



Completion report of the project **Ecology and silviculture of mahogany (*Swietenia macrophylla* King) in the western Brazilian Amazon.**

Host government: Government of Brazil

Executing agencies:

Foundation for Supporting Research Extension and Teaching in Agrarian Sciences (FUNPEA) and Federal Rural University of the Amazon (UFRA)



Project starting date: March 2014  
Project duration (months): 24  
Project costs (US\$):  
(a) ITTO Contribution (in US\$): 127,448  
(b) UFRA/FUNPEA (in US\$): 58,333  
(c) AGROCORTEx (in US\$): 25,521

TOTAL: **211,302**

## COMPLETION REPORT

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## Executive summary

This project is an extension of the project **Ecology and silviculture of mahogany (*Swietenia macrophylla* King) in the western Brazilian Amazon** carried out from 2009 to 2012 in a forest management unit formerly owned by Batisflor Timber Company and presently owned by Agrocortex Madeiras do Acre Agroflorestal Ltda.

In Brazil, development of sustainable management techniques tailored to mahogany forests are still needed, despite the drastic reduction on mahogany timber production and trade after the species has been introduced in CITES' Appendix II. Publication of IBAMA's Instruction 7 which regulates forest management in mahogany forests could have increased production of mahogany timber, but the lack of legally available forest lands in the mahogany belt prevented this to happen. In order to improve management of natural populations of mahogany in the Brazilian Amazon, more information is needed on the effect of the regulation on the population size class distribution, growth and yield in both undisturbed and managed forests as well as on seedling ecology. Furthermore, development of silvicultural techniques to ensure sufficient mahogany regeneration is needed in order to guide forest managers and to improve the present government regulations

Under this context the project aims at establishing best silvicultural practices for mahogany in natural forests and to improve the present government regulations concerning forest management plans to ensure that international trade meets CITES' requirements for sustainable management and conservation of the species.

During the project identification process it was very clear that it would only possible to set up the research proposal if a producer was involved. Therefore a mahogany producer was approached to support the initiative and its involvement was of paramount importance to project implementation. The reason was because we needed a forest being managed according to the forest management regulations regarding mahogany.

The project was built on three specific objectives: **Specific Objective (SO) 1: To evaluate dynamics of mahogany populations in logged and unlogged forests;** **Specific Objective 2: To monitor behaviour of enrichment plantings in gaps created by logging;** and **Specific Objective 3: To disseminate project results.** During the implementation phase some adjustments were introduced: a database on growth of mahogany trees was added to Specific objective (SO) 1; SO 2 was cancelled as many of the planted gaps were not properly tended and thus this would certainly interfere on the results of the evaluation; SO 2 was replaced by a computer application developed to help foresters process forest inventory data and to support university lecturers to teach that discipline in forestry courses.

Negotiations have been made with the partner enterprise Agrocortex to continue collaboration after completion of the project. A technical cooperation agreement is being discussed between UFRA and Agrocortex to extend the studies for a longer period of time with respect to monitoring natural regeneration, establishing one experiment to induce natural regeneration and establishment of mahogany seedlings as well as developing volume equations for the main commercial species occurring in the area. Species identification is also in the agenda as great deal of the species monitored in the permanent sample plot have not been identified yet.

Climate conditions impaired field activities to be carried out in proper time. This, coupled with the timing for students to be free from classes, caused some difficulties in implementation of field activities. The alternative was to train enterprise crews to collect data while no project crew could be in the field. This was a great contribution from the partner.

The project gave a great contribution to beneficiaries: students were trained and produced monographs and dissertations; two volume equations were provided to the partner enterprise and its collaboration with the project was very positive regarding the evaluation of its forest management by the certification body. The partner enterprise is now FSC certified.

Referring to the participation of the institutions involved on project implementation we only had some problems with the Foundation in charge of managing and implementing the project budget. We had delays in procurement of field and laboratory equipment. If a new project was to be presented to CITES – ITTO, we would review the fund manager.

During project implementation the following aspects could be highlighted as lessons learned:

- Problem identification was relevant but project life too short to produce more consistent results. On the other hand, involvement of a forest enterprise as partner was crucial to guarantee logistic support for the field activities.
- Involvement of graduate and undergraduate students was especially important to contribute to scientific production of the university.
- Involvement of CITES scientific authority in Brazil – IBAMA since the formulation of the project would have been advisable.

As for the operational aspects we can highlight:

- The excellent support by the co-ordination for Latin America of the ITTO-CITES Project;
- The management of funds by FUNPEA did not attend our expectations.

Project scientific achievements can be summarised as follows:

- Mahogany seedlings were found in considerable quantities up 200m from the seed bearers.
- Mahogany seedlings are capable to germinate under shade but are incapable to grow into pole size unless the canopy is open. Bamboo (*Guadua* sp.) is a serious impedier and its control must be considered in the silvicultural prescriptions for management of mahogany forests in the western Brazilian Amazon;
- Due to the high mortality of mahogany seedlings a few years after germination, it is advisable to carry out enrichment planting in gaps in order to increase density of the species in the forest and to keep production sustainable. It is strongly recommended that the partner enterprise carry out one experiment with such objective.
- Keeping 20% of commercial sized as seed bearers and establishing the minimum felling diameter to 60cm as required by IBAMA's Instruction 7, are two important measures to conserve the species in managed forests in the Brazilian Amazon.
- Reduced impact logging as applied in the study area had no impact in the structural parameters such as density and basal area; no important changes were also observed in the floristics of the forest as result of timber extraction.
- Volume equations for standing trees are now available for the partner enterprise and must replace the form factor model; it is strongly recommended to continue measuring sample trees to produce volume equations for the dominant species of the forest as a way to improve precision of volume estimates;
- Volume equation for logs (extracted timber) is available. The partner enterprise should negotiate its use as replacement to the usual one required by IBAMA as it is more precise.

## 1. Project identification

### 1.1 Context

This project is an extension of the homonym project carried out from 2009 to 2012 in a forest management unit formerly owned by Batisflor Timber Company and presently owned by Agrocortex Madeiras do Acre Agroflorestral Ltda. Due to delays on approval of the Annual Operating Plan by the Brazilian Environmental Agency – IBAMA, only part of project original activities which depended on a logged forest as a departure point could be implemented. Consequently, most of the project findings of the so called first phase were related to the impact of logging on mahogany's seedlings population. Growth and natural regeneration dynamics during the initial years of the forest regeneration period could not be evaluated. In this second phase or extension of the Project, efforts were made towards documenting the first phase project results in peer reviewed journals and involving forestry students on research activities in order to allow them to write dissertations and monographs. Research efforts were then directed towards the outputs that were not produced in the first phase. Those included a preparation of a database on growth of mahogany and also of other species occurring in the forest, seedling demography after canopy opening and impacts of logging on some phytosociological parameters. As part of the forest management project activities, the Batisflor Company has carried out enrichment planting with mahogany in gaps created by logging, as an alternative to complement natural regeneration and enhance mahogany future production. Thus, evaluation of the enrichment plantings in gaps was added as project output.

### 1.2 Origin and problem

Mahogany (*Swietenia macrophylla* King) is one the world's most valuable timbers. It has a huge geographical range in the Neotropics, from Mexico, trough to the Bolivian and Brazilian Amazonian regions. In Brazil it occurs in the southern Amazonia rain forests, the so called mahogany belt (Barros et al. 1992; Verissimo 1994) but it is well recognised that currently most of the commercial populations only occur in conservation areas (Indian Reserves, National and State Forests).

In Brazil, development of sustainable management techniques tailored to mahogany forests are still needed, despite the drastic reduction on mahogany timber production and trade after the species has been introduced in CITES' Appendix II. Publication of IBAMA's Instruction 7 which regulates forest management in mahogany forests could have increased production of mahogany timber, but the lack of legally available forest lands in the mahogany belt prevented this to happen.

In order to improve management of natural populations of mahogany in the Brazilian Amazon, more information is needed on the effect of the regulation on the population size class distribution, growth and yield in both undisturbed and managed forests. Similarly, development of silvicultural techniques to ensure sufficient mahogany regeneration is needed in order to guide forest managers and to improve the present government regulations.

## 2. Project objectives and implementation strategy

The project aims at establishing best silvicultural practices for mahogany in natural forests and to improve the present government regulations concerning forest management plans to ensure that international trade meets CITES' requirements for sustainable management and conservation of the species.

**Specific Objective 1:** To evaluate dynamics of mahogany populations in logged and unlogged forests;

**Output 1.1:** Dynamics of juveniles in logged and unlogged forest published in a peer reviewed scientific journal;

**Output 1.2:** A database on growth and yield of mahogany forests set up from permanent sample plot data;

**Output 1.3:** Phytosociological dynamics of a mahogany forest evaluated and published in a peer reviewed scientific journal;

**Specific Objective 2:** To monitor behaviour of enrichment plantings in gaps created by logging.

**Output 2.1:** The initial behaviour of enrichment plantings with mahogany in gaps published in a peer reviewed scientific journal.

**Specific Objective 2 (NEW):** To develop a computer application to help foresters and university lectures to teach how to process forest inventory data.

**Output 2.1:** computer application SIF (Sistema de Inventário Florestal – Forest Inventory System) developed and operational.

**Specific Objective 3:** To disseminate project results

**Output 3.1:** One seminar organised to present research findings at the end of the project.

**Output 3.2:** Documentation of project results published.

**Output 3.3:** Four university students trained

During the implementation phase some adjustments were introduced: a database on growth of mahogany trees was added to Specific objective (SO) 1; SO 2 was cancelled as many of the planted gaps were not properly tended and thus this would certainly interfere on the results of the evaluation; SO 2 was replaced by a computer application developed to help foresters process forest inventory data and to support university lecturers to teach that discipline in forestry courses.

The implementation strategy was based on a partnership between the University and a forest enterprise carrying out a fully licensed forest management plan in an area located within the mahogany belt. This was absolutely necessary for the objectives of the project which sought to study the behaviour of the species in a managed forest. Therefore support regarding field workers, field materials, local transport, lodging, etc, was guaranteed and provided by the enterprise.

Regarding the risks, because the project last only for two years, results are mainly partial. Field activities must occur strictly on time. For example, Annual Plans of Operations (APO) must be approved and liberated by IBAMA on proper time in order to avoid delays on the establishment of experiments and on surveys necessary to achieve projects results. Delays on establishment of these field activities would jeopardize project results and outputs.

Liberation of funds according to the schedule was also important risk related to the establishment of field activities on time but this has not occurred. Also graduate students should be free from class activities to allow them to carry out field trips and work.

The project coordinator should therefore: i) make sure that support for field activities from the partner enterprise should be provided ii) make efforts with ITTO's project supervisor in order

that funds were liberated on time; iv) guarantee that students were free from classes for field activities and that the schedule was followed.

3. Project performance (Project elements planned and implemented)

Specific objectives:

Planned	Accomplished
<b>Specific Objective 1:</b> To evaluate dynamics of <i>mahogany</i> populations in logged and unlogged forests;	All activities implemented and nearly all outputs achieved except for one paper that is still being prepared.
<b>Specific Objective 2:</b> To monitor behaviour of enrichment plantings in gaps created by logging.	This specific objective was cancelled due to lack of tending in most of the planted gaps. Results for the few ones where it was carried out would not represent the whole treatment.
<b>Specific Objective 2 (NEW):</b> To develop a computer application to help foresters and university lectures to teach how to process forest inventory data.	Activity completed and output achieved. Computer application developed and operational.
<b>Specific Objective 3:</b> To disseminate project results	All activities implemented and outputs achieved.

Outputs and related activities:

OUTPUTS	Activities Planned	VERIFIABLE INDICATORS	ACHIEVEMENTS
<b>Output 1.1</b> <b>Dynamics of juveniles in logged and unlogged forest published in a peer reviewed scientific journal</b>	<b>Activity 1.1.1:</b> <i>Reassessment of the regeneration plots established in the first phase to for demographic observations.</i> <i>Fifteen trees at reproductive age selected in the first phase will be reassessed for demographic observations</i>	<ul style="list-style-type: none"> <li>- Updated dataset on demographic observations in the regeneration plots.</li> <li>- MSc dissertation.</li> <li>- Paper submitted to a scientific journal.</li> </ul>	<ul style="list-style-type: none"> <li>✓ MSc student completed his dissertation and had his viva voice examination</li> <li>✓ Undergraduate student completed her monograph and had her viva voice examination</li> <li>✓ Paper submitted to a scientific journal</li> </ul>
<b>Output 1.2</b> <b>A database on growth and yield of mahogany forests set up from permanent sample plot data</b>	<b>Activity 1.2.1: Re-measurements of the PSPs</b> <i>Permanent sample plots both for mahogany and for the other species will be re-measured for growth and yield studies;</i> <b>Activity 1.2.2: Development of volume equations for mahogany and non-mahogany species</b> <i>Real volume of at least 50 mahogany trees and 150 trees of non-mahogany species will be determined to develop interim volume equations for mahogany and non-mahogany patches of the forest in order to calculate yield.</i>	<ul style="list-style-type: none"> <li>- Third assessment of the permanent sample plots carried out and a dataset created using specific computer application.</li> <li>- Measurement of sample trees carried out and dataset created.</li> <li>- Paper submitted to a scientific journal.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Permanent sample plots dataset created both for mahogany and for other species</li> <li>✓ Botanical specimens collected in permanent sample plots and partially identified</li> <li>✓ 65 mahogany trees measured for growth.</li> <li>✓ 246 sample trees measured for volume equations development for standing trees</li> <li>✓ 300 logs measured for development of volume equations of felled and extracted timber (logs)</li> <li>✓ Volume equations for standing timber developed</li> <li>✓ Volume equations for extracted timber developed (<b>new</b>)</li> <li>✓ Scientific paper in preparation</li> </ul>
<b>Output 1.3</b> <b>Phytosociological dynamics of a mahogany forest</b>	<b>Activity 1.3.1: Dynamic analysis of the horizontal forest structure</b> <i>Dynamic analysis of the horizontal structure of the mahogany forest will be carried out using data generated by re-measurement of the permanent sample plots.</i>	<ul style="list-style-type: none"> <li>- Permanent sample plot dataset available.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Dataset for growth and yield studies prepared</li> <li>✓ Botanical specimens for identification collected.</li> <li>✓ Dynamic analysis of the horizontal structure realized</li> <li>✓ Scientific paper in preparation</li> </ul>
<b>Output 2.1</b>	<b>Activity 2.1.1: Assessment of</b>	<ul style="list-style-type: none"> <li>- Dataset on enrichment planting</li> </ul>	<ul style="list-style-type: none"> <li>✓ Activity cancelled.</li> </ul>



OUTPUTS	Activities Planned	VERIFIABLE INDICATORS	ACHIEVEMENTS
<b><i>The initial behaviour of enrichment plantings with mahogany in gaps published in a peer reviewed scientific journal</i></b>	<i>enrichment plantings in gaps with mahogany.</i>  <i>Mahogany seedlings planted in 40 logging gaps will be measured for DBH and height. Survival and the extension of the attack by Hypsipyla grandella as well as the effects of application of the insecticide Colacid to prevent the shoot borer attack will be evaluated.</i>	updated. - Paper submitted to a scientific journal.	
<b>Output 2.1 (NEW)</b> <b>Computer application SIF (Sistema de Inventário Florestal – Forest Inventory System) developed and operational.</b>	<b>Activity 2.1</b> Computer application SIF (Sistema de Inventário Florestal – Forest Inventory System) developed.	- SIF operational and available in the University Webpage.	✓ Forest inventory system developed.
<b>Output 3.1</b> <b>One project seminar organised</b>	<b>Activity 3.1.1:</b> <i>Organization of the seminar</i> <i>One seminar will be organized as a final project activity to report project findings target to students, entrepreneurs, government officials and environmental agencies.</i>	- Seminar announcement; - Invitation letters; - Seminar folder.	✓ Seminar realized
<b>Output 3.2</b> <b>Documentation of project results published</b>	<b>Activity 3.2.1:</b> <i>Scientific papers with results of the project will be prepared and submitted to scientific journals, and to ITTO's Tropical Forest Update magazine. Information about the project development will be periodically prepared for publication in the project newsletter.</i>	✓ Field work carried out and datasets completed.	<ul style="list-style-type: none"> <li>✓ One paper submitted</li> <li>✓ One MSc dissertation completed</li> <li>✓ Two undergraduate monographs completed</li> <li>✓ Quarterly newsletters published</li> <li>✓ ITTO's Tropical Forest Update not yet prepared</li> <li>✓ Two papers in preparation</li> </ul>

OUTPUTS	<i>Activities Planned</i>	VERIFIABLE INDICATORS	ACHIEVEMENTS
<p><b>Output 3.3</b> <b>Four university students trained</b></p>	<p><b>Activity 3.3.1:</b> <i>Training of university students</i> <i>Two undergraduate and two graduate students will be trained within the project's activities. Two MSc dissertations and two undergraduate monographic publications are expected to be produced.</i></p>	<p>- Four students recruited and developing project activities.</p>	<ul style="list-style-type: none"> <li>✓ Two MSc and two undergraduate students trained on field activities</li> <li>✓ Two MSc and two undergraduate students trained on the MFT software for data analysis</li> <li>✓ One MSc student abandoned the course</li> <li>✓ One MSc dissertation completed</li> <li>✓ Two undergraduate monographs produced</li> </ul>

#### 4. Project outcome, Target Beneficiaries Involvement

Project specific objectives were almost all achieved. Unfortunately we had to cancel SO 2, as we could not evaluate the performance of mahogany planted in gaps as originally proposed for the project extension phase. Nonetheless the other two SO were fully achieved, i.e. the dynamics of mahogany populations (natural regeneration, growth and phytosociology of mahogany forest) and dissemination of project results, particularly through university monographs, MSc dissertation, quarterly reports and scientific papers. Involvement of two university undergraduate students was an incentive to continue their studies. Both of them are now attending MSc courses.

Except for a few studies, little is still known about the behaviour of managed mahogany forests following logging in the Brazilian Amazon. The situation before the project started was that no management at all has been applied to those forests. This is the second official management project approved by the Brazilian CITES administrative authority – IBAMA. This first one, located in southern Rondonia State in a small area is in regeneration phase waiting for the next cutting cycle. Results of the present project is in accordance with previous studies elsewhere which showed that mahogany regeneration will not succeed if canopy is not open enough to allow light reaches the understory. Leaving seed bearers at reproductive sizes as required by the Brazilian Environmental Agency – IBAMA, is an important preventive measure to conserve the species in its natural environment. Therefore this requirement must be kept in the mahogany forest regulations, as well as the minimum felling diameter which is 60 cm for the species. Thus IBAMA's Instruction 7 which regulates management in mahogany forests must be kept in force.

The main target beneficiaries are IBAMA and timber enterprises. The former, through its scientific authority followed the project development and it is expected that the results would help in advising IBAMA in licensing similar projects elsewhere in the Brazilian Amazon. The forest management applied by the partner enterprise serves as an example to other companies willing to work in mahogany forests in public lands (national and state forests).

Negotiations have been made with the partner enterprise Agrocortex to continue collaboration after completion of the project. A technical cooperation agreement is being discussed between UFRA and Agrocortex to extend the studies for a longer period of time with respect to monitoring natural regeneration, establishing one experiment to induce natural regeneration and establishment of mahogany seedlings as well as developing volume equations for the main commercial species occurring in the area. Species identification is also in the agenda.

#### 5. Assessments and analysis

During the project identification process it was very clear that it would only possible to set up the research proposal if a producer was involved. Therefore a mahogany producer was approached to support the initiative and its involvement was of a paramount importance to project implementation. This was because we needed a forest being managed according to the national forest management regulations regarding mahogany. It would be better to have

involved during the identification process the CITES scientific committee to Brazil because this would have given more strength to the initiative.

Regarding the identification of problems to be tackled it was very clear the need to develop a silvicultural system tailored to mahogany forests in Brazil. Research in this respect is still very incipient. So the objectives matched the research problem.

Unfortunately one of the Specific Objectives could not be attended which was precisely the Post-harvest Silviculture. In the case of the present project the goal was to evaluate enrichment planting in gaps as a way to complement natural regeneration. The reasons were already given previously in this report.

As far as timing is concerned it is very short for the objectives of the research but we understand on the other hand that donors hardly accept long term projects. Therefore agreement with stakeholder is a must if we want the research to continue. Financial resources were adequate once the partner enterprise contributed with logistic support and field crews.

Climate conditions impaired field activities to be carried out in proper time. This, coupled with the timing for students to be free from classes, caused some difficulties in implementation of field activities. The alternative was to train enterprise crews to collect data while no project crew could be in the field. This was a great contribution from the partner.

The project gave a great contribution to beneficiaries: students were trained and produced monographs and dissertation; two volume equations were provided to the partner enterprise and its collaboration with the project helped evaluation of its forest management by the certification body. The partner enterprise is now FSC certified. As previously commented IBAMA's scientific committee would have to be involved since the beginning in order to advise on project rationale.

Negotiation between UFRA and the partner enterprise Agro cortex to continue collaboration after project completion is well advanced. We expect that some activities such as monitoring natural regeneration and growth as well as implementation of an experiment to induce natural regeneration will be supported by the company.

Referring to the participation of the institutions involved on project implementation we only had some problems with the Foundation in charge of managing and implementing the project budget. We had delays in procurement of field and laboratory equipment. If a new project was to be presented to CITES – ITTO, we would review the fund manager.

## 6. Lessons learned

During project implementation the following aspects could be highlighted as lessons learned:

Problem identification was relevant but project life too short to produce more consistent results. On the other hand, involvement of a forest enterprise as partner was crucial to guarantee logistic support for the field activities.

Involvement of graduate and undergraduate students was especially important to contribute to scientific production of the university.

Involvement of CITES scientific authority in Brazil – IBAMA since the formulation of the project would have been advisable.

Project sustainability will depend on the success of negotiations with the partner enterprise to continue support for the research efforts initiated with the present project.

As for the operational aspects we can highlight:

- The excellent support by the co-ordination for Latin America of the ITTO-CITES Project;
- The management of funds by FUNPEA did not attend our expectations.

## 7. Conclusions and recommendations

**Identification:** the research problem identified is relevant. Mahogany is one the world's most valuable timbers and is threatened in all its geographical distribution. Good management practices that lead to its conservation are very important. The project tried to contribute to achieve this goal.

**Design:** more attention should be given by the time the project was designed to the difficult climate conditions in the area that had a tremendous impact on the logistics. Only 3-4 months per year were suitable for field activities. Thus, time was an important constraint. Two years of project life was too short a period to fully achieve the objectives. Design of experiments did not take this into consideration and therefore one important experiment to induce natural regeneration of mahogany could not be implemented, as it needs two years in advance of the logging activities to set it up. Therefore project life should be at least 4-5 years.

**Implementation:** considering the simplification of the project due to the constraints above, it was considered good. All field activities were carried out, except for one that had to be cancelled, which was the performance of mahogany planted in gaps. Unfortunately tending has not been made properly and therefore results would be biased. All other objectives were achieved.

**Organisation:** in this aspect the project was successful. The scientific team worked very hard to fulfill all the proposed objectives and to supervise the students in their research themes.

**Management:** from the viewpoint of technical and scientific coordination the project was very successful. Unfortunately we had problems with funds administration in respect to procurement of goods in proper time. In future projects the fund administrator should be replaced.

**Scientific achievements:** these can be summarised as follows

Mahogany seedlings were found in considerable quantities up 200m from the seed bearers.

Mahogany seedlings are capable to germinate under shade but are incapable to grow into pole size unless the canopy is open. Bamboo (*Guadua* sp.) is a serious impeder and its control must

be considered in the silvicultural prescriptions for management of mahogany forests in the western Brazilian Amazon;

Due to the high mortality of mahogany seedlings a few years after germination, it is advisable to carry out enrichment planting in gaps in order to increase density of the species in the forest and to keep production sustainable. It is strongly recommended that the partner enterprise carry out one experiment with such objective.

Keeping 20% of commercial sized as seed bearers and establishing the minimum felling diameter to 60cm as required by IBAMA's Instruction 7, are two important measures to conserve the species in managed forests in the Brazilian Amazon.

Reduced impact logging as applied in the study area had no impact in the structural parameters such as density and basal area; no important changes were also observed in the floristics of the forest as result of timber extraction.

Volumes equations for standing trees are now available for the partner enterprise and must replace the form factor model; it is strongly recommended to continue measuring sample trees to produce volume equations for the dominant species of the forest as a way to improve precision of volume estimates;

Volume equation for logs (extracted timber) is available. The partner enterprise should negotiate its use as replacement to the usual one required by IBAMA as it is more precise.

Responsible for the Report

Name: Dr Gracialda Ferreira

Position Held: Project Co-ordinator

Date: 1/11/2016

**Appendix 1 - Project financial statement (in US dollar)**

Project No.		ITTO/CITES			Period ending on:	OUT.16	
Project Title: <i>Ecology and silviculture of mahogany (Swietenia macrophylla King) in the western Brazilian Amazon.</i>							
Component		CITES - ITTO	Expenditures To-date			Available	
		Original	Gastos até a data				
		Amount (A) Quantidade Year I e II	Accrued (B) Acumulado	Expended (C) Despendido	Total (D) = { B + C }	Funds (E) { A - D } Fundos Disponíveis	
<b>10</b>	<b>Project Personnel</b>						
	11	National Exprerts	-	-	-	-	-
	12	National Consultants	-	-	-	-	-
	13	Other labour (Forest technician) [1]	0.000	0.000	0.000	0.000	0.000
	14	Fellowships and training	8,727.00	0.000	8,013.09	8,013.09	713.91
	15	International Experts	-	-	-	-	-
	16	International Consultants	-	-	-	-	-
	<b>19</b>	<b>Component Total</b>	<b>8,727.00</b>	<b>0.000</b>	<b>8,013.09</b>	<b>8,013.09</b>	<b>713.91</b>
<b>20</b>	<b>Sub-Contracts</b>						
	21	Sub-Contracts A (Computer Programmer)	18,750.00	0.000	22,048.85	22,048.85	(3,298.85)
	22	Sub-Contract B (parabotanist)	0.000	0.000	0.000	0.000	0.000
	23	Sub-Contract C	-	-	-	-	-
	<b>29.</b>	<b>Component Total</b>	<b>18,750.00</b>	<b>0.000</b>	<b>22,048.85</b>	<b>22,048.85</b>	<b>(3,298.85)</b>

<b>30.</b>	<b>Duty Travel</b>						
	31	Daily Subsistence Allowance	20,398.00	0.000	9,958.18	9,958.18	10,439.82
	32	International Travel	-	-	-	-	-
	33	Transports Costs	30,000.00	0.000	13,098.89	13,098.89	16,901.11
	<b>39</b>	<b>Component Total</b>	<b>50,398.00</b>	<b>0.000</b>	<b>23,057.07</b>	<b>23,057.07</b>	<b>27,340.93</b>
<b>40.</b>	<b>Capital Items</b>						
	41	Premises	-	-	-	-	-
	42	Land	-	-	-	-	-
	43	Vehicles	-	-	-	-	-
	44	Capital Equipmente (2 dataloggers)	0.00	0.00	0.00	0.00	0.00
	44.1	Data Show	1,030.00	0.00	0.00	0.00	1,030.00
	44.2	Camera	3,900.00	0.00	921.63	921.63	2,978.37
	44.3	Binoculars	1,000.00	0.00	160.52	160.52	839.48
	44.4	2 Gps Trimble Mod Juno 5B	3,000.00	0.00	5,447.29	5,447.29	(2,447.29)
	44.5	TerraSynic Professional Software	2,995.00	0.00	1,361.82	1,361.82	1,633.18
	44.6	Hipometer Vertex Laser 5 360º Kit	6,050.00	0.00	2,992.00	2,992.00	3,058.00
	44.7	Projection screen	245.00	0.00	105.25	105.25	139.75
	44.8	Graduated rod	1,850.00	0.00	1,071.90	1,071.90	778.10
	44.9	High Limb Chain Saw	1,100.00	0.00	169.00	169.00	931.00
	44.10	2 Callipers	1,297.00	0.00	167.90	167.90	1,129.10
	44.11	Diameter tape 7.5 m 4 units plus 4 refils	820.00	0.00	379.6	379.60	440.40



	44.12	Pruning equipment	0.00	0.00	800.00	800.00	(800.00)
	44.13	Laboratory oven	3,700.00	0.00	2,361.60	2,361.60	1,338.40
	44.14	Software statist (SPSS, MiniTab)	0.00	0.00	3,342.10	3,342.10	(3,342.10)
	44.15	Metric Clinometer	0.00	0.00	290.50	290.50	(290.50)
	44.16	Suunto + case	0.00	0.00	261.70	261.70	(261.70)
	<b>49</b>	<b>Component Total</b>	<b>26,987.00</b>	<b>0.00</b>	<b>19,832.81</b>	<b>19,832.81</b>	<b>7,154.19</b>
<b>50</b>	<b>Consumable Items</b>						
	51	Raw materials	-	-	-	-	-
	52	Spares	-	-	-	-	-
	53	Fuel and Utilities	-	-	-	-	-
	54	Office Supplies	6.000	0.00	1,568.95	1,568.95	4,431.05
	<b>59</b>	<b>Component Total</b>	<b>6.000</b>	<b>0.00</b>	<b>1,568.95</b>	<b>1,568.95</b>	<b>4,431.05</b>
<b>60</b>	<b>Miscellaneous</b>						
	61	Sundry	5.000	0.00	1,444.12	1,444.12	3,555.88
	62	Auditing	-	-	-	-	-
	63	Contingencies	-	-	-	-	-
	<b>69</b>	<b>Component Total</b>	<b>5.000</b>	<b>0.00</b>	<b>1,444.12</b>	<b>1,444.12</b>	<b>3,555.88</b>
<b>70</b>	<b>Executing Agency Management Costs</b>		5,249.50	0.00	5,249.50	5,249.50	0.00
	<b>79</b>	<b>Component Total</b>	<b>5,249.50</b>	<b>0.00</b>	<b>5,249.50</b>	<b>5,249.50</b>	<b>0.00</b>
<b>100</b>	<b>GRAND TOTAL</b>		<b>122,111.50</b>	<b>0.00</b>	<b>81,214.39</b>	<b>81,214.39</b>	<b>40,897.11</b>

Appendix 2 Project cash flow statement

Project No.		ITTO/CITES		Period ending on:		OUTUBRO.16	
Project Title: Ecology and silviculture of mahogany ( <i>Swietenia macrophylla</i> King) in the western Brazilian Amazon.							
Component		CITES - ITTO					
		Original		Expenditures To-date			
		Reference		Date		Gastos até a data	
				Amount in U\$\$		Local Currency	
<b>A.</b>	<b>Funds received from ITTO:</b>						
1.	First installment	49,990.00	Apr 2014			R\$	110,532.89
2.	Second installment	30,000.00	Oct 2015			R\$	117,870.00
3.	Third installment	25,000.00	Sep 2016			R\$	82,925.00
4.	Fourth installment						
	<b>Total funds received:</b>			104,990.00		R\$	311,327.89
<b>B.</b>	<b>Financial Yield</b>	86.12				R\$	221.58
<b>C.</b>	<b>Expenditures by executing agency:</b>						
10	<b>Project Personnel</b>						
11	National Exprepts				0.00	R\$	-
12	National Consultants				0.00	R\$	-
13	Other labour (Forest technician) [1]				0.00	R\$	-
14	<b>Fellowships and training</b>				<b>8,013.09</b>	<b>R\$</b>	<b>20,357.74</b>
14.1	<i>Lais Vieira Carvalho</i>				4,302.55	R\$	11,736.75
14.2	<i>Samila de Nazaré Gonçalves</i>				3,710.54	R\$	8,620.99

	15	International Experts			0.00	R\$ -
	16	International Consultants			0.00	R\$ -
	<b>19</b>	<b>Component Total</b>			<b>8,013.09</b>	<b>R\$ 20,357.74</b>
<b>20</b>	<b>Sub-Contracts</b>					
	21	Sub-Contracts A (Computer Programmer)			22,048.85	R\$ 48,750.00
	22	Sub-Contract B (parabotanist)			-	-
	23	Sub-Contract C			-	-
	<b>29.</b>	<b>Component Total</b>			<b>22,048.85</b>	<b>R\$ 48,750.00</b>
<b>30.</b>	<b>Duty Travel</b>					
	31	<i>Daily Subsistence Allowance</i>			<b>9,958.18</b>	<b>R\$ 21,170.00</b>
	31.1	<i>National Experts</i>			1,908.64	R\$ 4,220.00
	31.2	<i>Others(Students)</i>			8,049.54	R\$ 16,950.00
	32	International Travel			0.000	R\$ -
	33	<i>Transports Costs</i>			<b>13,098.89</b>	<b>R\$ 31,942.61</b>
	33.1	<i>National Experts</i>			3,191.31	R\$ 7,055.98
	33.2	<i>Others(Students)</i>			9,907.58	R\$ 24,886.63
	<b>39</b>	<b>Component Total</b>			<b>23,057.07</b>	<b>R\$ 53,112.61</b>
<b>40.</b>	<b>98</b>					
	41	Data Show			-	-
	42	camera			921.63	R\$ 3,629.38
	43	Binoculars			160.52	R\$ 530.44
	44	Laboratory oven			2,361.60	R\$

					9,300.00
44.1	GPS Timble Mod Jun 5B			5,447.29	R\$ 18,000.00
44.2	TerraSync Professional Software			1,361.82	R\$ 4,500.00
44.3	Hipsometer Vertex Laser 5 360º Kit			2,992.00	R\$ 9,885.56
44.4	Tela de Projeção			105.25	R\$ 347.82
44.5	Haste Graduada			1,071.90	R\$ 3,541.55
44.6	High Limb Chain Saw			169.00	R\$ 558.37
44.7	2 Callipers			167.90	R\$ 277.37
44.8	Diameter Tape 7,5 m 4unitd plus 4 Reflis			379.60	R\$ 1,254.19
44.9	Pruning equipment			800.00	R\$ 2,643.51
44.10	Statist Software (SPSS, MiniTab)			3,342.10	R\$ 11,043.64
44.11	Metric Clinometer			290.50	R\$ 959.81
44.12	Suunto + case			261.70	R\$ 864.65
<b>49</b>	<b>Component Total</b>			<b>19,832.81</b>	<b>R\$ 67,336.29</b>
<b>50</b>	<b>3</b>				
	51	Raw materials		-	-
	52	Spares		-	-
	53	Fuel and Utilities		-	-
	54	Office Supplies		1,568.95	R\$ 5,696.80
	<b>59</b>	<b>Component Total</b>		<b>1,568.95</b>	<b>R\$ 5,696.80</b>

<b>60</b>						
	61	Sundry			1,444.12	R\$ 4,571.66
	62	Auditing				
	63	Contingencies				
	<b>69</b>	<b>Component Total</b>			<b>1,444.12</b>	<b>R\$ 4,571.66</b>
<b>70</b>	<b>Executing Agency Management Costs</b>				5,249.50	R\$ 13,455.66
	<b>79</b>	<b>Component Total</b>			<b>5,249.50</b>	<b>R\$ 13,455.66</b>
	<b>Total expenditures to-date:</b>				<b>81,214.39</b>	<b>R\$ 213,280.76</b>
<b>D.</b>	<b>Remaining balance of funds (A+B-C):</b>				<b>23,775.61</b>	<b>R\$ 98,268.71</b>