“How to deal with opportunities?”

A research on requirements to successfully introduce lesser known timber species on the western (Dutch) timber market.

Boris Bakker
(Bachelor study International timber trade)

Responsible institute:
Van Hall Larenstein University of applied sciences.
Internal support by John Raggers

Enacted at the Probos foundation
External support by Mark van Benthem

February- July 2011

How to deal with opportunities?

A research on requirements to successfully introduce lesser known timber species on the western (Dutch) timber market.

Boris Bakker
(Bachelor study International timber trade)

Responsible institute:
Van Hall Larenstein University of applied sciences.
Internal support by John Raggers

Enacted at the Probos foundation
External support by Mark van Benthem

February- July 2011

Preamble.

Verifying sustainable forest management by an FSC certificate makes it possible to sell responsibly harvested timber in a visibly and documented way. The high costs and balanced harvesting make it necessary to harvest and sell more species than the commercial ones to stay profitable and spread these costs over more species.
The market however is quite loyal to well known species and prefers these above “new” ones.

We have learned that as a sales person, you should always listen to your customer. Listen to its demands and try to offer what he wants. But in this case, on the long term, isn’t it also important that the customer is listening to you for both sake?

The Probos foundation stands for sustainable forest management worldwide and therefore this item suits their contention very well and this research was formed around this particular issue.

In this research it is investigated how to deal with the issue and to test it on an actual case.
Hopefully, it will be adapted with pleasing results by others in the future.

Desk research formed the basis to start from, but later in the process a lot of related external actors provided information in the form of knowledge, experiences, opinions and suggestions.
I heartily want to thank; René Klaassen from SHR, Mark Diepstraten from Koninklijke houthandel G Wijma & zonen B.V., Herbert Reef from Reefhout BV, Ingvar Kristensen from Dekkerhout, Eric de Munck from Centrum hout, Chris van der Groot from Stichting Eco hout, Andries van Eckeveld from Precious woods Europe BV, Bert Kattenbroek from NBVT and Geert van Dijk from Arnhemse fijnhouthandel for their input, efforts and willingness to cooperate in this research. Without their expertise this research would not contain the essential “field experience” it requires.

A special thanks I want to express to Mark van Benthem from the Probos foundation. As my external coach he gave the right directions, feedback, suggestions and input during the whole project. His experience and insight made it possible for me to take the right routes and make the right steps in this process.

I would also like to thank John Raggers who was my internal coach during the thesis period.
He asked the right questions during the start of the process which made me think differently about certain aspects, or evaluate the issue from another point of view in this research.

It has been my objective to make a clear analysis with logical steps as a consequence.
Practical recommendations to apply based on valuable impulses from all sides of the field.

Borculo, June 2011

Summary.
Concession owners often have major difficulties to commercialize their lesser known timber species. Although this is obligated by FSC certification and often necessary to maintain a profitable business, it is found that customers are not very willing to apply these lesser known species. Despite this, these species may have good commercial potentials.
The main question therefore is: What influences the introduction of lesser known timber species and how can we deal with certain obstacles to make it as successful as possible?

An analysis on success and failure factors by desk research as well as interviews showed that the lack of practical experience with these species, the uncertainty of long term availability, the lack or limitation of knowledge and the costs of investigation all obstruct the ease of introduction. By desk research and interviews it was found that the issues that make a specie commercially interesting are properties and availability as primary issues. Secondary are demand and price which may vary. Experience from the past had different amounts of success and on average it is found that acceptance of lesser known timber species is better nowadays although it remains easier to sell common species. To place new species in the market the ground, way and hydraulics sector and the retail sector were found to be the most successful because of acceptance and suitability.

All these issues formed a tool to use during the selection of potentially interesting species which may become commercialized. By determining possible applications and comparing to somewhat similar species, the quality could be determined based on properties for a certain end use and features to become successful on the market. This concept tool was tested on a thoroughly selected pilot (test) area in Cameroon containing 61 species. After several selections the list was brought back to four species; Alep, Bodo, Koto and Movingui.
Alep was found to be a substitute to Azobé in the ground, way and hydraulics sector, Bodo as a substitute to Palissander and Walnut veneer, Koto as a substitute for Abachi sheet material and Movingui with a wide range of applications.
The system is found to function and covers most influences and provides useful species.

Acting together with multiple companies and developing an own alternative system of classifying species are some important conclusions. Also communicating the motive to the market might create better understanding which eventually can result in a better availability for certain end uses.

It is recommended to start a foundation which can manage research, promotion and the choice on necessary tests. A costly issue like marketing lesser known species consists of the same issues for comparable companies, so dealing with these problems might have more success if it will be challenged together.
Start projects to gain practical experience with the species is essential to gain information about timber in service. It is important to get those figures which are relevant for a specific branch.
These efforts should be put in species which have a good and long term availability.

Table of content:

List of figures and pictures:		Source:
Frontpage		Koninklijke Wijma & zn BV
Fig. 1	Questions and methods	
Fig. 2	SWOT analysis heoretical input	
Fig. 3	Success & failure factors from theoretical review	
Fig. 4	SWOT analysis practical review	
Fig. 5	Success and failure factors from practical review	
Fig. 6	Commercial potential schedule	
Fig. 7	Verifying and identifying log information	Koninklijke Wijma & zn BV
Fig. 8	Precious woods experience of dealing with new species	FSC- UK working group
Fig. 9	WWF/ GTZ experience of dealing with new species	WWF/ GTZ
Fig. 10	Schedual of differences and similarities between theoretical and practical input	
Fig. 11	Flow chart to determine specie's commercial potential.	
Fig. 12	Timber criteria which provides points	
Fig. 13	Concessions in Cameroon	A concession owning timber trader
Fig. 14	Table on availability selection	
Fig. 15	Calculation on minimum availability	
Fig. 16	Presence in hout database	
Fig. 17	A stack of thin sheet material	Private collection
Fig. 18	Providing points and selecting	
Fig. 19	Alep data	Picture: the Wood Explorer inc.
Fig. 20	Bodo data	Picture: the Wood Explorer inc.
Fig. 21	Koto data	Picture: the Wood Explorer inc.
Fig. 22	Movingui data	Picture: the Wood Explorer inc.

Abbreviations	Meaning
CSR	Corporate social responsibility (A triple P way of doing business; focusing on profit with respect for people and planet)
DBH	Diameter at breast height (from a standing tree trunk)
DIY	Do it yourself (market)
FSC	Forest stewardship council (Forest/ wood certification)
GWH	Ground, way and hydraulics (sector), also referred to as civil engineering
KOMO	Keuring en onderzoek van materialen voor de overhead (classical name)
KS	Known species
LKS	Lesser known species; these can be trees too
LKTS	Lesser known timber species
LUS	Lesser used specie, but might be known
MC	Moisture content (of the wood)
MTC	Malaysian timber council (Independent certified Malaysian timber products)
NEN	Nederlandse Norm (Dutch norm)
NGO	Nongovernmental organization
PR	Public relations
PS	Promotional species; planned to focus on. May become commercial ones
SFM	Sustainable forest management
SWOT	Strength, weaknesses, opportunities, threads (analysis)

Term	Glossary
Janka hardness	The force which is required to press a steel ball with a diameter of 11.824MM exactly to 50% deep into the wood. The surface of the ball is 100MM2.
Monin hardness	Monnin hardness is measured by pressing a cylinder with 30mm diameter into the wood perpendicular to the grain with a force of 200daN for 5 seconds. (1daN = 10N, 200daN = 203.94 KG.) The depth of the depression left by the cylinder is measured in millimeters, and the Monnin hardness N is then calculated as 1/T

1. Introduction.

1.1 Definition of the topic:

There is a huge amount of timber species worldwide. All with unique features and possibilities.
It is the case though that only a relatively small selection is commercially harvested. For concession owners it is obligated by FSC certification to maintain a balanced harvesting schedule which requires also the harvesting of lesser known timber species (LKTS).
To make certification and expensive forestry acts profitable, it is desirable by the concession owners to commercialize these lesser known species too, as more species are harvested, a bigger yield/ ha is maintained and certification investments can be earned back over more timber species which makes sustainable forest management (SFM) better payable.
In this research it is investigated what actually influences introductions of LKTS and how they could be commercialized more easily.

1.2 Problem analysis and (sub) questions:

As the harvesting of LKTS is obligated by FSC certification because of ecological motives and because of the financial benefits for the concession owners, commercialization these species is desired as well as necessary.
Also the pressure on known species increases and scarcity already occurs for certain species.
The market however is not very enthusiastic about these LKTS which makes the sales of them more difficult compared to common species.
The main question therefore is:

"*What influences the introduction of lesser known timber species and how can we deal with certain obstacles to make it as successful as possible?"*

These questions will form the **first part** of the research (chapter 2):
- What are the success and failure factors regarding actual LKTS introduction(s)?
- What makes a specie commercially interesting?
- How were new species introduced in the past?
- Why did companies not trade in LKTS before (on scale)?
- What are the companies and organizations opinions/ experiences about newly introduced LKTS?

The **second part** consists of the following sub question (chapter 4):
- What region benefits the most and brings probably the most result from this assignment?

The **third part** consists of the upcoming questions (chapter 5):
- What species are present in the concerning area and which are considered commercial (and
  which not)?
- Are these LKTS commercially available (volume)?
- What is done with these LKTS species until now?
- What commercial species could these LKTS become alternatives for?

The **final part** consists of the question (chapter 6):
- How can commercial interest and success be generated?

1.3 Goal(s):

This research has the following goals:

- The first one is to provide an insight about the relevant issues which play a role during the process of commercialization LKTS, so that a concessionaire knows which issues he has to deal with and which play an important role during introduction and promotion.
- Secondly the research has to provide a tool to apply during introductions so that it can be evaluated whether a specie suits commercialization step by step.

1.4 Methods and chapters:

As there is existing information available and practical input is vital too, a combination of several methods was applied. Figure 1 shows which ones apply for which parts.

Chapter 1: Introduction
Chapter 2: Analysis
Chapter 3: Data to be gathered and concept forming
Chapter 4: Pilot area choice
Chapter 5: Timber species and testing the concept
Chapter 6: Conclusions and recommendations

Question:	Method:	Chapter:
"What are the success and failure factors regarding actual LKTS introduction(s)?" To understand those issues which should be focused on or which should be avoided. Learning and preventing is central here.	Desk research and interviews.	2
"What makes a specie commercially interesting?" To understand the factors that a specie should have to gain commercial success.	Desk research and interviews.	2
"How were new species introduced in the past?" To learn and become aware of previous experiences.	Desk research and interviews.	2
"What are the companies and organizations opinions/ experiences about newly introduced LKTS?" To gain vital information on practical know how and experience.	Interviews	2
"What region benefits the most and brings probably the most result from this assignment?" To test the (concept) tool, a suitable pilot area has to be found.	Desk research and interviews	4
"What species are present in the concerning area and which are considered commercial (and which not)?" To know which species to focus on and which less.	Desk research, observations and interviews	5
"Are these LKTS commercially available (volume)?" To gain figures on the essential availability.	Observations	5
"What is done with these LKTS species until now?" To evaluate their usage and destiny so far.	Interviews	5
"Which commercial species could these LKTS become alternatives for?" To find out which species the LKTS could be substitutes for and which market to target them on.	Desk research	5
"How can commercial interest and success be generated?" What is the best way to put the species in the market and how to deal with certain issues?	Desk research, interviews	6

Fig. 1 Questions and methods

The answers to the questions from chapter 2 are used to form a concept tool (chapter 3) to test on the area which was selected in the fourth chapter.
Chapter 5 consists of the above preset questions on availability and these function as preparatory questions to test the concept tool. This is necessary because the concept is less influenced by availability.

1.5 Target audience:

This research is conducted on behalf of the Probos foundation. As they stand for sustainable forest management worldwide, they want to provide concession managers/ owners a tool and recommendations to use during the marketing of their LKTS.

2. Analysis on factors related to market introduction and promotion.

As research on LKTS is done in the past it is investigated what the result were and how the experiences have been. This way it can function as background information for this particular research to keep in mind and to act accordingly.

2.1 Factors from theoretical review.

Most available theory was focused on a particular project or research instead of the general topic itself. Therefore the sources provided different situations and motives for research.
The sources which did cover the general issue mutual agreed on most involved issues.
This information is important to evaluate the atmosphere around the topic and the evaluation of the practical input in the later stage.
Reports, articles and interviews were used to get a clear view of the existing situation. This resulted in key information which was put in a SWOT analysis. The statements in the analysis were selected to be the most prominent and important ones. By use of these statements, certain strategies were developed to deal with them or to make use of them. These strategies were developed by combining two kinds of impulses. The analysis is visible in figure 2.

SWOT Analysis

Factors related to LKTS introduction(s)
(based on theoretical information)

Sterkten (Strengths)

S1	LKTS in certified consessions are directly certified timber
S2	Promotion from the source- direct contact (as consession manager)
S3	Win- win results for economy, ecology and local people
S4	More species present than harvested
S5	Availability of commercial species often is to less
S6	Increase the yield/ Ha
S7	LKTS are often under utilized
S8	Releave (some) pressure of commercial species
S9	Scarsity will occur eventually if LKTS are not commercialized
S10	Forest value will increase (more reason to maintain)

Zwakten (Weaknesses)

Z1	Promotion method (and effect) depends on actor in the chain
Z2	Technical as well as commercial properties should favor
Z3	Potential species should be profitable enough to commercialize
Z4	Lack of sufficient timber information (including regeneration)
Z5	Unsteady availability (depends on specie)
Z6	Lack of proper marketing (information) and strategies
Z7	Lack of financial back- up for technical (timber) and market reserach
Z8	No standard promotion programms are known
Z9	Lack of commercial know how in the country of extraction
Z10	Consumer perception of tropical timber
Z11	Traditional consumers buying behavior
Z12	Difficulties in identification (also in the field)
Z13	So far relatively slow progress in practice (regarding introductions)
Z14	Large spread of species in the forest (not always the case)
Z15	Lack of understanding and eductaion in country of extraction
Z16	Often poor infra structure
Z17	Often yield and inventory data does not cover LKTS/ LUS

Kansen (Opportunities)

K1	New fineer/ design drawings
K2	Using attractive, memorizable names (maybe even existing)
K3	Use project examples to show
K4	Develop a strategy to adapt on every area
K5	Price and availability
K6	Group species with similar features (end use grouping)
K7	Show the environmental friendly impact
K8	Try pull- strategies by consulting architects and project developers
K9	Develop uses for every single LKTS
K10	Instruct local communities to understand long term benefits

SK strategieën

SK1	Connect marketing to "environmental friendly design". Connect to SK8
SK2	Use characteristic aliases used by different actors involved in LKTS/ LUS promotion
SK3	As whole- chain company: Sell LKTS cheaper first and make a deal to use the project as promotional example
SK4	Develop in phase 5
SK5	ZB1 combined with penetration strategy
SK6	Make a LKTS group per end use with ranking of (species)properties (results probably in price ranking by companies)
SK7	Make forestry monitoring more public (with positive progress). also by involved certified companies
SK8	Consult project developers & architects to prescribe certain LKTS/ LUS because of appearance and properties
SK9	Translate these enduses to the sales people of involved companies to advice their customers with S3 & S9
SK10	Involve locals in management decisions/ meetings for long term understanding and education

ZK strategieën

ZK1	Cooperate with existing initiatives (e.g. Linking Europe)
ZK2	Create a translating strategy from theory to practice unlike most reports
ZK3	Do not only promote LKTS but also PS which might provide more succes
ZK4	Start cheap pricing with a low margin & rise towards the future (penetration strategy)
ZK5	Try to skip middle man & focus PR on product group per end user
ZK6	Include carbon calculator on public sites to improve the image of tropical LKTS harvesting
ZK7	Establish willingness among involving companies to share technical timber info (with FSC?) to be able to develop LKTS marketing better
ZK8	Publish related initiatives also for public interest to generate understanding instead of skeptic ideas of LKTS harvesting
ZK9	
ZK10	

Bedreigingen (Threats)

B1	Resistance of middle man's
B2	Problems regarding steady supply (depends on specie)
B3	Problems regarding steady quality/ sizes
B4	Extra costs of introduction
B5	Willingness of paying more (if necessary)
B6	Not everyone might take it serious at this stage (need)
B7	Demand has to be there for succes
B8	Companies/ customers bad experience with LKTS
B9	Costs of money (currency) and national interest rates

ST Strategieën

SB1	Try to skip middle mans or make deals on a % of sales existing of LKTS. more gives a small bonus
SB2	Only promote those species with a good availability to prevent disappointment
SB3	Maintain clear property margins to cover for disputes or differences in the actual timber
SB4	
SB5	Make favorable packaging deals possible including LKTS. Increases sales and possibly trust/ experience
SB6	Involve possible future scenarios (availability) in PR when LKTS are not commercialized in short term
SB7	Penetration strategy (less expensive in beginning) + widely promoted consequences if LKTS are not utilized
SB8	Investigate in practical part and then come up with solutions. (why, how, what, etc.)
SB9	Make international financing possible with favorable interests (for exporting country)

ZB Strategieën

ZB1	Focus marketing on few species that account for 90% of availability (of course including technical data)
ZB2	Include all recognizable/ identifiable trees in data during concession inventories in the field (also for future purposes)
ZB3	Make communities aware of quality & availability needs instead of absolute price importance on western markets
ZB4	
ZB5	
ZB6	
ZB7	
ZB8	
ZB9	

Fig. 2 SWOT based on theory with possible solutions to the stated issues.

Also success and failure factors were stated which are important to keep in mind so that the same mistakes will be avoided in the future and during this research. These are also gathered by desk research and therefore the strategies from the SWOT also cover aspects from the “success & failure factors” (see figure 3).

Success	&	Fail factors regarding LKTS introduction(s)
End use grouping of species with somewhat comparable features		Resistance of agents/ middle mans
Promotion directly from the source (direct contact)		Short term availability
Lots of marketing motivations*		Unconstand quallity
Quite some existing timber information		Bad experiences (relying to much on FSC certificate as success factor)
Connect with existing projects with comparable mission(s)		Unfavorable valuta and interest rates to pay costs
Current high timber prices allow penetration strategy		Commit type of promotion to right actor in the chain
Using attractive commercial names (or connect to existing ones)		Financial back- up for introduction (marketing, research)
Use project examples to show		Lack of commercial know- how in country of extraction
Develop a strategy which is addapatable on every area		No standard promotion programm known
Try pull strategies by consulting project developers/ architects		(end)- consumer perception of tropical timer (LKTS means harvesting even more?)
Develop end uses for every specie to " think in advance for the customer"		Poor infra structure (cases known of 50% transport cost reduction when roads were improved)*
Concentrate marketing efforts on few species that acount for 90% of available volumes		Often yield and forest inventory data does not cover LUS & LKTS*
		Practical translation from research to marketing enactment
		Area is mostly fixed prior to research which might result in useless information and/ or conclusions
*:		*:
Increase of yield/ ha		Not directly related to market introduction but it is related to getting it on the market
Earn back FSC investment over more species		
Decrease pressure from commercial species		
New product options/ markets		
Ecological benefits		
Forest value will increase		

Fig. 3 Success & failure factors from theoretical input.

It became clear that;

- the lack of technical data (Cossio Antezana 2007) (Vlosky, Aguirre 2001),
- lack of commercial knowhow (Vlosky, Aguirre 2001),
- the willingness from the market (Cossio Antezana 2007),
- and a steady supply of good qualities, sizes and quantities (Cossio Antezana 2007) obstruct the ease of commercializing lesser known timber species.

The lack of a standard promotion instrument makes it difficult to deal with the issue in the first place (Vlosky, Aguirre 2001).
Some statements include local problems like financing (Vlosky, Aguirre 2001), resistance of middle mans (Vlosky, Aguirre 2001) or currency and interest rates which do not favor international trade or investments.
Examples on timber in service seemed to be crucial to gain experience and trust from the timber markets, especially those who supply timber for outside use or heavy duties. This way a practical tool is available instead of numbers only from lab tests which might deviate in practice.
No other systems with the obligation of harvesting LKTS are found and FSC is stated as the only one (*http://www.cadexco.bo*).
It is the case that the MTC certification system promotes the utilization of LKTS (*http://www.fao.org*)

2.2 Factors from practical review/ interviews.

Influence from theoretical input is important to gain a basis and to build up knowledge about the topic, but the input from related companies and organizations may be even more important as information on actual experience is gathered here. A separation in external actors was made to gain consequent questions and to gain useful answers. This is done in the form of companies and related organizations. To avoid certain expressions to be connected to a single organization, the sources only mention the type of the consulted parties. A deviation was made between:

- Concession owning timber traders
- Timber traders
- Research organizations
- Supporting organizations (marketers, project organizations, consultants)

An analysis was made from the practical input to see the success and failure factors taken from the received information and interviews. The plane interviews for companies and organizations are visible in the first and second attachment. The questions asked and answered in practice did deviate a little as the interviews create their own way to some extent. Also in this case a SWOT analysis was made visible in figure 4.

SWOT Analyse

Factors related to LKTS

(based on practical information)

	Sterkten (Strengths)
S1	LKTS are additional effect of FSC certification, better understanding
S2	New products for customers, appreciation from market
S3	
S4	
S5	
S6	
S7	
S8	

	Zwakten (Weaknesses)
Z1	Miscommunication in chain of custody
Z2	Lack of knowledge
Z3	People look at €, not at doing good to the environment
Z4	Current philosophy = rules
Z5	First find a market, then a harvest plan based on licence and sawmill programm
Z6	People want assurance/ guarantee
Z7	Often lack of interest from market
Z8	Differences in interest/ company.
Z9	No one wants to pay for expensive tests as every competitor can sell the specie afterwards (perhaps KOMO cert.)
Z10	More risk/ lack of guarantee with LKTS
Z11	Child illnesses

	Kansen (Opportunities)
K1	Create practical project examples to see the timber in service
K2	Focus on characteristic enduses where no alternatives are possible
K3	Furniture/ retail industry might benefit from LKTS species (also GWH sector)
K4	More lobbying for wood like PVC/ Steel industry does
K5	Interpreter inventarisation species by market instead of the licenced ones (for future purposes)
K6	Bundle concessions for a good collective availability of species
K7	Search for the niches in every market segment
K8	Use practical examples (on own buildings)
K9	Stimulate suppliers to deliver FSC, LKTS is a collateral occurance
K10	Retailers know the advance of LKTS, names never matter, only properties
K11	Often more availability from certain LKTS compared to KS

	SK strategieën
SK1	As a company, put more focus on CSR with LKTS. Use it on the website to explain to customers
SK2	Inform customers about additional effect of LKTS with FSC certification
SK3	Focus on service when it comes to LKTS trading as availability can be maintained
SK4	
SK5	
SK6	
SK7	
SK8	
SK9	

	ZK strategieën
ZK1	End use grouping of wood with similar properties for bigger availability
ZK2	As new foundation, establish projects for example projects, financing of tests (if needed) and marketing
ZK3	Establish quality description/ system instead of expensive tests
ZK4	Use carbon calculator also in lobbying practices
ZK5	Be modest when introducing LKTS because of unidentified teething problems
ZK6	Try to offer 1:1 to avoid losing margins and risks of claims
ZK7	
ZK8	
ZK9	

	Bedreigingen (Threats)
B1	Adaption of LKTS without experience
B2	Future might become fulfilled with plantations, modified wood, bamboo
B3	An existing culture is difficult to change
B4	Long term planning (years) to market, trade and availability
B5	Trading practices from China and India (cheap, non certified)
B6	Lack of durability experience/ tests
B7	
B8	

	ST Strategieën
SB1	
SB2	
SB3	
SB4	
SB5	
SB6	
SB7	
SB8	

	ZB Strategieën
ZB1	Share information with actors in chain to prevent collective mistakes and consequences
ZB2	Lobby in niche markets where timber is the best option for the project
ZB3	Focus more on example projects to get practical experience and to show for sales purposes
ZB4	
ZB5	
ZB6	
ZB7	
ZB8	

Fig. 4 SWOT based on consulting with possible solutions to the stated issues.

The success and failure factors from practical review are stated in figure 5.

Practical review		
Success	&	Fail factors regarding LKTS introductions and viability
Quallity description/ system per specie/ application		Regulations and product certification (e.g. KOMO)
Mind setting		Comminication in chain of custody
FSC certification, LKTS is a collateral consequence		Lack of knowledge/ experience
Lobbying for durable (niche) applications instead of steel/ PVC		People are often reluctant to unknown species
Technical properties/ category (grouping species)		Risk/ guarrantee difficulties
Focussing on niche markets where alternatives are scarse (different sizes, furniture?)		Alternative materials (plantations, modified wood, bamboo)
Practical examples for experience with the timber in service		Culture of timber traders (stated as quite conservative)
Focus on few species with big availability		Long process of acceptance
Develop overall adaptable marketing (all markets and timber from all sources)		Possibly "wrong" species on harvesting licence
Focus on green demanding markets (eco furniture e.g.?)		Often uncertanty about long term availability
Avoid expensive, long lasting tests		Differences on concession inventarisation (availability of full data on species)
Act from a point of CSR		Trading practices from China and India (good money for uncertified timber)
Be certified when LKTS will be traded (FSC increases value of wood)		Bad experiences (often because of lack of knowledge)
Concentrate concessions for better availability of certain species		Efforts of shackles in the chain related to commercializing LKTS
Applying LKTS on own estate to experience timber in service		
Good possible markets are; retail, furniture, GWH sector		
Willingness of customer after positive experience while prior trust was limited		

Fig. 5 Success and failure factors from consulting.

The difference with the theoretical part is that a few more factors were included which do not directly need to have influence on introductions but also on the potential (commercial) success of LKTS/ LUS viability in general. Some are suggestions, others are findings.
The input from these external actors was in most aspects clear and uniform, but some also very different. The main reason was the background. It was found that on average companies were more positive towards the marketing opportunities of LKTS than organizations.
Some have quite some experience with LKTS, others less and some are involved in an advising role or one in research. One thing they all have in common is that they have a strong opinion about the issue. What is clear is that the wood itself is not always the problem when it comes to commercializing a LKTS. The question remains why a specie is lesser known. Reasons can be the timber features itself or its availability, but also traditional timber use and harvesting. This way a set of "traditional species" was created which we know well and have good availability. But now the situation is changing worldwide, FSC regulations and the scarcity moves us to cut more species to sell, but the buyers opinion often comes to the Dutch expression; "*What a farmer doesn't know he doesn't eat*" (stated by multiple concession owning timber traders and research organizations).
This observed attitude might be the biggest challenge of commercializing LKTS. Money is stated as more important than the environment and the willingness to switch is often not there. There are concessions owning timber traders who have different experiences nowadays as they let their customers use to the (future) need of commercializing LKTS years ago. Thus this concession owning timber trader stated to start modest to prevent child illnesses and disappointments on large scale.

Practical examples and experience often lack so with good fate a LKTS has to be adapted (stated by all actors). Most actors experience this as one of the major drawbacks.
Some anticipate on this issue by applying LKTS on their own real estate as practical examples/ tests. This has limited effect as the tests are unilateral but it gives an indication.

It is also unanimously stated that current existing certifications like KOMO obstruct the possible success for certain species as they have to undergo tests before getting accepted.
For LKTS this takes too long and single companies are often not willing to pay for it (Klaassen, Munck de, Gard, Mooiman, 2001).
Though it is stated by companies as well as organizations that people do want some assurance.
A statement by a concession owning timber trader was that assurance cannot be given as wood is a commodity. For construction practices an exception is sometimes made for rotting in the first 10 years (e.g.).

The demand for LKTS might be less as people often have the tendency to compare these species to known ones putting LKTS in a less favorable position. A positive effect was found by a concession owning timber trader when the specie showed the opposite and the effect was positive and so unexpected. Although customers generally do not ask for certain LKTS, the situation is developing that the sale of LKTS is increasing simply because of availability issues (A concession owning timber trader).

In the SWOT, only a few “Strength” features were stated. This has partly to do with the kind of questions asked, but also with the way the actors approached the issue. Looking at the drawbacks and chances; a problem solving and/ or a problem identifying attitude was shown towards the issue (leaving some exceptions which were more focused on the chances).

2.3 What makes a specie commercially interesting?

2.3.1 Theoretical review

Research on certain timber features can be very interesting and pleasing, but what actually makes a specie commercially interesting? Everyone has an opinion from his or her point of view, influenced by habits, experience, culture, or a guess. For example; Local communities often do not understand that the importance of a steady delivery and quality are more important than price for export timber (Cossio Antezana 2007). The outcome therefore depends on the person involved and the end purpose of the specie. Not every end use requires the same features to be commercially interesting. Despite different requirements we can state that there are some features which -“in the rule”- are considered to be necessary to have commercial value.

The most important one which is the initial issue are the timber properties for the allotted end use. If these do not favor a specific application, the timber is unfit (for that application) and the rest of the features cannot compensate on this. Sometimes this is referred to as technical properties as they are directly related to the wood.

Secondly is the availability. This is a wide description as we can speak here about availability in the sense of delivery time, quantities, qualities, right sizes, conditions of delivery, long term sourcing or simple the ease of obtaining the timber in the first place. To serve the customer in time, to be able to plan, to be flexible and to have assurance in pricing, availability is extremely important. Today also certification is an important factor in this matter, but for LKTS this often is compulsory. This second point (availability) is referred to as a commercial property (Amarasekara 2011).

A third point is not directly related to the timber and its ability to obtain but depends on several external influences. Those are demand and price influenced by a situation (varying on issues like scarcity or current fashion). They are related very closely and therefore work complementary influenced by each other and the previous two issues. Demand -or in first instance- potential interest, is influenced by the core benefits of the timber which are the properties. The measurements, specifications, packaging and availability in the widest sense make the actual product what can lead to the actual demand. The price can have quite some influence on the choice to purchase, but this does not have to be the case (Solomon, Marshall, Stuart 2009).
In figure 6, the visual situation is given.

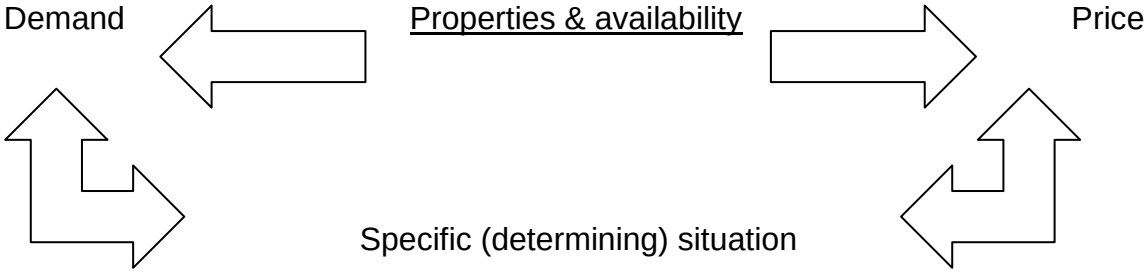


Fig. 6 Commercial potential schedule.

It is clear that properties and availability matter most and that demand and price are secondary issues depending on external issues (Cossio Antezana 2007).
Also -to get back to the start of this subchapter- background and type of organization influence the matter of reality the figure shows for a certain company. Also culture, time period, and fashion can influence the situation, but overall this is the way influences can be scheduled based on literature.

2.3.2 Practical review

External sources also mention certain features which make a specie commercially interesting.
All the theoretical features like properties and availability come back in their opinions.
Price is disputable depending on the situation (like stated in the theory).
A constant quality (stated by a research organization) is very important which is actually comprehensible.
Also right sizes and quality for the specific end use are mentioned often (A research organization). In the theoretical review this is referred to as one of the availability aspects. All stated external sources agreed that practical examples and experience is important in such a way that it can clearly make a specie commercially interesting (or not) as actual proof is there. The essence is that people gain fundamental trust quicker this way which might create the commercial interest.

As a **conclusion of both reviews** it can be stated that properties and availability have to favor the end use and the target market for sure. Price and demand depend on the end use and situation. Therefore it can be concluded that these factors are secondary factors for a specie to favor or not, but that does not mean that they are less important.
For example; external influences like the demand for certified KOMO species in a project. Even though there might be uncertified species which might suit application in this case too.

In such a case does direct availability or properties not matter anymore as certification is required, while the motive on decisions (certification) is a secondary factor.
Furthermore the correct sizes and practical experience is stated as crucial.

Fig. 7 Verifying and identifying log information.

2.4How were new species introduced in the past?

2.4.1 Theoretical input.

First of all it has to be stated that a specie is not brand new. It is growing in the forest but not commercially well known, applied and/ or accepted by the market. Commercially introducing could mean that it becomes new to the market, but the term “new” is just relative.
Unfortunately the actual marketing approach of a new specie is not often highlighted. Research on marketing is done, but only specified on the target market and area of interest. Especially Bolivia is focused on a lot as exporting country. Therefore, the information regarding this issue is mainly gathered from practical experience (chapter 2.5) in the form of interviews. The theory is used as background information but clearly divided regarding mentions of the specific sources and situation.
A small description by FSC UK in cooperation with Precious woods was publicly available, which is described in figure 8.

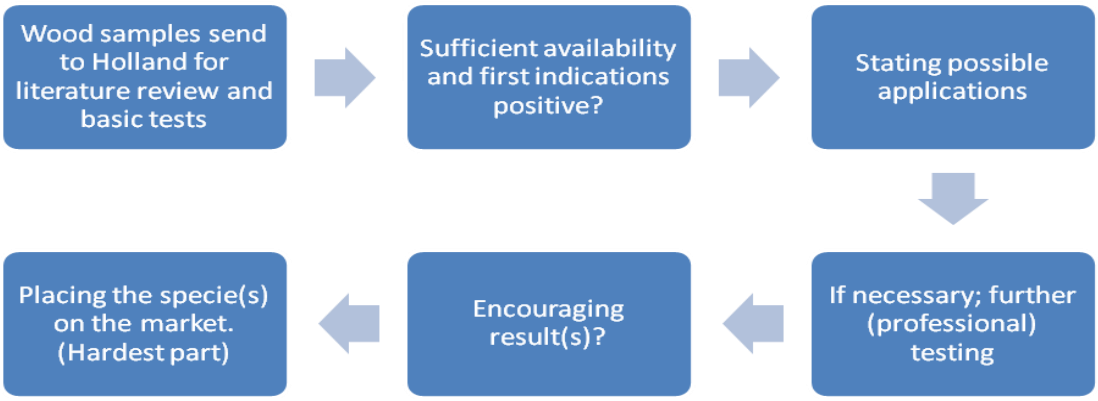


Fig. 8 Precious woods experience of dealing with new species.

Loyal partners who support their initiative applied bought new species (LKTS) in small quantities in their projects. This way they might transform into well known species step by step (FSC- UK working group).

In Vietnam also broad support was offered to introduce new species on the market (WWF greater Mekong project).
Here the inducement was the use of LKTS by processing companies because of their cheap purchase price and availability. Although the workability and appearance favored the operators, any scientific knowledge about the timbers was not known. External organizations saw the known consequences on the forest and therefore started a project to gain more knowledge and potential for several LKTS. The initiative was managed by the WWF and GTZ (Worldwide fund for nature and German technical cooperation). Figure 9 shows the process.

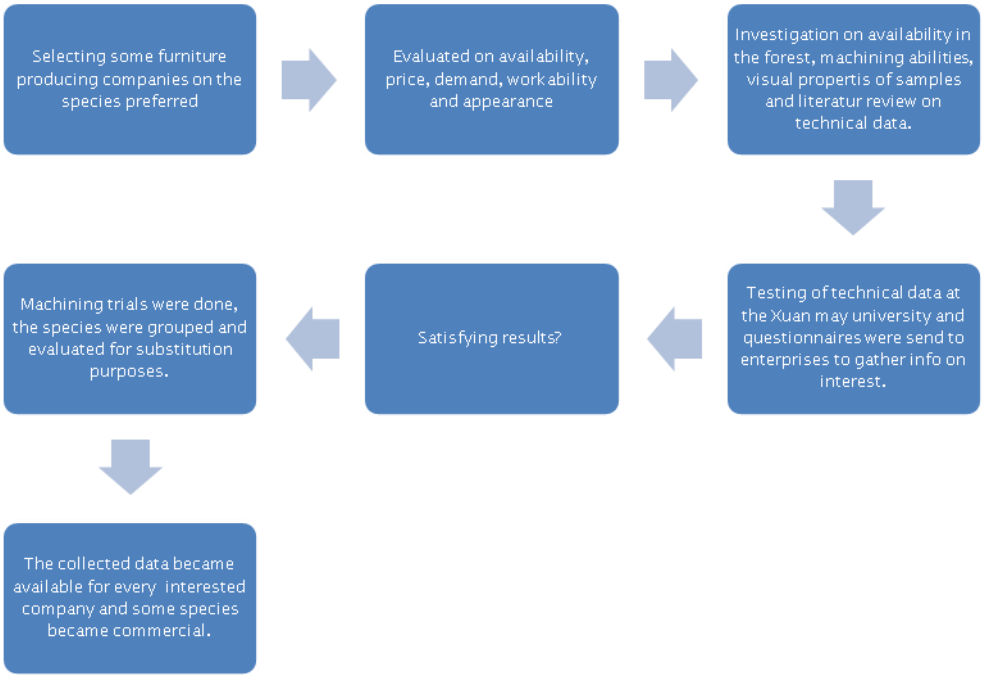


Fig. 9 WWF/ GTZ experience of dealing with new species.

Clearly the approach of introducing is very different depending on the situation, costs and motivation. Also the actors involved shall influence the aim and process of introduction.

2.5 Practical experiences on specie introductions.

Regarding companies, all of the consulted ones have some experience. Some put quite some efforts in the issue of LKTS in the form of scientific research, pushing sales towards alternative species or actually promoting them on the internet. Others only sell them by some occasions focusing more on the common ones.

2.5.1 Different (practical) experiences in the past:

- Some state it as a success in the early ’90 when FSC did not exist yet, but feel a decrease now that FSC exists and customers feel sustainable enough by buying the known species with that label (concession owning timber trader). Back then in the early ’90 it was an eye opener for a lot of people and a lot of followers commenced (concession owning timber trader).
- When another company started their efforts to sell LKTS they had put a lot of time, money and efforts in the issue. Scientific research was conducted to support the sale abilities of these species, but most companies stated that information on the species could be found on the internet, literature or local sources. This does not mean that full information schedules are always available, but often at least the necessary information. It does not apply for every specie and sometimes tests are necessary if it is stated as worth it.
  In the beginning sales were found to be difficult as people did not really want to buy LKTS. Later on trust increased as -with low expectations- the customer became happily surprised and wanted to continue with that specie.
- By a third concession owning timber trader it was found that timely informing customers about the compulsory issue of FSC to harvest LKTS, understanding was created for the sale of these species. Therefore the acceptance was found to be easier compared to some other actors. In this case the acceptance applies for garden wood in the retail sector.
  Gaining practical experience was done by applying new species on their own real estate.
  This provides examples and practical experience was gained. Before this act the timber is researched on it possible end use by literature studies.

2.5.2 Current situation.

- A concession owning timber trader sees that nowadays more awareness and understanding is experienced and by gaining trust after small purchased quantities the customers rely on certain lesser known species more compared to the moment they did not had any experience.
- Another concession owning timber trader states that nowadays it is found very possible to offer an alternative specie and future expectations are good as they see LKTS sales as a solution against availability problems.
- A third concession owning timber trader found that by supplying the retail sector with garden wood, no special demand on a specie is experienced. Only the suitability for a certain end use. In this sector the customer does not actually know what he buys exactly, so selling LKTS by having enough technical data to promise a good fit for the customer’s assortment is enough.

Though they are worried for the future in the form of the buying behavior of India and China who care less about certification and offer a good price for uncertified timber.

- Unfortunately most actors see that the market is often not very willing to switch from a certain assurance to species which are new to the commercial world. The unknown of LKTS, lack of experience and ease of common species obstruct this switch. It is getting better nowadays but full trust is far from there.

2.5.3 Tips and important issues.

- One of the research organizations stated that bad communications in the chain can have a very negative influence on introductions. The reason is that not all layers know what is expected, the knowledge on the timber is not present everywhere or acts on the timber are not done well which might result in faults after application. The defect is often sought by the timber while this is not always the case. This way intentionally good projects might fail.
- Another research organization is pointing on niche markets to target on, where there are no alternatives for the LKTS. This way the specie shall be a unique solution, but it is difficult to find such a niche.

Much attention was given to focusing on collective actions which might support the aim of commercializing LKTS as most companies have to deal with the same problems. Governmental financing of such initiatives could be lobbied for as the green purchasing policy suits this issue (A research organization).
Multiple actors (of all kinds) are confident that success should be booked with multiple parties together.

- It is stated that delivering to the trade sector is a waste of efforts because of loosing margin, lack of loyalty, and lack of knowledge. In this case the trade sector is referred to as a sector trading also other materials and do not have a major need to trade LKTS. Some actors (concession owning timber traders) did see this sector as one with little barriers to cross when it comes to selling to trading companies, so this branch created different opinions.
- Practically all actors agreed on the ground, way & hydraulics (GWH) and retail sector to gain the most success (see chapter 2.6).
- The carpentry and construction sector would benefit the least as certificates (e.g. KOMO) -and to some extend- assurance is requested which was discouraged (a research organizations and a supporting organization).
- Developing an alternative quality system (compared to commercial species for a certain application) could benefit if not all information is known or if the specie is not a (e.g. KOMO) certified one.

2.5.4 Marketing.

- Classical marketing like performed by companies with unique products does not suit this situation. In this case -and others related to the marketing of LKTS- it is more important to be able to commercialize the species in the first place. This also applies to marketing but follows a different strategy and approach. LKTS are not branded or unique to one company and do not carry lots of marketing related features which customers demand directly. The customers might request certain properties though, but those are often not connected to one specific specie.

With branded products this can be done as they are unique and often patented but for new timber species this is not possible in the same way (a supporting organization).

Most tips and important issues apply for every market segment. The reason is that they are secondary factors which are more related to the acceptation of lesser known species in the first place.

2.6 Suggested branches.

The GWH sector is suggested by most actors as a good market to put LKTS in. This market has experience in applying new species and (new) tropical species are already found suitable for this segment. Also the countries where these (GWH) species are harvested offer a lot of lesser used species.
Most important here is:

- Technical properties (for the specific end use)
- The stable behavior (little or no deforming or stress)
- Durability suitable for its end use (against several kinds of decay)
- Useful measurements (sizes which allow to make standard products out of the lumber with a sufficient recovery (different per specie))
- Availability (in the widest sense)
- Steady quality (not a lot of quality differences in the supplied lumber/ timber)
- Machinability (possible to (re)work the timber by sawing/ planning machines)

(Exact info depends on the exact end use in a certain environment).
Therefore grouping by properties would suit fine as properties is the leading factor in this sector (issues like color or unpleasant odors do not matter).
Better communication through the chain regarding expectations from each other and applying a penetration strategy to make the purchase of LKTS more interesting suit this branch (Solomon, Marshall, Stuart 2009).
Dutch customers are more sensitive for a price benefit compared to the Belgian timber market which is a bit more a “timber appreciating” market. Therefore this pricing strategy could suit fine for the Dutch market (a timber trader).

Next to the GWH sector is the retail or DIY (do it yourself) sector to benefit most. People who buy timber (garden timber) for private use buy timber which often is labeled as; “(tropical) hardwood” with a certain measurement, but do not know what specie they buy. The FSC logo provides an extra marketing item and could show attention to CSR (corporate social responsibility), as the LKTS issue fits well in this concept. For this sector matters:

- Technical properties (required for the end use)
- A good availability (As the retail sector offers a fixed assortment (a concession owning timber trader))
- Durability suitable for its end use (against several kinds of decay)

The strategies of bundling species with comparable properties and making a quality/ classification system of “comparables” would suit here as the requirements are not that technical as the GWH sector requests.
Also consequences on claims are not that dangerous because it involves less expensive projects (in the rule), because the timber is not bought at the timber trader itself and because the applications often are not of such a heavy impact on the timber. It is also stated by a concession owning timber trader that on average, a

garden will be renovated in a shorter timeframe than the timber in service can decay and losing its function.
A disadvantage (for the timber branch) is that the retail sector takes away most of the profit and that a concession owning company does have less control towards the end consumer. But looking at the (small) quantities sold per customer this could also be seen as an advantage.
Those who have experience with this sector are very pleased (A concession owning timber trader).
Certain certificates (besides FSC although this is not obligated) on garden timber are not requested at the moment which makes it easier to offer.

2.7 Differences and similarities between theoretical and practical input.

Differences	& Similarities
The way of monitoring the forest inventory. (On average) more focus on specific projects in literature. The suitability of the trade branch to push LKTS on. Literature mentions more local (place of extraction) problems. More focus on design purposes in literature. More focus on involving local people (in areas of extraction) stated by literature.	Lack of willingness from the market Lack of practical examples Lack of experience Lack of knowledge (often) End use grouping is suggested Creating an own way of grading/ evaluating LKTS Motives for commercializing new species The need of good availability (in all its forms) Obtaining all necessary data

Fig. 10 Schedule of differences and similarities between theory and practical input.

There are no major differences between the two sources of research. Literature mentions more local (place of extraction) issues than practical review like the bad local infra structure and country's interest rates. The most relevant issues and problems are recognized by both.

2.8 Conclusions from the analysis.

- It is clear that the need of commercializing LKTS is a compulsory factor from certification, but also from an economical point of view.
- The "unknown", lack of practical experience and uncertainty of correct supply in the widest sense do worry people.
- Assurance often cannot be given as there is a lack of practical experience. Customers often care most about certainty from commercial species and don't ask for LKTS. This means that purchasing by properties does not always have the first priority (for a lot of customers).
- When customers are positively "surprised", it is experienced that trust in some LKTS increases.
- To convince the customer, proper information has to be present, also to avoid mistakes which might damage the image of LKTS.
  Especially on durability and nervousness this can be improved a lot.
- Regarding the market segments; success depends on the timber properties and available information for that sector.

- It is stated that the retail and GWH sector probably benefit most from new species.
- The retail or DIY sector would suit the strategy of grouping species with the same properties. Specie names do not matter here as people do not actually know what specie they buy.
- The GWH sector could also suit this way of grouping as suitable species can be selected based on their necessary properties. This way a bigger availability per end use can be obtained.
- In contrast; the construction and carpentry branch are more difficult as they have a lot to do with desired tests and certifications. These can take years and cost a lot of money which no company is willing to pay for as a specie is sellable by every timber trader after testing/ certification.
- This also applies for certification on durability which in some cases takes years.
- Suggested is to develop an alternative classification system to compare LKTS to indicate the properties. This way, customers can have a “comparable” specie and the trust might increase (a research organization and concession owning timber traders).
- Initiatives like these could be executed by starting a foundation for collective benefits for involved companies. Share experiences, collective promotion, tests if they are necessary anyway and financed by the members or maybe even by grants.
- Lobbying could also increase the application of LKTS in certain projects.
- The environmental friendly factor could benefit a lot compared to competitive alternatives.
- Also niche markets where alternatives are scarce or absent could be targeted more depending on the specie’s properties and the specific possibilities of applications.

There are also some harsh differences in external opinions related to the (timber) trade branch regarding the marketing possibilities there. For this reason they are only mentioned but not explicitly dealt with to avoid misconceptions.

The gathered information which influences the introduction of LKTS will be used as an inspirational source. A concept tool will be formed (see chapter 3) to test on a certain pilot area. This way it can be tested and a thoroughly selection on possibly interesting species can be made. The selection on this area will be discussed in chapter 4 and a test on this concept tool in chapter 5.

3. Necessary data and forming a concept tool.

Next to the research on factors from previous experiences it has to be clear which information on species has to be gathered.
Eventually the selected species can be added to the online wood database (*www.houtdatabase.nl*) which partly is a Probos initiative. This database shows data sheets per branch based on the technical data, its applications and supplier(s). It is possible to select species based on the Dutch governmental purchase criteria. This way it can be used by timber applying people who can make a correct and responsible choice on timber for their particular project.

Two scenarios during species research are possible. The first one applies when data on the specie is available, the other if it is not. The way to deal with this situation is shown in figure 11. The red part is a decisive moment whether to continue the process or not.
When no info is available at all, the choice to quite the process could be made earlier too.
Availability is not taken into account in the created concept. Therefore it could be applied if a concession manager is aware of a specie with a certain availability in its concessions and wants to know whether it could be marketed. Availability is the starting point if possible success has to be determined.
However, a good availability of lumber differs per company and the eventual market share of the specie. Therefore it is not possible to take it into account in this concept tool as a preset amount (a customized calculation on availability will take place when testing this concept).

When there is a sufficient availability, it will be researched whether the specie is present in the wood database. If this is the case, further research is not necessary. Only if the (needed) data is not complete (in the database) it can be necessary to keep on seeking.

It is the aim to find the specific data which is maintained in the wood database (www.houtdatabase.nl) (see figures 19- 22 for the content):
This is divided into categories by:
- General information
- Physical/ mechanical properties
- Appearance
- Machinability/ processability
- Applications
- Suppliers

Depending on the found figures and their suitability for a specific application, a comparison can be made. First to verify the data found, next with comparable known species to determine the suitability/ quality for the suggested end use(s).
Whether a specie suits a particular end use can be found by desk research or tests but also by evaluating NEN regulations as an indicative guide on specific applications (Wiselius 2005)*.
Chapter 2.6 shows which issues matter most for both suggested branches.

* NEN 5493 for broad leaved species in GWH works and NEN 350-1 for durability of wood- and wood based products – Natural durability of massive timber – part 1: Guideline for the principles of testing and classifying of the natural durability of wood.

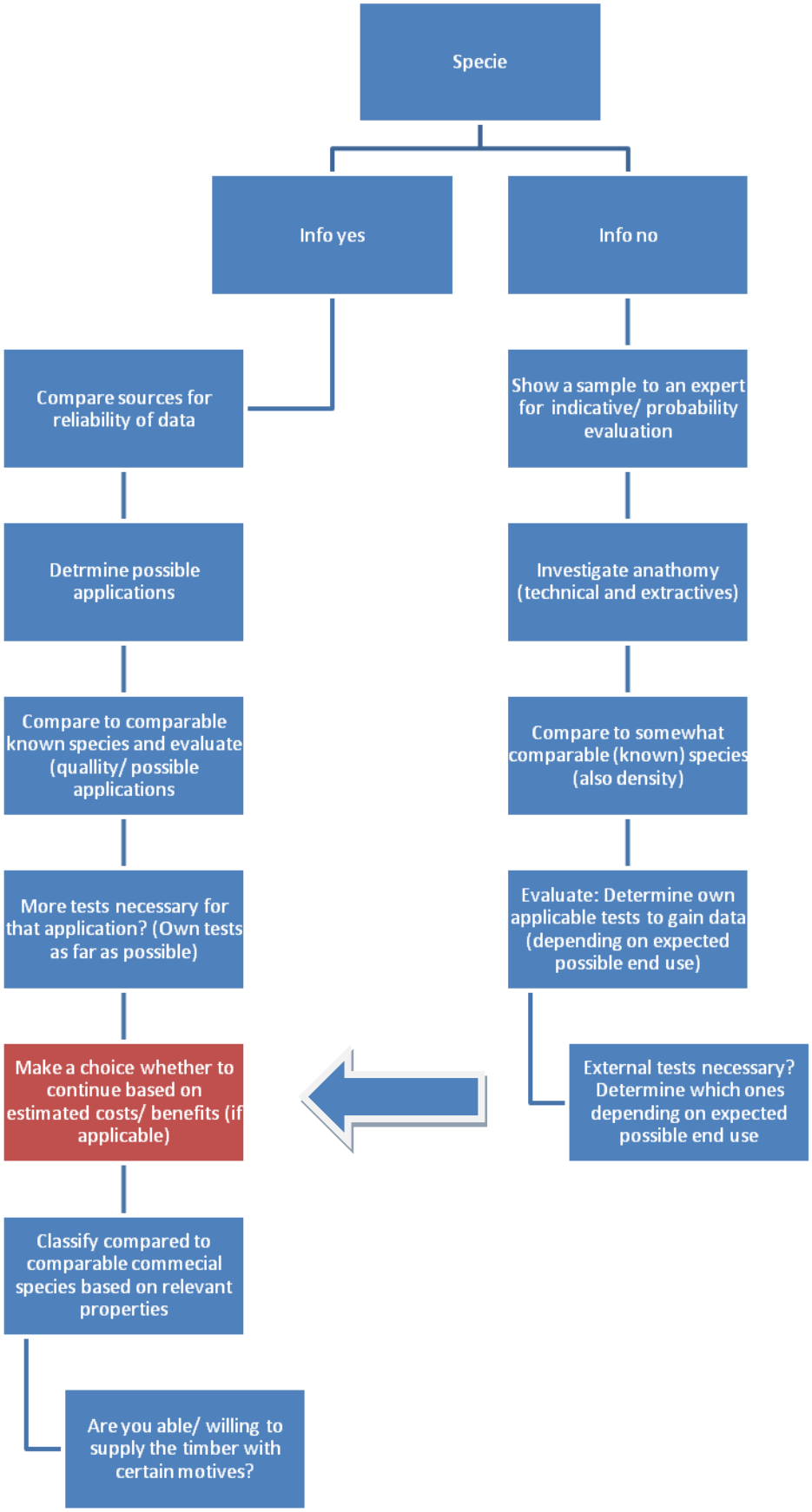


Fig. 11 Flow chart to determine specie's commercial potential.

After this step the specie's can be evaluated (see figure 11). At this stage it has to be known what kind of end use(s) it can fulfill. Criteria's do vary per specie/ end use. Therefore a grading system from 1 to 5 is maintained to grade the specie(s) rated by the houtvademecum (Wiselius 2005) the online wood explorer (*www.thewoodexplorer.com*) and the French database from Tropix cirad (*http://tropix.cirad.fr*).
All possible features can play a role if it is applicable for that specific end use (e.g. durability for GWH species or shrinkage to 12% MC for inside paneling).
These criteria were developed based on input from external consultancy and play a general role for every LKTS no matter what end use it might fulfill.
The selection of five relevant points is found to be important during marketing of LKTS.
Grades 1 and 2 are skipped and the rest (>2) is found to be suitable enough in this selection.
Whether it will bring eventual success depends on more factors like the allotted price, willingness from the market and current market climate. Five criteria's can be used visible in figure 12.

Criteria's on timber species; (1 point per criteria or none)
Suitable properties for suggested end use?
Suitable amount of required information available/ found?
Little or few (comparable) alternatives available?
Specie for a high class (end) product? (For a market expected to offer a relatively high price)
Market potential for the suggested end use?

Fig. 12 Timber criteria which provides points.

After this step a selection remains which is found to be interesting enough to continue with. It might be possible that more tests are found to be necessary and if so, selected. A choice to continue should be made. If no more tests are necessary the specie can be classified/ graded (compared to commercial ones in that segment) and placed on the market.

To sum the process up;

- Assurance on availability is required.
- Determining a possible end use based on the gathered data to suit.
- Evaluate by allotting points to see whether it is worth commercializing the specie.
- Determining additional efforts like extra tests or the choice of targeting a market segment.
- Alternative classification compared to commercial species in a specific market segment.

4. Area choice.

To test whether the concept on timber (LKTS) selection functions, a test area was necessary and used.
The area choice is related to several needs to make it a success, or at least feasible to perform. Connected to the resources like informative sources, abilities and time frame, a match was found with optional areas which might suit the research and the benefits which might come forth.
In this case it is important that extern consultancy can be performed with companies which are situated in the particular area. The reason for this is the local know- how, information on forest inventories, commercial potential of these species and possible experience with LKTS from the particular area.
Also the need for research is an important factor. Not every area might need a research in this form.

If all these points are summarized, the requirements for an area are as follows:

- Suiting the abilities and resources to perform the research;
- Extern consultancy with a closely involved company has to be possible;
- Need for research and the potential of success in the particular area.

Regarding this input from theoretical aspects, it can be stated that a region in West Africa could suit this assignment. Reasons are the several Dutch companies which are situated there having their own concessions, the potential of the many African species (often in bigger dimensions than South American lumber) and the FSC/ IDH (initiative durable trade) initiative to increase the amount of African (sustainable certified) timber on the Dutch market.
Next to this last mentioned plan, another initiative by FSC and IDH will be launched in the form of the Linking Europe initiative (*http://www.peopleplanetprofit.be*).
The aim is to increase the demand for (west) African lumber with 10% on the French, Belgian and Great Britain's market, based on existing good practices by countries like Holland (*http://www.dutchsustainabletrade.com*).

The increase of demand/ market share was already an existing project from FSC/ IDH in Borneo (The Borneo initiative) and the Amazon (The Amazon alternative) but now it is expanded with the African objective(s) in Congo called; The Congo- Basin program (CBP) all covered by IDH's Tropical timber program (TTP). The initiative targets Gabon, Cameroon, Congo- Brazzaville and the democratic republic of Congo. In several of these countries, Dutch timber traders/ harvesters are situated and also support these initiatives.
Marketing the LKTS and endeavor higher yields/ Ha by commercializing new species could contribute to the aim of this program in the particular area.
Another recent development in Cameroon is the attempt to establish an export ban on round wood of their prime species.
The processing activities are then kept in Cameroon itself. This way another reason rises to harvest and apply more LKTS (*http://www.oncameroon.com*).

To include more practical gathered impulses on the area choice, one of the big Dutch companies with concessions in Cameroon was willing to share concession data and background information. Another big Dutch company was willing to cooperate and as both companies are situated in Cameroon, this particular country could provide the most suitable information for this research and serve the market with its outcome.

4.1Conclusion on the pilot area choice:

The possibility to gather specific data, the initiative to increase certified timber from this region, the possible ban on prime species and the need for research all amplify the choice to take Cameroon as a pilot area.

A second focus will take place in the form of some company owned concessions in Cameroon. The concessions are amongst the many visible in figure 13.

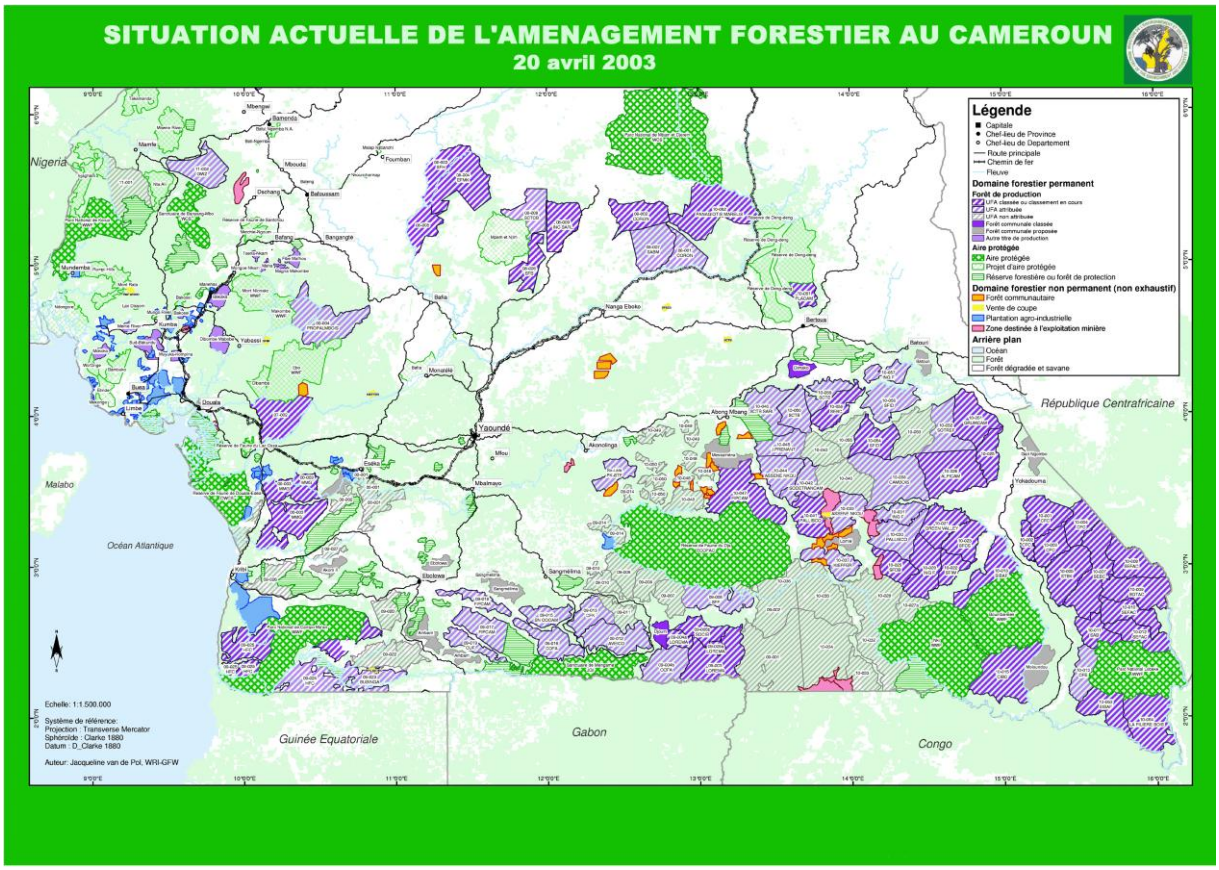


Fig. 13 Concessions in Cameroon

5. Timber species & testing the concept

Influenced by the concept and concession data a (test) selection on species is made. From this provided data it became clear which trees were present, in which volume, what their DBH (diameter at breast height) is and what volume with a correct DBH is available. It is also known what the commercial species are.

The provided harvesting licenses are applicable for block's which are divided in sub blocks resulting in 6 times a block for 5 years. Quotas on the amount of M^3/ specie/ block are made.
Total concession inventories cover more useful data than licenses because they are applicable for only one year and inventories cover the whole standing volume. This way they provide more useful data on the long term.
The focus therefore lies on two concessions.

For a minimum of volume it is normally necessary for the company to look at the required input of the local sawmill to gain a profitable sawing program. For most GWH species this has to be at least $3000M^3$ of round wood for a week of production as these will be sawn as a particular kind of lumber.
For different species this is not the case as the round wood will be sawn into falling lengths and widths. A minimum in this case has to be $80M^3$ of round wood a day.

In this case these numbers cannot be used as there will be more species within the saw programs which need to be sawn and actual demand is not known for the next 30 years.
Therefore a new calculation is made in figure 15 to calculate the minimum volume.

5.1 Selection of potentially interesting species.

The two concessions contain 61 species after some double species were removed. This was due to local naming which resulted in some double counted species with different names.

From these 61 species, 11 are commercial ones (stated by the data supplying company) which brings the list to 50 species. There are more commercial species but these are not situated in these particular concessions. The schedule is visible in figure 14.

Timber specie	Latin name	Available info? (Y/N)	Vol/ ha conc 1	Vol/ ha conc 2	Total M3	Vol > DBH conc 1	Vol > DBH conc 2	total M3/ conc 1&2	Necessary availability (# is the difference with the minimum required)
Trade name	*Scientific name*	*Technical data*	*M3/ HA*	*M3/ HA*	*< sum*	*M3 correct DBH*	*M3 correct DBH*	*< Sum*	*Based on estimated related factors for proper availability*
Abam á poils rouges	Gambeya beguei	N	0,14	0,17	0,31	4132	5046	9178	2559,813934
Abam évélé	Gambeya perpulchra	Y	0	0,01	0,01	0	0	0	-6618,186066
Abam fruit jaune	Gambeya boukokoensis	N	0	0	0	0	0	0	-6618,186066
Abam vrai	Gambeya lacourtiana	Y	0	0	0	0	0	0	-6618,186066
Acajou á grandes folioles	Khaya ivorensis	Y	0,24	0	0,24	5359	0	5359	-1259,186066
Acajou blanc	Khaya anthotheca	Y	0,64	0,11	0,75	9283	3029	12312	5693,813934
Acajou de bassam	Khaya ivorensis	Y	0,11	0,55	0,66	0	21875	21875	15256,81393
Aiélé/ Abel	Canarium schweinfurthii	Y	2,69	2,45	5,14	90562	156986	247548	240929,8139
Alep	Desbordesia Glaucescens	Y	3,58	6,15	9,73	69030	307641	376671	370052,8139
Andoung brun	Monopetalanthus microphyllus	Y	0,12	0,02	0,14	3073	0	3073	-3545,186066
Andoung rose	Monopetalanthus letestui	Y	0,09	0,02	0,11	2944	1251	4195	-2423,186066
Aningré A	Aningré altissima	Y	0,08	0,12	0,2	1204	2393	3597	-3021,186066
Aningré R	Aningeria robusta	Y	0,18	0,28	0,46	1204	6078	7282	663,8139344
Azobé	Lophira alata	Y	7,85	6,86	14,71	244461	427659	672120	665501,8139
Bahia/ Abura	Hallea ciliata	Y	4,73	3,46	8,19	64825	78568	143393	136774,8139
Bilinga	Nauclea diderrichii	Y	1,23	0,77	2	14888	16278	31166	24547,81393
Bongo H (Olon)	Fagara heitzii	Y	1	0,2	1,2	32616	9616	42232	35613,81393
Bossé clair	Guarea cedrata	Y	0,19	0,6	0,79	859	18608	19467	12848,81393
Bossé foncé	Guarea thompsonii Sprague	Y	0,22	0,38	0,6	859	3815	4674	-1944,186066
Bubinga rose	Guibourtia demeusei	Y	0,11	0,26	0,37	3760	11182	14942	8323,813934
Dabéma	Piptadeniastrum africanum	Y	4,07	4,78	8,85	140300	297531	437831	431212,8139
Dibétou	Lovoa trichilioides	Y	1,2	0,81	2,01	30759	27925	58684	52065,81393
Doussié blanc	Afzelia pachiloba	Y	0,03	0,22	0,25	0	3192	3192	-3426,186066
Doussié rose	Afzelia bipindensis	Y	0,27	0,27	0,54	4009	4917	8926	2307,813934
Ekaba	Tetraberlinia bifoliolata	Y	0,05	0,04	0,09	0	1251	1251	-5367,186066
Ekop léké/ Bomanga	Brachystegia laurentii	Y	0,93	0,04	0,97	23442	0	23442	16823,81393
Ekop naga akolodo	Brachystegia eurycoma	Y	0,01	0,79	0,8	0	21851	21851	15232,81393
Ekop naga nord- ouest	Brachystegia kennedyi	N	1,08	0,01	1,09	18690	0	18690	12071,81393
Ekop ngombé grandes feuilles/ Gombe	Didelotia africana	Y	0,04	0,51	0,55	532	14832	15364	8745,813934
Ekop ngombé mamelle	Didelotia unifoliata	N	0	0,39	0,39	0	12204	12204	5585,813934
Emien	Alstonia boonei	Y	5,75	6,14	11,89	194031	372154	566185	559566,8139
Eyong	Eribroma oblonga	Y	0,56	0,69	1,25	16004	32686	48690	42071,81393
Faro	Daniellia klainei	Y	0,23	0,52	0,75	6856	34142	40998	34379,81393
Faro mezilli/ Acajou d' Afrique	Acajou blanc	Y	0,03	0,11	0,14	1040	6403	7443	824,8139344
Fraké/ Limba	Terminalia superba	Y	1,91	4,79	6,7	51138	282704	333842	327223,8139
Fromager/ Ceiba	Ceiba pentandra	Y	0,62	4,25	4,87	21408	295510	316918	310299,8139
Ilomba	Pycnanthus angolensis	Y	3,35	20,83	24,18	105046	1188765	1293811	1287192,814
Iroko	Milicia excelsa	Y	0,07	1,91	1,98	0	69069	69069	62450,81393
Kossipo	Entrandrophragma candoleii	Y	0,47	0,44	0,91	14713	15690	30403	23784,81393
Kotibé	Nesogordonia papaverifera	Y	0,03	0,08	0,11	908	3079	3987	-2631,186066
Koto	Pterygota bequaertii	Y	0,57	1,05	1,62	14487	62589	77076	70457,81393
Longhi	Gambeya spp	Y	0,47	0,12	0,59	14189	4704	18893	12274,81393
Mambodé/ Amouk	Detairum senegalense	Y	0,44	0,21	0,65	12538	12139	24677	18058,81393
Moabi	Baillonella toxisperma	Y	0,15	0,05	0,2	3016	1630	4646	-1972,186066
Movingui	Distemonanthus benthamianus	Y	2,65	4,1	6,75	62550	204684	267234	260615,8139
Naga	Brachystegia cynometroides	Y	0	0,03	0,03	0	0	0	-6618,186066
Naga paralléle/ Bomanga	Brachystegia mildbraedii	Y	0,12	0	0,12	3189	0	3189	-3429,186066
Niové	Staudtia kamerunensis	Y	2,32	5,34	7,66	42428	185256	227684	221065,8139
Okan	Cyclicodiscus gabunensis	Y	1,48	2,91	4,39	51596	187514	239110	232491,8139
Omang bikodok	Maranthes gabonensis	N		0	0	0	0	0	-6618,186066
Onzabili K	Antrocaryon klaineanum	Y	0,55	0,62	1,17	18214	41945	60159	53540,81393
Onzabili M	Antrocaryon micraster	Y	0,17	0,93	1,1	5902	62129	68031	61412,81393
Padouk blanc	Pterocarpus mildbraedii	Y	0,06	0,12	0,18	1356	1592	2948	-3670,186066
Padouk rouge	Pterocarpus soyauxii	Y	3,24	7,01	10,25	79466	380342	459808	453189,8139
Sapelli	Entandrophragma cylindricum	Y	0,11	0	0,11	3036	0	3036	-3582,186066
Sipo	Entandrophragma utile	Y	0,12	0,27	0,39	4269	12889	17158	10539,81393
Tali	Erythrophleum ivorense	Y	9,34	7,47	16,81	325612	504954	830566	823947,8139
Tali Yaoundé	Erythrophleum suaveolens	Y	0	3,49	3,49	0	218421	218421	211802,8139
Tiama	Entandrophragma angolense	Y	0,16	0,22	0,38	5000	7534	12534	5915,813934
Tiama Congo	Entandrophragma congoense	Y	0	0,05	0,05	0	1667	1667	-4951,186066
Zingana/ Amuk	Zingana/ Amuk	Y	0	0,03	0,03	0	1553	1553	-5065,186066
							Total:	7470255	
							Factor on 30 year rotation	249008,5	
	Green is commercial already								
	Blue is commercial and enough standing volume						**Including annual increment (1 M3/ HA)**	367008,5	
	Yellow is LKTS and enough standding volume								
	No info available						**Spread over applicable species (61)**	6016,532787	
							Including safety factor (10%) on availability	**6618,186066** M3/ specie at least	

Fig. 14 Table on availability selection.

With this selection another selection can be made with one of the most important criteria's which is availability.
Because at this stage it is not known what kind of wood is dealt with, a possible calculation on the needed volume of round wood is made.
An absolute exact number is not realistic as this research is limited to two concessions, M^3's on annual increment is not known (a supporting organization), spread of species in the concessions is not known and a concession will be selectively harvested with a spread of 30 years. An often used commercial increment is 1-3M^3/ Ha/ year.
In unexploited forests this can be even 0M^3/ Ha/ year (a supporting organization). In this case a certain increment in M^3/ha/ year is used but not mentioned to avoid identification of the concessions and the data providing company.
Damage and failure however is not accounted as it simply does not say much about realism at this point. The availability calculation is visible in sub chapter 5.2.

5.2 Selection on sufficient availability.

Figure 14 shows the selection (in yellow) with sufficient available species. The calculation on the sufficient number on availability is shown in figure 15.

Total of all M^3's (2 concessions) with correct DBH: **7470255M^3**
7470255/ 30 (years) = **249008,5M^3**
249008,5M^3 + 118000M^3 (increment/ year) = **3670008,5M^3**
3670008,5M^3/61 (species) = **6016,53M^3**
6016,53M^3 * 1,1 (10% safety factor) = **6618,19M^3** / specie at least

Fig. 15 Calculation on minimum availability.

The figure of 6618.19M^3 is not 100% waterproof but it could be a figure to start from as several issues are covered and because the actual inventories are also not 100% sure. Influences which are not manageable ensure some space within the numbers. 30 species (LKTS) had a correct availability according to figure 14 (excluding the commercial ones).

5.3 Selection on presence in the houtdatabase.

The following selection (Fig. 16) was made based on the availability of the specie on the website www.houtdatabase.nl. The reason for this is that new species could be added, so double efforts have to be avoided. 11 species were already present and therefore removed from the list making it 19 species. Figure 16 shows which ones.

Trade name	Latin name		Present in database?
Acajou blanc	Khaya anthotheca	(d' Afrique)	Y
Acajou de bassam	Khaya ivorensis	(d' Afrique)	Y
Aiélé/ Abel	Canarium schweinfurthii		N
Alep	Desbordesia Glaucescens		N
Aningré R	Aningeria robusta		Y
Bahia/ Abura	Hallea ciliata		N
Bongo H (Olon)	Fagara heitzii		N
Bossé clair	Guarea cedrata		Y
Dabéma	Piptadeniastrum africanum		Y
Dibétou	Lovoa trichilioides		Y
Ekop léké/ Bomanga	Brachystegia laurentii	(Bomanga)	N
Ekop naga akolodo	Brachystegia eurycoma	(Naga)	N
Ekop ngombé grandes feuilles/ Gombe	Didelotia africana	(Gombe)	N
Emien	Alstonia boonei		N
Eyong	Eribroma oblonga		N
Faro	Daniellia klainei	(Ogea)	N
Faro mezilli/ Acajou d' Afrique	Acajou blanc		Y
Fraké/ Limba	Terminalia superba		N
Fromager/ Ceiba	Ceiba pentandra	(Fuma)	N
Ilomba	Pycnanthus angolensis		N
Kossipo	Entrandrophragma candoleii		Y
Koto	Pterygota bequaertii		N
Longhi	Gambeya spp	(Aniegré)	N
Mambodé/ Amouk	Detairum senegalense	(Bodo)	N
Movingui	Distemonanthus benthamianus		N
Niové	Staudtia kamerunensis		Y
Onzabili K	Antrocaryon klaineanum		N
Onzabili M	Antrocaryon micraster		N
Tali Yaoundé	Erythrophleum suaveolens		Y
Tiama	Entandrophragma angolense		Y

Fig. 16 Presence in the Houtdatabase

5.4Selection on described quality and score.

The following selection (see figure 18) was made based on the 5 criteria's verified by the specialized French database of tropix.cirad (*http://tropix.cirad.fr*) and the Hout vademecum (Wiselius 2005). Every selected specie in these concessions is mentioned in at least one source, also with practical experiences described. Before this, for every specie the application(s) and relevant properties were investigated and compared (like fig. 11 suggests). These are briefly stated in figure 18.
After this, the species were graded from 1 to 5 based on the criteria's developed in figure 12. The species which scored a 1 or 2 were deleted from the list making it more valuable.

A lot of species are suitable for low value end uses like different sheet materials or low value interior use. Therefore it is of less importance to focus on them as a lot of substitutes are available and eventual demand, value as well as profits from these species might be less. The selection brought the list back to 4 species.

Fig. 17 A stack of thin sheet material.

Trade name	Latin name	Alternative name	Score 1-5 (1 = low, 5= high)	End use
Aiélé/ Abel	Canarium schweinfurthii		2	Unstable, poor resistance to different influences
Alep	Desbordesia Glaucescens		4	Water works & heavy duties
Bahia/ Abura	Hallea ciliata		2	Inside applications, lot of sapwood
Bongo H (Olon)	Fagara heitzii		2	Inside uses, low value end use
Ekop léké/ Bomanga	Brachystegia laurentii	(Bomanga)	2	Inside uses, reffered too as seldom offered
Ekop naga akolodo	Brachystegia eurycoma	(Naga)	2	Inside use only, sometimes difficult to machine
Ekop ngombé grandes feuilles/ Gombe	Didelotia africana	(Gombe)	2	Interior uses, low value products, not durable
Emien	Alstonia boonei		1	Only inside, low yield
Eyong	Eribroma oblonga		2	Interior uses, looks like Koto in appearance as well as properties, mostly for sheet material
Faro	Daniellia klainei	(Ogea)	2	Interior uses, often quite soft, light and not strong
Fraké/ Limba	Terminalia superba		2	Inside uses. Big variations in weight, hardness and strength
Fromager/ Ceiba/ Fuma	Ceiba pentandra		2	Inside uses, light duties & weight and not very strong. Suitable for sheet material
Ilomba	Pycnanthus angolensis		2	Inside uses, poorly stable, low duty inside applications
Koto	Pterygota bequaertii		3	Interior uses and sheet material. It's medium hard but more stable and tougher than other light species like Abachi
Longhi	Gambeya spp	(Aniegré)	2	Inside use, collective name for several species, low value applications
Mambodé/ Amouk	Detairum senegalense	(Bodo)	3	States as quite unsensitive to marine borers, inside (decorative) uses, hard homogenious specie.
Movingui	Distemonanthus benthamianus		3	A lot of applications possible including heavy duties. Not very resistant to fungi, resistant to some chemicals
Onzabili K	Antrocaryon klaineanum		2	Low value (dry) applications. Substitute for Okoumé sheet material
Onzabili M	Antrocaryon micraster		2	Low value (dry) applications. Substitute for Okoumé sheet material

Fig. 18 Providing points and selecting.

5.5 Final selection result.

The final selected species are; Alep, Bodo, Koto and Movingui.
Not all information which is preferred to have is found, but a good indication is possible for these species.

The main sources actually used to find the data are the two mentioned before to define the quality (*http://tropix.cirad.fr*) and (Wiselius 2005) but also data from the online wood explorer (*www.thewoodexplorer.com*) was used. Sources for small details are stated on the overview sheets themselves.
Information on the species Alep and Bodo were limited. For this, a new external party was consulted. This timber trader has a lot of experience and knowledge but also lacked the missing information on both species. Suggested was to inform the Belgium wood study center (*www.hcto.be*) but a reply was not received.

Belgian and other ex- colonial countries probably have more information available from such species (a timber trader). Unfortunately, reliable Belgian sources did also lack the missing information although they did mention the possibly interesting specie of Alep (WWF Belgium vzw/asbl).

Figures 19-22 contain the information found per specie with the sources mentioned after the figures.

Fig. 19 Alep data

Required specie information

Trade name	Alep							
Botanical name	Desbordesia Glaucescens							
Other names	Alo, Aloi, Banga, Bwiba njoc, Kawo, Oman, Omang, Oteva, Teva							
Possible (certification) labels								
Bomen over…								
Growing area	Cameroon, gabon, Zaïre, Nigeria							
Houtvademecum nr.								
Color	Yellow brown	2)						
Draft	Fine	2)						
Grain	Straight	2)						
Other specialties	Sapwood clearly demarcated	2)						
Picture								
Nailing & screwing	Good but pre boring is necessary	2)						
Gluing	Correct (for interior use only), should be done with care as the wood is very dense	6)						
Surface finishing								
Other remarks	During drying risk of collapse and checks might occur, machining takes a lot of power	2)						
	Has to be sawn quickly after felling to prevent crack's.	2)						
Applications	Heavy carpentry, sleepers, bridges, hydrolic works, container/ vehicle flooring	2)						
Suppliers	-							
Durability fungi:	Class 1 very durable	2)						
Lab test without ground contact								
Other (literature) statements 1	Class 2 (untreated in function for 15-25 years)	7)						
Other (literature) statements 2	Stated as shipworm resistant	4)						
Durability insects	Durable	2)						
Termites/ marine borers	Class D durable	2)	→				The heartwood is naturally resistant to decay and attack by termites and marine borers 3)	
Density	1050 KG/M3	2)	→	785	3)			
Shrinkage to 12% (radial)	%		→	6,80%	2)	4%	3)	Both give no figure on drying to any MC
Shrinkage to 12% (tangential)	%		→	10,90%	2)	7%	3)	Both give no figure on drying to any MC
Hardness (Janka) crossection	N		→	10,9	2)	No conversion to janka possible 1)		
Hardness (Janka) plane	N							
Strength class								
Quallity class	NEN-5493							
Elasticity module (test)	23390 N/MM2	2)						
Elasticity module (parralel) (*RV)	N/MM2							
Elasticity module (perpendicular) (*RV)	N/MM2							
Bending strength (Test)	157 N/MM2	2)		1826	3)			
Bending strength (*RV)	N/MM2							
Pressure strength (parralel) (Test)	80 N/MM2	2)						
Pressure strength (parralel) (*RV)	N/MM2							
Pressure strength perpendicular (*RV)	N/MM2							
Pull strength parralel (*RV)	N/MM2							
Pull strength perpendicular (*RV)	N/MM2							

Literature reference

1) http://www.google.nl/search?hl=nl&rlz=1T4SUNA_enNL272NL273&q=monnin+janka+hardness&aq=f&aqi=&aql=&oq=
2) http://tropix.cirad.fr/africa/africa.html, 11th april 2011
3) http://www.thewoodexplorer.com/maindata/we389.html
4) http://www.lne.be/themas/milieu-en-infrastructuur/studies/ntmb_duurzaam-houtgebruik_eindrapport.pdf
5) http://www.fsc.dk/files/resource_1/Materialer/LKS/Alep/Alep_FSC.pdf?PHPSESSID=8e1145f7594b1c35516aa4ea1640cb21
6) http://www.dlh-nederland.nl/Houtsoorten/Afrika/Alep.aspx
7) http://www.berehout.nl/Houtsoorten/houtsoorten.htm

Fig. 20 Bodo data

Required specie information

Trade name	Bodo					
Botanical name 1	Detairum senegalense					
Botanical name 2	Detarium macrocarpum Harms					
Other names 1	Mambodé, Abu leile, Aluki, Beligbele, Boire, Boto, Boto burureh, Bowisi, Bowiwasi, Dabha, Dankh, Dathag, (up to 67 names)					
Other names 2	Amouk, boiré, Enouk, Enuk, Aboranzork					
Important to note is that trade names and latin names are mixed up during description(s). Problem however is the big difference in density.						
Possible (certification) labels						
Bomen over…						
Growing area 1	Guinee- bissau, Ivory coast, Sierra Leone					
Growing area 2	Gabon, Cameroon, Guinee					
Houtvademecum nr.	32					
Nailing & screwing	Good					1)
Gluing	Good					1)
Surface finishing	Average good. For a smooth surface a filling medium is adviseable					1)/ 2)
Other remarks	Pre drilling is necessary					2)
Applications	Mostly sliced fineer for furniture industry, substitute for Palisander and walnut, stairs, construction, exterior joinery, boat building flooring ,panneling, luxury cabinet work, turned goods.					1)/ 2)
Suppliers	-					
Durability fungi	3 Moderately durable, relative resistance against fungi				2)	
Other literature statements (durability class)	2			1)		
Durability insects	Durable			2)		
Termites/ marine borers	Class M moderately durable			2)		
Density 1	1740	KG/M3		1)		
Density 2	730- 800	KG/M3		1)		
Shrinkage to 12% (radial)	Minimal	%	→	3,8	2)	(No statement on drying to which MC)
Shrinkage to 12% (tangential)	Minimal	%	→	5,4	2)	(No statement on drying to which MC)
Hardness (Janka) crossection		N				
Hardness (Janka) plane		N				
Strength class						
Quallity class		NEN-5493				
Elasticity module (test)	13100	N/MM2	2)			
Elasticity module (parralel) (*RV)		N/MM2				
Elasticity module (perpendicular) (*RV)		N/MM2				
Bending strength (Test)	99	N/MM2	2)			
Bending strength (*RV)		N/MM2				
Pressure strength (parralel) (Test)	55	N/MM2	2)			
Pressure strength (parralel) (*RV)		N/MM2				
Pressure strength perpendicular (*RV)		N/MM2				
Pull strength parralel (*RV)		N/MM2				
Pull strength perpendicular (*RV)		N/MM2				

Literature reference

1) Houtvademecum, SDU publishers, S.I. Wiselius, 9th edition, 2005,
2) http://tropix.cirad.fr/africa/africa.html, 11th april 2011
3) http://www.thewoodexplorer.com/maindata/we390.html
4) http://www.holzwurm-page.de/holzarten/holzart/boire.htm
5) http://www.nova.net.pl/tropicalwood.html

Fig. 21 Koto data

Required specie information

Trade name	Koto		
Botanical name	Pterygota bequaertii/ Pterygota macrocarpa		
Other names	Kakendé, Pterygota, African pterygota, Kefe, Poroposo, Aké, Ware, Awari, Kyere, Okyere, Ikame		
Possible (certification) labels			
Bomen over...			
Growing area	Tropisch west Africa		
Houtvademecum nr.	109		
Color	Cream white	1)/ 2)	
Draft	Moderate rough	1)/ 2)	
Grain	Straight, sometimes cross grain	1)/ 2)	
Other specialties	An average hard specie but more stable and harder than other light colored species like Abachi (e.g.)	1)	
Picture			
Nailing & screwing	Good	1)/ 2)	
Gluing	Good	1)/ 2)	
Surface finishing	Good	1)/ 2)	
Other remarks	Regarding appearance and properties it looks like Eyong and Bonkonko	1)	
Applications	Fineer, ceiling and wall carpentry, doors, closets, stairs, store carpentry, moulding, block boards, joinery, paneling	1)/ 2)	
Suppliers	-		
Durability fungi			
Practical experience and field	5	2)	
Other literature statements	class 5 not durable	2)	
Durability insects	Susceptable	2)	
Termites/ marine borers	G , sapwood vulnorable for degradation	1)	
Density	510- 750 KG/M3	1)	
Shrinkage to 12% (radial)	2 %	1)	
Shrinkage to 12% (tangential)	5 %	1)	
Hardness (Janka) crossection	N		
Hardness (Janka) plane	N		
Strength class			
Quallity class	NEN-5493		
Elasticity module (test)	13140 N/MM2	2)	
Elasticity module (parralel) (*RV)	N/MM2		
Elasticity module (perpendicular) (*RV)	N/MM2		
Bending strength (Test)	96 N/MM2	2)	
Bending strength (*RV)	N/MM2		
Pressure strength (parralel) (T	54 N/MM2	2)	
Pressure strength (parralel) (*RV)	N/MM2		
Pressure strength perpendicular (*RV)	N/MM2		
Pull strength parralel (*RV)	N/MM2		
Pull strength perpendicular (*RV)	N/MM2		

Literature reference
1) Houtvademecum, SDU publishers, S.I. Wiselius, 9th edition, 2005
2) http://tropix.cirad.fr/africa/africa.html, 11th april 2011
3) http://www.thewoodexplorer.com/maindata/we998.html

Fig. 22 Movingui data

Required specie information

Trade name	Movingui		
Botanical name	Distemonanthus benthamianus		
Other names	Oguémenia, Bonsamdua, Bareé, Eyen, Ayan, Anyan, Anyaran, Yellow satin wood		
Possible (certification) labels			
Bomen over…			
Growing area	Tropical west Africa		
Houtvademecum nr.	137		
Color	Yello brown		1)/ 2)
Draft	Fine to slightly rough		1)/ 2)
Grain	Uneven and cross grain		1)/ 2)
Other specialties	Might excrete a yellow extractive in damp situations		2)
Nailing & screwing	Reasonably good to good		1)/ 2)
Gluing	Good		1)/ 2)
Surface finishing	Good		1)/ 2)
Other remarks	Pre drilling is necessary		2)
Applications	Furniture, fineer, turned goods, flooring, body work, beams, musical instruments, window frames, bowels for chemical industry, panneling, joinery, etc.		1)/ 2)
Suppliers	-		
Durability fungi:			
Practical experience and field research	3		2)
Other literature statements	3 Moderately durable		1)
Durability insects	Durable		2)
Termites/ marine borers	Class M moderately durable		2)
Density	590- 800 KG/M3		1)
Shrinkage to 12% (radial)	1,3 %	1)	
Shrinkage to 12% (tangential)	2,7 %	1)	
Hardness (Janka) crossection	N		
Hardness (Janka) plane	5450 N	1)	
Strength class			
Quallity class	NEN-5493		
Elasticity module (test)	14740 N/MM2	2)	
Elasticity module (parralel) (*RV)	N/MM2		
Elasticity module (perpendicular) (*RV)	N/MM2		
Bending strength (Test)	116 N/MM2	2)	
Bending strength (*RV)	N/MM2		
Pressure strength (parralel) (Test)	64 N/MM2	2)	
Pressure strength (parralel) (*RV)	N/MM2		
Pressure strength perpendicular (*RV)	N/MM2		
Pull strength parralel (*RV)	N/MM2		
Pull strength perpendicular (*RV)	N/MM2		

Literature reference
1) Houtvademecum, SDU publishers, S.I. Wiselius, 9th edition, 2005
2) http://tropix.cirad.fr/africa/africa.html, 11th april 2011
3) http://www.thewoodexplorer.com/maindata/we438.html

5.6 Use of the species so far.

Until now these species are not (extensively) traded on the European market (by the company which provided the concession data).
Koto and Movingui are traded on the “Bois divers” (timber processing industry).
Bodo and Alep are only harvested if it is requested by the round wood market. It is not completely sure where the last two end up in that case but probably Asia.

5.7 Market approach.

5.7.1 The selected species.

The analysis of this report provided leads to apply or consider during the process of commercializing LKTS. When it is actually the aim that these species will be commercialized, the term promotional species (PS) might be better in place.
The four species which are selected require different amounts of attention before selling them.

Like the flowcharts of chapter 3 suggests, possible branches can be allotted. Additional tests might be necessary and if so, determined:

Alep should definitely fit in the GWH sector.
The lack of shrinkage figures is not too bad as timber for the GWH sector does not need to have a 12% MC.
In the charts of chapter 3 a choice can be made to test a specie or not. A (my) suggestion is to test this specie on nervousness/ working. When doing so, also the durability can be practically verified.
Trials on sawing and drying could be started as these are stated to take extra care of (*http://tropix.cirad.fr*).
Alep is stated as good as Azobé regarding achievements in the same application categories and as a substitute (WWF Belgium VZW/ASBL). These statements could better be verified by tests or small scale sales to informed customers for a lower price than Azobé (as a part of the penetration strategy (Solomon, Marshall, Stuart 2009)) and to verify the expectations.

Bodo has high class purposes as a substitute for Walnut and Palissander veneer (e.g.).
Therefore it could be offered for a less expensive price as Palissander is very expensive and export on its sliced veneer is prohibited (Wiselius 2005).
Bodo also provides less trouble during drying compared to Walnut (Wiselius 2005).
It could be investigated what the actual nervousness and shrinkage is. “Minimal” is not a strong answer during sales of thin sheet material for inside use.

Koto is also suitable for veneer but for regular purposes like inside paneling.
Most technical figures are known. The advantages of a better stability and hardness over Abachie could be used as sales motive (Wiselius 2005).
It is not known what the actual hardness according to Janka is, but the Monnin hardness (*http://tropix.cirad.fr*) is known (see figure 21).

Movingui has a lot of purposes and could be targeted on a great variety of market segments. Depending on the company's background and customers, the end uses could be determined and the one(s) with the most potential for this specie could be targeted on. It can be possible that additional tests are necessary depending on these end uses. Especially for the chemical industry like suggested.
While its properties make it a specie to apply for multiple markets, it has to be investigated what the correct measurements need to be for those markets which a company wants to target the specie on. Many applications request different sizes.
A research should be made where what size is expected to be sold best for the company.

Bodo, Koto and Movingui might suit industrial purposes.
Bodo probably also suits some customized niche markets because of its appearance.
Movingui however is not connected to one segment while Alep has a clear target market.

The costs of testing depend on the kinds of testing, whether the company is willing to test and whether the company can conduct its own tests or has to consult external parties.

5.7.2 Commercializing promotional species.

At a certain moment the choice should be made whether to actually market the specie(s).
If the results are positive enough and there is a market for these species, they can be commercially offered.
At that point the biggest challenge starts which is the actual marketing/ sale (a concession owning timber trader).
In the case of Alep it is comprehensible to set up a quality system for timber in marine environments. The specie can be compared to (e.g.) Azobé and if the results confirm its positive properties, the sales should be focused on this too.
An absolute substitute with confirmed properties, more availability for its end use and trying to offer it with slightly a lower price than Azobé should create interest and a chance for the specie.
Focus on this power of availability and comparable properties also on the internet.
Steering towards properties selling and let it become a pro to think with- and for the customer. This, instead of just offering what is asked without being able to think along just that little bit more.

Packaging deals can make the acceptation of promotional species easier. By supplying timber for a project involving multiple species, a deal can be made to let a part or percentage exist of promotional species. Especially in governmental jobs the issue of SFM can go further than just applying approved certified wood.

Bodo could be lobbied for in the high class furniture sector. The better drying abilities than Walnut and the availability compared to Palissander (Wiselius 2005) make it an interesting choice for applying companies. This substitute can offer the customer competitive advantages if the specie is introduced by use of the penetration strategy (Solomon, Marshall, Stuart 2009).

5.8 Evaluating the concept tool.

The provided data which formed the case study made it possible to test the concept tool that was formed based on the analysis. In this case the schedule for species with available information was used to keep in mind the time frame.
The selection on availability and presence in the database was somewhat straight forward (after the minimum amount of M^3's was determined).

Stated applications are often suggested by available sources. Comparing properties to common species can also provide applications. Sources however sometimes state different figures for certain properties so this is something to be aware of and verify.

The grading part was a different issue as the results might deviate a little based on the person applying it or the specie involved.
A clear definition on a "high class product" or "few" alternatives is not uniform.
So are the selections on species, the possible markets and the climate.
Therefore it is concluded that room to discuss within these 5 criteria is rather better than worse compared to measurable statements as these (measurable statements) are not always representative for every specie or situation.

A measurable statement gives no exception in an evaluation. If a specie causes an exceptional situation for whatever reason, the grading system fails and perhaps a possible success too.
This freedom provides the ability to take external influences into account and to gain a useful score.

The data sheets contain the required information like the wood database prescribes. It is not complete but depending on the end use, this is not always required.

Whether additional tests are required depends on the end use and available information. In this case a choice to do so was made for some species.
Classifying them compared to commercial species could work well as their function as substitute has benefits over the known specie. A system for this should be developed by the company itself based on those issues which are important for that sector.

The stated information in the concept tool like the strategies, experiences and expectations can be used as points of attention during introductions or the process to it and were inspired by the analysis.

6. Conclusions.

The main question during this research was;
“What influences the introduction of lesser known timber species and how can we deal with certain obstacles to make it as successful as possible?”

The following sub questions answered the first part of the main question. The recommendations and the concept tool -as a result- the second part.

1. What are the success and failure factors regarding actual LKTS introduction(s)?
2. What makes a specie commercially interesting?
3. How were new species introduced in the past?
4. What are the companies and organizations opinions/ experiences about newly introduced LKTS?

1. For a selling company the following issues should favor.
   Correct properties for the end use, good availability in the widest sense, practical experience/ project examples and a price which is not higher than a comparable commercial specie make it possible for a LKTS to become accepted (if demand for a certain application is there).

   The market however has no direct demand and is not very willing to adapt these species.
   Reasons are the buying behavior of certainty and habits. Certainty in experience, availability, knowledge and acceptance. This results in a preference for known species.
   However, if trust is gained after practical experience and good timely information, it is experienced that customers are more willing to adapt LKTS. The chance to prove the positive effects is crucial to get trust but should be used with knowledge and modesty to avoid big mistakes.

2. Availability and correct properties for a certain end use are the main issues to favor for a specie to become commercially interesting. Secondary factors are price and demand but these are not always manageable. Furthermore the right quality and sizes for the end use, practical examples and a steady quality matter.

3. Introductions in the past have been very different. Depending on the motive, and abilities, efforts were made and therefore applied in different ways. The different methods were used as inspiration during the development of the concept tool.

4. The idea is that customers are not that willing to apply “unknown” species. Trust is increasing as successes are booked and some customers are informed in time. A lack of practical examples/ experience, some assurance and conservative buying behavior are reasons not to purchase LKTS. The expectation is that it will be a compulsory act to apply LKTS after a while because of availability problems with commercial species.

The second part involved the selection of a pilot area to test the concept. Based on the sub question; What region benefits most and brings probably the most result from this assignment?
Cameroon was selected. Within this country the focus lied on two concessions.

6.1 Species selection and the concept tool.

Before the actual concept was tested, some sub questions were stated:

1. What species are present in the concerning area and which are considered commercial (and which not)?
2. Are these LKTS commercially available (volume)?
3. What is done with these LKTS species until now?
4. What commercial species could these LKTS become alternatives for?

1. 61 species were present in these concessions whereof 11 where commercial (see figure 14)
2. 30 species had a correct availability (>6618,19M^3 after a calculation)

3. After filtering two concessions four species remained. Alep, Bodo, Koto and Movingui.
   These four species are not traded in Europe by the data providing company. Alep and Bodo are only harvested if there is specific demand (probably from Asia) and Koto and Movingui are traded on the local timber processing market.

4. Several sources stated Alep as a suitable and durable specie for the GWH sector and as a substitute for Azobé in this sector.
   Bodo is stated as a substitute for the expensive and prohibited Palissander veneer and also for Walnut veneer.
   Koto is a substitute for Abachi but is harder, more stable and suitable for inside sheet material like veneer and paneling.
   Movingui has a wide range of very different applications.

The created and evaluated concept tool is found to be useful as the result provided species with good potential. After selections on sufficient availability, investigating properties and allotting an application(s) the species were graded on 5 points. These are no concrete and measurable statements. The reason for that is that it can be applied even if the situation deviates.
An absolute statement gives no exception in an evaluation. If a specie causes an exceptional situation for whatever reason, the grading system fails and perhaps a possible success too.

Marketing these species requests another approach than regular marketing as these are no branded or unique products. Therefore it is more important to target them on the correct branch with all needed issues taken care of like technical data, correct sizes and practical experience.

As far as possible I conclude that the goal is reached. The gained insights and the tool can help to understand the involved issues and to introduce (probably) successful species.

6.2 Recommendations.

The final sub question creates the recommendations:

- How can commercial interest and success be generated?

To be able to evaluate the possibilities of your forest (and the tree species), it is important to take as much trees in the inventory as possible.

It is important to sell properties instead of a specie. This way the best solution for a job will be offered and the availability for an end use becomes bigger as multiple species can fulfill it.
This benefit should also be experienced by the customer to understand and appreciate the way of selling (helping) and its motive.

Some branches request certain certifications on the timber like KOMO. These practices should be prevented as they take a lot of time and a company is not often willing to finance it.
Instead, an alternative quality system could be developed to compare properties and to rank species for a certain end use. It is advisable to start with the development of such a system in time by companies, specified for their own market segment.

If efforts will be made to select species with commercial potential, it should be tried to select them for a “high class” market. If possible, a niche market is even better as substitutes are scarce. Species for the upper market segments provide a better profit and make the efforts worth it.

Collective efforts will support the ease of commercializing LKTS as financing, testing and sharing information is a common issue for all concession owning companies. This could be managed by a foundation which also takes care of the promotion.

The most suitable branches suggested to sell LKTS are the GWH and retail sector. The GWH sector benefits as properties matter most but are not too complicated, the retail sector benefits the fact that most customers do not known which specie they buy, but just purchase wood for an application.
Construction and carpentry branches should favor the least as they (often) request tests, certainty and product certifications.

“At the moment it will stay a struggle to some parties to sell LKTS in desired quantities, but the (my) expectation is that it will become a compulsory step because of availability problems of common species.
Being ready for that moment with sufficient knowledge and preparations is something to work on in time and not waiting for it to come.”

Sources.

Reports.

Author:	Title:	Date
Amarasekera Dr. Hiran	Selecting alternatives in place of naturally grown timber species - Local timbers for future?	1997
Klaassen René, Munck de Eric, Gard W , Mooiman A	Inventarisatieonderzoek 'Technische eigenschappen van minder bekende houtsoorten'.	26th November 2001
Cossio Antezana Victor H.	Introducing Lesser-Known Wood Species from Certified Forest in Bolivia to the U.S. Market.	July 10th 2007
Herbohn John , Smorfitt David and Harrison Steve	DEVELOPING MARKETS FOR LESSER-KNOWN SPECIES FROM TROPICAL AUSTRALIA.	WY
Hunder Joris, Buijert Daan	Marketing plan "lesser known species".	2009
Vlosky Richard Paul , Aguirre Juan Antonio	Increasing Marketing Opportunities of lesser known wood species and secondary wood products in tropical central America and Mexico.	August 3th 2001
Williams John, Meaden Melanie, Simm Jonathan, Dupray Sébastien	Assessment of the durability and engineering properties of lesser-known hardwood timber species for use in marine and freshwater construction.	2010
Williams PhD John	LKTS in marineworks 2 (TRADA report).	2010
WWF Belgium vzw/ sabl	*DUURZAAM HOUTGEBRUIK IN DE LEEFMILIEU- EN INFRASTRUCTURRSECTOR.*	WY

Articles.

Author:	Title:	Location	Date
Amarasekara Hiran S.	ALTERNATIVE TIMBER SPECIES - A REVIEW OF THEIR PROPERTIES AND USES.	Sri Lanka	1995
Augustin Sean	Campaign to promote lesser-known timber species.		July 23th 2008
Earle Johann	Lesser known species meeting mixed reception.	Guyana	August 25th 2010
Freezaillah B.C. Yeom	Lesser-known tropical wood species: How bright is their future?	Malaysia	WY
FSC-UK working group	FSC Case Study, Introducing Biodiversity in Building, CU-COC-008517.		WY

Hoenderboom Ghislaine	Hibin education, report theme day: Soms 'gesneden koek', maar vooral nog een wereld te winnen.		March 30th 2011
IDH	Nieuwe stappen in Tropisch Houtprogramma.		March 1th 2011
Kuffour Ben	Increased Utilisation of Lesser-Used Species - Social And Economic Impact.	Ghana	February 1998
P+ (People, planet, profit)	Nederland gaat veel meer goed hout uit Afrika halen .		2011
Probos foundation	Bosberichten nr 4, Houtdatabase.nl: *Duurzaam geproduceerd hout, hier vind je het!*	-	2009
PTM.org	Market evaluation of Lesser Known Timber Species.	Vietnam	WY
Schiøtz Martin	Perspectives of Increased Utilisation of Lesser Used wood species from Bolivia.	Bolivia	January 17th 2008
Stout Hans	"Geef bos een waarde, anders gaat het verloren", milieudefentie magazine.	NL	April 07
WWF Greater Mekong Program	Promotion of Lesser Known Timber Species in Vietnam.	Vietnam	WY
	PROMOTING Responcible Forest trade Of Lesser Known Timber Species.		WY
	Reaping The Potential Of Lesser Known Timber.	Malaysia	WY
	Cameroon looks to log export ban on prime species.	Cameroon	January 25th 2011
			WY= Without year

Books.

Solomon Michael R, Marshall Greg W, Stuart Elnora W, marketing, real people, real choices, 6th edition, Pearson education international, USA, 2009

Wiselius S.I, Houtvademecum, 9th edition, SDU publishers, 2005

Consulting.

Organization	Person	Date
SHR	René Klaassen	10th March
Koninklijke Houthandel G. Wijma & Zonen B.V.	Mark Diepstraten	11th March
Reefhout BV	Herbert Reef	13th March
Dekkerhout groep	Ingvar Kristensen	15th March
Centrum hout	Eric de Munck	17th March
Stichting Eco hout	Chris van der Groot	18th March
Precious woods Europe BV	Andries van Eckeveld	23th March
NBVT	Bert Kattenbroek (before employed at Titan wood)	7th April
Arnhemse fijnhouthandel	Geerd van Dijk	13th April
Tropenbos international	Marc Parren	30th May
Form international	Tieme Wanders	31th May

Miscellaneous.

Concession data Cameroon (anonymous)
Cancession map Cameroon (anonymous)

Internet sources.

http://bio.kuleuven.be/sys/iawa/IAWA%20J%20pdf's/30.no1-4.2009/277-291.pdf
http://database.prota.org/dbtw-wpd/exec/dbtwpub.dll?AC=QBE_QUERY&BU=http://database.prota.org/search.htm&TN=PROTAB~1&QB0=AND&QF0=Species+Code&QI0=Pterygota+macrocarpa&RF=Webdisplay
http://database.prota.org/publishedvernacularsEnAE.htm
http://diss-epsilon.slu.se:8080/archive/00002356/01/Uetimane_Junior_E_100928.pdf
http://espace.library.uq.edu.au/view/UQ:8154
http://ffp.csir.co.za/services/WoodProperties.pdf
http://info.frim.gov.my/cfdocs/infocenter/booksonline/ttb/TTBno29.pdf
http://info.frim.gov.my/cfdocs/infocenter/booksonline/ttb/TTBno32.pdf
http://library.wur.nl/WebQuery/rduser/login?url=http://www.cabi.org/fc/Default.aspx?site=163&page=2549&LoadModule=CABISearchResults&incontent=true&profile=13&query=LKWS&forcereload=true
http://omega.library.uu.nl/seal/omegasearch.php?cfg=omega&applid=omegaresult&idx=omega&lan=nl&sessionid=ppb1qbc4q1dtnslrhs86bjhan7&qry=lesser+known+timber+species&save=query_simple
http://psasir.upm.edu.my/3668/1/Fibre_Saturation_Point_of_Lesser-Known_Timbers_from_Sabah.pdf
http://pubs.ext.vt.edu/420/420-145/420-145.html
http://repository.ipb.ac.id/bitstream/handle/123456789/40474/Rayon%20Filament.pdf?sequence=1
http://scholar.lib.vt.edu/theses/available/etd-07262007-113504/unrestricted/vhcossio_MScThesis_09_19_07.pdf
http://timberanswers.com/howtouse.aspx
http://timberbuysell.com/Community/DisplayAd.asp?id=1452
http://tropix.cirad.fr/africa/africa.html

http://wwf.panda.org/who_we_are/wwf_offices/bolivia/our_work/forest_program/lesser_known_timber_species/developing_markets/
http://www.arkive.org/countries/congo
http://www.berehout.nl/Houtsoorten/houtsoorten.htm
http://www.bfafh.de/inst4/45/pdf/lstdoc05.pdf
http://www.biologie.uni-hamburg.de/b-online/wood/english/index.htm
http://www.cadexco.bo/actual/boletin-inteligencia/Promising%20EU%20export%20markets%20FSC-certified%20tropical%20building%20materials.pdf
http://www.ces.purdue.edu/extmedia/FNR/FNR-111.pdf
http://www.ddrn.dk/filer/forum/File/Increased%20utilisation%20of%20Lesser%20Used%20Wood%20Species_MS.pdf
http://www.dlh-nederland.nl/Houtsoorten/Afrika/Alep.aspx
http://www.dr-belair.com/dic/Agro-industries/Forestry/Bois-Afrique.htm
http://www.dutchsustainabletrade.com/nl/nieuws/nieuwe-stap-in-houtprogramma
http://www.fao.org/DOCREP/003/Y2199E/y2199e08.htm
http://www.fao.org/docrep/q9270e/q9270e00.htm#Contents
http://www.fao.org/docrep/q9270e/q9270e02.htm
http://www.fomabo.life.ku.dk/Research/MSc_BSc_and_Forest_Engineer_projects/~/

media/Fomabo/Documents/Publications/Other/2007/Martin_Schiotz.ashx
http://www.fornis.net/content/treatability-three-lesser-used-ghanaian-hardwood-timber-species
http://www.fornis.net/system/files/economic_impact_0.pdf
http://www.fsc.dk/files/resource_1/Materialer/LKS/Alep/Alep_FSC.pdf?PHPSESSID=8e1145f7594b1c35516aa4ea1640cb21
http://www.fsc.dk/index.php?id=262
http://www.fsc.org/worldwide_locations.html
http://www.fsc-uk.org/wp-content/plugins/downloads-manager/upload/Microsoft%20Word%20-%20Biodiversity%20in%20Building.pdf
http://www.ggcg.st/botany/trees_eg.htm
http://www.goforwood.info/nl/index.php
http://www.guyanachronicleonline.com/site/index.php?option=com_content&view=article&id=17764%3Alesser-known-species-meeting-mixed-reception&Itemid=12
http://www.hcto.be
http://www.holzwurm-page.de/holzarten/abisza.htm
http://www.houtdatabase.nl
http://www.houtinfo.nl/main.php?mn=0&id=1002
http://www.iwpawood.org/displaycommon.cfm?an=1&subarticlenbr=81
http://www.lfpdc.lsu.edu/publications/working_papers/wp50.pdf
http://www.northsouth.ethz.ch/news/past_events/inaugurationnorthsouthcentre/posterexhibition/Brunner.pdf
http://www.nova.net.pl/tropicalwood.html
http://www.oncameroon.com/rim/en/scdet?a=Cameroon-looks-to-log-export-ban-on-prime-species&story_id=1276&cat=business
http://www.preciouswoods.eu/index.php?option=com_content&task=view&id=34&Itemid=27
http://www.probos.net/kennisnetwerk/informatie.html
http://www.ptm.org.vn/index.php?option=com_alfadocman&
http://www.sawlog.ug/index.php?option=com_content&view=article&id=46&Itemid=107
http://www.sccd.org/forestry/timberharvest.shtml
http://www.shr.nl/publicaties/infobladen/
http://www.sjp.ac.lk/research/pdf/10-03-amarasekera-alternative-timber-construction.pdf
http://www.teaknet.org/images/HandBook%20sample%20pages.pdf
http://www.thewoodexplorer.com/maindata/we275.html
http://www.trada.co.uk/search?for=lesser+
http://www.trada.co.uk/techinfo/library/view/5BD3F257-51FC-48DB-B182-7E7B01011660/Specifying+sustainable+timbers/index.html
http://www.trada.co.uk/techinfo/tsg/
http://www.tropicalforest.ch/PD_44_98.php
http://www.tropicalforests.ch/files/bilateral_project/LKTS_leaflet.pdf
http://www.tropicalforests.ch/files/bilateral_project/LKTS_project_description.pdf
http://www.whyfsc.com/index1.asp?menu=8&sub=101#7
http://www.woodforum.be/nl/houtsoorten/
http://www.worldwildlife.org/what/globalmarkets/forests/WWFBinaryitem13634.pdf

SWOT sources.
Desk research: (points per source)

Richard Paul Vlosky, Juan Antonio Aguirre, Increasing Marketing Opportunities of Lesser Known Wood Species and Secondary Wood Products,
in Tropical Central America and Mexico, 2001:
Z3- Z10, K1- K4, B1

Victor H. Cossio Antezana, Introducing Lesser-Known Wood Species from Certified Forests in Bolivia to the U.S. Market, July 10, 2007
Z2, Z4, Z11, K2, K5- K10, B2- B5, S3, S4

John Herbohn, David Smorfitt and Steve Harrison, DEVELOPING MARKETS FOR LESSER-KNOWN SPECIES FROM TROPICAL AUSTRALIA,
Z6, S4

Selecting alternatives in place of naturally grown timber species- Local timbers for future?, Dr Hiran Amarasekera, 1997
Z2

http://scholar.lib.vt.edu/theses/available/etd-07262007-113504/unrestricted/vhcossio_MScThesis_09_19_07.pdf
Z16,

http://www1.milieudefensie.nl/publicaties/magazine/2007/mei/hans-stout.pdf
B8, S10

http://www.guyanachronicleonline.com/site/index.php?option=com_content&view=article&id=17764%3Alesser-known-species-meeting-mixed-reception&Itemid=12
B7, S10

http://timberbuysell.com/Community/DisplayAd.asp?id=1452
Z14, B5, S9

http://assets.panda.org/downloads/wwf_lkts_brochure.pdf
Z11, K9, K10, S1, S3- S7, S10

http://www.fornis.net/system/files/economic_impact_0.pdf
Z4, Z7, Z17, K6

http://www.ddrn.dk/filer/forum/File/Increased%20utilisation%20of%20Lesser%20Used%20Wood%20Species_MS.pdf
Z15, Z16

http://www.fao.org/docrep/q9270e/q9270e02.htm
Z4- Z6, Z12, Z13, K6, B2, B3

http://www.ptm.org.vn/index.php?option=com_content&task=view&id=212
Z2, S1

http://ybiol.tripod.com/forest/95sympo/9501amar.htm
Z2, Z4

http://www.sawlog.ug/index.php?option=com_content&view=article&id=46&Itemid=107
Z1

http://findarticles.com/p/news-articles/new-straits-times/mi_8016/is_20080623/campaign-promote-timber-species/ai_n44405286/
Z3

http://www.tropicalforests.ch/files/bilateral_project/LKTS_leaflet.pdf
S4

S8 – every source.

SWOT sources.

Based on practical review:

S1	COC	COC					
S2	COC						
B1	REAS	SUP	REAS				
B2	REAS						
B3	REAS	COC	COC	COC	SUP	SUP	REAS
B4	COC	COC					
B5	COC						
B6	COC	COC	SUP				
Z1	REAS						
Z2	REAS	COC	SUP				
Z3	REAS	COC	COC				
Z4	REAS						
Z5	COC						
Z6	REAS	COC	COC	SUP			
Z7	COC	COC	REAS				
Z8	COC						
Z9	COC						
Z10	SUP	SUP	REAS	REAS			
Z11	COC						
K1	REAS	COC	REAS	COC	COC	SUP	
K2	REAS	SUP	REAS				
K3	REAS	COC	COC				
K4	COC						
K5	COC						
K6	COC						
K7	COC	SUP	REAS	REAS			
K8	COC	SUP	REAS	COC			
K9	COC	COC					
K10	COC						
K11	COC						

COC= Concession owning company/ trader
SUP= supporting organizations
REAS= research organization

8 Attachments/ appendixes

1. Questionaire consulting companies
2. Questionaire consulting organizations
3. Project plan

Attachment 1.

Questionnaire consulting companies phase 1.

1. What are –in your opinion- commercial and LKTS (*Lesser known timber species*)/ LUS (*Lesser used species*) species (definition)?

2. What do LKTS mean for you and the organization you stand for?

3. Do you have any experience with LKTS in trade or introduction(s)?

3.1 Regarding trade:
- What makes the difference with commercial species?
- How are newer species perceived and do customers mind other species than the known ones? → Why do you think so?
- What about pricing and popularity. Do people mind other (LKT) species to be allotted to an order?

3.2 Regarding introduction(s):
- Were you as a company personally involved in introductions on the western market?

If yes; how did you experience this and how was it perceived by the market?
- Did you have all the necessary technical info on these species?
- If yes: How did you obtained these?

If not; who was/ were and how did it occur that you also could benefit?
- What was your idea about the perception of the market prior to the actual introduction(s)?
- Did this meet your expectations? Why and how?

4. In your opinion; which technical information should be known, or what example of data would you refer to?
5. Next to this technical information and numbers on availability, what do you think is important when new species will become introduced on the market and why?
   - Regarding this topic; do you feel that mistakes were made in the past? If yes, which ones and how do you think it could be prevented/ done better?

6. What is your view and opinion about the demand for such species?
   And; - regarding the future?
   - regarding long term availability?
   - regarding motivation and possible success?

7. How many species are taken into account when concession inventories are made up?
   - How many of them are commercial (Q/%)?
   - How many of them have potential commercial possibilities (Q/%)?

- Do you think research on this area would be profitable (regarding research results)

8. Do you see any possible market segments for these species?
   - What segments would be the most suitable and why?
   - What issues play an important role in this specific market segment?
   - Do you think that customers would appreciate the benefits of these species in the
     specific market segment to such extend that they are willing to adapt them?
   - What do you think about the global prices these species should be given and how would the market respond to this?

9. Are you willing to cooperate in the near future by sharing some information on species and availability (for confidential use in this research)?
   (This can be used to see whether species have commercial potential or not)

Attachment 2.

Questionnaire consulting organizations phase 1.

1. What are –in your opinion- commercial and LKTS (*lesser known timber species*)/ LUS (*Lesser used species*) species (regarding definition)?

2. To what extend and in which form is your organization involved in LKTS research and/ or marketing/ promotion?

2.1 Have efforts been satisfying so far? → Why?
2.2 What (in your opinion) is going very well? → Why?
2.3 What could be improved or done differently? → Why?

3. Do you see the need for any extra input, efforts or evaluation with LKTS regarding its introduction(s) on the western market? → In which form?

4. What is your overall opinion of the efforts to introduce LKTS/ LUS on the western market?
4.1 Do you think the message is clear to companies as well as public?
4.2 What do you think is their opinion about it? → And the need for it?

5. What -in your opinion- is necessary to successfully introduce new species on the western market regarding information and related factors?

6. What do you think about local efforts to improve the process of introducing LKTS?
(E.g. availability/ quality instead of price importance)

7. Do you think the approach of the many researches in the past were effective and/ or well executed? → Why?
7.1 What could be done differently and why?
7.2 What are the key elements of marketing LKTS/ LUS on the western market in your opinion?

8. What market segments –do you think- would welcome new species to become introduced? → Why?
8.1 How do you think customers would respond regarding interest and application?
8.2 How should the price be done during introduction in your opinion?

9. Are you willing to answer some more questions in the near future?
9.1 (Depending on organization):
- Do you think cooperation on some aspects could benefit in this matter?
- Are you willing to do so? → Why and how?

Attachment 3.

Project plan thesis assignment stichting Probos.

1. Summary
2. Inducement

   - Problem analysis (introduction)
   - Problem formulation

3. Target
4. Target group
5. Approach, sub questions, motivation
6. Methods
7. Product
8. Organization

   - Description of participants
   - Coaching
   - Internal & external consultation
   - Responsibilities
   - Allocation of tasks

9. Planning
10. Risk analysis & possible solutions

1. Summary

As the world's population is growing and the forests are shrinking, the pressure on the existing forests and species increases. There are thousands of timber species but relatively spoken there are only a few which are harvested for commercial purposes. Though it is an obligation for the forest manager to also harvest lesser known timber species (LKTS) when the forest is undergoing certified SFM (sutainable forest management) by FSC. Still the rest of the LKTS are lesser known and often sold on the local market or even burnt as commercial interest is limited. Some of these species could be a good alternative for and an addition to commercial ones if sufficient information about these species is available. SFM costs- and above all its certification- could be earned back by more species than just the currently commercial ones which therefore become very expensive. By investigating current experience and knowledge a basis to start from is made. Then a research on the most suitable area is done and the applicable species are researched. When it is clear what the commercial species in a certain area are it can also be investigated which species are present but not sold as commercial species. When the features of these species are found, they can be compared to others and when possible interesting alternatives with good availability are found a suitable strategy to market them is established based on gathered information. With all the information found (desk research and consulting) an appropriate promotion can be connected . Also different organizations will get involved for a broad set of information and experience.

2. Inducement

2.1 Problem analysis

Timber is one of the oldest materials used by humans for construction purposes. It is present all over the world in many different types of areas and in many varieties with different characteristics. Nowadays it still is a popular material because of its possibilities, appearance, durability and our conservative construction behavior and wishes. This last factor results also in the (often seen) conservative way of thinking that only a few species are good enough for a certain purpose. So as a result customers often ask for species instead of wood with certain characteristics:
"In water works Azobé always worked out so why asking for certain timber features?"
This buying behavior results in demand for only a few (relatively) species for every purpose what eventually causes shortages, ecological stress, higher prices and disregard for potential possibilities of LKTS. These species are lesser known, less popular and therefore sold on local markets, burned or sometimes even considered as an annoyance to timber traders and harvesters. Because these species do not have so much commercial value, the (certified) companies can only earn their investment in SFM certification back with the currently commercial species which decline very fast in some cases (e.g. Meranti) and which is very hard to stay profitable. As a result the pressure on these species is very big because the companies rely very much on them. Also, FSC requires to harvest LKTS, so how to make money out of them?

2.2 Problem formulation

The problem itself is that "the market" relies on only a few species by selecting them by name and thereby creating a lot of pressure on them.
Though it is not completely odd that the (LKTS) do not yet enter the European market as information about- and practical experience with these species is generally not present, which makes marketing of these species difficult.

Also SFM certification (often FSC) investments need to be earned back with the current selection of species which makes them more expensive and FSC requires that LKTS are harvested too. So, it is clear that certification plays a central role.
To formulate; What influences the introduction of lesser known species and how can we deal with certain obstacles to make it as successful as possible?

3. Target
The mentioned problems concern multiple targets. Though, one of these targets (3) is a sub target as this assignment does not directly have influence on that target involved.

1. Discover (LKTS) alternatives for certain current commercial species.
2. Promoting the entry of certain LKTS or “promotional species” based on theoretical and practical impulses (area to be discussed later).
3. Earning back the SFM certification investment with more sellable species.

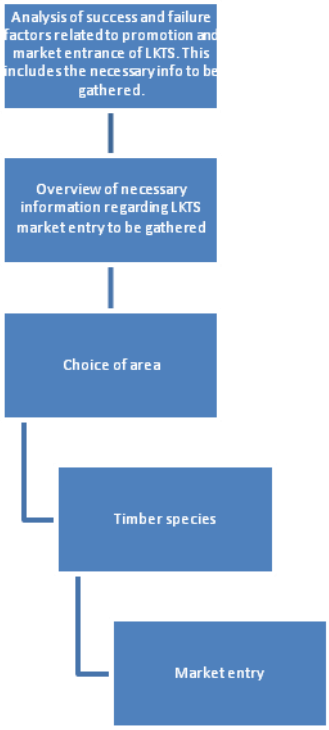
It is not the aim to find species for a certain purpose or to replace a specific product (group) but it probably have to be species with high potential as the costs and benefits have to be worth it to harvest them as “new” commercial species.

4. Target group
Different actors are involved in this assignment -which might have a positive influence on them- but the main target group to benefit are *companies with their own (certified)concessions. For them, the targets are an important issue and they are involved mostly with the essence of this assignment. Better income from more species and a better sales instrument by having knowledge about the features of the timber makes it useful for this target group. In fact all certified forestry companies in the specified region can benefit.
Also GFTN’s (Global forest & trade network) can benefit as certified forestry and trade is durable and financially more interesting with more knowledge about LKTS.
Stichting Probos supports forest conservation and better forest management worldwide. By giving LKTS a better market entrance, the forest will be used more balanced (No plunder for a view species). Also, when the costs of SFM can be earned back over more species, the price difference with non certified timber becomes smaller so the barrier to become certified and to buy certified timber becomes smaller.

* The region which will be focused on depends on the outcome of this project plan as possible cooperating organizations make a decision about the region with the highest priority and possibly the most satisfying results. This also means that the importing area is not known yet.

5. Approach

The research exists of several steps containing a topic with multiple questions:



Phase 1.

1.1 What are the successes and failure factors regarding actual LKTS introduction(s)
1.2 What makes a specie commercially interesting
1.3 How were new species introduced in the past
1.4 What is the opinion/ experience of companies about newly introduced LKTS (regarding harvesting)
1.5 What is the opinion/ experience of companies about newly introduced LKTS (regarding availability)
1.6 What is the opinion/ experience of companies about newly introduced LKTS (regarding features)
1.7 What is the opinion/ experience of companies about newly introduced LKTS (regarding demand)

Phase 2.

2. Format result from step one (including needs for complete and useful data)

Phase 3.

3. What region benefits the most and brings probably the most result from this assignment.

Phase 4.

4.1 What species are present in the concerning area and which are considered commercial
(and which not)
4.2 Are these (LKTS) commercially available (volume)
4.3 Which LKTS are harvested in the area concerned and what's done with these species (their use) until now?
4.4 What commercial species could these LKTS/ LUS become alternatives for?

Phase 5.
5.1 How can commercial interest and success be generated

6. Method(s)
The steps request different approaches to gain a sufficient result:
1.1 With this point an analysis will be performed to find out the possible related factors when certain LKTS's might actually be introduced. First different opinions will be gathered from several actors and present researches and based on this a SWOT analysis will be made with combined strategies as a result. This analysis will also come up with a list of necessary information to be gathered which becomes clear from desk research from former researches combined with the strategies.
1.2 By investigating the features which are necessary for different actors it is possible to state a set of fixed rules which apply for any specie to become commercial in the first place. These rules are influenced by theory, traders, customers, forest managers and sustainable organizations by consulting them to gain mutual agreement.
1.3 By consulting companies, organizations and documents it will be researched how and why new species were introduced on the western market in the past (e.g. Precious woods has this experience). It is also researched what information is necessary and what steps have to be taken to bring this to a success without running into familiar traps.
1.4, 1.5, 1.6, 1.7 By consulting companies and related organizations, the opinion and experience is reviewed. Is there a believe, possibility, chance and positive feeling about the introduction of certain species and the way this will be done or was done? Parts of this step will return in phase 5 as this is the preparatory phase and phase 5 the enactment.
The actual questions towards the extern actors differ from the sub questions in this project plan as the picture has to become bigger for wider understanding and linking different factors.

3. Several organizations will be consulted and (desk) research will be done to find out which region is the best suitable for this particular assignment regarding need and success. Of course it will be communicated with both coaches. When the area is known, relevant companies and organizations can be consulted for specific information. It might be possible that some impulses become clear in phase 1 already during the external consults.

4.1 By a region specified desk research, information is gathered about the species which are present. This is also connected to the stated rules for "commercial specie". Also the companies who are situated in the region will be checked and contacted to see what species they trade in. A selection on species which are commercial to them is made and also on their LKTS (not commercially traded but present LKTS/ LUS). This way a selection of commercial and LKTS/ LUS can be made.
4.2 By desk research and interviewing companies regarding the availability of these species it has to become clear if they are available sufficiently for (commercial) international trade. The outcome might reveal any potential or not.
4.3 LKTS which are harvested can be a potentional commercial specie and by investigating the area's forest/ wood/ timber information by desk research and consulting related organizations, this can be assured or not. Then it will be investigated what is done with these species until now. What are they used for or

where do they end up. This will mainly be researched by consulting relevant companies.
4.4 Having the related information on these species creates the opportunity to put them in a group for end uses. By comparing them to other species in the group, possible alternatives might rise. This also makes the marketing in phase 5 easier. Giving each specie an end use will probably be behind this scope as official testing and certificates have to be allotted which is costly and takes too much time.

5.1 By consulting companies and related organizations the most important features and routes to effect have to be discovered to gain the most interest and effect for the particular LKTS on the market. As this is a marketing related point, the term “promotional species” might be better in place. Currently it is already applied by several organizations and might help better understanding the purpose of this action. A following action is to start up a certain market approach probably involving other actors to support the idea and target. Which organizations will be involved depends on the choice of area again. This part is strongly related to phase 1 as the learned experience has to be adapted in this phase. In this phase external actors might be consulted as well for reviews and feedback on results to success.

* It is important to state that there will be a significant difference between theoretical and practical information and experiences which will be gathered.

7. Product

The eventual result will be (on the one hand) an informative report with bundled information about the LKTS which are found technically interesting and might suit the commercial market in the chosen area, and on the other hand about the market potential and entry which is probably more important as specie information is researched more. An official Probos report might also be written based on the assignment, depending on the outcome. The consulted companies and organizations which are willing to cooperate in promotion and adaptations are included and eventually (after this assignment) maybe even in actual promotion campaigns.

8. Organization

8.1 Description of the participants

Like stated in chapter four, it is not yet clear which area will be focused on and which 3th parties might be involved in this assignment. In the actual thesis report this will be clear of course.

8.2 Coaching

The task of coaching is divided up in internal (van Hall Larenstein) by John Raggers and
external (stichting Probos) by Mark van Benthem. Mr. Raggers is the major coordinator of International timber trade and Mr. van Benthem is senior advisor forest management and wood/ timber flows. These people are probably the best coaching persons for this topic.

8.3 Internal & external consultations

As stated in 8.1 it is not yet clear who (exactly) to consult externally. Some could be:

- WWF
- GFTN
- FSC
- SHR
- Precious woods
- Tropenbos
- University of Utrecht
- IDH
- Centrum hout

Internal there are multiple people inside stichting Probos who might be able to support in a certain way as people have different affinities. It is also possible that van Hall Larenstein (VHL) has useful sources to consult/ contact.

8.4 Responsibilities and allocation of tasks

The responsibilities related to the thesis assignment are stated in the document provided by VHL. (VHL Forest and nature management. Guidelines for Thesis research and Graduation 2010- 2011, p. 9- 11). This document is provided by VHL en also made available extern.
As a student all stated responsibilities have to be fulfilled and also make sure that others do so. Mainly deadlines and meetings have to be arranged in time on the stated dates or before.

9. Planning

See the included Excel sheet

10. Risk analysis & possible solutions

Regarding the whole process several risks or unwanted aspects might get involved influencing the process and/ or end result. For this research the following risks are identified:

Risk	**Solution**
To little information available to gain a sufficient picture of a specie.	Consult other sources who might have the information and use the name of Probos to give trust
Results might be less favorable (e.g. bad availability of a certain LKTS)	No solution possible but still a result from research
Limited cooperation of companies	Use the motivation of collective importance and long term benefits for companies
Skeptic point of view regarding LKTS or reluctant attitude from actors involved.	Ask for information and opinions only. Companies do not have to reveal their “secret” information. Make clear the benefits and importance.
Language of available information	Keep on searching in a different language or consult people who can read the concerning language. Digital translating is partly also possible

Thesis planning					
Month	**Week**	**Acts**	**Obligated task(s)/ deadlines**	**Deadline**	**Notes**
Feb	Start 5	Project plan			Including meeting with external coach
Feb	6	Project plan			Evaluation wit external coach, editting. When finished consulting internal coach and hand in afterwards
Feb	7	Phase 1			
Feb	8	Phase 1	Project plan	M	
Feb- Mar	9	Phase 1+2			
Mar	10	Phase 1+2+3			Establishing contact with related organizations (for area choice)
Mar	11	Phase 3			Choice on area, contacting relevant companies/ organizations
Mar	12	Phase 3+ 4			Martijn --> LKTS info
Mar- Apr	13	Phase 4			
Apr	14	Phase 4			Consulting companies.
Apr	15	Phase 4+ 5	Stop gathering info		Consulting companies. Not gathering primary information but verifying
Apr	16	Phase 4+ 5			
Apr	17	Phase 5			
May	18	Buffer			
May	19	Writing report			Probably still consulting organizations for promotional purposes
May	20	Writing report			
May	21	Writing report			Hand in draft report for feedback
May- June	22	Writing report			
June	23	Hand in final thesis		D	1 hardcopy, 1 digital version on CD and the project plan at C105
June	24	Preparing presentation			
June	25	Preparing presentation			
June- July	26	Colloquia			
July	27	Colloquia			
Effective total:	16				
M = Monday					
D = Tuesday					
W = Wednesday					
D = Thursday					
V = Friday					