COMPLETION REPORT

THE DEVELOPMENT OF *GONYSTYLUS* SPP. (RAMIN) TIMBER MONITORING SYSTEM USING RADIO FREQUENCY IDENTIFICATION (RFID) IN PENINSULAR MALAYSIA

ITTO-CITES PROJECT
MALAYSIA'S WORK PROGRAMME FOR 2008

Ensuring International Trade in CITES-listed timber Species is Consistent with their Sustainable Management and Conservation

IMPLEMENTING AGENCY

Forestry Department Peninsular Malaysia,
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PROJECT IDENTIFICATION

Title	The Development of *Gonystylus* spp. (Ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia.
Executing Agency	Ministry of Natural Resources and Environment Malaysia
Implementing Agency	Forestry Department Peninsular Malaysia
Host Government	Government of Malaysia
Starting Date	November 2008
Actual Duration	8 months (Extended to 24 months)

Actual Activity Costs

ITTO	=	103,200.00
GOM (In kind)	=	70,910.00
TOTAL	=	174,110.00

Table Of Contents

EXECUTIVE SUMMARY

1.0 *Activity Context, Origin and Problem to be Addressed*

Ramin (*Gonystylus* spp.) is one of the most important peat swamp forest tree species that are currently being utilized in Malaysia. There are wide spread concern about the rate of these species are being harvested due to increasing demand for timber from industries both local and international. As a highly sought after species, there are also concerns that Ramin trees are under considerable threats from illegal logging and tax evasion that caused government loss of lucrative forest revenues. Tree marking is one of the measures carried out by Forestry Department Peninsular Malaysia to address those problems. It also serves as to regulate the harvestable number and volume of trees area as well as to monitor incompliance of forest operation such as the felling of mother trees, buffer zone and protection trees from logging license areas. The Activity will embark on the use of Radio Frequency Identification (RFID) technology instead of the manual timber tagging activities in the harvesting of peat swamp forest area particularly ramin species with the aims of development of a customised cost-effective *Gonystylus* spp. (ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia and development of automated detection and notification mechanism for tracing non-compliances using handheld computers with RFID scanner system in Peninsular Malaysia. This Activity is very essential to promote sustainable utilization towards the conservation of ramin in production forests of Malaysia.

2.0 *Activity Objectives*

Overall objective

The objectives of the Activity will contribute significantly in ensuring the detection of non-compliance timber harvesting procedures to achieve the sustainability of *Gonystylus* spp. (ramin) timber species that consistent with the sustainable forest management implemented by the country.

Specific objective

The specific objectives of the Activity are the development of a customised cost-effective *Gonystylus* spp. (ramin) Timber Monitoring (RTRfid) System using Radio Frequency Identification (RFID) and the development of automated detection and notification mechanism for tracing non-compliances using handheld computers with RFID scanner system in Peninsular Malaysia.

3.0 *Most Critical Differences between Planned and Realized Activity Implementation*

Activity personnel:

There were no major changes in personnel in implementing this Activity.

Time schedule:

The Department had faced considerable difficulty in the appointment of the logging licensee due to the drop of current timber prices and economic recession. Furthermore, unexpected earlier monsoon and flood contribute to the delays in activities planned

Budget amendment:

No budget amendment for this activity.

4.0 Lessons Learned

i. It is important that the activity teams are properly trained with the RFID RTMS in order to ensure accurate data collection, effective activity management and reduce the amount of errors.

ii. A well and in-depth study of the most appropriate RFID (tag) form is crucial in the RFID tree marking and tracking processes in the peat swamp forest.

iii. It is crucial to comprehensively study the user requirement and processes in order to make sure the system application is within the process and cater the all the required challenges.

5.0 Recommendations

i. A larger scale activity to further develop the application such as writing data from handheld onto the RFID chips at certain control points, as well as field printing of removal pass either via a thermal printer or a PC connected printer at the checkpoint.

ii. Extend the Activity scope of coverage by including the transformation processes i.e. sawmill, ply mill to further extend the traceability along the chain of custody.

iii. Analyzing the integration of RFID monitoring with FDPM current computer system as well as state revenue collection system to provide a wider range of monitoring.

iv. RFID tag management that include the issue of unique identifiers in a controlled and auditable manner to the activity participants and for both assets (e.g. trees and logs) and documents (e.g. waybills (invoice), receipts, reports) in the form of encoded barcodes that can be validated in the field.

v. It is recommended that similar system/activity could be replicated and extended the full coverage of Ramin habitats in Malaysia.

1.0 ACTIVITY IDENTIFICATION

1.1 Context

Social, economic and environment

Ramin (Gonystylus spp.) is a tropical hardwood native to the fragile peat swamp forest and one of the most valuable timber species that are currently being utilized in Malaysia. It is widely used for furniture, picture frames and indoor crafting.

Ramin has become increasingly scarce and there are wide spread of concern about the rate of these species are being harvested due to the increasing demand for timber from the markets. As a highly sought after species, there are major concerns also Ramin trees are under threat from illegal logging and tax evasion that has caused government of Malaysia loss of lucrative forest revenues.

The over harvest of Ramin's habitat has had devastating effect on the ecosystems and biodiversity in the forest as well.

Activity location

The activities were carried out in Compartment 74 A, Pekan Forest Reserve, Pahang. The main activities carried out are demarcation of boundary, pre-felling inventory, tree tagging and felling.

Relevant national and regional policies and programs

In 2004, the Parties to CITES had agreed unanimously to up-list Ramin to Appendix II as a result of the continued threats to the species. It means more requirements have to be complied for harvesting and trade. To further protect Ramin, Malaysia has successfully introduced the use of rubber wood as substitute for the endangered species in the furniture industries, and hence reduce the over reliance on Ramin. For many years, timber tagging system has been the measure carried out by Forestry Department Peninsular Malaysia (FDPM) to address the harvesting activities in forests. Tree tagging is a process that allows the determination of timber origin. It also serves as to regulate the harvestable number and volume of trees area as well as to monitor incompliance of harvest operation. Compliance with regulations means legal harvesting and that is major need towards sustainable forest management.

1.2 Origin and the main problem to be addressed

Illegal logging issues have tarnished Malaysia's name and also effect in some of global markets that only adopt of legally source and sustainable forest management timbers. It also costs the government millions of forest revenues through incompliance of forest regulations such as over harvesting, harvesting of unspecified trees species, illegal transport of timber, forest tax evasion as well as the high cost to rehabilitate the degraded forest. In additions, there are also global concerns about the rate of these ramin species are being exploited that as a result of increasing demand for timber from industries both local and international. One of the solutions identified to mitigate the problems is to capture log movement, production and sales by implementing the recent Radio Frequency Identification (RFID) technology that being used effectively, among others in airport baggage handling, electronic payment, retail theft prevention, library systems, automotive manufacturing, parking as well as postal services. The main features to RF-based technology that make it such an attractive option include identification without visual contact, read-write capabilities to store and change data, and its ability for cluster reading in order to simultaneously read many tags. Radio Frequency Identification (FRID) is an acronym that refers to small electronic devices that consist of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less. The RFID device serves the same purpose as a bar code or a magnetic strip on the back of a credit card or ATM card and it also provides a unique identifier for that object. Akin to bar code or magnetic strip which must be scanned to get the information, the RFID device must also be scanned to retrieve the identifying information. The advantages of RFID compared to other scanning devices are RFID requires no line of sight requirement, able to read longer range, can stand harsh environment, more storage capability and real-time tracking capability. These features are the principal characteristics, which enter the strategic decision by Forestry Department Peninsular Malaysia (FDPM) to implement RFID-based technology and its basic applications.

2.0 ACTIVITY OBJECTIVES AND IMPLEMENTATION STRATEGY

The objectives of the Activity will contribute significantly in ensuring the detection of non-compliance timber harvesting procedures to achieve the sustainability of *Gonystylus* spp. (Ramin) timber species that consistent with the sustainable forest management implemented by the country.

Rationale

Timber tagging system using plastic tag has been operating in Peninsular Malaysia for many years now with considerable merit. However, large components of the system are manual and paper based. Monitoring and checking can be cumbersome and this can impact on the overall utility of the system. Likewise validation and verification cannot be undertaken effectively on a remote basis and on a volume basis.

Even though barcode have been widely used for more than 30 years; however the technology had its own limitation such as easily damage, reader operations can be affected by moisture and required clear line of sight. Barcode also does not possess the ability to read/write as well as information cannot be added or written on a printed barcode. As a result, the timber tagging system will apply the technology of RFID and the tag will be replaced with RFID tag. Advanced technology including handheld computer, the internet, Wi-Fi broadband data transfer and RFID tag make it possible that the process of timber tracking can be much more streamlined and easy to manage and monitor.

2.1 Specific objectives

The specific objectives of the Activity are as follows:

i. To development of a customised cost-effective *Gonystylus* spp. (ramin) Timber Monitoring (RTRfid) System using Radio Frequency Identification (RFID) in Peninsular Malaysia.

ii. To development of automated detection and notification mechanism for tracing non-compliances using gentry (gate) system in Peninsular Malaysia.

Adjustments made in the implementation phase

Within the scope and the budget of this Ramin activity, the **Objective 2 - Development of an Automated Detection and Notification Mechanism for Tracing Non-compliance Using Gentry (gate) System in Peninsular Malaysia** is revised. Instead of using gentry (gate), FDPM's felt that using the handheld computers with RFID scanner is more suitable.

The benefit of using handheld in the forest checkpoint is cost effective, accuracy (scanning all logs on a lorry with a gentry is never 100%) and the opportunity a handheld gives to include additional load specific data to strengthen the Chain of Custody (CoC). Whereas, the issue probably is the additional time it takes to scan a load. As mentioned, the CoC actually requires additional load specific data to be captured.

2.2 Implementation strategy

i. FDPM recommends deploying the commercial (one off-the-shelf) RFID software solutions it knows of in the marketplace that can address the mentioned challenges without any major development as the platform for RFID Ramin Monitoring System.

ii. During the pilot period, FDPM will provide advice on the system configuration to ensure that it meets state requirements. The Activity deploying RFID Ramin Monitoring System will be managed by FDPM with technical assistance being provided by the Solution Provider, and with the full cooperation of a nominated concessionaire.

iii. The RFID Ramin Monitoring System will be deployed by the nominated concessionaire during tree inventory operations, felling, scaling and log transportation from log yards to forestry checking station. FDPM enforcement officer will use the handheld verification system for monitoring and checking removal pass and royalty invoicing.

iv. Identify qualified and experience party as activity director (director) and to form a Technical Activity Team comprises representatives from FDPM and the Solution Provider to oversee the Activity initiation, specification study, schedule management and processing, as well as user role and responsibilities confirmation.

iv. Identify qualified and experience party as activity director (director) and to form a Technical Activity Team comprises representatives from FDPM and the Solution Provider to oversee the Activity initiation, specification study, schedule management and processing, as well as user role and responsibilities confirmation.

v. Ensure participation of all stakeholders during Activity implementation including from FDPM, Pahang Forestry Department, Pekan District Forest Office and concessionaire for system demo, testing and capacity training in the field. Focus will be particularly given to building strong relationships with stakeholders at all level in the different organizations, communicating the value proposition to all involved and obtaining commitments at all levels in the organizations involved.

vi. Periodic Activity review meetings will be chaired by the activity director or representative, the technical activity team will provide progress reports and ensure milestones are being met according schedule and budget.

vii. Sustain the ongoing engagement of stakeholders and enhance the knowledge of using the RFID monitoring system through;

a. the development of system user guides for data collection and synchronization and RFID tag reading.

b. organizing training workshop to improve capacity on using handheld computer and RFID tag.

2.3 Assumptions and risks

It is assumed that the system and activity implementation will receive full participation and commitment from all stakeholders. It is also assumed that this RFID technology and tag will be continuously tested as a potential replacement to the existing timber tagging system. There will be challenges to the foresters as the usage of this system is still in its infancy in forestry sector. There will also challenge to the foresters to quickly adapt and operate the system that involve not only information but also communication technology. There is also a risk of the system is not compatible to be used to other computer system that will be developed by other consultants as an integral part or enhancement of the system later on.

3.0 ACTIVITY PERFORMANCE (Activity elements planned and implemented)

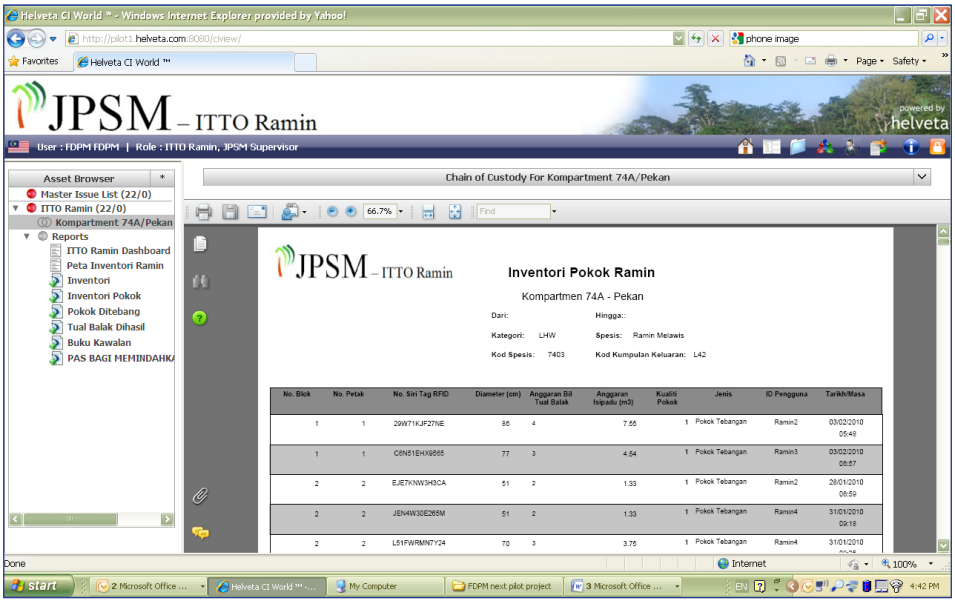
3.1 Performance of each activity

Outputs and Operational Activities		Schedule (Duration)	Applied Inputs
1.1	**To strengthen and improve the efficiency of tree marking operations and forest revenue system, as well as to expedite the issuance of removal passes during the transport of timber from logging areas to mills using a customized cost-effective RFID based timber monitoring system.**		
1.1.1	Documentation and procedures to appoint FDPM's system consultant.	Nov 2008 – Jan 2009	Appointment of Leadcom (M) Sdn. Bhd.
1.1.2	Acquisition of computer peripherals, including servers, computers, printer and other related hardware.	Dec 2008 – Feb 2009	A total 10 personal computers and 10 laptops.
1.1.3	RTRfid system peripherals rental, including satellite (VSAT) communication system and broadband.	Feb 2009	System developed by Leadcom (M) Sdn. Bhd.
1.1.4	Issuance of logging license.	Jul 2009 – Jul 2010	Appointment of ASPA as licensee
1.1.5	Inventory work and electronic tree marking in the field.	Oct 2009 – April 2010	Started in the late October and completed in early February 2010
1.1.6	Forest harvesting activities.	Jul 2010 – Oct 2010	Started in the late July 2010.
2.1	**To improve the efficiency of forest enforcement activities and non-compliance detection using cost effective computerized handheld data logger with RFID scanner.**		
2.1.1	RFID chip/tag acquisition	Jul 2009 – Dec 2009	Completed on schedule.
2.1.2	Computerized handheld data logger with RFID scanner	Jul 2009 – Dec 2009	System developed by Leadcom (M) Sdn. Bhd.
2.1.3	Forest monitoring and enforcement.	Nov 2008 – Oct 2010	Started since tree tagging activities.
2.1.4	Report and documentation.	Nov 2008 – Oct 2010	A total of 3 reports produced.

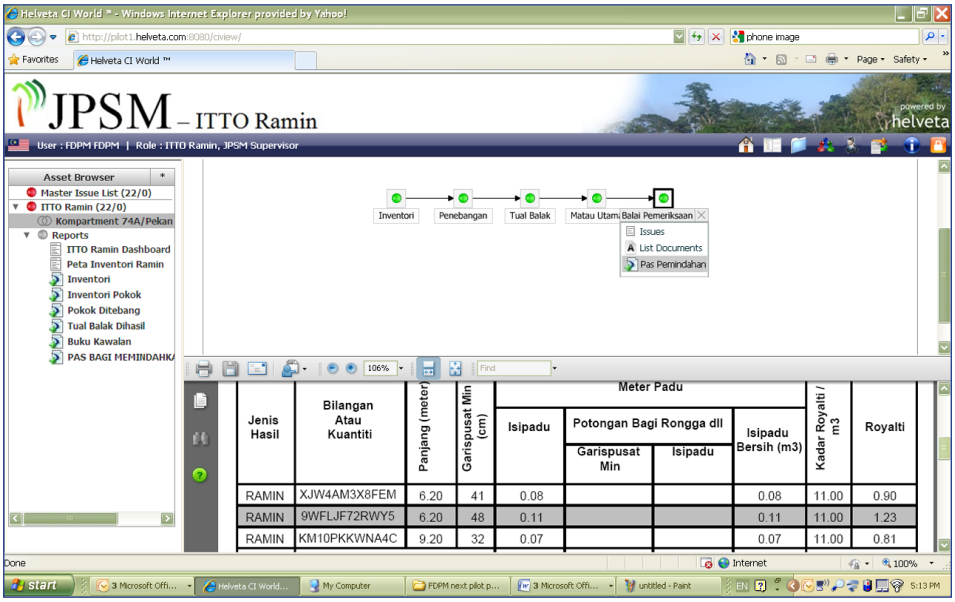
3.2 Outputs achieved

Output 1.1 To strengthen and improve the efficiency of tree marking operations and forest revenue system, as well as to expedite the issuance of removal passes during the transport of timber from logging areas to mills using a customized cost-effective RFID based timber monitoring system.

The RFID Ramin Monitoring System and its handheld data capturing application have proved its capability in transmitting and output data in real time/near real time, enabling the maximum visibility and detection of non-compliance timber harvesting procedures for all the Activity stakeholders. The System has provided a fully documented Ramin inventory and documented evidence of timber moving from the peat swamp forest through the defined control points. The RFID Ramin Monitoring System and RFID handheld application were made available and online to the operational use in October 2009.



RFID Ramin Monitoring System – Tree Marking (Inventory) Report

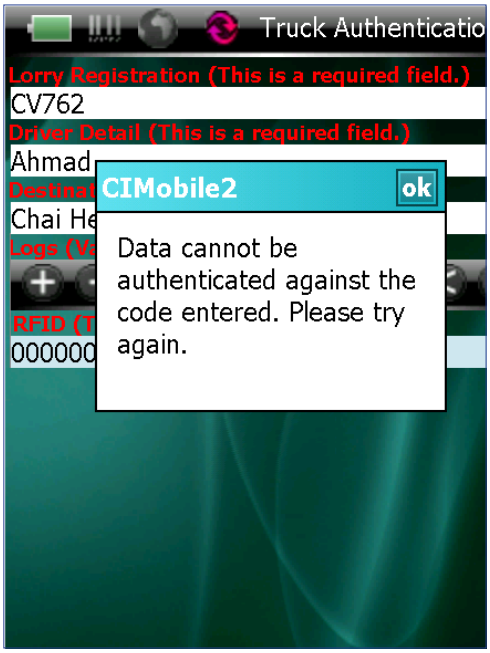


RFID Ramin Monitoring System – Removal Pass Report

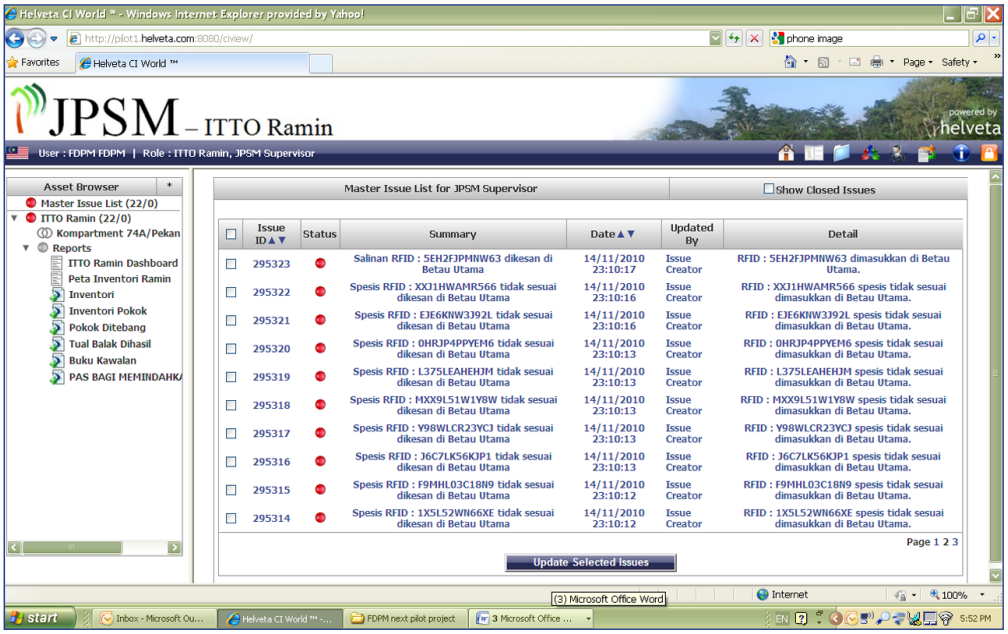
Output 1.2. To improve the efficiency of forest enforcement activities and non-compliance detection using customized cost-effective handheld data logger and/or gentry (gate).

The RFID Ramin Monitoring System has developed a secure key feature for the security of the removal pass and truck inspection. It is a unique authentication code associated to the removal pass and RFID numbers that can be verified at any point along the transports route. The authentication code is generated from the RFID handheld application and written on the removal pass. It enable the enforcement officers inspecting the removal pass by entering the authentication code carried with the removal pass into a different handheld to verify the loads legitimacy. If all data match each other the detection system in the handheld immediately pass the load as legitimate. Otherwise, reject as suspect if wrong code is entered or different RFID number is detected. This functionality is available in “off-line” mode and has significantly improved removal pass security and that preventing the counterfeiting of removal pass and tag.

Authentication Code Verification (1)



Authentication Code Verification (2)



RFID Ramin Monitoring System – Detection of Non-Compliance Issues

The technical report and manual produced by Activity are:

i. Technical Report - Ramin Timber Monitoring System Using Radio Frequency Identification (RFID);

ii. Completion Report - The Development of *Gonystylus* spp. (Ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia; and

iii. User Manual For Handheld Application.

3.3 Total Amount of Expenditures and Analysis

From the ITTO contribution of US$103,200.00, at total of US$102,000.00 was spent while leaving a balance of US$1,200.00 as reflected in the 'Activity Cash Flow Statement - ITTO contribution' and the 'Activity Financial Statement - ITTO contribution' in **Annex 1**. In this regard from the in-kind contribution of US$70,910.00 from Malaysia, a total of US$79,100.00 was spent as shown in the 'Activity Cash Flow Statement – Government of Malaysia (GoM) contribution' and the 'Activity Financial Statement - GoM contribution' in **Annex 2.**

4. ACTIVITY OUTCOME, TARGET BENEFICIARIES INVOLVEMENT

4.1 Achievement of specific objectives

The effectiveness of the RFID Ramin Monitoring System has delivered the following:

i. Automated checking of Ramin timber for legality compliance by software algorithms that are configured to reflect Malaysia Criteria and Indicator (MC&I), chain of custody scheme and revenue collection.
ii. A RFID monitoring system that allows digitized paper documentation to be stored in repository for review and validation by all stakeholders involved in the Activity.
iii. A RFID monitoring system that is sufficient scalable and robust to handle the volume of RFID tree marking and related legality assurance data for FDPM.
iv. A RFID monitoring system that accessible by a range of stakeholders that can be automated to verification of the underlying chain of custody data alongside offline enforcement functionalities.

4.2. Situation at Activity Completion as compare to the pre-activity situation

The Activity has successfully provided an online environment accessible by the stakeholders that can automate the verification of underlying chain of custody data alongside legality documents. Through the implementation of the Activity, the issues and weakness on the existing tree marking system (paper based) has been identified for further improvement and rectification. Nevertheless the implementation of the Activity could be better executed and benchmarked, especially the beneficiaries are willing to participate actively during the preparation and development of system, field testing and involved other organizations within the supply chain that required for monitoring purposes.

4.3 Participation of the target beneficiaries

The key beneficiaries of the Activity are the Forest Department Peninsular Malaysia and the state forestry departments. The Activity has provided the capability in facilitating traceability and verification of legal origin. The RFID dataset captured along the supply chain has integrated their current control of tree marking & inventory exercise to overall forest control and monitoring and allow FDPM maintains its leadership in forest management.

4.4 Expectation of Activity sustainability after Activity completion

The long term utilization of the RFID monitoring system will depend substantially on the capacity building, sustained and ongoing engagement of the various stakeholders in the process. In addition to evaluate the cost/benefit relationship as well as feasibility of using RFID tags to manage the Chain of Custody of wood from the inventory of standing trees to a state government checkpoint located outside the concession and identify the key properties and specifications required in order to enable wide adoption at the national level.

5. ASSESSMENT AND ANALYSIS

i. The system, as configured and customized, focused on the more complex aspects related to chain of custody management. The RFID system platform nonetheless demonstrated its ability to be easily configured to match and improve on existing paper-based processes, of facilitating the capture of information at key control points, therefore enhancing management capabilities from harvesting to transformation and revenue collection. The system efficiently replicated the processes of issuing Control Book and Removal Pass, thus ensuring effective monitoring and enforcement of compliance. Under the RFID monitoring system approach, the idea is to provide a strict control of the whole wood supply chain, therefore “fencing out” wood of illegal sources. If the system is extended by integrating all sectors of the wood industry and monitoring the associated wood flows, the RFID Ramin Timber Monitoring system can assists in addressing illegal logging by eliminating entry points for unlawful wood into the legitimate supply chain.

ii. The various configurable modules built-into the RFID monitoring system platform, allow replicate and extend to any current processes and procedures used in managing, monitoring and enforcing the MC&I, chain of custody scheme. The system can provide tool to better share real-time information and documents between the district, state and central offices, as well as facilitate field inspections. Finally the system can also significantly impact the process of collecting fees, royalties, and levies by automating calculations, invoicing and payments.

iii. A well and in-depth study of the most appropriate RFID form is crucial in the RFID tree marking and tracking processes. While the price of a RFID tag is a concern however it is estimated that pricing will quickly erode as the tag gets deployed in commercial applications and production volume increase.

iv. It is important that the sense of ownership and responsibilities of this RFID Ramin Timber Monitoring system is acquired by all stakeholders involved. The management of the data collection and monitoring is placed under the FDPM but it is equally vital for the State Forestry and District Forest Offices share the responsibility to ensure the right skill and knowledge are equipped at the state and district level, as well as with the forest concession operators. These are the group of people is going to perform tree marking using RFID tag and using handheld to read and capture data in the field. Thus comprehensive training workshops and adequate user guides and manual have to be provided in order strengthen the beneficiaries' capacity to implement and use the RFID monitoring system for wood legality assurance.

6. LESSONS LEARNED

i. It is important that the Activity teams are properly training with the RFID RTMS in order to ensure an accurate data collection, effective activity management and reduce the amount of errors.

ii. A well and in-depth study of the most appropriate RFID (tag) form is crucial in the RFID tree marking and tracking processes in the peat swamp forest.

iii. It is crucial to comprehensively study the user requirement and processes in order to make sure the system application is within the process and cater the all the required challenges.

Definition of the roles and responsibilities of the institutions involved in the Activity implementation

The main stakeholders of the activity and their respective roles are summarily described below.

Forestry Department Peninsular Malaysia (FDPM)

As the initiator of the Activity, the FDPM was the main driver of the whole Activity. Its collaboration was instrumental in leading and assisting with activities coordinated with the Pahang State Forestry Department, sub-contractor as well as in providing direct support and advice with regard to the specifications of the activities of the Activity.

It also actively contributing by providing manpower to perform various activities in the field that were required in the Activity and collaborating with the IT processes of testing and running the system from tree inventory, main log yard to the checkpoint.

As such, FDPM proved a perfect partner for the implementation of a Ramin Timber RFID Monitoring System aiming at improving forest operations, Chain of Custody (CoC) management and overall access to information. FDPM's active participation in defining the configuration of the system platform, facilitating a progressive deployment of the Activity as well as in providing logistical and lodging support was the central most important success factor to the Activity, and that in all aspects, its contribution exceeded all expectations.

Pahang State Forestry Department (PSFD)

PSFD was the collaboration partner from a state level where the Activity concession site was located. It also actively contributed to the Activity by nominating Amanah Saham Pahang Bhd (ASPA) as concession holder to participate in the Activity, as well as assisting with the survey process undertaken to better define the specifications of the system with regards to the applicable Legal Standard.

Amanah Saham Pahang Berhad (ASPA) and Mohd Subky bin Ahmad

As the concession holder for logging licence KT 018/2010 (KP), Amanah Saham Pahang Bhd appointed Mohd Subky Bin Ahmad as a sub-contractor to perform the logging and transportation activities within the compartment.

The main activities of the sub-contractor typically involve access road clearing and maintenance, bridge building, forest landing management, felling and cross-cutting of the trees, transportation of the logs to a forest landing and onwards to a main log-yard and finally, delivery of the logs to processing mills. As such, securing the cooperation of sub-contractor was also pivotal in insuring the smooth implementation of the Activity.

Activity documentation

All documents of the Activity are kept at the Activity secretariat and NRE for records.

Monitoring and evaluation

i. In order to be efficient, a RFID monitoring system must achieve wide acceptance within the forestry sector. Unless all stakeholders in the forest supply chain agree to participate and actively use the system, its impact will remain limited. The best incentive for the stakeholders / industry to adopt a RFID Timber Monitoring System is to provide a flexible tool that can be adapted to corporate processes and therefore provide intrinsic benefits in terms of output optimization, Business to Business (B2B) processes facilitation, and management control.

ii. It is important that the sense of ownership and responsibilities of this RFID Ramin Timber Monitoring system is acquired by all stakeholders involved. The management of the data collection and monitoring is placed under the FDPM but it is equally vital for the State Forestry and District Forest Offices share the responsibility to ensure the right skill and knowledge are equipped at the state and district level, as well as with the forest concession operators. These are the groups of people who are going to perform tree marking using RFID tag and using handheld to read and capture data in the field. Thus comprehensive training workshops and adequate user guides and manual have to be provided in order to strengthen the beneficiaries' capacity to implement and use the RFID monitoring system for wood legality assurance.

iii. Throughout the Activity implementation periods, there are four progress monitoring meetings undertaken and coordinated by NRE. At the same time during the mid-term review, there is also monitoring and evaluation by the Regional Project Coordinator (Asia) – Mr. Thang Hooi Chiew and independent representative Mr. Jorge Mallueux in November 2009.

External factors that influenced the Activity implementation and that could have been foreseen and that could not have been foreseen

The external factors influenced the Activity implementation are the participation and commitment of the relevant stakeholders, the physical condition on the site and the proper execution of activity/ system by the concessionaire in the field.

7. CONCLUSIONS AND RECOMMENDATIONS

i. A larger scale activity to further develop the application such as writing data from handheld onto the RFID chips at certain control points, as well as field printing of removal pass either via a thermal printer or a PC connected printer at the checkpoint.

ii. Extend the Activity scope of coverage by including the transformation processes i.e. sawmill, ply mill to further extend the traceability along the chain of custody.

iii. Analyzing the integration of RFID monitoring with FDPM current computer system as well as state revenue collection system to provide a wider range of monitoring,

iv. RFID tag management that include the issue of unique identifiers in a controlled and auditable manner to the activity participants and for both assets (e.g. trees and logs) and documents (e.g. waybills (invoice), receipts, reports) in the form of encoded barcodes that can be validated in the field.

v. It is recommended that similar system/activity could be replicated and extended the full coverage of Ramin habitat in Malaysia.

Annex 1

ACTIVITY CASH FLOW STATEMENT (in US Dollar)
ITTO CONTRIBUTION

Programme Title: ITTO-CITES 2008

Activity No. : 4 Period covered (ending on): October 2010

Activity Title : The Development of Gonystylus spp. (Ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia.

Component	Reference	Date	Amount	
			in US$	Local Currency
A. Funds received from ITTO:				
1. First instalment			$93,097.00	325,841.00
2. Second Instalment			$10,103.00	39,831.99
3. Third instalment				
4. Fourth instalment				
5. Interest on bank deposits				
Total Funds Received:			$103,200.00	365,672.99
B. Expenditures (by Executing Agency):				
10. Personnel				
11. Coordinator				
12. Other Personnel				
12.1 Assistant 1				
12.2 Assistant 2				
12.3 Other labour				
13. National Experts				
13.1 Expert 1				
13.2 Expert 2				
13.3 Expert 3				
14. International Consultant(s)				
14.1 Consultant 1				
14.2 Consultant 2				
15 Personnel Total:			$0.00	0.00
16. Workshop/Seminar and Training				
(specify beneficiaries)				
16.1 Travel/Transportation Costs (participants)				
16.2 Daily Subsistence Allowances (participants)				
16.3 Venue and Logistics				
16.4 Workshop Materials				
16.5 Others				
17. Workshop/Seminar and Training Total:			$0.00	0.00

ACTIVITY CASH FLOW STATEMENT (in US Dollar) Continued				
Component	Reference	Date	Amount	
			in US$	Local Currency
20. Sub-contracts				
21. Sub-contract (Leadcom Sdn Bhd)			$102,000.00	361,080.00
22. Sub-contract				
29. Sub-contracts Total:				
30. Travel				
31. Daily Subsistence Allowance				
31.1 National Expert(s)				
31.2 International Consultant(s)				
31.3 Others				
32. International Travel				
32.1 National Expert(s)				
32.2 International Consultant(s)				
32.3 Others				
33. Local Transport Costs				
33.1 National Expert(s)				
33.2 International Consultant(s)				
33.3 Others				
39. Travel Total:			$0.00	0.00
40. Capital Items				
41. Premises				
42 Vehicle(s)				
43 Capital Equipment				
43.1 Computer Equipment (specify)				
43.2 Others (specify)				
49. Capital Items Total:			$0.00	0.00
50. Consumable Items				
51. Raw materials				
52. Spares				
53. Utilities				
54. Office Supplies				
59. Consumable Items Total:			$0.00	0.00

ACTIVITY CASH FLOW STATEMENT (in US Dollar) Continued				
Component	Reference	Date	Amount	
			in US$	Local Currency
60. Miscellaneous				
61. Sundry				
62. Contingencies				
69. Miscellaneous Total:			$0.00	0.00
70. Others (specify)				
71. Others (specify)				
79. Others Total:			$0.00	0.00
Total Expenditures To-date *****:			$0.00	0.00
Remaining Balance of Funds (A-B):			$1,200.00	$4,592.99

Notes:

(1) Amounts in U.S. dollars are converted using the average rate of exchange when funds were received by the Executing Agency;

(2) Amount of expenditures in US dollar should be the same as amount shown in column (c) of the Financial Statement (with direct link from the Cash Flow Statement);

(3) Provide a **list of all expenditure components** (listing the expenditures on excel format, showing date, payee, category/components of expenditures and the amount, both in local currency and in US dollar);

(4) Submit all **actual supporting payment documents/evidences** (filed in the same sequence as the entries in the list of expenditures in (3) above); and

(5) Submit **bank reconciliation statements** along with the bank statement to support the remaining balances/ funds in the Cash Flow Statement.

***** **Actual expenditures is in Ringgit Malaysia (RM) @ conversion rate USD1 = RM3.50**

Annex 2

ACTIVITY CASH FLOW STATEMENT (in US Dollar)
GOVERNMENT OF MALAYSIA CONTRIBUTION

Programme Title: ITTO-CITES 2008

Activity No. : 4 Period covered (ending on): October 2010

Activity Title : The Development of Gonystylus spp. (Ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia.

Component	Reference	Date	Amount	
			in US$	Local Currency In RM
A. Funds received from GoM:				
1. First instalment				
2. Second Instalment				
3. Third instalment				
4. Fourth instalment				
5. Interest on bank deposits				
Total Funds Received:			70,900.00	248,150.00
B. Expenditures (by Executing Agency):				
10. Personnel				
11. Coordinator				
12. Other Personnel				
12.1 Assistant 1				
12.2 Assistant 2				
12.3 Other labour				
13. National Experts				
13.1 Expert 1				
13.2 Expert 2				
13.3 Expert 3				
14. International Consultant(s)				
14.1 Consultant 1				
14.2 Consultant 2				
15 Personnel Total:				
16. Workshop/Seminar and Training				
(specify beneficiaries)				
16.1 Travel/Transportation Costs				
(participants)				
16.2 Daily Subsistence Allowances				
(participants)				

ACTIVITY CASH FLOW STATEMENT (in US Dollar)
Continued

Component	Reference	Date	Amount	
			in US$	Local Currency
16.3 Venue and Logistics				
16.4 Workshop Materials				
16.5 Others				
17. Workshop/Seminar and Training Total:				
20. Sub-contracts				
21. Sub-contract (Topic e.g. mapping,etc.)				
22. Sub-contract (Topic 2)				
29. Sub-contracts Total:				
30. Travel				
31. Daily Subsistence Allowance				
31.1 National Expert(s)				
31.2 International Consultant(s)				
31.3 Others				
32. International Travel				
32.1 National Expert(s)				
32.2 International Consultant(s)				
32.3 Others				
33. Local Transport Costs				
33.1 National Expert(s)				
33.2 International Consultant(s)				
33.3 Others				
39. Travel Total:				
40. Capital Items				
41. Premises				
42 Vehicle(s)				
43 Capital Equipment				
43.1 Computer Equipment (specify)				
43.2 Others (specify)				
49. Capital Items Total:			45,100.00	157,850.00
59. Consumable Items Total:			3,100.00	10,850.00

ACTIVITY CASH FLOW STATEMENT (in US Dollar)
Continued

Component	Reference	Date	Amount	
			in US$	Local Currency
60. Miscellaneous				
61. Sundry				
62. Contingencies				
69. Miscellaneous Total:				
70. Others (specify)				
71. Others (specify)				
79. Others Total:			22,700.00	79,450.00
Total Expenditures To-date:			70,900.00	248,150.00
Remaining Balance of Funds (A-B):			0.00	0.00

Exchange rate: 1USD = RM3.5

Notes:

(1) Amounts in U.S. dollars are converted using the average rate of exchange when funds were received by the Executing Agency;

(2) Amount of expenditures in US dollar should be the same as amount shown in column (c) of the Financial Statement (with direct link from the Cash Flow Statement);

(3) Provide a **list of all expenditure components** (listing the expenditures on excel format, showing date, payee, category/components of expenditures and the amount, both in local currency and in US dollar);

(4) Submit all **actual supporting payment documents/evidences** (filed in the same sequence as the entries in the list of expenditures in (3) above); and

(5) Submit **bank reconciliation statements** along with the bank statement to support the remaining balances/funds in the Cash Flow Statement.

Annex 3

ACTIVITY FINANCIAL STATEMENT (in US Dollar)
ITTO CONTRIBUTION

Programme Title : ITTO-CITES 2008

Activity No. : 4 Period covered (ending on): October 2010

Activity Title : The Development of Gonystylus spp. (Ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia.

Component	Original Amout (A)	Expenditures To-date			Available Funds (E) { A - D }
		Accrued (B)b/	Expended (C)	Total (D) { B + C }	
I. Funds managed by Executing Agency					
10. Personnel					
11. Coordinator					
12. Other Personnel					
12.1 Assistant 1					
12.2 Assistant 2					
12.3 Other labour					
13. National Experts					
13.1 Expert 1					
13.2 Expert 2					
13.3 Expert 3					
14. International Consultant(s)					
14.1 Consultant 1					
14.2 Consultant 2					
15. Personnel Total:	$0.00	$0.00	$0.00	$0.00	$0.00
16. Workshop/Seminar and Training (specify beneficiaries)					
16.1 Travel/Transportation (participants)					
16.2 Daily Subsistence Allowances (participants)					
16.3 Venue and Logistics					
16.4 Workshop Materials					
16.5 Others					
17. Workshop/Seminar and Training Total:	$0.00	$0.00	$0.00	$0.00	$0.00
20. Sub-contracts	$103,200.00	$0.00	$102,000.00	$102,000.00	$1,200.00
21. Sub-contract					
22. Sub-contract					
29. Component Total:	$103,200.00	$0.00	$102,000.00	$102,000.00	$1,200.00

ACTIVITY FINANCIAL STATEMENT (in US Dollar)
Continued

Component	Original Amout (A)	Expenditures To-date			Available Funds (E) { A - D }
		Accrued (B)b/	Expended (C)	Total (D) { B + C }	
30. Travel					
31. Daily Subsistence Allowance					
31.1 National Expert(s)					
31.2 International Consultant(s)					
31.3 Others					
32. International Travel					
32.1 National Expert(s)					
32.2 International Consultant(s)					
32.3 Others					
33. Local Transport Costs					
33.1 National Expert(s)					
33.2 International Consultant(s)					
33.3 Others					
39. Travel Total:	$0.00	$0.00	$0.00	$0.00	$0.00
40. Capital Items					
41. Premises					
42.. Vehicle(s)					
43. Capital Equipment					
43.1 Computer Equipment (specify)					
43.2 Others (Satellite Image)					
49. Capital Items Total:	$0.00	$0.00	$0.00	$0.00	$0.00
50. Consumable Items					
51. Raw Materials					
52. Spares					
53. Utilities (Fuel, toll, 4WD maintenance)					
54. Office Supplies					
59. Consumable Items Total:	$0.00	$0.00	$0.00	$0.00	$0.00
60. Miscellaneous					
61. Sundry (Publication of "The Jewel of Peat Swamp Forest")					
62. Contingencies					
69. Miscellaneous Total:	$0.00	$0.00	$0.00	$0.00	$0.00
70. Others (specify)					
71. Others (specify)					

ACTIVITY FINANCIAL STATEMENT (in US Dollar)
Continued

Component	Original Amout (A)	Expenditures To-date			Available Funds (E) { A - D }
		Accrued (B)b/	Expended (C)	Total (D) { B + C }	
79 . Others Total	$0.00	$0.00	$0.00	$0.00	$0.00
100. GRAND TOTAL:	$0.00	$0.00	$102,000.00	$102,000.00	$1,200.00

Annex 4

ACTIVITY FINANCIAL STATEMENT (in US Dollar)
GOVERNMENT OF MALAYSIA CONTRIBUTION

Programme Title : ITTO-CITES 2008

Activity No. : 4 Period covered (ending on): October 2010

Activity Title : The Development of Gonystylus spp. (Ramin) Timber Monitoring System Using Radio Frequency Identification (RFID) in Peninsular Malaysia.

Component	Original Amout (A)	Expenditures To-date			Available Funds (E) { A - D }
		Accrued (B)b/	Expended (C)	Total (D) { B + C }	
I. Funds managed by Executing Agency					
10. Personnel					
11. Coordinator					
12. Other Personnel					
12.1 Assistant 1					
12.2 Assistant 2					
12.3 Other labour					
13. National Experts					
13.1 Expert 1					
13.2 Expert 2					
13.3 Expert 3					
14. International Consultant(s)					
14.1 Consultant 1					
14.2 Consultant 2					
15. Personnel Total:	$0.00	$0.00	$0.00	$0.00	$0.00
16. Workshop/Seminar and Training (specify beneficiaries)					
16.1 Travel/Transportation (participants)					
16.2 Daily Subsistence Allowances (participants)					
16.3 Venue and Logistics					
16.4 Workshop Materials					
16.5 Others					
17. Workshop/Seminar and Training Total:	$0.00	$0.00	$0.00	$0.00	$0.00
20. Sub-contracts					
21. Sub-contract (Topic e.g. mapping, etc.)					
22. Sub-contract (Topic 2)					
29. Component Total:	$0.00	$0.00	$0.00	$0.00	$0.00

ACTIVITY FINANCIAL STATEMENT (in US Dollar)
Continued

Component	Original Amout (A)	Expenditures To-date			Available Funds (E) { A - D }
		Accrued (B)b/	Expended (C)	Total (D) { B + C }	
30. Travel					
31. Daily Subsistence Allowance					
31.1 National Expert(s)					
31.2 International Consultant(s)					
31.3 Others					
32. International Travel					
32.1 National Expert(s)					
32.2 International Consultant(s)					
32.3 Others					
33. Local Transport Costs					
33.1 National Expert(s)					
33.2 International Consultant(s)					
33.3 Others					
39. Travel Total:	$0.00	$0.00	$0.00	$0.00	$0.00
40. Capital Items					
41. Premises					
42.. Vehicle(s)					
43. Capital Equipment					
43.1 Computer Equipment (specify)	$45,100.00	$0.00	$45,100.00	$45,100.00	$0.00
43.2 Others (Satellite Image)					
49. Capital Items Total:	$45,100.00	$0.00	$45,100.00	$45,100.00	$0.00
50. Consumable Items					
51. Raw Materials					
52. Spares					
53. Utilities (Fuel, toll, 4WD maintenance)					
54. Office Supplies					
59. Consumable Items Total:	$3,100.00	$0.00	$3,100.00	$3,100.00	$0.00
60. Miscellaneous					
61. Sundry (Publication of "The Jewel of Peat Swamp Forest")					
62. Contingencies					
69. Miscellaneous Total:	$3,100.00	$0.00	$3,100.00	$3,100.00	$0.0
70. Others (specify)					
71. Others (specify) Executing Agency Management Costs	$22,710.00	$0.00	$22,710.00	$22,710.00	$0.00

ACTIVITY FINANCIAL STATEMENT (in US Dollar)
Continued

Component	Original Amout (A)	Expenditures To-date			Available Funds (E) { A - D }
		Accrued (B)b/	Expended (C)	Total (D) { B + C }	
79 . Others Total	$22,710.00	$0.00	$22,710.00	$22,710.00	$0.00
100. GRAND TOTAL:	$70,910.00	$0.00	$70,910.00	$70,910.00	$0.00

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