medium term time horizon.

Conclusion on MRP

In conclusion we assume the ex-ante global *MRP* to be **5.50%** to **6.50%.** While this is lower than historical estimates of the market risk premium for many developed countries, the assumption of full market integration under a global CAPM should lead to greater diversification of risk and hence lower the forward-looking market risk premium.

Global Beta

As already noted beta is a measure of the systematic risk of a firm (i.e., non-diversifiable risk or that part of the risk of an asset that cannot be diversified away).

Estimation of beta almost invariably involves an element of judgement.

International OLS beta estimates sourced from Bloomberg

[6] The implied market risk premium will move in the opposite direction to market returns.
[7] See Damodaran (2008) for a discussion of this point.

The following table presents estimates for ten companies with a significant weight in the S&P Global Timber & Forestry Index. The betas were estimated using data on weekly returns over two years.[8]

Table 6: Beta estimates ex Bloomberg (2009)

Company	Equity Beta	Market D/E Ratio	Unlevered Asset Beta
Plum Creek Timber Company	0.89	48.5%	0.60
Rayonier Inc.	1.00	20.7%	0.83
Oji Paper Co.	0.79	193.9%	0.27
Potlatch Corp.	1.11	39.8%	0.79
Weyerhaeuser Corp.	1.37	44.0%	0.95
Sino-Forest Corp.	1.54	9.4%	1.41
West Fraser Timber	0.49	44.3%	0.34
UPM-Kymmene Oyj	1.33	112.4%	0.62
Canfor Corp.	0.55	27.8%	0.43
Svenska Cellulosa AB – B shares	0.82	65.9%	0.49
Mean	**0.99**		**0.67**
Median	**0.95**		**0.61**

In this sub-sample of 10 companies the mean (median) equity beta is 0.99 (0.95) and the mean (median) asset beta is 0.67 (0.61).

International OLS beta estimates sourced from Damodaran (2009)

The following table presents average beta estimates sourced from the website of Damodaran (2009) for Forest Products companies in North America, Europe, Japan and Emerging Markets.[9] The betas were estimated using monthly returns over five years.

Table 7

Region	Number of Firms	Average Equity Beta	Market D/E Ratio	Average Asset Beta
North America	15	0.95	153.5%	0.60
Europe	16	1.06	213.0%	0.39
Japan	6	0.78	195.4%	0.29
Emerging markets	46	0.76	84.2%	0.44
Weighted average		**0.85**		**0.45**

The global weighted mean equity beta is 0.85 and the weighted mean asset beta is 0.45.

For US timber assets Akers and Staub (2003) report asset beta estimates of between 0.67 and 0.76 measured relative to a global market portfolio.

---

[8] To convert an equity beta to an asset beta (and vice-versa) we use the following formula.
$\beta_i = \beta_a [1+ D/E]$; where:
β_i = equity beta;
β_i = asset beta;
D / E = target or long-run ratio of debt to equity

[9] Data sourced from Damodaran (2009). Damodaran, A., 2009, http://pages.stern.nyu.edu/~adamodar/New_Home_Page/.

US Betas - Data from Value Line

Beta estimates that from data sourced from Damodaran (2009)[10] for US listed entities are summarised below are:

Table 8

Industry classification	*Year*	*Number of Firms*	*Average Equity Beta*	*Market D/E Ratio*	*Unlevered Asset Beta*
Paper/Forest Products	2009	38	1.20	118.1%	0.60
Paper/Forest Products	2008	39	0.93	40.9%	0.69
Paper/Forest Products	2007	40	0.84	56.5%	0.60
Paper/Forest Products	2006	40	0.82	77.3%	0.53
Paper/Forest Products	2005	39	0.86	65.8%	0.57
Paper/Forest Products	2004	40	0.86	65.5%	0.56
Paper/Forest Products	2003	40	0.84	71.9%	0.61
Paper/Forest Products	2002	44	0.84	72.2%	0.56
Paper/Forest Products	2001	48	0.83	74.1%	0.54
Paper/Forest Products	2000	48	0.78	61.1%	0.55
	Average	**42**	**0.88**	**70.3%**	**0.58**

The average US betas for paper and forest products firms is circa 0.60 (Value Line estimates).

Fundamental factors that impact on beta

Beta is a relative risk measure and measures the sensitivity of returns on a stock relative to market returns (e.g., in response to macroeconomic shocks to GDP, interest rates, taxes etc.). The beta of the market is one.

Factors that impact on the sensitivity of returns to real economic / GNP shocks and hence the estimate of an entity's or company's beta include:[11]

- Nature of the industry. Companies that produce products that are essential commodities or supply essential services should have less sensitivity to real Gross Domestic Product shocks compared to companies that produce discretionary commodities or services.
- Duration of contracts. Companies with fixed price contracts will have lower risk and beta as returns will be less sensitive to economic shocks or broad market movements.

[10] Ibid.

[11] See Lally, M., 2000, The cost of equity capital and its estimation, McGraw-Hill series in Advanced Finance.

- The type of customer. Companies producing products or providing services to the private sector should be more sensitive to economic shocks than companies producing products or services for the public sector.
- Degree and type of regulation. As a general rule companies that supply monopoly services subject to regulation will have lower sensitivity to real GDP shocks. Regulation, however, that prevents companies responding to economic shocks may increase risk and beta.
- Presence of real options. The presence of expansion options (exercised in an economic upturn) should increase the company's sensitivity to economic shocks. By contrast options that permit the company to contract its operations should reduce the company's sensitivity to economic shocks.
- Operating leverage. Companies with high operating leverage (high fixed costs to operating costs) will be more sensitive to real GDP shocks, as returns will be more sensitive to changes in demand for the company's goods or services.
- Market weight. An increase in an industry weight in the market proxy will tend to draw the company's beta towards one.
- Shocks to the discount rate.

Summary on beta

Overall the empirical evidence suggests an appropriate asset beta for a generic forest asset of between circa 0.40 and 0.75. Based on fundamental factors, however, we consider a lower bound asset beta for a timber resource would be higher than 0.45.

We conclude that the asset beta of a pure-play forestry owner of timber resources is likely to be in the range **0.50** to **0.75.**

US inflation rate

As at 9 December 2009 the ten-year inflation-indexed Treasury yield spread or the difference between nominal and inflation-indexed bonds yields was circa 2.30%.[12]

The yield spread on 20-year US Treasury bonds compared to US Treasury real long term interest rates was also circa 2.3%. [13]

At present there is a high degree of uncertainty and a wide difference in consensus estimates of inflation given the impact of the recent credit crisis, with estimates for US inflation between circa 1.5% p.a. (least optimistic forecasters) and 3.0% p.a. (most optimistic forecasters). [14]

[12] Based on an estimate of the 10-Year Inflation-Indexed Treasury yield spread – see Federal Reserve Bank of St Louis, December 2009, http://research.stlouisfed.org/publications/usfd/page12.pdf
[13] Source: US Department of Treasury. http://www.treasury.gov/offices/domestic-finance/debt-management/interest-rate/yield.html, December 2009.
[14] See "Inflation May Be the Next Dragon To Slay" By Kevin L. Kliesen, Jan 2010, http://stlouisfed.org/publications/re/articles/?id=1865

In the current economic environment we apply a long-run inflation rate of **2.00%** to deflate the US nominal WACC to calculate the US real WACC.

F.1.2. Parameter estimates in Table 9

Assumptions specific to the Chinese market are summarised in Table 9.

Table 9: Parameters *used for China*		
	Low	**High**
Country bond default spread ($R_{Country\ Risk}$)	1.00%	2.00%
$\sigma_{Local\ Equity} / \sigma_{Country\ Bond}$	1.5	1.5
Sensitivity to country risk premium (λ_i)	0.80	1.20
Corporate tax	15.00%	25.00%
Debt margin	4.50%	4.50%
Debt ratio	15.00%	15.00%

Country bond default spread

The *country bond default spread* can be proxied by the difference between USD denominated bonds issued by a foreign country and USD Treasury bonds of similar maturity.

As at 9 December 2009 the average traded yields on long-term 18 year US dollar sovereign bonds issued by the Chinese Government traded at a yield spread (premiums) of circa 1.62% over US Treasury bonds. [15]

Table 10			
Bond maturity (yrs)	**Yield on USD Bonds issued by Chinese Government (as at 9 Dec 2009)**	**Yields on USD Treasury Bonds (as at 9 Dec 2009)**	**Spread over similar term USD Treasury bonds**
1 yr	1.20%	0.31%	0.89%
18 yrs	5.76%	4.14%	1.62%

The credit rating for China USD Bonds as at December 2009 was:[16]

Table 11		
Rating agency	**Rating**	**Comment**[17]
Moodys	A1	Upper-medium grade and subject to low credit risk

[15] Source Bloomberg, December 2009.
[16] Ibid.
[17] See the websites of Moodys, Standard & Poors and Fitch.

Standards & Poors	A+	Strong capacity to meet financial commitments
Fitch	A+	High credit quality

For China we assume a *country bond default spread* of between **1.00** and **2.00%.** This reflects increased investor risk aversion in the context of the current global credit crisis. Damodaran (2009) also determines a default spread of 1.4% for China which falls in the range of our estimate.

Ratio of local equity market volatility and country bond volatility **($\sigma_{Local\ Equity}/\sigma_{Country\ Bond}$)**

We do not have data to empirically measure this estimate. In the absence of any empirical evidence we assume the ratio of ($\sigma_{Local\ Equity}/\sigma_{Country\ Bond}$) is **1.5**.[18]

Sensitivity to country risk premium (λ_i)

The term λ_i is the sensitivity of each project / company to country risk (Damodaran, 2003). The average value of λ_i is one.

We understand the timber in the Chinese forest will be sold almost entirely into the domestic market (i.e., no exports) and with prices set domestically. Similarly costs to harvest and produce the timber are exposed to Chinese country risk.

Recent evidence by Cavaglia, Brightman and Aked (2000) suggests that with increased worldwide market integration, industry risk factors are growing in relative importance to country risk factors. The study by Cavaglia, Brightman and Aked is, nevertheless, confined to developed markets. Evidence by Harvey (1995) finds returns in developing markets are still likely to be influenced by local (domestic) factors compared to market returns in more developed countries.

In summary we assume the value of λ_i for a forest company in a developing market of China is between **0.8** and **1.2** (i.e., average exposure to Chinese country risk).

Corporate tax rate

Based on information provided by Pöyry and discussions with you we assume the corporate tax rate is **25%** in China. However, we also provide our estimate of the real post-corporate and real post-corporate tax WACC assuming a corporate tax rate of **15**%.[19]

We understand the corporate tax rate applies to the marginal cost of one dollar of additional interest expense on debt and hence is appropriate for use in the determination of the weighted average cost of capital. Other non-deductible taxes,

[18] See Damodaran (2009).

[19] See http://www.worldwide-tax.com/china/chi_econonews.asp. From Jan 2008 China's new corporate tax rate is 25%. The new corporate tax rate applies to both domestic and foreign companies. The new tax rate replaces the previous tax rate of 33%. Foreign companies which set up activities before 2008 can enjoy, for a limited period, the previous 15% tax rate or tax holiday.

certain payroll taxes and withholding payments may need to be modelled in the cashflows and are not accounted for in our estimate of the WACC.

In this respect we are not taxation experts and do not have a detailed knowledge of China's tax system.

We note the presence of any tax concessions in the Chinese market may lower the effective corporate tax rate. A lower effective corporate tax rate would raise our post-tax WACC estimate. The forest value may still, however, be greater due to higher expected after-corporate tax cashflows. In addition we note the presence of "tax holidays" (if any) and tax losses that can be carried forward potentially introduce considerable complexity into capital budgeting. A discussion of capital budgeting (and cost of capital) under time varying tax rates is outside the scope of this report.[20]

Debt margin and debt ratio

The impact of the global credit crisis has resulted in significantly higher cost of capital for those firms that have high leverage and/or high degrees of operating leverage.

In addition credit or default spreads on investment grade (BBB or Baa) debt has widened to around 4.50% - 5.00% (or more).

We do not have sufficient detailed information to accurately determine a debt margin for a forest project in the developing market of China. However, for the WACC calculated using the CAPM we assume a debt margin of **4.5%** over the US Government bond rate ($R_{f\ US}$). This is higher than historical debt margins but reflects much wider spreads in the current economic environment.

To calculate the WACC we assume a debt to equity ratio of **0.15:0.85** for a long term investment in a forest asset.

F.2. Economic data

You have requested us not to provide any commentary on the economic outlook or political developments in China. We understand this may be covered in a separate report prepared for Pöyry.

[20] See Cheung and Marsden (2003) for a discussion of some of the complexities of capital budgeting in the presence of initial tax losses.

G. Results

Section E.3 sets out the three alternative models that we apply under Damodaran's (2003) approach.

G.1 Results for range of assumptions

We summarise in Table 12 the estimated WACC denominated in USD (both nominal and real) under Damodaran's (2003) Models 1, 2 and 3 assuming:

- Asset beta = 0.50 to 0.75;
- Market risk premium = 5.50% to 6.50%;
- Country bond default spread = 1.0% to 2.0%;
- Sensitivity to country risk premium *(λ_i)* = 0.8 to 1.2; and
- Corporate tax rate = 25%

Table 12: Weighted Average Cost of Capital Estimates from 3 Different Models for a generic forestry firm in China

Parameter assumptions	**Input value**	
	Lower end of range	**Higher end of range**
Asset beta	0.50	0.75
Market risk premium	5.50%	6.50%
Country bond default spread	1.00%	2.00%
Corporate tax rate	25%	25%
λ_i	0.80	1.20
Damodaran Models	**WACC (real - post tax)**	
Model 1. Same risk premium	6.2%	9.5%
Model 2. Beta adjusted premium	5.6%	9.2%
Model 3. Lambda adjusted premium	5.9%	10.0%
Average	**5.9%**	**9.6%**
Overall Average	**7.7%**	

These estimates are all *post-corporate* tax.

In Table 13 we summarise the estimated WACC denominated in USD (both nominal and real) under Damodaran's (2003) Models 1, 2 and 3 assuming:

- Asset beta = 0.50 to 0.75;
- Market risk premium = 5.50% to 6.50%;
- Country bond default spread = 1.0% to 2.0%;
- Sensitivity to country risk premium *(λ_i)* = 0.8 to 1.2; and
- Corporate tax rate = 15%

Table 13: Weighted Average Cost of Capital Estimates from 3 Different Models for a generic forestry firm in China		
Parameter assumptions	**Input value**	
	Lower end of range	**Higher end of range**
Asset beta	0.50	0.75
Market risk premium	5.50%	6.50%
Country bond default spread	1.00%	2.00%
Corporate tax rate	15%	15%
λ_I	0.80	1.20
Damodaran Models	**WACC (real - post tax)**	
Model 1. Same risk premium	6.3%	9.6%
Model 2. Beta adjusted premium	5.8%	9.3%
Model 3. Lambda adjusted premium	6.0%	10.1%
Average	**6.0%**	**9.7%**
Overall Average	**7.9%**	

The average **real post-corporate tax WACC** under the three alternative models is circa **5.9%** and **9.7%** as follows:

Table 14		
Corporate tax rate	**Low estimate**	**High estimate**
Corporate tax rate = 25%	5.9%	9.6%
Corporate tax rate = 15%	6.0%	9.7%

Our "low" and "high" estimates are not lower and upper bounds of the possible range of the WACCs but rather reflect a low and high range based on estimates of the parameter inputs under the different versions of the CAPM we adopt. The lower and upper bounds for the WACC may be wider than the range of estimates provided in the tables above if we undertook additional sensitivity analysis based on different versions of the CAPM.

H. Comparison to our prior cost of capital estimates for a forest entity in China

We provide below a summary of our current estimates for the real post-corporate tax WACC for a generic forest asset in China compared to the estimates in our prior reports as at November 2008.

Table 15: Real after corporate tax WACC

	Estimated range November 2008	Estimated range December 2009
Real after corporate tax WACC	7.3% - 10.8%	5.9% - 9.7%
Real pre-corporate tax WACC	9.8% - 15.9%	7.1% - 12.8%

Both our after-corporate tax and pre-corporate tax cost of capital estimates have decreased over the period between November 2008 and December 2009. This predominantly reflects a decrease in the asset beta for a pure play forest entity and an increase in the expected rate of inflation from 1.0% p.a. to 2.0% p.a.. Table 16 summarises the factors that are responsible for the increase in our cost of capital estimate over this period.

Table 16: Comparison of parameter estimates November 2008 versus December 2009

Parameter	**Parameter estimate November 2008**	**Parameter estimate December 2009**	**Comment**
Asset beta of US forestry firms (bi US)	0.60 - 0.80	0.50-0.75	Decrease in beta for pure-play forest entity
Risk-free rate - global (Rf US)	3.90%	3.90%	No change
Market risk premium (RM US – Rf US)	5.5% - 6.5%	5.5% - 6.5%	No change
Expected US inflation	1.00%	2.00%	Increased inflation risk with global credit crisis and quantitative easing
Country bond default spread ($R_{Country\ Risk}$)	1.00% - 2.00%	1.00% - 2.00%	No change
$\sigma_{Local\ Equity} / \sigma_{Country\ Bond}$	1.5	1.5	No change
Sensitivity to country risk premium (λ_i)	0.80 - 1.20	0.80 - 1.20	No change
Corporate tax	24% - 33%	15% - 25%	Decrease in corporate tax rate
Debt margin	4.50%	4.50%	No change
Debt ratio	15%	15%	Decrease in corporate tax rate

I. Summary and determination of a pre-corporate tax real WACC

Conversion to a real pre-tax WACC

There is no easy or simple method to transform a nominal post-corporate tax WACC to a real pre-corporate tax WACC. In this respect formal modelling of the entity's cashflows is required to determine an "equivalent" pre-tax WACC.

However, to an approximation we assume:[21]

Pre-tax real WACC = (Post-corporate real tax WACC) / (1- t_c)

Where t_c = corporate tax rate.

Based on this transformation our indicative estimate of the real pre-tax WACC (denominated in USD) is between circa **7.1%** and **12.8%**[22] as follows:

Table 17: Weighted Pre-corporate Tax Average WACC Estimates from 3 Different Models for a generic forestry firm in China

Corporate tax rate	Low estimate	High estimate
Corporate tax rate = 25%	7.9%	12.8%
Corporate tax rate = 15%	7.1%	11.4%

J. Size, liquidity and other premiums

Our cost of capital estimates are derived using different versions of the CAPM only.[23] In our determination of the cost of capital and WACC we have made no adjustment for factors such as size, control premiums, illiquidity premiums and other market frictions.

Making an ad-hoc adjustment to the "standard" CAPM model rate of return for size and liquidity measures may be somewhat arbitrary. However, we understand from anecdotal evidence that many practitioners and forest valuers add an increment to the cost of capital to value small illiquid forests and/or where other significant market frictions may exist.

[21] In the case of forests where the timber is not expected to be harvested until some relatively long-time in the future, this transformation may overstate the "equivalent" pre-corporate tax WACC.
[22] As already noted, in view of the uncertainty of the parameter input estimates these low and high values should not be taken as absolute lower or upper bounds of the possible distribution of the WACC.
[23] There are a number of shortcomings of the CAPM (e.g., see Fama and French, 1993, 1996). We would be happy to discuss some of the possible shortcomings of the CAPM in more detail if requested.

K. Conclusion on USD Cost of Capital

In conclusion under the different versions of Damodaran's (2003) CAPM we consider a **real post-corporate tax WACC** (denominated in USD) for a China forest entity will likely be in the range of between **5.9%** and **9.7%**. The corresponding **real pre-corporate tax WACC** (denominated in USD) is in the range between circa **7.1%** and **12.8%** (based on our simple transformation formula). The range of estimates assumes a corporate tax rate of between 15% and 25%.

Our cost of capital estimates are as at 9 December 2009 and all denominated in USD.

L. Other Factors Relevant to the estimation of the Cost of Capital

If significant corporate governance and agency cost issues between insiders and outside investors arise (e.g., from lack of transparency, possible risk of expropriation of assets, restrictions on offshore remittance of profits or the likelihood of exchange rate controls), the use of a cost of capital at the upper end (or higher) of our range may be warranted.[24]

We also strongly recommend (to the extent such evidence is available) our estimates of the cost of capital for a Chinese forest entity be compared to implied discount rates based on transactional evidence for actual forest sales in the Chinese market.

In addition we note that China's legal, institutional and bankruptcy laws likely differ to Western capital markets. Restrictions on the level of foreign ownership of forest assets may apply in China and the level of corporate governance may vary significantly between companies in emerging markets (see Klapper and Love, 2004, Chen et al., 2003).

Corporate governance is important as it provides mechanisms whereby outside investors can protect themselves against expropriation of assets by insiders.

These factors together with any size and liquidity premium may warrant an adjustment to the cashflow expectations or an increment to the cost of capital for a forest investment if investors' property rights are not clearly defined.

[24] See Stulz (2005).

Appendix I

This appendix forms part of and therefore should be read in conjunction with this valuation report and our engagement letter of 10 December 2009.

Independence

Auckland UniServices do not have any interest in the outcome of this valuation. The fee proposed by Auckland UniServices in our engagement letter for the preparation of this report is solely time based which are charged at normal professional rates plus disbursements.

Qualifications

Auckland UniServices is the consulting arm of The University of Auckland.

Recipients of the report and restrictions on use of this report

The report has been prepared for Pöyry Forest Industry Limited ("Pöyry") to assist in the valuation of forest assets located in the markets of China.

Because of its special nature, our report may not be suited for any purpose other than as described in this report and as such, will be restricted for use by Pöyry only for the purpose of assisting Pöyry determine the cost of capital for a generic forest asset in China.

Declaration

This report was prepared primarily based on information available up to 9 December 2009. The findings and opinions contained in this report are expressed as at that date, and also reflect our assessment of the information provided to us as at that date.

This exercise is based upon information that has been supplied to us and described in this report. Much of the information forms the basis of future projections and estimates. As the achievement of any prediction is dependent on future events, the outcome of which cannot be assured, the actual outcome achieved may vary materially from forecast. In the circumstances, no warranty of accuracy or reliability is given.

In preparing our valuation we have received and relied upon the information received from Pöyry and other sources. Therefore Auckland UniServices does not imply, and it should not be construed, that it has carried out any form of audit on the accounting or other records or information provided to us for the purposes of this report.

Auckland UniServices Ltd reserves the right, but will be under no obligation, to revise or amend our report and the opinions contained herein, if any additional information (which may or may not be in existence on the date of this report) subsequently comes to light.

uniservices

Our liability in providing the services

We have agreed that in the event of any error or omission by us in performing any work under the terms of this letter, then our liability to you for any loss or damage of any type you may suffer directly or indirectly as a result of or in connection with our work will be limited to an amount of ten times the fees charged by us for any work undertaken. We have agreed that this limitation of liability applies to us and all staff or persons employed by us in providing our services. This clause does not apply where our neglect giving rise to a claim is wilful or reckless.

In any event we will not be responsible or liable if information material to our task is withheld or concealed from us or wrongly represented to us.

It is a condition precedent to any liability of Auckland UniServices that any claim against Auckland UniServices must be made and notified to Auckland UniServices within two years of the date we complete the performance of the work specified in this agreement.

We will not be liable for any loss or damage to any other party that may rely on our report.

Additionally, we have no obligation to update our report or to revise the information contained therein because of events and transactions occurring subsequent to the date of the report.

References

Akers, K. and R. Staub, 2003, Regional investment allocations in a global timber market, The Journal of Alternative Investments, 73-87.

Cavaglia, S., Brightman, C. and M. Aked, 2000, The increasing importance of industry factors, Financial Analysts Journal 56, 41-54.

Cheung, J. and A. Marsden, 2003, Valuation biases in projects with tax losses, JASSA 2, Winter, 15-20.

Chen, K.C.W., Chen, Z. and K.C. Wei, 2003, Disclosure, corporate governance, and the cost of equity capital: Evidence from Asia'a emerging markets, Working paper, Hong Kong University of Science and Technology.

Claus, J. and Thomas, J., 2001, Equity premia as low as three percent? Evidence from analysts' earnings forecasts for domestic and international stock markets, Journal of Finance 56, 5, 1629-1666.

Copeland, T., Koller, T. and J. Murrin, 2000, Valuation: Measuring and managing the value of companies, 3rd edition, McKinsey and Company Inc.

Damodaran, A., 2003, Country risk and company exposure: Theory and practice, Journal of Applied Finance, Fall / Winter, 63-76.

Damodaran, A., 2008, Equity risk premiums (EPR): Determinants, estimation and implications, Sept 2008. Website: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/

Damodaran, A., 2009, Equity risk premiums (EPR): Determinants, estimation and implications- A post crisis update, Oct 2009. Website: http://pages.stern.nyu.edu/~adamodar/New_Home_Page

Damodaran, A., 2009, Website: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/

Dimson, E., Marsh, P. and M. Staunton, 2009, Credit Suisse Global Investment Returns Sourcebook 2009, Credit Suisse Research Institute, Switzerland.

Fama, E. and K. French, 1993, Common risk factors in the returns on stocks and bonds, Journal of Financial Economics 33, 3-56.

Fama, E. and K. French, 1996, Multifactor explanations of asset pricing anomalies, Journal of Finance 51, 55-84.

Fama, E. and K. French, 2002, The equity premium, Journal of Finance 57, 2, 637-659.

Fernández, P., 2009, Market risk premium used in 2008 by Professors: a survey with 1,400 answers, IESE Business School, srrn = 1344209

Graham, J. R. and Harvey, C. R., 2009, The equity risk premium amid a global financial crisis. Available at: http://ssrn.com/abstract=1405459

Harvey, C., 1995, Predictable risk and returns in emerging markets, Review of Financial Studies 8, 773-816.

Ibbotson, R., 2008, Market results for stocks, bonds, bills and inflation 1926 – 2007, 2008 Valuation Yearbook, Morningstar Inc.

Ibbotson, R. and P. Chen, 2003, Long-run stock returns: Participating in the real economy, Financial Analysts Journal Jan/Feb 59, 88-98.

International Monetary Fund, 2009, World Economic Outlook: Sustaining the Recovery, October 2009, www.imf.org/external/pubs/ft/weo/2009/02/index.htm

James, M. and T. Koller, 2000, Valuation in emerging markets, The McKinsey Quarterly 4, 78-85.

Klapper, L. and I. Love, 2004, Corporate governance, insider protection, and performance in emerging markets, Journal of Corporate Finance 10, 703-728.

Keck, T., Levengood, E. and A. Longfield, 1998, Using discounted cash flow analysis in an international setting: a survey of issues in modelling the cost of capital, Journal of Applied Corporate Finance 11 (3).

Lally, M., 2000, The cost of equity capital and its estimation, McGraw-Hill series in Advanced Finance.

Lessard, D., 1996, Incorporating country risk premium in the valuation of offshore projects, Journal of Applied Corporate Finance 9, 52-63.

Mehra, R., 2003, The equity premium: Why is it a puzzle?, Financial Analysts Journal Jan/Feb 59, 54-69.

Pereiro, L.,2001, The valuation of closely-held companies in Latin America, Emerging Markets Review 2, 330-370.

Siegel, J., 1992, The Equity Premium: Stock and Bond Returns Since 1802, Financial Analysts Journal Jan-Feb, 28-38.

Siegel, J., 1999, The Shrinking Equity Premium, Journal of Portfolio Management 26, 1, 10-17.

Stulz, R., 2005, The limits of financial globalization, Working paper, Ohio State University.

Welch, I., 2008, The consensus estimate for the equity premium by academic financial economists in December 2007, Brown University ssrn abstract = 1084918