



**Samling Reforestation (Bintulu) Sdn Bhd**  
A member of Samling Group of Companies

## **PUBLIC SUMMARY**

**Forest Plantation Management Plan**

**for the**

**MTCS Area within PAONG LPF/0021**

**For the period**

**1<sup>st</sup> January 2023 to 31<sup>st</sup> December 2032**

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James Ho Yam Kuan  
Chief Operating Officer

## **1. Related Documents and Systems**

There are numerous related documents. These are listed in the Document Register held in the PAONG office.

## **2. The Company**

Paong Licensed Planted Forest (PAONG) is an industrial tree plantation (ITP) operating under a Sarawak government licence (LPF/0021) issued to Samling Reforestation (Bintulu) Sdn Bhd (SRB) – a subsidiary of Syarikat Samling Timber Sdn Bhd (SST). The licence was issued on 16 August 2000. It is valid for 60 years and expires 15 August 2026.

Samling is head-quartered in Miri City, in the north of Sarawak, Malaysia.

The use of Samling here and throughout this FPMP refers to the timber and wood products division of the Samling Group.

Samling aims to produce an economically sustainable supply of logs from the PAONG ITP which, when combined with logs from their other ITP areas and from their natural forest timber licence areas, will support its downstream wood processing activities – plywood, sawn timber, fibreboard, door skins, furniture and furniture components and wood pellets.

Samling is an equal opportunity employer that operates an active safety and health management system.

Additionally, Samling also recognises the value of, and the importance of, its environmental and social responsibilities.

## **3. Malaysian Timber Certification Scheme (MTCS)**

### **3.1 Our Commitment**

Samling is committed to develop and conform to the principle of sustainability on all forested land and potentially forested land held under PAONG LPF/0021 and, in so doing, to comply with the Malaysian Criteria & Indicators for Sustainable Forest Management (MC&I SFM) of the Malaysian Timber Certification Scheme (MTCS) - the MTCS ST 1002:2021 operated by the Malaysian Timber Certification Council (MTCC). It is intended that the ethos of MTCS compliance should be embedded in PAONG's management culture for the whole LPF and not just the area proposed for certification under the MTCS, which, in any event, covers 95.0% of the LPF.

Certification of forest plantation management - and therefore of the plantation logs produced for in-house processing – is very important to the future of Samling. It creates potential marketing and economic advantages for its wood-based products and, more importantly, it will help ensure that management of its resources is carried out under MTCS principles thereby helping to ensure sustainability.

### **3.2 Certification Requirements**

The MTCS requires:

- 1] Practicing the guidelines and requirements set out by the nine principles of the MTCS that are the framework of the MC&I SFM.
- 2] Developing a sound policy base derived from the nine principles and ensuring they are

communicated and followed in the workplace.

- 3] Developing open lines of communication involving employees and stakeholders in the development of economically sustainable forest plantation management practices.
- 4] Using best practice guidelines in its management regimes. This includes the implementation and continued use of sound, proven and economically viable forest plantation management and environmental, financial and social practices that protect the sustainability of the resources.

### **3.3 Area Eligible for Certification under MTCS**

Section 5.2 and Table 5.1 give details for the determination of the area eligible.

### **3.4 Certification Status**

At the time of preparing this FPMP, PAONG LPF was not yet certified under any certification scheme. The intention is to certify those areas within the LPF which are eligible under the MTCS.

SIRIM QAS International Sdn Bhd conducted the MTCS Stage 1 audit in the first week of January 2023 and is scheduled to conduct the Stage 2 audit in the second week of June 2023.

#### **3.4.1 MTCS area**

To be completed post Stage 2

#### **3.4.2 Controlled Source**

The whole of Paong LPF is managed in accordance with the requirements of the MTCS. It is also managed in full compliance with the MC&I SFM, apart from the cut-off date. This means that any log production from the ITP area outside of the MTCS area is considered to be from a Controlled Source for the purpose of CoC certification.

## **4. Forest Plantation Management**

### **4.1 Statutory Framework**

In the main the most recent legislation that effects ITP and environmental management is contained within the Forest (Planted Forests) Rules, 1997 and the Natural Resources and Environment Ordinance, 1993 (Cap. 84).

The outcomes should always adhere to the principle of sustainable ITP management and are controlled in companies such as Samling by the use of these documents as resource consents. These two pieces of legislation therefore act as a method of controlling adverse management effects.

Other are numerous other Acts and Regulations that form the basis of forest plantation management practices at PAONG. These are all listed in the document register held in the PAONG office.

SST's legal department will advise PAONG management of relevant changes in existing legislation and of new legislation as appropriate.

PAONG management keeps "hard" copies of legislation key to its business and management practices on site in the PAONG office and at the Miri HQ. In some cases the legislation is held in PDF format where hard copies are not available. However, amendments to legislation are relatively frequent and there is access to up-to-date acts of parliament through the internet. (Full copies of these acts of parliament may be found at [www.agc.gov.my](http://www.agc.gov.my) and [www.federalgazette.agc.gov.my](http://www.federalgazette.agc.gov.my).)

## 4.2 Forest Plantation Management Objectives

The forest management objective is the **economic production of logs for supply to Samling downstream**. This supply is primarily for solid use, i.e., peeler logs and saw logs. However, in achieving this primary objective there are several important supplementary objectives. These are listed below, not in any order of priority:

- maintain the ecological productivity of the ITP – thereby assisting to maintain the value of the forest services;
- ensure a sustainable level of log production at the group level;
- conduct forestry operations in a manner that does not impact negatively on the wellbeing of those people living within and nearby the LPF;
- safeguard the environment of the LPF - thereby assisting to maintain the value of the forest services;
- ensure that natural forest areas are protected from human interference in the Conservation Area SMZs; and
- maximise harvesting recovery.

## 4.3 Forest Plantation Management Strategy

SRB uses the MTCS principles and criteria to formulate the management strategy in order for PAONG to achieve the objectives set out above.

As the history of the LPF described in Chapter 5 indicates and as is noted in the EIA, the area has a long history of repeated harvesting. The ITP is established in clearly defined areas of this degraded residual forest.

Special Management Zones (SMZ) have been, and continue to be, identified (see Section 4.4). The SMZs invariably contain residual forest which, as it is protected within the SMZ, has a protective function and contributes to conservation values, the enhancement of biodiversity and to carbon sequestration. The area under SMZs represents 36% of the total MTCS area (Table 5.2).

SRB also recognises the importance and significance of international agreements in its management. It will give governing authorities as much cooperation as possible to enforce the regulations of such agreements.

## 4.4 Special Management Zones (SMZs) in PAONG LPF's MTCS Area

### 4.4.1 Zone types occurring in PAONG LPF's MTCS Area

SMZs are generally, but not necessarily, those areas of harvested and now degraded residual MDF which do not form a part of the ITP planted area for reasons other than being designated as SA (shifting agriculture) or under land claim. R&D areas, although under special management, are within the ITP management area. Within Sarawak there are a number of possible zone types but only those listed in Table 4.1 below have been identified as occurring within PAONG's MTCS area to date.

**Table 4.1: Special Management Zones (SMZs) occurring within PAONG LPF's MTCS Area**

Zone Types
Riparian buffer: mandatory; to EIA prescribed widths determined by the water course width
Swampy: (mineral soil)
Rocky and skeletal soils
Steep areas: $\geq 35^\circ$ rare mandatory; upper slopes (i.e. outside riparian buffers)
Gulley: steep riverside areas outside the mandatory buffer zone
Conservation: voluntarily designated as such; otherwise it might have been planted

A zone type may be mandatory, e.g. a riparian buffer zone must be established along permanent water courses – see Table 4.2 – and steep areas in excess of  $35^\circ$  must not be cleared for planting. Elective zone types are those where, for example, at the manager's discretion a wildlife corridor has been demarcated on otherwise plantable land. This would be classed as a conservation area. In reality all the above SMZs are effectively conservation areas and are totally protected from encroachment. And there are 'Hobson's choice' zone types where the physical characteristics of the site preclude the option of planting, e.g., marshland and skeletal soils.

**Table 4.2: Recommended Widths for River Buffer Zone**

Width of Permanent Water Course (m)	Width of River Buffer Zone on each side of the river (m)
>40	50
20 - 40	40
10 - 20	20
5 - 10	10
<5	5

Source: Table 4. PAONG EIA Jan 2000, Ecosol Consultancy Sdn Bhd

The types are not mutually exclusive: e.g., a riparian buffer may contain marshland and steep areas. By virtue of being demarcated on the ground, GPS-ed and mapped and then protected from most human activity, SMZs, of whatever type, play a significant role in the conservation of the PAONG LPF's bio-diversity.

#### 4.4.2 Management of SMZs

The guiding management principles are common to all SMZs that are currently identified in PAONG LPF regardless of whether or not they fall within the MTCS area.

The zones are first identified and then demarcated on the ground. Although they must still be demarcated, the boundaries of steep areas, skeletal soils and marshland are more or less self-defining whilst the boundaries of riparian buffers must be carefully located to ensure compliance. Once clearly demarcated on the ground all SMZs are protected and, apart from the removal of any planted merchantable exotic trees and access by local people for traditional purposes (and such use is negligible). There should be no invasive human activity within them. However, incursion can and does take place but most in cases management does not have the authority to take any action other than to make an official report to the relevant government agency.

Where mangium (or any other exotic ITP species) was originally planted in the RBZ the intention is to remove it when harvesting the adjacent block. Harvesting will be undertaken with minimum damage leaving the residual vegetation to recover and to continue to develop over the ensuing years. The removal of the exotics can be considered as assisting the natural process of recovery and reversion. The use of machinery, other than chain saws, in an RBZ is prohibited. A contractor who transgresses may be fined up to RM5,000.00 should he allow machinery to enter any SMZ (other than chain saws in zones where exotics are to be removed) and RM100.00 for any tree deemed to have been avoidably damaged within the zone.

Following demarcation and the removal of any merchantable exotic trees, no further invasive action in these SMZs is allowed. This protection will allow the SMZs to develop in structure and bio-diversity. Table 5.2 in the following chapter shows the distribution of SMZ types. The major SMZ type is that of the Conservation Areas (formerly, and sometimes still, called green belts) which in total covers 6,650 ha; this is just over 74% of the Protected Area and almost 27% of the gross MTCS area.

## **5. Resource Description**

### **5.1 History and Land Status**

#### **5.1.1 Introduction**

This history more or less refers only to the area now known as Paong LPF, the location of which is shown in Map 5.1 ([Right click here to access Map 5.1](#)) shows the present boundaries of the LPF.

#### **5.1.2 Forest Timber Licences**

The licensing history is not well known. At some time in the late 1970s, a forest timber licence (FTL) was issued covering most of what was known as FAO Unit 8 together with some adjoining State land. Initially this area was licensed to STIDC as T/0233 which was then re-issued to Samling Plywood (Lawas) Sdn Bhd as T/0404 for a period of 20 years expiring in 2013. On expiry, T/0404 was renewed for a further 20 years to May 2033 ((WPO.628.319.29(VI))-75 dated 3<sup>rd</sup> January 2013). A large part of T/0404 was designated as LPF/0021 (Map 5.1) to become ITP on completion of harvesting of the natural forest.

#### **5.1.3 Past Harvesting**

The terms and conditions attached to the original FTL are not known. The first revision of the Tinjar-Paong Management Plan, dated 1<sup>st</sup> April 1982, gave DBH cutting limits as the usual 45cm/60cm – non-dipterocarp/dipterocarp. It also stated that all merchantable trees of obligatory species of 45+cm on State land must be harvested. The cutting cycle is stated as 25 years for the FAO Unit 8 area.

Up to 100 m<sup>3</sup>/ha of merchantable logs might have been harvested in the first cycle. This would inevitably result in a significant degree of damage to the remaining trees and saplings with the actual degree being more or less proportional to the volume removed. Thus, the structure of the post-harvest forest would rarely if ever approximate that of the undisturbed ‘natural forest’ or the ‘native ecosystem’ or to use more common term, the ‘primary forest’. If an area has been subject to more than one cycle of harvesting, then its structure and diversity would have been further compromised.

On an area designated for conversion to LPF the FTL holder, after completion of harvesting, surrenders the completed coupe to the LPF holder. The LPF holder then applies to SFC under the Permit to Enter Coupe (PEC) system, first for Operations 1 to 4 cover the demarcation of coupe and block boundaries, road alignment etc., all of which would have been done under the FTL’s operation. Following inspection by SFC, Operation 5 is then applied for. This allows the LPF holder to clear areas in preparation for planting at which time any residual merchantable trees would be extracted (an

operation known as ‘salvage’). If the area has been subject to more than one cutting cycle, then the residual merchantable volume will be very low or even non-existent. (In the LPF licence, page 6, it states that “...*The existing Mixed Dipterocarp Forest had been logged at least twice and had lost its original form and structure...*”)

**5.1.4 Conversion of primary forest**

As has been noted in the preceding sections, the natural forest within the LPF has been subjected to harvesting since the mid-1970s. Consequently, no undisturbed primary forest was known to remain within areas identified as suitable for ITP at the time the LPF licence was issued in August 2000. Under the LPF licence conditions, the substantial areas of Terrain Class IV (TCIV  $\geq 35^\circ$ ) are excluded from the plantable area. Much of TCIV would have been subject to at least one and possibly two cycles of helicopter logging. This means that almost all, if not all, the conservation areas are residual MDF, having been harvested at least twice either by helicopter or ground based equipment.

***This means that no primary forest has been converted to ITP within the LPF area. Furthermore, no primary forest remains for conversion.***

**5.2 Determination of the Area Eligible for Certification under MTCS**

**5.2.1 PAONG LPF’s eligibility**

ITP on land converted after 31<sup>st</sup> December 2010 is not eligible for forest management certification. PAONG LPF is fortunate in that clearing of residual forest and planting started relatively early with the first areas planted in 2003 - three years after Segan LPF (LPF/0014), which is Samling’s oldest.

Table 5.1 shows that 17,119.5 ha were endorsed by the FDS for conversion to ITP prior to the MTCS cut-off date of 31 December 2010. This is the *gross plantable* area and includes areas which, on detailed survey, were found to be not suitable for planting - because too steep, wet, gullied, etc. It also includes areas that, whilst plantable, are currently claimed by natives. This means that the actual planted area of 8,437 ha is considerably less than might be indicated by the GIS PEC area. Table 5.1 also shows the distribution of the 24,834 ha of the total MTCS area, i.e., including ITP areas, non-forest land and protected forest areas, across each of the eight coupes that comprise the LPF. The gross area of what is technically plantable but currently under investigation is also shown under ITP Production Area.

Whilst there are areas of shifting agriculture (SA) within the boundaries of the LPF, the conditions of the licence specifically exclude them from consideration for planting unless an agreement with the natives to do so has been made with Operations. There is no SA within the MTCS area. The simple area breakdown of PAONG LPF as given by FDS is:

	(ha)
Area under MTCS	24,834
Shifting agriculture	1,285
Road buffer	11
<hr/> LPF area	<hr/> 26,124

Unfortunately, FDS has not supplied a shape file and so the LPF boundary must be digitised from the map supplied by FDS. This results in Samling’s GIS measurement of the LPF area being 26,130 ha - a 6 ha discrepancy.

Fortunately, there is agreement on the MTCS area, for which a detailed area statement is shown in Table 5.2.

### **5.2.2 Determination of the area eligible for MTCS**

The eligible area was determined through the application of the FDS's operational control system known as Permit to Enter Coupe (PEC). Table 5.1 lists the coupes and blocks and the dates the blocks were endorsed by FDS for Operation 5. The original PEC area was revised on a coupe by coupe basis consequent of FDS revising the LPF boundaries. This boundary revision resulted in some LPF blocks falling outside the revised LPF boundary and into Samling's Sekiwa FMU, the adjacent forest timber licence T/0404. All of these blocks were unplanted. The location of the MTCS area is shown on Map 5.3. ([Right click here to access Map 5.3](#))

### **5.3 Geology and Soils**

For the geology and soils reference should be made to the EIA which gives a very concise overview of the geology of the LPF. It also gives a quite detailed, useful summary of the soils although these are only been documented at reconnaissance level.



**Table 5.2: Area Statement for MTCS Area within PAONG (LPF/0021) - at 14th November 2022**

													2-Jan-23			
Land Type	Gross Area	Non-production Area <sup>4</sup>										ITP Production Area				
		Non-forested Areas					Protected Area (SMZ)					Total	Planted <sup>2</sup>	Plantable <sup>3</sup>	Area Under Investigation <sup>7</sup>	Total <sup>6</sup>
		Shifting Agriculture	Water	Road line	Others <sup>1</sup>	Total Non-Forested Area	Conservation <sup>5</sup>	River Buffer Zone	Gully	Steep	Total Protected Area					
Mineral	24,834 100.0%	0	210	340	1,697	2,248	6,650	1,806	31	460	8,946	11,194	8,437	1,242	3,962	13,640
<b>Total</b>	<b>24,834</b>	<b>0</b>	<b>210</b>	<b>340</b>	<b>1,697</b>	<b>2,248</b>	<b>6,650</b>	<b>1,806</b>	<b>31</b>	<b>460</b>	<b>8,946</b>	<b>11,194</b>	<b>8,437</b>	<b>1,242</b>	<b>3,962</b>	<b>13,640</b>
% Distribution - Certification Area		0.0%	0.8%	1.4%	6.8%	9.1%	26.8%	7.3%	0.1%	1.9%	36.0%	45.1%	34.0%	5.0%	16.0%	54.9%
% Distribution: Non-production <sup>4</sup> & ITP Production Area		0.0%	1.9%	3.0%	15.2%	20.1%	59.4%	16.1%	0.3%	4.1%	79.9%	100.0%	61.9%	9.1%	29.0%	100.0%

Sources: LPF Licence, Block Master 14th November 2022

Layer used : Z:\Mapping\Temp\2022\11\_Nov\21\FPMU\21\_FPMU.gdb\Basemap\21\_block\_update\_2022\1114\_clip\_rev1\_mtcs

1) Rocky, swampy & sandy areas, proposed nursery, misc unplanted area & others

2) See Note in Chapter 5, regarding the minor discrepancy between this figure & that shown in Table 5.4

3) Approved under PEC Opt5 on or before 31st December 2010; assessed as plantable but still not recorded as planted at map record date

4) Non-production as in not producing industrial timber

5) Including International Buffer Zone (Marudi LPF), kerangas forest, green belts & water catchments

6) This is lower than the approved PEC gross operable area because the latter is gross & includes unplanted areas

7) These are areas which require investigation in order to determine if they can be planted

## 5.4 Land Use and Status

The Licence for Planted Forest (LPF/0021) became effective on 8th December 1998 for a period of 60 years. It is located in the Telang Usan District of the Miri Division. (See Map 5.1). The area designated for MTCS lies entirely within LPF/0021 (See Map 5.3). The whole LPF is on mineral soils. An area statement for land use in the MTCS area is given in Table 5.2. In Table 5.3 the relationships between the MTCS area, the Nakan-Kalulong F.R. and State land that comprise the PAONG LPF are shown. It is notable that the MTCS area constitutes 95% of the total LPF area and that 91.8% of it is within the forest reserve.

Map 5.2 ([Click here to access Map 5.2](#))

**Table 5.3: PAONG LPF – relationship with Nakan-Kalulong F.R. and State land**

Location	ha	%	Note
<b>Paong LPF area</b>	26,130	100.0%	
of which	23,702	90.7%	is inside Nakan-Kalulong FR
Balance of	2,428	9.3%	is State land
<b>Paong MTCS area</b>	24,834	100.0%	
of which	22,804	91.8%	is inside Nakan-Kalulong FR
Balance of	2,030	8.2%	is State land
Paong LPF area	26,130	100.0%	
Paong MTCS area	24,834	95.0%	
LPF area outside MTCS	1,296	5.0%	

Source: Samling GIS; Paong FMP Tabs 5.1 etc

Reference to the gazette notification for the Nakan-Kalulong Forest Reserve (Appendix 3) shows that no rights or privileges within the forest reserve were admitted to any specific individual nor to any community.

## 5.5 Industrial Tree Plantation (ITP) Resource in the MTCS

### 5.5.1 Resource utilisation

Harvesting started in September 2021. Much of the area is over mature as can be seen in Fig. 5.1.

### 5.5.2 Species distribution

Table 5.4 shows the major species and year of planting (YOP) for the MTCS ITP resource at 14th November 2022 as extracted from the Block Master at that date.

There are two important points to note regarding Table 5.4.:

- *E. pellita* represents 35.2% of the planted area; and
- Most of the mangium is a failed crop and will yield little of no commercial volume.

**Table 5.4: Species and Year of Planting for the PAONG MTCS area**

Species	Year of Planting (YOP)																			Grand Total	
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2022	2023	ha	%
A. crassicarpa	3.7		0.1																	3.8	0.0
A. hybrid							4.9	19.2	31.4											55.6	0.7
A.mangium	74.4	13.2	71.1	696.7	738.0	1.7														1,595.1	18.9
E. pellita		0.5		9.1	434.3	915.7	371.8	748.6	163.0	112.1	33.5	5.5			45.2		25.8	48.5	56.5	2,970.1	35.2
F. moluccana										21.8	34.8	123.3	337.1	444.7	292.9	5.4			15.6	1,275.3	15.1
G. arborea	0.2				9.8				18.0	192.0	116.4	172.9	207.6	389.9	325.4					1,432.3	17.0
Other spp.	17.6	7.0	8.7	155.4	31.7	39.1	119.7	121.8	31.4	71.1	14.9	45.8	43.6	18.3	75.7	289.6	13.1	0.0	0.0	1,104.5	13.1
<b>Grand Total</b>	<b>95.9</b>	<b>20.7</b>	<b>79.9</b>	<b>861.2</b>	<b>1,213.8</b>	<b>956.5</b>	<b>496.3</b>	<b>889.7</b>	<b>243.8</b>	<b>396.9</b>	<b>199.6</b>	<b>347.4</b>	<b>588.3</b>	<b>853.0</b>	<b>739.2</b>	<b>295.0</b>	<b>38.9</b>	<b>48.5</b>	<b>72.1</b>	<b>8,436.7</b>	<b>100.0</b>

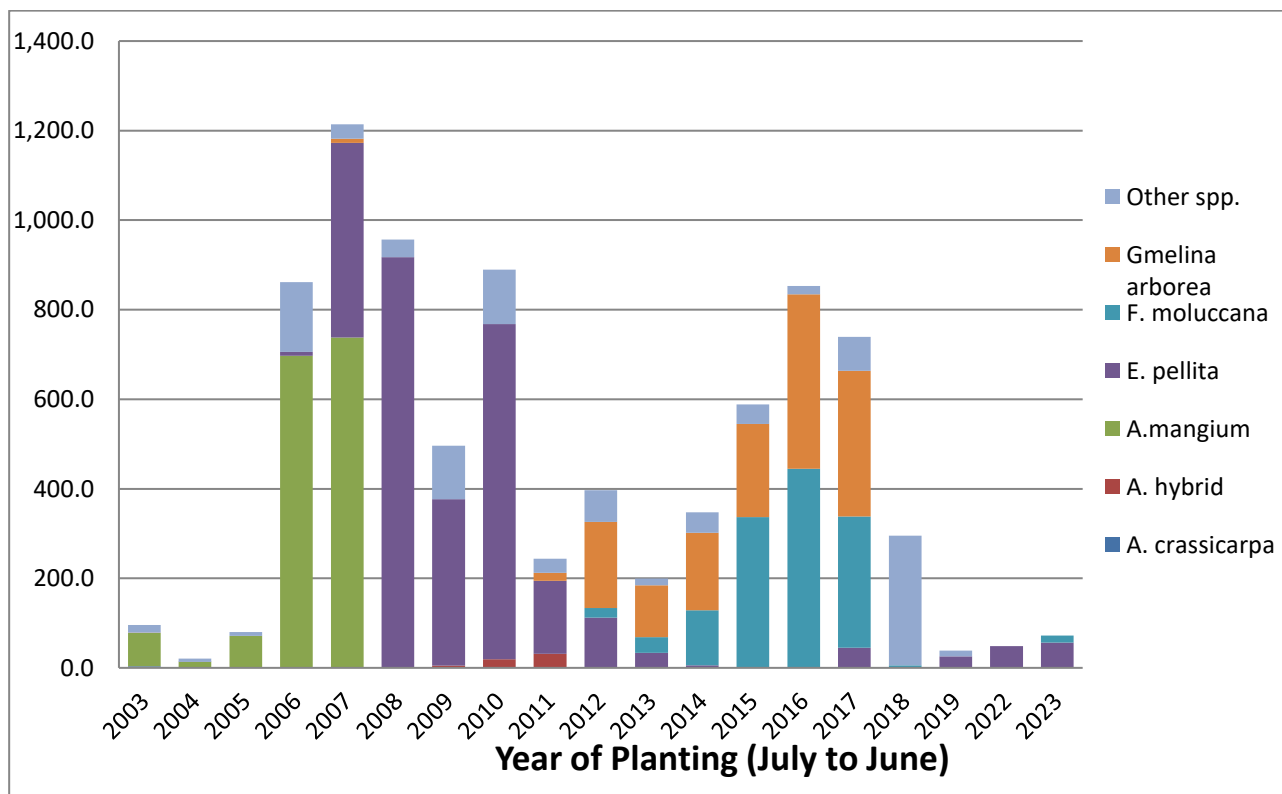
Layer used : Z:\Mapping\Temp\2022\11\_Nov\L21\FPMU\L21\_FPMU.gdb\Basemap\l21\_block\_update\_2022\1114\_clip\_rev1\_mtcs

N.B. The areas in Table 5.4 are those which passed post-plant QC. Table 5.4 also includes a few small areas which were planted but are considered to have failed following establishment and which might be re-planted before rotation age.

The age class distribution of the resource in the MTCS area for six named species, and all other species combined, is shown in Figure 5.1.

The age class distribution is highly skewed. With a weighted average rotation age of around 10 years the annual area harvested on a ‘normalised forest basis’ would be about 850 ha. The harvesting plan takes in to account the desirability of attaining a more normal forest structure, together with fact that almost all the mangium blocks have failed and will yield little or no harvestable volume, when determining the annual cut in terms of area and volume.

**Figure 5.1: Age Class Distribution for the Major Species - Paong (LPF/0021)** 14 November 2022



Source: Paong Block master 14 November 2022. Excel file: Paong FPMP Tabs 5.1, 5.2 & 5.3. etc

### 5.5.3 Sustainability of production

When considering sustainability of production, it should be kept in mind that Samling's downstream is also supported by log production from Samling's other ITPs. In order to ensure a more or less regular log flow to the mills it is, therefore, Samling's *total log flow* that must be sustainable and not necessarily that of any individual LPF. (See also Ch.10). Furthermore, as noted in the previous paragraph, the area that might be harvested on an annual basis is far too small for economic annual production.

### 5.5.4 Risks faced by the resource

#### *Disease*

A *Ceratocystis* sp. has been present in PAONG LPF for some time and has resulted in the death of a number of *A. mangium*. Management must always be aware of the possibility that the incidence of damage and death will reach the epidemic proportions already experienced in Sumatra and, to a lesser extent, in Sabah and of the impact that this will have on the AAC – and on future species selection. However, in PAONG *A. mangium* had in great part already failed before the arrival of the *Ceratocystis* sp. and, as reference to Fig. 5.1 shows, it is not been planted, other than for an R&D trial, since 2007.

#### *Fire*

All forest plantations are at serious risk to fire at some stage in their development. It is the responsibility of management to reduce the risk where possible and be prepared to deal with any incidence of fire that might be within its area of responsibility and to assist in dealing with fire in nearby neighbouring areas.

#### *Flood*

There are no parts of the MTCS area that are subject to serious, prolonged flooding.

#### *Wind blow*

Experience on the peat at Segan has shown that wind damage can be severe. Mangium and its hybrid might be more prone: a stark example of this was observed with two adjacent blocks, one of pellita and the other of mangium: the latter was flattened but the former remained standing. Elsewhere pellita is seen to suffer but, perhaps surprisingly, not from uprooting but from both stem break and the stems bending - something from which they did not recover. However, if the water table is too high then blow may occur.

However, on the mineral soils of PAONG LPF, wind damage, whilst it might be severe very locally, has not yet been wide spread. When wind blow does occur, it gives the impression that the trees have been struck by a strong wind on a very a narrow front – a line squall. But, of course, the damage is accumulative over the rotation period and could have a significant effect on yield.

### 5.6 Forest Carbon Stocks and High Carbon Stock Areas (HCS)

The previous edition of the MTCC's MC&I (MC&I Forest Plantation.v2) did not stipulate any requirements regarding forest carbon stock. The revised version, the MC&I SFM, which came into force 1st January 2021, does mention forest carbon stocks under Indicator 6.1.2 in terms consideration of the impacts [of the LPF's activities] on forest carbon stocks. The 8,946 ha (36.0%) of the MTCS area that is under natural forest and protected as SMZs, is a significant forest carbon stock that increases as the heavily disturbed MDF continues to recover, grow and to sequester carbon dioxide in the process.

High carbon stock is mentioned under Indicator 6.12 with specific reference made to *afforestation of non-forest lands*.

## 6. Environmental Considerations

### 6.1. Environmental Limitations

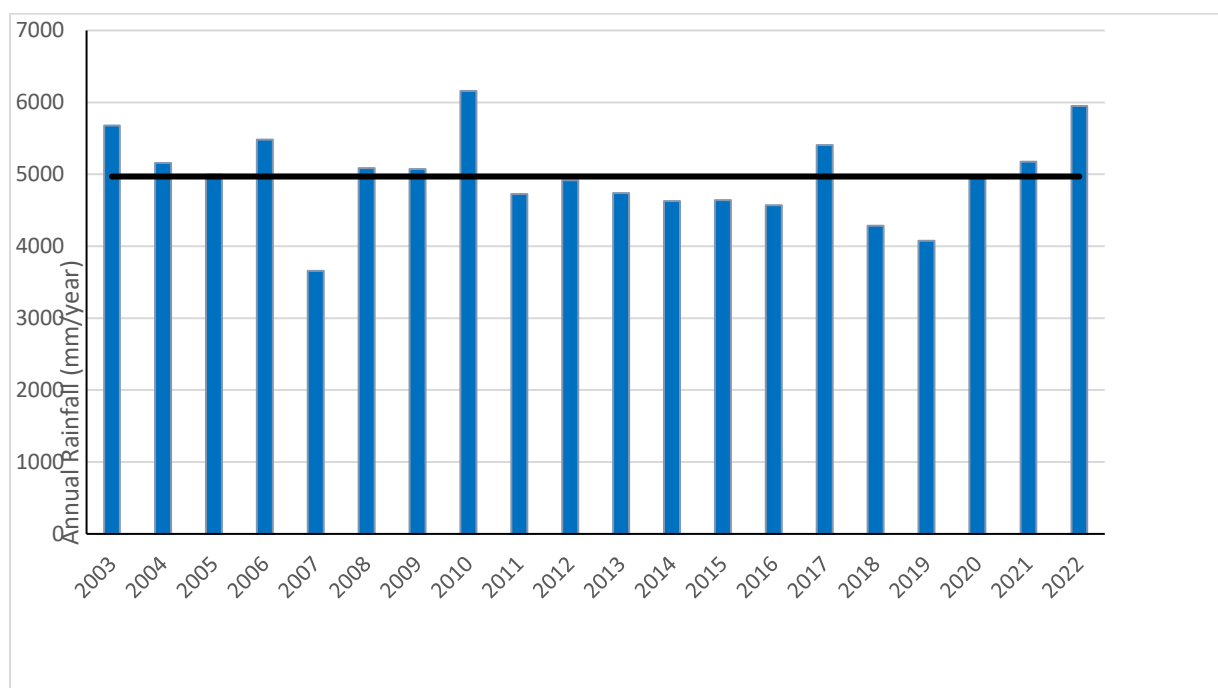
#### 6.1.1 Introduction

There are few environmental limitations for ITP in the LPF area. Similarly, for the MTCS area where the main limitation is the broken terrain with short, steep slopes on relatively fragile soils leading to a potential for increased erosion. A further limitation is that the combination of high rainfall and broken terrain gives rise to an intricate network of small streams. There are thus numerous water courses that must be buffered with protective strips of residual natural forest or unplanted land of widths determined by the prescription set out in the EIA and shown in Table 4.2.

#### 6.1.2 Rainfall

The average annual rainfall recorded over 20 years at PAONG nursery is 4,969mm. It has ranged from 3,658mm (2007) to 6,157mm (2010) and has averaged 19 rain days a month and 232 rain days a year. Any given month in the year might be either the driest or the wettest in that year. The driest month is August 2007 with 102mm and the wettest is October 2005 with 824mm. This relatively high annual rainfall with frequent rain days and no truly distinct seasons<sup>1</sup> impacts heavily on the efficient use of both labour and equipment and thus on operational costs.

**Figure 6.1 Paong LPF: Annual Rainfall - 2003 To 2022 (mm)**



Source: Rainfall LPFs Feb 2023

<sup>1</sup> November, December & January contribute 30% to the total annual rainfall, whilst June, July & August contribute 20%.

**Table 6.1 Paong LPF: Average monthly rainfall and rain days 2003 to 2022 (inclusive)**

Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	
													Monthly	Annual
mm	484	373	408	439	428	370	323	304	394	420	527	500	414	4,969
days	22	19	19	20	20	17	16	16	18	20	23	23	19	232

Source: Rainfall LPFs Feb 2023

**6.1.3 Access**

The high level and frequency of the rainfall and steep terrain makes access to some areas difficult, and even impossible at times, especially during the wetter season (November to January inclusive) when ungravelled roads can quickly become slippery and temporarily unusable. Because of this it is not realistic to plan for reliable harvesting and transporting on a year-round basis. To ensure a regular log supply a buffer stock will have to be built up at an all-weather depot, or at the mill, or both, before the onset of the wetter season.

**6.1.4 Harvesting**

Harvesting will be predominantly by shovel yarder with shovel extraction close to the roads. This combination makes for reasonably efficient extraction in the broken terrain whilst minimising the environmental impact, especially soil disturbance that can lead both to compaction and to increased erosion. Ground skidding may be used in the few areas where the access and topography restrict the efficient use of a shovel yarding/shovel extraction combination but must be kept to the absolute minimum to avoid serious site damage and compromising the productivity of the next rotation.

**6.2. The Environmental Management Plan<sup>2</sup> (EMP)**

The EMP (DOC015) is a stand-alone document to which reference should be made for details. Elements of the EMP are referred to in various sections of this FPMP. Some of the essential points regarding environmental impact mitigation measures are restated below in Section 6.3.

**6.3. Environmental Impact Mitigation****6.3.1. Soil erosion**

Mechanised operations in areas of steep slopes and high rainfall inevitably give rise to increased soil erosion. This is kept to a minimum firstly by using the most appropriate harvesting systems. Secondly, where new roads must be constructed, by ensuring good road alignment and by construction that conforms to the FDS standards – which is necessary in order to obtain a PHC (Permit to Harvest Coupe). Thirdly, by ensuring that any extensions of spur roads and clearing of new landings to facilitate extraction and loading are kept to the minimum necessary for efficient operation.

Section 10.2 describes the shovel yarder system that is the main extraction method. The use of this system minimises soil erosion and compaction by reducing the need to enter the harvest block with ground-based machinery. Where the terrain allows, operation efficiency requires the use of shovel extraction (excavators with grapples) to extract from roadside strips.

<sup>2</sup> EMP for the Replanting of Coupes 01A -08A of Paong Forest Plantation. Ecosol Consultancy Sdn Bhd September 2021 (NREB/6 -3/2H/52)

### **6.3.2. Water quality**

Maintenance of water quality is in part achieved by minimising soil erosion (6.3.1) and by keeping fertiliser leaching and herbicide run off to the minimum. Fertiliser use is exceptionally low - less than 70kg/ha. The herbicide load is also low with 4 to 5 litres/ha applied each round. The active ingredient of the main herbicide used is glyphosate which is generally considered to be toxicologically and environmentally more benign than most of the other herbicides currently available.

To date PAONG LPF has not used insecticides in the field. However, experience with *Gmelina* in other ITPs indicates that there might be a need for very restricted use of a termiticide. However, it would only be used in response to attack and, as *Gmelina* is not currently planted, this is unlikely to be an issue.

Sewage disposal in the camp is by means of cess pits and in the plantation by long drop latrines. All used oil from in-field oil changes is brought back to the workshop for controlled recycling or for disposal as scheduled waste.

Water quality is monitored by means of water sampling whereby samples are taken quarterly from sampling points identified by the EIA. These samples are analysed by an external laboratory with the results submitted to NREB and presented within the external consultant's quarterly Environmental Monitoring Report (EMR). Reference to these reports will confirm that, to date, the results have always been within NREB acceptable parameters or in other ways compliant with the standards set in the EIA. (The most recent results appear in Samling's website.)

### **6.3.3. River buffer zones (also known as riparian buffer zones) – RBZ**

Riparian buffer zones are established in accordance with the EIA recommendation (See the EMP and Table 4.2). The objective is to establish a well-defined strip of land - a buffer - that will help to protect the river bank and the river bank eco-system at least for the currency of the LPF. This will reduce soil erosion and thereby reduce the amount of sediment moving into the water courses. Establishing and then protecting riparian buffer zones also maintains, and over the longer term enhances, the biodiversity of the area. There is currently 1,806 ha of RBZ within the MTCS area. It is expected that the RBZ area will increase following demarcation prior to the harvesting of the first rotation and re-demarcation prior to planting: this has been the experience in other LPFs.

### **6.3.4. Zero burning**

There will be a 'zero burn policy' for the preparation of second rotation sites for re-planting after harvesting. This practice has the benefit of reducing air pollution; conserving the organic carbon content of the top soil and improving the overall nutrient status and condition of the soil. (Where the first crop was *Acacia*, burning for second rotation site preparation usually results in very dense natural regeneration of acacia seedlings. This gives rise to very heavy competition for the planted seedlings.)

'Zero burn' also removes the ever-present danger of a controlled burn getting out of hand. However, there are negative factors arising from a 'zero burn' policy: even on the second rotation, planting is more difficult than would be the case on a clean burnt area, especially where a very thick fern layer has built up. Furthermore, in dry periods the presence of large amounts of flammable debris presents a serious fire hazard that remains for some time after planting.

### **6.3.5. Integrated pest management (Use of chemicals)**

Apart from the insecticides and fungicides used, unavoidably, in the nursery only herbicides and fertiliser are used in the plantation. As stated in 6.3.2, both are used at low, or very low, rates of application. To review its use of chemicals in ITP, and in an attempt to further reduce such usage, Samling recently commissioned an Integrated Pest Management Framework; this is in the process of being finalised (March 2022).

## **6.4. Environmental Safeguards**

### **6.4.1. Environmental Monitoring Report (EMR)**

Ecosol Consultancy Sdn Bhd is contracted to monitor and review PAONG's compliance with the recommendations set out in the EIA. The results of their findings are presented in Environmental Monitoring Reports (EMR) which are produced four times a year: January to March, April to June, July to September and October to December.

### **6.4.2. Use of chemicals**

As stated in 6.3.5 chemicals are used in both in the nursery and in the blocks (but only herbicides) at very low rates of application.

PAONG acknowledges that under current best practice, applications of herbicides are necessary to ensure an acceptable survival rate as well as prevent increment loss through the competitive effects of weeds. The ERP (Enterprise Resource Planning) system records the type and quantity of chemicals used in forest operations and the rate of application is recorded on a block-by-block basis with the results reported monthly in the Block Consumption Report.

However, PAONG will always actively seek management practices that reduce the amount of chemical entering the environment of its LPF. This is of benefit not only to the environment but also to SRB as chemicals are expensive to procure and apply. Reducing these activities would have a substantial financial as well as environmental benefit to PAONG.

Training also provides best practice guidelines and protocols for the proper use of chemicals in terms of human and environmental safety and economic application and for the safe disposal of the containers in which chemicals were supplied.

### **6.4.3. Water course quality**

As mentioned in 6.3.2 under the LPF licence conditions PAONG is required to monitor water quality of the LPF's water courses. This is done four times a year with analysis undertaken by an independent laboratory and the results reported in the EMR.

### **6.4.4. Monitoring exotic plant introductions**

PAONG's management is aware of the potential problems that might arise from the introduction of exotic species. However, no exotic species grown by SRB has been identified as an invasive plant pest by any Sarawak government agency. Furthermore, only two exotic genera (*Eucalyptus*, *Falcataria* and *Gmelina*) are currently planted commercially (as opposed to trialled). Both are known to regenerate naturally, to a greater or lesser degree, under PAONG's conditions but this not is considered to be an adverse environmental impact.

To date, no exotic ITP species is known to have invaded areas outside either the LPF or the MTCS area. *A. mangium* – no longer planted in Paong – and *A. crassicaarpa* are pioneering, short-lived light demanders and are only known to regenerate freely in open areas, e.g. burnt-over SA. In any hill



paddy cropping cycle areas of SA, regeneration of *Acacia* might be considered as beneficial because it both protects and, as a nitrogen-fixer, improves the soil.

Even in the event that seed should germinate, then *E. pellita* seedlings will find it difficult to compete with the strong weed competition. *Gmelina*, whilst it does regenerate naturally in Sarawak, is not known anywhere to be invasive. *Falcata* (batai), although something of a pioneering light demander, has not been known to be invasive under Sarawak's conditions.

Unfortunately, other than those of the four genera listed above, not one of the almost 90 exotic species that have undergone trials by Samling to date has, as yet, proven successful enough to regenerate naturally and thus none poses any degree of environmental risk.

Monitoring is by observation during the course of regular security patrols and by *ad hoc* comment from management staff made in the course of their duty.

### **6.5 Fire Prevention and Control**

The PAONG LPF has a detailed fire plan covering fire prevention and control. Sections 3 & 4 cover the description of the LPF, rainfall records and trends and vegetation and boundaries and neighbours. Sections 5 and 6 cover the prescription for firebreaks and the potential fire risk areas and the fire danger rating system. Sections 8 and 9 cover vehicles and equipment. Sections 12, 13 and 14 cover the management of the situation should a fire occur with 11 and 15 covering post fire activities.

### **6.6 Conservation of Bio-diversity**

This has been briefly referred to in Section 4.4. Conservation of the bio-diversity as represented by the gene pools of PAONG LPF's flora and fauna and of the ecosystems in which they are found is very much dependent on the residual natural forest in the riparian buffer zones and the conservation areas which together represent more than 34% of the gross area of the MTCS area. There will be, as yet unidentified, contributions to bio-diversity from the *planted* forest areas. Indeed, even areas of SA in their various stages have a part to play in contributing to the overall bio-diversity of an area, although there is no SA within PAONG's MTCS area

As stated in the EIA report and mentioned in Chapter 5, harvesting in the residual natural forest has been very wide spread and at varying degrees of intensity for several decades. No natural forest type has been identified within PAONG LPF that is not also widely represented elsewhere within Sarawak. As already mentioned, the residual or remnant forest falls into several mapping units which together are termed Special Management Zones (SMZ) - see Table 4.1 - all of which are protected to the extent that the LPF management the authority to do so.

Prior to harvesting starting in September 2021 the process of re-demarcating SMZ areas on the ground and their subsequent GPS tracking was carried out with far greater diligence than was the case in the early years of clearing and establishing the planted areas of the LPF. This in part due to the wide spread availability of GPS devices – some of the original blocks were established using chain and compass and in part in order to comply with the requirements of the MC&I. As harvesting proceeds through the MTCS area the re-survey of the coupes and blocks will no doubt result in a small increase in the total area of RBZs and possibly of other SMZ types.

As already stated in Section 4.2.2 the SMZs are protected areas. This protection should ensure that the current level of bio-diversity does not diminish; indeed, over time the diversity of the flora

should increase with the arboreal component developing in terms of DBH and height (i.e. structure) with the species composition becoming, albeit very slowly, more diverse (see 6.6 Residual Forest). The PAONG plantation maps show that the SMZs are widely distributed throughout both the LPF and the MTCS area. Currently they represent about 36% of the MTCS area (Table 5.2). It is expected that this percentage will increase a little over time as the pre- and post-harvest GPS surveys better define the land categories.

## **6.7 Residual Natural Forest**

### **6.7.1 Background**

The history of the LPF referred to in Section 5.1 clearly shows that the original MDF was subjected to very heavy harvesting in the past. This means that the residual, or remnant, MDF forest is very much secondary in physical structure and in terms of genetic diversity its flora is probably somewhat changed. However, as no study was undertaken to establish baselines in the natural forest prior to harvesting, the original diversity levels of both the flora and of the fauna of the no longer extant primary forest type(s) remain unknown. It is now a question of protecting those areas of residual forest that have been designated as SMZs. Continued protection should, over many decades, allow the forest to recover in terms of structure: i.e. only time will allow the full expression of those species that are genetically pre-disposed to grow to a large size. Similarly, over time, genetic diversity should increase – slowly – as species that might have disappeared are recruited back into the SMZs by various means of seed dispersal.

## **6.8 Adjacent Lands**

As can be seen from Map 5.3, the greater length of the MTCS boundary is common with two of Samling's FTLs: Sekiwa FMU (T/0404) - from which LPF/0021 was excised, and Gerenai FMU (T/0413). Sekiwa FMU is currently in the process of being certified under the MTCS and the Gerenai FMU was certified, also under MTCS, in 2020.

In the north-eastern 'wing' of the LPF, a short length of the LPF boundary is common with that of Juta Intelek Sdn Bhd (T/0429) – an unrelated company.

There is no neighbouring or nearby suburban or residential development which requires the consideration of either environmental and aesthetic values or additional safety considerations during forest operations.

## **7. Socio-Economic Context**

### **7.1 Contribution by Current and Future Forest Operations**

The net plantable and potentially plantable area of the MTCS area is just under 10,000ha. This is almost negligible when viewed against the State's previous planting target of one million hectares or even against the area currently planted state wide. However, small as this area might appear the PAONG resource is important to Samling and to the Miri region's economy. All the log production goes to Samling's own downstream operations: peeler logs to the plywood mill and saw logs to Samling Housing Products Sdn Bhd. The sawn timber will be further processed by Samling Housing Products Sdn Bhd (located at Kuala Baram). Chip logs may go TreeOne Mega Pellet Sdn Bhd in Bintulu for wood pellet production or to Samling's associated company – Daiken Sdn Bhd (Kuala Baram) – for the manufacture of MDF. Thus, the entire log production from PAONG ITP will be utilised locally, i.e. primarily within the Miri-Bintulu region.

Maintaining a sustainable flow of logs suitable for Samling's solid wood downstream requirements is a key overall management objective of SST. The PAONG MTCS area must both play its part in achieving this.

The determination of the annual cut is based on:

- areas of mangium in the MTCS area that need to be cleared for replanting; and
- the need to start the normalisation process for the LPF.

Based on a long term, sustainable cut objective, the AAC must be reviewed on an annual basis. The objective is to ensure a more or less sustainable harvest volume from the whole LPF whilst moving towards a normal age class distribution.

## **7.2 Employment and Services**

As may be seen in Table 7.1, at the end of 2022 PAONG employed 11 full time staff at supervisor level of whom six are local and a further four are Sarawakian. There were 43 workers of whom 25 were Indonesians on two-year contracts and only 14 were locals. The competition for local workers from offshore oil and gas employment and the oil palm industry (both own planting and estates) is strong. However, of PAONG's Sarawakian work force almost 100% can be considered as 'local', e.g. from Lg Tebanyi @ Lg Sebatang and other long houses not too far away.

Establishment and maintenance work in PAONG are done using in-house workers and contractors. The greater part of the logistical support is supplied locally from Miri; e.g. engineering, spares and supplies.

PAONG is an equal opportunity employer: however, of the 33 Sarawakians employed only 6 are female. Rather being the result of any prejudice or bias, this imbalance reflects the not incorrect perception by locals of ITP work being in the 3 D category – dirty, dangerous and demanding (or difficult).

**Table 7.1: Paong LPF - Social and economic monitoring – employment**

Staff		2022	
		n	%
Sarawakian *local	m	8	72.7
	f	3	27.3
	m+f	11	100.0
Sarawakian – other	m	3	100.0
	f	0	0.0
	m+f	3	100.0
Other Malaysian	m	0	0.0
	f	0	0.0
	m+f	0	0.0
Foreign	m	0	0.0
	f	0	0.0
	m+f	0	0.0
Staff - total Malaysian & foreign		14	18.7
<b>Worker</b>			
Sarawakian – local	m	9	75.0
	f	3	25.0
	m+f	12	100.0
Malaysian - other	m	1	100.0
	f	0	0.0
	m+f	1	100.0
Foreign	m	48	100.0
	f	0	0.0
	m+f	48	100.0
Worker - total Malaysian & foreign		61	81.3
<b>All employees - Summary</b>			
Male & female	m	69	92.0
	f	6	8.0
	m+f	75	100.0
Malaysian & foreign	*local	23	30.7
	other Mal	4	5.3
	foreign	48	64.0
	<b>All</b>	<b>75</b>	<b>100.0</b>
Source: Paong Payroll Dec 2022			2-Jan-23
*local-means within district.			

### 7.3 The Value of Forest Services

An EIA of the whole LPF was undertaken in November 2000; Section 3.3.3 deals with the socio-economy of the region. Ten native settlements were identified then within a much larger LPF (100,000+ha) but none was within what is now the PAONG MTCS; the nearest is Lg Tebanyi @ Sebatang which is less than one kilometre for the MTCS area. For these communities that EIA survey recorded 224 doors with an estimated population of 1,209. But it was noted that “... whilst the number of door-units can be taken as more or less correct the population figures do not give a true picture of the actual number of people residing in the communities surveyed. ...a significant number of residents, especially the younger and more able-bodied people, have left the settlements and are now working elsewhere...”. This is an extract from an EIA conducted almost 23 years ago. The SIA (2023) recorded only 61% of the individual houses (*sulaps*) as being occupied. In Lg Tebanyi @ Sebatang and Lg Ta’ah 87% and 40% of the doors, respectively, were occupied.

The core occupation of the area's resident communities is subsistence farming and is therefore not related to the residual forested areas of the MTCS – which constitutes more than 95% of the total LPF area and which is mainly (91.8%) within the Nakan-Kalulong F.R..

On Page C3-29 of the EIA (2000), the point regarding rural depopulation is re-emphasized: “... *most of the younger people of working age have left for the towns where better paying jobs can be found while the elderly and young children remain in the longhouse...*”.

The following extract from Section 4.2.1 of the HCVA (2023) Assessment indicates a lack of demand for forest services: “...*use of Non-timber Forest product (NTFP) appears to be on decrease, although wildlife, wild vegetables and wild fruits are still gathered as their food supplement. Raw material, herbs and medicinal plants are rarely used nowadays because much of the knowledge has been lost and the increasing on modern medicine. ...For local communities, dependence on forests has generally decreased since embarking on eco-tourism.*” HCVA (2023) concludes in Section 5.0: “*The ethnic communities are likely to continue to rely on forests for many years for materials such as timber, rattans, palm leaves and foods from nearby forests including a part of the study are in the vicinities of their settlements. ...Any direct impact [on the HCV 5 Values] from Paong plantation would be minimal...*”.

There seems to be little significant need, and hence little current demand, for forest services in the form of products such as fish, wild meat, honey, boat and house building materials, rattan etc. from the LPF and therefore from the MTCS area.

In the EIA assessment undertaken 23 years ago it was noted that “... *a significant number of residents, especially the younger and more able-bodied people, have left the settlements and are now working elsewhere.*”

**Fishing:** “...*fishing in the Batang Tinjar and its tributaries is not commercial in nature being carries out by the locals mainly to supplement their diets. Only excess catch, which is rare, is sold for extra cash...*”

**Hunting:** “...*activity has diminished greatly since the arrival of the loggers. The disturbed forests do not support a large population of wild game...Game meat, if any is mainly for the hunters' own consumption...*”

As an ever-increasing percentage of the population becomes wage earners and entrepreneurs, either locally - especially in Samling's ITP and nearby oil palm plantations - or more probably, after migrating to urban centres, any continuing demand for forest services from PAONG MTCS area in the form of products such as fish, wild meat, honey, boat and house building materials, jungle vegetables and fruit, rattan etc. will surely continue to fall.

## **8. Establishment and Silvicultural Regimes**

### **8.1 General**

Planting started in PAONG LPF in 2003, mainly with mangium. The establishment regime for mangium is well known but the most appropriate silvicultural regime required for solid wood products, as opposed to chip logs, has yet to be proven. There is little information available in terms of the methodologies and economics of such practice from either the private sector or government agencies.

Samling's Segan is a leader in developing the management practices required to satisfy the objective of producing logs for solid wood use. (The Sarawak Planted Forest (SPF) objective was to produce chip wood - for a pulp mill that has yet to be built near Samarakan, Bintulu.)

The Sarawak Timber Association (STA) has a Plantation Committee on which SST is represented. This committee is charged primarily with representing the industry in meetings with government to discuss, improve and resolve technical and common management issues. It also provides a valuable forum for discussion and exchange of ideas and practices. STA also organises overseas study tours that present a useful opportunity to learn from longer established ITP based industries. Samling is now a member of the Borneo Forestry Cooperative together with three or four Sabah ITP companies; it shares knowledge, experience and R&D trials and results.

## 8.2 Choice of Species

### 8.2.1 Background

When Samling started planting in Segan in 2000 the management objective was to produce only chip wood. This objective was revised 3-4 years later to the current Samling objective. At that time mangium was the species of choice throughout Malaysia. The perceived wisdom at the time was that mangium would '*grow well - anywhere*'. Time has clearly shown that this is not correct. The initial large-scale planting of mangium in PAONG failed. The cause of failure has still to be determined. PAONG's average annual rainfall of around 5,000 mm might well be all or part of the cause but, somewhat anomalously, 10 plus trees were identified close to the Refor camp that, at 13.2 years old averaged, 1.2 m<sup>3</sup> with an average DBH of almost 40 cm (and a maximum of 55 cm).

Mangium suffers from high early mortality. In PAONG LPF mortality was exceptionally high and very early – to the extent that, as noted above, mangium was a failure. In part this might have been due to a high susceptibility to root rot (*Ganoderma* spp.) which experience elsewhere indicates increases in severity with each succeeding rotation. However, without doubt there were other, as yet identified, contributing factors to the failure. Whilst *Ceratocystis* is undoubtedly a serious problem for mangium in Samling's plantations, it appeared too late to become a problem in PAONG LPF as the mangium had already failed.

The decision has been made to plant *A. crassicarpa* on sites not suitable for *E. pellita*. This planting will be rigorously monitored.

The early promise of *Acacia* hybrid has not yet been realised. Whilst the form and branching habit is quite good the growth and survival (susceptibility to pink disease) are generally not. The MAI of both Year Class 4 and 5 was below 10 m<sup>3</sup>/ha. The PAI was a little higher but not sufficiently high to lift the MAI to an acceptable level. Clones 1 to 14 of the 28 *Acacia* hybrid clones brought in as tissue culture material from Sabah in 2012 were planted in LANA. Not one of the fourteen clones planted is performing well and the form is generally very poor. (Not one of clones 15 to 28 planted in Segan has performed well.)

The initial dependence on a single species is recognised by Samling - and by much of the ITP industry in Sarawak - as a flawed policy and R & D's search for alternative species continues. with a recently increased momentum. R&D's aim is to achieve a degree of species diversity that will help mitigate the risk from pest and disease attack whilst still meeting the objective of economically producing peeler logs of acceptable size and quality.

However, other than *Acacia mangium*, *Eucalyptus pellita* and *A. crassicarpa*, and perhaps *Falcataria moluccana* and *Gmelina arborea* on very select sites, not one of the more than 90 or so species trialled (both native and exotic, see Appendix 1) by Samling to date has shown any promise for use in solid wood ITP.

### 8.2.2 Site-species matching

There will no doubt be subtleties provided by differing chemical characteristics of the various series and compound associations of the mineral soils but Samling's recognition of any such subtleties and the ability to make use of them is some way off. There are two main soil mapping units in the MTCS area - and six within the LPF. The Merit and Kapit series dominate the LPF and the MTCS area but the compound association (i.e., a mix of two or more soil series) that form the soil mapping units are all capable of supporting ITP species.

Over time the planted species diversity might better reflect the diversity of planting sites available. But any successful increase in species diversity will require: a) a wider range of economic species than has currently been identified; and, b) a much greater knowledge of both the soils and of the requirements of the economic species that might be best suited to them. Soil maps are available from reconnaissance level surveys at a scale of 1:250,000. The EIA refers to soil maps at 1:50,000. Samling's experience from the actual harvest yields has shown the performance of *E. pellita* to be highly variable - in all LPFs. Several factors might contribute to this variability, one of which might well be due to soil. A system of soil classification, based on in-house soil survey supervised by an external consultant, is in process for all LPFs. In PAONG 108 auger pits have been established and reviewed by the consultant to date; of these 86 points (80%) were considered to be soils better suited to *pellita*. Based on the soils work done to date, the consultant is of the opinion that soil should generally not be considered a limiting factor for the growth of *pellita* in Samling's mineral soil LPFs.

Samling's extensive *pellita* breeding program still continues with the first of the improved seed collected in 2022.

### 8.2.3 Planting of native species

The Sarawak Forest Department has long extolled *kelampayan* (*Neolamarckia cadamba*) as an ITP species. Without doubt the form, growth rate and peeling qualities of this are all very positive attributes of this species. However, in Sarawak to date there is insufficient knowledge of seed sources and related genetics, nursery practice through to ITP silviculture for this species. There has been at least one relatively large-scale failure; success in Sarawak at an operational ITP level seems to be unknown - to Samling at least. Samling has planted *kelampayan* in other LPFs with no success and it has been planted in PAONG on several small sites, also with no success.

In Chapter 9, Plantations, in 'A Review of Dipterocarps'<sup>3</sup>, Weinland restates a conclusion drawn by Kollert *et al* (1994) "...The establishment and management of [dipterocarp] plantations are uneconomical on financial terms alone." This conclusion was drawn more than 20 years ago. With the changes that have occurred since, particularly in wood processing technology, the possibility that one or more of the dipterocarps, e.g. *S. parvifolia*, might prove to be an economic plantation species is recognised by Samling. There is however more than 100 years of literature on the subject of dipterocarps as plantation species and a review is required before addressing the problem of sourcing seed and then moving to trials can be considered.

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<sup>3</sup> Eds. Appanah, S & Turnbull, J. M. CIFOR (1998)

Samling has spent much time and money on trials of native species. However, at the present time neither Samling nor - so it would appear - any other company in Sarawak has accessed sufficient and reliable information on the use of Sarawak native species in ITP to implement any other choice of species scenario than that described here.

#### 8.2.4 Utilisation of species selected – end uses

Table 8.2 shows the end uses for the species that will be harvested during the currency of this FPMP – mainly pellita, with some mangium and hybrid being salvaged on clearing for planting.

**Table 8.2: End-uses of species being harvested in PAONG**

	Plywood	Sawn timber	HDF/door skins/wood pellet
<b>Long Established</b>			
Mangium	Yes	Yes	Yes
Acacia hybrid	Yes	Yes	Yes
Pellita	Yes	Yes	Yes
<b>Recently Established</b>			
Gmelina	Yes	Yes	Yes
Falcata	Yes	Yes?	BD (kg/m <sup>3</sup> ) - 270 cf mangium 460 Possibly too light?

### 8.3 Current Establishment and Silvicultural Regimes

#### 8.3.1 *A. crassicarpa*

The intention is to produce a percentage of logs that will be suitable for peeling and for sawing. The determinant of suitability is primarily small-end diameter with grading for roundness, straightness and internal defect (centre rot and hollow) undertaken after felling. Logs that are unsuitable for solid wood use will be sent to Samling's HDF mill and wood pellet plant.

#### **Good Quality Stock**

As a matter of course PAONG will only plant selected stock with good genetic characteristics with preference given to seeds from in-house collections of elite trees or from the clonal seed orchard which comprises only clones of elite trees.

#### **Site Preparation and Establishment**

Before planting takes place some site preparation is necessary. This usually involves a manual slash and a chemical application to kill any emergent weeds, particularly natural regeneration of mangium, thereby reducing competition to newly planted seedlings. Labour shortage often results in the time elapsed between completion of harvest and the commencement of site preparation being overly long. This means that prior to spraying the site must be slashed and time allowed for new growth to flush so that spraying can be more effective.

PAONG plants 1,667 stems per hectare (2m x 3m) and considers a block to be established when a survival rate of 95% or more is achieved 30 days after passing planting QC.

#### **Maintenance**

Conditions in the ever-wet tropics are very conducive to vigorous weed growth. Circle weeding, slashing and herbicide spray are all used at a frequency that is determined by the rate of weed growth relative to that of the trees.



### **Silviculture**

The silviculture regime with pruning lifts to 3 metres is intended to produce trees with some “clear wood” in the pruned length. Live knots would be restricted to a small DOS core along the pruned length. This should reduce the amount of veneer repair required, allow a proportion of face and back veneer to be produced and also improve sawn timber recovery.

#### **8.3.2 Eucalyptus species**

As originally planned the value of the unthinned eucalyptus resource would be maximised by:

*aiming to produce a crop that has a final stocking of 600 to 700<sup>4</sup> SPH of good form and which have at least 80% of these stems pruned to 6.0m.*

The regime designed to achieve this is essentially the same as that for mangium except that the rotation length might be 10-12 years. Where performance has been particularly poor the rotation would be shortened. Only when a sufficiently large number of PSPs have been established in blocks of 10 or more years old and when there is grade recovery information from downstream will it be possible to determine the economic rotation age.

#### **Good Quality Stock**

As a matter of course PAONG will only plant improved genetic material. Seed is currently from Samling’s own elite tree section. The extensive pellita breeding programme is now well in hand on three sites. The first recommendations for improved seed have been made and it is expected that SPA seed will be available from these areas in 2021/22.

#### **Site Preparation and Establishment**

Before planting takes place, some site preparation is necessary. This usually involves a blanket herbicide application to kill any emergent weeds, particularly natural regeneration, therefore reducing competition to newly planted seedlings. Labour shortage often results in the time elapsed between completion of harvest and the commencement of site preparation being overly long. This means that prior to spraying the site must be slashed and weed growth allowed to time to flush with new growth before spraying herbicide.

PAONG plants 1,110 stems per hectare (3m x 3m) and considers a block established with a survival rate of 90% assessed 30 days after passing planting QC.

#### **Maintenance**

Conditions for weed growth are excellent in the ever-wet tropics. Circle weeding, slashing and herbicide spray are all used at a frequency that is determined by the rate of weed growth relative to that of the trees.

### **Silviculture**

The objective is to produce primarily peeler logs. Samling downstream has undertaken peeling trials of SEGAN pellita logs at 5.6yrs old. The results were satisfactory. There was negative comment only on the small diameter and the existence of dead knots; both of which can be influenced by silviculture. The results of both the sawing and KD trials were also strongly positive.

The intensive silvicultural regime with four pruning lifts was designed to produce trees with a significant volume of “clear wood” in the lower stem. Logs from the lower stem would have

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<sup>4</sup> This is considerably higher than the conventional stocking for solid wood ITP – a direct result of the current ‘no thin’ policy. With improvements in site selection and in the genetic material, thinning may be introduced.

primarily green knots restricted to a small DOS core along the pruned length and should yield a significant proportion of face and back veneer.

The rationale behind producing stands with 80% of stems pruned to 6.0m is to allow pruned butt-logs with a minimum small end diameter (sed) of >15cm to yield two peeler logs each of 8 ft (2.5m) with an allowance for end splitting.

With a 'no-thin' regime a residual stocking of around 600 to 700 stems per hectare is expected to remain after natural mortality has taken its toll through to Year 12. Whilst this high stocking will restrict branch size in the logs above the pruning limit it will also restrict "clear wood" production over DOS (diameter over stub) in the pruned stem length.

Pruning above 4.5m might prove to be uneconomic but until PSP data on older trees is available and more information is produced by downstream both as to their intentions regarding re-equipping and the likely recovery rates at various log diameters it is difficult to evaluate the economics of pruning.

In early 2013 a stem canker (*Botryosphaeria?* sp.) was confirmed as widespread in *E. pellita* in Samling LPFs including PAONG (see Dr Lee, S.S. internal report, 12 August 2010). Pruning of eucalyptus stopped in mid-2013. Subsequent R&D trials have shown that green pruning (that is the removal of branches before they die) reduces the incidence of stem canker arising from what is termed *branch associated stem fungal irritation*. Green pruning has now restarted. It also reduces the incidence of dead knots and should more or less totally eliminate them if correctly practiced. Green pruning had a marginal negative effect on DBH increment in the first two years of the trials. Continuation of the trials will show if this impact is maintained or not.

#### **8.4 Scheduling of Silvicultural Operations**

Apart from the need to ensure that early competition from weeds is kept to minimum, the key driver behind the silvicultural schedules of those species to be pruned is the timing (but see below). As PAONG is aiming to produce clear wood material in order to maximize veneer recovery and quality, the minimisation of the knotty core (determined by diameter over stub, or DOS, at time of pruning) is essential.

Schedules are produced by the PAONG LPF manager and checked by the visiting HQ manager. The recognition of *Ceratocystis* sp. in mangium and a stem canker in *pellita* – both in 2012 - means that the progress in the relationship between pruning and the incidence of these two diseases must be closely monitored.

#### **8.5 Alternative Plantation Regimes**

It is acknowledged that ITP silviculture for the production of logs for solid wood, as opposed to chip, use is a new subject both to SRB and within Sarawak, and indeed within Malaysia, and that there is much that is not known. A flexible approach is therefore taken towards the use of a particular establishment or silvicultural regime. Although there are core regimes (set out above) there is very much a "horses for courses" dynamic in place at PAONG LPF. If a block or species warrants a different, seemingly more appropriate, regime to be used then it might well be used.

A good example of this is on some of the older mangium blocks where the final pruning lifts had not been done by Year 4 and it was decided that no further pruning would be done. It was

considered that the investment of time and money into these blocks in an attempt to produce some additional high quality clear wood product was not justified.

PAONG is committed to employing the best practice for all its resource. It is open to employing new or innovative ideas if they are proven to be appropriate and they exceed the performance boundaries of currently accepted best practice.

## **9. Monitoring Plantation Forest Dynamics**

### **9.1 Permanent Sample Plots**

PAONG is active in the use of permanent sample plots (PSPs) to monitor the growth and to develop growth models. The LPF licence conditions require that one plot be established for every 20 hectares planted. From the start of PSP measurement this was reduced to one plot per 5 hectares and this has been maintained in order to build up a strong data base in reasonable time. PSPs are established when trees are 12 months old (previously 24 months). The PSP data are used to construct yield tables, to model the growth in order to update estimates of the sustainable allowable annual cut (SAAC), to determine which blocks should be harvested in any one year to achieve the SAAC and for long term production forecasts. P&D information is also collected at the time of PSP assessment.

PAONG has established, maintains and regularly measures an intensive allocation of PSPs to monitor forest growth and dynamics. There are more than 1,000 plots distributed over the R.1 area but not all are currently active due to access problems. The first PSPs in R.2 should be established in February 2023.

Following initial establishment of the PSP subsequent re-measurement should be done on the anniversary of the first measurement over the length of the whole rotation. As the data base strengthens the need to continue the current, very high, level of sampling intensity will be reviewed for each species.

Each plot is randomly (with some restriction) located within the area of the block that the GIS shows as planted. This is done at HQ, In the field, regardless of where it falls, the plot centre is established at the predetermined GPS point. The only exception allowed being to ensure that a plot does not encroach on to a road-line or any non-productive area that has been GPSd and excluded from the productive planted area statement.

PSP measurements are recorded on a paper-based system and then entered in to Excel for processing.

### **9.2 Taper Functions and Volume Equations**

An interim volume equation has been developed for *Eucalyptus pellita* (pellita).

Taper functions might be developed for Samling's pellita and other species when there is a sufficient number of representative trees old enough to provide the required full DBH range of sample trees. At a later stage of plantation development, it will be necessary to test the applicability of a single taper function for each species to all LPFs as opposed to a taper function for each species for each LPF.

### **9.3 Result of Monitoring Tree Growth and Site Productivity**

#### **9.3.1 Introduction**

As mentioned in Section 9.1, a strong system of PSPs is in place to monitor the tree growth of the whole of PAONG LPF. Consequently, as the MTCS area forms a part of the monitored area, the yield tables developed are applicable to the whole LPF and therefore to the MTCS area.

#### **9.3.2 Pellita**

The growth of pellita is variable with large differences between the PSP results for plots of the same age. (More than 4,800 plot measurements have been recorded for pellita in the PSP data base.) The increment (CAI) between sequential measurements of the same plot can also vary widely from one year to the next. The optimum harvest age has yet to be determined. It will probably be around 10-12 years. Much depends on the approach taken be downstream to handling small diameter logs.

At 31 March 2023 the average age at harvest was 13.8 years.

The determination of rotation length is dependent on a robust PSP data base. The growth to date has been disappointing and although there does appear to be an improvement in the CAI of the older stands until further measurements can confirm that this improved growth is being maintained it is planned to harvest at 10-12 years in the future. This assumption does not conflict with the earlier mention of 13.8 years, it merely reflects the delay in starting to harvest. The rotation length will be continually reviewed as more PSP data become available, both from PAONG and Samling's other LPFs, and when more detailed log recovery analysis is undertaken by downstream.

### **9.4 Monitoring of Pests and Diseases**

#### **9.4.1 Regular monitoring**

Regular monitoring is undertaken by the PSP crew at the time of establishing or re-measuring the PSP plot. Only the occurrence of what are considered to be the more important P&D factors are recorded.

#### **9.4.2 Ad hoc monitoring**

*Ad hoc* monitoring is undertaken for specific purposes by R&D.

## **10. Sustainability: Annual Cut, Harvesting Plan & System, Financial**

Sustainability: an enduring value. *Sustainable [forest] management is a beguiling term and open to many interpretations. It contains many uncertainties and ambiguities.* ♦ *Duncan Poore, 2003.*

### **10.1 Allowable Annual Cut (AAC)**

The AAC for PAONG LPF has not yet been determined as harvesting was much delayed meaning that there is a significant backlog to be harvested over the next 6-8 years. The over-age growing stock situation is clearly shown in Figure 5.1.

However, a preliminary computation estimates the AAC to be around 105,000m<sup>3</sup>/year. This is based on a 10-12-year rotation over the currently planted area of 8,400 ha using a MAI of 15 m<sup>3</sup>/ha at 12 years old.

The MTCS area is a significant contributor to the all LPF AAC. Because of the over-age situation harvesting is not determined by age but more on the need for a uniform level of annual production that deals with the over-stocked situation in reasonable time.

It should be noted that PAONG is only one of several of Samling's plantations that supply the Samling's mills. It is therefore the sustainability of Samling's total annual plantation log supply that is of critical importance and not necessarily that of the individual plantation.

As can be seen in Fig. 5.1 the age class distributions for both the all species total and the individual species are heavily skewed. This results in a very variable annual cut in terms of both volume and area because neither Gmelina nor Falcataria should be allowed to become too old and so should be harvested as close to their rotation length as is possible. It also means that there might be two years without any harvesting. However, as harvesting progresses management will try to start normalising the area harvested and thus planted for the second rotation.

### **10.2 Annual Harvest Plan**

The harvest plan follows the established Samling harvest plan style and is dynamic and held in soft copy format only. This allows for easy and, more important, for continual revision as new and revised PSP information is generated. It consists of a register of blocks planned for harvest in each of the next ten budget years; the blocks listed against each budget year will be the source of that year's AAC. The register is updated to reflect the reduction factor that considers the variance of the actual yield from that estimated for harvest planning purposes.

A management objective for the MTCS area is to eventually achieve a normal age class structure as the basis for a sustainable yield whilst targeting an AAC that should continue to increase until PAONG MTCS is fully planted. This will mean that some blocks would be harvested at an age other than their ideal rotation age. In some cases, this will result in a loss of increment. This is considered to be a 'cost' of achieving a normal structure more even level of annual production.

### **10.3 Harvesting System**

Because of the steep, broken terrain yarding is the primary harvesting system to be used at PAONG is cable. As well as being economically more efficient the use of this system also helps to protect the fragile soils and in particular reduce erosion and compaction. Avoidance of the latter effect is of particular importance when replanting with eucalypts.

Currently PAONG uses shovel yarders. This a cable system that enable partial or full suspension of felled trees when yarded to a landing for partial processing. PAONG may follow the SEGAN model and use a combination of in-house and contractor crews. Economics demands that extraction of trees harvested near the roadsides and in areas not suitable for shovel yarding must be ground based. Site damage will be limited by the use of shovel mounted grapples.

Other benefits of a yarding system include:

- reduced disturbance to soils on steep erodible sites;
- reduced compaction when compared to a ground-based system;
- it can be used from high vantage points minimising construction of new road infrastructure (this helps maintains water quality and minimises site disturbance); and
- it allows access to otherwise economically inaccessible areas.

PAONG only started harvesting the first rotation of ITP in September 2021. Planting was on the residual and degraded MTH areas that resulted from being very heavily harvested. Full use is made of the existing roads and skid trails and little new roading is required other than short extensions of some access spur roads necessary for efficient harvesting.

#### **10.4 Financial Sustainability**

The PAONG MTCS area is the major part of the PAONG LPF but only a part of the total ITP area operated by the Samling Group. The Group has clearly been financially supportive of PAONG LPF for the past 20 years (from start-up to starting harvest), and of its other ITPs since their start-ups. It is reasonable to assume that this will continue to be the case for the foreseeable future. However, following the start of harvesting in September 2021, net revenue from internal log sales will cover replanting and overhead costs and it is expected that this will continue to be the case for the remainder of the 60-year licence period.

#### **10.5 Non-Timber Forest Products**

There are no non-timber forest products collected for commercial use.

### **11. Spatial Information and Management System**

#### **11.1 Spatial Information**

With the ArcGIS Samling has a GIS that contains detailed spatial information for the PAONG LPF. Data are captured by the QS team using Garmin 76CSx. LiDAR commissioned by Samling covers part of the area. GPS tracks are downloaded using OziExplorer. Tracks are then cleaned and processed using Quantum GIS. GIS data is then held by ArcGIS for further processing and mapping. The GIS allows Samling to produce a variety of maps displaying an array of information including legal, coupe and block boundaries, protected areas, land-use and related spatial information, such as contours and transportation features. Harvest planning will be done manually on maps generated from the GIS and where available - with LiDAR providing contours at 5m intervals. Currently, purchase of IFSAR data for those areas not covered by LiDAR is under consideration.

GPS tracks are backed up at PAONG. After arrival at Miri HQ tracks are checked and cleaned and then saved on both Refor hard drives and Samling's local server.

Paper based copies are held as further "backup" should the electronic systems fail.

#### **11.2 Management System**

Samling uses the ERP system for financial control and the ATLAS GeoMaster suite to manage block records.

### **12. Conservation, Conservation Areas and High Conservation Values**

#### **12.1 Conservation and Conservation Areas**

Some of the area's past history was mentioned earlier. Given the wide spread, heavy harvesting with at least two re-entries using both ground-based equipment and helicopters, it is not surprising that undisturbed primary forest has yet to be identified within the PAONG LPF.

This history mitigates against, but does not necessarily preclude, PAONG MTCS having much relevance to conservation in general and as a haven for rare, threatened and endangered species (RTE) in particular. This is of course especially true for larger animals. But, however limited the potential might be PAONG recognises it has an obligation and commitment to incorporate into its management practices a system that considers the need for conservation awareness and for the identification and protection of RTE species. It also recognises the importance of indigenous biodiversity and the need to protect areas of indigenous vegetation which might have the potential to recover, albeit over a long time, in both structure and biodiversity, to something approximating that which existed prior to the start of natural forest harvesting.

It follows that, no areas of undisturbed primary forest have yet been identified in the PAONG MTCS area. Those areas of remnant forest that have been designated as conservation areas, as opposed to riparian buffer zones (the establishment of which is a mandatory), will be protected as SMZs. Full protection of the conservation areas and other SMZs will allow them to continue to recover and develop their biological diversity. These areas will also provide refuges and ecological corridors for the wildlife in other parts (non-MTCS) of the LPF and adjoining areas.

It is Samling's policy that anyone working in PAONG LPF should have a positive approach to conservation and be involved with the process of protecting RTE species. Contractors are asked to note, either verbally or in writing, the location and type of any rare or threatened species they come across in their day-to-day activities.

For example, all new contracts and those renewed for establishment, silviculture and harvesting work contain the following clause:

*"Sites which are known to be culturally sensitive or are known to contain rare or endangered species are surveyed and placed on PAONG maps. If these areas are identified on any map(s) issued with the Work Order, it is the responsibility of the Contractor to ensure his workers have been informed of them before work commences. Any new sites or species encountered will be reported to PAONG management immediately."*

Where a current contract does not contain this clause then the contractor is required to acknowledge and to agree in writing that he will comply with this clause.

As a forestry company, and with its Sarawak ITPs increasing in significance in terms of log production, Samling also views its forest plantations as a contributor to reducing pressures on the harvesting of MTH in Sarawak and Malaysia (and therefore globally).

The EIA identified some of the protected and totally protected flora and fauna that occur within the LPF, and the recent HCV assessment made further identifications.

### **High Conservation Values (HCV)**

The main headings for HCVs are given below.

**HCV 1 Biodiversity Values** *Forest area contains globally, regionally or nationally significant biodiversity values (e.g., endemism, endangered species, sites of critical temporal use)*

**HCV 2 Landscape-level Forest** *Forest area contains globally, regionally or nationally significant large landscape level forest where significant populations of most if not all naturally occurring wildlife species exist in natural patterns and abundance.*

**HCV 3 Ecosystems** *Forest area contains or is part of a threatened or endangered ecosystem.*

**HCV 4 Services of Nature** *Forest area provides basic services of nature in critical situations.*

**HCV 5 Basic Needs of Local Communities** *Forest area is fundamental to meeting basic need of local communities.*

## **HCV 6 Cultural Identity of Local Communities** *Forest area is critical to local communities' traditional cultural identity.*

### **12.2 High Conservation Value Assessment (HCVA)**

Ecosol Consultancy Sdn Bhd undertook an HCV assessment in March 2023 and produced a report entitled '*High Conservation Value Assessment (HCVA) for Paong Licence for Planted Forest LPF/0021*'. The assessment methodology followed the WWF Toolkit for Malaysia<sup>5</sup> and gives a detailed summary of the HCV status of Paong LPF.

Several HCV attributes were identified as 'present' in the course of the assessment. However, when considering HCV attributes scale and proportion must always be kept in mind. In Table 5.2 it may be seen that the gross area of the MTCS area is 24,834 ha; of this more than 36 % (8,946ha) is already in protected areas (SMZs).

### **12.3 Analysis of the High Conservation Value Assessment (HCVA)**

#### **12.3.1 Background**

It should be noted that:

1. the area had generally been very heavily disturbed by logging for about 30 years prior to the issue of the LPF licence.
2. further, that salvage logging took place prior to the release of coupes to the LPF under Op.5 (clearing & site preparation);
3. the LPF has been in continuous operation for 20 years.
4. no rights or privileges have been admitted, either to individuals or to communities, within the Nakan-Kalulong F.R.; however, there has been encroachment by individual families.
5. 36% of the MTCS area is designated as SMZ. This means there is already a very large, forested area under protection.
6. there are no registered or unregistered communities (kampongs) within the MTCS area (or within the LPF);
7. hunting by Samling employees and contractors is prohibited in all Samling's FTLs and LPFs.
8. and demand by locals for hunting and fishing for their own consumption within the MTCS area is very limited as there are only two adjacent communities; and
9. a number of individual houses along M2 and the Spg Pasir road are actually within the MTCS area, having encroached into the Nakan-Kalulong F.R. (see point 4.)

The first two points, above are, without doubt, 'conservational negatives' as is possibly, the third point. But it is quite clear from the EIA and the HCVA report that, despite these negatives, an interesting degree of biological diversity has been maintained.

The fourth point is primarily positive but of course any encroachment must be considered negative. The fifth point - that such a high proportion (36%) of the area has SMZ status and is therefore already protected from significant invasive human activity – together with the sixth, seventh and eighth points, will surely lead to the existing diversity of the wildlife, already quite considerable, being quantitatively and qualitatively further enhanced over time. The final point is something of a negative

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<sup>5</sup> First Edition 2009 WWF-Malaysia



### 12.3.2 Analysis

In summary, the report on the HCVA shows that, for PAONG MTCS:

**HCV 1 and 2** the area does have some HCV1.2, HCV 1.3 and HCV 1.4, e.g., the existence of RTE species and some species endemic to Borneo. However, when the qualitative and quantitative aspects of these attributes are viewed in the context of relevance either to national and Sarawak state needs or to those of the PAONG LPF itself, there is no justification for elevating any of PAONG MTCS conservation areas from their current protected status and according to them HCV status under either HCV 1 or HCV 2. This point is reinforced by the SMZs providing an equal level of protection for both mammals and birds that are free ranging, i.e. not confined to limited areas of habitat, as would be accorded to an area declared as an HCV area. Similarly, the linkage from the large Conservation Area in the south, across a strip of Samling's MTCS certified Gerenai FMU through to the Usan Apau NP is in no way enhanced by re-naming the Conservation Area an HCV area. No salt licks have been identified to date.

**HCV3:** no threatened or endangered ecosystem occur within the PAONG MTCS area;

**HCV4:**

**HCV 4.1:** the whole of PAONG LPF falls outside the 8km radius from the Water Intake Points (WIPs) of the two nearest water treatment plants; there are no water catchments within the LPF area that are required for gravity feed water systems to supply local communities;

**HCV 4.2:** reference is only made to riparian buffers, the designation and protection of which are any mandatory under the conditions attached to the EIA Report Approval certificate; and

**HCV 4.3:** Over a 20-year period of record the annual rainfall has averaged just under 5,000mm. There are, on average, 20 rain days a year. Paong LPF must be considered a wet area for most of the year and for most years. The MTH of the two large Conservation Areas, in the east of the LPF and adjoining the Gerenai FMU, is almost certainly in similar condition to that of the FMU and, in terms of providing a barrier in the event of fire, is not likely to be any more effective than that of the FMU.

No reference is made in the HCVA report to Terrain Class IV which is present to a very limited extent in the MTCS area but is all within the designated Conservation Areas and is thus protected.

**HCV 5:** the HCVA report shows that there is now no real dependence on the forest products available in the MTCS area or indeed on those provided by the whole LPF. Although wildlife still supplements the diets of some people, and wild vegetable and wild fruits are still gathered, what activity there is – primarily hunting, fishing and foraging for wild vegetables – is supplemental. It is abundantly clear that there has been little real negative socio-economic impact by the activities within the PAONG MTCS area on the nearby communities. However, there are two main identifiable positive economic impacts as a result of these activities: employment by Paong LPF management and the provision of road access from the LPF area to Tuyut, from where vehicle owners may continue on the sealed government road and from where buses depart to Miri.

All the SA areas that the HVCA report refers to are outside of the MTCS area.

**HCV 6:** No sites of cultural significance have been identified by the EIA, the SIA or the HCVA.

### **13. Social Multiple-Use**

#### **13.1 Local Population**

##### **13.1.1 Recreational Pursuits**

Personal safety on the logging roads is an unavoidable issue and security of both the company's and contractors' equipment and of workers' property, is an on-going problem. This leaves little opportunity for recreational pursuits within the LPF by the general public. Members of the Natural Science Society, Bintulu (NSSB) and other such organizations are of course encouraged to approach SST/SRB to discuss arranging visits which should serve to further our knowledge of the area's biodiversity.

##### **13.1.2 Hunting and Fishing**

Hunting is prohibited other than by members of the local communities and then only for personal consumption, and not whilst actively employed by Samling within the LPF. The opportunities for fishing within the MTCS area are limited.

##### **13.1.3 Water Catchments**

The boundary of any water catchment within the LPF must be clearly marked on the ground with blue paint on standing trees, GPSd and then be shown in all the relevant LPF maps. Water catchments are special management zones and there should be no disturbance of the vegetation within these areas.

##### **13.1.4 Shifting Cultivation/Agriculture (SA)**

Whilst not multi-use of the *forested* area, the use of the long-established SA areas within the LPF (but which are excluded from the plantable area statement in LPF licence) still continues. There is however no SA within the MTCS area.

##### **13.1.5 Land Rights**

The Nakan-Kalulong F.R. covers 91.8% of the MTCS area. Gazetted in 1984, under G.N. No. 3147 (Appendix 4), no rights were admitted within the forest reserve. However, the two main roads constructed by Samling in the early 1980s gave access to significant linear encroachment into the forest reserve. This has been reported to FDS.

Claims made by members of the local population regarding land rights within the 2,030 ha of state land, e.g., NCR claims, must be addressed and verified by the relevant government departments. Where boundaries are subsequently agreed and surveyed by the relevant government agency, the boundaries will be shown on the relevant LPF maps following receipt of the shape files from FDS.

Verified landowners who wish to enter into an agreement with Samling to develop their land for ITP may do so on terms mutually acceptable to both parties. Copies of any such agreement should be kept in the PAONG LPF office.

##### **13.1.6 Public Health and Workplace Safety**

The Occupational Safety and Health Act 1994 will apply to all members of the local population who are employed by Samling, or by Samling contractors, in the PAONG LPF in the same way as it applies to all any other Samling employee.

They will also benefit from all other provision of the applicable laws of Sarawak and Malaysia with regard to conditions of employment and safety in the workplace.

### **13.2 Others**

Samling entered into a long-term R&D co-operative agreement with SFC. PAONG LPF was an active participant in this R&D and hosted a site for a *Falcata moluccana* breeding program. Unfortunately, SFC is no longer active in R&D and the status of the agreement has yet to be resolved. However, the site is still actively maintained by Samling and the results should benefit the MTCS area by way of improved genetic material in time to come. It is expected that the first of the improved seed will be collected sometime in 2024.

Samling, through STA's Plantation Committee, has cooperated with Swinburne University (Kuching) in the development of a biofertilizer for *E. pellita*. It is uncertain whether or not this will move into commercial production but if it does then it will be trialled on Samling's LPFs with the hope that the results will show a cost-effective benefit for Samling's *E. pellita*.

### **14. Cultural and Historic Values**

No sites of cultural or historic value were identified within the MTCS area by the EIA (2000), or by the SIA (2023) or HCVA (2023). None has been subsequently identified on the ground and local knowledge indicates that there are none.

There are no burial grounds or graveyards within the LPF. No salt licks have been located within the LPF nor have any other sites of cultural or historic interest been identified within the LPF.

## **15. OCCUPATIONAL HEALTH AND SAFETY AND ENVIRONMENT**

### **15.1 Introduction**

In the conduct of forestry operations, a safe and healthy work place, as far as practicable, is assured by compliance with the Occupational Safety and Health Act 1994 and the relevant legislative regulations and guidelines that are applicable to the respective work places.

### **15.2 Health, Safety and Environment (HSE) Policy Statement**

The management is committed to the following principles:

- Provision of systems of work, work environment, plant, equipment and the maintenance of the same, in so far as practicable, that are safe and without risk to health and adverse impact to the environment;
- Provision of adequate welfare, religious and recreational facilities for all employees without adverse impact to the environment;
- Provision of a safe means of access, egress to and from work places, emergency response (ERT) for rescue, control of environmental spill and natural disaster in so far as practicable;
- Provision of information, work instruction, training and supervision for all staff to enhance work competencies, skills and awareness in HSE, and the implementation of Best Management Practices (BMPs) in the industry;
- Review the HSE standards and practices periodically to ensure continued relevance and appropriate to the organisation.

### **15.3 Safety Practice Guidelines for Forestry Activities**

Safety practice is the responsibility of both the management and employees regardless of level or job designation. All employees must be mindful at all times of the Safety Practice Guidelines (Appendix VII).

However, the camp management is required to play an active role in carrying out measures to ensure the safety and health of all employees in the work areas. The role of camp management is as follows:

- To hold regular Health, Safety and Environment Committee meetings and to enforce procedures to reduce or eliminate safety and health hazards in the work place;
- To carry out safety and health inspections and enforce disciplinary measures on errant employees to ensure the safe operation of the Samling's machinery, tools and equipment, and to provide a healthy environment;
- To give proper instruction and orientation on safe working procedures and health, awareness to all new employees when they report for work and to ensure that hazardous activities are only to be carried out by competent personnel;
- To select key personnel to undergo training on safety and health matters as may be decided by Samling.
- To ensure that all employees use appropriate Personal Protective Equipment (PPE), such as safety helmets, gloves and vests, during field operations;
- To consider the Safety Officer's and /or the HSE Committee's findings and recommendations with regard to the cause of any accidents and to review any form of unsafe practices as and when reported and to take appropriate corrective actions;
- To promote co-operation among all Samling's employees and contractors in propagating, developing and carrying out measures to ensure safety for everybody;
- To prohibit the consumption of alcohol in the work place and to have zero tolerance of any form of drug abuse;
- To ensure proper road safety signboards are displayed;
- To notify the relevant authorities of any accident arising out of employment by Samling that results in death, or in serious bodily injury that prevents an employee from attending his normal work for more than four calendar days, by the quickest means available; and
- Where a dangerous incident occurs in the work place, to notify forthwith to the nearest Department of Occupational Safety and Health (DOSH) office by the quickest means available, and within seven days, report the incident using the approved DOSH form.

Within the framework of the Safety Practice Guidelines, camp management must take due consideration of all employees' health and safety during tree felling, skidding, log handling and scaling, land and river transportation, road construction and maintenance, and of those working in the camp office and workshop or in any of Samling's working areas located within the FMU. Where practicable relevant salient points reflecting those set out above, will be incorporated into work instructions.

#### **15.4 Training of Forest Workers**

As required under The Forests (Trained Workmen) Rules, 2015, workers who are engaged in any one of the following: tree felling, log extraction or log loading, must be trained by STA Training Sdn Bhd trainers or by other STA or SFC approved trainers.

## **15.5 In-house Training for Occupational Health and Safety and Environment**

### **15.5.1 Health, Safety and Environment Committee**

A Health, Safety Environment and Committee (HSEC) comprises: (a) Chairman; (b) Secretary; (c) representatives of employer; and (d) representatives of employees. The functions of the HSEC are as follows:

- It shall assist in the development of safety and health rules and safety systems of work;
- It shall review the effectiveness of the safety and health program;
- It shall carry out studies on the trends of accidents, near-miss accidents, dangerous occurrences, occupational poisonings or occupational diseases which occur at the place of work;
- It shall report to the Samling management any unsafe or unhealthy s;
- It shall review the safety and health policies at the place of work and make recommendations to the employer for any revision of such policies;
- It shall meet as often as may be necessary but shall not meet less than once in three months;
- It shall furnish a copy of the minutes of every meeting to every member and to the Samling management within two weeks after the meeting has taken place; and
- It shall ensure the Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease (NADOPOD) Regulations 2004 are complied with.

### **15.5.2 DOSH Guidelines**

DOSH's *Guidelines for Occupational Safety and Health in the Logging Industry* are used as the basis to develop the Safety Practice Guidelines for the better prevention of injury and health problems in harvesting operations. It provides training information and guidelines for risk control in the core activities of the upstream timber industry which are primarily: tree felling, ground-based and cable log extraction, loading and transportation of logs by road, road building and maintenance.

## **16. Monitoring**

### **16.1 Introduction**

#### **16.1.1 PAONG LPF not yet certified**

At the time of preparing this FPMP, PAONG LPF had yet to be certified under any forest management certification scheme. This means there is no history of formal monitoring that is compliant with the MC&I requirements.

#### **16.1.2 Environmental monitoring reports**

However, the LPF has been subject to quarterly environmental monitoring by external consultants for many years. An integral part of the environmental monitoring report (EMR) is monitoring of water quality through the collection of water samples at pre-determined water monitoring points (WMPs but called SPAs in the EMR maps) and subsequent analysis by a qualified laboratory. The results of the analysis can be found on the Samling website.

### **16.2 Elements to be Monitored**

The following elements will be monitored in compliance with the MC&I SFM:

- a) Yield of forest products (logs) harvested is monitored through the daily trucking reports based on weighbridge records used for royalty assessment. These are summarised by block in an Excel file: Trucked Yarded and a running analysis of the yield by species is maintained. This file is held for all LPFs at Segan and the updates are distributed monthly to LPF managers. (See Table 10.1 for log production records).

- b) *Ad hoc* records of observations by LPF staff in conjunction with formal visits by Samling's Environment Team are used to assist in monitoring changes in fauna and flora. Toolbox talks given by the Team are used to develop staff awareness and competence in this respect.
- c) (i) Environmental: Data from the HCV assessment will be used to assist in monitoring fauna in conjunction with *ad hoc* records of observations by FPMU staff. Toolbox talks will develop staff awareness and competence in this respect. However, as there are no communities within the MTCS area the environmental impact of the harvesting and other ITP operations on communities is clearly negligible. The HCV assessment clearly show that the MTCS area is not fundamental to meeting the basic needs of the nearby communities and that there is little to monitor in this regard.  
  
(ii) Social: There are no communities within the MTCS area but there are a number of families that have encroached into a part the MTCS area that is within the Nakan-Kalulong F.R... There are two communities adjacent to the MTCS area, both of which are on main logging roads that provide good access to facilities elsewhere.

The SIA (2023) shows that the MTCS area is not fundamental to meeting the basic needs of the more distant communities and that there is little to monitor in this regard. Furthermore, any use that might be made of the MTCS area for NTFP will surely lessen as the rural population decreases and continues to change its consumption patterns to those of a more modern way of life. These SIA also showed that the impact of operating, and of harvesting in particular, in the MTCS area has generally no or negligible social impact other than a positive one in providing employment for those with the relevant skills - or for those who wish to obtain such skill – and the required levels of discipline and energy required for regular employment.

The LPF's road network is of significant social importance as it provides communities and small holders access to the Long San Health Clinic and, of greater significance, access to Miri City.

(iii) Social: Employment is monitored by analysing the payroll at the more or less the same time each year; the results are shown in Table 7.1

- d) Costs are monitored by budgetary controls in which productivity and the efficiency of forest management will of necessity also feature.
- e) Growth rates are monitored through a network of PSPs.
- f) Invasion<sup>6</sup> by exotic species is monitored during the regular patrols and is recorded when observed. The patrol reports cover invasion of areas adjoining the MTCS area and the monitoring of the MTCS area itself being invaded from outside its boundaries.

## 17. Climate Change - Adaption, Mitigation and Monitoring Introduction

Forests have a significant function in climate change mitigation by acting as "sinks", i.e. absorbing carbon from the atmosphere and storing it in biomass and soils. However, when the forests are

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<sup>6</sup>'Invasion' here means an exotic species growing where it was not intended that it should.

cleared or degraded, they are also significant sources of greenhouse gas emissions. Forests, therefore, are important components in strategies for adapting to climate change.

Sustainable Forest Management (SFM) can help reduce the negative effects of climate change on forests and forest-dependent people. SFM is consistent with climate adaptation and mitigation whereby the planning will factor climate change and the management practices will be adjusted accordingly. The planning will put greater emphasis on risk management and to weigh the costs of changes in forest management against the likely benefits.

In 2010, the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC) adopted a decision on reducing emissions from deforestation and on the conversion of forests, sustainable management of forests, and enhancement of forest carbon stocks, usually known as *REDD+*. The accessibility of benefits from *REDD+* activities to individual forest managers would depend on the arrangements in place in the country for *REDD+* benefit-sharing.

Last but not least, the forest management should also be aware of the policy incentives instituted by governments, or market incentives, such as carbon credits or demand for bio-energy. Forestry projects are favoured by the voluntary carbon markets because of their additional social and environmental benefits (known as co-benefits).

### **Policies on Climate Change**

Forest management is affected by climate change policies made at the national and global levels. Under the Malaysian Timber Certification Scheme (MTCS ST 1002:2021), forest management shall comply with the National Policy on Climate Change, 2002 and the UN Framework Convention on Climate Change, 1992.

### **Adaptation and Mitigation in Forestry**

Adaption and mitigation are the two main responses to climate change. The mitigation addresses the causes of climate change whereas the adaptation on its impacts.

In the forest sector, adaptation encompasses changes in management practices design to decrease the vulnerability of forests to climate change and interventions intended to reduce the vulnerability to climate change.

Mitigation strategies in the forest sector can be grouped into four categories: reducing emissions from deforestation; reducing emissions from forest degradation; enhancing forest carbon sinks and product substitution.

### **Adaption Actions**

The actions for adaptation to climate change shall address risks or impacts. These actions are drawn mostly from existing forest management practices.

### **Mitigation Actions**

Mitigation actions on climate change shall focus reducing Green House Gases (GHG) emissions at source and increasing GHG removals by sinks. These actions can be grouped into four general categories:

- Maintaining the area under forest by reducing deforestation and promoting forest conservation and protection.
- Increasing the area under forest (e.g., through afforestation and reforestation);
- Maintaining or increasing carbon density at the stand and landscape level by avoiding forest degradation and managing timber sustainably; and through the restoration of degraded forests, e.g., enrichment planting; and
- REDD+ activities: using the voluntary carbon markets as a means to sell carbon credits generated from carbon sequestered by the forests.

### **Monitoring and Evaluation**

Monitoring of the climate change adaptation and mitigation actions shall be additional and significant burden. Nevertheless, the existing databases, criteria and indicator processes and forest certification schemes shall form the framework for monitoring.

Regardless of the scale of monitoring required, forest management shall use precautionary approach and involve participation by local people in the social and environmental impacts.

Monitoring will require the collection of data on indicators of climate-induced impacts (e.g. forest productivity, forest health and forest pests). Much of these data will normally be collected in standard forest inventory.

For biodiversity, the ideal species for monitoring are those that are expected to be vulnerable to climate change and that are also easy to census. Ideally, such species will also be species of special concern.

For water monitoring, dry season base flow and suspended sediments during periods of low flow might be the most appropriate indicators. Macro-invertebrates in streams can serve as good indicators of ecological integrity.

For fire susceptibility, monitoring fuel loads and moisture content are the first steps in assessment.

Social factors can be monitored by engaging with the Community Representative Committees (CRC) where the communities have decided to establish these, or by the census data or rural development databases maintained by government.

For forest carbon monitoring for mitigation projects, some aspects of monitoring will need to be outsourced, e.g. academic institutions with undergraduate and graduate researchers.

Where forest carbon needs to be monitored this will almost certainly be a requirement for the continued verification of validated carbon project registered under the likes of Verra. Such a project would require a Carbon Licence issued by FDS and would be outside the scope of a forest management certification program such as the MTCS.

### **Greenhouse Gas (GHG) Inventory Accounting**

The initiative to reduce GHG emissions in Samling's timber operations started in 2023 with baseline accounting of GHG emissions for Scope 1 and Scope 2 for the year 2022. This in-house accounting reporting exercise was conducted by a third-party consultant engaged to ensure that the scope



coverage, methodologies and verifications used in the accounting exercise were in accordance with the:

- GHG Protocol Corporate Accounting Reporting Standard, covering Scope 1 and Scope 2,
- 2006 IPCC Guidelines for National Greenhouse Gas Inventories (“2006 IPCC Guidelines”); and the
- 2019 Refinement to the 2006 IPCC Guidelines.

Scope 3 studies will be developed at a later stage.

## **18. Forest Plantation Management Plan – Review and Revision**

### **18.1 Background**

ITP is still a relatively young industry in Malaysia. Planting only started in PAONG in 2003. The Samling mills that use PAONG’s ITP logs are still addressing the technical challenges and changes required when processing plantation logs and in marketing the products made from BORNEOTEAK<sup>®</sup>, crassiparva, gmelina and falcataria (batai) and pellita. Although many other plantation species have been trialled none are currently planted operationally; the challenges of processing and marketing these new (to Samling’s ITP) species economically at a commercial level are challenges that are yet to come.

### **18.2 Review and Revision**

#### **18.2.1 Requirements**

When considering any new knowledge, Samling R&D findings, developments within the ITP sector and to ensure that as far as is possible PAONG meets down-stream’s evolving requirements, it might be necessary to interpret parts of this FPMP with a degree of flexibility. Any such changes will be incorporated at the end-term revision of this FPMP.

Reviews and revisions should consider:

- new information from operational monitoring or research becoming available and being used to make significant improvements or necessary changes.
- new information becoming available to senior management and resulting in policy change.
- changes in downstream planning or requirements; and
- new or revised regulations imposed by the government.

#### **18.2.2 Mid-term Review**

A mid-term review of the PAONG FPMP will be undertaken and revisions made as appropriate.

#### **18.2.3 Revision**

In the last year of the first ten-year term the FPMP will again be reviewed and revised as necessary.

## **19. Internal Audit and Management Review**

### **19.1 Introduction**

Forest management activities are subject to internal audit and management review at planned intervals as required under Malaysian Criteria & Indicator (MC&I) 8.1.3 of Malaysian Timber Certification Scheme (MTCS ST 1002:2021) for sustainable forest management. Both internal audit and management review will ensure that there is continual improvement in the management system.

### **19.2 Internal Audit**

The internal audit shall be planned and conducted once a year. The objectives of the audit plan shall ensure that the FMU:

- (a). meets the requirements of its management system; and
- (b). its management system conforms to the requirements of MC&I SFM.

The Audit Plan shall define the audit criteria and scope of each audit. The auditors conducting the audit must ensure objectivity and impartiality of the audit process. The results of the audit should be presented during the management review meeting. All information gathered during the internal audit should be documented and retained as evidence of the implementation of the audit program and the audit results.

### **19.3 Management Review**

The Management Review shall be conducted annually and shall include at least the following:

- (a). The status of actions from previous management reviews;
- (b). Changes in external and internal issues that are relevant to the management system;
- (c). Information on the FMU's performance, including trends in:
  - Non-conformity and corrective action;
  - Monitoring and measurement results; and
  - Audit results.
- (d). Opportunities for continual improvement.

### **19.4 Non-conformity and Corrective Action**

When any non-conformity is encountered, applicable action shall be taken to control and correct it. The consequence shall be dealt with, too. The non-conformity shall be reviewed and the causes of it shall be determined. The need for the action shall be evaluated to eliminate the causes of the non-conformity and ensure that similar non-conformity does not recur or occur elsewhere.

Any action needed shall be implemented and the effectiveness of any corrective action taken be reviewed. Changes shall be made to the management system, if necessary.

Corrective actions shall be appropriate to the effects of the non-conformity encountered. Information as evidence of the nature of the non-conformity and any subsequent action taken including the results of any corrective action shall be documented and retained.

### **19.5 Continuous Improvement**

By undertaking the annual internal audit and management review, the sustainable management of the forest shall be continuously improved by addressing the suitability, adequacy and the effectiveness of the sustainable management system. The sustainable management system shall also conform with the Malaysian Criteria and Indicators for Sustainable Forest Management (MC&I SFM) under the Malaysian Timber Certification Scheme (MTCS ST 1002:2021).

### **19.6 Internal Audit and Management Review Procedure**

The Internal Audit and Management Review Procedure is used as the basis to the annual internal audit. It outlines the frequency, methods, responsibilities, planning requirements and reporting of the internal audit process.