

Implementation of Reduced Impact Logging (RIL) in Sabah

Introduction

Historical records show that logging started in Sabah in 1879. Logging at that time was concentrated on lowland areas, with production method limited to human or animal energy and traditional equipment. The introduction of mechanized equipment such as chainsaws in 1962 has changed the scenario in Sabah. Timber production increased suddenly and logging activities penetrated into the interior and highlands. Since the 1900's, the logging industry in Sabah intensified and become significant, timber has become the second biggest export commodity after tobacco. In 1978, the total timber export for Sabah reached 14 million m³ and the large volume continued until 1992. This high production figure exceeding the regeneration capacity of the forests, aggravated by the bad conventional harvesting practices, has resulted in reduced production capacity of the residual forest stands. Recognizing this reduced production capacity of Sabah's forest due to indiscriminate harvesting practices and in line with State and National Forestry Policies, the Sabah State Government has taken the necessary steps to implement sustainable forest management. One of the many strategies in sustainable forest management is the implementation of RIL (Reduced Impact Logging) to mitigate degradation of the forest resource and conservation of the environment.

Forestry Policies

In the 1990's, the world community was getting more aware of the destruction that took place to the environment and logging tropical forest was singled out as one of the main activities that contributed to environmental degradation, to the point of boycotting tropical forest products. During the Rio World Earth Summit held in 1992, world leaders agreed and declared their commitment for a Sustainable Development

Agenda to ensure proper socio-economic development and that the environment is taken care in the development processes. Subsequently, the world community agreed to allow logging in the tropical forest but with a strict condition of practising sustainable forest management. Malaysia is a signatory to ITTO (International Tropical Timber Organization) to signify Malaysia commitment to sustainable forest management.

The State Forest Policy was streamlined with the National Forest Policy to achieve effective and systematic implementation of the State's forest management in line with the concept of Sustainable Forest Management. It is aimed at ensuring the role of forestry as one of the pillars of Sabah's economy, in environment protection and also in the protection of the State's rich biological resources. The Forestry Department was responsible to formulate strategies and implement programmes to achieve Sustainable Forest Management in all the permanent forest reserves. One of the first activities implemented was the initiation of the Malaysia-Germany Sustainable Forest Management Project in the late 1980's, in which Deramakot Forest Reserve was chosen as the testing ground for the implementation of sustainable forest management which should later on serve as a model for implementation in all other forest reserves in Sabah.

As a result of this Malaysia-Germany Collaborative Project, the Forest Stewardship Council (FSC) certified Deramakot Forest Reserve as a well-managed forest in recognition of achieving sustainability in this forest in 1997. This status continues to be maintained by the Forestry Department to this date. This experience and success brought about awareness that there were still rooms and opportunities for sustainable forest management to be implemented in other forest reserves. To this end, the Government has leased the various forest management units (FMUs) to selected private companies and these private companies are regarded as "partners" of the State Government in the implementation of sustainable forest management in all of Sabah's permanent forest estate. In accordance with Forest Enactment 1968, the forest management units were demarcated and Sustainable Forest Management

Licence Agreements were signed with selected private companies for implementation of sustainable forest management.

It is important to use the suitable harvesting system which complies with the principles of sustainable forest management (SFM). Using the right harvesting system could reduce damage to residual stands, protect the environment and ensure sustainable production of the harvested forests. A system that ensures the residual stand is not severely damaged and can recuperate will ensure sustainable forest production of the areas.

Among the methods used are Reduced Impact Logging (RIL using tractor) and skyline logging as well as helicopter logging. The RIL method is emphasized, as it is able to reduce damage to residual stand by 50% as compared to conventional logging. Economic factor and current widespread use of tractor has resulted in the wide adoption of RIL as compared to the other harvesting systems. Skyline system is only suitable in areas where tractors cannot access. However, other systems can still be used in Sabah, so long as the system applied can reduce damage of residual stand and the environment within acceptable limit and complies with existing laws and regulations.

RIL Operation

RIL is a collection of various harvesting techniques to minimize damage to PCT (Potential Crop Trees), regeneration and soil to maintain its production capacity and to protect the environment. RIL is divided into three stages of operations *viz*:

- Pre-harvest operations
- Harvesting operations
- Post-harvest operations

Pre-harvest operations involve various preparatory activities such as gathering information on the areas to be harvested from past logging records, aerial photos, acquisition of site detailed information based on field survey, infrastructure planning and detailed strategy of harvesting. The detailed planning strategy will reduce damage to a level which is acceptable and predictable. A well planned CHP (Comprehensive Harvesting Plan) will facilitate smooth harvesting operation and monitoring and control activities in the harvested areas.

Harvesting operations are the actual harvesting activities, such as road construction, preparing log landing, tree harvesting and log transportation. The smooth implementation of forest operation activities depends very much on the CHP and the skill and experience of the workforce. It is at this stage that damage to forest occurs and thus it requires strict supervision.

Post-harvest operations are mitigation measures to minimize the effect of the various activities in forest operations. Various activities include the construction of drains across roads or bumps, removing temporary structures such as bridges and culverts used in forest harvesting that could block the free flow of water. The log landings sites are also reformed to promote regeneration. All the above activities are aimed at minimizing the effects of erosion and promoting regeneration in these logged over forests.

RIL Implementation

The decision to implement RIL in 2000 has led the Department to formulate necessary strategies for its implementation. One of the strategies was to conduct RIL training which commenced in 1996, while the control system was implemented in 1998 as a mechanism for controlling and guiding field staff to monitor and control logging operations.

Commercial RIL operation started in 1998 within the Sabah Foundation concession area, and since 2000, RIL harvesting technique is mandatory to be used in all forest harvesting in forest reserves. At the same time, the State's Conservation Environment Department recognized RIL techniques as a tool to mitigate the destruction and impact to the environment. This has further encouraged the Department to implement RIL harvesting technique throughout Sabah.

RIL Training

Training programme was formulated to prepare skillful workforce with knowledge on RIL. The training programme takes the following into consideration:

- All activities involved in forest harvesting
- Knowledge, attitude and skill that are required
- Priority targeted group
- The variety of training methods to suit the skill required

The first step taken by Department was to produce trainers. To achieve this, the Department engaged Mr. Richard Taumas as a RIL consultant in 1996. Two forest areas with two different sites conditions (Deramakot Forest Reserve, a logged over forest, and Gunung Rara Forest Reserve, a virgin forest) were selected as a training site for RIL. Training conducted included theory and practical sessions as well as site visits to various logging sites in Sabah. A total of 30 RIL trainers were trained to provide more training to other workers. A booklet on RIL Operation Guideline was produced by the Department to assist trainers and serve as a guide in the various stages of RIL implementation.

Subsequent training phase is a specific RIL training for supervisors and machine (tractor) and machine (chainsaw) operators. The target groups are staff of the

Forestry Department, SFMLA holders and interested individuals with background in forestry. Training for RIL Supervisor include all levels of RIL operation and take 2 months, while training for tractor and machine operators takes 2 weeks. In addition, specific training for harvesting planners and skyline operators were also conducted. The following table shows the number of trained workers that have been trained in RIL until 2007.

Table 1: Number of trainers that have attended RIL training as of 2007.

Category	Staff of JPS	IPS*	FMU**	CHP Contractor	Individual	Total
Trainers	15	0	15	0	0	30
Harvest Planners	20	0	0	0	0	20
Supervisor	474	95	306	15	131	966
Tractor operator & Tree feller	11	0	876	0	43	835
Skyline Operator	12	0	0	0	0	12 +
Total						2013

Control System

The System and Work Procedure for Monitoring RIL or “SPKP RIL” was formulated in 1998 and aimed at providing a systematic work guideline for staff of the Department, especially those at the supervisory and monitoring levels of RIL operations.

In line with the various levels of RIL activities, “SPKP RIL” was formulated based on the following stages of RIL activities:

- Pre-harvest Control

- Operation Control

- Post-harvest Control

Pre-harvest control is the initial step for verification of CHP planning and other relevant information, suitability of infrastructure being planned, schedule of operations, evaluation of compliance with existing RIL Guidelines and related Rules being enforced.

Damage to residual stand due to forest harvesting is normally attributed to tree felling, hauling of logs and transportation and construction of infrastructure. Well organized and systematic supervision is crucial to ensure compliance with Planned CHP, damage is within the acceptable limit, log quality and sufficient information on the remaining stock of residual stands. Leniency can be accepted as long as it contributes to the reduction of damage to residual stand. Control and supervision work is facilitated with the introduction of a control form.

Post-harvest control includes closing inspection which involves estimation of damage to residual stand. This activity can be used to assess the performance of harvester, damage level, level of compliance and non-compliance to the planned CHP and existing rules and the amount of penalty that should be imposed. This work does not contribute further to the aim of reduction of forest stand damage, but it will provide the basis for the harvester to learn and not repeat the same mistake in their future work.

Implementation

RIL implementation was tested in 1995 when the first RIL was conducted in compartment 60 of Deramakot FR, that is before any trainers were given specific training. In 1998, KTS voluntarily implemented RIL in its FMU. In the same year, the State Government decided that Sabah Foundation would lead the other FMU holders in RIL implementation. RIL has since been implemented by other FMU licensees, beside Deramakot. The licensees are:

- Yayasan Sabah
- Benta Wawasan Sdn.Bhd
- MUIS
- KTS Plantation Sdn. Bhd.
- Tenju Sdn. Bhd.
- Mega Bountiful
- Bornion Timber Sdn.Bhd.
- Makmuran Sdn.Bhd
- Anika Desiran Sdn. Bhd.
- Sabah Forest Industries Sdn. Bhd. (SFI)
- Syt. Hinapad Enterprise
- Bugaya Forest Sdn. Bhd.
- Timberwell Berhad
- Idris Hydraulic (M) Bhd
- Idris Hydraulic (M) Bhd

However, until now only KTS Plantation Sdn. Bhd, SFI, Yayasan Sabah, Benta Wawasan Sdn. Bhd, Idris Hydraulic (M) Bhd, and Timberwell Bhd have active CHPs. To date, the total areas of which CHPs have been prepared, including areas that have been logged, totalled 90,301.78 hectares. The total RIL area in 2006-2007 is 50,674 hectares. The following is the updated information on Forest Harvesting using RIL approach throughout Sabah in 2006-2007.

Harvesting Information/ Licensee	No. of compt.	Gross Areas (ha.)	No. of harvestable trees	Vol(m3)	Density (tree/ha)	Vol. Density (m3/ha)
Benta Wawasan (ALISB) Heli-Log	13	7,087	81,521	385,691.82	11.5	54.42
Timberwell B.	14	3,849.6 8	12,010	80,964.35	3.12	21.03
KTS Plantation	13	6,722.5 1	29,931	87,176.21	4.42	12.87
SFI Segalong S/B	4	3,653.6 6	13,555	123,663.36	5.59	51.01
Makmuran S/B	4	1,565.1 5	6,742	40,394.70	6.38	38.25
Yayasan Sabah	73	27,446	152,388	597,599.32	5.80	22.74
TSH Resource B	1	300+	1,700	9,400+	5.67	31.67
Grand Total	122	50,674	297,847	1,324,889. 76	5.88	26.15

In 2006 to 2007, the biggest area that implemented RIL technique was YS in the Ulu Segama Malua Forest Reserve with an area of 27,446 ha.

The Sabah Conservation Enactment which was enforced in 1999 contains a provision which makes it mandatory to prepare an EIA (Environmental Impact Assessment) report for any area more than 500 hectares that is planned to be harvested. This enactment also recognises and recommends RIL method as a tool in the mitigation of environmental impact in forest harvesting, not just in forest reserves, but also in areas outside forest reserves.

Challenges of Implementation

The companies faced various problems in their effort to implement RIL. Some of the problems faced by the companies are related to the CHP, *viz*, lack of skillful workforce, reduced production, longer harvesting time, the increase in operation costs and the objection of companies to RIL implementation. All these problems are related to one other.

Although there has been no specific study to identify the reasons of these problems, based on observations and discussion, the problem of declining volume production was due to their lack of skill in the preparation of CHP, which resulted in substantial areas not covered in the CHP. The unskilled removal of logs also resulted in the deterioration of log quality. In addition, the reduced production volume is also probably due to reduced stock of the logged over forest itself and the exclusion of some areas from harvesting due to existing rules and procedures of logging. The long time needed in preparation of CHP before any harvesting can be carried out, has resulted in delay of actual harvesting by the companies. Together with the past economic crisis, this has resulted in cash flow problem of the companies. In addition, the companies which adopted RIL practices for timber production, did not get a premium price for their logs

As a result of the above, there were signs that companies dislike and reject RIL implementation. Efforts been made by the Department by introducing refined RIL which is said to be comparable in terms of damage reduction and incurring less operation costs. However, without terms of reference (TOR), the effects of harvesting will be no different from conventional logging. Furthermore, there are SFMLA holders that are inclined towards establishing Industrial Tree Plantations (ITP) due to their past experience in developing agricultural plantations (Cocoa, Rubber and Oil Palm). However, considering the role of natural forests in the protection of biological resources and the environment, it is necessary to ensure that all remaining natural forests should be protected and managed under the NFM (natural forest management) and RIL should be widely implemented.

The Effects of RIL Implementation

The recognition of Deramakot Forest Reserve which implemented RIL by a world renowned certification body, the Forest Stewardship Council, gives hopes to the Forestry Department to duplicate the management implemented in Deramakot to other forest reserves. This is because, Deramakot Forest Reserve is also a logged over forest areas similar to other forest areas in the State, which have been repeatedly logged. As long as there is a residual stand, there is a chance to implement sustainable forest management based on ITTO guideline or the sustainable development agenda as agreed upon during the Rio Summit. This conforms to the State and National Forest Policy to manage Permanent Forest estates sustainably and in perpetuity.

The effect of reduced capacity of the forests to produce, viewed in its right perspective is due to the past harvesting practices which failed to consider the ability and capacity of the forests to recuperate to its original state. As a result of reduced production, many timber processing mills have shut down. Lessons should be learnt from all these, so that the best management practices are adopted, for example in RIL implementation. It is hoped that the widespread use of RIL harvesting technique

as well as efforts to reforest and undertake silvicultural treatment will rehabilitate the forests.

In comparison with conventional logging, RIL harvesting operation will leave behind healthy potential crop trees (PCTs) which can grow to produce prime logs in the next harvesting cycle. Being healthy remaining trees as result of proper harvesting with less competition to grow, these residual trees are likely able to grow well. This situation will reduce the next cutting cycle and increase economic potential of this stand.

The experience of KTS Plantation Sdn Bhd. in implementing RIL is very convincing for the company. Logging carried out in 1995 without using RIL technique, resulted in sufficient stock for harvesting based on field observation in 2004. According to the company, if they had adopted RIL fully in their 1995 logging, by now they should have more stock for harvesting for the area. As a result of this experience, KTS will continue to adopt RIL, even if they were exempted from carrying out RIL. It is not surprising if KTS will abandon their planned ITP development and instead focus on rehabilitating their natural forests.

In addition, the implementation of RIL has encouraged the use of skilful workforce and continuous building of knowledge for RIL implementation and improvement of skill. This is in contrast to conventional logging, which is driven by short term gain purely to exploit the forests without considering the future and the damage to the environment.

RIL Development Plan

RIL technique has been recognized by various international organizations, but improvement will continue to be made to solve some of the pressing problems. Some of the efforts are conducting research on forest harvesting system which includes studies on the effects of helicopter logging and in areas where harvesting has been conducted using RIL technique. It is hoped that with information from these studies, the RIL system can be improved.

In addition, efforts are planned on how to promote the use of RIL techniques among the SFMLA holders, so that they will willingly implement RIL in their areas. It will be a bonus, if these SFMLA holders help to further strengthen the procedures of RIL implementation. The above perhaps could be achieved if both SFMLA holders and their contractors share a common goal in RIL implementation and continue to learn to better understand and improve RIL implementation on the ground. Field visits with licensees and logging contractors can help to contribute to improving understanding and awareness of the advantages of RIL.

Conclusions

Though RIL implementation has been planned systematically and implemented successfully at Deramakot Forest Reserve, and recently in Yayasan Sabah (Ulu Segama Malua), Timberwell Berhad, SFI Sdn. Bhd., KTS Plantation Sdn. Bhd. and TSH Resource Berhad., for its implementation in the other FMU there is still much to be done. The Forestry Department will continue to give advice and guidance to SFMLA holders until they are competent in RIL implementation. This could also be done through the System and Work Procedure for Monitoring RIL (SPKP RIL).