Improving the Investment Environment for
Private Sector Plantation Forestry Development in
Uganda

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List of Acronyms

CFR        Central Forest Reserve
EAAFRO    East African Agriculture and Forestry Research Organisation
EU         European Union
FAO        Food and Agriculture Organisation (United Nations)
FD         Forest Department
FID        Forestry Inspection Division
FORRI      Forestry Resources Research Institute
FRMCP      Forest Resources Management and Conservation Programme
ha         Hectare
HQ         Headquarters
IRR        Internal Rate of Return
ITTA       International Tropical Timber Agreement
ITTO       International Tropical Timber Organisation
m³         Cubic Metre
MAI        Mean Annual Increment
MWLE       Ministry of Water, Lands and Environment
NAADS      National Agriculture Advisory Services
NARO       National Agricultural Research Organisation
NFA        National Forestry Authority
SPGS       Sawlog Production Grant Scheme
UIA        Uganda Investment Authority
URA        Uganda Revenue Authority

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Finally, great thanks are due to the commercial tree planters who attended the two workshops, shared their ideas and experience and, through their enthusiasm, showed that the opportunities to engage in commercial timber plantations have been enthusiastically taken up. We wish them silvicultural and commercial success.
Executive Summary

1. We report on our examination of the effectiveness of the incentives offered by the SPGS to promote plantations of high-yielding, fast-growing species for sawlog production.

2. Uganda has a favourable climate, suitable soils and sufficient land for a programme to establish the 60-70,000 ha of sawlog plantations needed to meet domestic demand for sawn wood. The plantations must achieve high standards to meet competition from imports.

3. The programme would bring economic, employment and foreign exchange benefits. It would: earn a real rate of return of 10-14%; create some 6,000 jobs in the forest alone, excluding management and supervision; and save about $100m a year in foreign exchange.

4. It would also help relieve the pressures on the natural forests that will otherwise increase as the few remaining mature plantations are felled. However, measures aimed directly at conserving these forests are also needed.

5. The main incentive offered by the SPGS is a grant of 600,000 UShs per ha, meeting about half the costs of establishing a plantation, and paid only when it meets the standards required. This is backed up by technical advice in the field and through published guides, with a newsletter and meetings to sustain enthusiasm. These incentives have secured:
   - Some 1,700 ha planted and approved in 2 years;
   - Another 4,000 plus ha in the pipeline.

6. These areas exhaust the current scheme. There is an area of over 50,000 ha submitted for planting approval, if it or similar scheme is continued beyond 2006.

7. The grant is needed to get plantation forestry started again in Uganda. Without it the rate of return to the investor, after tax, would be only 7-10 %, rather low for such a long term and risky investment. The SPGS also provides valued and necessary technical support.

8. Grants are the best instrument for promoting new plantations: they can be set to get the desired results, adjusted as circumstances change and new requirements arise, allow the forestry authorities to influence the location and nature of the planting, and be terminated when they have achieved their object. The alternative of a ‘soft’ loan would not be practical over such a long period. Tax incentives can be effective, especially with high income earners paying high marginal tax rates; but they favour the rich, and are indiscriminate and need to be supplemented with planning controls to prevent planting that may damage the environment.

9. Nonetheless, forestry should be put on a level playing field for tax with other land uses. The very long timescale - 10 to 25 years - between planting and final felling leads to plantations being taxed more heavily than other investments yielding a similar return. There is no income against which to offset the early expenditure; and the main reward when the trees are harvested is taxed as if it were an annual income with no recognition of the many years it has taken to accrue.

10. This anomaly is dealt with in a variety of ways in other countries, mainly through exemptions from, or lower rates of, land, inheritance, input, purchase and income taxes. In Uganda it could be rectified by:
   - either allowing the costs of re-planting to be set against the proceeds from felling of the first crop;
   - or exempting plantation forestry from income taxes, as in the UK.

11. All other taxes would apply as now. Neither change would involve much direct loss of revenue, while taxes on profits and incomes derived from processing the raw material in
Uganda would benefit the public purse. Nor should they be very complicated to implement or onerous to administer.

12. Such a change would also compensate to a degree for the reduction in profitability when the grants are terminated. Once established, these sawlog plantations should be able to stand on their own feet and not need any continuing subsidies, provided they are not “overtaxed”.

13. There are other changes that would increase the effectiveness of the scheme:

• Change the terms of CFR leases to remove the disincentive to plant;
• Provide insurance against loss from fire, pests and diseases, etc through a fund financed by a small levy on the grants;
• Arrange for continuing contact with the owners to prompt them to take necessary action, for example, timely thinning;
• Negotiate longer term contracts for seeds to ensure supplies of the high quality required;
• Build environmental standards into the grants conditions.

We recommend early action on these aspects.

14. Looking ahead, there are additional ways in which Uganda can get greater value from sawlog plantations:

• In order to attract processors, there will have to be more strategic level planning, so as to build up concentrations of log supplies in selected areas;
• To attract large investors, sizeable areas of land (upwards of 10,000 ha) have to be available;
• To benefit poorer landowners, help in forming cooperatives should be given;
• The sawlog producers would benefit from the formation of an association to undertake advocacy for their cause and to offer the benefits of cooperation in purchasing of materials, contracting services, etc;
• Of most importance in the next few years is an improvement in the wretchedly low conversion rates produced by the mobile sawmills: increases towards the rates routinely achieved elsewhere will feed through to improved log prices paid to planters;
• A growing plantation sector will offer employment to competent managers; more training in plantation management is needed to take advantage of this opportunity;
• The skills training opportunities offered by SPGS have been vital in securing good field standards. This needs to be both continued and institutionalised;
• Generally, it would avoid future problems to begin to move towards international standards so that Uganda can gain accreditation for its sawlog production. This is particularly important if additional funds, such as those for carbon trading, are to be secured.

15. There is a strong case for continuing the SPGS for a few more years to maintain the momentum built up by the current team. An extension would respond to the wide interest it has created and capitalise on the current enthusiasm to participate in establishing plantations. There would be time to consider its successor, which could build on the achievements of the SPGS and take account of the opportunities noted above. The
insistence on high standards of silviculture in plantations raised from top quality planting material must be maintained as a core component of the SPGS.

The following Recommendations are made as a result of this assignment:

**Recommendation 1**
Uganda’s remaining plantation resource should be assessed for its production potential. At the same time, seed areas and potential breeding trees should be identified and conserved

**Recommendation 2**
FRMCP should start encouraging sawlog plantations based on *Eucalyptus grandis* by establishing demonstration areas in selected, favourable sites

**Recommendation 3**
A strategic review of plantation development in Central Forest Reserves is required to accommodate NFA strategic aims and encourage maximum private sector interest to optimise the economic benefit to Uganda, including re-examination of lease conditions to ensure they are fair and support plantation development

**Recommendation 4**
A network of Permanent Sample Plots should be established in public and private timber plantations to improve knowledge of growth patterns. Concurrently, experimental plantings of alternative species should be made covering the full range of silvicultural zones

**Recommendation 5**
SPGS should encourage the formation of community groups that can benefit from the scheme without requiring changes to the SPGS restrictions already in place.

**Recommendation 6**
SPGS standards should be consistent with those required for certification. Consideration should be given to paying some of the grant for high value conservation areas such as riparian strips and wetlands left unplanted over up to 10% of the gross area

**Recommendation 7**
Through contact with individual planters, NFA/FRMCP should assist in the formation of Owners’ organisations that are transparent, fully representative and deliver useful benefits to owners while improving the efficiency of the private timber plantation sector

**Recommendation 8**
The system by which future tax liabilities will be assessed must be clarified. To create a level playing field with other sectors, consideration should be given to allowing second and
subsequent rotation establishment costs to be offset against the revenue from the preceding rotation. Alternatively, forestry revenue should be exempted from taxation.

**Recommendation 9**

The timber price survey should be completed every quarter with particular attention to ensuring that prices are obtained for the same cross sections each time. Sawmill efficiency should be monitored as an aid to setting reserve prices in timber auctions and a guide to future development assistance.

**Recommendation 10**

Consideration should be given to a grant for thinning and pruning plantations, and to provision of assistance with marking thinnings. Training events and provision of information for tree planters should continue, maintaining current high standards and evolution.

**Recommendation 11**

NFA/FRMCP should investigate the scope for providing grants to support protection of riparian forests on private lands, concentrating on key locations. Concurrently, mechanisms for providing grant support should be investigated.

**Recommendation 12**

Carbon and other funding options for the future should be investigated, with international expertise if required, to identify a wider range of possible support for future funding of SPGS and extensions.
Chapter 1 Introduction

1.1 Background to the study

16. Globally, plantations of fast-growing, high-yielding species for sawlog and pulp production have expanded rapidly in the last two decades. There is a continuing shift in wood production from exploitation of natural forests to plantations, as the former become depleted and reserved for other uses. There are now some 200 million ha of plantations worldwide, producing most of the timber traded in the markets (FAO 2004).¹

17. Uganda currently has less than 2,000 ha of mature timber plantations remaining and these will be exhausted within a few years. Although there have been efforts to establish new plantations since 1986, these have not been particularly successful. In the absence of a national timber plantation resource, the country has to rely on imports and on timber from its remaining, but rapidly diminishing, natural forests. A range of species is now being seen as the prime timber species become less common.

18. High quality timber including Mahogany and Iroko is available from natural forest in DR Congo, and there are Teak plantations in southern Sudan, but it would not be wise or right for Uganda to rely on these sources, as much of the supply comes as a result of conflicts in these countries and from forests that are not being managed sustainably. Internal demand in DR Congo and Sudan is expected to rise ultimately, too. Kenya has many problems within its own forestry sector, including conflict over land allocation, and its plantation resource is now critically low.

19. Many of Uganda’s remaining natural forests have important biodiversity and watershed functions, and their productive potential is thus limited. Without the creation of a new timber plantation resource, pressure on remaining natural forests would inevitably rise to levels that would make control very difficult.

20. It is for this reason that the EU funded Forest Resources Management and Conservation Programme (FRMCP) identified support to compensatory plantations as one of its core strategies. The strategy is predicated on engaging the private sector to create the plantation resource as a commercial investment. Financial modelling during appraisal and later shows that the time frame and the returns are not inherently attractive to commercial investment, and a system of support, the Sawlog Production Grant Scheme (SPGS), was introduced in 2003 to encourage investors to plant.

21. SPGS provides a grant covering 50% of the estimated establishment cost paid in arrears in three tranches to private planters accepted into the scheme, following inspection of field operations. It requires a management plan for plantation development and stipulates the species selection, type of planting material and establishment methods to be employed. The key requirements are: the use of improved seed, intensive tending and no agricultural crops to be grown with the trees (the Taungya or Shamba system).

1.2 Terms of Reference summarised

22. The full Terms of Reference for the study are in Annex 1. The key requirements were as follows:

¹ What does it take? The role of incentives in forest plantation development in Asia and the Pacific. FAO RAP Publication 2004/28
• Make constructive recommendations to improve the environment for private investors in plantation forestry in Uganda;
• Identify key factors that currently act as disincentives to more serious, long-term investors;
• Suggest approaches that are likely to find favour with the Government of Uganda and donors;
• Give particular consideration to fiscal issues;
• Wherever appropriate provide information on approaches used in other countries in developing options for Uganda;
• Participate in an initial workshop with SPGS beneficiaries and personnel to canvass and discuss views and suggestions; and
• Present the preliminary findings at a workshop with key government and donor representatives at the conclusion of the mission.

1.3 Methodology and reporting

1.3.1 Approach to the study

23. The international team consisted of two Senior Experts, P D Hardcastle (PDH) the Forestry Plantation Specialist and Team Leader and David Grundy (DG) the Forest Economics Specialist. FRMCP provided a Local Expert, Cornelius Kazoora (CK), with strong experience of both the local investment and forestry sectors together with Feddy Mwerinde (FM) an expert on taxation and former senior staff member of the Uganda Revenue Authority.

24. The approach adopted was largely defined by the Terms of Reference. Prior to the visiting specialists (PDH and DG) travelling to Uganda, a selection of literature detailing forestry grant and taxation systems in different countries was reviewed together with comparative analyses of these systems.

25. During the first week of July, the local team (CK and FM) undertook a series of visits to key actors in the Ministries of Finance and of Lands Water and Environment as well as meeting with senior personnel in the Uganda Revenue Authority. The local team also made preliminary visits to local commercial and investment banks and held discussions with senior NFA personnel. Annex 2 lists the persons met during the assignment.

26. On arrival in Uganda, the team exchanged ideas and, following detailed analysis of the fiscal framework and the investment profile of plantation forestry in Uganda, developed basic proposals. These were discussed with key players in the public and private sectors. The main financial model used was based on *Pinus caribaea* as this is the primary species being planted at present.

27. A mix of approaches was adopted. Private planters were gathered together for an all day meeting during the first week at which progress with SPGS was discussed and the international experts given opportunity to present the options. Public officials were met individually so that the discussions could be focused more narrowly on the specific points of interest.

28. A field visit was made halfway through the assignment during which demonstration plantations and private planters’ plantations were examined. This visit provided confirmation of the success of SPGS in achieving very high field standards.
29. At the end of the second week, another workshop was held with representatives of the key ministries and agencies as well as a number of private planters. NFA was, of course, represented at both workshops. A presentation of the team’s findings was made and there were ample opportunities for discussion.

30. Copies of the PowerPoint presentations made at the workshops have been left with SPGS for future reference; handouts were given to all participants after the workshops.

1.3.2 Structure of the report

31. Following on from this introductory Chapter, Chapter 2 examines the background of timber plantations in Uganda and the Sawlog Production Grant Scheme. This is followed by a review of the benefits of meeting a substantial part of the national demand for sawn timber from plantations and the economic case underlying this.

32. Chapter 4 addresses the issue of motivating the private sector to engage in investment in plantations and examines international experience of different instruments of subsidy. Chapter 5 then addresses the issue of taxation and exemplifies the current anomalous position of timber plantations. Four alternatives for remedy are then presented and discussed, leading to one approach that can be strongly recommended and an alternative.

33. Chapter 6 examines the investment profile for investors in timber plantations in Uganda and shows the risks that need to be accommodated and the importance of changes in the key assumptions underlying investment decisions. Chapter 7 then looks at non-fiscal means of support and adjustments that might be made to improve and support the investment climate for forestry. It also considers future options for continuing support.

34. Chapter 8 draws out conclusions from the work undertaken and presents a series of recommendations. Thereafter, five Annexes provide more detail of particular elements, including the current taxation system and the importance of an efficient forest processing industry to timber growers.
Chapter 2 Timber Plantations in Uganda

2.1 Brief history of plantations in Uganda before SPGS

35. In the mid-1970s, Uganda had a timber plantation area of between 25,000 and 30,000 ha. During the turbulent years from then until 1986, over half of this area was lost leaving an optimistically estimated figure in 1998 of 9,000 ha in Forest Reserves and 2,000 ha in National Parks (Kibale and Mount Elgon). The plantations within National Parks were quickly and inefficiently liquidated on the grounds of their being exotics, sadly with little regard to the numerous seed supply areas and trial plots included in them. The plantations in Forest Reserves have been sold to sawmillers: the latest estimate is that only 2,000 ha remain.

36. Sawmilling of the Forest Reserve plantations has generally been very poorly done, with inappropriate equipment and generally low conversion of between 20 and 25%. Log making and re-sawing were both neglected in favour of standard lengths of larger cross-section material.

37. Following concern with the loss of timber plantations and the poor conversion being carried out, attempts were made to establish new plantations. These included actions by the then Forestry Department, by external investors and by local companies as well as plantations established by sawmillers as a condition of their utilisation lease. In most, but not all, cases the results have been extremely poor. There was no control of seed quality and widespread use of the taungya system. The plantations so created, even where they still exist, have very limited production potential. The experience, however, did provide a good basis for the SPGS to develop its strict criteria to avoid the same mistakes being made.

Table 1 Timber Plantations Established in Uganda since 1986

<table>
<thead>
<tr>
<th>Period</th>
<th>Established by</th>
<th>Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986 – 2000</td>
<td>Forestry Department – generally rather poor</td>
<td>1,700</td>
</tr>
<tr>
<td>2002 – 2005</td>
<td>EU FRMCP and NFA – includes demonstration areas</td>
<td>1,700</td>
</tr>
<tr>
<td>2003 – 2005</td>
<td>SPGS supported private planters</td>
<td>2,000</td>
</tr>
<tr>
<td>2005 – 2007</td>
<td>SPGS anticipated private planters</td>
<td>3,000</td>
</tr>
<tr>
<td>1995 – 2003</td>
<td>Private tea company – <em>Eucalyptus</em> for fuelwood – as a comparison</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Source: SPGS 2005

2.2 Recent institutional changes and current responsibilities

38. In 2003, the National Forestry Authority (NFA) replaced the former Forestry Department. The NFA is a parastatal organisation with a board representing public and forestry sector interests. It has responsibility for the control and management of Central Forestry Reserves (CFRs) and for liaison with the commercial forestry sector through its Technical Services Division.

39. Management of Local Forest Reserves (under 100 ha in extent and generally rather smaller) is the responsibility of District Forestry Services under the guidance of Ministry of Lands, Water and Environment (MLWE) and its Forestry Inspection Division (FID). Activities on farm forestry and trees in support of agriculture are delivered through the National Agriculture Advisory Services (NAADS). This is a demand led system, but to date there has
seldom been sufficient interest in forestry and tree issues for them to be addressed by NAADS.

40. NFA presently has substantial donor support but from 2008 is expected to become self-financing. NFA has identified four commercial forestry zones (Mbarara and SW, Kabarole-Kyenjojo-Mubende, Luwero-Nakosongala, and West Nile) where it wishes to see private commercial forestry and also to develop its own plantations as a long-term source of NFA revenue. Funding is close to being secured for an area of 1,800 ha at Rwoho, but the aim of creating an NFA managed resource of 35,000 ha will require access to very substantial funding: as a guide, around US$ 1,000 per ha is needed, indicating US$ 35 million in total.

41. Given all major donors’ current policy of only funding state-owned plantations for highly specific purposes, such as demonstration or development of new approaches, there is a substantial risk that this funding will not become available. If NFA cannot meet its strategic target plantation area, a greater share of the target total of 60,000 to 70,000 ha will have to be undertaken by private investors.

2.3 The Sawlog Production Grant Scheme

42. The aim of SPGS is to assist in the creation of a national saw-timber plantation resource through encouraging investment by the private sector. The scheme provides information and technical guidance notes as well as offering training courses and advice on an ad hoc basis. All applicants have to either prove their land title or have a legal lease in a Central Forest Reserve issued by NFA. There is no legal charge held over plantations established under the Scheme and once payment has been made, no further formal actions are required from planters.

43. SPGS has a very small staff and is funded by the EU through the Forest Resources Management and Conservation Programme. It operates as a part of NFA although it is deliberately independent in its activities and has its own board to approve grant applications. There is a system of guidelines that all applicants have to follow. One key point is that the grant is paid in arrears and subjected to inspection of field operations prior to payment.

44. Plantations undertaken by NFA are not eligible for support under SPGS.

45. The Sawlog Production Grant Scheme has been designed to meet the needs of larger investors who are interested in growing timber commercially. It does not address directly the needs of smallholders, outgrowers or those who wish to grow timber in parallel with other crops or in silvo-pastoral systems.

46. These are all valid approaches, but the scheme was deliberately aimed to concentrate on creating large-scale plantations as a base for the development of an efficient forest industry. Approaches such as those noted above may be useful marginal additions in due course. Systems such as the peri-urban plantations, which allowed Taungya, were effective in creating supplies of fuelwood and poles and generated high returns with low risks, as the agricultural crops could be grown on degraded forest land with minimal lease payments.

47. Much more intensive extension support would be required if outgrowers and smallholders are to be successful in creating supplies of high quality sawlogs. In South Africa, large forestry companies use outgrowers successfully, with the company providing the extension support. In New Zealand, farmers grow Pinus radiata under a silvo-pastoral system. This works because of the special characteristics of P radiata; it can be grown at wide spacing without compromising wood quality. Such a system is not transferable to Uganda.
Chapter 3  Benefits of Meeting Sawlog Demand from Domestic Production

3.1 Natural forests

48. Conserving the biodiversity and other service functions of natural forests will restrict, and in some cases stop entirely, the flow of sawlogs from natural forests. The valuation of this benefit would be complex and, as the Government of Uganda has already accepted the policy, detailed economic valuation of these functions is not required in this report.

49. As the remaining small area of mature plantations, now only about 2,000 ha, is harvested in the next few years, domestic demand will be met from imports of sawn wood and substitutes, and increased felling in indigenous forests. The pressure to cut timber in these forests comes from saw millers, whose capacity already exceeds the available supply of wood, and from land owners wishing to make money from their private forests. This will add to the difficulties facing the Government as it tries to achieve its forestry policy objectives of sustainable management of natural forests, conservation of biodiversity, and protection of watershed forests (National Forest Policy for Uganda, 2002).

50. Uganda is not unique in this position. Analysis undertaken by the International Tropical Timber Organisation (Tomaselli and Hardcastle, 1999 \(^2\); papers for ITTA renegotiation, June 2005) show that historically forest rich countries such as India, Philippines, Thailand, Panama, Colombia, Honduras and Nigeria are all now net importers of tropical timber. The reason is a combination of land use change, forest degradation and removal of conservation areas from production. Philippines and Thailand have established plantations but are now mainly engaged in secondary processing using imported, primary-converted timber.

51. Without an alternative supply, such as that from plantations, pressure on the Central Forest Reserves in Uganda will increase, especially as the remaining natural forest on private land becomes exhausted. In addition to the cost of protecting natural forests, there would also be the very negative impact of NFA having to exercise ever-tighter control over those seeking to exploit the remaining forest illegally. The aim is to police the Permanent Forest Estate by consent.

52. As an example of what can be achieved, Guyana is a country with almost 80% forest cover, which in the early 1990s suffered from more than 50% of its traded timber coming from illegal chainsaw conversion. Revision of forest policy allowed for closely controlled State Forest Permission areas within the natural forests, managed and controlled by the Guyana Forestry Commission (GFC). Within these areas, individuals can operate low-technology conversion, giving them entry to the sector. Combined with tight control, this has largely obviated the illegal timber trade in Guyana. Without the alternative approach, however, the pressures from illegal chainsaw loggers would have been impossible for GFC to control.

53. Some 60,000 to 70,000 ha of plantations are required to meet a substantial share of the projected demand in Uganda of 500,000 m³ of sawn wood a year. If this area can be established in the next 10 to 15 years, it will certainly help relieve the pressure on the natural forests. However, valuable this would be, it cannot replace the need for policy instruments directly aimed at conserving these forests. As and when such policies become effective, the case for supporting plantations comes back to the economic benefits they offer.

54. The economic benefits to Uganda accrue through the return on investment, the employment created, and the foreign exchange saved. These are discussed in following sections of this Chapter.

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\(^2\) Working Paper for Revision of ITTO Action Plan (downloadable at www.itto.or.jp)
3.2 The return on forestry investment

55. The Internal Rate of Return (IRR) from plantation forestry is the standard measure of the value of investment opportunities. It represents the maximum interest rate at which money could be borrowed to fund the investment, the revenues being just sufficient to match the costs incurred and the interest charges. It allows ready comparison between different investments as well as with the target rates of return sought by investors.

56. An interest rate has three components – basic time preference ("risk free") rate, risk premium and inflation. The overall interest rate is the product of these three items. The international "risk free" rate is that on, for example, UK government index-linked securities and their equivalents. It is around 2 to 2.5% at present. For external investors, there is also need to consider long term exchange rate fluctuations.

57. Throughout this report, constant prices are used, thereby ignoring inflation. This is standard practice in assessing forestry investment and avoids the need to estimate inflation over very long periods. The only difficulty arises if timber prices and/or operating costs are expected to inflate differentially from other costs and revenues. For much of the Twentieth Century, there was some evidence of a long-term relative increase in timber value at around 2% per annum overlaying regular cyclical variation. This trend ceased around 1990 and since then, timber prices have been deflating. On balance, using constant prices seems a fair assumption.

58. To facilitate modelling and assessing the impact of possible changes, a simple IRR model was created (see Chapter 6 and Annex 4). This allowed rapid assessment of the impact of changing the key parameters (Mean Annual Increment (MAI) 3, rotation, log price, establishment cost, grant level and taxation).

3.3 Economic IRR to Uganda

59. Uganda has substantial areas of land suitable for timber plantations, as shown by the “Silvicultural Map of Uganda” (Report on a Silvicultural Classification of Uganda, P D Hardcastle, 2003, for NFA/FRMCP, Annex 6). These areas generally have well-distributed total annual rainfall in excess of 1,200 mm combined with soils that are often marginal for agriculture but more than adequate for forestry in terms of depth, reaction and fertility.

60. Forestry, with its long time scales – even in Uganda – is seldom an attractive investment in its own right. Considerations of risk in terms of future markets as well as from influences such as fire, pests and diseases, and political and regional instability all influence investment decisions. If forestry is to secure investment funds, the return has to be adequate to meet investors' perceptions of the risk burden as well as returning a competitive rate of return on the capital engaged.

61. The SPGS is willing to support a range of timber species options including pine, Terminalia ivorensis and T superba, Maesopsis emenii, Araucaria hunsteinii and A cunninghamii. Eucalyptus has recently been added, with some restrictions on the proportion of the area under the species and payments being linked to heavy first thinning.

62. The main species used so far have been pine, predominantly Pinus caribaea, as this is the species that grows well in Uganda for which high quality seed could be obtained. Some plantations have used P oöcarpa from local seed stands, although the quality is variable.

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3 Mean Annual Increment (MAI) is measured in m³/ha/an and is the crop volume divided by the age. It is the basic tool for comparing different timber crops as each site has a maximum potential MAI for the species that can be grown on it, assuming good silviculture. MAI peaks at the rotation of maximum productivity.
63. Hence the main model used in this report is *Pinus caribaea*. Some test calculations were also made on *Eucalyptus grandis* for timber production. This has a shorter rotation (10 to 14 years compared with 20 to 25 years for pine) and has higher productivity in respect of its MAI. Generally speaking, then, *Eucalyptus grandis* timber crops mature more quickly than pine and have higher productivity. They are, however, a much more risky investment. If tending is neglected, the crop quickly stagnates and may be lost completely. Furthermore, the conversion of *Eucalyptus grandis* in sawmills requires specialised techniques. The apparent higher return must be offset against this greatly increased risk to the grower.

64. The basic return on *Pinus caribaea* is shown in Figure 1. The calculation excludes grants and taxes and thus represents the base case for pine plantations. It measures the return to Uganda as a whole, leaving aside at this stage the division between the investor’s profit and the benefit to the Government in the form of taxes. The return is between 8.7% and 11.6%, assuming a standing log price of US$ 20/m³. At MAI 15 m³/ha/an, a fair average, the return is 10% in real terms.

65. Real rates of return of 9 to 12%, when adjusted for inflation at 5 to 6%, approximate to a 15 to 18% financial rate of return including inflation. This compares reasonably well with current borrowing costs in Uganda. It is better than the rates achieved in some other countries with successful plantations, for example, New Zealand (8% to 8.5% real), and matches those in South America, Turkey and Spain. Table 2 shows comparative figures for other countries. Taken with the other benefits, this basic rate of return appears to be satisfactory.

66. The expected rates of return depend mainly on the costs of establishment, the productivity of the plantations, the conversion rate at sawmills, and the import price of sawn wood. The financial costs are well known from recent planting experience; they may overstate economic resource costs, as the opportunity cost of labour is less than the wage rate; but this saving has been discounted in the analysis. Figure 1 shows how dependent the return is on the productivity. The productivity assumptions are based on performance in the few plantations that remain and as achieved by similar plantations in comparable countries; early results from SPGS planting suggest that they are conservative, but it has not been presumed that all plantations will receive the high quality care needed to maximise output.
Figure 1  *Pinus caribaea*, MAI vs IRR – (No grant, No tax on revenue)

![Graph showing MAI vs IRR for *Pinus caribaea*.](image)

Graph based on - Sawlog Value US$ 20/m³, MAI 15m³/ha/an, Rotation 22 years

Table 2  Examples of Returns on Investment in Timber Plantations

<table>
<thead>
<tr>
<th>Country</th>
<th>Indicative Returns – Constant prices</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Zealand, Australia</td>
<td>8 to 8.5%</td>
<td>Stable politically, assured markets</td>
</tr>
<tr>
<td>Brazil, Chile, Spain, Turkey</td>
<td>10 to 12%</td>
<td>Often for industrial wood with very short rotations, market cyclical, fair to good stability</td>
</tr>
<tr>
<td>UK</td>
<td>3 to 5%</td>
<td>Fair growth rates, politically stable, aim was strategic timber supply, service values now predominate</td>
</tr>
<tr>
<td>Germany</td>
<td>0.5 to 1%</td>
<td>Return on established forest compared with liquidation value, maintaining forest cover is enshrined in the constitution</td>
</tr>
</tbody>
</table>

67. Sawlog conversion rates in Uganda are notoriously poor, even as low as 20%; it is assumed that they will be increased through competition from more modern sawmills towards, but not necessarily equal to, the rates achieved elsewhere in Africa, i.e. 35 to 50%. Imported timber values are based on wood export prices from South Africa, adjusted for transport, (more details are given in Annex 3)
3.4 Employment

68. The EXCEL spreadsheet-based One-hectare Models of sawlog production from *Pinus caribaea* and *Eucalyptus grandis* (P D Hardcastle, 2004 for MLWE/FID and FRMCP) include estimates of employment generation. These are summarised in Table 3.

69. Establishing a 70,000 ha timber plantation resource would ultimately create some 6,000 direct full-time jobs in the forest and between 4,000 and 6,000 in harvesting and haulage when it is in production. Processing would create 18,000 to 30,000 jobs, leading to a total figure of between 28,000 and 42,000. To this, there would be added 2,800 to 4,200 full-time managerial and administrative jobs supported Table 4. Although the figures are for full-time jobs, many will probably be part time and will include substantial employment opportunities in rural areas, where opportunities are currently limited. Given the growing labour force, and the lack of employment opportunities, these will be significant.

Table 3 Summary of Labour Input into 1 ha of Timber Plantation

<table>
<thead>
<tr>
<th>Model</th>
<th>Days input required per ha</th>
<th>Annualised labour input/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>P caribaea – 22 year rotation, excluding roads</td>
<td>315</td>
<td>14</td>
</tr>
<tr>
<td>P caribaea – 22 year rotation, including roads</td>
<td>379</td>
<td>17</td>
</tr>
<tr>
<td>E grandis – 14 year rotation, excluding roads</td>
<td>298</td>
<td>21</td>
</tr>
<tr>
<td>E grandis – 22 year rotation, including roads</td>
<td>358</td>
<td>26</td>
</tr>
</tbody>
</table>

Table 4 Estimate of Sector Employment Created

<table>
<thead>
<tr>
<th>Scenario Element</th>
<th>Number of jobs created</th>
</tr>
</thead>
<tbody>
<tr>
<td>55,000 ha <em>Pinus caribaea</em></td>
<td>4156</td>
</tr>
<tr>
<td>15,000 ha <em>Eucalyptus grandis</em></td>
<td>1733</td>
</tr>
<tr>
<td>Total jobs created (225 days/an), approximately</td>
<td>6000</td>
</tr>
<tr>
<td>Estimated jobs in harvesting and haulage (ratio 1:1 – forest to harvesting, relatively low level of mechanisation)</td>
<td>6000</td>
</tr>
<tr>
<td>Estimated jobs in harvesting and haulage (ratio 1.5:1 – forest to harvesting, substantially mechanised)</td>
<td>4000</td>
</tr>
<tr>
<td>Estimated processing jobs</td>
<td></td>
</tr>
<tr>
<td>3 times forest employment</td>
<td>18000</td>
</tr>
<tr>
<td>5 times forest employment</td>
<td>30000</td>
</tr>
<tr>
<td>Estimated employment in supervision, management and administration (assumed ratio of 1 to 10 labour)</td>
<td></td>
</tr>
<tr>
<td>Forest</td>
<td>600</td>
</tr>
<tr>
<td>Harvesting and haulage</td>
<td>400 to 600</td>
</tr>
<tr>
<td>Processing</td>
<td>1800 to 3000</td>
</tr>
</tbody>
</table>
70. Although the jobs created in the forest and in harvesting and haulage will be new, those in processing will partly replace existing employment based on material from natural forests and other sources. In the absence of accurate information on current employment, it is impossible to be definitive. Nevertheless, it appears that the timber plantation programme would create some 30,000 permanent, full-time jobs. Secondary processing will create employment additional to this. The ratios assumed for jobs on processing are based on employment statistics from a range of countries. The actual ratio depends on the level of technology employed. It is expected that Uganda will tend to adopt labour-intensive processing technologies for some considerable time to come.

3.5 Foreign exchange

71. An area of 60,000 to 70,000 ha of timber plantations would produce some 1 million m³ of sawlogs. Efficient conversion should result in about 500,000 m³ of sawn wood. If this had to be imported, at the current estimated price of US$150 per m³ delivered to Kampala, it would require some US$ 75 million in foreign exchange. The plantations would thus make a modest, but worthwhile, contribution to the balance of payments and the country’s need for foreign exchange.

3.6 Concluding remarks

72. Uganda has solid comparative advantages for growing timber in plantations, including structural advantages of climate, soils, topography and access. It is not well placed for exporting timber products other than regionally, but this has the advantage of raising the price of imported timber. Provided sawlogs are efficiently converted, good quality plantation establishment and management can yield a satisfactory economic return to the country.

73. Timber plantations have significant employment creation potential in terms of both direct employment in the forest and employment in harvesting and processing. Much of the employment would be rural and there would be substantial administrative, supervisory and managerial employment created as a consequence. There would also be a positive contribution to the balance of payments.
Chapter 4  Motivating the Private Sector

4.1  The need for a subsidy

74. Although the rate of return and other benefits may be satisfactory from the point of view of the Government, which takes account of the interests of Uganda as a whole, to the individual planter or investor, the returns without any subsidy are rather poor. Investors have to pay tax and bear the direct risks of fire, disease, pests, etc., as well as those affecting the economy as a whole, such as those that afflicted Uganda in recent memory.

75. Table 5 below shows the return after tax may be as low as 7%, even with careful silviculture, on the less productive sites. Generally, returns are less than short term borrowing rates, while this investment matures only after 10 to 25 years. Moreover, in many cases investors are not well informed about forestry.

4.2  The case for subsidy

76. A subsidy may be needed to stimulate the private sector; but is it warranted? As an established commercial business, sawlog production should not need continuing subsidies, although it may require special treatment for taxation purposes to accommodate its long time-scale and unusual cash flow, an issue that is considered in Chapter 5 below. Nonetheless, many governments have intervened to promote the inception and early expansion of a timber plantation sector, either directly through financing a state forestry enterprise, which might then be subsequently privatised or divested, or by offering subsidies, tax concessions, protection, technical support, and other aids for a period (FAO 2004).

77. Keipi reviewed financing mechanisms in Latin America. The conclusions were that public subsidies should be geared towards public benefits that would otherwise not accrue. These may relate to encouraging forestry where it is a desirable but financially non-viable land use or to refining decision making within forestry to favour certain species or silvicultural practices. The article also emphasises that, in addition to the provision of targeted direct incentives, there is great scope for public support of private forestry through indirect mechanisms. These include research, training, extension services and the provision of market information (see 7.2 and 7.3).

78. Such help may be warranted because of the long time-scale and risks involved in plantations. The government is able to take a longer view of the country’s interests than a private investor can afford to do, and it can more easily spread the risks.

79. In addition, the profitability of plantations is increased if there is sufficient production to support efficient processing industries. Government promotion can assure private investors that a critical scale is likely to be achieved. Large-scale investment in forest industry requires an assured supply of raw material, as the capital costs can be huge. In highly competitive industries such as pulp and paper, break-even point may require operating at 90% of installed capacity. Companies in this business have backward-integrated into plantations to ensure their raw material supply.

80. Finally, there may be benefits to the public that cannot be sold by the plantation owner and so are not reflected in his profits. These are service values such as watershed protection, landscape values and protection of natural forests within a matrix of plantations. All these arguments in support of subsidising plantations apply in Uganda.

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4.3 Comparing different types of subsidy

81. Given that a subsidy is needed and warranted, is a grant the best type of subsidy? A ‘soft loan’ is an alternative in some circumstances, and has some attractions, especially in that it allows the creation of a revolving fund. However, it has not generally been found to be practical to extend credit over the long time-scales of forestry projects. Even development finance institutions in Uganda do not lend beyond 10 years, while the commercial banks set the limit at five.

82. More use has been made in other countries of tax concessions; they appeal to the investor because they leave control in his hands; they are cheap to administer; and they can be very effective, especially with the super rich when marginal tax rates are high. But they can easily lead to the forestry authorities losing control of the nature and location of the planting, and so need to be supplemented by planning controls, the costs of which offset any savings on administration. In the UK, for example, they produced much planting of a type the public did not like in unsuitable places, and were abolished in favour of grants.

83. Grants can be targeted, are more flexible, more easily adjusted, more transparent, less inequitable, and easier to turn off when they have done their job. They can be linked to quality control systems as well as being potential policy instruments to push investment to the desired type of silviculture. They also make it easier to take in, and account for, contributions from donors. As the SPGS grants are working well, it would be best to continue with them in the short to medium term, while a substantial resource is being created and investment in the sector becomes more widely known and established.

84. Tax incentives alone are not a good instrument, as noted in section 4.2 above. While they are not recommended as the mechanism to stimulate planting, it is, nonetheless, necessary to put forestry on a level playing field for tax with other land uses and investments. This is addressed in further detail in Chapter 5.

85. A wide range of mechanisms can be used to support forestry, ranging from direct grants to highly focused subsidies and taxation benefits. Brown (2000) notes the dispute over the support given to plantations in Chile. One group argues that government has subsidised an environmentally and socially destructive development, the alternative view is that it created one of the world’s most efficient forest-based industries.

4.4 The level of grant

86. The following sections are based on use of the spreadsheet models for *Pinus caribaea* and *Eucalyptus grandis* developed for FRMCP in 2004. These are used to show the relative impact of changes to taxation and subsidy levels and are meant as a guide. They are not a basis for investment decisions without detailed checking of the assumptions on which they are based.

87. Table 5 and Table 6 show the range of IRR for both *Pinus caribaea* and *Eucalyptus grandis* with a range of grants and taxation scenarios. A grant of US$ 350/ha lifts the IRR to an acceptable level, especially when the sawlog price is US$ 20/m³ or greater, even with current levels of taxation. These various scenarios are discussed in more detail in Annex 4.

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5. Global Outlook for Future Wood Supply from Forest Plantations, FAO 2000


88. It is apparent that the SPGS grant of US$ 350/ha thus makes a significant impact on the return for pine; it is increased to 11-13% in real terms for likely sawlog prices. This evidently has been enough, along with the technical support, to stimulate private planting (see Table 1). It is thus succeeding in getting the sector established.

Table 5  IRR for Pine Timber Plantations – MAI 15m³/ha/an, Rotation 22 years

<table>
<thead>
<tr>
<th>Sawlog price US$/m³</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>No grant, revenue taxable at 30% (base case)</td>
<td>6.6%</td>
<td>8.2%</td>
<td>9.5%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Grant of US$ 350/ha, revenue taxable at 30%</td>
<td>10.4%</td>
<td>12.0%</td>
<td>13.2%</td>
<td>14.2%</td>
</tr>
<tr>
<td>Grant of US$ 350/ha, revenue tax free</td>
<td>12.2%</td>
<td>13.8%</td>
<td>15.1%</td>
<td>16.1%</td>
</tr>
<tr>
<td>No grant, revenue tax free</td>
<td>8.3%</td>
<td>10.0%</td>
<td>11.3%</td>
<td>12.3%</td>
</tr>
<tr>
<td>No grant, tax relief (30%) on 2nd Rotation Costs</td>
<td>8.6%</td>
<td>10.2%</td>
<td>11.4%</td>
<td>12.4%</td>
</tr>
</tbody>
</table>

Table 6  IRR for Eucalyptus Timber Plantations – MAI 25m³/ha/an, Rotation 14 years

<table>
<thead>
<tr>
<th>Sawlog price US$/m³</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>No grant, revenue taxable at 30% (base case)</td>
<td>9.0%</td>
<td>11.8%</td>
<td>13.9%</td>
<td>15.6%</td>
</tr>
<tr>
<td>Grant of US$ 350/ha, revenue taxable at 30%</td>
<td>13.8%</td>
<td>16.5%</td>
<td>18.5%</td>
<td>20.2%</td>
</tr>
<tr>
<td>Grant of US$ 350/ha, revenue tax free</td>
<td>16.7%</td>
<td>19.5%</td>
<td>21.6%</td>
<td>23.3%</td>
</tr>
<tr>
<td>No grant, revenue tax free</td>
<td>11.9%</td>
<td>14.7%</td>
<td>16.8%</td>
<td>18.6%</td>
</tr>
<tr>
<td>No grant, tax relief (30%) on 2nd Rotation Costs</td>
<td>12.3%</td>
<td>15.0%</td>
<td>17.1%</td>
<td>18.8%</td>
</tr>
</tbody>
</table>

4.5 Key aspects of a grant system

89. Plantation forestry has been the subject of controversy in many countries. It is interesting to note that in general, this is focused on environmental issues in developed countries (e.g. UK flow country, US owl habitat, Sweden, ecosystem approaches to meet CBD goals), whereas in developing countries, social issues seem to be more prominent and controversial. The issues involved are now well understood.

90. The controversy has arisen largely because investment in forestry plantations would logically tend to the following pattern, if not constrained:

- Minimise establishment costs – large blocks, monocultures, close planting to give early site capture, favouring species with rapid early growth;
- Minimise stand improvement investment – limited pruning, short rotations for maximum productivity of raw material;
- Minimise harvesting costs – flat ground, limited roads, large cutting areas;
- Maximise revenue – short rotation, quick maturing species.

91. These characteristics of “industrial” forestry have occurred in many countries including UK, Chile, and Brazil. If grants and subsidies are not constrained by conditions, then the type of forestry undertaken may not meet wider public wishes. This was certainly the case in UK, where the planting of the Flow Country, supported by a generous tax system with very high marginal tax rates (between 60 and 99% during the period 1965 to 1979) led to public outcry.
Similar results occurred in South America. In Brazil, a grant was given based solely on expenditure incurred. With no conditions, it led to inefficient operations and forests that were subjected to criticism as being simply “Cellulose farms”. There were also major disputes over land rights.

Grants and subsidies may thus be used both to encourage private investment in a national resource (timber plantations) and also as a policy instrument to guide the type of forestry undertaken. Examples include: species choice; landscape; conservation of riparian forest, environmental factors and regeneration systems. In Germany, grants are available for non-chemical control of bark-beetle attacks as well as for establishing long rotation hardwoods and for natural regeneration under the selection system to give mixed-species mixed-age forests of high environmental and recreation value.

By contrast, the United States has few incentives for private forestry even when pest outbreaks occur, preferring to use market instruments alone. In Switzerland, on the other hand, private and community forest owners are subsidised to maintain their forests in good condition for soil and water conservation and for protection from avalanches. In this case, the subsidy is calculated as the opportunity cost compared with unrestricted use and paid annually.

Conceptually, the principles are clear and logical but the application in any particular country may be difficult. Not only is agriculture often subjected to numerous direct and indirect grant and price support mechanisms, but most other land uses in sophisticated economies also secure at least some favourable treatment. Defining clear and precise rules for forestry that deliver the desired benefits without also encouraging undesirable practices is challenging. In general terms, simplicity and transparency are the most desirable attributes.

4.6 Attracting international investors

In the case of international investors, there are two steps required. The first is to publicise the opportunity for investment in forestry plantations in Uganda, and the second is to make it attractive. External investors interested in forestry plantations can choose from a global range of countries. In particular, South America, Australia and New Zealand as well as Turkey, Spain, Portugal and USA have an established track record in this. It is these countries that Uganda must compete with for the funds.

As well as offering a competitive return, the wider investment climate and the political, legal and regulatory framework must be attractive. Information such as that from the US State Department Investment Climate Reports on individual countries (for Uganda see http://www.state.gov/e/eb/ifd/2005/42193.htm) gives an example of the type of country profile that external investors may consult before making further investigations. Investment is a voluntary action!

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Chapter 5  Taxation of Plantations

5.1  The forestry tax anomaly

97. Forestry is subject to the same tax regime as other land uses, notably agriculture. Full details are provided in Annex 5 but neither interest charges nor inflation would be considered.

98. The unusual cash flow of plantation investments make the incidence of income taxes higher than for businesses that operate on an annual cycle Figure 2, as the income is nearly all earned in a single year.

Figure 2  Net Annual Cash Flow Pine - US$ / ha - Interest Charges Excluded

99. At the time of maximum expenditure, the first two years, there is no income against which to offset costs. Under Ugandan tax regulations, costs from one business, such as forestry, cannot be offset against profits from another, unlike the former system in UK, which allowed wealthy people to reduce their tax bill by investing in forestry.

100. The costs incurred in forestry can be carried forward and offset against the future forestry income, However, while the tax code allows expenditure to be carried forward indefinitely, it is not really practical to maintain records for 10 or more years. Given the length of time involved, much longer than the 7 years for which financial records must be kept, it seems unlikely that many investors would retain the information on costs incurred. Should they do so, even quite modest inflation would have depreciated its value to a negligible amount. Worse follows when the plantation is harvested. All the income accrues in one year and is taxed as if it were an annual profit, with no recognition of the many years it has taken to earn.

101. If interest charges are also included, then the cumulative cashflow remains negative for both pine and Eucalyptus until the final felling takes place, as shown in Figure 3 below. This
is based on an assumed real interest rate of 5%. If higher rates of interest are used, the pattern is similar but the size of the accumulated deficit becomes progressively larger.

Figure 3 Post Interest Cumulative Cash Flow (US$/ha), No Grant, Tax excluded - Interest Rate 5%

102. This problem has been dealt with in a variety of ways elsewhere, but mainly through exemptions or reduced rates of taxes on land, inheritance, inputs, value-added, profits and incomes. In Uganda, it could be remedied by a change to income and corporation tax. The following four alternatives illustrate what might be done.

5.1.1 A) Allow costs to be set off against income from other sources

103. This provision would certainly solve the problem for high-income earners, but does not help others, who should be catered for in view of the Government's policies for helping the poor. Consequently, this solution is not recommended

5.1.2 B) Tax plantations at a lower rate

104. A top rate of, say, 15% would be a reasonable reflection of the high tax paid on plantations. But the Government might be concerned about setting a precedent for special rates that other sectors might seek to exploit. This solution is not therefore recommended
5.1.3 **C) Exempt forestry plantations from income taxes**

105. This solution is the simplest and easiest to administer. There would be little direct loss in revenue, which would be compensated for from taxes on the processing of the raw material. This solution should be considered.

5.1.4 **D) Allow the costs of the second rotation to be offset against income from the first**

106. The owner would be able to claim retrospectively a tax credit against tax paid on the income from felling the plantation when he replants. These costs are incurred in the two years following the felling of the trees, so bookkeeping should not be a problem. It would treat the plantation as a continuing business, and provide an incentive to replant quickly. Owners of large areas of plantation can achieve much the same result by phasing the felling over several years, but this provision would help those with small areas that must be harvested in one operation to get the best return. This solution should also be considered.

5.1.5 **Conclusion on tax changes**

107. Alternatives C and D meet the requirement that plantations be taxed at the same level as other land uses, are straightforward to implement, and should not be onerous to administer. It is recommended that the Ministry of Finance and the Uganda revenue Authority (URA) be invited to consider them.

108. An additional advantage is that, when the grants are withdrawn, either of these changes would go some way to restoring the rate of return to the level with grants. Plantation forestry should then be able to prosper without continuing subsidies.

**Figure 4 IRR Pinus caribaea under a Range of Tax Scenarios**
It is interesting to note that the IRR under Scenario C – no tax on revenue – is almost identical to that achieved when second rotation costs are offset against the revenue from the first rotation – Scenario D. Figure 4 and Figure 5 show that under reasonable assumptions of sawlog price and productivity, the returns would be adequate to attract investors into an established sector and to encourage those that invested with the assistance of a grant to stay in the sector when the grant is no longer available.

Figure 5  IRR Pine, Range of Taxation Systems and MAI Assumptions

![Graph showing IRR Pine, Range of Taxation Systems and MAI Assumptions]
Chapter 6  Analysis of Factors that affect Returns to Investors

110. Section 3.3 above shows the basic return on investment in *Pinus caribaea* timber plantations in Uganda. Figure 4 and Figure 5 in the previous Chapter show the actual returns to investors under a range of different taxation and grant scenarios. The returns are competitive but not high. In order to test in more detail both the underlying assumptions and the returns, a simple one-hectare model was constructed [Simple IRR Calculator.xls]. From this, the basic returns shown earlier were calculated. These are repeated here.

**Table 7  IRR for Pine Timber Plantations – MAI 15m³/ha/an, Rotation 22 years**

<table>
<thead>
<tr>
<th>Sawlog price US$ / m³</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>No grant, revenue taxable at 30% (base case)</td>
<td>6.6%</td>
<td>8.2%</td>
<td>9.5%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Grant of US$ 350/ha, revenue taxable at 30%, (current SPGS system)</td>
<td>10.4%</td>
<td>12.0%</td>
<td>13.2%</td>
<td>14.2%</td>
</tr>
<tr>
<td>No grant, revenue tax free (Option C above)</td>
<td>8.3%</td>
<td>10.0%</td>
<td>11.3%</td>
<td>12.3%</td>
</tr>
<tr>
<td>No grant, tax relief (30%) on 2nd Rotation Costs (Option D above)</td>
<td>8.6%</td>
<td>10.2%</td>
<td>11.4%</td>
<td>12.4%</td>
</tr>
</tbody>
</table>

**Table 8  IRR for Eucalyptus Timber Plantations – MAI 25m³/ha/an, Rotation 14 years**

<table>
<thead>
<tr>
<th>Sawlog price US$ / m³</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>No grant, revenue taxable at 30% (base case)</td>
<td>9.0%</td>
<td>11.8%</td>
<td>13.9%</td>
<td>15.6%</td>
</tr>
<tr>
<td>Grant of US$ 350/ha, revenue taxable at 30%, (current SPGS system)</td>
<td>13.8%</td>
<td>16.5%</td>
<td>18.5%</td>
<td>20.2%</td>
</tr>
<tr>
<td>No grant, revenue tax free (Option C above)</td>
<td>11.9%</td>
<td>14.7%</td>
<td>16.8%</td>
<td>18.6%</td>
</tr>
<tr>
<td>No grant, tax relief (30%) on 2nd Rotation Costs (Option D above)</td>
<td>12.3%</td>
<td>15.0%</td>
<td>17.1%</td>
<td>18.8%</td>
</tr>
</tbody>
</table>

111. Obviously, sawlog price is a key determinant of return and will require a competitive market amongst processors if it is to be secured. Many aspects are under the direct control of planters, particularly efficiency, cost control and protection from damage as well as sound initial planning. More information and graphical presentations are presented in Annex 4. Overall, it is apparent that the potential returns to investors from timber plantations in Uganda are competitive but there are a number of important caveats:

- Good field practice including high quality planting material and intensive weeding is essential to secure optimal growth rates;
- Protection from damaging influences such as fire is important;
- An efficient forest processing industry must be encouraged so that fair market prices are paid when plantations mature;
- The current grant system is useful to kick-start the industry and provide a mechanism for ensuring high standards are achieved;
In the long run, an equitable taxation for forestry will ensure that investors make fair returns on their capital.

112. The detailed analysis undertaken and presented in Annex 4 shows that key variables which determine the IRR of a timber plantation are summarised below.

- **Establishment cost** – incurred at the outset and therefore should be minimised, increasing the cost by US$ 100 per ha reduces IRR by between 1.2 and 1.4%.

- **Productivity**, expressed as **Mean Annual Increment (MAI)** in m³/ha/an. This depends on the site potential and good silviculture; the aim is 15 to 20 for pine and 25 to 35 for *Eucalyptus*. For pines, each additional 1m³ MAI above 15 lifts the IRR by 0.3%, reducing MAI below 15 by 1m³ reduces IRR by 0.4%.

- **Rotation length** – should be as short as possible but must be long enough to produce logs of sufficient size to allow efficient conversion into timber. The aim is a stand of trees with an average diameter at breast height (dbh) of at least 30 cm. For pines, this is 20 to 25, for *Eucalyptus* 10 to 14 years. For pines, a change of 1 year in rotation length changes IRR by 0.3%.

- **Price per cubic metre of the logs**: the higher the better, hence the need to invest in thinning and pruning, which allow conversion into high quality timber. At around US$20/m³, US$1 per m³ changes the IRR by around 0.3%. The price paid for logs is very dependent on the efficiency of conversion (see Annex 3).

- **Annual costs for protection etc.** have relatively little impact on the IRR; similarly, late rotation costs such as road for harvesting (a change of US$100 per ha at the end of the rotation only changes the IRR by 0.1%).

- **Intermediate thinnings** have limited impact on the IRR and can be ignored for the purposes of this study. It is possible to carry out heavy thinning and remove the larger trees to generate early positive cash flow, but this then reduces the income at final felling and may also require extending the rotation.

113. Unlike agricultural crops, the decision on when to fell a timber plantation can be made within a period of up to 5 years around the optimum rotation derived from growth models. A stand with an indicative rotation of 22 years could be cut between ages 20 and 25 years depending on the current and expected market price for the logs. This allows growers flexibility within a fair period; however, investment in processing capacity depends on regular supplies of raw material. Growers and processors are linked and need to cooperate commercially if both are to benefit.
Chapter 7  Other Factors that affect the Investment Climate

7.1  Investors’ concerns

7.1.1  CFR Leases

114. There are two drivers for the policy of leasing land in CFRs. The first is to provide land to investors who would not otherwise have access to it; initially, this was particularly seen as relevant for external investors. The second driver is to bring land that is degraded into productive use, rather than allowing it to remain idle and thus vulnerable to further degradation or encroachment.

115. The Nature Conservation Master Plan (FD, 1990) reviewed the main Forest Reserves in Uganda and determined their value for biodiversity conservation purposes. Reserves were placed into three categories – Core, Prime and Secondary. Within the last two categories, the areas that could be utilised for activities such as plantation establishment were outlined. Severely degraded reserves were not examined in detail, as the expectation was that they could be used for other purposes.

116. Not all areas that could be used for plantation purposes have been or will be so allocated. To be economically, viable plantations require adequate rainfall and soils. The silvicultural potential of Uganda for commercial forestry was analysed and reported upon in 2003, showing those areas of the country that were considered capable of supporting commercial timber plantations. (Report on a Silvicultural Classification of Uganda, P D Hardcastle, 2003, for NFA/FRMCP – see Annex 6).

117. In the southern part of the country, this zonation is supported by past plantation experience, albeit that neither pilot trials nor detailed records are now available. The northern areas (Gulu, Kitgum, Moyo, etc.) appear to have potential but this is unproven. Furthermore, parts of northern Uganda remain too unsettled to allow useful research work to be undertaken, let alone commercial plantation establishment.

118. Information on the future market for plantation grown saw timber is scarce and largely speculative. What is clear is that the main market will be the more developed urban areas, with Kampala and its environs forming the nucleus. Access alone is not a barrier to development, but distance to Kampala, meaning that sawn wood will incur internal transport costs, will discourage investment unless there are counterbalancing factors, such as greater productivity, that could lead to lower production costs.

119. The current strategy of the NFA is for it to engage directly in plantation establishment, with the goal of roughly equal portions of the national target of around 65,000 ha being established by NFA and by private investors. At present, the capital required for NFA investment is not fully available and the balance may change, depending on such capital being secured. Whoever undertakes the investment, location is clearly critical.

7.1.2  Plantations with agricultural crops, taungya

120. Taungya was developed in Burma in the nineteenth century as a method of establishing Teak plantations. It has been applied elsewhere in the world, but has caused considerable conflict on grounds of inequity – when the trees and crops have different owners – and on grounds of inefficiency when land pressure militates against people moving on quickly once the trees are established.

121. In Uganda, studies in the field under FRMCP, during and since appraisal, showed that the system was ineffective. Deliberate damage to the tree crop has been common, done to avoid the cultivators having to move on. Crops were planted throughout the site, rather than leaving a clear strip for the trees. Tall crops such as maize were used, which competed too
strongly with the trees, and many trees were tugged during cultivation, leading to the roots being brought out of contact with the soil and growth stagnating as a result.

122. Although taungya may be a useful system for farm woodlots, where the owner can choose to favour one crop or the other, for commercial plantations it is ineffective. The early growth of pine and, especially, *Eucalyptus* under intensive management leads to rapid canopy closure, which limits the scope for food crops, while, as noted above, taungya impacts negatively on both survival and early growth. The only exception is when *Terminalia* is used, as these are planted at wide spacing (5 to 8 metres). There is no doubt that SPGS decision to prohibit of the use of the taungya has been amply justified by the results obtained.

123. In this regard, it is noted that the information given out by SPGS recommends wide planting distance for *Maesopsis emenii* and the use of taungya. Although *Maesopsis* is a strong light demander, initial planting distances wider than 3 metres are likely to lead to a short stem and a heavy crown. Close planting (3 metres) and regular thinning is a better approach.

124. Prior to SPGS, taungya was widely used by sawmillers undertaking their replanting commitments, as they received no support or incentive to work to high standards. It was also used by some who mistakenly viewed it as a cost saving measure. In a few cases, leaseholders simply planted agricultural crops in their lease areas on the grounds of “accumulating capital for tree planting”. This has been stopped by the regulation that agricultural crops may only be grown for one year.

125. There is, however, a wider issue. Where leased areas have a history of encroachment, to remove illegal cultivators, ostensibly because the land is to be used for timber plantations, but then to allow new leaseholders to cultivate agricultural crops gives a mixed message. When the encroachers are largely from the poorer sector of society and the leaseholders are from the wealthy and the elite sectors, there is considerable danger of very negative publicity. Overall, it would be better to prohibit any cultivation of agricultural crops in areas designated for timber plantations.

7.1.3 Lease fees

126. The fee rate for leases is currently based on the distance from Kampala, with three tiers of payment level. This seems sensible. What is less readily understood is the rationale behind the decision to start charging only once plantations have been established; this appears to run counter to the desire to encourage lessees to plant as quickly as possible. Furthermore, to transfer public assets (in this case the use of public land) to private interests for less than a fair price is not compatible with proper accountability for public property.

127. The lease payment is a relatively small component of the overall cost of plantation development. It might be argued that the lease payment should be subjected to a bidding process with a floor price, as for timber concessions. This would introduce additional processes into SPGS and so tend to delay planting. Accordingly, it is not recommended for plantation leases in Uganda at this stage, as the aim is to encourage investment. If the demand for leases comes to exceed the available supply, allocating them through a market process would be the only way to ensure fairness and transparency.

128. Recent NFA experience with tendering of timber utilisation contracts in mature plantations has been that prices have been pushed beyond commercially prudent levels. It is expected that the buyers will learn to make better estimates quite quickly.
7.1.4 Lease block sizes

129. The minimum size for support under SPGS has been lowered from 100 ha to 25 ha although the maximum area has been raised from 300 ha to 500 ha. There is a danger that the number of planters may become too large for SPGS to handle effectively without increased staffing.

130. The allocation of leases at present appears to have a number of potential problems. Larger reserves have not been kept available for larger investors who may seek 5,000 to 10,000 ha. This may influence investment decisions adversely. Furthermore, the individual lease units do not appear to have been framed within a reserve or zonal level strategic plan that would group them to make efficient use of infrastructure and facilitate investments in processing. This may make future utilisation more difficult and less efficient.

131. Development of large-scale plantations to support efficient forest industries requires substantial areas of plantation. Internationally, countries such as Brazil and Indonesia have created massive forest plantations where the industry lies at the centre of a large, contiguous block, minimising transport distances and optimising the scale of operation so that residues from one process can be utilised in other processes. The full utilisation of the raw material is critical to both sound environmental practices and to economic efficiency.

7.1.5 Lease transfers

132. One advantage of channelling plantation development into reserves should be to bring synergies and economies of scale. This does not appear to have been fully achieved. Ultimately, it may be necessary to allow and facilitate sales or exchanges to facilitate future management.

133. If timber plantation development continues in Uganda to 60,000 ha or larger area, there is likely to be pressure for a market in established plantations. This could be helpful to the industry's performance by allowing concentration of larger areas into single management units, with consequent improvements of efficiency in protection, harvesting and utilisation.

134. At present, this is not possible as leases are not transferable, and therefore have no value as a security. In Guyana, concession leases have been made transferable, provided the new owner passes the technical, financial and ethical tests applied when concessions are allocated. Such a system is worth consideration for plantation leases, too.

135. It is also worth noting that where a plantation lease is held by a limited company, shareholding and hence control can be bought and sold without any controls being applied, unless specific rules are enacted.

7.1.6 Land use conflict

136. Although land pressure in Uganda is generally much lower than in many countries, there is considerable localised pressure. This is being driven by external conflicts and population growth. For example, areas identified as possible plantation development sites during FRMCP appraisal in 1999, such as parts of Hoima, Kabarole, Kibaale and Kyenjojo Districts, are no longer available.

137. Some degraded forest reserves deliver few functional and no major productive values, although they may be used for grazing and charcoal making. In view of the potential conflict arising from removing people engaged in these activities, a strategic approach to identifying which reserves should be put under plantation lease is required. If conflict arises, then the resulting plantations will be extremely vulnerable to damage from deliberate fire and cutting.
To avoid this, it will be essential to handle the process of allocating leases in a transparent and equitable way that accommodates all interests.

138. External investors are likely to be very wary of taking leases in locations with a history of conflict, especially if the resolution was not achieved by consent. In some cases, degazettement of areas that deliver few or no service values may provide leverage for negotiation to resolve pressures elsewhere and so remove the potential for future conflict and criticism. At least one company seems to have so acted already, and may decline to take up a potential lease on grounds that the area is too heavily used by local people.

7.2 Incentives that could be adjusted quickly:

7.2.1 CFR leases

139. The availability of adequate blocks of land is essential if larger investors are to be attracted. There are two elements that need to be considered. The first is the size in respect of productivity. A large sawmill complex will require 100 to 200m³ per day operating for 300 days per annum. This means 30,000 to 60,000 m³ of logs a year will be required. At MAI 15 to 20 m³/ha/an, this equates to 1,500 to 4,000 ha of plantation. There are few blocks of this size currently available.

140. Block sizes are also relevant from the management point of view. Large-scale investors usually employ professional managers. The cost of employing such people, who initially may be expatriates, is high and can only be justified if a sufficiently large area is available to absorb the overhead cost. If the area being managed is not either a large single block or a group of reasonably large sub-units that are relatively close (within, say, 15 Km), then management costs quickly escalate to uncompetitive levels.

141. Investors are also likely to be very wary of CFR leases in locations where there is unresolved conflict. Those investors with high standards of corporate social responsibility, who are the type of investor Uganda needs, will be reluctant to take leases where there is a history of conflict or even severe land pressures that could result in conflict. This issue is a major one for NFA to tackle and includes conflict over boundary demarcation as well as conflict over use of land within reserves.

142. There is also need to reconsider the transferability of leases within CFR areas. A lease is a valuable asset should be a negotiable instrument. As noted already, (Section 7.1.5) it is possible to design systems that allow this without losing control of standards.

7.2.2 Seed supplies

143. SPGS has organised supply of improved seed-orchard seed of *Pinus caribaea* from Queensland, Australia. There is a major benefit to most growers in having centrally purchased supplies since the fixed transaction costs of seed purchase are relatively high and can be spread much more widely when large quantities are purchased. This is a short-term solution; in the longer term, Uganda will need to secure its own seed supplies. A national seed supply strategy was outlined in the FRMCP consultancy undertaken by Alan Pottinger in 2003. As a first step, seed stands can be selected from maturing plantations. These would then be heavily thinned and used for general collections.

144. The next stage would be to develop seed orchards from a breeding programme based on selected clones. This is a long-term commitment but well worth while. At present, the seed being used has been selected under rather different climatic regimes and will require further selection within Uganda, although the form should be generally very good.

145. One of the challenges for Uganda is that *Pinus caribaea* is a shy seeder. It often fails to produce seed until age 15 or later and even then seed production is light. *Pinus oocarpa* and
P tecunumanii do not suffer from this problem, but are largely untested in Uganda. The P oöcarpa that is in the country is of unknown origin and not particularly well-formed.

146. In general, regional approaches to tree breeding are helpful in reducing the cost and increasing the range of material available for selection. There are some seed orchards still existing from EAAFRO times based on collections in Kenya, Tanzania and Uganda. Unfortunately, the predominant species are Pinus patula and Cupressus lusitanica. Neither of these species is suitable for wide planting in Uganda. Suitable sites for Cupressus lusitanica and Pinus patula are scarce. Furthermore, C lusitanica has, since 1986, been heavily attacked by the aphid Cinara cupresi and aphid resistant material is required for any planting.

147. The clonal C lusitanica seed orchard established in the 1960s using clones from Kenya, Tanzania and Uganda in Kibale NP (when it was a forest reserve) was felled and sold for sawtimber in 2000 by the Uganda Wildlife Authority (UWA). It is not known whether there were aphid resistant clones amongst those represented. A similar clonal seed orchard remains in Kenya. Uganda’s only large block of Pinus kesiya of Philippine origin was also cleared before measurement and breeding material could be obtained.

7.2.3 Risks and insurance

148. Timber plantations are subjected to a number of risks including fire, damage by browsing, insect pest damage and diseases. They may also be subjected to deliberate vandalism if there are conflicts over land ownership and use.

149. The minimisation of risk is a responsibility of both NFA and individual owners. NFA has to ensure that leases are only given out in areas where there are no outstanding conflicts. Unfortunately, it appears that in some cases, leases have not met this criterion. There may also be particular problems where leaseholders have been allowed to establish their plantations right up to a disputed boundary. In such situations, it would be prudent to leave a strip of unplanted land, which can then be utilised as a wide firebreak and burned off annually. The boundary dispute can then be resolved without the danger of finding that plantations have been established on land that is not legally within the reserve.

150. Pests and diseases are best controlled by good silviculture and regular patrols; this can also reduce damage from browsing, which is only a problem for a short period.

151. Fire is a major hazard and requires a combination of passive and active measures. SPGS has already provided training and advice on both of these. A system of firebreaks combined with weeding of vulnerable crops before the fire season is essential. The cost has been built into the models on which the grant is based. Nevertheless, there remains some risk of loss from fire.

152. Commercial plantation fire insurance is always costly and is unavailable in Uganda. It would be possible for SPGS to provide a system of cover, but this would have to be carefully designed to avoid deliberate loss to secure payment. One solution could be a charge (for example 2%) deducted from the grants and notionally paid into an insurance fund. In the event of loss from fire, the fund would then be used to pay some of the owner’s contribution to re-establishment, which could also receive the normal grant. All payments would need to be subjected to rigorous inspection, and there would be a reduction to account for costs such as clearing and access routes that would not be incurred in re-planting.
7.2.4 Environmental standards

153. Most grant schemes around the world have environmental standards built in to them. These include the protection of watercourses and riparian vegetation. They may impose restrictions on clearing indigenous vegetation and, especially, on the treatment of wetlands. They may also apply conditions on land preparation, such as deep ploughing, and on the handling of chemicals.

154. It is seldom sensible silviculturally or economically to plant too close to watercourses, as the weed growth is very heavy and costly to control. Strips of riparian vegetation can provide useful internal firebreaks and a natural boundary for management purposes. Wetlands often have high environmental values, both of biodiversity and as water sources, and are also difficult and costly to use for plantations.

155. Within a gross plantation area, it is normal to expect between 5 and 15% of the area to be unproductive. This includes riparian strips, roads, rides and rocky patches. Grant systems normally pay on the basis of the gross area and expect some land to remain unplanted. In the UK, the norm is that 85% of the gross area is planted up.

156. It would help achieve high environmental standards if SPGS were to adopt a similar approach. Given the low cost of land, a modified system could be utilised. As an example, SPGS might consider allowing up to 10% of the gross area to be set aside, and at the same time make more restrictive regulations on the protection of wetlands and riparian vegetation (SPGS already prohibits clearing closed natural forest on the site). These areas could be paid for at half the normal grant rate. Precise area measurements and records are required as part of sound management planning: this is an aspect where further assistance may be required from the Technical Services Division of NFA.

157. As Uganda should aim to achieve certification of its plantation forests, (see 7.3.8) the Forest Stewardship Council (FSC) guidelines could be a useful starting point for the initial formulation of tighter environmental standards.

7.2.5 Thinning and pruning

158. Once site capture has been achieved in a timber plantation, crop improvement is required if high quality sawlogs are to be produced. This is mainly pruning to create knot free timber and thinning to concentrate the increment on the better-formed trees that will make up the later thinnings and the final crop.

159. The first pruning, to 2 metres or thereabouts, will probably be required around age 3 to 4, when the trees are 5 to 6 metres tall. A series of pruning operations is then undertaken with progressively fewer stems being pruned as there is little value in high pruning trees that will be thinned out before age 12 to 15. Pruning must be carried out with a saw, ensuring that the branches are cut cleanly and flush with the stem to minimise damage and encourage rapid callusing over.

160. The thinning operation is more complex. The aim in most timber crops is to remove the poorer trees and those that compete with the selected final crop trees. If the final crop is to have some 300 stems per ha, these would be on average just under 6 metres apart. Thinning must be done evenly and progressively to maintain high increment, avoid burgeoning understorey growth and limit potential wind damage. Marking thinnings is a skilled operation and in some countries can only be carried out by trained personnel, even in private forests.

161. Thinning and pruning will take place in pine stands between ages 4 and 16 approximately, as shown in Table 9 below.
162. Each pruning operation takes roughly 12 days per ha and will therefore cost approximately US$ 18 assuming a daily wage of US$ 1.50, making the total direct cost of pruning US$ 72 per ha. Thinning operations should be income generating, apart from the first, which will only produce small poles and posts. Income will depend on their being a local market for such material.

163. There are a number of systems that can be used to facilitate thinning. One of the well-tested ones is to lay out a 20 metre square grid in the stand. Each block is 0.04 ha. Counting the trees in the block, it is easy to calculate how many to remove to leave the desired stocking. This system was used successfully in Malawi and Swaziland, achieving great improvement in stand evenness.

Table 9 Example of Thinning and Pruning Schedule – *Pinus caribaea*

<table>
<thead>
<tr>
<th>Operation</th>
<th>Year</th>
<th>Prune to (metres)</th>
<th>Stems pruned/ha</th>
<th>Maximum Pruning Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruning 1</td>
<td>3 to 4</td>
<td>2 m</td>
<td>1100</td>
<td>Half height</td>
</tr>
<tr>
<td>Pruning 2</td>
<td>6 to 7</td>
<td>c. 4 m</td>
<td>750</td>
<td>Half height</td>
</tr>
<tr>
<td>Pruning 3</td>
<td>9 to 10</td>
<td>c. 7 m</td>
<td>500</td>
<td>Half height</td>
</tr>
<tr>
<td>Pruning 4</td>
<td>12 to 13</td>
<td>c. 10+ m</td>
<td>350</td>
<td>2/3 height plus dead branches</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operation</th>
<th>Year</th>
<th>Stems before thinning</th>
<th>Stems removed</th>
<th>Stems after thinning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thinning 1</td>
<td>8</td>
<td>1100</td>
<td>362</td>
<td>738</td>
</tr>
<tr>
<td>Thinning 2</td>
<td>12</td>
<td>738</td>
<td>246</td>
<td>492</td>
</tr>
<tr>
<td>Thinning 3</td>
<td>16</td>
<td>492</td>
<td>162</td>
<td>330</td>
</tr>
<tr>
<td>Felling</td>
<td>22</td>
<td>330</td>
<td>330</td>
<td>0</td>
</tr>
</tbody>
</table>

164. One of the key attributes of the success of SPGS has been the close contact with planters. Once the final grant payment has been made, there will be much reduced contact. By providing training courses in thinning and pruning, and perhaps offering a marking service, SPGS could maintain this contact, albeit at a reduced level. Experience elsewhere in the world confirms that regular contact with grant-supported planters is valuable in maintaining interest and stand quality. Consideration might also be given to providing grants for pruning; this would require roughly 10% additional funds to achieve. Given the value to Uganda of high quality sawlogs, this is a small price to pay, especially considering the substantial investment being made already.

7.3 Opportunities in the medium term:

7.3.1 A strategic approach to plantation development

165. At present, four zones have been identified for timber plantation development (Section 2.2). Within each of these zones some site analysis has been carried out within Forest Reserves identified as available for plantation establishment as an aid to species selection. As far as can be ascertained, there is no further strategic plan in place.

166. Consideration is required as to how access will be secured both to the area and within it. Similarly, there does not appear to have been significant consideration of the spatial
allocation of the various lease areas and the creation of viable units for a range of investors with different needs in terms of their area.

167. In Scotland, large areas of private planting of conifers, often encouraged by the tax breaks applying at establishment, were established on private land under a policy of creating a strategic timber reserve. As the policy evolved, the Forestry Commission entered into long term supply contracts to encourage processing capacity. The private sector tended to prefer short term contracts, which allowed them to obtain higher prices albeit over short periods. Although wood prices are currently low, these plantations are increasingly vulnerable to windthrow and the government is seeking alternative measures and incentives to bring this timber to the market but it is often less readily accessible, and in generally smaller blocks, than the state plantations, exacerbating the low price obtainable.

168. In Uganda, much of the planting by the private sector will be in CFRs. This creates an opportunity to develop strategic plans geared towards efficient access and harvesting of larger blocks, which would be generally helpful to the processing industry and result in higher prices for growers.

169. In Germany, public forestry services in states such as Hesse provided overall strategic planning through engagement with private and community owners. The centralised overview of the forest resources, combined with assistance for thinning and marketing, helped to secure a more strategic approach, which also resulted in good wood prices for owners, especially as private owners’ wood was given priority in sales.

170. In Uganda there is an opportunity to avoid future problems that will accrue from simply creating an area of timber plantations without consideration of future harvesting and marketing. To do so, a strategic plan for each commercial forestry zone, into which investors can be integrated, is required. It should not of course be too prescriptive, but it is important that NFA has a clear overview of the size and quality of the resource being created and acts now to ensure that questions of access and processing development can follow as smoothly and cheaply as possible.

7.3.2 Large scale planting

171. Most countries with successful timber plantation sectors are characterised by a few very large players: for example, Australia, New Zealand, South Africa, Swaziland and South America. These large players apply high standards, engage in their own field research programmes, take innovative marketing approaches and generally lead the industry. They are also very important in attracting large-scale investment in processing, or may even forward integrate themselves. South African examples include SAPPI and MONDI; the latter has provided clonal *Eucalyptus* hybrid material to Kenya and Uganda.

172. Without the guaranteed wood supplies that large operators can provide (these can be publicly owned, as happened in UK, or private-sector) it is much more difficult to attract large and efficient processing industry. Given the current uncertainty over the success of NFA in securing funding for its strategic aim of 35,000 ha NFA plantations, it would be prudent to ensure that opportunities remain for larger private investors in the sector. Land availability in appropriate locations is the first priority in this regard.

173. Large companies can also engage usefully in outgrower schemes, for which they provide the extension service and, usually, the planting material. They also provide a market for the produce. Although such an approach is not without its dangers, particularly in
transferring market risk to the smallholders as happened in PICOP (Philippines – see case studies in FAO Forestry Paper 17), they can be very valuable.

7.3.3 Training
174. SPGS has run regular field based courses since 2003. No formal evaluation of these was carried out by the mission, but informal discussions with people who had attended SPGS courses confirmed that they are well-designed, highly appropriate and very well delivered.

175. Course materials are also of a high standard as are the SPGS information notes, which are clear, simple and easy to follow, especially as an adjunct to the training. The provision of training is a valuable additional subsidy to those who wish to avail themselves of it and should be continued. The cost of providing training such as this needs to be included in the overall cost of SPGS. As the number of planters engaged increases, there may have to be an increase in the number of staff engaged to provide this service. It is essential that the high quality achieved so far is not compromised. This has been achieved by ensuring that those responsible for course delivery are highly competent and experienced practitioners.

176. Those NFA personnel actively engaged in plantation work, at present largely through undertaking demonstration plantations, have also attended these courses. As noted earlier, (2.1), Uganda has largely lost its institutional memory on plantation techniques and NFA staff need exposure to the latest ideas and concepts. This must be more than theoretical; field trips to South Africa, for planters and NFA personnel, have provided participants with opportunity to see the techniques being applied and thus they are able to carry with them a clear image of what they are aiming to achieve. This aspect of training has been very worthwhile, as confirmed in the reports made at the Workshops for this study by people who had been on study tours.

7.3.4 Research and information
177. Forestry Research in Uganda is the responsibility of Forestry Resources Research Institute (FORRI), which is part of the National Agricultural Research Organisation. This is helpful in respect of coordination between researchers on agriculture and forestry. In recent years, most forestry research has been focused towards agroforestry and farm woodlots, since there has been little or no commercial forestry activity. This is now changing.

178. At present, silviculture is based on historical practices used in Uganda combined with more recent ideas brought from other countries, notably South Africa. It is not generally necessary to undertake research in Uganda on silvicultural treatments such as establishment and stand improvement. One exception is perhaps the land preparation system for the large areas of compacted soils that occur widely in degraded woodland areas.

179. The loss of trial plots and seed orchards has prevented Uganda benefiting from research trials laid down in the 1960s and 1970s (see paragraph 147). What is now required is some species and provenance testing of potential timber species, many of which were tried earlier but final results have never been obtained, as noted above. One very useful source is the report entitled Performance of Indigenous and Exotic Trees in Species Trials by W Kriek. There is also the personal knowledge of former chief research officers such as Peter Karani, Jim Ball and Mike Philip, which could be usefully recorded. Some trial plots

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9 See Raising the Stakes, Mayers J, J Evans and T Foy, IIED, London 2001
10 FAO report TA 2826 (1970)
may still exist in locations such as Rwoho and should be identified and protected. There are also arboretum plots at Oruha, now somewhat degraded but well known to FORRI.

180. The report on the Silvicultural Classification of Uganda (P D Hardcastle, 2003 - Annex 6) includes an initial list of species for trial in the various zones. Plots should be established based on this as a matter of priority. Some of the larger private planters may well be willing to have such trials established on their land.

181. Growth models were developed in Uganda in the 1960s and 1970s; in some cases growth data was sent to Oxford, where it should still be accessible. In 2002, FRMCP funded a consultancy to develop growth models for Pinus caribaea and Eucalyptus grandis. These have proved very valuable for planning purposes. A network of Permanent Sample Plots should now be established as a priority in NFA and private plantations to refine and improve these models. James Finlay (U) has already established a network of permanent plots in its Eucalyptus grandis plantations at 7 estates, which run from Bushenyi to Hoima.

182. If inventory plots are to be established, training in inventory techniques will be required for field crews. It will also be very important to ensure that the results are validated, computed and made available quickly.

183. The question of short-term seed supplies has already been referred to (Section 7.2.2). In the longer term, access to national supplies of seed from species/provenances/clones adapted to local conditions will be required, certainly for the widely planted species. This needs to be addressed in parallel with the testing of species and identification of potential breeding trees within the plantations now being established.

184. Linked to research is the concept of demonstration plantations. There appears to be resistance in some quarters to acceptance of SPGS recommendations on issues such as culling of nursery stock and intensive weeding during establishment. In addition to the demonstration plots based on exemplary practice already laid down, it would be helpful to lay out some simple plots to exemplify the difference between good and poor practice. This can be done in short lines planted at right angles to an access road to demonstrate points such as the importance of culling or in small blocks to show the effects of poor weeding.

7.3.5 Cooperatives

185. In the original project design, self-forming cooperatives, pooling their land resources, were identified as one of the target beneficiary groups. So far, one such group has joined SPGS. It has 22 members and some 112 ha of approved plantation.

186. It would be highly desirable for smaller landowners to be able to benefit from the scheme, but this aim has to be balanced against the difficulty of providing advice and undertaking inspections for a large number of small areas. The reduction of minimum area (now 25 ha to be established over a maximum of 3 years) may already be too accommodating in this respect.

187. The formation of cooperative groups is an area where NFA could provide assistance through its regional field offices and HQ personnel. It is only when the groups have been legally constituted that SPGS should become involved. There are many examples of structures that may be applied to voting and to cost and benefit allocation. The usual systems are to allocate costs and benefits on a pro-rata area basis, with votes either allocated under a similar system or on the basis of each member having equal voting power (the latter is the Markwald system, widespread in Europe and very ancient).

11 Yield of Eucalyptus and Caribbean Pine in Uganda – D Alder, P Drichi and D Elungar (2003) for FRMCP
7.3.6 Owners' organisations

188. In the background information provided in the Terms of Reference for the study (Annex 1), comments and suggestions given by SPGS participants at an earlier workshop are recorded. Many of these relate to the type of activity that Owners' organisations often provide, such as bulk purchase of materials and leased machinery.

189. In countries such as Sweden and Finland, the bulk of the productive forest is in relatively small, privately owned land holdings (50 to 100 ha being the norm). Owner associations in these countries deliver a wide range of support services including management and marketing.

190. It appears that without some outside assistance plantation owners' organisations may not develop, although there is a long tradition of relevant groups such as the sawmillers' and pitsawyers forming associations in Uganda. These have not, however, had an unchequered history, and it would be helpful for SPGS/FRMCP/NFA to assist in the formation of such a group or groups of owners for the new plantations.

191. In addition to the supply side benefits, owners will benefit from an organisation that is able to provide advocacy on their behalf. SPGS and NFA will benefit from having a channel through which advice and information can be delivered and through which opinion can be sounded. The scope and location of training events is one example of the use that SPGS might make of such a connection.

7.3.7 Sawmilling efficiency

192. The sawmilling sector in Uganda at present is notoriously inefficient and largely based on inappropriate, mobile technology. The very adverse effect this has on sawlog prices is illustrated in Table 10 below. Annex 3 contains more detailed information on the assumptions underlying the imputed standing sawlog prices shown in the Table. At the conversion rates currently common in Uganda, (20 to 25%) the prices that would be received for sawlogs are only one-third of those that would be paid if sawmills achieved conversion rates that are routine elsewhere. The figures in bold in Table 10 indicate the timber retail price and sawmill efficiency combinations that would result in a standing timber price of around US$ 15/m³ or better.

193. As well as the conversion efficiency from logs to sawn timber, use of residues for other markets is critical for processing profitability. The present practice of leaving large heaps of sawdust at the conversion site represents a waste of valuable material. In other countries, efficient processing industries aim to utilise all material transported for products and energy production. This should be the goal for Uganda, too.

194. The latest timber price information available to the team was for February 2005. This indicated that 4 by 2 inch and 6 by 2 inch cross section material is selling at US$ 220 per m³ while 12 by 1 inch cross section material is retailing at US$ 350 per m³ in Kampala.

195. These prices are well above the cost at which large volumes of timber purchased on the international market could be available. At present, the market has artificially high prices because of protection due to a lack of competitive material. When such material does become available, the first impact is likely to be excess profit for the supplier, followed by prices dropping as supplies and competition increase.

196. The inflated timber price allows inefficiencies in processing to continue. More realistic prices would force sawmillers to be more efficient. An EXCEL file (Uganda Timber Prices.xls)
has been provided, which allows price trends to be determined from quarterly price information.

197. It is recommended that the quarterly price survey, publicised in the NFA Newsletter, be improved by ensuring that information on the key cross sections and species is collected each quarter. Figure 6 below shows the pine timber price trend since August 2002.

### Table 10 Imputed Standing Value of Sawlogs (US$ / m³)

<table>
<thead>
<tr>
<th>Retail Timber Value in Kampala</th>
<th>150</th>
<th>140</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesale Timber Value in Kampala</td>
<td>113</td>
<td>105</td>
<td>90</td>
</tr>
<tr>
<td>Standing value if conversion efficiency is:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50%</td>
<td>29.00</td>
<td>25.25</td>
<td>17.75</td>
</tr>
<tr>
<td>45%</td>
<td>25.10</td>
<td>21.73</td>
<td>14.98</td>
</tr>
<tr>
<td>40%</td>
<td>21.10</td>
<td>18.20</td>
<td>12.20</td>
</tr>
<tr>
<td>35%</td>
<td>17.30</td>
<td>14.68</td>
<td>9.43</td>
</tr>
<tr>
<td>30%</td>
<td>13.40</td>
<td>11.15</td>
<td>6.65</td>
</tr>
<tr>
<td>25%</td>
<td>9.50</td>
<td>7.63</td>
<td>3.88</td>
</tr>
<tr>
<td>20%</td>
<td>5.60</td>
<td>4.10</td>
<td>1.10</td>
</tr>
</tbody>
</table>

### Figure 6 Pine Timber Price Trend – US$/m³ Retail
198. The ultimate success of SPGS will be very dependent on the processing industry investing in technology and skills that improve conversion efficiency towards international norms and thereby becoming able to pay fair prices. Some action may be required by NFA and Government to ensure that this comes about; for example, only selling logs to prequalified bidders with a proven history of efficient working.

### 7.3.8 Certification

199. It is unlikely that, in the foreseeable future, Uganda will supply sawn timber into markets where certification is required. A more likely scenario is where outside donors and/or investors fund projects such as building construction where certified timber is specified.

200. The value of certification to Uganda, however, is more likely to be in the development of the high field-standards – technical, environmental and social – that certification requires. There are indications that the current restriction on forest conversion incorporated into FSC rules may be relaxed, as plantations are more widely recognised as an important component of forest conservation. This would clarify the position in a number of Forest Reserves in Uganda, where it is debatable whether the forest is sufficiently degraded to avoid plantations established in them to be excluded from certification.

201. It would be worthwhile determining the size of the gap between current practices and those required by a certification system such as FSC. This would allow standards to be changed and improved at an early date. A short field visit undertaken by an approved certifier from, for example, South Africa, would provide a useful baseline.

202. The key element of certification is that it is a participatory system, which has to engage all stakeholders in the process of developing national standards. The danger is that the picture may become clouded by those who have particular interests. These may be industry people who resent the possible additional cost burden or people who believe that all forestry planting should be based only on indigenous species.

203. The range of interests and opinion will have to be resolved by discussion and negotiation and this can be a long-process. Nevertheless, it would be worth beginning to explore the requirements soon, but not allowing it to delay the much needed planting.

### 7.4 Value of an extension of the programme for 2/3 years

204. In terms of SPGS, there is an impressive momentum built up with very effective demonstration plantations of pine and a substantial area of private plantations established to a high standard.

205. It is important that this momentum is not lost. In the longer term, the possibility of a further project appears attractive. This would allow consolidation of the plantation base and also provide support for the improvement of those areas already established. It would also provide continuity for support to inventory, development of national seed supplies for timber species and facilitate the diversification of plantations into the faster growing, but more risky, *Eucalyptus grandis* for timber.

206. As the preparation, consideration and implementation of a successor programme will take several years to come to fruition, there appears to be a strong case to provide bridging support for 2 to 3 years after the current programme is due to finish in 2006 through an extension of SPGS.
7.5 Further support options

207. It would appear that there is strong potential for the current grant support delivered with EU funding through SPGS to be ultimately taken over by simple changes to the taxation system, making investment in timber plantations an attractive financial investment. The cost of providing support at the current level (US$ 350/ha) for 70,000 ha is however very substantial – US$ 24,500,000 – to which would need to be added management and administration costs.

208. It must be emphasised that if an area of 70,000 ha were to be established in this way, there would also be a similar amount of investment by the growers themselves. In total, the overall investment would be likely to be in excess of US$ 70 million when management costs and interest payments are included.

209. Having established an effective system of support, there should be opportunities for other donors to provide funds, which could then be used in a similar manner. The key elements in the process must be transparency in funding decisions and the achievement of high operational standards.

210. One point that was raised at the closing Workshop on 22 July was the use of carbon funds to support plantation development. This is a complex issue. In 2001, the Uganda Forestry Sector Support Project commissioned a review of the potential of carbon funds to support delivery of forest policy in Uganda. Since then, the carbon market has evolved and increased in complexity. It continues to do so with rapidity.

211. There are three basic sources of carbon funds. The first is the speculative market, where investors are providing funds in the expectation of being able to trade them in the future. The second is the voluntary market, where companies are aiming to be carbon neutral as part of a wider corporate social responsibility strategy. The third is the more formal market under Kyoto.

212. This last is complex and usually operates on a project-by-project basis. One option would be for Uganda to undertake a “national forestry carbon umbrella project”, which would have the benefit of reducing the rather high transaction costs involved when carbon funds are sought on a project-by-project basis.

213. In respect of timber plantations, the rules for Kyoto are that the project should be commercially non-viable without the carbon funding. This could be a difficult case to argue for commercial investors, especially when there is grant support under SPGS. It could, however, be pursued as an adjunct to the SPGS, with carbon funds replacing the grants.

214. Examples of interventions where Kyoto carbon money might be accessed to support timber plantations would be on particular sites with local constraints that incur higher than normal costs. Another possibility may be the engagement of local community groups, who would have difficulty accessing funds for their part of the investment and are also incurring opportunity costs from locking up their land.

215. An attractive alternative would be to utilise carbon money to support a grant scheme that rehabilitates and then protects natural forests on private land. Given the importance of riparian forests in Uganda as corridors linking the core forest reserves, and thus their high importance for biodiversity conservation as well as for water quality, this is worthy of investigation.

216. In view of the complexities, it would seem prudent for FRMCP to commission an expert study on carbon funding. This would require 2 to 3 weeks of input and cost between € 12,000 and €20,000. It would be very helpful in identifying the potential of carbon funds to both

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12 The Potential of Carbon Management to assist in the Achievement of Uganda’s Forest Policy – R Tipper, ECCM
plantation development and natural forest conservation and would assist in framing any future extension of the current programme as well as informing the development of a possible successor programme.

217. Unlike timber plantations, where “Kick-start” grants can be phased out and replaced with an equitable system of taxation, support for natural forest will require indefinite payments. Such payments could be generated through a trust fund, for which provision is already incorporated in the National Forestry and Tree Planting Act (Act 8 of 2003). There are many potential sources of capital for such a fund, including international donors and NGOs such as Conservation International, as well as possible carbon funding.

218. The main “selling points” for sponsorship of a fund to support natural forest conservation will be the uniqueness of Uganda’s biodiversity, the high conservation return from limited investment in riparian forest and the possible positive impact on poverty. In addition, SPGS has shown that private individuals are willing to engage in long-term activities such as forestry if they are given the right type of support.
Chapter 8 Conclusions and Recommendations

219. Analysis of the silvicultural potential, land availability, demand for sawntimber and the price of alternative supplies (3.3) confirms that Uganda should develop timber plantations. By doing so, there will be national economic benefits in terms of the creation of a profitable industry (3.3), employment (3.4) and foreign exchange savings (3.5). These benefits require investment and efficiency in growing and processing of the resource (3.6). Dedicated timber plantations also have value in securing conservation benefits, through reducing pressure on timber supplies from natural forests (3.1).

220. The remaining timber plantation area in Uganda, estimated at around 2,000 ha, will be exhausted in 3 to 5 years. Some of this area was rather poorly established and the projected potential yield is likely to be sub-optimal (Section 2.1). These plantations, despite their limited extent, represent a valuable source of sawn timber and of genetic material. Cuttings from selected trees can be grafted onto 12 to 18 month old rootstock plants in large plots and also conserved in a clone bank.

Recommendation 1
Uganda’s remaining plantation resource should be assessed for its production potential. At the same time, seed areas and potential breeding trees should be identified and conserved.

221. One implication of the limited plantation area now remaining is that a substantial area of short rotation sawlog production is required to meet domestic demand. This should be based around Eucalyptus grandis. Given that the silviculture and processing of Eucalyptus grandis for timber is more challenging than with Pinus caribaea, effective demonstration and related support will be needed.

222. The growth of E grandis in the hotter zones, such as Hoima district, shows early stagnation. E grandis sawlog plantations should be in the cooler and wetter areas such as Kyenjojo and Kabarole. Provided silviculture is of a high standard, the productivity and potential returns are adequate to compensate for the risks involved (in 4.1).

Recommendation 2
FRMCP should start encouraging sawlog plantations based on Eucalyptus grandis by establishing demonstration areas in selected, favourable sites.

223. Detailed examination of the potential returns to investors (Chapter 6) confirms that whilst potentially attractive, the long time horizon and the risks, together with the lack of an established plantation sector, requires there to be a “Kick-start” mechanism, as used in many other countries facing a similar situation (4.2). Payment of an establishment grant is the main approach adopted elsewhere. The level of grant being paid in Uganda (50% of the estimated establishment cost) has the effect of raising the IRR of the investment by around 4% for both pine and Eucalyptus). This is a significant attractant to investors. SPGS has been very effective in attracting interest and supporting private plantations at a high standard (2.3). The indication is that the grant has been set at the correct level.

224. NFA is aiming to establish half of the target area of 60,000 to 70,000 ha directly. However, the finance for this has not yet been secured and may prove difficult to obtain (2.2). Consequently, the private sector may be the vehicle for establishment of the bulk of target plantation area. If NFA does undertake significant plantation establishment, it is essential that a level playing field is maintained vis-à-vis the private sector.
225. There would be strong benefits from a more strategic approach to plantation development in CFRs (7.1.1 and 7.2.1). This approach should address the needs of both public and private sectors and build on the potential complementary strengths of each sector.

**Recommendation 3**

*A strategic review of plantation development in Central Forest Reserves is required to accommodate NFA strategic aims and encourage maximum private sector interest to optimise the economic benefit to Uganda, including re-examination of lease conditions to ensure they are fair and support plantation development.*

226. A strategic approach to plantation establishment in CFRs is linked to a raft of other measures that are required to support private sector investment in commercial plantations (7.2). Lease sizes, rental payments and transferability are all issues that would benefit from review. Other measures relate to securing short-term and long-term seed supplies (7.2.2, 7.3.4) improving knowledge of growth patterns and testing of alternative species to widen the range of potential species for timber plantations and refine species-site matching.

**Recommendation 4**

*A network of Permanent Sample Plots should be established in public and private timber plantations to improve knowledge of growth patterns. Concurrently, experimental plantings of alternative species should be made covering the full range of silvicultural zones.*

227. Entrants to SPGS are predominantly Ugandan rather than international investors. Although there is some evidence of international interest, this remains small compared with major timber plantation countries. Established foreign timber plantation businesses have much to offer, particularly technical knowledge and experience, marketing contacts, and investment funds. They will only come to Uganda if a specific effort is made to attract them to Uganda in preference to alternative locations.

228. There is only one community group so far engaged (Kamusenene Memorial Rural Development). The SPGS requirements for minimum size of plantation and minimum annual planting area have been reduced, but further actions may be required to secure more community-level engagement. It has to be recognised that the aim of SPGS is commercial scale planting and that the transaction costs of dealing with individual small-holders would be more than can be accommodated. There may be possibilities for outgrower schemes based around larger commercial investors (7.3.5). More community level engagement would probably be helpful in securing donor interest, as it has a clear poverty alleviation link.

**Recommendation 5**

*SPGS should encourage the formation of community groups that can benefit from the scheme without requiring changes to the SPGS restrictions already in place.*

229. At present, SPGS participants provide funds from their own sources, generally generated from other business interests. There are possibilities of carbon funding although this is complex to access and may incur high costs (7.5).

230. The standards being achieved through SPGS are high, but there is scope for more specific positive environmental benefits. In common with other schemes around the world, protection of water courses and blocks of natural forest could be accommodated by allowing up to 10 or 15% of the area paid for to remain unplanted, perhaps at a lower rate (7.2.4).
Developing standards fully congruent with those for internationally recognised certification would be useful in this regard (7.3.8).

**Recommendation 6**

*SPGS standards should be consistent with those required for certification. Consideration should be given to paying some of the grant for high value conservation areas such as riparian strips and wetlands left unplanted over up to 10% of the gross area.*

231. One disadvantage of there being no large external investor is that SPGS participants appear to be very dependent on the Scheme for support and advocacy of their requirements (see for example to comments in the background to the Terms of Reference in Annex 1). There is scope for SPGS to provide assistance to the formation of Commercial Tree Planter groups who could deliver useful services to their members in terms of planning, operational cost savings and marketing as well as advocacy (7.3.6). Insurance against risks, especially fire, could also be channelled through such an organisation (7.2.3).

**Recommendation 7**

*Through contact with individual planters, NFA/FRMCP should assist in the formation of Owners’ organisations that are transparent, fully representative and deliver useful benefits to owners while improving the efficiency of the private timber plantation sector.*

232. While a grant scheme such as SPGS is valuable, it is best used as a “Kick-start” mechanism and should not be needed for purely commercial businesses in the longer term.

233. An important part of the investment profile of timber plantations is the taxation system. This should as far as possible be neutral to create a level playing field. In Uganda, forestry has no special treatment; this results in plantations being more heavily taxed than other investments with a similar profitability (5.1). The main reason is the unique cashflow pattern of timber plantations, with a long period between incurring costs and receiving revenues (Figure 2 and Figure 3).

234. Even if cost records are kept for a rotation to allow them to be offset against revenue, inflation will have reduced the benefit to a negligible level. In addition, the receipts from harvesting, obtained after 20 or more years, are taxed as an annual income. Based on international precedents, four options are available. The first two, allowing forestry costs to be offset against income from other sources or taxing plantations at a lower rate, are undesirable as they create uncertainty within the national taxation system and favour the very wealthy.

235. Exempting forestry revenue from tax altogether is simple and clear, but does not provide any mechanism for the forestry authorities to continue to influence the management of the plantations. The final option is to allow the costs of re-establishing the following timber plantation crop to be offset against revenue from the previous one. This has the advantage of maintaining the plantation base and providing leverage to control quality. It is possible for larger owners to achieve this under existing rules by staggering the timing of the fellings. A more formal system would extend this benefit to all growers, including the smaller ones, and thus have positive social impact.

236. The two options described in the previous paragraph have an almost identical impact on IRR, raising it by some 2% above the base case. It can thus replace the grant for the second and subsequent rotations. It is therefore a means of obtaining sustainability and
obviating dependence on outside support while at the same time putting plantations on a level playing field with other land use businesses.

237. Whichever option is chosen, it is important that the taxation position is clarified. It is a question that has already been raised by planters, as noted in the Terms of Reference (Annex 1). The only other inconsistency appears to be that of VAT on non-zero-rated items, which cannot be claimed back by non-VAT Registered organisations.

**Recommendation 8**

_The system by which future tax liabilities will be assessed must be clarified. To create a level playing field with other sectors, consideration should be given to allowing second and subsequent rotation establishment costs to be offset against the revenue from the preceding rotation. Alternatively, forestry revenue should be exempted from taxation._

238. The returns on investment in sawlog plantations are very dependent on the price obtained for the sawlogs (Table 13). This is a resultant of both the price of alternatives and the efficiency of the processing sector (7.3.7). Timber price information and monitoring of processing efficiency are both important to all players in the timber plantation sector.

**Recommendation 9**

_The timber price survey should be completed every quarter with particular attention to ensuring that prices are obtained for the same cross sections each time. Sawmill efficiency should be monitored as an aid to setting reserve prices in timber auctions and a guide to future development assistance._

239. Overall, SPGS has made an impressive start in engendering private interest in establishing timber plantations. It is important that this impetus is not lost. As well as continued funding, there is need to continue engagement with the planters. One mechanism for doing this would be through owners’ organisations (7.3.6). In addition, as the plantations will require pruning and thinning to produce high quality material, there is scope for extending grant payments and other support to these activities (7.2.5). Training and information are also valuable for maintaining engagement (7.3.3).

**Recommendation 10**

 _Consideration should be given to a grant for thinning and pruning plantations, and to provision of assistance with marking thinnings. Training events and provision of information for tree planters should continue, maintaining current high standards and evolution._

240. Extension of the SPGS could also provide opportunity to include community groups more widely. It could also be utilised to extend financial support to natural forest on private land, which contributes to benefits for wider society. Perhaps the most important natural forests currently unprotected are riparian strips. Such forest has very high conservation and hydrological value (7.5).
Recommendation 11

NFA/FRMCP should investigate the scope for providing grants to support protection of riparian forests on private lands, concentrating on key locations. Concurrently, mechanisms for providing grant support should be investigated

241. Any extension of the current programme, or consideration of a new phase, will have to consider casting a wide net for funding, which should include the carbon market and the market for ecological services. Some actions can be undertaken now to assist with identification of these.

Recommendation 12

Carbon and other funding options for the future should be investigated, with international expertise if required, to identify a wider range of possible support for future funding of SPGS and extensions
Annex 1 Terms of Reference

STUDY AIMED AT IMPROVING THE INVESTMENT ENVIRONMENT FOR PRIVATE SECTOR PLANTATION FORESTRY DEVELOPMENT IN UGANDA.

TERMS OF REFERENCE

INTRODUCTION AND SUMMARY

There is a large and very worrying imbalance looming between supply and demand of sawlogs in Uganda. Within 10 years, the situation is likely to become serious as the mature plantations will have been harvested and there is a 10-15 year gap in supply: a situation brought on by virtually no replanting (by the state or private sector) for 20 years. The country’s remaining natural high forests cannot sustain a high production of sawtimber and the likelihood of imports from neighbouring countries cannot be relied on. Hence Uganda must establish substantial areas of timber plantations quickly.

The EU-funded Forest Resources Management and Conservation Programme (FRMCP) recognised this scenario and started establishing demonstration plantations in strategic Central Forest Reserves (CFRs) from 2002 onwards. To date around 1,500 ha have been planted. The National Forest Authority (NFA), which was set up in 2004, has set itself a provisional target of planting 25,000ha over a 10-year period and is assuming that the private sector will plant a similar area.\(^{13}\)

There is plentiful land available in Uganda where timber plantations will produce excellent yields – both within CFRs (which can be leased by private planters) and on private land. The private sector only seriously started planting in 2003 – and this accelerated in 2004 with the launching of the FRMCP’s Sawlog Production Grant Scheme (SPGS), which offers grants to private planters to offset 50% of establishment costs.

Although the SPGS has created great interest in commercial tree planting in Uganda, it is becoming clear that many of these private planters are not planning ahead sufficiently. Many have grossly underestimated the level of investment (and commitment) required to establish high yielding timber plantations. The more serious long-term investors are still not willing to commit themselves to plantations as the investment environment in forestry in Uganda does not offer incentives that other sectors do: a recent oil palm development is a case in point.

It should be a major concern to both the Government of Uganda (GoU) and donors that forestry investment does not receive any favourable investment status – despite the importance of forests to every Ugandan and the huge biodiversity in its remaining natural

\(^{13}\) The best available data predicts that Uganda requires some 50,000ha of plantations to meet the country’s timber requirement.
forests. Timber plantations will not only provide the raw material to support the country’s economic development but also will compensate to a large extent for the timber ‘locked’ in the protected natural forests.

The main area of concern to private tree planters is the fiscal framework. The critical point is the long time period between initial investment and maturity (even in Uganda rotations for a timber crop might be 25 years or more), during which inflation occurs and opportunity costs are incurred. The standard systems of for example, capital allowances, may not be relevant to a company that has occurred only expenditure and hence has no liability against which to offset the capital expenditure.

The study outlined here is to address these issues. It is suggested that the consultancy team (hereafter referred to as the Team) compiles information on the current fiscal framework that effects forestry in Uganda, and highlights the key issues to be addressed. It is expected that the Team will carry out an analytical review, using selected case studies from other countries. The main output of the study is a specific set of recommendations for Uganda that is likely to attract more serious private investors in timber plantations.

**BACKGROUND**

1. **FRMCP**
   The FRMCP’s purpose is to “improve forest management for conservation of biodiversity and increased sustainable production with a focus on the poor”. Clearly the bulk of ‘sustainable production’ needed to support Uganda’s demand for timber, will have to come from plantations grown primarily for timber production. The current timber supply situation in Uganda is extremely worrying, with less than 3,000ha of mature (mostly softwood) plantations remaining and virtually no replanting carried out over the last 20-25 years, until the FRMCP started in 2002/03.

2. **SPGS**
   Since the National Forestry Authority (NFA) started operating in mid-2004, the FRMCP has been incorporated into the new organisation, with the exception of the Sawlog Production Grant Scheme (SPGS), which is run separately and has its own Work Programme 14. The proposed study will focus on the FRMCP’s plantation development initiatives and in particular, the support to private sector planting under the SPGS.
   
   The SPGS - which has a total budget of €1.92M (ca.Ushs4.2B) - had a long gestation period, starting with a Stakeholders’ meeting in mid-2002. A number of bureaucratic hurdles had to be overcome, however, ending up with the FRMCP

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14 There still is a close link, however, between the SPGS and the NFA – as the NFA’s ED is the FRMCP’s Programme Supervisor and the NFA Director, Field Operations is the FRMCP’s Programme Manager. Day to day supervision is through the SPGS Administrator (funded directly from the SPGS) and the FRMCP’s Chief Technical Advisor.
managing the fund itself, under the guidance of a Steering Committee. The SPGS became fully operational only in 2004, although grants are now being paid to those investors who started planting late 2003 - provided they comply with the required standards.

The SPGS offers subsidies to private sector planters, in the form of a retrospective grant of UShs 600,000 per ha, paid in two or three instalments over the establishment period. Money is only dispersed after a satisfactory report from a field inspection by one of the two Technical Advisors attached to the FRMCP/SPGS. Reasonably high standards have been set: the contracts investors sign up to in the SPGS specifies certain species and seed origins, as well as minimum standards of weeding and survival after planting.

The delays in starting the SPGS were perhaps inevitable but the positive side is that it appears to have resulted in a project which is very focussed on achieving results. Despite the delays in starting, the SPGS is likely to be over-subscribed soon in 2005 (though of course, some of the current planters under contract will not make their targets). The first payments were made late 2004 and to date (Feb ’05) Ushs150M has been paid out under the SPGS, covering 500ha of new plantations.

Despite the promising start made by the SPGS and the high level of interest in tree planting from the private sector, there is a major concern that needs to be addressed to ensure the long-term needs of investors in forestry. It is clear from the virtually all the private investors to date, that they have not properly planned or budgeted for the long-term investment that growing sawlogs requires. There is a real possibility of investors soon becoming disillusioned as they begin to realise the full cost implications of their ventures. Questions are already being asked about their tax status and what happens when they harvest their trees. If private planters are hit with a huge tax bill at time of harvest they are unlikely to plough some money back into the next rotation.

Through a combination of their own experience, site visits from the Technical Advisors, the SPGS/NFA training courses and a series of Plantation Guidelines being published, planters are becoming more aware and are only now starting to ask the sort of questions that they really should have asked before starting. The last meeting of the SPGS clients (Jan ’05) proved to be something of a watershed, as investors for the first time admitted they had underestimated what was involved in commercial tree planting. Some important questions were also raised, most notably:

- What rotation lengths and timber yields can we expect?
- Why can’t the SPGS buy machinery (bulldozers, graders etc.) that can be hired out to clients?
- Can the SPGS bulk buy herbicide (and maybe other equipment too) on behalf of clients?
➢ Can the SPGS not subsidise seedlings similar to the Government of Uganda (GoU) do with some agricultural crops (e.g. cotton, coffee, tea)?

➢ Why are they being charged VAT on tree seedlings from NFA’s nurseries?

➢ What is our tax liability when we harvest our crops?

➢ What concessions can we claim against capital expenditure incurred during the establishment of our plantations?

The proposed study is not expected to provide answers to all these questions but should focus on identifying the areas that are critical for ensuring that serious private investors are attracted into plantation development in Uganda. The Team will focus on the fiscal framework and other likely investment incentives, having carried out a thorough study of the situation in other sectors and other countries. For the plantation development to be successful in the long-term in Uganda, some of the current investors (or those to come) must make reasonable returns on their investments and be happy to replant their crops after the first rotation.

3. ALTERNATIVE INVESTMENTS

Providing incentives to private investors in the forest sector hardly appears on the GoU’s radar screen at present. Interestingly, however, GoU have given significant concessions to investors in other long-term crops – most notably an oil-palm development in Ssesse Islands. It will be important for the Team to investigate this (and similar cases) and see whether there are opportunities for forestry to receive similar treatment.

The Uganda Investment Authority (UIA) have published Guidelines for Investors in Forestry in Uganda but these do not address the real needs of potential investors in the sector. The Team will be expected, however, to work closely with UIA during their study to ensure that any recommendations made will be acceptable to them. The Team will provide key chapters for a revision of these Guidelines, which will be carried out by the FRMCP and UIA following the current study.

4. OTHER

The SPGS funded a small, local consultancy late 2004/early 2005 entitled “Reducing the Uncertainty for Forest Investors in Uganda”. This study aimed at identifying key constraints (and opportunities) along the timber value chain and also looked at theoretical timber demand predictions. A lack of financial planning was highlighted as the most frequent cause of business failure in the sector. Access to

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15 Available on-line – see www.ugandainvest.com/

16 Study was carried out by Mr. Kay Kallweit (Unique Forestry Consultants) for the SPGS.
working capital was a significant concern also, with very high interest rates working against a long-term venture like forestry.

**DESCRIPTION OF ASSIGNMENT**

5. **BENEFICIARIES**

The principle beneficiaries of this study will be private sector investors in the sector having increased confidence that by investing in timber plantations in Uganda, they will make a healthy return on their investments. A healthy private investment will benefit the GoU’s goals aimed at poverty reduction. A vibrant plantation forestry business will provide not only major rural employment but also many training and small business opportunities associated with wood products.

6. **OBJECTIVES**

The overall objective of the study is to make constructive recommendations to improve the environment for private investors in plantation forestry in Uganda. The study should identify key factors that currently act as disincentives to the more serious, long-term investors and suggest the methods most likely to gain GoU (and donor) support. Fiscal issues, in particular, should be reviewed and – with reference to case histories from other countries – likely options should be presented for Uganda.

7. **KEY DOCUMENTS**

The main documents that the Team will need to digest are as follows:

**General Background to Sector:**

- Forest Sector Review (MWLE, 2001).
- The National Forest Plan (MWLE, 2002).
- Uganda Investment Authority’s *Investing in Uganda’s Forestry Industry* (date?) – see footnote on previous page.
- The Private Sector in Uganda – Opportunities for Greater Involvement. A study carried out by Paul Jacovelli & John Carvalho for UFSCS (MWLE) as part of the Forest Sector Review.

**FRMCP:**

- FRMCP Annual Reports - 2002/03 and 03/04.
- Investment Models for Uganda Plantations: Consultancy carried out by Pat Hardcastle (2003).
SPGS:

- Financing Private Sector Forestry Development in Uganda – the Forest Fund. A Consultancy carried out by Cornelius Kazoora & Geoff Tyler for UFSCS (MWLE) – carried out prior to FRMCP starting (2001).

All the above documents will be made available for the Team when they mobilise. Most are available digitally and could be emailed prior to mobilisation on request.

8. EXPECTED RESULTS

The key outputs of this study are expected to be as follows:

- A main report with a one page executive summary, as well a summary of the Team’s main findings and recommendations. The report should not exceed 50 pages of text (excluding Annexes).
- The report must include a clear plan for raising the profile of forestry within GoU (and main donors) circles.
- The format of the report should be such that key sections of it (e.g. Investment Incentives) could be incorporated into a revision of UIA’s Investor Guidelines\(^\text{17}\).
- The report should include brief reviews of the incentives and fiscal framework for forestry in other countries and with clear indications as to which scenarios are likely to gain acceptance in Uganda.
- The Team will be expected to present a case for forestry investment at a Plantation Workshop to be organised near the end of the Team’s study.

9. EXPERTISE REQUIRED

The Consultancy Team should consist of three members: two Senior Experts – both recognised experts in their fields and qualified to higher degree level – and a local consultant. The Senior Experts will be international consultants since the work involves calling on considerable experience from other countries.

One Senior Expert should possess the following skills and experience:

- Forestry Plantation specialist with at least 20 years experience of working with tropical and/or sub-tropical plantation forestry, at good proportion of which must have been gained in a commercial environment.
- A good knowledge of the plantation forestry business cycle and factors that influence the investment decision (e.g. yields; markets; risks etc.).

\(^{17}\) The FRMCP are planning to publish revised “Guidelines for Forestry Investment in Uganda” later in 2005 – in conjunction with UIA and following the Final Report from this study.
A proven track record of carrying out similar studies elsewhere.

The other Senior Expert is expected to possess the following profile:

- Forest Economics specialist, with at least 20 years experience in a company or organisation (or proven success with international consulting).
- Experience with subsidies, grants or loans for plantation forestry.
- Experience with tools for aiding the investment decision – including modelling for different scenarios, with various rates of returns.

A Local Expert will make up the third member of the Team and will have the following skills:

- Minimum 15 years experience with private sector investment in Uganda, preferably within the natural resources arena (but not necessarily forestry).
- Contacts in GoU and private sector business.
- Good working knowledge of GoU’s administrative set up.
- Knowledge of GoU’s regulations and initiatives with regard to incentives to investors.

The local consultant will most likely be a Ugandan national and will be selected by the FRMCP/SPGS to work alongside the two International TAs. The two Senior Experts do not necessarily have to have worked in Uganda but obviously experience in the region would be an advantage to the Team. Prior to mobilising, the proposed Team must nominate who will be the Team Leader amongst the two Senior Experts for the mission.

LOCATION & DURATION

10. TIMING
   The Team will be expected to mobilise in Uganda as soon as possible – but no later than June 2005.

11. DURATION
   It is expected that the Senior Experts will spend at least 30 days (combined) in country and a further 10 days gathering information and report writing. The local Expert will be expected to work for around 10 days with the Team, whilst in Uganda.

12. ADMIN. MATTERS & PROGRAMME
   The SPGS Administrator, Allan Amumpe, and FRMCP Chief Technical Adviser, Paul Jacovelli, will be the main contacts for the Team and will assist with
administrative matters. Secretarial services (inc. typing, scanning, phone, fax and email facilities) will be made available for the Team. Office space will also be provided for the Team: the consultants are advised to bring their own laptops, however. Recommended Kampala hotels (or self-catering apartments) can be booked on request too but payment will be the responsibility of the consultants.

Local transport will be provided – including to and from Entebbe airport and from the hotel in Kampala to the SPGS’s office. Transport will also be provided by the SPGS for any field trips that might be taken during the study. The SPGS will also bear the full cost of the Plantation Workshop mentioned in Section 8.

Briefings will be organised with officials in EC Delegation and SPGS Steering Committee at the beginning and end of the teams’ time in Uganda. The local consultant will be expected to arrange meetings with the key people/organisations, assisted where necessary by the SPGS team. Amongst those considered important to establish contact with are:

- Uganda Investment Authority (UIA).
- Relevant GoU Ministries – MWLE, MoFPED, MoAg, Min of Local Govt.
- Key donors (EU Delegation, DFID, NORAD)
- NFA senior staff (and Board Chairman?).
- Private Sector Foundation.
- Plus others to be identified.

Meetings - including site visit(s) - will also be organised with a selection of some private investors: these will be arranged in conjunction with the SPGS management team once the Team is mobilised in country.

**REPORTING & FEEDBACK**

The Team Leader will be expected to leave behind a Summary of Key Findings and Recommendations (max. 3 pages) prior to the Senior Experts leaving the country. The Team Leader will be responsible for producing a draft report (refer Section 8) within 14 days of the Senior Experts leaving Uganda. The Final Report should also incorporate issues that emerged from the Workshop to be held. The SPGS will comment on the draft within 10 days and then the Final Report will be due after a further 10 days. Digital copies are acceptable – provided the files are compatible with MS Office XP: the Final Report will be printed and bound by the SPGS in Kampala.

Contact details as follows: Allan Amumpe – tel. + 256 77 590 943; email alliana@nfa.org.ug
Paul Jacovelli – tel. + 256 77 312 769; email pauli@nfa.org.ug
### Annex 2  List of Persons Met

<table>
<thead>
<tr>
<th>Title</th>
<th>Forename</th>
<th>Surname</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Uganda Government</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hon Dr</td>
<td>Ezra</td>
<td>Suruma</td>
<td>Minister of Finance, Planning and Economic Development</td>
</tr>
<tr>
<td>Mr</td>
<td>Bwango</td>
<td>Apuuli</td>
<td>Acting Director of Lands and Environment</td>
</tr>
<tr>
<td>Mr</td>
<td>Eliphaz</td>
<td>Bazira</td>
<td>MWLE</td>
</tr>
<tr>
<td>Mr</td>
<td>Charles</td>
<td>Byaruhanga</td>
<td>Forest Inspection Division, MWLE</td>
</tr>
<tr>
<td>Mr</td>
<td>Deo</td>
<td>Kamweya</td>
<td>NAO, Ministry of Finance</td>
</tr>
<tr>
<td>Mrs</td>
<td>Jacqueline</td>
<td>Kobusingye</td>
<td>Commissioner Domestic Taxes, Uganda Revenue Authority</td>
</tr>
<tr>
<td>Mr</td>
<td>Malinga,</td>
<td></td>
<td>Commissioner Customs and Excise</td>
</tr>
<tr>
<td>Mr</td>
<td>Ngabirano,</td>
<td></td>
<td>UCDA</td>
</tr>
<tr>
<td>Mr</td>
<td>John</td>
<td>Walala</td>
<td>Acting Commissioner General, Uganda Revenue Authority</td>
</tr>
<tr>
<td>Mr</td>
<td>James</td>
<td>Wokadala</td>
<td>Assistant Commissioner, Ministry of Finance</td>
</tr>
<tr>
<td><strong>Uganda Investment Authority</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr</td>
<td>Lawrence</td>
<td>Byensi</td>
<td>Director Facilitation Division, UIA</td>
</tr>
<tr>
<td>Mrs</td>
<td>Kigozi</td>
<td></td>
<td>Executive Director, Investment Authority</td>
</tr>
<tr>
<td>Mr</td>
<td>Godfrey</td>
<td>Ssemakula</td>
<td>UIA</td>
</tr>
<tr>
<td><strong>Uganda Revenue Authority</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr</td>
<td>Frank</td>
<td>Ssekaway</td>
<td>URA</td>
</tr>
<tr>
<td><strong>International Organisations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr</td>
<td>Reint</td>
<td>Bakema</td>
<td>EC Delegation in Uganda</td>
</tr>
<tr>
<td>Ms</td>
<td>Margaret</td>
<td>Kasekende</td>
<td>EC Delegation in Uganda</td>
</tr>
<tr>
<td>Mr</td>
<td>Charles</td>
<td>Owach</td>
<td>FAO office Uganda</td>
</tr>
<tr>
<td>Mr</td>
<td>Jody</td>
<td>Stallings</td>
<td>USAID office Uganda</td>
</tr>
<tr>
<td><strong>National Forestry Authority</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mr</td>
<td>Alan</td>
<td>Amumpe</td>
<td>SPGS</td>
</tr>
<tr>
<td>Mr</td>
<td>Olav</td>
<td>Bjella</td>
<td>Executive Director, NFA</td>
</tr>
<tr>
<td>Mr</td>
<td>George</td>
<td>Gawaya</td>
<td>SPGS / NFA</td>
</tr>
<tr>
<td>Mr</td>
<td>Paul</td>
<td>Jacovelli</td>
<td>CTA, FRMCP/SPGS</td>
</tr>
<tr>
<td>Mr</td>
<td>JR</td>
<td>Kamugisha,</td>
<td>Director Field Operations, NFA</td>
</tr>
<tr>
<td>Mr</td>
<td>Isaac</td>
<td>Kapalaga</td>
<td>Director, Forestry Technical Services, NFA</td>
</tr>
<tr>
<td>Mr</td>
<td>Stephen</td>
<td>Kaukha</td>
<td>Manger, Uganda Tree Seed Centre</td>
</tr>
<tr>
<td>Ms</td>
<td>Josephine</td>
<td>Mbogga</td>
<td>NFA</td>
</tr>
<tr>
<td>Mr</td>
<td>Bric</td>
<td>Milligan</td>
<td>SPGS</td>
</tr>
<tr>
<td>Mr</td>
<td>Edward</td>
<td>Mupada</td>
<td>Director, Corporate Affairs, NFA</td>
</tr>
</tbody>
</table>

**Commercial Tree Planters**

| Mr   | Richard   | Bakojja | Bakojja New Woodcounty Ltd. |
| Mr   | Bhaskar   |        | Nile Ply Ltd |
| Mr   | Jossy     | Byamah  | South Busoga Forestry Company |
| Ms   | Brenda    | Mwebenze | Kamusenene Memorial Rural Development |
| Mr   | Jim       | Sandom  | James Finlay Ltd. |
| Mr   | Manfred   | Vohrer  | Global Woods |
| Mr   | Kai       | Worhost | Global Woods |

**Banking and Finance**

| Mr   | Kenneth   | Agaba | Business Development DFCU Group |
| Mr   | Boaz      | Buhamizo | Stanbic Bank U LTD |
| Mr   | Njoroje   | Nganga, | Head of Development Finance DFCU Group |
Annex 3 Sawmilling Efficiency

Sawmilling efficiency is crucial to the price paid for sawlogs. Unless there is an efficient processing industry, then the price offered to growers will not be sufficient to provide them with a satisfactory return on investment. The Table below shows how the price offered for sawlogs is affected by conversion efficiency.

Table 11 Impact of Sawmill Efficiency on Sawlog Price

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Sawmill Efficiency 25%</th>
<th>Sawmill Efficiency 33%</th>
<th>Sawmill Efficiency 45%</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 m³ sawn timber retail</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>a</td>
</tr>
<tr>
<td>1 m³ sawn timber wholesale</td>
<td>113</td>
<td>113</td>
<td>113</td>
<td>b</td>
</tr>
<tr>
<td>1 m³ at mill gate</td>
<td>105</td>
<td>105</td>
<td>105</td>
<td>c</td>
</tr>
<tr>
<td>Sawing, seasoning and storage per m³ sawn</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>d</td>
</tr>
<tr>
<td>Residual value</td>
<td>78</td>
<td>78</td>
<td>78</td>
<td>e</td>
</tr>
<tr>
<td>Cubic metres sawlog per m³ sawnwood</td>
<td>4</td>
<td>3</td>
<td>2.2</td>
<td>f</td>
</tr>
<tr>
<td>Sawlog Value per m³</td>
<td>20</td>
<td>26</td>
<td>35</td>
<td>g</td>
</tr>
<tr>
<td>Harvesting and transport of sawlogs / m³</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>h</td>
</tr>
<tr>
<td>Standing Value / m³</td>
<td>10</td>
<td>16</td>
<td>25</td>
<td>i</td>
</tr>
<tr>
<td>Revenue per ha from 300 m³</td>
<td>US$ 3,000</td>
<td>US$ 4,800</td>
<td>US$ 7,500</td>
<td>j</td>
</tr>
</tbody>
</table>

Explanatory Notes

a  This is an estimated retail price for sawn pine timber in Kampala derived from an international price of around US$ 80 per m³ (South Africa)
b  Allows for 33% mark-up from wholesale to retail
c  Transport from processing site: 20 m³ load, US cents 50/Km, 300 Km
d  Based on discussion with sawmillers and international norms
e  Obtained by subtraction
f  Inverse of conversion efficiency
g  Residual (row “e”) divided by volume of sawlogs required per m³ sawn (row “f”)
h  Estimated based on discussion with sawmillers
i  Value obtained by subtraction of row “i” from row “h”
j  Revenue per ha assuming 300 m³/ha multiplied by standing value per m³

See EXCEL Files [Uganda Timber Prices.xls] and [Timber Valuation.xls], these allow variation of the assumptions
Annex 4  Details of Returns to Investors

The model in Table 12 below was created to allow rapid changes to the key variables. It assumes all expenditure occurs at the start of the rotation and all revenues accrue at the end, thus allowing IRR to be calculated by a simple formula. This model is contained in the EXCEL file [Simple IRR Calculator.xls]. The justification for this simplification is twofold. Firstly, the difference between the IRR calculated this way and that computed from an annual projected cashflow using the IRR function is negligible. Secondly, the main interest is in the comparative figures rather than the absolute ones to see the impact of changed assumptions. The model was created for this assignment, not for use in investment planning!

Table 12  Simple One Hectare Model for Pinus caribaea and Eucalyptus grandis IRR

<table>
<thead>
<tr>
<th>Variable</th>
<th>P caribaea</th>
<th>E grandis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflation rate</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Cost/ha</td>
<td>700</td>
<td>870</td>
</tr>
<tr>
<td>Grant</td>
<td>350</td>
<td>350</td>
</tr>
<tr>
<td>Net cost/ha</td>
<td>350</td>
<td>520</td>
</tr>
<tr>
<td>MAI</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>Rotation</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>Price/m3</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Roads/ha at end</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td>Tax rate</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>Gross Revenue</td>
<td>6600</td>
<td>7000</td>
</tr>
<tr>
<td>Net Revenue</td>
<td>6050</td>
<td>6280</td>
</tr>
<tr>
<td>Tax due</td>
<td>1815</td>
<td>1884</td>
</tr>
<tr>
<td>Post Tax revenue</td>
<td>4235</td>
<td>4396</td>
</tr>
<tr>
<td>IRR – post tax revenue</td>
<td>12.0%</td>
<td>16.5%</td>
</tr>
</tbody>
</table>

A series of computations was conducted to determine the returns to investors. These are summarised Table 13 to Table 17.

Table 13  Summary of Impact of Sawlog price on IRR – Pinus caribaea

<table>
<thead>
<tr>
<th>Sawlog price / m3 --&gt;</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant, revenue taxable</td>
<td>10.4%</td>
<td>12.0%</td>
<td>13.2%</td>
<td>14.2%</td>
</tr>
<tr>
<td>No grant, revenue taxable</td>
<td>6.6%</td>
<td>8.2%</td>
<td>9.5%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Grant, revenue tax free</td>
<td>12.2%</td>
<td>13.8%</td>
<td>15.1%</td>
<td>16.1%</td>
</tr>
<tr>
<td>No grant, revenue tax free (Option C)</td>
<td>8.3%</td>
<td>10.0%</td>
<td>11.3%</td>
<td>12.3%</td>
</tr>
<tr>
<td>No grant, tax relief on 2nd rotation (Option D)</td>
<td>8.6%</td>
<td>10.2%</td>
<td>11.4%</td>
<td>12.4%</td>
</tr>
</tbody>
</table>

*Pinus caribaea, MAI 15 m³/ha/an, rotation 22 years*
Table 14  Summary of Impact of Sawlog price on IRR – *Eucalyptus grandis*

<table>
<thead>
<tr>
<th>Sawlog price / m3</th>
<th>15</th>
<th>20</th>
<th>25</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant, revenue taxable</td>
<td>10.4%</td>
<td>12.0%</td>
<td>13.2%</td>
<td>14.2%</td>
</tr>
<tr>
<td>No grant, revenue taxable</td>
<td>6.6%</td>
<td>8.2%</td>
<td>9.5%</td>
<td>10.5%</td>
</tr>
<tr>
<td>Grant, revenue tax free</td>
<td>12.2%</td>
<td>13.8%</td>
<td>15.1%</td>
<td>16.1%</td>
</tr>
<tr>
<td>No grant, revenue tax free (Option C)</td>
<td>8.3%</td>
<td>10.0%</td>
<td>11.3%</td>
<td>12.3%</td>
</tr>
<tr>
<td>No grant, tax relief on 2nd rotation (Option D)</td>
<td>8.6%</td>
<td>10.2%</td>
<td>11.4%</td>
<td>12.4%</td>
</tr>
</tbody>
</table>

*Eucalyptus grandis*, MAI 25 m³/ha/an, rotation 14 years

Table 13 and Table 14 above show the importance of sawlog price in the IRR achieved. An efficient forest processing industry is essential if adequate returns are to be achieved.

The following Tables show the impact of efficiency in field operations. If costs are allowed to escalate, either through poor control or through neglect, necessitating additional tending operations, there is a substantial lowering of the IRR. This could result in investors failing to make the returns expected. The most important period is that of first two years during which establishment operations take place (see Figure 2 showing the annual cash flow pattern).

Table 15  Impact on IRR of Increasing Rotation Length, Grant, Revenue Taxable

<table>
<thead>
<tr>
<th>MAI ™</th>
<th>12</th>
<th>15</th>
<th>18</th>
<th>12</th>
<th>15</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sawlog price US$15/m³</td>
<td>Sawlog price US$20/m³</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base case</td>
<td>9.1%</td>
<td>10.4%</td>
<td>11.4%</td>
<td>10.8%</td>
<td>12.0%</td>
<td>13.0%</td>
</tr>
<tr>
<td>Increase by 1 year</td>
<td>8.9%</td>
<td>10.2%</td>
<td>11.1%</td>
<td>10.5%</td>
<td>11.7%</td>
<td>12.6%</td>
</tr>
<tr>
<td>Increase by 2 years</td>
<td>8.8%</td>
<td>9.9%</td>
<td>10.9%</td>
<td>10.3%</td>
<td>11.4%</td>
<td>12.3%</td>
</tr>
<tr>
<td>Increase by 3 years</td>
<td>8.6%</td>
<td>9.7%</td>
<td>10.6%</td>
<td>10.0%</td>
<td>11.1%</td>
<td>12.0%</td>
</tr>
</tbody>
</table>

Figures in Table 15 are for *Pinus caribaea* with a 22 year base rotation.
Table 16  Impact of Increased Establishment Costs – *Pinus caribaea*

<table>
<thead>
<tr>
<th>MAI</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P caribaea – Sawlogs US$ 15 / m³</strong></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Grant, revenue taxable</td>
<td>9.1%</td>
<td>9.6%</td>
<td>10.0%</td>
<td>10.4%</td>
<td>10.8%</td>
<td>11.1%</td>
<td>11.4%</td>
<td>11.7%</td>
<td>12.0%</td>
</tr>
<tr>
<td>No Grant, tax relief on 2nd</td>
<td>7.3%</td>
<td>7.7%</td>
<td>8.2%</td>
<td>8.6%</td>
<td>8.9%</td>
<td>9.3%</td>
<td>9.6%</td>
<td>9.9%</td>
<td>10.2%</td>
</tr>
<tr>
<td>Rotation Costs (D)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>Increase Establishment Costs US$ 100</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant, revenue taxable</td>
<td>7.7%</td>
<td>8.2%</td>
<td>8.6%</td>
<td>9.0%</td>
<td>9.4%</td>
<td>9.7%</td>
<td>10.1%</td>
<td>10.4%</td>
<td>10.6%</td>
</tr>
<tr>
<td>No Grant, tax relief on 2nd</td>
<td>6.5%</td>
<td>7.0%</td>
<td>7.4%</td>
<td>7.8%</td>
<td>8.2%</td>
<td>8.5%</td>
<td>8.9%</td>
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<tr>
<td>Rotation Costs (D)</td>
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<tr>
<td>Increase Establishment Costs US$ 200</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant, revenue taxable</td>
<td>6.6%</td>
<td>7.1%</td>
<td>7.5%</td>
<td>7.9%</td>
<td>8.3%</td>
<td>8.6%</td>
<td>9.0%</td>
<td>9.3%</td>
<td>9.6%</td>
</tr>
<tr>
<td>No Grant, tax relief on 2nd</td>
<td>5.8%</td>
<td>6.3%</td>
<td>6.8%</td>
<td>7.2%</td>
<td>7.5%</td>
<td>7.9%</td>
<td>8.2%</td>
<td>8.5%</td>
<td>8.8%</td>
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<tr>
<td>Rotation Costs (D)</td>
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<tr>
<td><strong>MAI</strong></td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td><strong>P caribaea – Sawlogs US$ 20 / m³</strong></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Grant, revenue taxable</td>
<td>10.8%</td>
<td>11.2%</td>
<td>11.6%</td>
<td>12.0%</td>
<td>12.4%</td>
<td>12.7%</td>
<td>13.0%</td>
<td>13.3%</td>
<td>13.6%</td>
</tr>
<tr>
<td>No Grant, tax relief on 2nd</td>
<td>8.9%</td>
<td>9.4%</td>
<td>9.8%</td>
<td>10.2%</td>
<td>10.5%</td>
<td>10.9%</td>
<td>11.2%</td>
<td>11.5%</td>
<td>11.8%</td>
</tr>
<tr>
<td>Rotation Costs (D)</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Increase Establishment Costs US$ 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant, revenue taxable</td>
<td>9.4%</td>
<td>9.8%</td>
<td>10.3%</td>
<td>10.6%</td>
<td>11.0%</td>
<td>11.3%</td>
<td>11.7%</td>
<td>12.0%</td>
<td>12.2%</td>
</tr>
<tr>
<td>No Grant, tax relief on 2nd</td>
<td>8.2%</td>
<td>8.6%</td>
<td>9.1%</td>
<td>9.5%</td>
<td>9.8%</td>
<td>10.2%</td>
<td>10.5%</td>
<td>10.8%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Rotation Costs (D)</td>
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</tr>
<tr>
<td>Increase Establishment Costs US$ 200</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grant, revenue taxable</td>
<td>8.3%</td>
<td>8.7%</td>
<td>9.2%</td>
<td>9.6%</td>
<td>9.9%</td>
<td>10.3%</td>
<td>10.6%</td>
<td>10.9%</td>
<td>11.2%</td>
</tr>
<tr>
<td>No Grant, tax relief on 2nd</td>
<td>7.5%</td>
<td>8.0%</td>
<td>8.4%</td>
<td>8.8%</td>
<td>9.2%</td>
<td>9.5%</td>
<td>9.8%</td>
<td>10.1%</td>
<td>10.4%</td>
</tr>
</tbody>
</table>

Neglect of weeding will result in slower growth, this will almost certainly require the rotation length to be extended to achieve the desired size. Table 15 shows the impact of increasing the rotation. It is small but 2 or 3 years extension would have a significant impact on the returns. Table 16 shows the impact of increasing establishment costs by US$ 100 / ha and US$ 200 / ha, this is not difficult to achieve!

In Table 17, two scenarios are presented for each of a range of three MAI projections. The “base case” approximates optimal practices while the “worst case” includes lower yield, higher establishment cost and increased rotation length. The analysis is presented for two potential sawlog prices, US$ 15 and US$20 per m³. It also shows the IRR for the present situation, when a grant is being paid and for the longer term position, if tax relief is given on the second rotation establishment costs (Option D described in Chapter 5).
Table 17  Summary of Impact of Poor Management – *Pinus caribaea*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Base Case</th>
<th>Worst Case</th>
<th>Base Case</th>
<th>Worst Case</th>
<th>Base Case</th>
<th>Worst Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAI</td>
<td>12</td>
<td>10</td>
<td>15</td>
<td>12.5</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>Rotation</td>
<td>22</td>
<td>24</td>
<td>22</td>
<td>24</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>Establishment cost</td>
<td>700</td>
<td>800</td>
<td>700</td>
<td>800</td>
<td>700</td>
<td>800</td>
</tr>
<tr>
<td><strong>Sawlog Price US$ 15/m3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IRR with Grant</td>
<td>9.1%</td>
<td>6.6%</td>
<td>10.4%</td>
<td>7.7%</td>
<td>11.4%</td>
<td>8.7%</td>
</tr>
<tr>
<td>IRR with Tax relief on Rotation 2</td>
<td>7.3%</td>
<td>5.4%</td>
<td>8.6%</td>
<td>6.6%</td>
<td>9.6%</td>
<td>7.6%</td>
</tr>
<tr>
<td><strong>Sawlog Price US$ 20/m3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IRR with Grant</td>
<td>10.8%</td>
<td>8.1%</td>
<td>12.0%</td>
<td>9.2%</td>
<td>13.0%</td>
<td>10.2%</td>
</tr>
<tr>
<td>IRR with Tax relief on Rotation 2</td>
<td>8.9%</td>
<td>7.0%</td>
<td>10.2%</td>
<td>8.1%</td>
<td>11.2%</td>
<td>9.1%</td>
</tr>
</tbody>
</table>

Similar sensitivity analysis can be performed for *Eucalyptus grandis* using the spreadsheet. It should be noted that neglect of weeding this species can lead to total failure of the plantation.
Annex 5  Current Taxation System for Forestry

Forestry does not receive any special treatment under the present Uganda taxation. The only special concession is a recent one, in the 2005 budget speech, introducing the Income Tax Amendment 2005, when forestry was included in the list of bank lending areas on which the bank would not be charged tax, thus opening the way for lower interest rates to borrowers.

According to the results of the 2002 Population and Housing Census, agriculture accounts for the livelihood of a very large population of the population. Despite this, access to finance is still very poor. In order to encourage lending to the agricultural sector, I am proposing that interest earned by financial institutions on loans granted to persons engaged in agriculture be exempt from tax. The details will be found in the Income Tax (Amendment) Bill 2005.

Forestry can receive normal investment incentives covered under the Income Tax Act 1997. These incentives are administered by the Uganda Revenue Authority as part of the taxation system and are detailed below.

Capital Allowances

- Initial allowances on plant and machinery located in Kampala, Entebbe, Namanve, Jinja and Njeru - 50%
- Initial allowances on plant and machinery located outside Kampala, Entebbe, Namanve, Jinja and Njeru - 75%
- Start up costs spread over the first 4 years - 25%
- Scientific research expenditure - 100%
- Training expenditure - 100%
- Mineral exploration expenditure – 100%

Deductible annual allowances

Depreciable assets specified in 4 classes under declining balance method:

- Class 1 Computers and data handing equipment - 40%
- Class 2 Automobiles, construction and earth moving equipment - 35%
- Class 3 Buses, goods vehicles, tractors trailers, plant & Machinery for farming, Manufacturing and Mining - 30%
- Class 4 Railroad cars, locomotives, vessels, office furniture, fixtures etc. - 20%

Other annual depreciation allowances

- Industrial buildings, hotels and hospitals - 5%
- Farming general farm works (declining balance depreciation) - 20%
**Priority Investment Areas**
Forestry and processing of forest products is included in the list of priority investment areas.

**Other incentives**
In addition to the incentives listed above, Uganda offers the following:

- *Import Duty Exemptions.* Apply to motor vehicles, personal effects and plant and machinery;
- *Duty drawback facilities.* Allows exporters to claim taxes on inputs used to manufacture exportable products;
- *Corporation tax.* With the exception of mining there is a uniform corporation tax rate of 30%, which allows the “carry forward of losses”. Practically, this means, profits are not taxable until, previous years’ losses are fully covered.

**Investment protection**

**Investment guarantees**
- Uganda is a member of the Multilateral Investment Guarantee Agency (MIGA) of the World Bank and VAT deferred payment agreements.

**Externalisation of funds**
Foreign investors are allowed to externalise funds for:

- Loan repayment in a foreign country;
- Payment of financial earnings to foreign personnel;
- Payment of royalties or fees;
- Payment of profits or proceeds on disposal of assets;
- Protection against compulsory acquisition. Compulsory acquisition can only be made in accordance with the Constitution of Uganda. Should compulsory acquisition take place, the investor must be compensated within 12 months from the date of acquisition, based on fair market value of the enterprise.
Annex 6  Silvicultural Map of Uganda

SILVICULTURAL ZONES OF UGANDA
For Commercial Plantations

Silvicultural zones

A - Cold, Wet - MAT = 18, Rf = 1250 mm - Fair potential, little land available
B - Cold, Dry - MAT = 18, Rf < 1250 - Little potential
C - Cool, Dry - MAT = 18 - 22, Rf = 1250 - 1500 - Some potential, careful site analysis required
D - Cool, Moist - MAT = 18 - 22, Rf = 1500 - Good potential
E - Cool, Wet - MAT = 18 - 22, Rf > 1500 - Very high potential
F - Warm, Wet - MAT = 22 - 23, Rf = 1250 - Very high potential
G - Hot, Wet - MAT = 23 - 24, Rf > 1250 - High potential with careful practices
H - Hot, Dry - MAT = 23 - 24, Rf < 1000 - Some potential with careful site analysis
I - Very Hot, Wet - MAT = 24, Rf = 1250 - Good potential, largely untested
J - (Very) Hot and Very Dry - MAT = 22, Rf < 1000 - No potential except on favourable microsites

Lake
Tarmac
Murram
Railway
Town
International boundary

Scale 1:3,800,000