INTERNATIONAL TROPICAL TIMBER ORGANIZATION

I T T O

PROJECT DOCUMENT

TITLE	SUSTAINABLE MODEL FOR THE BRAZILIAN WOOD FLOORING PRODUCTION CHAIN
SERIAL NUMBER	PD 433/06 Rev.3 (I)
COMMITTEE	FOREST INDUSTRY
SUBMITTED BY	GOVERNMENT OF BRAZIL
ORIGINAL	ENGLISH

SUMMARY

This project proposal embraces the industrial production chain of wood flooring, with activities directed to forest management, manufacture process and, product utilization. Its Development Objective is to contribute to the sustainable and adequate utilization of forest resources from the Brazilian tropical forest. The Specific Objective aims to increase the efficiency in forest resources utilization by the production chain of solid wood flooring, from the forest to the final product; integrating extraction and utilization of commercial and less used lumber species, improving drying and manufacture processes, adding quality and value to the product, promoting residues utilization, and with social benefits to industry employees crossing over all proposed objectives. This project should be executed in collaboration with several Brazilian research institutions and universities. Expected outputs are a more diversified forest exploration; improvements in manufacture process, reducing residues generation and setting a flooring quality standard; and to establish a Quality Certification Program for wood flooring.

EXECUTING AGENCY	ANPM - National Hardwood Flooring Association
COOPERATING GOVERNMENTS	BRAZIL
DURATION	30 MONTHS
APPROXIMATE STARTING DATE	TO BE DETERMINED

BUDGET AND PROPOSED SOURCES OF FINANCE	Source	Contribution in US$
	ITTO	**516,927**
	ANPM	304,860
	TOTAL	**821,787**

Abbreviations

ABC	Brazilian Agency for International Cooperation
MRE	Ministry of External Relations of Brazil
ABNT	Brazilian Technical Standards Association
ANPM	National Hardwood Flooring Association
CCNT	Center of Natural Sciences and Technology
CONAFLOR	National Council of Forest
CONAMA	National Council of Environment
DPF	Division of Forest Products
EMBRAPA	Brazilian Agricultural Research Corporation
ESALQ	Agriculture High School "Luiz de Queiroz"
FNABF	National Forum of Forest Organizations
FC	Field Coordinator
FFT	Tropical Forest Foundation
FLONA	National Forest
FSC	Forest Stewardship Council
IBAMA	Brazilian Environmental and Natural Resources Institute
INMETRO	National Institute of Metrology, Standardization and Industrial Quality
IPT	Technological Research Institute of São Paulo State
ITTO	International Tropical Timber Organization
LCF	Department of Forest Sciences
LPF	Laboratory of Forest Products
NGO	Non Governmental Organization
MMA	Ministry of the Environment of Brazil
PM	Project Manager
PNF	National Forest Program
SC	Steering Committee
SFB	Brazilian Forest Service
SPWP	Secondary Processed Wood Product
SFM	Sustainable Forest Management
UEPA	Para State University
USP	University of São Paulo

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PART I: CONTEXT

1. Origin

Statistics of international market during the 1990 decade showed that Brazilian SPWP's (Secondary Processed Wood Products), including solid tropical wood flooring, had a lower price compared to similar products proceeding from Southwest Asia (23). This low price can be due to different factors, as lack of quality, turn pricing the principal marketing tool or buyer's negative perception regarding such Brazilian suppliers.

In the same period, increasing concerns about environment preservation also affect flooring producers. The crescent demand for Sustainable Management Certification (as FSC certification) by users and more restrictive law regarding exploration of tropical forest represent a cost increase in production chain.

Those reasons lead a group of companies to join efforts and found the ANPM (National Hardwood Flooring Association) in early 2001. Its mission is to promote the use of wood flooring, technology improvement in manufacture processes and the sustainability of wood resources. Since its foundation, ANPM is working together partners institutions to achieve its objectives. This project is an initiative that can help this deal.

Finally, it is worth noting that this proposal is consistent with the recommendations within ITTO 2004 -2007 Program Framework for Cooperation in Brazil, recently developed by the ABC - Brazilian Cooperation Agency and the MMA - Ministry of Environment through the PNF - National Forest Program. The framework defines a systemic approach for planning and approval process of technical cooperation projects sent by the Brazilian government to the ITTO. This approach includes: (i) the harmonization of the goals of the three working areas of the ITTO with the priorities of the national forest program and (ii) a public bidding process to receive proposals; (iii) the establishment of common and impartial judgment process including independent experts committee and a commission involving members of the National Forest Program Board, there included the Civil Society and the Private Sector, among others.

2. Sectoral Policies

The Brazilian government's forest policy for the Amazon region is expressed in the National Forest Program (PNF) launched in February 2004 by the Ministry of the Environment. The PNF is the agency in charge of forest policy and its compatibility with other public policies. PNF objective is to promote sustainable forest development, harmonizing economic use with the protection of ecosystems, and to promote the institutional development of the forest sector (18).

Among the medium term objectives set by PNF, by year 2010, should be detached the following: (a) to expand public forests in the Legal Amazon by 50 million hectares; (b) to incorporate into the system of sustainable management an area of 20 million hectares of natural forests in private properties and: (c) to assure that 1/3 of lumber production came from social forests, involving families and communities.

Another important initiative supported by Brazilian Government is the Pilot Program for the Conservation of the Brazilian Rainforest (Pro Manejo), which is financed by the G7 through World Bank. Supporting and financing strategic actions and pilot experiences in

forest areas considered as priority, Pro Manejo should contribute to the development and the adoption of sustainable systems of forest management in Amazon Region.
The great part of activities supported by Pro Manejo will be developed in the State of Para, where State Government has addressed industrial policies to promote value addition to forest products and forest policies to stimulate sustainable management in private areas and to create State Forest with the possibility of private management and exploration.

More recently (February, 2006), was promulgated the "Law on the management of public forests for sustainable production" (Law n° 11.284/06), which set rules to the allocation of timber concessions in public forests for sustainable production, involving communities, private sector and other potential investors. Although the area of land affected by this law should be quite small in short to medium terms, the legalization of the private use of federal lands for lumber production will show a positive result regarding industries' and communities' development; besides making law enforcement easier, as well as protecting forest areas under concession from agriculture expansion. This same Law created the SFB – The Brazilian Forest Service, which is the agency in charge of the execution of the Brazilian policy for timber concessions in public forests, subordinated to the Ministry of Environment.

In August of the present year (2007), the SFB concluded the First Annual Plan of Forest Concession, discriminating priority areas to be allocated for timber concession and indicating the rules for Sustainable Forest Management in those areas.

However, the more general and, probably, the more important constraint to Sustainable Forest Management still is the fact that production of timber is less profitable than other possible ways of using the land (14). In this way, initiatives to increase the efficiency of timber and wood based industries, as well to promote the production of wood based and non timber added value products, should contribute to the Government effort to stimulate the sustainable use of Brazilian tropical forests.

3. Programs and operational activities

Brazilian forest policies are clearly directed to the promotion of SFM in the Amazon Region. Actions and initiatives supported by PNF and Pro Manejo are part of those policies, helping to create pilot results and to stimulate forest companies moving into SFM. This effort, working together international pressure by forest certification, has resulted in constant increase of the FSC certified area. In December 2005, a total of 3.46 million hectares of natural and planted forests had been FSC certified in Brazil. Of this, an estimated 1.16 million hectares were natural tropical forest and 1.35 million hectares planted tropical forest (04, 14).

From all timber produced in Amazon Region during 2003-2004, it is estimated that only 7% comes from areas covered by approved forest management plans and 25% from approved forest conversion areas. Law enforcement executed by IBAMA during 2001 suspended 23% of forest management plans, due lack of reliable information. A similar initiative in 2005 resulted in almost total suspension of those plans, this time due legal aspects related to land property. IBAMA action was a decisive pressure to "Public Forest Concession Law" approval.

Although PNF initiatives had been very important to change SFM status in Brazil, initiatives directed to timber industries had been quite few. The main governmental project

is developed by the Ministry of Development, Industry and Commerce - MDIC, named Sectorial Chamber of Timber and Furniture Productive Chain. However, initiatives supported by MDIC are more directed to improvement of industrial manufacture processes and, in the case of tropical timber, not always is connected to forest management issues.

ITTO has shown a strong commitment to Brazil and to adequate use and conservation of the Amazon Forest through its financial support to several projects; from which could be cited:

- ***PPR 3/87 (I) Lesser Known Species. Carried out by Centre Technique Forestier Tropical; and in sequence ITTO OP-1., 1990. Tropical Timber Atlas of Latin America.***

  This project is concluded. Final result was a publication sponsored by ITTO, describing physical and mechanical characteristics, as well as possible uses, of 84 tropical lumber species from Latin America. Around 70 of those species are from tropical forest.

- ***ITTO TS-1, 1989. Amazonian Timbers for the International Market, carried out by IBAMA (Brazilian Institute for Environment and Renewable Natural Resources).***

  This project is concluded. Final result was a booklet with description of 60 tropical lumber species, many of them classified as LUS (less used species) at time of publication.

- ***PD 31/92 Rev. 1 (M, I) Selection and Introduction of Lesser Known and Lesser Used Species for Specific End-uses.***

  There is no available online information about this project.

- ***PD 47/94 Rev 3 (I) Industrial Utilization of Lesser-Known Forest Species in Sustainable Managed Forests.***

  There is no available online information about this project.

- PD007/94 Rev. 3 (M, I) Information and Technical Assistance for Production and Trade on Tropical Timber. Carried out by SINDIMAD.

  This project is concluded. The objective was to promote marketing of tropical timber from SFM. Technical assistance to industries and traders, marketing missions and information divulgated through Internet strongly contributed to improve production and commercialization practices.

- PD 31/99 Rev. 3 (I) Non-timber Production and Sustainable Development in the Amazon region. Carried out by the University of Brasília – UNB.

  This project still is operational. The main objective is to build a database regarding Amazonian NTFP, including socioeconomic and technological information.

- PD 46/97 Rev. 3 (I) Community Processing of Forest Products in the Porto Dias Extractive Reserve (ACRE). Carried out by the Centre for Amazonian Workers - CTA

This project is concluded. It was one of the first projects of SFM focusing an Extractive Reserve exploited by community persons, to avoid land invasion and illegal timber exploitation. The project helps to discuss the problem with communities near forest and industries and establish an Operational System and a Management System, including personal training and environmental license. Best strategy to involve communities was to keep the extractive action using the community families as units of production, allowing a cultural adaptation to SFM.

- PD 57/99 Rev. 2 (F) Sustainable Management of Productive Forests on a Commercial Scale in the Brazilian Amazon region. Carried out by the Centre for International Forestry Research – CIFOR and EMBRAPA.

  This project still is operational. Its objective is to establish forest areas under SFM to demonstrate in several fields and exploitation conditions the benefits of SFM. Possible operational obstacles to sustainable management will be identified and alternatives should be pointed. Results, even partial, should help to formulate auditing tools and parameters to be used by governmental agencies in charge to control SFM in Amazon Region.

- PD 61/99 Rev. 4 (I) Increase in Efficiency in Conversion of Tropical Timber and Utilization of Residues from Sustainable Sources. Carried out by FUNPAR.

  This project is concluded. The main conclusion was that the use of residues generated by lumber industries could be used to generate electric energy, replacing petroleum derivatives as solid fuel. Although the use of lumber residues to generate electric energy can add value to SFM, the energetic police of Brazilian government do not stimulate industrial investment.

- PD/142/02 Rev. 2 (F) Sustainable Production in National Forests Forest Concession Sub-system. Carried out by the MMA.

  This project still is operational. Based on social and economic surveys, environmental studies and preliminary forest inventories, five Amazonian national forests will be prepared as future concession areas. Management plans for the sustainable production of timber from the five national forests will be developed, along with the rules and procedures to be followed by companies under the concession regime. The rules for concession to explore public forest in Amazon Region were formalized through Law n° 11.284, dated March 01, 2006.

The present project, despite its wide range of activities, approaches the production chain and connects the SFM to the manufacturing process. Its execution should contribute to the better conservation and utilization of forest resources, resulting in:

- Valorization of SFM, through experimental results and data;
- Value added to wood flooring;
- More efficient processes to manufacture wood flooring, with less residues;
- Better technical qualification of industries employees.

PART II: THE PROJECT

1. Project Objectives

1.1 Development Objective

To contribute for sustainable and adequate utilization of the Brazilian Amazon forest resources.

1.2 Specific Objective

To increase the environmental, social and economic sustainability of wood flooring production chain: from the forest to the final product.

2. Justification

2.1 Problems to be addressed

The most part of development projects related to SFM and tropical wood manufacturing industries approach specific segments of the production chain. The projects listed in page 5 are an example of this affirmative. The integration of results obtained from different projects depends on the initiative of governmental agencies and its public polices, not always reaching the desirable interaction between industry and society.

Analyzing the whole production chain (illustrated in Figure 1), the need to integrate all segments (links) of that chain is clear. The present project approaches the main segments of the wood flooring production chain; ***integrating the manufacture of value added product (solid wood flooring) to the valuation of SFM (less known species) and to marketing (quality program and assistance to consumer)***; crossed over by social initiatives directed to industries employees.

According to ITTO report (13), "*a key constraint to the development of a sustainable timber industry based on natural tropical forests is the fragility of the supply chain, which is subject to disturbance by several factors. Moreover, the financial competitiveness of SFM in natural forests with alternative land-uses is often low, leading to significant deforestation*". Those two reasons should be analyzed to permit a better understanding.

Fragility of the supply chain can be related to the high quantity of logs proceeding from approved forest conversion area. In this case, continuous log supply is impossible. The possibility of public forest concession should contribute to minimize the problems related to raw material supply.

The low competitiveness of SFM with other possible land uses is more complex, embracing several aspects related to SFM as well to timber industry.

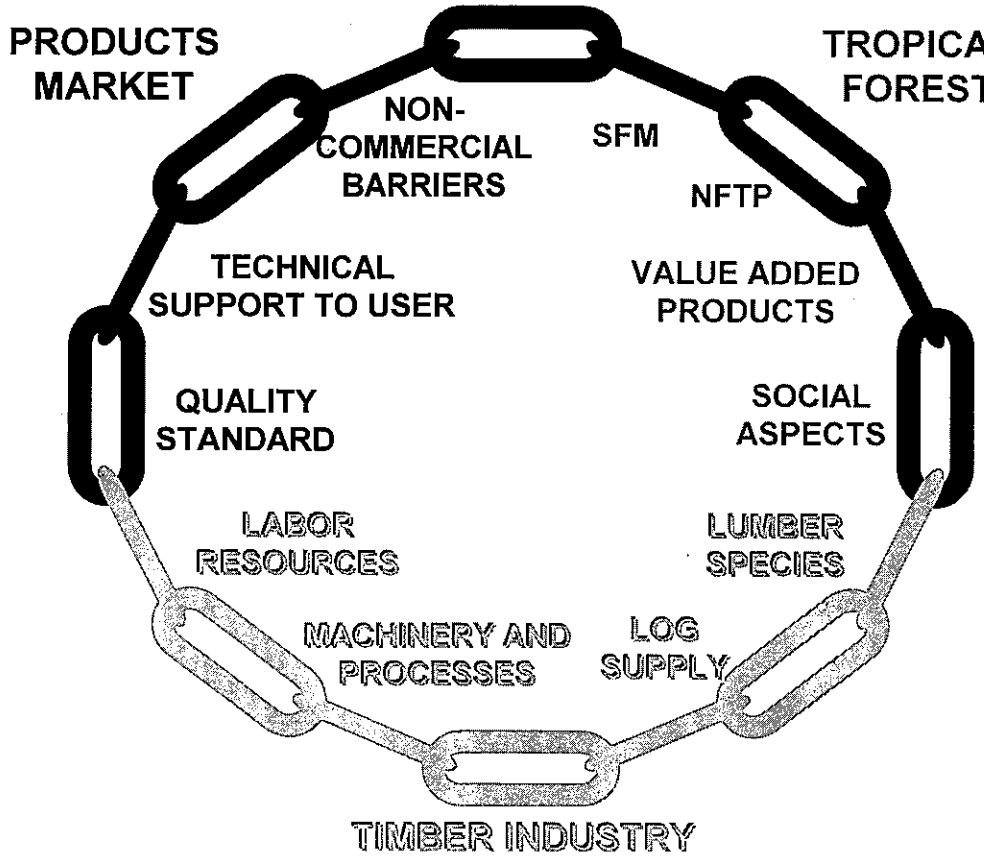


Figure 1. Illustration of main aspects in the production chain of tropical timber industry.

As one can see in Table 01, only 20 lumber species represents around 72% of total commercialized lumber. In the specific case of solid wood flooring, only three species (Jatobá, Ipê and Cumaru) reaches until 80% of total commercialized volume. In addition to the selective exploration of lumber, there is a quite few commercialization of non timber products. The result is the need of a very large area under SFM to get a comparatively small volume of row material (timber).

Discussing the industrial production chain of solid wood flooring, there also are several issues contributing to low profit. Mechanical manufacturing processes still are inefficient, generating a high volume of lumber residues.

It was proved that those residues can be used to generate electricity (13), but installation of electric power plants based on solid fuel burning is not priority according governmental police for energetic supply. Extraction of high added value products from lumber residues, as natural colorants and pharmacological substances, is a potential alternative.

Final product is under priced as in global market as well in domestic commerce. The lack of quality standard prejudices commercialization, because the buyer has no references to distinguish prices differences. The lack of after sales assistance, mainly in domestic market, also contributes to competition by prices instead by quality. In many situations, it

is more profitable to produce and sell less processed lumber, as rough sawn timber, than a secondary processed wood product as solid wood flooring.

Table 01. Species profile of tropical timber commercialized in Brazil.

Species	Scientific Names	% of total
Cedrinho	Erisma uncinatum	17,2
Angelim	Dinizia excelsa	7,9
Amesclão	Tratinickia spp	5,6
Itaúba	Mezilaurus itauba	5,4
Maçaranduba	Manilkara spp	4,3
Jatobá	Hymenea spp	3,7
Faveira	Vaitarea, Parkia and Dimorphandra	3,4
Peroba	Aspidosperma spp	3,2
Tauari	Couratari spp	3,0
Ipê	Tabebuia spp	2,6
Cupiuba	Goupia glabra	2,3
Cedro	Cedrela spp	2,2
Garapeira	Apuleia leiocarpa	1,8
Cumaru	Dipterix odorata	1,7
Amapá	Parahancornia amapa	1,5
Louro	Lauracea spp and Boraginaceae spp	1,4
Mogno	Swietenia macrophilla	1,4
Sumaúma	Ceiba pentandra	1,2
Muiracatiara	Astronium spp	1,2
Canelão	Nectandra spp and Ocotea spp	1,1
Sub total		**72,2**
Other woods		**27,8**
Total		**100,0**

Source: PNUD, 2002 (19)

To effectively stimulate the adoption of sustainable forest management in the Amazon region it is necessary to diversify the forest exploration, ***including lumber of commercial and less used species to value added products.*** Considering that almost totality of the forest managed area is linked to manufacturing industry, it is very important to have the industry (or its association) conducting a development project aiming the sustainable and diversified forest exploration and use.

The specific objective of present project is to increase the efficiency of forest resources utilization, looking the industrial production chain of wood flooring. It includes, over the flooring itself, the possibility to use lumber residues.

To add value to lumber product (wood flooring), to reduce waste in manufacturing process, to use lumber residues to get wood based sub products and to explore lesser known lumber species are tools to increase financial competitivety of SFM.

Direct involvement of industry employees and its families, with a measurable social and economical return, could also contribute to create a society perception

favorable to SFM and to related products. Considering that industry focus is the manufacture of lumber flooring, it can promote new enterprises to explore and to use residues, integrated to SFM, fomenting its employees as partners in those enterprises. Without losing its focus, the industry could be the drive force to develop new economic alternatives.

Following the initial approach, to have a quality standard and a Quality Certification Program, to improve efficiency of manufacturing process, to train industry technicians and employees, to supply information and assistance to buyers and users are tools to add value to the product.

The addressed problem can be summarized as follows, and graphically described on Figures 2 and 3.

Figure 2. The problem tree.

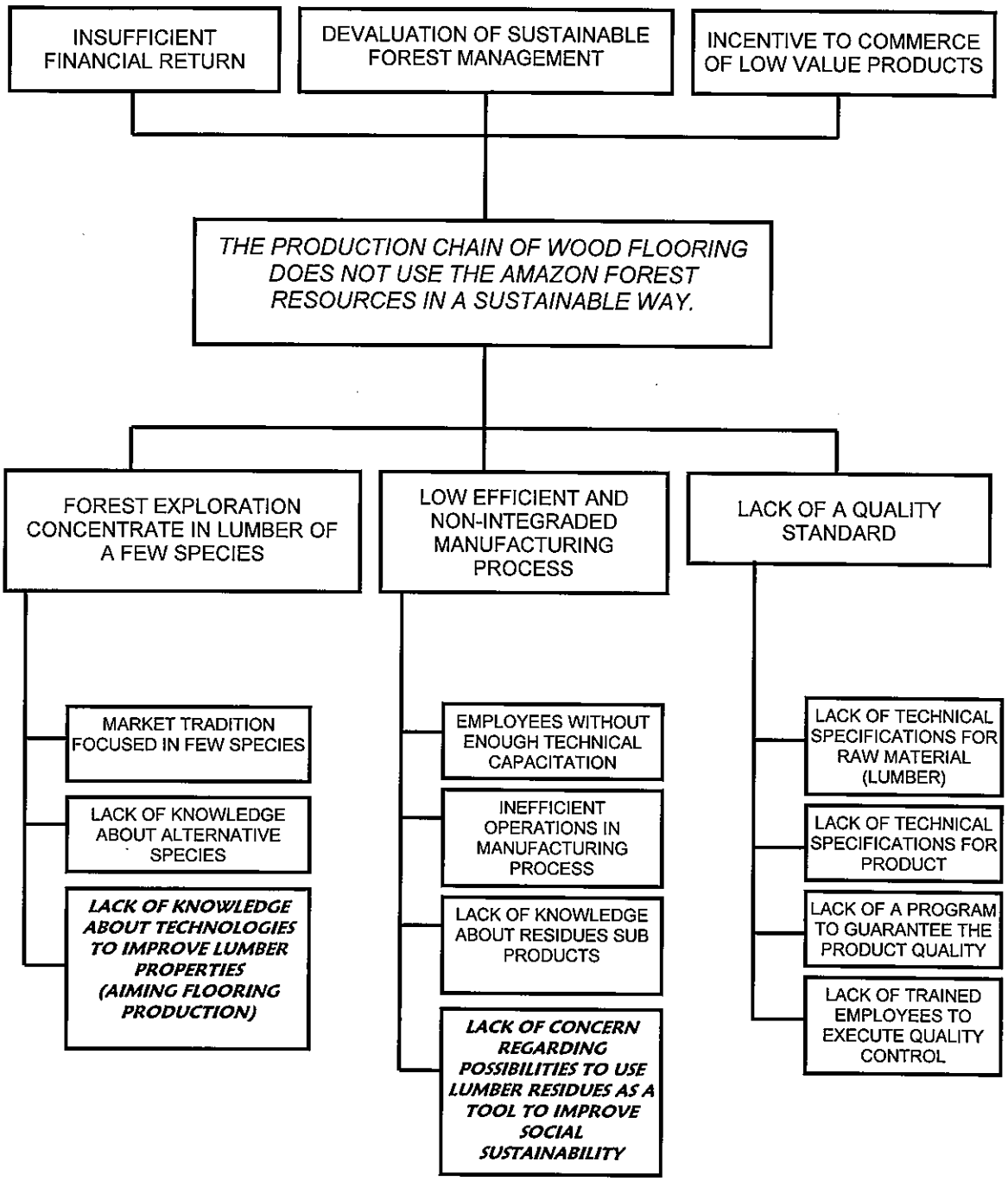
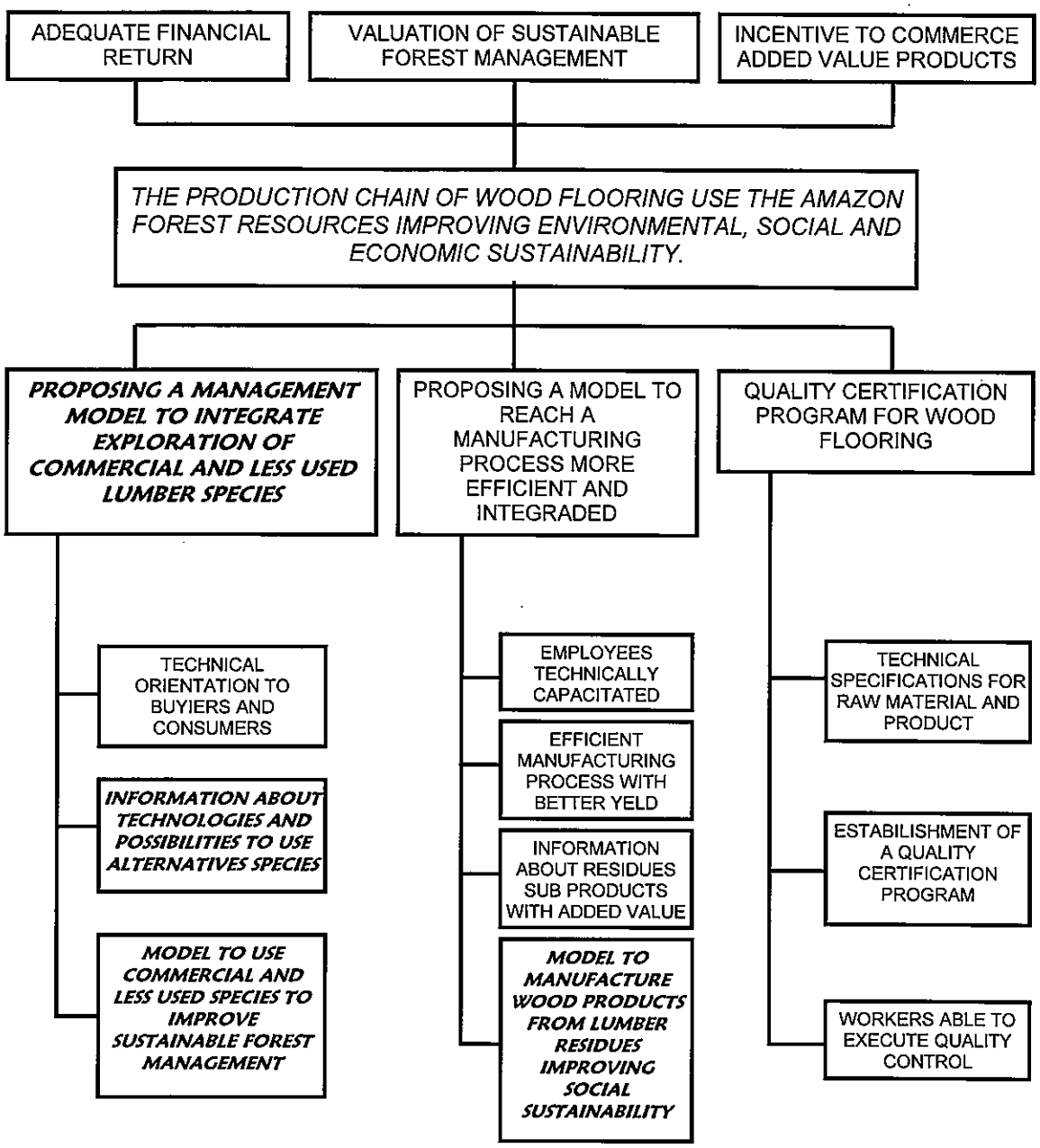


Figure 3. The objectives tree.



2.2 Intended situation after project completion

After project completion, ANPM should have a proposal to orientate its affiliated industries to use tropical lumber species considering: a) a model to improve environmental, social and economic sustainability of the tropical forest management; b) a model to improve social responsibility, stimulating business opportunities and social benefits; c) the incentive to improve and to integrate the manufacturing process, increasing the capacity to offer added value products to domestic as well as to international market.

The first output expected from this project is related to the forest, reflecting over the SFM. The better knowledge and the improvement of some characteristics of the less used species should result in great number of lumber species used to flooring production. Divulgation of that information to market agents should result into a more diversified use of forest resources, with financial return more adequate to SFM objectives.

The second line of action is directed to the manufacturing process. Reduction of residues generation and improvements in manufacture operations, mainly kiln drying, moisture content determination and surface finishing, will result a better yield of flooring and will collaborate to improve product quality. Specific training of industries technicians should turn those improvements effective.

A complimentary line of action is the manufacture of decorative and utilitary objects using gross lumber residues, which will increase job opportunities. An alternative, with social return, is to foment new enterprises involving industry employees.

The last output is to have a formal standard for lumber and solid wood flooring and a recognized Quality Certification Program. Actions of training and auditing in flooring industries, in parallel with actions to formalize the standards under the umbrella of ABNT and INMETRO, should result in a formal Mark of Conformity. The goal is to have, at least, five flooring producers with concession to use the ANPM Mark of Conformity.

This output will be closed with the divulgation of ANPM initiatives to buyers and consumers, who should better understand the advantages of using a wood flooring with a quality standard and coming from a sustainable managed forest.

The development of this project should improve the dialogue between ANPM and Governmental agencies, in all levels of public administration. Based on field results it will be possible to propose a political strategy to discuss with SFB (Brazilian Forest Service) and MMA (Ministry of Environment) all aspects related to the production chain. In the same way, the project results and the ANPM experience should be useful to regulamentation of the Brazilian policy of timber concessions in public forests, under coordination of the Ministry of Environment.

As the social aspects and benefits are crossing over all technical objectives, the model of social responsibility and sustainability; which includes business opportunities, technical capacitating, job and incoming generation, should be tested at project completion.

2.3 Project strategy

The project deal is to propose a model to improve sustainability of forest resources utilization, incentivating SFM and avoiding the conversion of forest areas to another agricultural use. This model should include alternatives for forest and industry management, integrated forest exploration and process manufacture, offer of added value products, valuation of the work labor (employees) and benefits for the society in general.

It is important to detach that the communities involved in the project are the forest and industry employees and their families. Traditional local communities will not be directly involved in the project actions, but the models of social responsibility could be lather extended to other lumber industries and other communities living in areas under industry influence.

This project has three integrated lines of action; involving ANPM affiliated flooring industries, the partnership with universities (USP and UEPA), research institutes (EMBRAPA, IPT and LPF/IBAMA), and collaboration with industries employees. At the same time, ANPM has a channel to participate (through FNABF) in Collegiate Agencies linked to the Ministry of Environment, as the CONAMA and the CONAFLOR. This position should allow ANPM, as the executing agency, to link the technical strategy of the project to the political strategy of Governmental Agencies.

The forest activities will be carried on in a forest area administrated by Cikel Brasil Verde S.A., with 108,241 ha. This area is explored under SFM rules since year 2000 and FSC certified since 2001 (this forest is one of the few tropical areas with FSC certification). The localization map and general information about the forest area is shown in Annex D; a letter of commitment and authorization to use the forest area is included in Annex E.

Forest inventory (realized by Cikel S.A.) will supply information about availability of less used species. After botanical identification, this species list will be compared to literature information to select the species to be tested.

Although several publications about less used species from tropical forest could be found in specialized literature, those papers were published more than ten years ago, and a great number of the species described as "less used" at the time of testing are "commercial" at the present moment.

Comparing a preliminary forest inventory from Cikel S.A. area with some papers regarding tropical lumber properties (02, 07, 09, 25, 26), around 68% of total species are described in the literature, from which 60% is considered as "commercial" lumber (Annex I).

Another important aspect regarding "less used" species is the possibility of use. The available information is preponderantly about mechanical resistance (flexure) and physical properties as specific gravity and shrinkage. A very few papers give some information about surface machining characteristics and uses indication is based on the general evaluation of lumber properties (without a specific test directed to flooring manufacture, as surface machining, finishing or shrinkage after kiln drying).

Testing physical and mechanical proprieties of less used species and improvement of surface properties should increase the number of wood species suitable for

flooring production. Those assays will be conducted in different research institutions due its laboratorial and intellectual capacities.

Ordering all possibilities to use forest resources will result into a plane to integrated exploration, contributing to improve economic issues of SFM. Initially this plane will be suggested to ANPM affiliated industries, but it could be adapted and executed by other timber industries in forest areas under SFM.

To reach external public, results and information derived from the project will be divulgated through several ways. Characteristics of lumber species to wood flooring will be ordered in a booklet and distributed to domestic and international buyers. Technical and social results should be divulgated through project reports, specialized magazines and scientific publications. ANPM home page should be also used to divulge the project and its results, as well it's affiliated and partners.

One important aspect to be detached is the measuring of results. The first field evaluation will include results of present exploration, expressed in volume of lumber extracted by area unity (m^3/ha, as an example), quantity of non timber products and flooring yield. Those results, expressed in volume per area or monetary value per area, will constitute the term of reference to avoid measuring of direct benefits originated by the project execution. Social benefits are more difficult to measure in short time, but if possible, it will be included too.

The second line of action also is a net of integrated activities, more direct to process manufacturing; and addressed to key constraints to product quality and conversion yield.

One of the principal characteristics devaluating solid wood flooring is the great range of moisture content in the product, resulting from inadequate kiln drying and moisture measurement. Development and improvement of kiln drying schedules; standardization of methods for moisture measuring and calibration of moisture meters are activities to eliminate this constraint. The technical information and results will compose a training material ***(Annex J)***, and industry employees trained to perform better kiln drying, adequately measure lumber moisture content .and product classification.

Improvement of product conversion yield should be reached by correct lumber drying and also by reducing residues generation. Qualification and quantification of residues generated during flooring manufacture process and identification of critical points of residues generation are the basis to establish a program to reduce residues and to point possibilities to transform residues into wood based sub products.

Other possibilities to use lumber residues will be also considered, as decorative and utility objects. The results will compose a training material ***(Annex J)***, and industry employees trained to contribute in residues reduction. Alternatives to use residues to obtain additional products should be ordered in a program to residues management, including potential enterprise sharing with communities.

Although this initiative should not be directly related to flooring production, similar experiences were successful to promote integration with industry personnel and to create a better perception related to a well managed forest.

The last line of action also is a net of integrated activities, addressed to guarantee product quality and a better understanding between producers, buyers and consumers.

There is no formal ABNT standard for wood flooring, and lumber standards are sometimes quite confuse and conflicting with international specifications. The first step is to recovery all ABNT specifications about lumber as well international standards related to lumber and solid wood flooring. Those documents will guide the draft for up to date specifications.

As the lumber and flooring standards should be, at same time, in compliance with accepted international specifications and in accordance with producers and consumers requirements; complementary activities are needed. A preliminary auditing cycle in all 23 affiliated industries will furnish a quality profile of the product. Workshops joining producers and institutional consumers (exporters, home building companies and resellers) to discuss the proposed draft should complete the information to prepare the definitive ANPM standards for lumber and solid wood flooring.

To transform a standard issued by an industrial association into a formal ABNT specification requires an official process including the appointment of a specific committee, official meetings to discuss the proposed standard and a public consultation. Due the ABNT lack of resources to support its formal requirements, usually this is a long term procedure. To avoid this inconvenient, ANPM should require the charge to proceed formalities and contribute to correspondent expenses with project resources.

The same approach and strategy should be followed to propose a Quality Certification Program, formally recognized by INMETRO.

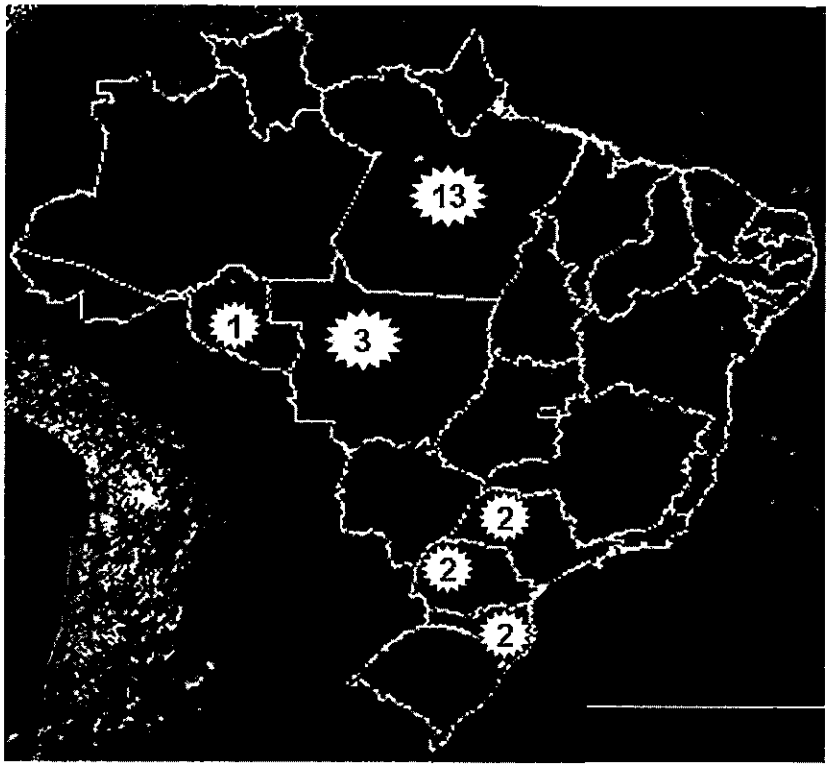
After to define the standards and to initialize formalization process, the major effort will be directed to execute the Quality Certification Program. This group of activities starts with training on internal and external auditors ***(Annex J)***, follows by a sequence of audits on affiliated industries and finishes with Mark of Conformity concession to industries that achieve the Program requirements. It is planned to realize six auditing cycles, periodically covering all ANPM affiliated industries.

As all ANPM affiliated industries will enroll the project, each one auditing cycle will require product inspection in 23 flooring producers, located in six States. Time necessary to complete one cycle is estimated in 46 days, what means around two month of audit team dedication to realize inspections and prepare reports. Table 2 lists the 23 industries and Figure 4 illustrates its localization.

Table 2. Relation of ANPM affiliated industries.

Industry	Municipality / State	Industry	Municipality / State
Amazônia Florestal	Itaituba / PA	Madereira Eroná	Rondônia / RO
Brasil Tropical	Alta Floresta / MT	Madenorte	Breves / PA
Cikel Brasil Verde	Ananindeua / PA	Madescan Export	Belém / PA
Comercial ZCT	São Paulo / SP	Marinepar	São José dos Pinhais/PR
Ebata	Belém / PA	MG Mad. Araguaia	Marituba / PA
Exmam Madeiras	Marituba /PA	Nordisk Timber	Belém / PA
Expama	Paragominas / PA	Pampa	Belém / PA
Guavirá	São José do Rio Claro/MT	Tecnowood	Canoinhas / SC
Forex	Três Barras / SC	Tradelink	Ananindeua / PA
Indusparquet	São Paulo / SP	Triângulo Pisos	Curitiba / PR
Juruá Florestal	Ananindeua / PA	Vitória Régia	Ananindeua / PA
Mad. Bom Sucesso	Sorriso / MT		

Figure 4. Localization of ANPM affiliated industries in Brazil.



Interface with institutional buyers and users will occur through workshops and training ***(Annex J)*** to divulgate the Quality Certification Program and guidelines to install and to maintain solid wood flooring. This last activity is important, because correct instruction to users will avoid losses of product (and also credibility) due inadequate storage, mistakes during installation and lack of appropriate care when in use.

It is important to detach again that the project is first directed to ANPM affiliated industries; but all results and project products, as manuals and training material, will be available for other timber industries, governmental agencies, industry association, universities, NGO's and any interested organization.

2.4 Target Beneficiaries

The main beneficiaries of the project are:

- Flooring producers affiliated to ANPM, by improving SFM, reducing waste, increasing industry efficiency, getting better economic return and keeping business continuity.
- Other forest based industries, which can adapt and use project results.
- Industry employees, by the possibility to have more job positions available, to share potential enterprises in sub products manufacturing.

- Local NGO's, which could be stimulated to work with local communities executing and improving the alternatives to use or to manufacture forest products and sub products.

- Forest and industry employees, who should improve technical capacity and ecological concern.

- Municipalities, States and Federation, by increase in tax incoming proceeding from increased commercial values.

- Equipment and components suppliers, affected by technical development of manufacture process.

- Institutional buyers, resellers and users, by the improvement of product quality.

- Governmental agencies, as MMA and SFB, as well associations of industries and worker co-operative societies.

- Brazilian society in general, since project results should contribute to valuate SFM, avoiding alternative use of land and stimulating environment conservation.

2.5 Technical and scientific aspects

The main technical and scientific aspects are:

- Technological characterization of less used lumber species, grouping those ones with potential for flooring manufacture.

- Technology to improve surface characteristics, allowing the use of less suitable lumber species.

- Development of kiln drying schedules and grouping of species for kiln drying.

- Technology to improve accuracy of lumber moisture content measuring.

- Improvement of quality control procedures in flooring industries.

- Method to reduce residues generation.

- Training of industry employees to reduce waste, to control kiln drying process, and to inspect product quality ***(Annex J)***.

- Technical specifications (standards) for lumber and solid wood flooring.

- A Quality Certification Program.

- Training of institutional buyers and consumers about quality characteristics of solid wood flooring, installation guidelines and maintenance care ***(Annex J)***.

2.6 Economic aspects

The principal goal of this project is to improve efficiency of tropical forest exploration, what is one of the principal economic activities of Brazilian Amazon. Important economic aspects can be listed as:

- Increase of lumber species used in flooring manufacture process, increasing profitability of SFM.
- Increase in product yield, increasing economic return to industries.
- Possibility to commercialize other lumber sub products, also increasing profitability of SFM.
- Increase of flooring sales due quality improvements and divulgation.
- Possibility to increase income of communities in the places under influence of industries activities.

2.7 Environmental aspects

Besides the economic benefits to flooring industries, the big deal to benefit the Brazilian society in general is the environment conservation. The economic result from the project should valuate SFM and stimulate its adoption by other lumber companies.

As pointed in the literature, SFM guarantees forest cover in the area, retains most of the original plant diversity, minimizes impacts on wildlife and assures natural forest regeneration. Furthermore, adoption of SFM guarantees timber production continuously, requires half of the time necessary in predatory logging and avoids land use for agricultural purposes.

Considering that to burn lumber residues is a common practice in Amazon region, the reduction of waste generation and possible use of lumber residues will contribute to reduce the return of carbonic gas to atmosphere.

2.8 Social aspects

The social aspects and benefits are crossing over all technical objectives of the project, including business opportunities, technical capacitation, job and incoming generation.

The more diversified exploration of forest should incentive the forest management; and the SFM brings direct social benefits as professional improvement, capacitate workers, better remuneration for employees and more stable employment.

Industries more efficient and adding value to its products tends to invest and growth up; what could means increase of job positions, workers capacity, better remuneration for employees and more stable employment.

An integrated process of manufacture will generate more jobs and business opportunities, mainly those related to the use of lumber residues. The possibility

to share enterprises with local employees should bring a wide improvement in family income.

To execute the project, the affiliated industries will assume a strong commitment with the two extremes of production chain, the forest and the consumers group. This interaction should consolidate a positive perception concerning the rational use of forest resources, reflecting to all society.

2.9 Risks

There are a few risks what could prejudice the project. Some risks are outside project decision, and the following assumptions were done:

- Brazilian Government will keep forest policy and incentive to SFM;
- Demand by wood flooring will keep growing continuously;
- Exchange rate is favorable to exporters.

As pointed before, Brazilian Government is showing a strong determination to incentive SFM in Amazon region. The more recent laws, as the "Law on the management of public forests for sustainable production" (Law n° 11.284/06), setting rules to the allocation of timber concessions in public forests for SFM and establishing the Brazilian Forest Service, are examples of this determination.

Recent reports discussing global commerce of wood based products (13, 19, 23) are demonstrating the constant increment in commercialized volumes. No one of those reports comments a potential possibility to invert this tendency.

To predict the future of currency exchange between the dollar (US$) and Brazilian real (R$) is an impossible mission, because it is affected by global economic changes and Brazil could experiment a speculative action against its emergent economy. However, during 2004 the exchange rate drops from around 2.8 R$/US$ to near by 2.0 R$/US$; and fluctuated between 2.1 and 2.3 R$/US$ since end of 2004 until the end of 2006. ***This year (2007) there was a little drop, with the exchange rate varying from 1.95 to 2.05 R$/US$, range of value which still permits international competitive prices for Brazilian flooring.***

Other identified risks, more directly related to project are:

- **Overexploitation of the forest and regeneration management.**

To increase the number of lumber species available to commercial exploitation could be assumed as a risk. However, the principles of SFM preconize that exploitation of a large number of species means a better use of the forest resource and it avoid the exploitation pressure only over a few species.

According Brazilian technical standard related to forest management (01), sustainability means the way environmentally appropriate, socially beneficial and economically viable to use natural resources. To exploit a few number of species is a bad management practice and causes a decrease in the forest regeneration capacity, with less exploit cycles (15).

Even producing around $25x10^6$ m^3 per year, the contribution of Brazilian Amazon to international market of wood based products is very small. There are several reasons to explain this situation, but with sure one is the exploitation concentrated in the species required by the market (04). From almost 350 species known in Brazilian Amazon, around 30 are highly pressed by timber industry (16). Like an example, saw timber resale in the State of São Paulo commercialize near by 75 different species, but only 3 species (cupiúba, cedrinho and garapeira) represent 51.0% of total volume sold (24).

Introduction of less used species in the commerce will reduce this concentrated pressure in few species and add more value to the forest (03).

Present rules to exploit timber species in Amazonian tropical forests are the minimum diameter for cutting, maintenance of seeds supply (20% of total trees to Mahogany and 10% for other species) and it is not allowed to cut rare species (less than 1 tree per 20 ha). Potential yield of saw timber and some kind of defect in the tree (i.e. internal rot) are indirect criteria used by industry.

For species with some knowledge about its ecology, like the Mahogany (Swietenia macrophylla), there is specific legal rules with limit to exploitation and recommendations to assure the forest regeneration. For a large number of species there is no knowledge enough to orientate a feasible management system. Sustainability will depend on research regarding life history of species (05, 06), about its ecology and to group species under the same management criteria (05, 21, 22, 28).

In productive forest, the regeneration of species with economical value could be done trough a cutting strategy, removing less valuable trees and opening space to growing the valuable ones. If the forest has no economical value (due the absence of valuable trees), management strategy could use genetic improvement and planting of desirable species (27).

The forest partner in the present project (Cikel) owns one of the biggest areas, in Brazilian Amazon, with management research and silvicultural treatments. Under technical guidance from EMBRAPA, management method includes planting of additional seedlings, monitoring of natural regeneration to avoid excess of competition to commercial species, ringlike cutting of less valuable species to open space, and others.

- **Failure of technological solutions proposed by the project.**

Among the technological alternatives to de studied in the project, the following activities could have the possibility to fail, meaning that the proposed objective will not be reached:

- **Testing and introduction of less used species for wood flooring**

  The group of species considered as traditional for flooring production was selected based on volume availability in the forest, market requirement and easy manufacturing. If there is no trouble during secondary processing, it also means that those species require less technology and more simple machinery to manufacturing. Considering the high number of species (more than hundred) without economical value at moment and the objective to develop or to adapt technologies to process those species, the possibility to get no favorable results is very small. There also is the alternative to use the inadequate species (for solid flooring production) in the manufacturing of engineered flooring.

❖ **Better use of industrial lumber residues**

Preliminary results regarding the extraction of chemical substances from lumber residues, as natural colorant for textile as well in the search of medicinal substances, are very promising. In the same way, the possible use of gross residue to manufacture other wood based products is feasible, depending on quantity and quality of available residues and a strategy for production and marketing. To foment economical activities that could improve the utilization of the forest under SFM is crucial to lumber industries.

- Consumers do not accept flooring manufactured with new lumber species.

An adequate orientation to consumers, mainly the institutional ones, can be enough to avoid this risk. In the same way, industries can put in practice a commercial strategy, reducing prices at first moment, to introduce the new lumber species in the market.

- ABNT and INMETRO do not formalize the proposed specifications and the Quality Certification Program.

Preliminary contacts with ABNT and INMETRO were very positive, because the objective of both institutions is exactly to develop and to set standards and certification programs. The only possibility to happen some trouble is the lack of financial resources to support the formal process. To avoid this possibility, the presented budget already includes resources to help experts' participation in ABNT and INMETRO meetings (see Project Strategy).

- Some industries could use the Mark of Conformity to "grow up" its image to clients, without a serious commitment.

To avoid this risk the Quality Certification Program should include a Code of Condute, proposing some kind of penalty if proved an inadequate use of the Mark. Furthermore, any industry integrating the Program should be audited in periodic bases.

3. Outputs

Output 1.: ***Proposing a management model to integrate the exploration and use of lumber from commercial and less used species.***

This output comprehends the utilization of less known lumber species and the possibility to manufacture added value products. Characterization and suggestion of potential uses for less used species, as well alternative technologies to improve lumber characteristics, are included in objectives.

Output 2.: Proposing a model to reach a manufacturing process more efficient and integrated.

Output 2 embraces the improvement and the integration of manufacture process through technology development and technical capacitating, the reduction of residues generation, strategies to manage industrial residues, utilization of residues in sub products production, and strategies to involve employees in sub product manufacturing.

Output 3.: Quality Certification Program for wood flooring.

Expected output includes proposal and formalization of technical specifications for lumber and solid wood flooring, proposal and formalization of a Quality Certification Program, capacity of industries technicians to perform quality control, industries inspection to audit product quality, establishment of a Mark of Conformity, and attending to consumers through the supply of technical information and training.

4. Activities

Output 01.: Proposing a management model to integrate the exploration and use of lumber of commercial and less used species.

A1.1. Field survey to identify the less used species, to collect material for botanical identification and to prepare samples for physical and mechanical tests.

A1.2 Physical and mechanical testing (specific gravity, shrinkage, Janka hardness and kiln drying behavior; superficial cutting and finishing; superficial hardening by impregnation and densification; superficial hardening by heat treatment) of less used lumber species.

A1.3 Grouping less used species, based on lumber characteristics and potential to be used to flooring manufacture.

A1.4 Pilot manufacture of solid wood flooring with less used species.

A1.5 Proposal of a management model to explore lumber of commercial and less used species.

A1.6 Commercial material to divulge lumber species (commercial and less used) indicated to flooring manufacture.

Output 2.: Proposing a model to reach a manufacturing process more efficient and integrated.

A2.1 Laboratory kiln drying test to define kiln schedule and to group species.

A2.2 Testing of electrical moisture meters to provide calibration curves, species settings and standard methods to measure lumber moisture content.

A2.3 Test to improve superficial cutting and finishing.

A2.4 Qualification and quantification of residues generated during flooring manufacture process, identification of critical points of residues generation and proposal to reduce residues yield.

A2.5 Proposal to residues management detaching possibilities to produce added value products.

A2.6 Elaboration of training material (kiln drying and quality control of dried lumber; reduction of residues yield and residues management).

A2.7 Training courses (kiln drying, quality control of dried lumber, residues management) ***[Annex J]***.

Output 3. Quality Certification Program for wood flooring.

A3.1 Recovery of international standards and specifications about lumber, solid wood flooring and Quality Programs regarding wood based products.

A3.2 Review of ABNT specifications about lumber and proposal of up to date standards (including lumber and solid wood flooring), according ABNT Standard Guideline.

A3.3 Elaboration of a Quality Certification Program, directed to ANPM affiliated producers, containing product specification, audit procedures and a Mark of Conformity.

A3.4 Workshop with flooring producers and users, regarding proposed specifications about lumber, and solid wood flooring and Quality Certification Program.

A3.5 To submit lumber and solid wood flooring specifications to ABNT and the Quality Certification Program to INMETRO.

A3.6 First audit in flooring producers, affiliated to ANPM, and product qualification.

A3.7 Elaboration of training material about quality evaluation and auditing (directed to internal auditors); and maintenance of solid wood flooring (direct to users).

A3.8 Training courses for internal auditors according ANPM Quality Certification Program and for institutional users about installation and maintenance of solid wood flooring ***[Annex J]***.

A3.9 Audit of ANPM affiliated producers according ANPM Quality Certification Program.

A3.10 Material elaboration to inform and divulge ANPM Quality Certification Program.

5. Logical Framework

Project elements	Indicators	Means of verification	Assumptions
Development objective: to contribute for sustainable and adequate utilization of Brazilian Amazon forest resources.	Increased area of tropical forest under SFM, duly approved by IBAMA Deforestation and forest burning reduced. Consumption of lumber provenient from non managed areas reduced.	Reports from Governmental agencies and NGO's. Publications from forest sector. Publications from midia in general.	Brazilian forest policy keeps the incentive to SFM.
Specific Objective: To increase the environmental, social and economic sustainability of wood flooring production chain: from the forest to the final product.	Efficiency of forest exploration increased **at least** by 5%, at project conclusion.	Statistical reports from Government agencies. Statistical data collected at industries. Project reports (see Project Strategy).	Demand by wood flooring will **keep** growing continuously. Exchange rate is favorable to exporters.
Output 1: ***Proposing a management model to integrate the exploration and use of lumber from commercial and less used species.***	Physical and mechanical characterization of, at least, 12 less known lumber species. Promotional booklet describing the more used and the less known lumber species used to flooring production. Number of lumber species used to flooring production increased at least 10% in 30 months.	Technical publications. Booklet edition. Statistical reports from forest sector. Project reports. ANPM web site.	Consumers duly informed and conscious of the benefits of the use of new lumber species in flooring production.

Output 2. Proposing a model to reach a manufacturing process more efficient and integrated.	Lumber residues reduced in, at least, 15%, at project conclusion. Utilization of residues to manufacture sub products increased in, at least, 15%, at project conclusion. Instructive material (CD's, booklets, web site) for training in kiln drying, quality control of dried lumber and residues reduction. ***At least 03 courses on kiln drying and quality control of dried lumber.*** ***At least 02 courses on residues management.***	Statistical data collected at industries. Technical publications. Edition of instructive material. Project reports. ANPM web site.	Demand by wood flooring will keep growing continuously. Exchange rate favorable to exporters.
Output 3. Quality Certification Program for wood flooring.	ABNT Standards established for lumber and solid wood flooring. "Mark of Conformity" (output of Quality Certification Program) established At least 5 affiliated industries authorized to use the 'Mark of Conformity" within 30 months. ***At least 04 courses to internal auditors, according ANPM Quality Control Program, directed to affiliated industries.*** ***At least 04 courses on installation and maintenance of wood flooring, directed to institutional consumers.*** Instructions and guidelines booklet to consumers published.	Consultation to ABNT web site Consultation to INMETRO web site Consultation to ANPM web site Publication of material to divulgate the Quality Certification Program. Publication of instructions booklet for the consumers. Project reports.	ABNT will officialize standards for lumber and solid wood flooring. INMETRO will officialize the Quality Certification Program.

6. Work Plan

Outputs and Activities	EXECUTOR	YEAR / QUARTER									
Output 1 – *Proposing a management model to integrate the exploration and use of lumber from commercial and less used species.*		Y 1				Y 2				Y 3	
Activities:		Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2
1.1. Field survey to identify the less used species, to collect material for botanical identification and to prepare samples for physical and mechanical tests.	EMBRAPA ANPM ESALQ/USP	■	■	■							
1.2 Physical and mechanical testing (specific gravity, shrinkage, Janka hardness and kiln drying behavior; superficial cutting and finishing; superficial hardening by impregnation and densification; superficial hardening by heat treatment) of less used lumber species.	LS/ESALQ/USP LPF/IBAMA EMBRAPA FLORESTAS				■	■	■	■			
1.3 Grouping less used species, based on lumber characteristics and potential to be used to flooring manufacture.	LS/ESALQ/USP								■		
1.4 Pilot manufacture of solid wood flooring with less used species.	ANPM								■	■	
1.5 Proposal of a management model to explore lumber of commercial and less used species.	LM/ESALQ/USP										■
1.6 Commercial material to divulge lumber species (commercial and less used) indicated to flooring manufacture.	ANPM					■					■

Outputs and Activities	EXECUTOR	YEAR / QUARTER									
Output 2 - Proposing a model to reach a manufacturing process more efficient and integrated.		Y 1				Y 2				Y 3	
Activities:		Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2
2.1 Laboratory kiln drying test to define kiln schedule and to group species.	LM ESALQ/USP	■	■	■							
2.2 Testing of electrical moisture meters to provide calibration curves, species settings and standard methods to measure lumber moisture content.	ANPM		■	■	■	■					
2.3 Test to improve superficial cutting and finishing.	LPF/IBAMA		■	■	■						
2.4 Qualification and quantification of residues generated during flooring manufacture process, identification of critical points of residues generation and proposal to reduce residues yield.	LM ESALQ/USP		■	■	■	■					
2.5 Proposal to residues management detaching possibilities to produce added value products.	LM. ESALQ/USP								■		
2.6 Elaboration of training material (kiln drying and quality control of dried lumber; reduction of residues yield and residues management).	LS-LM ESALQ/USP						■				
2.7 Training courses (kiln drying, quality control of dried lumber, residues management).	ANPM							■	■	■	■

Outputs and Activities	EXECUTOR	YEAR / QUARTER									
Output 3 - Quality Certification Program for wood flooring.		Y 1				Y 2				Y 3	
Activities:		Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2
3.1 Recovery of international standards and specifications about lumber, and solid wood flooring and Quality Programs regarding wood based products.	ANPM										
3.2 Review of ABNT specifications about lumber and proposal of up to date standards (including lumber and solid wood flooring), according ABNT Standard Guideline.	LS ESALQ/USP										
3.3 Elaboration of a Quality Certification Program, directed to ANPM affiliated producers, containing product specification, audit procedures and a Mark of Conformity.	ANPM										
3.4 Workshop with flooring producers and users, regarding proposed specifications about lumber, and solid wood flooring and Quality Certification Program.	ANPM										
3.5 To submit lumber and solid wood flooring specifications to ABNT and the Quality Certification Program to INMETRO.	ANPM										
3.6 First audit in flooring producers, affiliated to ANPM, and product qualification.	ANPM										
3.7 Elaboration of training material about quality evaluation and auditing (directed to internal auditors); and maintenance of solid wood flooring (direct to users).	LS ESALQ/USP										
3.8 Training courses for internal auditors according ANPM Quality Certification Program and for institutional users about installation and maintenance of solid wood flooring.	ANPM										
3.9 Audit of ANPM affiliated producers according ANPM Quality Certification Program.	ANPM										
3.10 Material elaboration to inform and divulge ANPM Quality Certification Program.	ANPM										

7. Budget

7.1. Overall Budget by Activity (US $)

BUDGET COMPONENT OUTPUTS and ACTIVITIES (+ Non-Activity Based Expenses)	10 Project Personnel	20 Sub-contracts	30 Travel Expenses	40 Capital Items	50 Consu-mable	60 Miscella-neous	Year and Quarter	TOTAL
Output 1 – ***Proposing a management model to integrate the exploration and use of lumber from commercial and less used species.***								
1.1. Field survey to identify the less used species, to collect material for botanical identification and to prepare samples for physical and mechanical tests.	***5,856***		***10,176***		***300***		***Y 1 Q 1, 2, 3***	***16,332***
1.2 Physical and mechanical testing (specific gravity, shrinkage, Janka hardness and kiln drying behavior; superficial cutting and finishing; superficial hardening by impregnation and densification; superficial hardening by heat treatment) of less known lumber species.	46,624	21,900	18,876	153,390	10,160		Y 1; Q 4 Y 2; Q 1, 2, 3	250,950
1.3 Grouping less known species, based on lumber characteristics and potential to be used to flooring manufacture.	2,176		1,413				Y 2 Q 4	3,589
1.4 Pilot manufacture of solid wood flooring with less known species.	4,608	11,000			1,400		Y 2; Q 4 Y 3; Q 1	17,008
1.5 Proposal of a management model to explore lumber of commercial and less used species.	***1,360***		***2,896***				***Y 3 Q 2***	***4,256***
1.6 Commercial material to divulge lumber species (traditional and less known) indicated to flooring manufacture.	1,632	5,390					Y 2; Q 1 Y 3; Q 2	7,022
SUBTOTAL 1	***62,256*** *(E + I)*	***38,290*** *(E + I)*	***33,361*** *(I)*	***153,390*** *(E + I)*	***11,860*** *(I)*		***ALL***	***299,157***

Output 2 - Proposing a model to reach a manufacturing process more efficient and integrated.								
2.1- Laboratory kiln drying test to define kiln schedule and to group species.	7,856	3,400	6,586	1,400	260		Y 1 Q 1, 2, 3	19,502
2.2 - Testing of electrical moisture meters to provide calibration curves, species settings and standard methods to measure lumber moisture content.	9,408	7,800	7,312	2,580	400		Y 1; Q 2, 3, 4 Y 2; Q 1	27,500
2.3 - Test to improve superficial cutting and finishing.	7,008	2,960		1,200	440		Y 1; Q 2, 3, 4	11,608
2.4 - Qualification and quantification of residues generated during flooring manufacture process, identification of critical points of residues generation and proposal to reduce residues yield.	15,396	1,400	10,593	800	480		Y 1; Q 2, 3, 4 Y2; Q1	28,669
2.5 Proposal to residues management detaching possibilities to produce added value products.	4,560						Y 2; Q 4	4,560
2.6 Elaboration of training material (kiln drying and quality control of dried lumber; reduction of residues yield and residues management).	5,700	4,912			400		Y 2; Q 2	11,012
2.7 Training courses (kiln drying, quality control of dried lumber, residues management).	5,760	5,440	12,918			1,020	Y 2; Q 3, 4 Y 3; Q 1, 2	25,138
SUBTOTAL 2	***55,688*** *(E + I)*	***25,912*** *(E + I)*	***37,409*** *(I)*	***5,980*** *(E + I)*	***1,980*** *(I)*	***1,020*** *(I)*	***ALL***	***127,989***
Output 3 - Quality Certification Program for wood flooring.								
3.1 Recovery of international standards and specifications about lumber, and solid wood flooring and Quality Programs regarding wood based products.	5,208				1,800		Y 1; Q 1	7,008
3.2 Review of ABNT specifications about lumber and proposal of up to date standards (including lumber and solid wood flooring), according ABNT Standard Guideline.	12,480		3,420		340		Y 1; Q 2	16,240
3.3 Elaboration of a Quality Certification Program, directed to ANPM affiliated producers, containing product specification, audit procedures and a Mark of Conformity.	7,584						Y 1; Q 2, 3	7,584

3.4 Workshop with flooring producers and users, regarding proposed specifications about lumber, and solid wood flooring and Quality Certification Program.	6,864	1,000	7,026			100	Y 1; Q 3, 4	14,990
3.5 To submit lumber and solid wood flooring specifications to ABNT and the Quality Certification Program to INMETRO.	7,464		10,284				Y 1; Q 3, 4	17,748
3.6 First audit in flooring producers, affiliated to ANPM, and product qualification.	10,440	3,600	12,516				Y 1; Q 2	26,556
3.7 Elaboration of training material about quality evaluation and auditing (directed to internal auditors); and maintenance of solid wood flooring (direct to users).	17,328	13,240	2,424		320		Y 1; Q 4 Y2; Q 1, 2	33,312
3.8 Training courses for internal auditors according ANPM Quality Certification Program and for institutional users about installation and maintenance of solid wood flooring.	8,640	4,520	6,366	5,600		1,340	Y 2; Q 1, 2, 3, 4 Y3; Q 1, 2	26,466
3.9 Audit of ANPM affiliated producers according ANPM Quality Certification Program.	33,600	14,850	75,096	5,600			Y 2; Q 2, 3, 4 Y 3; Q1	129,146
3.10 Material elaboration to inform and divulge ANPM Quality Certification Program.	5,424	1,496			200		Y 2; Q 3, 4	7,120
SUBTOTAL 3	***115,032*** *(E + I)*	***38,706*** *(I)*	***117,132*** *(E + I)*	***11,200*** *(E + I)*	***2,660*** *(E + I)*	***1,440*** *(I)*	***ALL***	***286,170***
Non Activity Based Expenses								
(1) Contingency and petty cash						2,500	ALL	2,500
(2) Office equipment and supply					7,680		ALL	7,680
(4) Accountant	24,000						ALL	24,000
(5) Legal Consultant		6,000					ALL	6,000
SUBTOTAL 4	***24,000*** *(I)*	***6,000*** *(E)*			***7,680*** *(E + I)*	***2,500*** *(E)*	***ALL***	***40,180***
SUBTOTAL ITTO	***94,200***	***89,508***	***166,518***	***51,090***	***15,880***	***2,460***		***448,636***
SUBTOTAL EX. AGENCY	***138,776***	***13,400***	***21,384***	***119,480***	***620***			***304,860***
TOTAL	***256,976***	***108,908***	***187,902***	***170,570***	***24,180***	***4,960***		***753,496***

7.2 Overall Budget by Source, ITTO (US $)

(expanded according the 32nd Expert Panel recommendation)

BUDGET COMPONENT	TOTAL	YEAR 01	YEAR 02	YEAR 03
10. Project Personnel	**118,200.00**	**54,032.00**	**40,008.00**	**24,160.00**
Researchers - 13@$ 2,720/mo	0.00	0.00	0.00	0.00
Forest Engineer - 2@$ 1,440/mo	57,168.00	24,192.00	27,216.00	5,760.00
Training Coordinator - 1@$ 1,520/mo	18,000.00	3,600.00	2,880.00	11,520.00
Lab Technician - 8@$ 1,040/mo	0.00	0.00	0.00	0.00
Field Technician - 2@$ 1,040/mo	17,784.00	15,392.00	312.00	2,080.00
Botanic Technician - 1@$ 1,040/mo	1,248.00	1,248.00	0.00	0.00
Accountant - 1@$ 800/mo	24,000.00	9,600.00	9,600.00	4,800.00
20. Subcontract	**89,508.00**	**28,761.00**	**42,382.00**	**18,365.00**
Samples collecting, preparing and packing for laboratory test	2,000.00	2,000.00	0.00	0.00
Lumber and samples transportation	3,260.00	2,735.00	525.00	0.00
Lumber kiln drying of samples	3,000.00	0.00	0.00	3,000.00
Flooring manufacture	0.00	0.00	0.00	0.00
Equipment maintenance	20,850.00	10,950.00	9,790.00	110.00
Photographic services	1,530.00	200.00	1,255.00	75.00
Printing office	10,500.00	1,300.00	7,900.00	1,300.00
Location of training room and facilities	4,600.00	1,000.00	400.00	3,200.00
Specialist consultant - 3@$ 4,000/mo	13,600.00	6,400.00	7,200.00	0.00
Designer specialist - 1@$ 1,920/mo	4,608.00	576.00	3,312.00	720.00
Translator specialist - 1@$ 2,400/mo	1,200.00	0.00	600.00	600.00
Operational instructor - 2@$ 1,200/mo	6,360.00	0.00	600.00	5,760.00
Audit technician - 6@$ 800/mo	18,000.00	3,600.00	10,800.00	3,600.00
Legal Consultant - 1@$ 1,600/mo	0.00	0.00	0.00	0.00
30. Travel Expenses	**166,518.00**	**72,709.00**	**52,010.00**	**41,799.00**
National air ticket, Y class	69,880.00	26,459.00	21,254.00	22,167.00
Lodging and feed (daily value)	69,786.00	34,584.00	20,262.00	14,940.00
Car rental (daily value)	20,688.00	9,144.00	7,896.00	3,648.00
Fuel	6,164.00	2,522.00	2,598.00	1,044.00
40. Capital Items	**51,090.00**	**24,675.00**	**25,015.00**	**1,400.00**
Equipments	35,540.00	16,890.00	17,450.00	1,200.00
Repair parts	15,550.00	7,785.00	7,565.00	200.00
50. Consumable Items	**20,860.00**	**7,470.00**	**11,680.00**	**1,710.00**
Chemicals, reagents and lab glass	8,000.00	0.00	8,000.00	0.00
Consumable material	12,860.00	7,470.00	3,860.00	1,710.00
60. Miscellaneous	**2,460.00**	**100.00**	**400.00**	**1,960.00**
Technical stuff for users consultation	100.00	100.00	0.00	0.00
Training technical material	1,680.00	0.00	280.00	1,400.00
Training promotion and divulgation	680.00	0.00	120.00	560.00
Contingency and petty cash	0.00	0.00	0.00	0.00
Subtotal 1	***448,636.00***	***187,747.00***	***171,495.00***	***89,394.00***
80. **ITTO Monitoring, Evaluation and Administration Costs**				
81. Monitoring and Review Cost	15,000.00			
82. Evaluation Cost	15,000.00			

Subtotal 2	*478,636.00*			
83. Program Support Cost	**38,291.00**			
90. Refund of Pre Project Cost	0			
TOTAL ITTO	***516,927.00***			

7.3 Overall Budget by Source, ANPM (US $)

BUDGET COMPONENT	TOTAL	YEAR 01	YEAR 02	YEAR 03
10. Project Personnel	138,776	70,624	60,808	7,344
20. Subcontract	19,400	7,575	2,625	9,200
30. Travel Expenses	21,384	10,692	10,692	0
40. Capital Items	119,480	94,600	24,880	0
50. Consumable Items	3,320	1,550	1,770	0
60. Miscellaneous	2,500	1,000	1,000	500
TOTAL ANPM (Ex. Agency)	**304,860**	**186,041**	**101,775**	**17,044**

7.4 Consolidated Total and Yearly Budget (US $)

BUDGET COMPONENT			UNITY	QUANTITY	TOTAL	ITTO	ANPM	YEAR 01	YEAR 02	YEAR 03
10	**Project Personnel (salary + legal burden)**									
11	**National Experts**									
	11.1	Researchers - 13 @ $ 2,720/mo	man/mo	40.85	111,112.00	0.00	111,112.00	57,936.00	45,832.00	7,344.00
	11.2	Forest Engineer - 2 @ $ 1,4440/mo	man/mo	39.70	57,168.00	57,168.00	0.00	24,192.00	27,216.00	5,760.00
	11.3	Training Coordinator - 1 @ $ 1,520/mo	man/mo	11,84	18,000.00	18,000.00	0.00	3,600.00	2,880.00	11,520.00
	11.4	Laboratory Technician - 8 @ $ 1,040/mo	man/mo	26,60	27,664.00	0.00	27,664.00	12,688.00	14,976.00	0.00
	11.5	Field Technician - 2 @ $ 1,040/mo	man/mo	17,10	17,784.00	17,784.00	0.00	15,392.00	312.00	2,080.00
	11.6	Botanic Technician - 1 @ $ 1,040/mo	man/mo	1.20	1,248.00	1,248.00	000	1,248.00	0.00	0.00
		Sub total			***232,976.00***	**94,200.00**	**138,776.00**	**115,056.00**	**91,216.00**	**26,704.00**
12	**Project Administration Personnel**									
	12.1	Accountant - 1 @ $ 800.00/month	man/mo	30.00	24,000.00	24,000.00		9,600.00	9,600.00	4,800.00
		Sub total			***24,000.00***	***24,000.00***		***9,600.00***	***9,600.00***	***4,800.00***
13	***Total Component***				***256,976.00***	***118,200.00***	***138.776,00***	***124,656.00***	***100,816.00***	***31,504.00***
20	**Subcontracts**									
	20.1	Samples collecting, preparing and packing for laboratory test			6,100.00	2,000.00	4,100,00	5,075.00	225.00	800.00
	20.2	Lumber and samples transportation			6,560.00	3,260.00	3,300,00	4,835.00	525.00	1,200.00
	20.3	Lumber kiln drying of samples			3,000.00	3,000.00	0,00	0.00	0.00	3,000.00
	20.4	Flooring manufacture			6,000.00	0.00	6,000,00	0.00	0.00	6,000.00
	20.5	Equipment maintenance			20,850.00	20,850.00	0,00	10,950.00	9,790.00	110.00
	20.6	Photographic services			1,530.00	1,530.00	0,00	200.00	1,255.00	75.00
	20.7	Printing office			10,500.00	10,500.00	0,00	1,300.00	7,900.00	1,300.00
	20.8	Location of training room and facilities			4,600.00	4,600.00	0,00	1,000.00	400.00	3,200.00
	20.9	Specialist consultant - 3 @ $ 4,000/mo	man/mo	3.55	13,600.00	13,600.00	0,00	6,400.00	7,200.00	0.00
	20.10	Designer specialist - 1 @ $ 1,920/mo	man/mo	2.40	4,608.00	4,608.00	0,00	576.00	3,312.00	720.00
	20.11	Translator specialist - 1 @ 2,400/mo	man/mo	0.50	1,200.00	1,200.00	0,00	0.00	600.00	600.00
	20.12	Operational instructor - 2 @ $ 1,200/mo	man/mo	3.70	6,360.00	6,360.00	0,00	0.00	600.00	5,760.00
	20.13	Audit technician - 6 @ $ 800/mo	man/mo	22.50	18,000.00	18,000.00	0,00	3,600.00	10,800.00	3,600.00
	20.14	Legal Consultant - 1 @ $ 1,600/mo	man/mo	3.75	6,000.00	000	6,000.00	2,400.00	2,400.00	1,200.00

21	***Total Component***				**108,908.00**	**89,508.00**	**19,400.00**	**36,336.00**	**45,007.00**	**27,565.00**
30	**Travel Expenses**									
	30.1	National air ticket, Y class	unity	161	81,760.00	69,880.00	11,880.00	32,399.00	27,194.00	22,167.00
	30.2	Lodging and feed (daily value)	day	1,197	79,290.00	69,786.00	9,504.00	39,336.00	25,014.00	14,940.00
	30.3	Car rental (daily value)	day	431	20,688.00	20,688.00	0.00	9,144.00	7,896.00	3,648.00
	30.4	Fuel	liter	5,120	6,164.00	6,164.00	0.00	2,522.00	2,598.00	1,044.00
31	***Total Component***				***187,902.00***	***166,518.00***	***21,384.00***	***83,401.00***	***62,702.00***	***41,799.00***
40	**Capital Items**									
	40.1	Equipments			155,020.00	35,540.00	119,480.00	111,490.00	42,330.00	1,200.00
	40.2	Repair parts			15,550.00	15,550.00	0.00	7,785.00	7,565.00	200.00
41	***Total Component***				***170,570.00***	***51,090.00***	***119,480.00***	***119,275.00***	***49,895.00***	***1,400.00***
50	**Consumable Items**									
	50.1	Chemicals, reagents and laboratory glass			8,000.00	8,000.00	0.00	0.00	8,000.00	0.00
	50.2	Consumable material			8,500.00	7,880.00	620.00	4,700.00	2,400.00	1,400.00
51	***Total Component***				***16,500.00***	***15,880.00***	***620.00***	***4,700.00***	***10,400.00***	***1,400.00***
60	**Miscellaneous**									
61	**Activity Based Expenses**									
	61.1	Technical stuff for users consultation			100.00	100.00	0.00	100.00	0.00	0.00
	61.2	Training technical material			1,680.00	1,680.00	0.00	0.00	280.00	1,400.00
	61.3	Training promotion and divulgation			680.00	680.00	0.00	0.00	120.00	560.00
		Sub total			***2,460.00***	***2,460.00***	***0.00***	***100.00***	***400.00***	***1,960.00***
62	**Non Activity Based Expenses**									
	62.1	Contingency and petty cash			2,500.00		2,500.00	1,000.00	1,000.00	500.00
	62.2	Office equipment and supply			7,680.00	4,980.00	2,700.00	4,320.00	3,050.00	310.00
		Sub total			***10,180,00***	***4,980,00***	***5.200,00***	***5.320,00***	***4.050,00***	***810,00***
63	***Total Component***				***12,640.00***	***7,440.00***	***5,200.00***	***5,420.00***	***4,450.00***	***2,770.00***

SUB TOTAL Project			**753,496.00**	**448,636.00**	**304,860.00**	**373,788.00**	**273,270.00**	**106,438.00**
80	**ITTO Monitoring, Evaluation and Administration Costs**							
	81	Monitoring and Review Cost	15,000.00					
	82	Evaluation Cost	15,000.00					
	83	Progrm Support Cost	**38,291.00**					
89	***Total Component***		***68,291.00***					
100	**TOTAL GLOBAL**		**821,787.00**					

PART III: OPERATIONAL ARRANGEMENTS

1. Management Structure

ANPM is the executing agency, in charge of all activities and will report to ITTO. ABC and PNF (and probably SFB too, after regulation of Law n° 11.284/06) will monitor and audit project activities, and also report to ITTO if necessary. The ANPM Executive Manager and a member of ANPM Administrative Board (also full professor at ESALQ/USP) will hold the position of Project Managers (PM). Both person holding PM position are graduated (MSc and PhD level), with technical and administrative experience.

The Steering Committee (SC) will monitor the execution of the project and deliberate on operational and administrative issues. The SC will be constituted by the members of ANPM Administrative Board and invited representatives from ABC, PNF (or BSF) and ITTO.

ANPM's Technical Committee (TC) will discuss and advise on technical issues when requested by PM.

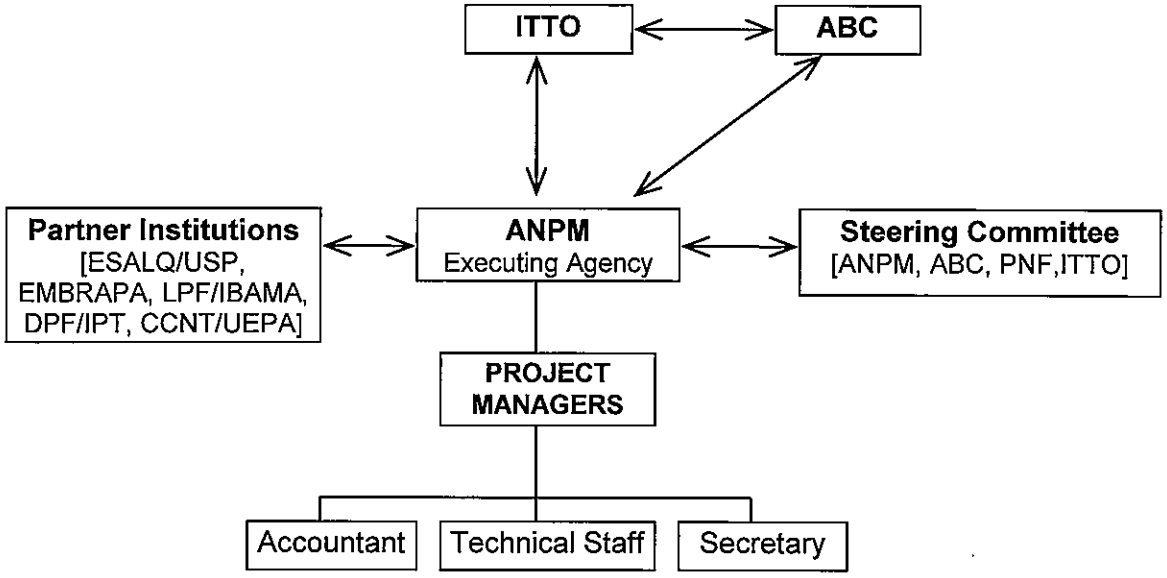
Partner institutions (EMBRAPA, LPF/IBAMA, ESALQ/USP, DPF/IPT and CCNT/UEPA) will collaborate and conduct research on various subjects included in the project, according the better scientific and laboratorial availability. A brief description of partners' institutions is presented in Annex F.

ANPM will contract, with project resources, professionals to complete the staff. One Accountant to manage financial issues and to organize project accountancy. Two Forest Engineers will be in charge to coordinate and to execute field activities and at industries. Other professionals will be contracted in partial time bases, to attend specifics requirements and activities of the project.

Principal project staff will have 18 persons, described as follows. Organizational chart is illustrated in Figure 5.

POSITION	STATUS
02 Project Manager	ANPM staff / USP staff
01 Accountant	to be contracted
01 Secretary	ANPM staff
02 Forest Engineer	to be contracted
01 Course Coordinator	to be contracted
02 Industry Technician	ANPM staff
02 Field Technician	to be contracted
01 Botanic Technician	to be contracted
06 Audit Technician	to be contracted

Figure 5. Organizational chart of project.



2. Monitoring, Reporting and Evaluation

Monitoring of project will include Progress Report, Final Report, Financial Report, Meetings of Steering Committee and Monitoring (ABC and ITTO) visits.

Progress Reports will follow "ITTO Manual for Project Monitoring, Review and Evaluation". Meetings of Steering Committee will evaluate Progress and Financial Reports, check indicators, check objectives achieving and analyze general subjects. Suggested schedule for reports and meetings is in Table 3.

Material used in the several training activities, technical reports, publications, standards and other possible wrote outputs from the project will be sent to ITTO and ABC.

Table 3. Suggested schedule for monitoring project activities.

TIME AFTER PROJECT STARTS	PROGRESS REPORT	FINAL REPORT	FINANCIAL REPORT	MEETING OF STEERING COMITEE	MONITO-RING VISIT (ABC/ITTO)
06 month	■			■	
12 month	■		■	■	■
18 month	■				
24 month	■		■	■	■
30 month					■
33 month		■	■		

3. Future Operation and Maintenance

All results from project are benefic to flooring industries, and it is the reason to guarantee the continuity of project deal.

Increase the number of lumber species (less used species) to flooring manufacture means a better recovery from SFM. In the same way, reducing residues and manufacturing of sub products from residues means a better profit from incoming lumber. Furthermore, integration with employees is also a demonstration of social responsibility, what is a very important flag to any industry.

After established and officialized, the "Mark of Conformity" will be a program under INMETRO and ABNT umbrella, and ANPM the executive agency. As all other INMETRO quality program, it will have continuity by itself.

Results of the project will give to ANPM affiliated industries a detached position in flooring market and also a positive perception by the public in general; and it will be an important tool to ANPM increase industries affiliation.

Training activities to capacitate industry employees will have continuity too. Each one training course (kiln drying, internal audit, residues reduction, consumer orientation) should be executed once a year, at least.

PART IV: THE TROPICAL TIMBER FRAMEWORK

1. Compliance with ITTO 1994's Objectives

The project is in compliance to following ITTO objectives:

c) To contribute to the process of sustainable development;

All project results will contribute to sustainable development, through valuation of SFM, incentive SFM adoption by other lumber industries and utilize forest resources more efficiently.

f) To promote and support research and development with a view to improving forest management and efficiency of wood utilization as well as increasing the capacity to conserve and enhance other forest values in timber producing tropical forests;

All results will contribute to increase efficiency to use forest resources, mainly the more diversified forest exploration.

i) To promote increased and further processing of tropical timber from sustainable sources in producing member countries with a view to promoting their industrialization and thereby increasing their employment opportunities and export earnings;

Results deriving from output 2 (Proposing a model to reach a manufacturing process more efficient and integrated) will achieve this ITTO objective, through reducing residues and process losses, capacitating employees, sub products manufacturing, residues utilization and adding value to wood flooring.

k) To improve marketing and distribution of tropical timber exports from sustainable managed sources;

Results deriving from output 3 (Quality Certification Program for wood flooring) will be in direct accordance to this ITTO objective. To have a wood based product with a constant pattern of quality, properly audited and certified, is an important tool to conquer consumer confidence, to add commercial value to product and, as a consequence, to improve marketing and distribution.

l) To encourage members to develop national policies aimed at sustainable utilization and conservation of timer producing forests and their genetic resources and at maintaining the ecological balance in the regions concerned, in the context of tropical timber trade;

The project embraces the production chain of solid wood flooring, and its results will bring information and benefits affecting flooring industries, industry employees, Brazilian Governmental agencies and consumers. So, this project can be an example to other wood based industries, to contribute to National Forest management and supply technical bases to ameliorate national policies regarding the sustainable utilization of Brazilian forest resources.

2. Compliance with ITTO Yokohama Action Plan

Due the fact to embrace all production chain, the project is strongly related to ITTO Decision 2 (XXXIX), as well to several Actions of Goals 01 and 02 of Yokohama Action Plan. The principal points of compliance with Yokohama Action Plane are:

GOAL 1: Promote increased and further processing of tropical timber from sustainable sources

Action 02. *Study and promote policies and other measures to increase timber industry competitiveness.*

Achieved by improving process manufacturing, residues reduction and employees capacity.

Action 03. *Commission and publish analytical studies in the field of tropical timber processing to identify and quantify the final use of processed wood products and to identify critical knowledge and information gaps.*

Achieved by flooring yield measurement before and after project execution, as well by waste reduction.

Action 04. *Monitor the impact of technical and environmental standards on the efficiency of industrial operations and review the need for action on harmonization in concert with relevant national and international bodies.*

Achieved by execution of the Quality Certification Program and related measurements.

Action 05. *Encourage members and assist them, where appropriate, to;*

- *Promote investments in timber-processing industry by taking steps to:*

  - *Develop a sound balance between sustainable timber production and the processing capacity of the connected industry, based on timber supply studies and other relevant information.*

Information regarding less known lumber species will contribute this goal.

  - *Clarify the benefits of downstream processing for creating or producing high-value, internationally competitive products.*

The project will result in better understanding of flooring manufacturing process, generating added value products.

- *Organize workshops/seminars on the use of new and/or improved techniques and technology, including increased further processing.*

Achieved by workshops with producers and consumers, in which technical aspects and product improvement will be discussed.

- *Undertake sector-wide training needs analyses; development of training strategies, training facilities and course curricula; preparation of training manuals; and delivery of training courses.*

Achieved by training activities included in the project (residues reduction, kiln drying, quality control and internal auditing).

- *Develop forest industry sector planning.*

Results derived from project will contribute to establish plans and policies regarding the production chain of wood flooring.

GOAL 2: Improve industry's efficiency of processing and utilization of tropical timber from sustainable sources

Action 01. *Develop, publish and disseminate information on increasing utilization efficiency and the reduction of losses and residues throughout the production chain.*

All results derived from Output 2 will be in compliance with this action.

Action 02. *Facilitate and encourage industrial demonstration projects addressing increased production and utilization efficiency, and the competitiveness of the tropical timber industry.*

General result of project will be a fully demonstration of increased production and improved efficiency. Publications, workshops and related activities will contribute to divulge this experience.

Action 04. *Develop, publish and disseminate recommendations for increasing efficiency throughout the production chain through the utilization of residues and through recycling.*

Achieved by activities included in Output 2, regarding reduction, utilization and management of residues.

Action 07. *Promote increased awareness and utilization of existing information on wood properties and end-use requirements.*

It is included in the project divulgation of wood properties and uses recommendation for flooring production, with detach for the less used lumber species.

Action 08. *Encourage members and assist them, where appropriate, to:*

- *Develop, publish and disseminate guidelines on increasing efficiency and reducing residues throughout the production chain while at the same time increasing the utilization of wood residues and recycling.*

Achieved by activities included in Output 2, regarding reduction, utilization and management of residues.

- *Create and publicize industrial demonstration projects on, for example: fully integrated and competitive industries based on sustainable forest management; efficient and socially sound community-based forest industries; and efficient low impact logging which is consistent with sustainable forest management while ensuring continuity of log supplies.*

All project results will be in compliance with this recommendation.

- *Formulate research and development of proposals that assist with the piloting and commercialization of improved and/or innovative utilization methodologies, including the reduction of losses and increased use of residues and recycling.*

Achieved by activities included in Output 2, regarding reduction, utilization and management of residues.

- *Participate in international standards activities related to forest products.*

Achieved by the establishment and execution of the Quality Certification Program.

- *Undertake research into wood properties and end-use requirements, paying particular attention to the properties and availability of lesser-used species and timber plantation species and the potential markets for them.*

Research with less used species, including availability and properties, is part of project activities, as well results divulgation.

Finally, it is important to detach that this project is consistent with recommendation issued in ITTO 2004-2007 Program Framework for Cooperation in Brazil, recently set by the Brazilian Cooperation Agency and the Ministry of Environment through the National Forest Program.

The framework defines a systemic approach for planning and approval process of technical cooperation projects sent by Brazilian Government to the ITTO. This approach includes:

- the harmonization of the goals of the three working areas of the ITTO with the priorities of the national forest program,

- a public bidding process to receive proposals,

- the establishment of common and impartial judgment process including independent experts committee and a commission involving members of the National Forest Program Board.

DOCUMENTS CONSULTED

(01) ABNT, 2004 – Coletânea de Manejo Florestal. Associação Brasileira de Normas Técnicas, Rio de Janeiro, Brasil. 42p.

(02) Chichignoud, M. et al. 1990. Atlas de maderas tropicales de América Latina. OIMT/CTFT, Nogent sur Marne, France. 218 p.

(03) Clement, Charles R. E Higuchi, Niro. A floresta amazônica e o futuro do Brasil. *Cienc. Cult.*, jul./set. 2006, vol.58, no.3, p.44-49. ISSN 0009-6725.

(04) FSC, 2006. Florestas Certificadas. (www.fsc.org.br)

(05) Grogan, J., Vidal, E., Schulze, M., 2005. Apoio científico para os padrões de manejo de madeira na floresta amazônica - a questão da sustentabilidade. Revista Ciência e Ambiente.

(06) Grogan, J.E. 2001. Bigleaf mahogany (Swietenia macrophylla King) in southeast Pará, Brazil: a life history study with management guidelines for sustained production from natural forests. Ph.D. thesis. Yale University, New Haven, Connecticut.

(07) IBDF, 1981. Madeiras da Amazônia - Floresta Nacional do Tapajós. IBDF, Brasília, Brasil.114 p.

(08) IBGE – Instituto Brasileiro de Geografia e Estatística – www.ibge.gov.br .

(09) INPA, 1991. Catálogo de madeiras da Amazônia: características tecnológicas, área da hidrelétrica de Balbina. INPA/CPPF, Manaus, Brasil. 88 p.

(10) ITTO, 2000. ITTO Objective 2000 - Decision 2(XXIX). 3p.

(11) ITTO, 2002. Achieving the ITTO Objective 2000 and sustainable forest management in Brazil. ITTO, Yokohama, Japan. 104p.

(12) ITTO, 2002. ITTO YOKOHAMA ACTION PLAN 2002–2006. ITTO POLICY DEVELOPMENT SERIES NO.11. 17 P.

(13) ITTO, 2005. Aumento da eficiência na conversão de madeira tropical e utilização de resíduos de fonts sustentáveis. FUNPAR, Paraná, 62 p. [Final Report, ITTO project PD 61/99 REV. 4(1)]

(14) ITTO, 2006. Status of tropical forest management 2005. ITTO Technical Series n° 24., Yokohama, Japan. 302p.

(15) Macqueen, D.J. *et al* , 2004. Exportando sem crises: a indústria de Madeira tropical brasileira e os Mercado internacionais. International Institute for Environment and Development, Londres. 159p.

(16) Martini, A.; Rosa, N. & Uhl, C. An attempt to predict which Amazonian tree species may be threatened by logging activities. Environmental Conservation, v. 21 (2), p. 152-162, 1994.

(17) MMA, 2005. Ministry of the Environment. Plano para prevenção e controle do desmatamento na Amazônia . Brasília. MMA. 52p. (www.mma.gov.br)

(18) PNF. 2001. National Forest Program-PNF. Brasília. MMA/SBF/DIFLOR. 54p.

(19) PNUD, 2002. Comercialização de Produtos Madeireiros da Amazônia – 2001. Brasília, Brasil. 27p.

(20) Prefeitura do Município de Paragominas / PA - www.paragominas.pa.gov.br

(21) Schulze, M., 2003. Ecology and behavior of nine timber tree species in Pará, Brazil: links between species life history and forest management and conservation. PhD dissertation, Pennsylvania State University, Pennsylvania, PA, USA.

(22) Schulze, M., Vidal, E., Grogan, J., Zweede, J., Zarin, D., 2005. Madeiras nobres em perigo. Ciência Hoje 36, 66-69.

(23) Simula, Markku. Evolution of the added value products timber industries. In: V International Plywwod and Tropical Timber Congress, Belém, PA, BR, November 22 to 24, 2001. 27 p. (www.abimci.com.br)

(24) Sobral L, Veríssimo A, Lima E, Azevedo T, Smeraldi R. 2002. Acertando o alvo 2: consumo de madeira amazônica e certificação florestal no Estado de São Paulo. Belém. Imazon. 72p.

(25) Souza, M. H.; Magliano, M. M.; Camargos, J. A. A. 1997. Brazilian tropical woods. IBAMA/LPF, Brasília, Brasil. 152 p.

(26) Teixeira, D. E.; Santana, M. A. E.; Souza, M. R. 1988. Amazonian timbers for the international market. ITTO/IBDF, Brasília, Brasil. 78 p.

(27) Tsukamoto Filho *et at*, 1999. Sistema Silvicultural de Enriquecimento Florestal. In: Anais: IV Congresso Internacional de Compensado e Madeira Tropical. Belém/PA. 101-116.

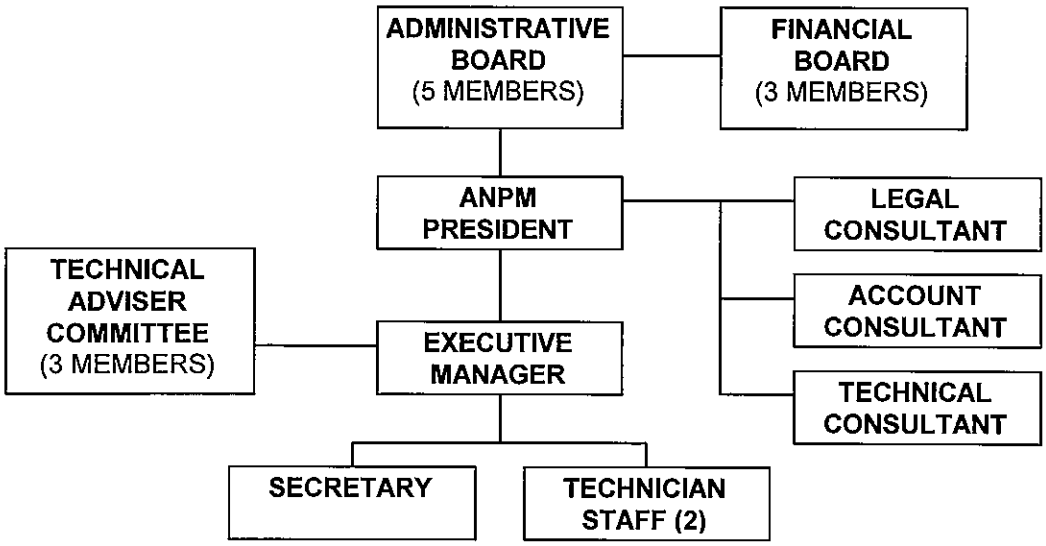
(28) Vidal, E. 2004. Dinâmica de florestas manejadas e sob exploração convencional na Amazonia Oriental. Ph.D thesis. Escola de Engenharia de São Carlos, Universidade de São Paulo, Piracicaba, SP, Brazil.

ANNEX A: Profile of the executing agency

A1. Experience of the executing agency

ANPM is a Class Association without profit finality, founded in 2001 and joining companies related to production and commercialization of wood flooring. At moment, its affiliated are 23 flooring industries and 18 related companies, as varnish, adhesives and machinery suppliers and resellers. Its administrative organization is showed in Table 4.

Table 4. ANPM administrative organization.



ANPM mission is to divulgate and to incentive the use of wood flooring, working together the industries to promote process technology and sustainability of forest resources.

Activities develop by ANPM include informative notes, promotion of technical events, participation in institutional events, collecting statistical data from affiliated industries, technical analysis, divulgation articles, attending to affiliates and consumers requirements.

Besides its staff, ANPM establish partnership with universities (ESALQ/USP and CNNT/UEPA), research institutions (DPF) and other organizations related to the forest and timber sector, to better attend its needs and goals.

A2. Infrastructure of the executing agency

ANPM office is located in Piracicaba, State of São Paulo, near by ESALQ/USP; its main partner institution.

Its structure is the basic, including, furniture, computers, office facilities and a meeting space. Its laboratory structure is simple, include oven, moisture meters and related stuff, used to evaluate quality characteristics of dried lumber and wood flooring. When necessary, laboratory facilities of its partners are used too.

A3. Budget

ANPM budget do not show high financial values, mainly due its recent foundation. However, since 2001 its budget is continuously growing, as consequence of affiliation and activities increasing. Follows the financial account of the last four years:

Component	2003	2004	2005	*2006*
Personnel	9,341.86	17,659.07	20,184.25	*24,948.74*
Sub-contracts	3,015.27	7,547.14	12,199.51	*25,999.85*
Duty Travel	2,891.48	8,009.73	12,025.54	*11,559.36*
Capital Items	1,296.86	2,676.86	2,924.74	*3,640.80*
Consumables Items *	5,133.66	6,229.50	6,388.51	*7,419.16*
Miscellaneous	2,947.45	2,820.89	1,978.27	*10,716.98*
TOTAL (US$)	**24,626.58**	**44,943.18**	**55,700.83**	***84,284.89***

* include administrative costs

ANNEX B: Curricula Vitae of the key staff and Terms of Reference

B1. Curricula Vitae of the key staff

Ariel de Andrade — **CURRICULUM VITAE**

Personal Data: **Birth Date:** 08.08.1971
Birth Place: Brasília / DF
Nationality: Brazil

Post Graduation: **2000 - M.Sc. in Wood Science and Technology**
- SÂO PAULO UNIVERSITY - USP, Piracicaba-SP, Brazil
- Superior School of Agriculture "Luiz de Queiroz" – ESALQ/USP
- Department of Forest Sciences
- Thesis Title: "Suggestion of kiln schedules to conventional drying of lumber"

Graduation: **1995 - Forestry Engineering**
- BRASÍLIA UNIVERSITY, Brasília-DF, Brazil
- Department of Forest Engineering

RELEVANT WORK UNDERTAKEN IN THE LAST 3 YEARS:

2001 to present Executive manager of ANPM – National Hardwood Flooring Association. Main activities: administrative and accounts management; elaboration and development of projects; elaboration of courses and trainings; statistics analyzes and market analyzes; attendance to members of the association and people in general; participation and presenting events; elaboration and marketing of subjects and information; integration with other associations of forest base sector.

2001-2005 Partner proprietor of Galopes Forestry Consulting Company. Main activity: elaboration and development of projects related to the forestry area and technology of wood.

Ivaldo Pontes Jankowsky **CURRICULUM VITAE**

Personal Data: **Birth Date:** 06.05.1953
Birth Place: Santos / SP
Nationality: Brazil

Post Graduation: **1988 – 1989 - Ph.D.**
- INSTITUTE OF TECHNOLOGICAL RESEARCH OF THE STATE OF SÃO PAULO - IPT, Brasil
- Technology and Use of Forest Products

1982 - 1986 - Doctor in Chemistry Engineering
- SÂO PAULO UNIVERSITY - USP, São Paulo-SP,Brasil
- Polytechnic School of the University of São Paulo
- Wooden Treatment

Thesis Title: ""Potentiality of creosote of *Eucalyptus* spp as a preservative for wood"
Relationship Water-wood and drying"

1977 - 1979 M.Sc. in Wood Science and Technology
- SÂO PAULO UNIVERSITY - USP, Piracicaba-SP, Brazil
- Superior School of Agriculture "Luiz de Queiroz" – ESALQ/USP
- Wood-water Relations and Wood Drying

Thesis Title:: "Influence of basic density and the content of moisture extractors of wood balance"

Graduation: **1972 – 1976 Forestry Engineering**
- SÂO PAULO UNIVERSITY - USP, Piracicaba-SP, Brazil
- Superior School of Agriculture "Luiz de Queiroz" – ESALQ/USP

RELEVANT WORK UNDERTAKEN IN THE LAST 3 YEARS:

At present Teaching (graduation and master degree) and Research in the area of Technology of Forestry Products along with the Department of Forestry Sciences (ESALQ/USP).
Lines of Research: Relationship water-wood, movement of fluids, drying and preservation of wood, Treatment and preservation of wood, components of wood in civil Construction.

2002-2004 Member of the Council of Department of Forestry Sciences (ESALQ/USP)

2000-2004 Executive Vice-Director of IPEF (Institute of Researches and Studies of Forests)

2000 –2002 Chief of Department of Forestry Sciences (ESALQ/USP) (substitute)

Published Works

1. JANKOWSKY, I.P., SANTOS, G. R. V. Drying behavior and permeability of *Eucalyptus grandis* lumber. Maderas: Ciencia y Tecnologia, Concepción, 7(1):17-21. 2005.
2. JANKOWSKY, I. P. Secagem adequada é decisiva para a secagem. Revista da Madeira, Curitiba. 87:102-104. 2005.
3. ALMEIDA, R. R. ; BORTOLETTO JÚNIOR, G. ; JANKOWSKY, I. P.Produção de lâminas a partir da madeira de clones do híbrido Eucalyptus grandis x Eucalyptus urophylla. Scientia Forestalis, Piracicaba, v. 65, p. 49-58, 2004..
4. JANKOWSKY, I. P. ; SANTOS, G. R. V. Drying behavior and permeability of Eucalyptus grandis lumber.. In: 14th International Drying Symposium (IDS 2004), 2004, São Paulo. Drying 2004 – Procedings of the 14th International Drying Symposium, 2004. v. B. p. 1385-1389.
5. JANKOWSKY, I. P. ; LUIZ, M. G. ; ANDRADE, A. Pisos de madeira maciça – agregando valor e qualidade ao produto.. In: IX EBRAMEM – Encontro Brasileiro em Madeira e em Estruturas de Madeira., 2004, Cuiabá. Anais do IX EBRAMEM, 2004.
6. JANKOWSKY, I. P. ; SANTOS, G. R. V. ; ANDRADE, A. Secagem da madeira serrada de eucalipto. Circular Técnica Ipef, Piracicaba, v. 199, p. 1-14, 2003.

Orientations **Concluded:** Master:04 ; Initiation 02 **Studying:** Initiation 03 pupils

Adriana Maria Nolasco **CURRICULUM VITAE**

Personal Data: **Birth Date:** 29.04.1965
Birth Place: Piracicaba / SP
Nationality: Brazil

Post Graduation: **2000 – Ph.D. in Sciences of Environmental Engineering**
- SÂO PAULO UNIVERSITY - USP, São Carlos-SP,Brazil
- School of Engineering of São Carlos

Theme of study: "Residues of harvest and tooling of caixeta - Tabebuia cassinoides (Lam.) DC.: characterization and perspectives".

1993 - M. Sc. in Architecture
- SÂO PAULO UNIVERSITY - USP, São Carlos-SP,Brazil
- School of Engineering of São Carlos
- Technology of Build Environment

Theme of Study: "Use of residues of paper industry in the production of materials for civil construction".

Graduation: **1987 - Domestic Economy**
- SÂO PAULO UNIVERSITY - USP, Piracicaba-SP, Brazil
- Superior School of Agriculture "Luiz de Queiroz" – ESALQ/USP

RELEVANT WORK UNDERTAKEN IN THE LAST 3 YEARS:

At present PhD Professor in RDIDP, at the Department of Forestry sciences at Superior School of Agriculture "Luiz de Queiroz", University of São Paulo, responsible for the subjects of graduation and master of lines of research in Forestry residues and Furniture.
Coordinator of the Laboratory of Furniture and Forestry Residues at ESALQ/USP.

2000-2003 Integrated Development of Agro Industry of Sisal. Financial Sponsor: FUNDACENTRO. Resources: R$ 1,666,241.00

2002-2004 Generation and management of residues in wood frame industries. Financial sponsor: Madeireira Uliana. Resources: R$ 5,000.00

2003-2005 Characterization and quantification of residues of furniture production of certified wood. Financial Sponsor: CNPq. Resources: R$ 18,784.30

2004 Reuse of residues of paper industry in the production of compacted bricks. Financial sponsor: FAPESP/Votorantim Celulose e Papel. Resources: R$ 6,000.00

Published Works

1. NOLASCO, A.M.; GUERRINI, I.A.; BENEDETTI, V. The use of urban and industrial residues for fertilization and conditioning of forest plantation soils. IN: Gonçalves, J.L.M.; Benedetti, V. Forest nutrition and fertilization. Piracicaba: Ed. IPEF, 2004. p. 379-408.

2. NOLASCO, A.M.; VIANA, V.M. Problemas e oportunidades para a indústria de processamento primário da caixeta – Tabebuia cassinoides (Lam.) D.C.. Piracicaba, Circular Técnica IPEF, n. 202, abril, 2004, 16p.

3. NOLASCO, A.M.; ULIANA, L.R.; GARCIA, J.N. Identificação de pontos críticos de geração de resíduos em indústrias de processamento mecânico da madeira. IN: Anais do Congresso Brasileiro de Ciência e Tecnologia em Resíduos e Desenvolvimento Sustentável. Florianópolis, 2004.

4. ULIANA, L.R.; NOLASCO, A.M.; GARCIA, J.N. Monitoramento do fluxo de madeira numa indústria de esquadrias para minimização da geração de resíduos. IN: Anais do IX EBRAMEM – Encontro Brasileiro de Madeiras e Estruturas de Madeira. 2004.

Edson José Vidal da Silva **CURRICULUM VITAE**

Personal Data: **Birth Date:** 07.12.1963
Birth Place: Santarém / PA
Nationality: Brazil

Post Graduation: **2004 – Ph.D. in Sciences of Environmental Engineering**
- SÂO PAULO UNIVERSITY - USP, São Carlos-SP,Brazil
- School of Engineering of São Carlos

Theme of study: "Dinamics of managed forests and under conventional exploitation in Amazônia Oriental".

1998 - M. Sc. in Forest Sciences
- SÂO PAULO UNIVERSITY - USP, Piracicaba-SP,Brazil
- Superior School of Agriculture "Luiz de Queiroz" – ESALQ/USP
- Ecology and Forest Management

Theme of Study: "Impacts of predatory and planed lumber exploitation on growing and diversity of tree species in Amazônia Oriental".

Graduation: **1989 - Agronomy**
- Faculty of Agricultural Sciences of Pará, FCAP, Belém-PA, Brazil

RELEVANT WORK UNDERTAKEN IN THE LAST 3 YEARS:

At present PhD Professor in RDIDP, at the Department of Forestry sciences at Superior School of Agriculture "Luiz de Queiroz", University of São Paulo, responsible for the subjects of graduation and master degree and lines of research in Tropical Forest Management. Coordinator of the Laboratory of Tropical Silviculture at ESALQ/USP.

2001-2005 Senior Researcher from IMAZOM - Institute of Man and Environment from Amazon; Coordinator and Principal Researcher of the Program on Ecology and Forest Management.

1996-2000 Associated Researcher from IMAZON, Proncipal Researcher on Ecology and Forest Management; focusing tropical forest monitoring after lumber exploitation and sustainable alternatives for lumber production in Amazon Region.

2001-2004 Adminstrative Coordinator of IMAZON

Published Works

1. GROGAN, J., E. VIDAL & M. SCHULZE. **Apoio científico para os padrões de manejo de madeira na floresta amazônica – a questão da sustentabilidade.** *Ciência e Ambiente.*

2. SCHULZE, M., E. VIDAL, J. GROGAN, J. ZWEEDE & D. ZARIN. Madeiras nobres em perigo: **As melhores práticas e normas de manejo atuais não sustentarão a produção de madeira nas florestas da Amazônia.** *Ciência Hoje.*

3. GERWING, J., VIDAL, E. Changes in liana abundance and species diversity eight years after liana cutting and logging in an eastern Amazonian forest. **Conservation Biology**. , v.16, p.544 - 548, 2002.

4. VIDAL, E., VIANA, V., BATISTA, J. L. F. Crescimento de floresta tropical três anos após colheita de madeira com e sem manejo florestal na Amazônia oriental. **Scientia Florestalis**. Piracicaba/SP/Brasil: , v.16, p.133 - 143, 2002.

5. BARRETO, P., VIDAL, E., AMARAL, P., UHL, C. Costs and benefits of forest management for timber production in eastern Amazonia. **Forest Ecology and Managemen**t. , v.108, p.9 - 26, 1998.

6. VIDAL, E., VIANA, V., BATISTA, J. L. F. Efeitos da exploração madeireira predatória e planejada sobre a diversidade de espécies na Amazônia oriental. **Revista Árvore**. Viçosa/Minas Gerais: , v.22, n.4, p.503 - 520, 1998.

7. UHL, C., BARRETO, P., VERÍSSIMO, A., AMARAL, P., VIDAL, E., SOUZA JR, C., BARROS, A. C. Natural resource management in the brazilian Amazon: an integrated research approach. **BioScience**. Washington: , v.47, n.3, p.160 - 168, 1997.

8 VIDAL, E., JOHNS, J., GERWING, J., BARRETO, P., UHL, C. Vine management for reduced-impacts logging in Eastem Amazon. **Forest Ecology and Management**. , v.98, p.105 - 114, 1997 .

Marcos Antonio Eduardo Santana **CURRICULUM VITAE**

Personal Data: **Birth Date:** 28.11.1954
Birth Place: São Paulo / SP
Nationality: Brazil

Post Graduation: **1993 – 1994 Ph.D.**
• Forest Products Laboratory, USDA-FPL, EUA.
1986 – 1990 Doctor in Wood and Paper science.
• North Carolina State University, NCSU, EUA
Thesis Title: "Separation of glucuronic acid from sweetgum (Liquidambar styraciflua L.) wood prehydrolyzates".
1983 – 1985 M.Sc. in Wood and Paper Science.
• North Carolina State University, NCSU, EUA
Thesis Title: "Evaluation or resin-forming capability of lignin residue from hydrolysis os sweetgum wood with concetrated HCl at moderate temperatures".

Graduation: **1975 - 1978 Chemistry.**
• BRASÍLIA UNIVERSITY, Brasília-DF, Brazil
• Chemistry Institute

RELEVANT WORK UNDERTAKEN IN THE LAST 3 YEARS:

1979 to present - Researcher of the Laboratory of Forestry Products - LPF/IBAMA.
- Elaboration, execution and coordination of projects of research. Consulting and lectures. Tutoring of students and researchers.

1998 to present Member of the editorial commission of the following technical-scientific magazines: Forest and Environment, Federal Rural University of Rio de Janeiro-UFRRJ; Magazine of Forestry Sciences, Federal University of Santa Maria-RS.

Published Works

1. OKINO, E. Y.; SOUZA, M. R.; SANTANA, M. A. E.; ALVES, M. V. S.; SOUSA, M. E.; TEIXEIRA, D. E. Physico-mechanical properties and decay resistance of *Cupressus* spp. cement-bonded particleboards. **Cement & concrete composites**. Inglaterra: , v.27, n.2005, p.333 - 338, 2005.
2. OKINO, E. Y.; SOUZA, M. R.; SANTANA, M. A. E.; ALVES, M. V. S.; SOUSA, M. E.; TEIXEIRA, D. E. Cement-bonded wood particleboard with a mixture of eucalypt and rubberwood. **Cement & concrete composites**. Inglaterra: , v.26, n.2004, p.729 - 734, 2004.
3. OKINO, E.; SOUZA, M. R.; SANTANA, M. A. E.; SOUSA, M. E.; TEIXEIRA, D. E. Chapa aglomerada de cimento-madeira de *Hevea brasiliensis* Mull.. **Revista Árvore**. Viçosa-MG, v.28, n.3, 2004.
4. OKINO, E. Y.; SOUZA, M. R.; SANTANA, M. A. E.; ALVES, M. V. S.; SOUSA, M. E.; TEIXEIRA, D. E. Evaluation of the physical and biological properties of particleboard and flakeboard made from *Cupressus* spp. **International Biodeterioration & Biodegradation**. Reino Unido: , v.53, p.1 - 5, 2004.
5. OKINO, E.Y.A.; TEIXEIRA, D. E.; SANTANA, M. A. E.; SOUSA, M. E.; SOUZA, M. R. Properties of oriented strandboard made of wood species from Brazilian planted forests: Part 1: 8 mm-long strands of *Pinus taeda* L.. **Holz Roh Werkst**. Alemanha: , v.62, p.221 - 224, 2004.
6. GOUVEIA, F.N.; VITAL, B.R.; SANTANA, M.A.E. Avaliação de três tipos de estruturas de colchão e três níveis de resina fenólica na produção de chapas de partículas orientadas – OSB. **Revista Árvore**. Viçosa-MG, v. 27, n.3, p.365-370, 2003.

Orientations Tutoring of 8 students of PIBIC from 2003 to 2005, 2 pupils of master.

Takashi Yojo **CURRICULUM VITAE**

Personal Data: **Birth Date:** 24.08.1953
Birth Place: Guarulhos / SP
Nationality: Brazil

Post Graduation: **1993 – Ph.D. in Engineering of Structures.**
- SÂO PAULO UNIVERSITY - USP, São Paulo-SP,Brazil
- Polytechnic School of the University of São Paulo

Thesis Title: "Accurate Geometrically non-linear analyzes of Spatial Doors (with application in towers of transmission of high tension)."

1989 - M.Sc. in Engineering of Structures.
- SÂO PAULO UNIVERSITY - USP, São Carlos-SP,Brazil
- School of Engineering of São Carlos

Thesis Title: "Spatial trusses of Wood in viscous-elastic way under geometrically non-linearity"

Graduation: **1977 - Civil Engineering**
- SÂO PAULO UNIVERSITY - USP, São Paulo-SP,Brasil
- Polytechnic School of the University of São Paulo

RELEVANT WORK UNDERTAKEN IN THE LAST 3 YEARS:

Study of crosses with Amazon wood; study of poles of eucalyptus; Study of crosses of Eucalyptus; Study of tensions of growth in Eucalyptus; Study of wood links of wood in metallic connectors; Study of Standard pallets ABRAS; Study of 10 species of wood in the region of Tucuruí; Physical-mechanical Characterization of solid wood; Characterization of plywood; Characterization of wooden flooring; Characterization of wooden doors; Characterization of wooden carpets; Identification and control of quality of ground sills for Companhia Vale do Rio Doce - CVRD in the region of Serra dos Carajás; Registering of saw mills in the states of Maranhão and Pará; Dimensioning and construction of wooden platform for Companhia Brasileira de Bauxita, in the state of Pará; Structural evaluation in wooden arches for Eletropaulo and Clube de Campo São Paulo; Structural evaluation in wooden tower for water cooling of Petrobrás and Petroquímica União; Dimensioning of the wooden footbridge for the Mayor Hall of São Paulo; Calculation and dimensioning of Wooden House like Balloon - framing; Physical and mechanical essays of clones of eucalyptus; Essay of calibration of electrical measurers used to determine the content of wood moisture; Essay of elastic wooden stairs used in electricity companies; structural evaluation of trusses partly burnt at Brasimet; and, evaluation of furniture performance; analyzes of risk of tree falling in the city of São Paulo.

Published Works

1. Pimenta, P., M., Yojo, T. Análise geometricamente exata de pórticos espaciais através do método dos elementos finitos. São Paulo, IPT, 1992. 12p. (Publicação IPT 2003).
2. Franco, N; Yojo, T. Avaliação das características físicas e mecânicas e acústicas da madeira de pau-brasil. In: IX EBRAMEM – ENCONTRO BRASILEIRO EM MADEIRAS E EM ESTRUTURAS DE MADEIRAS, 27 a 29 de julho de 2004, Cuiabá, MT. Proceedings... Cuiabá : FENF-UFMT/IBRAMEM, 2004. (inclui CD-ROM)..
3. Yojo, T. Dicussões sobre as propriedades acústicas e sua utilização em madeira. In: IX EBRAMEM – ENCONTRO BRASILEIRO EM MADEIRAS E EM ESTRUTURAS DE MADEIRAS, 27 a 29 de julho de 2004, Cuiabá, MT. Proceedings... Cuiabá : FENF-UFMT/IBRAMEM, 2004. (inclui CD-ROM)

Concluded Orientations

Master: 01

Washington Luiz Esteves Magalhães **CURRICULUM VITAE**

Personal Data: **Birth Date:** 20.11.1960
Birth Place: Cuiabá / MT
Nationality: Brazil

Post Graduation: **2002 – Ph.D. in Science and Engineering of Materials.**
- SÂO PAULO UNIVERSITY - USP, São Carlos-SP,Brazil
- School of Engineering of São Carlos (IFISC/IQSC)

1998 - M.Sc. in Science and Engineering of Materials
- SÂO PAULO UNIVERSITY - USP, São Carlos-SP,Brazil
- School of Engineering of São Carlos (IFISC/IQSC)

Graduation: **1983 - Chemistry Engineering**
- MILITARY INSTITUTE OF ENGINEERING - IME, Rio de Janeiro-RJ, Brazil

RELEVANT WORK UNDERTAKEN IN THE LAST 3 YEARS:

At present Researcher of EMBRAPA FLORESTAS

Projects Coordination
- Coordinator of Projects of Embrapa: "Net of transference fields of Technologies for preservation and covering of wood", "Development of non-destructive and fast method for forecast of physical, anatomical and chemical properties of wood",
- FINEP/RBT/MCT: "Construction of two national models of saw mills directed to groups of small and medium rural producers"
- CNPq – RHAE: "Biomorphic pottery from Brazilian wood for application in nanotechnology";

Co-Orientations **Master:** 07 **Doctor:** 02

Henriqueta da Conceição Brito Nunes **CURRICULUM VITAE**

Personal Data: **Birth Date:** 25.04.1970
Birth Place: Abaetetuba / PA
Nationality: Brazil

Post Graduation: **2001 – M.Sc. in Agronomy and Tropical Vegetal Biology.**
- COLLEGE OF AGRARIAN SCIENCES OF PARÁ - FCAP, Pará - Brazil
- Area of concentration (working): Botanic, Vegetable Systematic, Agricultural industrial raw materials, Genetics, Phytotechnical and Gardening

2004 - Specialization in Rural Entrepreneur and Sustainable Development
- STATE UNIVERSITY OF PARÁ – UEPA, Belém - PA, Brazil

Graduation: **1996 - Agronomy Engineering**

RELEVANT WORK UNDERTAKEN IN THE LAST 3 YEARS:

Teaching in Colleges in the subjects of:
Graduation: Botanic, Vegetable Systematic and dendrology, genetics topics, Agricultural and industrial Raw materials and Biology IV.
Specialization: Notions of Botanic and Methods of plant propagation

- Coordinator of the Course of Specialization *latu sensu* in Gardening as Entrepreneur;
- Coordinator of the Course Trainee of Graduation in Agricultural and Industrial Technology;
- Member of the Council of the Center of UEPA – Center of Natural Sciences and Technology (CCNT);
- Member of the team of Gespública of UEPA (Program of Quality);
- Representative of UEPA in the agreement for the trainer auditory with the National Hardwood Flooring Association – ANPM.

Projects Coordination

- Coordinator of the Research Project: Diagnoses of the Quality of Air on Avenida Almirante Barroso – Belém (Pa) from the use of biological indicator species;
- Executor in the Research Project: Indication of alternative wood in substitution if the traditional commercialize in the international market by the wooden polo of Paragominas-PA.

B2. Terms of Reference (personnel to be contracted with project resources)

Function: Field Engineers (2)

Experience:

Graduate in Forest Engineering or related field, Post Graduated level, minimum Master degree, related to forest products and its utilization.
Former experience with forest management or lumber industrialization is desirable.
Other skills: initiative, teamwork, experience with training activities.

Duties:

- To participate in field activities of the project.
- To participate in collecting information.
- To organize and facilitate debates with all actors involved.
- To assist work of the team and supervise activities.
- To participate in the courses and extension activities.
- To substitute the field coordinator in his absence.
- To assist in development of course promotional materials.
- To assist in the coordination of technical and operational materials.
- To participate in data processing and analysis.

Function: Course Coordinator (1)

Experience:

Graduate in Forest Engineering, Production Engineering or related areas, Post Graduated level, minimum Master degree, related to wood based industries or extension services.
Other skills: initiative, teamwork, good communication (writing and speaking) and discipline.

Duties:

- To coordinate all administrative activities related to trainees
- To organize and maintain all course materials, correspondences and contacts
- To provide management with summaries of participant requests for evaluation
- To provide information to all those interested how to participate in the courses
- To make travel arrangements and purchase necessary tickets

Function: Field Technician (2)

Experience:

Graduate in Agronomy or Forestry (technical level) or related field, or ungraduate student of Forest Engineering or related field.
Former experience with lumber industrialization and/or tropical forest operations is desirable.
Other skills: initiative, teamwork.

Duties:

- To participate in field activities of the project.

- To participate in collecting information.
- To participate in collecting and preparing wood samples.

Function: Botanic Technician (1)

Experience:

Graduate in Biology or Forestry (technical level), or ungraduate student of Forest Engineering, Biology or related field.
Former experience with tropical forest operations and taxonomy of tropical species is desirable.
Other skills: initiative, teamwork.

Duties:

- To participate in field activities of the project.
- To identify tree species (common and scientific).
- To collect botanical specimens for future identification and preservation.

Function: Audit Technicians (6)

Experience:

Graduate in Industry Operation (technical level) or related field, or ungraduate student of Forest Engineering or related field.
Former experience with lumber industrialization is desirable.
Other skills: initiative, teamwork.

Duties:

- To participate in field activities of the project.
- To participate in collecting information.
- To assist auditing cycles.

Function: Accountant Technician

Experience:

Graduate in Accountability (technical level), or ungraduate student of Accountability.
Former job experience (2 years).
Other skills: initiative, teamwork.

Duties:

To maintain accurate and up-to-date accounting records for the ITTO project
To maintain direct communication with project director

ANNEX C: Letters of Support

ESALQ
ESCOLA SUPERIOR DE AGRICULTURA LUIZ DE QUEIROZ
USP

CIÊNCIAS FLORESTAIS

Departamento de Ciências Florestais
E.S.A. "Luiz de Queiroz"
Universidade de São Paulo
Av. Pádua Dias, 11 - Caixa Postal 9
CEP 13418-900 - Piracicaba, SP - Brasil
Fone (19) 3436-8673 - Fax (19) 3436-8601
E-mail: lcf@esalq.usp.br
http://lcf.esalq.usp.br

Termo de Endosso Institucional
(Chamada de Projetos ABC/MRE nº 01/2005)
Organização Internacional de Madeiras Tropicais - OIMT

Pelo presente Termo de Endosso Institucional, atesto estar ciente do projeto intitulado "**AGREGAÇÃO DE VALOR NA CADEIA PRODUTIVA DE PISOS DE MADEIRA: DA FLORESTA AO PRODUTO FINAL**", a ser proposto pela ANPM - Associação Nacional dos Produtores de Pisos de Madeira, nos termos do Edital ABC/MRE 01/2005.

O Departamento de Ciências Florestais, ao integrar-se ao referido projeto, compromete-se a apoiar a execução das atividades compreendidas na proposta, cooperar com os outros grupos envolvidos e disponibilizar as suas instalações para as atividades previstas.

Piracicaba, 22 de dezembro de 2005.

Prof. Dr. Fernando Seixas
Chefe do Dep. de Ciências Florestais
LCF / ESALQ / USP

Prof Dr. Fernando Seixas
Chefe do LCF ESALQ/USP

Termo de Endosso Institucional
(Chamada de Projetos ABC/MRE nº 01/2005)
Organização Internacional de Madeiras Tropicais - OIMT

Pelo presente Termo de Endosso Institucional, atesto estar ciente do projeto intitulado "**AGREGAÇÃO DE VALOR NA CADEIA PRODUTIVA DE PISOS DE MADEIRA: DA FLORESTA AO PRODUTO FINAL**", a ser proposto pela ANPM - Associação Nacional dos Produtores de Pisos de Madeira, nos termos do Edital ABC/MRE 01/2005.

A Instituição, ao integrar-se ao referido projeto, compromete-se a apoiar a execução das atividades compreendidas na proposta, cooperar com os outros grupos envolvidos e disponibilizar as suas instalações para as atividades previstas.

Brasília, 20 de dezembro de 2005.

VARLONE ALVES MARTINS
Chefe Substituto do LPF/IBAMA

SCEN Trecho 02 - BRASÍLIA - DF CEP -70818-900 – TEL: (6) 3316 1209/3316 1517
FAX: (61) 3225 1182/3316 1515 E-MAIL: lpf.df@ibama.gov.br

IPT
Instituto de Pesquisas Tecnológicas

Termo de Endosso Institucional
(Chamada de Projetos ABC/MRE nº 01/2005)
Organização Internacional de Madeiras Tropicais - OIMT

Pelo presente Termo de Endosso Institucional, atesto estar ciente do projeto intitulado "**AGREGAÇÃO DE VALOR NA CADEIA PRODUTIVA DE PISOS DE MADEIRA: DA FLORESTA AO PRODUTO FINAL**", a ser proposto pela ANPM - Associação Nacional dos Produtores de Pisos de Madeira, nos termos do Edital ABC/MRE 01/2005.

A Instituição, ao integrar-se ao referido projeto, compromete-se a apoiar a execução das atividades compreendidas na proposta, cooperar com os outros grupos envolvidos e disponibilizar as suas instalações para as atividades previstas.

São Paulo, 18 de janeiro de 2006.

Oswaldo Poffo Ferreira
Diretor da Divisão de Produtos Florestais

Instituto de Pesquisas Tecnológicas do Estado de São Paulo S.A. - IPT
Av. Prof. Almeida Prado, 532 - Cidade Universitária - Butantã - 05508-901 - São Paulo - SP - Tel.: (11) 3767-4000 - www.ipt.br
Serviço de Atendimento ao Cliente - SAC - Tel.: (11) 3767-4129, 3767-4456 e 3767-4744 - Fax: (11) 3767-4002 - sac@ipt.br

Embrapa

TERMO DE ENDOSSO INSTITUCIONAL
(Chamada de Projetos ABC/MRE nº 01/2005)
Organização Internacional de Madeiras Tropicais – OIMT

Pelo presente Termo de Rndosso Institucional, atesto estar ciente do projeto intitulado ***"AGREGAÇÃO DE VALOR NA DEIA PRODUTIVA DE PISOS DE MADEIRA: DA FLORESTA AO PRODUTO FINAL"*** *a ser proposto pela ANPM – Associação Nacional dos Produtores de Pisos de Madeira, nos termos do Edital ABC/MRE 01/2005.*

A Instituição, ao integrar-se ao referido projeto, compromete-se através da celebração de contrato de parceria após aprovação do projeto a apoiar a execução das atividades compreendidas na proposta, cooperar com os outros grupos envolvidos e disponibilizar as suas instalações para as atividades previstas.

Belém, 18 de janeiro de 2006

p/ JORGE ALBERTO GAZEL YARED
Chefe Geral da Embrapa Amazônia Oriental

Ministério da Agricultura, Pecuária e do Abastecimento
Empresa Brasileira de Pesquisa Agropecuária
Embrapa Amazônia Oriental
Trav. Dr. Enéas Pinheiro s/nº
Bairro Marco
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Telefone (91) 276-1941
Fax (91) 276-0323
www.embrapa.br

Embrapa

Termo de Endosso Institucional
(Chamada de Projetos ABC/MRE nº 01/2005)
Organização Internacional de Madeiras Tropicais - OIMT

Pelo presente Termo de Endosso Institucional, atesto estar ciente do projeto intitulado "**AGREGAÇÃO DE VALOR NA CADEIA PRODUTIVA DE PISOS DE MADEIRA: DA FLORESTA AO PRODUTO FINAL**", a ser proposto pela ANPM - Associação Nacional dos Produtores de Pisos de Madeira, nos termos do Edital ABC/MRE 01/2005.

A Instituição, ao integrar-se ao referido projeto, compromete-se a apoiar a execução das atividades compreendidas na proposta, cooperar com os outros grupos envolvidos e disponibilizar as suas instalações para as atividades previstas.

Curitiba, 18 de janeiro de 2006.

Claudia Maria B. F.Maia
Chefe Adj. de Pesquisa e Desenvolvimento Substituta
Embrapa Florestas

Ministério da Agricultura, Pecuária e Abastecimento
Empresa Brasileira de Pesquisa Agropecuária Embrapa Florestas
Estrada da Ribeira km 111 Colombo PR BR CP. 319 CEP 83411-000 e-mail: sac@cnpf.embrapa.br
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GOVERNO DO ESTADO DO PARÁ
UNIVERSIDADE DO ESTADO DO PARÁ
CENTRO DE CIÊNCIAS NATURAIS E TECNOLOGIA
CURSO DE GRADUAÇÃO EM TECNOLOGIA AGROINDUSTRIAL
Tv. Enéas Pinheiro, 2626 – Marco – CEP: 66.095-100 - Belém-PA

TERMO DE ENDOSSO INSTITUCIONAL
(Chamada de Projetos ABC/MRE nº 01/2005)
Organização Internacional de Madeiras Tropicais - OIMT

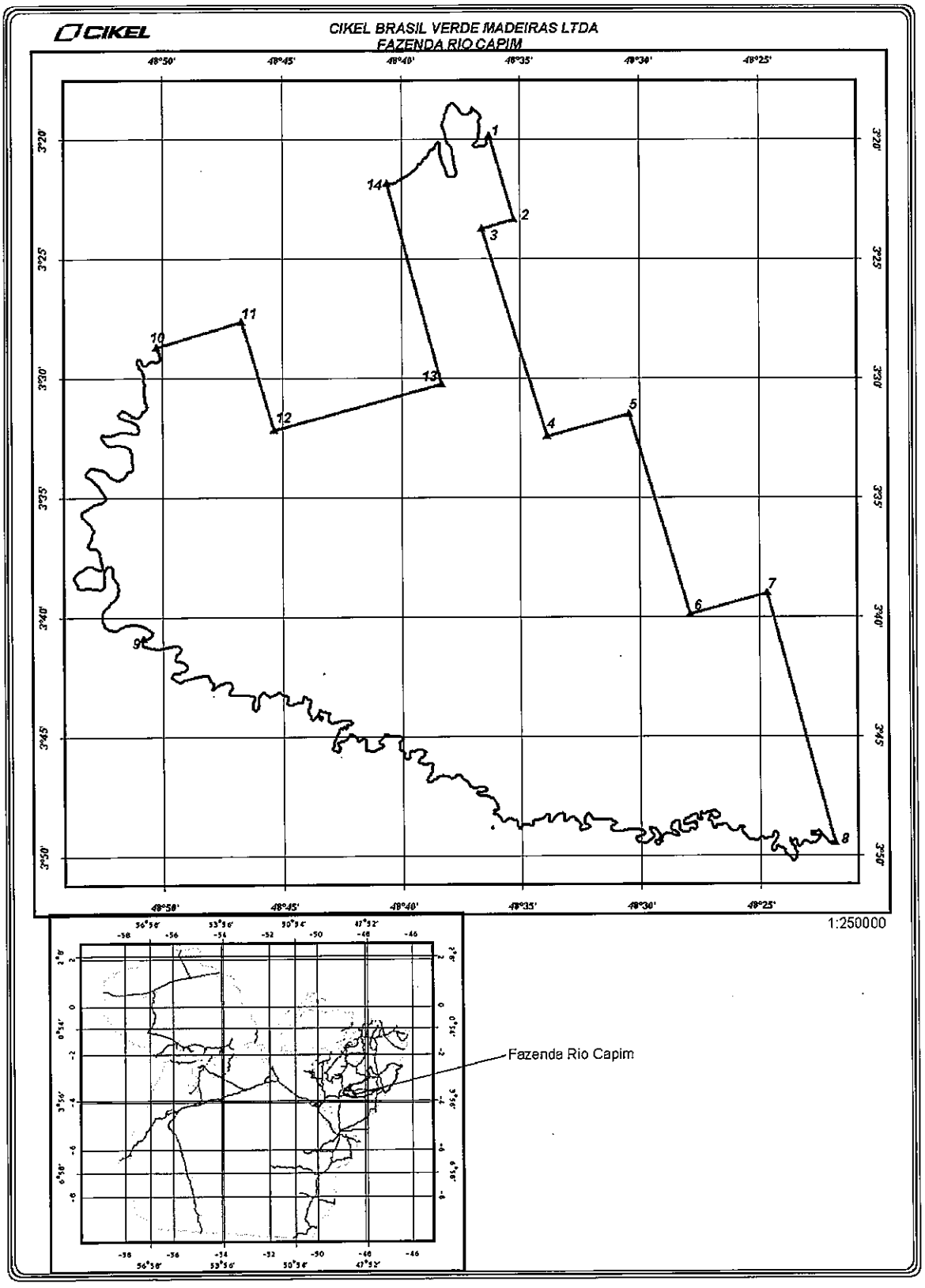
Pelo presente Termo de Endosso Institucional, atesto estar ciente do projeto intitulado "**AGREGAÇÃO DE VALOR NA CADEIA PRODUTIVA DE PISOS DE MADEIRA: DA FLORESTA AO PRODUTO FINAL**", a ser proposto pela ANPM - Associação Nacional dos Produtores de Pisos de Madeira, nos termos do Edital ABC/MRE 01/2005.

A Instituição, ao integrar-se ao referido projeto, compromete-se a apoiar a execução das atividades compreendidas na proposta, cooperar com os outros grupos envolvidos e disponibilizar as suas instalações para as atividades previstas.

Belém, 11 de janeiro de 2006

Gerson Lopes Raposo
Diretor do Centro de Ciências Naturais e Tecnologia

ANNEX D: Location map of forest area and related information



The area were the project will be conducted is near by the City of Paragominas, State of Pará, North Region of Brazil. The main commercial species occurring in the forest are: maçaranduba, angelim, breu, muiracatiara, guajará, timborana, tauari, faveira, abiu, matamatá e jarana.

According information from city administration (20), the total area of municipality is around 20,000 km², covered by natural forest, forest plantation and farms. Original vegetation was Tropical Forest, but the continuous deforestation due the increase of cattle farm areas reduced drastically the area covered by Tropical Forest. Currently, former dense forest areas were replaced by Secondary Forest, in different levels of regeneration.

Municipality population is around 90,000 inhabitants (17), most of them rural workers in the region farms. In the forest area administrated by CIKEL there is a small community of rural workers too.

The City of Paragominas, like many other small cities in North Region of Brazil, shows few job opportunities and high indicators of poorness and social inequality. The project can generate benefit to local rural workers other communities near by CIKEL forest, including job offer and income generation. The integration between community workers, the project objectives and Cikel can be trough rural union, cooperatives or employees association.

Near the forest area there is a small indian reserve, with few inhabitants. However, it is not expected to involve this indigenous community in project activities. Some legal requirements to involve indians in projects like this one could represent a risk of activity failure, without possibility of interference by Coordinators or technical staff to avoid or to manage this risk.

Another area administrated by CIKEL is located in the City of Portal, also in State of Pará. Portel is a smaller municipality, with 25,350 km² of area and around 45,000 inhabitants. Depending on results obtained in Paragominas forest, some activities can be also developed in Portel forest. Possible activities in this second forest area will not alter the project budget.

ANNEX E: Letter of commitment and authorization to use facilities

CIKEL

LETTER OF COMMITMENT

Belém, june 06, 2006.

Mr. Ariel de Andrade
Executive Manager
ANPM – National Hardwood Flooring Association
Piracicaba / SP

Dear Mr. Andrade,

As CEO of CIKEL BRASIL VERDE MADEIRAS LTDA., a forest and wood products business group, I would like to confirm our support to the project "Improvement of the solid wood flooring productive chain: from the contribution to sustainable forest management up to value added product", to be submitted to the International Tropical Timber Organization (ITTO) by our National Wood Flooring Association (ANPM).

The referred support means full access to information regarding forest management and authorization to develop experiments and research in our facilities and forest areas located in the State of Para.

Sincerely yours

MANOEL PEREIRA DIAS
C E O
Cikel Brasil Verde Madeiras Ltda.

IndusParquet®

TERMO DE COMPROMISSO

Tietê/SP , April 25th of 2007

Mr. Ariel de Andrade
Executive Manager
ANPM – National Hardwood Flooring Association
Piracicaba / SP

Dear Mr. Andrade,

As owner and President of Indusparquet Indústria e Comércio de Madeiras Ltda, a wood products business group, I would like to confirm our support to the project "Improvement of the solid wood flooring productive chain: from the contribuition to sustainable forest management up to valeus added product", to be submitted to the International Tropical Timber Organization (ITTO) by our Nacional Wood Flooring Association (ANPM).

The referred support means full access to information regarding manufacture process and authorization to develop experiments and research in our facilities located in the State of São Paulo.

Sincerely yours

José Antonio Baggio
PRESIDENT
Indusparquet Ltda.

INDUSPARQUET: Rodovia SP 127, km 75,5 - Fone: (15) 3285.5000 - Fax: (15) 3282-3544 - CEP 18530-000 - Tietê - SP - Brasil
www.indusparquet.com.br e-mail: parquet@indusparquet.com.br

ANNEX F: Brief description of Partner Institutions

- Department of Forest Sciences - LCF / ESALQ / USP

LCF is part of the University of São Paulo, an education and research institution, in charge of ungraduate course of Forest engineering and graduate Program in Forest Resources. Besides teaching and research activities, LCF staff has an intense collaboration to forest companies, through its groups of co-operative research and extension; established in partnership with IPEF - Institute of Forest Research and Development and other NGO's. Its responsibilities in the project will be: (**A**) physical and mechanical test of less known lumber species; (**B**) supervise pilot manufacture of flooring with less known species; (**C**) grouping of species according potential use to wood flooring; (**D**) determination of kiln drying schedules and correction curves for electric moisture meters; (**E**) heating test to improve surface hardness; (**F**) all activities related to residues generation and management; (**G**) preparing base text for lumber and flooring specifications; (**H**) to suggest forest management alternatives based on possibilities to use other lumber species and ; (**I**) to manage the project.

- Laboratory of Forest Products – LPF / IBAMA / MMA

LPF is a Specialized Center from IBAMA. Its administrative structure has three Divisions. Research Division includes Anatomy and Morphology, Wood Decay and Preservation, Energy from Biomass, Physics and Engineering, Panels, Products and Processes, Chemistry, Adhesives and Natural Rubber, and Wood Drying. Activities in project will be: (**A**) physical and mechanical test of less known lumber species; (**B**) grouping of species according potential use to wood flooring; (**C**) Test of surface mechanical and chemical finishing; (**D**) potential uses for lumber residues; (**E**) preparing base text for lumber and flooring specifications.

- Division of Forest Products - DPF / IPT

The Division of Forest Products, part of administrative organization from IPT - Institute for Technological Research of São Paulo State, comprehends technical areas related to wood technology and wood based products. Education activities are the collaboration with University of São Paulo in post-graduated courses, since 1992, and the Master Program from IPT. Its staff will collaborate in the project through: (**A**) potential uses for lumber residues; (**B**) preparing base text for lumber and flooring specifications.

- Brazilian Agricultural Research Corporation - EMBRAPA

EMBRAPA is linked to the Ministry of Agriculture, with Research Center and Unities all abroad Brazil. Two of those unities will participate in this project.

EMBRAPA Oriental Amazon

EMBRAPA Unity with head office in Belém, State of Pará. It has the principal objective to make feasible technological solutions for agro-business; promoting sustainability of economical activities with environmental equilibrium, contributing to reduce social differences, and promoting improvement of life quality and local communities. Collaboration to the project will be: (**A**) field survey and collecting botanical samples; (**B**) preparing base text for lumber and flooring specifications.

EMBRAPA Forest

EMBRAPA Unity with head office in Colombo, State of Paraná. This Unity is directed to pursue forest research, working in co-operation with universities, state research institutes, NGO's and private companies. The collaboration to the project will be: (**A**) Test of surface hardening by polymer impregnation and by densification.

Center of Natural Sciences and Technology – CCNT / UEPA

The University of Pará State is an institution dedicated to teaching and research in areas related to education, health, science and technology for Amazon region. The CCNT has the objective to capacitate technician workers and to transfer technology industries located in Amazon region. Its staff will collaborate to the project through: (**A**) test to measure lumber moisture content; (**B**) measurement of residues generation in flooring manufacturing process; (**C**) field and industry survey; (**D**) product auditing.

ANNEX G: Budget justification (according 32nd Expert Panel recommendation)

A. Labor Input

Labor input is distributed in personnel to be contracted with project resources and contracts.

All personnel will be directly involved with project activities, as described in the Table "Outputs and Activities", ***pages 27 to 29***. The duties are described in item B2 "Terms of Reference", ***pages 58 and 59***. Personnel contract, as proposed, is essential to execute the proposed activities. Personnel cost, representing ***46.0%*** of total personnel and ***26.0%*** of ITTO budget, is reasonable.

In contracts are included specialists and audit technicians. Three specialist consultants should be contracted only to participate in activity ***2.1 and 2.6*** (related to kiln drying), and activity ***2.2*** (electrical measurement of lumber moisture content). A designer specialist will help to prepare all divulgation and training materials, as well a translator should help to prepare english version of divulgation material. All those specialist will have a specific and short time participation in the project. Cost of specialist represents ***17.8%*** of total item and ***4.3%*** of total ITTO budget.

To contract a team with 6 Audit Technicians (representing ***16.5%*** of total item and ***4.0%*** of ITTO budget) is essential to execute all products auditing proposed in Quality Certification Program (***Activity 3.9***). Duties are described in item B2, page ***59***.

B. Cost of Researchers

All researchers involved in the project are affiliated to partner institutions (Universities and Research Institutions, cited in Figure 5, page 46). There are 13 researches, 11 with PhD level and 2 with Master degree. Mean net salary of a research with PhD level and 5 years of experience, working in a Brazilian public institution, is between US$ 2,500.00 and US$ 3,000.00. In the project, labor cost of researches was set to US$ 2,720.00 per month, value in agreement to reality. Besides this, research cost was included in budget as ANPM counterpart.

C. Equipment cost

Total cost of Capital Items is ***US$ 170,570.00***. ANPM counterpart is ***US$ 119,480.00*** (***70.0%*** of total item), represented by testing machines for physical and mechanical properties, equipment for chemical extraction, laboratory facilities for drug tests with animals and other complimentary items. Considering this research facilities, distributed in 6 partner institutions, the attributed value is reasonable.

ITTO contribution to the item is ***US$ 51,090.00*** (***30.0%*** of total item), to be applied in parts for testing machines, renovation of laboratory kiln drying (including an automatic control system), an impregnation pump, a muffle furnace, moisture meters and other small parts. All equipment solicited will be directly used in project activities.

ANNEX H: Detailed description of Inputs

Outputs and Activities	
Output 1 – *Proposing a management model to integrate the exploration of lumber and non timber forest products.*	**INPUTS**
1.1 - Field survey to identify the less used species, to collect material for botanical identification and to prepare samples for physical and mechanical tests.	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Botanical technician - 1 @ $ 1,040/mo Field technician - 2 @ $ 1,040/mo h Duty travel Consumables
1.2 - Physical and mechanical testing (specific gravity, shrinkage, Janka hardness and kiln drying behavior; superficial cutting and finishing; superficial hardening by impregnation and densification; superficial hardening by heat treatment) of less known lumber species.	Researcher - 4 @ $ 2,720/mo Field technician - 2 @ $ 1,040/mo Laboratory technician - 2 @ $ 1,040/mo Collecting, cutting, packing and transporting of lumber and samples Duty travel Reagents and glasswork Impregnation pump and parts Muffle furnace and parts Consumables Accessories and spare parts for testing machine Kilns control system Maintenance services
1.3 - Grouping less known species, based on lumber characteristics and potential to be used to flooring manufacture.	Researcher - 4 @ $ 2,720/mo Duty travel
1.4 - Pilot manufacture of solid wood flooring with less known species.	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Field technician - 2 @ $ 1,040/mo Collecting, cutting, packing and transporting of lumber Drying and manufacturing services Consumables
1.5 Proposal of a management model to explore lumber of commercial and less used species.	Researcher - 5 @ $ 2,720/mo Duty travel
1.6 - Commercial material to divulge lumber species (traditional and less known) indicated to flooring manufacture.	Researcher - 3 @ $ 2,720/mo Designer - 1 @ $ 1,920/mo Translator - 1 @ $ 2,400/mo Photo and printing services Consumables
Output 2 - Proposing a model to reach a manufacturing process more efficient and integrated.	**INPUTS**

2.1- Laboratory kiln drying test to define kiln schedule and to group species.	Researcher - 1 @ $ 2,720/mo Field technician - 2 @ $ 1,040/mo Laboratory technician - 2 @ $ 1,040/mo Specialized consultant - 1 @$ 4,000/mo Collecting, cutting, packing and transporting of lumber and samples Duty travel Kiln parts and maintenance Consumables
2.2 - Testing of electrical moisture meters to provide calibration curves, species settings and standard methods to measure lumber moisture content.	Researcher - 2 @ $ 2,720/mo Field technician - 2 @ $ 1,040/mo Specialized consultant - 1 @$ 4,000/mo Collecting, cutting, packing and transporting of lumber and samples Duty travel Moisture meters and parts Consumables
2.3 - Test to improve superficial cutting and finishing.	Researcher - 1 @ $ 2,720/mo h Field technician - 2 @ $ 1,040/mo Laboratory technician - 2 @ $ 1,040/mo Collecting, cutting, packing and transporting of lumber and samples Duty travel Maintenance services Consumables
2.4 - Qualification and quantification of residues generated during flooring manufacture process, identification of critical points of residues generation and proposal to reduce residues yield.	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Field technician - 2 @ $$ 1,040/mo Laboratory technician - 2 @ $ 1,040/mo Duty travel Spare parts and maintenance services Consumables
2.5 - Proposal to residues management detaching possibilities to produce added value products.	Researcher - 4 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo
2 6 - Elaboration of training material (kiln drying and quality control of dried lumber; reduction of residues yield and residues management).	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Specialized consultant - 1 @$ 4,000/mo Designer - 1 @ $ 1,920/mo Photo and printing services Consumables
2 7 - Training courses (kiln drying, quality control of dried lumber, residues management).	Course coordinator - 1 @ $ 1,440/mo Instructor - 2 @ $ 1,200/mo Divulgation and local rental Technical material Duty travel
Output 3 - Quality Certification Program for wood flooring.	**INPUTS**
3.1 - Recovery of international standards and specifications about lumber, and solid wood flooring and Quality Programs regarding wood based products.	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $$ 1,440/mo Consumables

3.2 - Review of ABNT specifications about lumber and proposal of up to date standards (including lumber and solid wood flooring), according ABNT Standard Guideline.	Researcher - 4 @ $ 2,720/mo Forest engineer - 2 @ $ 1,440/mo Duty travel Consumables
3.3 – Elaboration of a Quality Certification Program, directed to ANPM affiliated producers, containing product specification, audit procedures and a Mark of Conformity.	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Duty travel
3.4 - Workshop with flooring producers and users, regarding proposed specifications about lumber, and solid wood flooring and Quality Certification Program.	Researcher - 2 @ $ 2,720/mo Course coordinator - 1 @ $ 1,440/mo Divulgation and local rental Technical material Duty travel
3.5 - To submit lumber and solid wood flooring specifications to ABNT and the Quality Certification Program to INMETRO.	Researcher - 4 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Duty travel
3.6 - First audit in flooring producers, affiliated to ANPM, and product qualification.	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Audit technician - 6 @ $ 800/mo Duty travel
3.7 – Elaboration of training material about quality evaluation and auditing (directed to internal auditors); and maintenance of solid wood flooring (direct to users).	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Designer - 1 @ $ 1,920/mo Photo and printing services Consumables
3.8 - Training courses for internal auditors according ANPM Quality Certification Program and for institutional users about installation and maintenance of solid wood flooring.	Researcher - 2 @ $ 2,720/mo Course coordinator - 1 @ $ 1,440/mo Instructor - 2 @ $ 1,200/mo Divulgation and local rental Technical material Duty travel
3.9 - Audit of ANPM affiliated producers according ANPM Quality Certification Program.	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Audit technician - 6 @ $ 800/mo Duty travel Moistures meters, pachymeters and parts Maintenance services
3.10 - Material elaboration regarding installation and maintenance of solid wood flooring.	Researcher - 2 @ $ 2,720/mo Forest engineer - 1 @ $ 1,440/mo Designer - 1 @ $ 1,920/mo Photo and printing services Consumables

ANNEX I: Preliminary forest inventory at Cikel area

Nr	SPECIES (common name)	Nr	SPECIES (common name)	Nr	SPECIES (common name)
1	abiurana *	32	guajara bolacha	62	murure *
2	acapu *	33	goiabão *	63	oiticica *
3	amapa amargoso *	34	imbaubarana	64	orelha de macaco
4	amapa doce *	35	inhare	65	parapara *
5	anani *	36	ipe amarelo *	66	pau amarelo *
6	angelim amargoso	37	itauba *	67	pau jacare *
7	angelim coco	38	jarana *	68	perobinha
8	angelim pedra *	39	jatoba *	69	piquia *
9	angelim rajado *	40	jatoba curuba	70	piquiarana *
10	angelim vermelho *	41	jatoba de fava	71	quaruba *
11	breu *	42	louro *	72	quarubarana *
12	breu sucuruba *	43	louro canela	73	quarubacedro
13	breu vermelho	44	louro faia *	74	roxinho *
14	caju açu *	45	louro abacate	75	sapucaia *
15	cedro *	46	louro amarelo *	76	sucupira
16	cedroarana *	47	louro pimenta	77	sucupira amarela *
17	copaiba *	48	louro preto	78	sucupira babona
18	cumaru *	49	louro rajado	79	sucupira pele de sapo*
19	cumaru amarelo	50	louro vermelho *	80	sucupira preta *
20	cumaru vermelho	51	macacauba *	81	sucupira tento
21	cupiuba *	52	maçaranduba *	82	sumauma *
22	envira quiabo	53	mandioqueira *	83	tanimbuca *
23	escorrega macaco	54	maparajuba *	84	tatajuba *
24	fava atanã *	55	marupa *	85	tauari *
25	fava bolota / juerana *	56	matamatá	86	taxi *
26	fava de paca	57	matamata branco	87	taxirana
27	fava folha fina *	58	matamata preto *	88	timborana *
28	fava tamboril *	59	matamata vermelho	89	ucuuba terra firme *
29	fava vick	60	morototo *	90	uxi *
30	faveira *	61	muiracatiara *	91	uxirana *
31	freijo cinza *				

(*) : Species with some description of lumber characteristics (02, 07, 09, 25, 26).

ANNEX J: Details and Program of Training Activities

TRAINING COURSE: KILN DRYING AND QUALITY CONTROL OF DRIED LUMBER
ANPM – Associação Nacional dos Produtores de Pisos de Madeira
Sponsor: ITTO - International Tropical Timber Organization
Execution: **Date:**
Local:
Introduction The purpose of kiln drying is to reduce final moisture content variability around target moisture and to prevent drying defects. Although kiln drying is a process simple to understand, it is very complex to execute. Quality of all lumber manufactured products is highly dependant of its moisture content, and to keep the moisture content of dried lumber all over manufacturing process is also an important procedure to achieve the desirable product quality. Those aspects are crucial to Brazilian lumber industries exports, due the climate difference between the mill and the customer place.
Objectives - to present the basic theory regarding lumber kiln drying; - to present and to discuss the key aspects of kiln drying process, as lumber preparation, kiln operating, control system, drying schedules and process control; - to discuss methodology to control final moisture content and alternatives to avoid moisture adsorption during manufacture.
Target Audience Lumber industry personnel in charge of drying and quality control (managers, supervisors, technicians and kiln operators).
Program (resumed)
1st Day - Importance of drying to lumber manufacturing industry. - Principles of moisture movement, equilibrium moisture content. - Air relative humidity and wood moisture content (concepts, methods of measurement, practical exercise). - Wood characteristics affecting moisture movement. **2nd Day** - Variables of drying process affecting moisture movement. - Drying stresses and defects: causes and correction (exercise about drying defects). - Preparing lumber to drying. - Pre-drying (seasoning) and conventional kiln drying. **3rd Day** - Kiln schedules (principles and exercise about schedule elaboration), - Controlling kiln drying (control systems and kiln performance). - Achieving quality requirements: stress relief and moisture distribution. **4th Day** - Testing quality of dried lumber. - Problems caused by mal function kiln. - Kiln maintenance. - Storage and handling of dried lumber. - Course evaluation. **5th Day** - Industry day (visit to an industry kiln facility).
Availability: 30 participants

TRAINING COURSE: INTERNAL AUDITOR FOR THE SOLID WOOD FLOORING INDUSTRY
ANPM – Associação Nacional dos Produtores de Pisos de Madeira
Sponsor: ITTO - International Tropical Timber Organization
Execution: **Date:**
Local:
Introduction A product Quality Certification requires a constant attention to manufacturing process and product requirements. To conquest and to keep a "Mark of Conformity" is necessary to have prepared personnel to execute internal auditing to evaluate product conformity, to identify non conformity occurrence and to suggest corrective action.
Objectives - to capacitate industry employees to execute internal auditing of the solid wood flooring quality, aiming the "Certification of Conformity"; - to orientate wood flooring industries regarding the ANPM Quality Certification Program and the "Certification of Conformity".
Target Audience Lumber industry personnel in charge of quality control (managers, supervisors, technicians, kiln operators and quality control staff).
Program (resumed) **1st Day** - General aspects of auditing practices. - Planning auditorship. - Executing auditorship. - Exercise about auditing methods. - Classification and reports of non conformity. **2nd Day** - Auditing follow-up. - Improving the auditing procedure. - Psychology of behavior (auditor and audited). - The "Auditor Kit". - Auditing of Quality as a management tool. **3rd Day** - Certification of Conformity for solid wood flooring: - technical specifications (terminology and standards); - audit procedure and management; - principal problems related to manufacturing process; - market and customer relationship. **4th Day** - Quality Control for solid wood flooring: - principles; - industry point of view; - common mistakes and troubles; - changing industry experience. - Course evaluation. **5th Day** - Industry day (visit to an industry facility, practical auditing exercise).
Availability: 30 participants

TRAINING COURSE: RESIDUES MANAGEMENT IN THE SOLID WOOD FLOORING INDUSTRY

ANPM – Associação Nacional dos Produtores de Pisos de Madeira

Sponsor: ITTO - International Tropical Timber Organization

Execution: **Date:**

Local:

Introduction

The secondary processing of lumber generates a high volume of lumber residues, which are usually burnt or put way causing some environment impact.
It is important to discuss the methods to reduce residues generation and technologies to transform residues to valued sub products. Considering the industry based on tropical lumber, residues utilization can be a tool to increase job opportunities and incoming.

Objectives

- to capacitate industry personnel to diagnose residues generation and manufacturing efficiency, detecting critical points and action priority;
- to capacitate industry personnel to elaborate a "Residue Management Plan", based in actions to reduce residues generation, residues treatment and disposal;
- to discuss methods, technologies and opportunities to transform lumber residues to added value products.

Target Audience

Lumber industry personnel in charge of manufacturing operations (managers, supervisors, and technicians).

Program (resumed)

1st Day

- residues management:
  - concept and management models;
  - integrated residues management.
- residues generation in the wood flooring industry:
  - concepts and characterization, residues classification;
  - environmental impacts due inadequate management.

2nd Day

- Elaboration of the Residue Management Plan
  - industry environmental concern and policy;
  - diagnosis of residues generation and identification of critical operations;
  - actions to prevent residues generation;
  - valuations, treatment and disposal of lumber residues.

3rd Day

- Prevention of residues generation:
  - MDL concepts;
  - qualitative and quantitative prevention, residues re-utilization;
  - choosing the best alternative.

4th Day

- Valuation of lumber residues:
  - solid fuel and energy generation;
  - manufacture of utility and decorative products;
  - lumber based composites and chemical extraction;
  - problems, opportunities and responsibilities concerning lumber residues utilization.
- monitoring and improving the Residue Management Plan.
- Course evaluation.

5th Day

- Industry day (visit to an industry facility, to discuss residues generation and management).

Availability: 30 participants

TRAINING COURSE: INSTALLATION AND MAINTENANCE OF SOLID WOOD FLOORING
ANPM – Associação Nacional dos Produtores de Pisos de Madeira
Sponsor: ITTO - International Tropical Timber Organization
Execution: **Date:**
Local:
Introduction Wood is a porous, organic and anisotropic material, with very specific characteristics and behavior. The industry effort to offer a certified product can be lost due the lack of care during flooring installation or due inadequate maintenance. Correct selection of wood flooring, consumer orientation and adequate installation will contribute to product credibility and user satisfaction.
Objectives - to present the basic characteristics of wood and its interaction with another materials. - to capacitate technical personnel acting with wood flooring sell and installation; - to present and to discuss former experiences related to wood flooring selection, installation and maintenance.
Target Audience Institutional buyers (home building companies), resellers, distributors and users in general.
Program (resumed)
1st Day - Basic characteristics of the wood: - anatomic structure; - chemical composition and physical properties; - water-wood relationship. - Using wood based products: - selecting species based on wood characteristics; - drying and moisture measurement; - environmental effects and common troubles; - reception and storage of wood based products; - quality control. **2nd Day** - Installation and maintenance of solid wood flooring: - preparing the substrate; - impermeabilization; - installation care and procedures; - surface finishing; - conservation and maintenance; - common problems: causes and correction. - Course evaluation.
Availability: 50 participants

ANNEX K: Summary of 32nd Expert Panel recommendations and respective responses

B) Specific Recommendations	Responses / Actions Taken
1. clarify the specific objective of the project together with a clear problem analysis and a logical framework to explain the focus of the project and a justification for the integration or not of NTFP related activities and adjust the project title accordingly;	Done. The Specific Objective, the Problem Tree, the Objectives Tree and the Logical Framework were re-wrote, making more clear the project focus and integration with the activities related to NTFP. The changes are detached in the text of reviewed project, pages 7, 8 and 10 to 12.
2. in light of above nr.1, match Specific Objectives with Outputs and reduce the number of activities as appropriate;	Done. The previous review, to attend Recommendation nr.1, allowed to match Specific Objectives and Outputs and to keep the original project proposal. The number of activities was also reduced.
3. provide more information on the project sites, such as areas and if local and indigenous communities will be involved and how their participation is envisaged;	Done. The requested information is in Annex D, pages 72 and 73, complementing the information from original project (item 2.3, pages 14 and 15.
4. expand the risk section, including on the environmental aspects of using more species and if this could lead to overexploitation of the forest and how the regeneration of the harvested species in the forest resources will be handled;	Done. The reviewed text is detached in pages 20 to 23.
5. Refine budget tables by providing sub-components in table 7.2, expressing unit costs for researchers in terms of man/months or man/days, instead of man/hours. And provide justification for labor input in these categories;	Done. Table 7.2 was re-wrote (pages 35 and 36), required justifications are in Annex G, page 78. Global values from original project remains the same.
6. complement the budget with a justification for the high unit cost per hour of researchers (units should be in Man/Months or Day/Months, but not in Hour/Months) and for the equipment;	Done. Justification for cost of researchers and equipment are in Annex G, page 78.
7. Include an Annex which summarizes the recommendations of the 32nd Expert Panel and the respective responses in a tabular form and highlight the changes in the proposal.	Done, present Annex.
The Panel noted also that more information must be given in bullets on the key scientific achievements of the projects mentioned on page 5.	*Done. Revised text is in pages 6 and 7.*
Also the risk section needs to be expanded to cover the possibility of failure of not finding the technological solutions as proposed by the project.	*Done. The revised text covering risk of failure is in pages 20to 23.*

ANNEX L: Summary of 34th Expert Panel recommendations and respective responses

B) Specific Recommendations	Responses / Actions Taken
1. Exclude outputs and activities related to NTFPs from the proposal. Revise relevant project components accordingly;	Done. Activities related to NTFPs were excluded, with respective changes in: - item 2.1, pages 7, 9, 10, 11 and 12; - item 2.2, page 13; - item 2.8, page 19; - item 3, page 22; - item 4, page 23; - item 5, page 25; - item 6, page 27; - item 7, pages 30 to 37; - Annex H, page 72. There was also a reduction of key staff, personnel to be contracted and partner institutions.
2. Consult previous work on LUS conducted in Latin America, including outcomes of past ITTO projects, and discuss further needs of a study on them to avoid duplication of efforts;	Done. Changes are in: - item 3, page 5 - item 2.3, page 14; - item 3, page 22; - item 4, page 23; - Annex I, page 75.
3. Clarify indicators and activities related to training initiatives, detailing each component of the training activity;	Done. See: - item 5, page 26; - item 6, page 27; - Annex J, pages 76 to 79.
4. Modify structure of Organizational Chart, to show a horizontal line between ABC and ITTO in the chart and show non-hierarchical relationship between Project Steering Committee members in the chart;	Done. See page 38.
5. Exclude ABC monitoring cost from the ITTO contribution;	Done. See item 7 (Budget), pages 30 to 37.
6. Provide an Annex which shows the recommendations of the 34th Expert Panel and the respective modifications in tabular form.	Done, present Annex.