



T. Knowles 2011

# FINANCIAL MODELLING AND ANALYSIS OF FSC CERTIFIED RATTAN IN LAO PDR

## **Final report**

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## Note on spelling

There is no standardised romanisation of Lao words. This report attempts to be consistent and uses an English transliteration of Lao words.

## Summary

This report examines the financial costs and benefits of obtaining and maintaining Forest Stewardship Council (FSC) rattan within areas included in the WWF’s Sustainable Rattan Project (the project). The project has been running since 2006 in the Lao PDR and in 2011, following the completion of forest inventories and management plans, four villages in the project area successfully obtained FSC forest management certification under the Lao PDR Department of Forestry (DoF) group certificate. In addition, in 2011, the export company Leudnilan successfully obtained FSC Chain of Custody (CoC) certification, allowing it to export finished rattan products using the FSC logo. Obtaining both FSC certifications involved significant work and expenditure by all project partners. Maintaining FSC certification is less costs but nonetheless still requires ongoing monitoring and annual audit costs. Expansion of FSC certification to new forest areas and additional export companies will also require further costs for training, creation of forest inventory and management plans and training of stakeholders.

Understanding the costs and benefits of the FSC component of the project between 2009 and 2011 is important because it allows the project stakeholders to understand how much it might cost to support existing and new FSC certificate holders in the Lao PDR rattan value chain.

The WWF Sustainable Rattan project encompasses three countries and 100 villages in total. Of this, 40 villages in three provinces are located in Lao PDR. Four villages in the Khamkeut District of Bolikhamsai province obtained FSC certification in 2011. Research methods for this report included reviewing key project documents and data, interviewing WWF staff and staff at partner organisations and village visits.

In order to sell rattan products using the FSC label, two different FSC certificate types are required:

- Forest Management certificate is required for the forest management area from which rattan is harvested.
- Chain of Custody (CoC) certificate is required to track rattan through the supply chain from the forest to the export producer. This ensures that products sold with the FSC logo are actually sourced from FSC certified forest management areas.

The table below lists the key costs and benefits of obtaining FSC certification considered in this report.

| FINANCIAL COSTS   | FINANCIAL BENEFITS   |
|---|--|
| <p>Capital costs</p> <ul style="list-style-type: none"> <li>• Costs to conduct forest inventories and create management plans.</li> <li>• Costs to build storage sheds for rattan.</li> <li>• Costs to train villagers and other partners in FSC requirements.</li> </ul> | <ul style="list-style-type: none"> <li>• Higher incomes, particularly at a harvesting level.</li> <li>• More equitable distribution of income within villages.</li> <li>• More sustainable supply of rattan – longer-term benefits.</li> <li>• Increased awareness of actual extent of forest resources.</li> <li>• Increased income due to increased availability of NTFPs</li> </ul> |
| <p>Operating costs</p> <ul style="list-style-type: none"> <li>• Annual FSC audit fee.</li> <li>• Ongoing forest management costs.</li> </ul>  |  |

Specifically, this report will examine the estimated costs for expansion of the FSC project area and the costs and benefits of obtaining and maintaining FSC certification, as well as break-even points.

Project costs are important for the project for discussion with donors. Supply chain income is calculated to understand how market access can contribute to rural incomes, particularly for non-timber forest products (NTFPs). Finally, the amount of revenue required to cover the costs of FSC certification is estimated (otherwise known as break-even point) both in dollars and also the volume of rattan harvested.

The table below shows estimates of the project costs based on data provided for the planned expansion of the project to new villages between 2011 and 2014. The analysis is based on actual expenditure for 2011 and forecast expenditure provided by project staff for 2012-2014.

|  | Units    | 2011   | 2012   | 2013   | 2014    |
|--|----------|--------|--------|--------|---------|
| Number of villages                             | Villages | 4      | 6      | 14     | 28      |
| Area of forest                                 | ha       | 1,142  | 3,142  | 11,142 | 20,000  |
| Cost for forest inventory and management plans | USD      | 97,454 | 48,477 | 75,379 | 149,255 |
| Cost for product export support                | USD      | 26,205 | 18,535 | 18,535 | 18,535  |

The project is coming to the end of what could be considered an research and development phase. Research and development is typically where the most capital is required and consequently, the cost per unit of output is also highest. For illustration purposes, the true cost of each basket set in the COOP order, if we consider all project costs, is approximately \$64<sup>1</sup>. At a purely commercial level, this is unsustainable since the final export price per basket set was only \$16.5. However, this fails to account for several things:

1. This figure of \$64 includes all costs, many of which are capital costs.
2. Cost per unit will decline over time.
3. The project resulted in many auxiliary benefits such as capacity building across the entire rattan supply chain and forest conservation.

The inclusion of capital costs in the total cost per product set is misleading since capital costs are usually amortised over many years. To provide an example, if the exact same order was placed by COOP in 2012, the total cost per product set would drop to just \$21 – if sunk capital costs were ignored. This is because in subsequent years, the costs to support additional areas and ongoing forest management and annual FSC audits are much lower than the upfront establishment costs.

Another way to look at the project is to consider the development and conservation outcomes achieved. Looking at things this way, it can be seen that the successful order for approximately 2,623 sets of baskets at \$16.50 per set subsidised development outcomes to the tune of \$43,280. The table below provides the data on the prices paid throughout the value chain. This data was estimated from project documentation and is based on expenditure within the Khamkeut district and prices and costs relating to the COOP order for rattan baskets.

| Recipients | Area                        | Units       | Number of units | Average per unit - LAK | Average per unit - USD |
|------------|-----------------------------|-------------|-----------------|------------------------|------------------------|
| Villagers  | Forest inventory (variable) | ha          | 1               | 37,800                 | 4.73                   |
| Villagers  | Monitoring                  | Person days | 1               | 30,000                 | 3.75                   |

<sup>1</sup> This includes the US\$16.5 paid by COOP per basket set because the export margins were just US\$0.30 per set.

|            |                      |              |   |         |       |
|------------|----------------------|--------------|---|---------|-------|
| Villagers  | Harvesting costs     | Canes        | 1 | 882     | 0.11  |
| Government | Natural resource tax | Canes        | 1 | 177     | 0.02  |
| Villagers  | Splitting costs      | Split canes  | 1 | 773     | 0.10  |
| Villagers  | Weaving costs        | Product sets | 1 | 30,000  | 3.75  |
| Exporter   | Wholesale margin     | Product sets | 1 | 2,492   | 0.31  |
| Exporter   | Wholesale price      | Product sets | 1 | 132,000 | 16.50 |
| Retailer   | Retail price         | Product sets | 1 | 373,000 | 46.65 |

The unit prices in the table above were used to estimate break-even points where the costs of maintaining FSC certification are equal to the revenue received from selling FSC certified rattan. The key findings of the break-even analysis (see [Table 14](#) in the report) are that:

- Break-even points based on rattan canes harvested are interesting but probably best used once data about a new potential product order is available. Otherwise, dollar figures are better for break-even analysis since per cane break-even points are very sensitive to per unit costs throughout the supply chain.
- Increasing the number of export businesses has a significant impact on break-even points. Without sufficient market demand, export businesses may find it hard to justify the costs of CoC certification. If there was a mechanism for exporters to share certification costs, similar to being group members for forest management certificates, this could make it easier for the number of CoC exporters to increase.
- Quota data provided by the project did not include expanded projections of harvestable rattan canes, this has affected assessments regarding the sufficiency of quotas to cover break-even points.
- If only the harvesting group is expected to cover the costs of FSC forest management certification at a village level, it is probably too expensive to maintain FSC certification unless rattan harvesting levels are very high. A mechanism for sharing of FSC costs across harvesters, splitters and weaving groups would be better.

The annual FSC audit costs were assumed to be \$500 (out of \$9000) for rattan members. At \$500, this would account for 50% of annual costs under Scenario 1, in which there are 4 FSC certified villages and 1,142ha of sustainably managed forests. In this scenario, the total yearly costs after year 1 are estimated at approximately \$1000. \$500 of this can be attributed to ongoing forest monitoring (estimated at 36 full days per year) and \$500 to the annual audit cost. Assuming the rattan share of the audit cost is held constant at \$500, increasing the number of FSC certified villages in the project area (Scenarios 2, 3 and 4 from [Table 9](#)) would lower the cost per village from \$125 under Scenario 1 to \$18 under Scenario 4. The situation with annual audit costs is still not clear but this is a potentially large, but obviously necessary, expense for rattan producers.

FSC certification has a number of benefits such as improved forest management and access to international markets. Well-managed forests not only result in more sustainable supplies of rattan, and thus more sustainable incomes, but can also result in improved yields of other NTFPs. Access to international markets, particularly for more expensive labeled products, can contribute to higher incomes from rattan harvesting and processing. In addition, experience in sustainable forest management and product export can potentially be carried over to other practices.

The project should be encouraged by the tremendous impact it has had on forest management but perhaps more importantly, the capacity development achieved at all stages of the rattan value chain

in Lao. Combining best practices in forest management with market access creates an amazing incentive for more sustainable resource management. The project has proven that rattan can be sourced sustainably and that Lao can produce export quality finished products. Building on the success of the project so far will contribute to the development of Lao PDR and the development of a more sustainable global rattan industry.

## Background

WWF's Sustainable Rattan Harvest and Production Project has been operating since 2006. It operates in Lao PDR, Cambodia and Vietnam. The project began with discussion between WWF and IKEA about non-timber forest products (NTFPs), particularly rattan, and NTFP supply from Southeast Asia.

From the outset the project has worked with stakeholders right through the rattan supply chain, from village-level harvesters, small and medium sized enterprises (SMEs) involved in rattan purchase, processing and trade and national and international retailers. Government departments and authorities involved in forest management and trade are also extensively involved. The project aims to improve practices throughout the whole supply chain through:

- improved forest management and reduced forest degradation,
- contribution to poverty alleviation,
- cleaner processing and production
- encouraging accountability and accreditation.

The European Commission (EC) has jointly funded the project from 2009 to 2011 to scale up the project begun by WWF and IKEA. This report is focused on an assessment of the EC requirements of the 2009 – 2011 period. An overview of the project's stages is provided below.

| Phase                    | Period                  | Donors      | Summary   |
|--------------------------|-------------------------|-------------|---|
| Scoping phase            | 2006 April to September | IKEA        | <ul style="list-style-type: none"> <li>• Identified key rattan species</li> <li>• assessed rattan resources</li> <li>• researched harvesting system</li> <li>• researched market chain</li> </ul>   |
| Phase 1, "Pilot phase"   | 2006 to 2008            | IKEA        | <ul style="list-style-type: none"> <li>• Pilot project areas established in Bolikhamsai and Vientiane Provinces.</li> <li>• Sample plots for forest management areas established and surveyed</li> <li>• Baseline socioeconomic data collected.</li> <li>• Harvesting plans developed and implemented.</li> <li>• Networks of rattan-related businesses established.</li> <li>• Study tours for participants to other parts of supply chain.</li> </ul> |
| Phase 2, "Scale up"      | 2009 to 2011            | EC and IKEA | <p>Project activities scaled up to include 40 villages in Laos. Main activities:</p> <ul style="list-style-type: none"> <li>• Strengthening village-level rattan management and links to supply chain.</li> <li>• Introduction of cleaner production (CP)</li> <li>• Introduction of certification</li> <li>• Improving relevant legislation</li> <li>• Improving communications</li> <li>• Strengthening of stakeholder capacity</li> </ul>            |
| Phase 3, "Strengthening" | 2012 to 2014            | IKEA        | <ul style="list-style-type: none"> <li>• Strengthen village-level rattan management groups</li> <li>• Expansion of FSC sustainable forest resource management area</li> <li>• Linkage with IKEA and other suppliers</li> <li>• Improve research on rattan ecology and biodiversity</li> </ul>   |



## Objectives of this report

In 2010 COOP, a Swiss retailer and partner of WWF, agreed to work with WWF to sell rattan products harvested from the project area in European retail stores. WWF and other stakeholders engaged SmartWood to conduct the certification of certain villages. In 2011 a container of approximately 2623 sets of rattan baskets was shipped to COOP for sale in Europe<sup>2</sup>.

This report aims to assess the costs and benefits of obtaining FSC certification for rattan produced in project areas and discuss the implications for maintaining and expanding FSC certification for rattan. The report looks at the entire supply chain up until export. In order to do this, the author created a model based on data about project expenditure and the COOP order. Consideration of environmental and social impacts will be touched on in this report but discussed in more detail in Campbell (2011).

## Assessment team

The lead author of this report is Tristan Knowles. He has worked on development projects in Indonesia and Malaysia. In addition to development, Tristan is interested in environmental economics, responsible investment and small and medium enterprise development.

The co-author of this report is Roderick Campbell. Rod is an Australian economist with considerable experience in development and project analysis. He has worked previously in Laos, including as a consultant to Phase 1 of the WWF rattan project.

Tristan and Rod work mainly Economists at Large, a Melbourne (Australia) based firm who specialize in bespoke economic research with a social or environmental focus.

## Methodology

Research methods for this report included reviewing key project documents and data, interviewing WWF staff and staff at partner organisations and village visits.

The primary documents and used for the analysis included:

- Extracted expenditure from WWF accounts for the project period and project area of assessment (Khamkeut district)  
*Filename: Kamkeut expenditure 2009-2011.xls*
- Details of the final payments across the entire supply chain for the COOP order  
*Filename: Final summary of total payment\_COOP\_8Aug.xls*
- The SmartWood 2011 audit of DoF  
*Filename: Smartwood 2011 FSC audit of DoF.pdf*
- Interviews conducted by the report author with villagers in Phonthong and Sopphuoan.
- The financial model created from the data above;  
*Filename: Laos-Rattan-Data-Analysis-v-1-00.xls*

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<sup>2</sup> This may be referred to throughout this report as “the COOP order”.

The analysis in this report is based largely on the financial model created by the author and made available to the project.

Unless specified, all dollar values in this report are in USD.

### **Report period and scope**

This report was written between September and October 2011 and is based on analysis of the project between 2009 and 2011. The analysis covers the entire rattan supply chain in Lao from a village level up until export. The analysis does not look into retail aspects of FSC certified rattan.

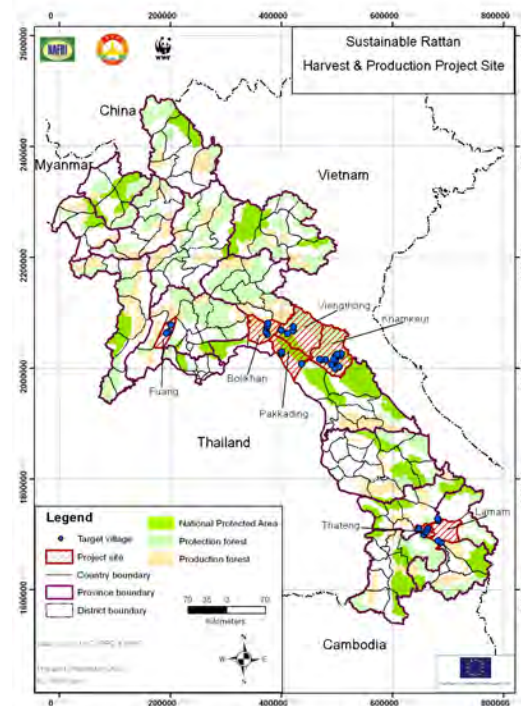
The scope for the report will be limited to the four villages that obtained FSC certification in Khamkeut district of the Bolikhamsai province; Soupphouan, Phonthong, Dongsat and Boungpatao. Field work was undertaken in Soupphouan and Phonthong as part of this project. Expenditure and outcomes of the wider project in other areas of Lao and in Cambodia and Vietnam was not undertaken. Other consultants were engaged by the WWF to conduct project assessments in Vietnam and Cambodia.

The location of the villages included in the scope of this report is shown in the maps below.

### Lao PDR project area

The Sustainable Rattan Project in Lao PDR encompasses three districts and forty villages. The analysis in this report is based on analysis of villages in the Khamkeut district (Bolikhamsai province) that obtained FSC certification. The Lao PDR project area is shown in [Figure 1](#).

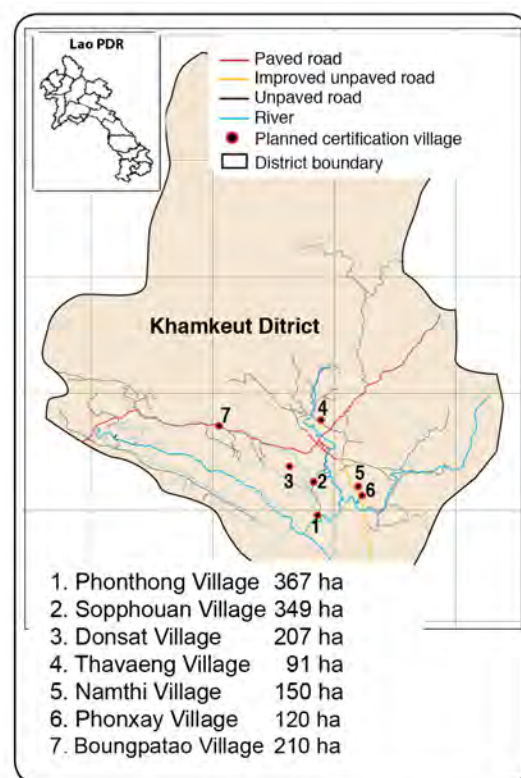
Figure 1: Map of project areas in Lao PDR



### Khamkeut FSC villages

Seven out of the forty villages in the project area were selected as 'planned certification villages' and shown in the map to the right. The selection was made based on willingness to be involved by the village residents and an assessment of local capacity undertaken by WWF project staff. In 2011, four of the seven villages shown on the map were accepted into the Lao PDR Department of Forestry's FSC group certificate. Field visits were undertaken to Phonthong and Soppouan.

Figure 2: Map of planned FSC certification villages in Khamkeut



## Sustainability in rattan

Sustainability in rattan relates to social, economic and environmental aspects across the entire supply chain. Examples are provided in the table below.

Table 1: Social, Environmental and Economic aspects to sustainable rattan

|                      |  |
|----------------------|--|
| <b>Social</b>        | Equity in distribution of costs and benefits of forestry, a sense of empowerment and achievement, community cohesion, self-sufficiency.  |
| <b>Environmental</b> | Sustainable levels of harvesting, improved ecological values, improved production and management of other timber and non-timber forest products, and reduction of pollutants in rattan processing. |
| <b>Economic</b>      | Increased value of FSC rattan, access to markets, income stability and capacity building.  |

Discussions with project stakeholders revealed that for this project there were five main components to the sustainable supply of rattan in Lao PDR:

Table 2: Project specific aspects to sustainable rattan in Lao

|   |   |
|---|---|
| <b>2. FSC forest management and CoC certification</b> | FSC certification of forest management aims to inform and assure buyers that certified rattan is managed sustainably. Chain of custody certification ensures that the finished rattan products are produced using rattan from an FSC certified forest management area. This has important environmental outcomes for forest resources but also opens up market opportunities for FSC certified rattan products. |
| <b>3. Cleaner Production (CP) techniques</b>          | Cleaner production techniques involve the use of fewer – or no – chemicals to produce finished products. This results in fewer harmful pollutants being used by people involved in the manufacturing process and fewer chemical outputs being discharged into the environment.  |
| <b>4. Village Group organisations</b>                 | Village group organisations such as the Rattan Sustainability Group, the Harvesting Group and the Handicraft Group helped to build capacity and skills at a village level. Many villages are resettlement villages so increased local skills and social cohesion are very important to the community.   |
| <b>5. Reduced waste</b>                               | Changing rattan processing practices ensured that off-cuts were used rather than discarded. This resulted in increased resource use efficiency (reduced waste) and increased income for the harvesters.   |
| <b>6. Market awareness and access</b>                 | Increasing villagers understanding of their role in global supply chains and developing their skills to work with export companies opens up market opportunities in the future. Where products previously produced were only for local markets, villagers now have experience producing export quality products.  |

## Overview of certification

### Background

In order to sell products using the FSC label, two different FSC certificate types are required:

- Forest Management certificate is required for the production area.
- Chain of Custody (CoC) certificate is required to track raw materials through the supply chain from the forest to the eventual consumer. This ensures that products sold with the FSC logo are actually sourced from FSC certified forest management areas.

### Forest management certification

The villages of Phonthong, Sopphuoan, Donsat and Boungpatao are group members of a Forest Stewardship Council (FSC) group certificate. The Lao PDR Department of Forestry (DoF) is the group manager of this certificate. Group certificates are a more cost effective way for smallholders to participate in FSC since certification costs can be shared among group members. As of 2011, eight members, including timber producers, are included in the DoF group certificate. In FSC documentation, the DoF and members of the group certificate are collectively referred to as the Forest Management Enterprise (FME).

### Chain of Custody certification

In addition to the forest management certification, to sell FSC-labelled products, an individual Chain of Custody (CoC) certificate is required. In late 2011, WWF assisted Leudnilan, a Vientiane-based export company and furniture producer, to obtain a CoC certificate for rattan (see appendices).

For a comprehensive overview of the steps required for CoC certification for rattan and lessons learnt from the initial certification of Leudnilan, see Gephart (2011).

### Steps for certification

The basic steps to FSC certification are the same for forest management and chain of custody certificate. These steps are listed below.

Table 3: Basic steps for FSC certification

|   |   |
|---|---|
| <b>Step 1: Contact certification body</b> | Contact accredited certification body and provide basic information about operation.  |
| <b>Step 2: Management plan</b>            | Create management plan that complies with FSC standards.  |
| <b>Step 3: Certification</b>              | If successful, FSC certification body grants FSC certificate that allows the use of FSC logo. "Corrective Action Requests" may be made if full compliance is not yet achieved at the time the certification is granted. |
| <b>Step 4: Annual audit</b>               | The certification body will undertake an annual audit of documents and records related to the certificate.  |
| <b>Re-certification</b>                   | Re-certification is required every five years following the same process as for initial certification.  |

Source: (Forest Stewardship Council, 2011)

### Rattan villages in the group FSC certificate

Fieldwork for this report was conducted in two of the above-mentioned FSC certified villages, Phonthong and Sopphuoan.

Table 4: FSC villages in Lao PDR as of 2011

| Village name | Province    | Closest main city | Area managed under forest management plan (ha) | Included in field work |
|--------------|-------------|-------------------|--|------------------------|
| Phonthong    | Bolikhamxay | Laksao            | 349  | ✓                      |
| Sopphuoan    | Bolikhamxay | Laksao            | 376  | ✓                      |
| Donsat       | Bolikhamxay | Laksao            | 207  | ✗                      |
| Boungpatao   | Bolikhamxay | Laksao            | 210  | ✗                      |

Source: (SmartWood, 2011)

## The costs and benefits of certification

The following sections of the report will examine the *financial* costs and benefits of obtaining and maintaining FSC certification. There are additional costs and benefits associated with FSC certification and the activities of the project but these are outside the scope of this report. For a more holistic evaluation of the project for the period between 2009-2011, see Campbell (2011). The table below lists the key costs and benefits considered in this report.

Table 5: The financial costs and benefits of FSC certification

| FINANCIAL COSTS   | FINANCIAL BENEFITS   |
|---|--|
| <b>Capital costs</b> <ul style="list-style-type: none"> <li>Costs to conduct forest inventories and create management plans.</li> <li>Costs to build storage sheds for rattan.</li> <li>Costs to train villagers and other partners in FSC requirements.</li> </ul> | <ul style="list-style-type: none"> <li>Higher incomes, particularly at a harvesting level.</li> <li>More equitable distribution of income within villages.</li> <li>More sustainable supply of rattan – longer-term benefits.</li> <li>Increased awareness of actual extent of forest resources.</li> <li>Increased income due to increased availability of NTFPs</li> </ul> |
| <b>Operating costs</b> <ul style="list-style-type: none"> <li>Annual FSC audit fee.</li> <li>Ongoing forest management costs.</li> </ul>  |  |

Table 6: The financial costs and benefits of FSC certification – by link in supply chain

| LINK IN SUPPLY CHAIN  | COST   | BENEFITS  |
|-----------------------|--|---|
| Village or harvesting | <ul style="list-style-type: none"> <li>Costs (time) to conduct forest inventories and create management plans.</li> <li>Costs to build storage sheds for rattan.</li> <li>Costs to train villagers and other partners in FSC requirements.</li> <li>Upfront cost for FSC assessment.s</li> </ul> | <ul style="list-style-type: none"> <li>Higher incomes, particularly at a harvesting level.</li> <li>More equitable distribution of income within villages.</li> <li>More sustainable supply of rattan – longer-term benefits.</li> <li>Increased awareness of actual extent of forest resources.</li> <li>Increased income due to increased availability of NTFPs.</li> </ul> |
| Government            | <ul style="list-style-type: none"> <li>Annual FSC costs for forest management group.</li> <li>Costs to train government officials in FSC requirements.</li> </ul>  | <ul style="list-style-type: none"> <li>Improved collection of resources taxes.</li> </ul>   |
| Exporter              | <ul style="list-style-type: none"> <li>FSC fees</li> <li>Costs to government officials in FSC requirements.</li> </ul>   | <ul style="list-style-type: none"> <li>New markets for FSC products.</li> <li>Improved understanding of export procedures.</li> </ul>   |

Note: WWF paid for some of the costs listed above so the purpose of this table is to identify who is ultimately responsible for the costs and benefits.

Specifically, this section will examine the estimated costs for expansion of the FSC project area and the costs and benefits of obtaining and maintaining FSC certification, as well as break-even points.

Project costs are important for the project for discussion with donors. Supply chain income is calculated to understand how market access can contribute to rural incomes, particularly for non-timber forest products (NTFPs). Finally, the amount of revenue required to cover the costs of FSC certification is estimated (otherwise known as break-even point) both in dollars and also the volume of rattan harvested.

The analysis presented in the following sections can serve as a useful guide to the expansion of FSC certification for rattan to other districts and villages in Lao PDR, or even for other countries looking to establish FSC certified rattan projects.

### **Project model for Lao PDR**

Much of the analysis in this report is based on a financial model created by the report author. The model is an excel document that uses actual data to estimate project costs and supply chain income and break-even points based on a number of scenarios. The model takes data provided by the project to estimate the following:

- Costs of the expansion of the project to cover new villages and additional hectares of forest.
- Break even points throughout the supply chain based on costs for acquiring and maintaining FSC certification.
- Income derived throughout the supply chain.

The model estimates five different scenarios. Four scenarios estimate a discrete five-year cycle (in line with FSC recertification time scales) based on the project scale at the start of the starting year for the particular scenario (see Table 7). This approach has been used to capture the break even point necessary for new villages and exporters who participate in the project. In other words, to estimate the break-even point at a village level, it was necessary to hold the project variables (villages and forest area). This was done to isolate each village or area in order to estimate a break-even point for that particular village or area, irrespective of growth in other project areas which adds to overall costs but not costs to that particular area. The model does not calculate a break even point for government but could be adjusted to do this. The fifth scenario is cumulative and with estimates factoring in growth between 2011 and 2014 (see



[Figure 5](#)). The fifth scenario is intended for WWF project planning and has ramifications for project costs as well as potential supplies of sustainable rattan.

Table 7: Scenarios used to estimate future costs, benefits and break-even points

|  |   |
|--|---|
| <b>Scenario 1 (2011-2015)</b>              | Assumes four villages and 1,142 ha covered by FSC forest management certification for rattan.           |
| <b>Scenario 2 (2012-2016)</b>              | Assumes six villages and 3,142 ha covered by FSC forest management certification for rattan.            |
| <b>Scenario 3 (2013-2017)</b>              | Assumes fourteen villages and 11,142 ha covered by FSC forest management certification for rattan.      |
| <b>Scenario 4 (2014-2018)</b>              | Assumes twenty-eight villages and 20,000 ha covered by FSC forest management certification for rattan.  |
| <b>Scenario 5 (2011-2015) - cumulative</b> | Provides estimates for costs and break-even points for 2011-2015 allowing for expansion in the project. |

### Key variables

The model is based on a number of key variables including:

- Costs paid at each stage of the supply chain.
- Number of products ordered by the end customer.
- Number of rattan canes required per product set.
- Number of split canes derived from a single harvested cane.

Modifications to any of these variables can significantly alter the outputs of the model.

### Use of the model

The model can be used for estimating several components of the project.

- i. Revenue derived throughout the supply chain.
- ii. Canes required based on a customer order.
- iii. Canes required to cover costs of FSC Forest Management certificate.
- iv. Finished products required to cover costs of CoC certificate.
- v. Comparing ii. or iii. with the sustainable harvest yields for rattan.
- vi. Changing prices paid through the supply chain to affect yields required to break even.

## Project costs

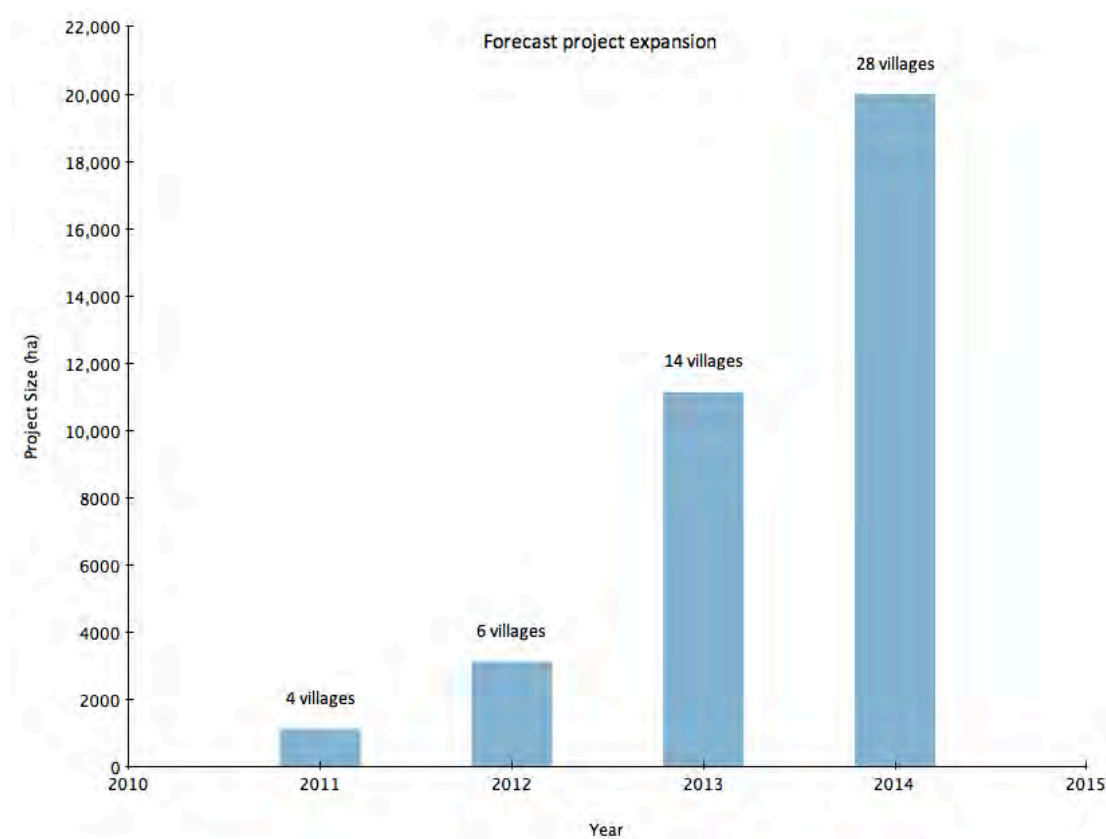
The table below shows estimates of the project costs based on data provided for the planned expansion of the project to new villages between 2011 and 2014. The analysis is based on actual expenditure for 2011 and forecast expenditure provided by project staff for 2012-2014.

Table 8: Estimated project costs based on planned expansion between 2011 and 2014

|  | Units    | 2011   | 2012   | 2013   | 2014    |
|--|----------|--------|--------|--------|---------|
| Number of villages                             | Villages | 4      | 6      | 14     | 28      |
| Area of forest                                 | ha       | 1,142  | 3,142  | 11,142 | 20,000  |
| Cost for forest inventory and management plans | USD      | 97,454 | 48,477 | 75,379 | 149,255 |
| Cost for product export support                | USD      | 26,205 | 18,535 | 18,535 | 18,535  |

The data for the expansion of the project (villages and area of forest) is shown in the chart below.

Table 9: Forecast expansion of the project in Lao PDR



### Forecast categories for forest management

The following categories are used to estimate future WWF costs for forest management support (also see **Error! Reference source not found.**):

- i. Expenditure to support ongoing rattan forest management activities in existing rattan forest management areas.
- ii. Expenditure to expand rattan forest management areas within existing villages.
- iii. Expenditure to create new rattan forest management areas to in new villages within existing districts (Khamkeut).
- iv. Expenditure to create new rattan forest management areas in new villages within new districts.

Each of the categories above has a different cost assumption and project expansion is assumed to take place mostly within the context of scenarios i) and ii) from the above list. Expanding to new villages and districts will be more expensive and this is not the stated goal for the next project period.

### **Forecast categories for product support**

The following categories are used to estimate future WWF costs for product export support (also see **Error! Reference source not found.**):

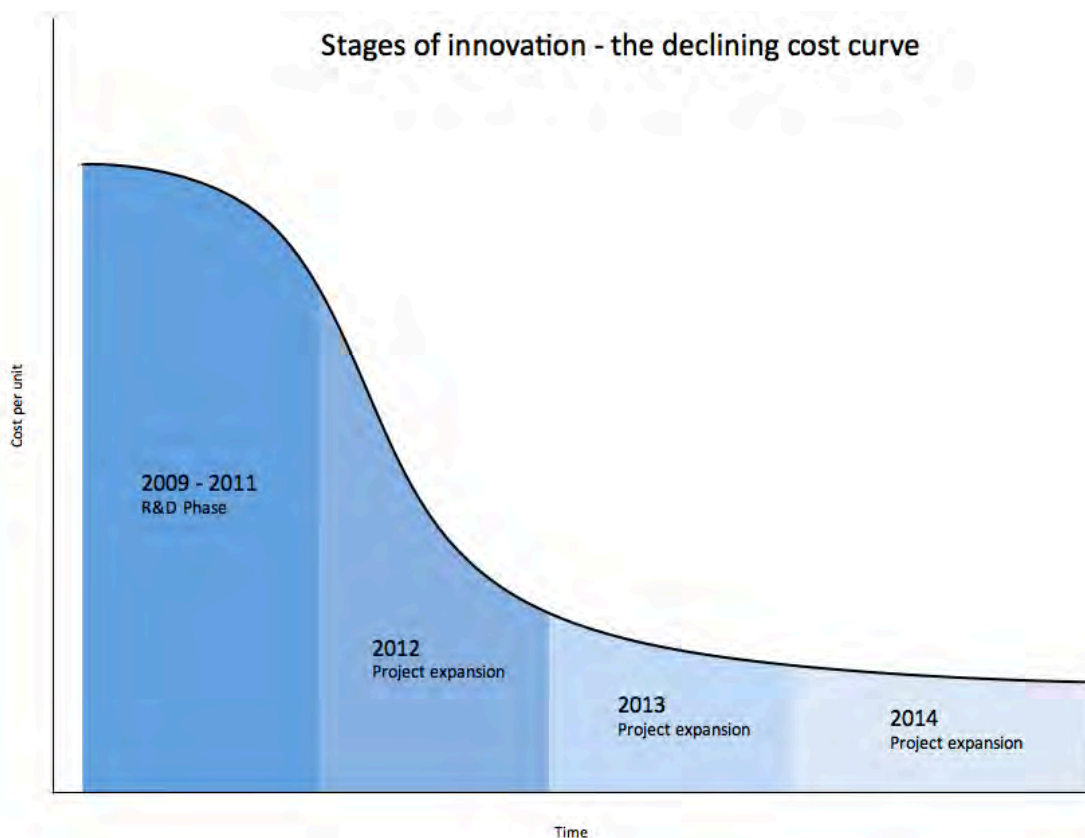
- i. Expenditure to support additional orders to existing export businesses.
- ii. Expenditure to support new orders to new export businesses.

A third category not considered but worth mentioning is the impact of a design for a new product style and how much support exporters and also villagers will require to learn how to make the product. This has not been considered yet in the model.

### **Cost curve for innovation**

Obtaining FSC certification for rattan in Lao PDR involved a significant amount of research and development (R&D). These R&D costs have already been incurred and future costs for maintaining FSC certification at existing villages and expanding FSC certification to new areas and villages are likely to be lower. The expected declining cost curve is shown in the chart below.

Figure 3: Stages of innovation - the project expansion and the declining cost curve



The project is coming to the end of what could be considered an research and development phase. Research and development is typically where the most capital is required and consequently, the cost per unit of output is also highest. For illustration purposes, the true cost of each basket set in the COOP order, if we consider all project costs, is approximately \$64<sup>3</sup>. At a purely commercial level, this is unsustainable since the final export price per basket set was only \$16.5. However, this fails to account for several things:

1. This figure of \$64 includes all costs, many of which are capital costs.
2. Cost per unit will decline over time.
3. The project resulted in many auxiliary benefits such as capacity building across the entire rattan supply chain and forest conservation.

The inclusion of capital costs in the total cost per product set is misleading since capital costs are usually amortised over many years. To provide an example, if the exact same order was placed by COOP in 2012, the total cost per product set would drop to just \$21 – if sunk capital costs were ignored. This is because in subsequent years, the costs to support additional areas and ongoing forest management and annual FSC audits are much lower than the upfront establishment costs.

In addition, the cost to establish new forest management areas and support exporters should decline as the project expands.

Expected expenditure for a range of scenarios is provided in the table below.

Table 10: WWF forecast expenditure to expand project - forest management support

| Category   | Unit | Value  |
|--|------|--------|
| Actual expenditure to support forest inventories and plans (2009-2011)   | USD  | 97,454 |
| i) Forecast expenditure to support <i>ongoing forest management activities in existing areas</i>                         | USD  | 12,750 |
| ii) Forecast expenditure to support <i>expanding FSC rattan forest areas in existing villages in existing districts</i>  | USD  | 20,500 |
| iii) Forecast expenditure to support <i>expanding forest inventories and plans to new villages in existing districts</i> | USD  | 28,500 |
| iv) Forecast expenditure to support <i>expanding forest inventories and plans to new villages in new districts</i>       | USD  | 36,500 |

Project staff indicated that most forecast expenditure for the next few years will relate to areas i), ii) and iii) from [Table 10](#) above.

Table 11: WWF forecast expenditure to expand project - export support

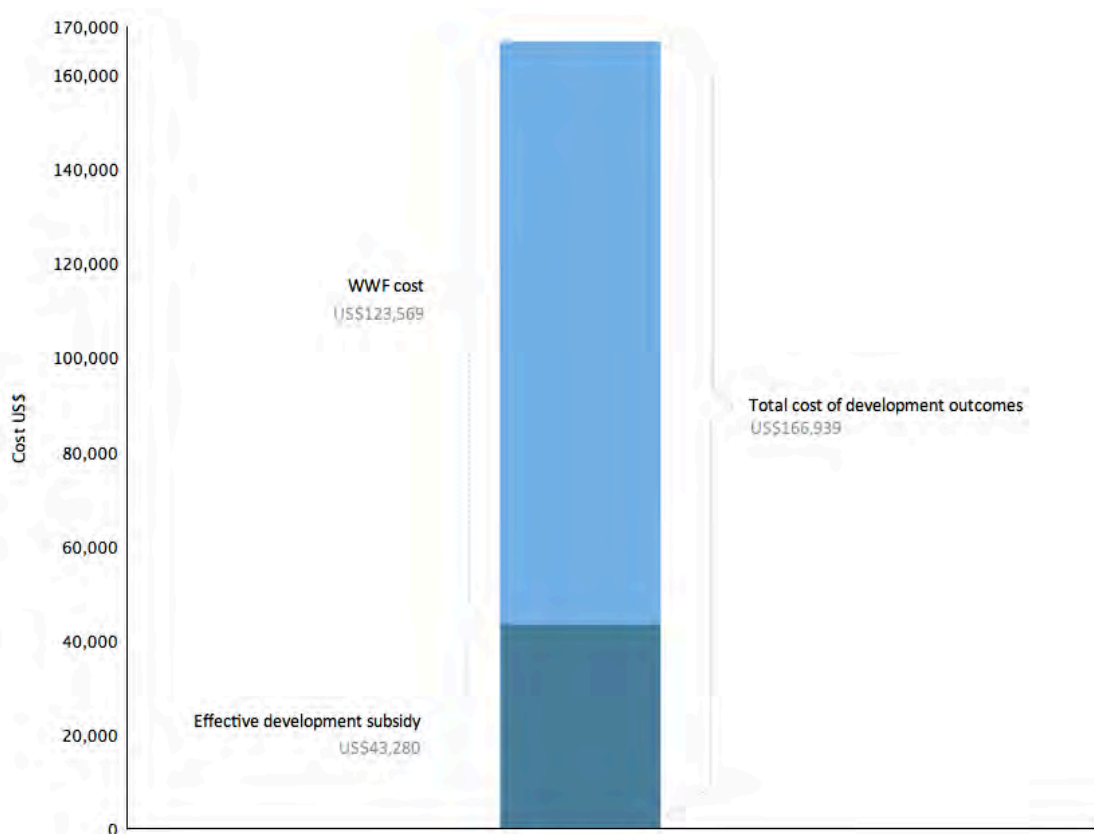
| Category   | Unit | Value  |
|--|------|--------|
| Actual expenditure to support COOP order   | USD  | 26,205 |
| i) Forest expenditure to support additional orders to existing export businesses | USD  | 6,200  |
| ii) Forecast expenditure for new orders to new export business                   | USD  | 12,335 |

<sup>3</sup> This includes the US\$16.5 paid by COOP per basket set because the export margins were just US\$0.30 per set.

### Subsidised development and conservation outcomes

The section above discussed the real cost of each rattan basket set once costs borne by WWF were factored in. This revealed that currently the retail price paid is not covering the full costs of production. However, another way to look at the project is to consider the development and conservation outcomes achieved. Looking at things this way, it can be seen that the successful order for approximately 2,623 sets of baskets at \$16.50 per set subsidised development outcomes to the tune of \$43,280. This is shown in the chart below.

Figure 4: Total project cost and effective subsidy through export revenue



Forest conservation can have a measurable impact on livelihoods of rural villagers who are often highly dependent on NTFPs. (Foppes & Samontri, 2010) reported that NTFPs accounted for an average of 39% of rural household cash incomes. However, due to forest degradation, this could decrease by 3%. Interviews with villagers in Sopphuoan for this report suggest that for areas covered in this project, NTFPs have actually increased in abundance. Interviews conducted in Konchane revealed that due to overharvesting, Konchane no longer has any rattan to harvest and so has lost an important source of income.

## Value chain analysis

The table below provides the data on the prices paid throughout the value chain. This data was estimated from project documentation and is based on expenditure within the Khamkeut district and prices and costs relating to the COOP order for rattan baskets.

Table 12: Unit prices paid through supply chain

| Recipients | Area                        | Units        | Number of units | Average per unit - LAK | Average per unit - USD |
|------------|-----------------------------|--------------|-----------------|------------------------|------------------------|
| Villagers  | Forest inventory (variable) | ha           | 1               | 37,800                 | 4.73                   |
| Villagers  | Monitoring                  | Person days  | 1               | 30,000                 | 3.75                   |
| Villagers  | Harvesting costs            | Canes        | 1               | 882                    | 0.11                   |
| Government | Natural resource tax        | Canes        | 1               | 177                    | 0.02                   |
| Villagers  | Splitting costs             | Split canes  | 1               | 773                    | 0.10                   |
| Villagers  | Weaving costs               | Product sets | 1               | 30,000                 | 3.75                   |
| Exporter   | Wholesale margin            | Product sets | 1               | 2,492                  | 0.31                   |
| Exporter   | Wholesale price             | Product sets | 1               | 132,000                | 16.50                  |
| Retailer   | Retail price                | Product sets | 1               | 373,000                | 46.65 <sup>4</sup>     |

Source: Project data, discussion with project staff and Ecolarge analysis.

## Break-even points

The model estimated four different break-even points. A break-even point occurs when revenue is equal to costs for establishing and maintaining FSC certification. These are explained below.

Table 13: Description of different break-even points estimated by the model

|                         |  |
|-------------------------|--|
| <b>First year</b>       | The first year break-even target consists of the upfront costs to obtain certification and any costs for conducting a forest inventory and establishing management plans.  |
| <b>Subsequent years</b> | The subsequent year break-even target consists of the cost of annual monitoring of the forest as well as annual audit fees or group member fees for the FSC certificate.   |
| <b>Five year period</b> | The five-year period break-even target is the sum of the first year break-even target plus the subsequent year target multiplied by four. This brings the total break-even period to five years, the cycle for FSC requirements for renewal of the FSC certificate (and repayment of the higher cost for initial certification). |
| <b>Annual average</b>   | The annual average target is the simple arithmetic mean of the five-year period. That is, the five-year period break-even target divided by five years. This is essentially amortising the first year once off costs over the entire five years.   |

Table 14 below summarises the results of the modeling for break-even estimates. Only five-year and average-annual break-even points are provided in Table 14. Five-year and average-annual points are

<sup>4</sup> Converted to USD in October 2011. Combined price for all products, although these will be sold separately in retail stores. Individual prices will be: Small – 9.90 CHF, Medium – 12.90 CHF, Large – 18.90 CHF.

provided because if we were to take cumulative-annual breakeven points, the costs and number of canes required to be harvested would be significant for the first five years, after which the costs would drop significantly (shown in

Figure 5). Using five-year and simple averages-annual points smoothens the cost recovery period. This is similar to the issue discussed above regarding the total subsidised cost per basket set and the high total cost per basket if capital costs are not amortised<sup>5</sup>.

Table 14: Summary of break-even estimates

|   | Units        | Scenario 1<br>(2011) | Scenario 2<br>(2012) | Scenario 3<br>(2013) | Scenario 4<br>(2014) |
|---|--------------|----------------------|----------------------|----------------------|----------------------|
| 1. Annual average cost (break-even point) for village level forest management for FSC | USD          | 19,935               | 10,530               | 40,320               | 46,894               |
| 2. Annual average cost (break-even point) for FSC chain of custody                    | USD          | 7,150                | 7,150                | -                    | -                    |
| 3. Five year period rattan canes harvested to break even (harvesting only)            | Rattan canes | 219,000              | 143,000              | 452,000              | 581,000              |
| 4. Five year period rattan canes harvested to break even (all village activities)     | Rattan canes | 51,000               | 33,000               | 105,000              | 135,000              |
| 5. Five year period products made to break even                                       | Product sets | 86,000               | 149,000              | 126,000              | 126,000              |
| 6. Average annual harvest required to break even (harvesting only)                    | Rattan canes | 44,000               | 29,000               | 90,000               | 116,000              |
| 7. Current quota status for harvesting only   | Status       | Quota sufficient     | Quotas sufficient    | Quotas insufficient  | Quotas insufficient  |
| 8. Average annual harvest required to break even (all village activities)             | Rattan canes | 10,000               | 7,000                | 21,000               | 27,000               |
| 9. Current quota status for all village activities                                    | Status       | Quota sufficient     | Quota sufficient     | Quota sufficient     | Quotas insufficient  |

To assist with understanding Table 12, an explanation of the terms above is provided below:

|   |   |
|---|---|
| 1. Total cost (break-even point) for village level forest management for FSC      | The total cost estimated at a village level for forest management including the cost for an initial FSC audit and also time spent conducting forest inventories and creating forest management plans.   |
| 2. Total cost (break-even point) for FSC chain of custody                         | The total cost estimated for exporters to obtain chain of custody (CoC) certification from FSC. In 2013 and 2014 no cost is included because  |
| 3. Five year period rattan canes harvested to break even (harvesting only)        | The number of rattan canes required to cover the costs of FSC certification at forest/village level. It is based on the price paid to harvesters per cane. That is, it assumes that the harvesters cover 100% of the costs of FSC certification.  |
| 4. Five year period rattan canes harvested to break even (all village activities) | The number of rattan canes required to cover the costs of FSC certification at forest/village level. It is based on the price paid per cane at the village level, inclusive of harvesting, splitting and weaving. That is, it assumes that the entire revenue from the village covers the costs of FSC certification. |
| 5. Five year period products made to break even                                   | The number of product units that would need to be sold to cover the costs of CoC certification for the exporter.  |
| 6. Average annual harvest required to break even (harvesting only)                | The average annual harvest required to break even over the five-year period, where only harvesting revenue covers FSC costs.  |
| 7. Current quota status for harvesting only                                       | In the model this cell performs a check of the required annual harvest (5.) against the reported annual quota from the harvest plans. These harvest plans are yet to be updated so harvests are understated.  |

<sup>5</sup> Despite this, people with low incomes and subsistence livelihoods tend to place a much higher value on costs and benefits today. Similarly, without access to credit to cover initial costs and smoothen repayment, this might be an unrealistic assumption.



|   |  |
|---|--|
| 8. Average annual harvest required to break even (all village activities) | The average annual harvest required to break even over the five-year period, where harvesting, splitting and weaving revenue covers FSC costs.   |
| 9. Current quota status for all village activities                        | In the model this cell performs a check of the required annual harvest (7.) against the reported annual quota from the harvest plans. These harvest plans are yet to be updated so harvests are understated. |

The key findings of the analysis presented in [Table 14](#) are that:

- Break-even points based on rattan canes harvested are interesting but probably best used once data about a new potential product order is available. Otherwise, dollar figures are better for break-even analysis since per cane break-even points are very sensitive to per unit costs throughout the supply chain.
- Increasing the number of export businesses has a significant impact on break-even points. Without sufficient market demand, export businesses may find it hard to justify the costs of CoC certification. If there was a mechanism for exporters to share certification costs, similar to being group members for forest management certificates, this could make it easier for the number of CoC exporters to increase.
- Quota data provided by the project did not include expanded projections of harvestable rattan canes, this has affected assessments regarding the sufficiency of quotas to cover break-even points.
- If only the harvesting group is expected to cover the costs of FSC forest management certification at a village level, it is probably too expensive to maintain FSC certification unless rattan harvesting levels are very high. A mechanism for sharing of FSC costs across harvesters, splitters and weaving groups would be better.

Figure 7 below shows the break-even revenue required if a cumulative annual approach is taken (dark blue) and contrasts this with a situation where the project doesn't expand beyond areas already covered in 2011 (see Scenario 1 in [Table 9](#)). For the cumulative approach, costs are high for the expansion period as FSC certification costs need to be paid and new forest inventories and management plans created. By 2015, if no new areas are added, the cost to maintain the certificate significantly drops, since only ongoing monitoring and annual audit fees need to be paid. For Scenario 1, assuming no expansion of existing forest areas between 2012 and 2015, we can see that the costs drop dramatically between 2011 and 2012 because the costs switch from establishment to just monitoring and support - some re-certification audit fees may be required by 2016.

This suggests that the project should be careful not to expand too rapidly, both because of the costs and also because of uncertainty about market demand for FSC certified rattan. Similarly, supporting additional exporters too early in the project would result in unnecessary costs if market demand is not sufficient to support multiple exporters of FSC certified rattan. Of course, this analysis takes a purely financial perspective looking only at FSC certification. With this perspective, the primary benefit of expanding the project area is to have an increased supply of FSC certified rattan. In reality, the project has a number of additional economic, social and environmental benefits and the analysis presented here is not with respect to the entire project. See Campbell (2011).

Figure 5: Cumulative cost of FSC Forest Management Certification (2011-15)



## Annual audit costs

Annual audit costs are dealt with in the model by simply dividing the annual audit fee by the number of anticipated members in the Forest Management Enterprise (FME). This is shown in the table below.

Table 15: Estimated costs per member and total rattan share of annual audit

|  | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 |
|--|------------|------------|------------|------------|
| Expected number of rattan villages     | 4          | 6          | 14         | 28         |
| Annual audit costs (USD)               | 9,000      | 9,000      | 9,000      | 9,000      |
| Total rattan share of audit cost (USD) | 500        | 500        | 500        | 500        |
| Total audit cost per village (USD)     | 125        | 83         | 36         | 18         |

If the annual audit costs were to be equally divided by the number of group members, by 2014, rattan members of the DoF group certificate would be paying \$7,412 of the \$9,000 audit fee per year. This is 82% of the cost of the annual audit. This assumes that no new timber members are added over this time.

This would represent a significant proportion of the annual costs to maintain certification and we suggest that sharing of annual audit costs – or group membership fees – should not be based on a simple average.

For the figures run in the modelling, we assumed that rattan members would cover no more than \$500 (data provided by WWF project) of the \$9,000 annual audit fee.

At \$500, this would account for 50% of annual costs under Scenario 1, in which there are 4 FSC certified villages and 1,142ha of sustainably managed forests. In this scenario, the total yearly costs after year 1 are estimated at approximately \$1000. \$500 of this can be attributed to ongoing forest monitoring (estimated at 36 full days per year) and \$500 to the annual audit cost. Assuming the rattan share of the audit cost is held constant at \$500, increasing the number of FSC certified villages in the project area (Scenarios 2, 3 and 4 from [Table 9](#)) would lower the cost per village from \$125 under Scenario 1 to \$18 under Scenario 4. However, as already discussed, expansion on this scale will require significant expenditure to support the creation of forest inventories and management plans.

### Basing audit costs on member revenue

Another approach to sharing the annual audit costs within the FME may be to base cost of the audit covered by each member on their revenue. For example, if there are ten forest members, of which the timber members account for 90% of revenue derived from FSC certified products, those members could cover 90% of the cost of the annual audit. This would support smaller rattan producers for whom the annual audit costs can represent a significant barrier to running profitable operations.

## Conclusions and recommendations

FSC certification has a number of benefits such as improved forest management and access to international markets. Well-managed forests not only result in more sustainable supplies of rattan, and thus more sustainable incomes, but can also result in improved yields of other NTFPs. Access to international markets, particularly for more expensive labeled products, can contribute to higher incomes from rattan harvesting and processing. In addition, experience in sustainable forest management and product export can potentially be carried over to other practices.

Looking at the short-term financial only analysis, the costs of FSC certification have exceeded the benefits. The benefits of FSC certification, however, go beyond just short-term financial gains. As was demonstrated by field work, unsustainable harvesting practices can result in a collapse in rattan supplies, denying rural villages one source of future income. To properly assess the net benefits of FSC certification, a longer-term study would be needed, perhaps looking at incomes over 5 years. Analysis at such an early stage can be distorted by the inclusion of high capital costs. For now, the financial sustainability of areas certified as well-managed forests will continue to depend on support from WWF and other project partners.

To improve the project in the future, some recommendations include:

- Data monitoring could be improved by focusing on fewer, but the most relevant, metrics being tracked.
- The project should focus on expansion of areas where additional capital costs are lowest.
- The potential for sustainable export of other NTFPs should be explored.
- The project needs to clarify with DoF the arrangement by which annual forest management audit costs will be shared.
- A mechanism for sharing the rattan share of the annual FSC audit cost, for Forest management and CoC, should be investigated.

The project should be encouraged by the tremendous impact it has had on forest management but perhaps more importantly, the capacity development achieved at all stages of the rattan value chain in Lao. Combining best practices in forest management with market access creates an amazing incentive for more sustainable resource management. The project has proven that rattan can be sourced sustainably and that Lao can produce export quality finished products. Building on the success of the project so far will contribute to the development of Lao PDR and the development of a more sustainable global rattan industry.

## References

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SmartWood. (2011). *Forest Management 2011 Annual cum Scope Expansion Audit - Report for: Department of Forestry In Vientiane, Lao PDR. Organization.*

## Appendices

### FSC Chain of Custody Certificate for Leudnilan



# The Rainforest Alliance

LEUDNILANH AGRICULTURAL PROMOTION CO., LTD.  
KAOLIAO ROAD, SYKHOTABONG VILLAGE  
VIENTIANE, LAO PEOPLE'S DEMOCRATIC REPUBLIC

**IS CERTIFIED FOR FOREST STEWARDSHIP COUNCIL  
CHAIN-OF-CUSTODY**

**Certificate Scope**

**Certificate Type:** Single Chain-of-Custody  
**Standard(s):** FSC-STD-40-004 V2-0  
**Product group(s):** Kitchenware  
**Valid from** May 20, 2011 **to** May 19, 2016  
**Certificate Registration Code:** SW-COC-005471

**FSC License Code:** FSC-C105379  
**Certificate Issue Number:** IN-2011-1

Additional details regarding the scope, including a full list of products and species, are available at [info.fsc.org](http://info.fsc.org).

  
Jon Jickling, Director  
SmartWood Program of the Rainforest Alliance  
65 Millet Street, Suite 201, Richmond, Vermont, USA 05477

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## Key processes

Figure 6: Steps required to begin harvest

## Buyer / exporter

## Government

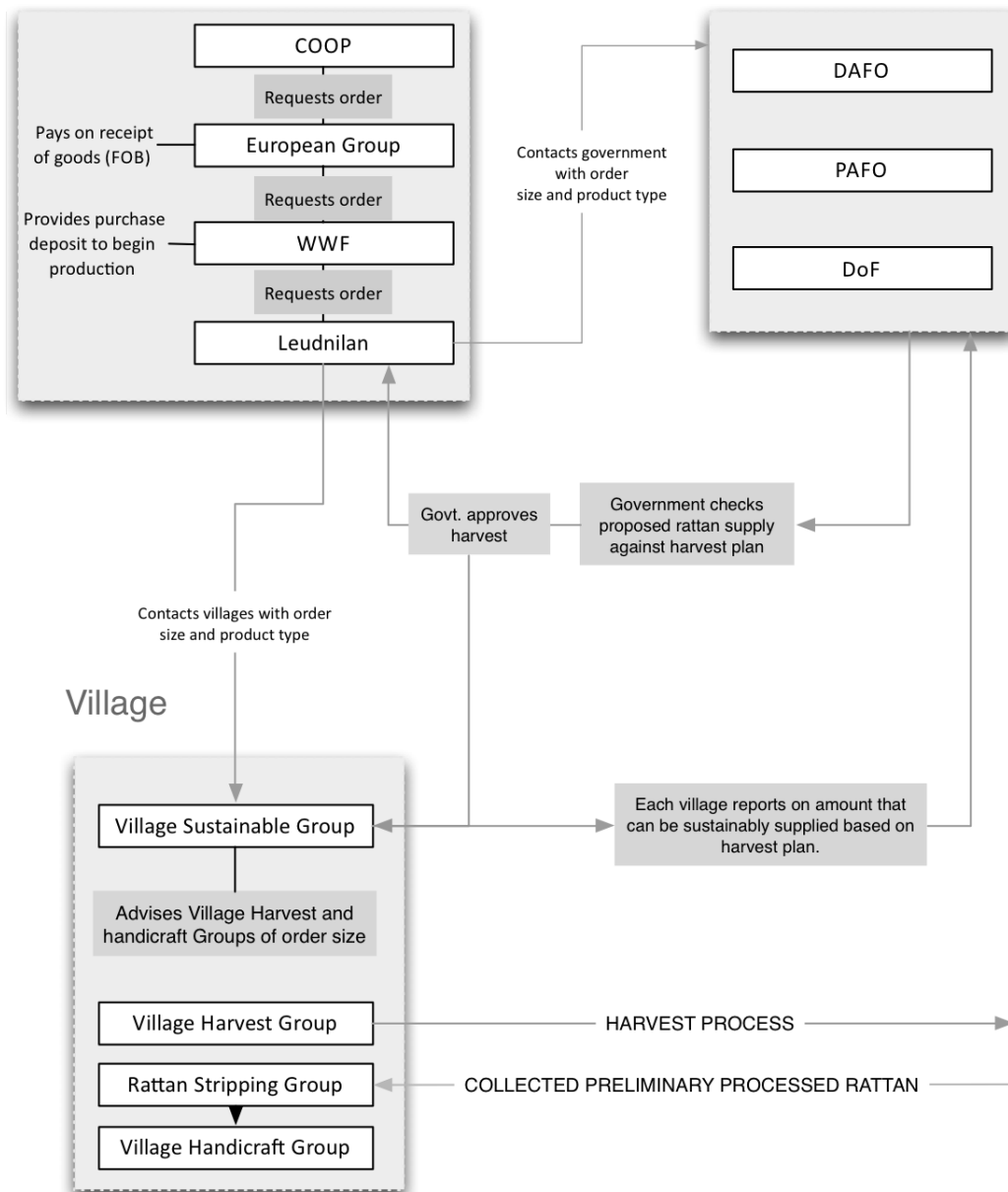


Figure 7: Process flow diagram - rattan harvest to shipping

