PUBLIC SUMMARY OF SECOND PLANTATION DEVELOPMENT PLAN (2ND PDP)

1st January 2020 – 31st December 2029

Information of Licensed Area

Company	:	Sapulut Forest Development Sdn Bhd (SFDSB)
Forest Management Unit	:	14
Size of Area	:	21,760 ha
Location	:	Part of Sapulut Forest Reserve (Class II)
Jurisdiction	:	Tibow Forestry Department, Keningau
Co-ordinates	:	Latitudes: 4° 32.5' and 4° 49 North Longitudes: 116° 27' and 116° 54' East
Agreement	:	Sustainable Forest Management License Agreement No.04/97 (SFMLA 04/97)
Contact Person	:	Mr. Norman Wong (Managing Director)
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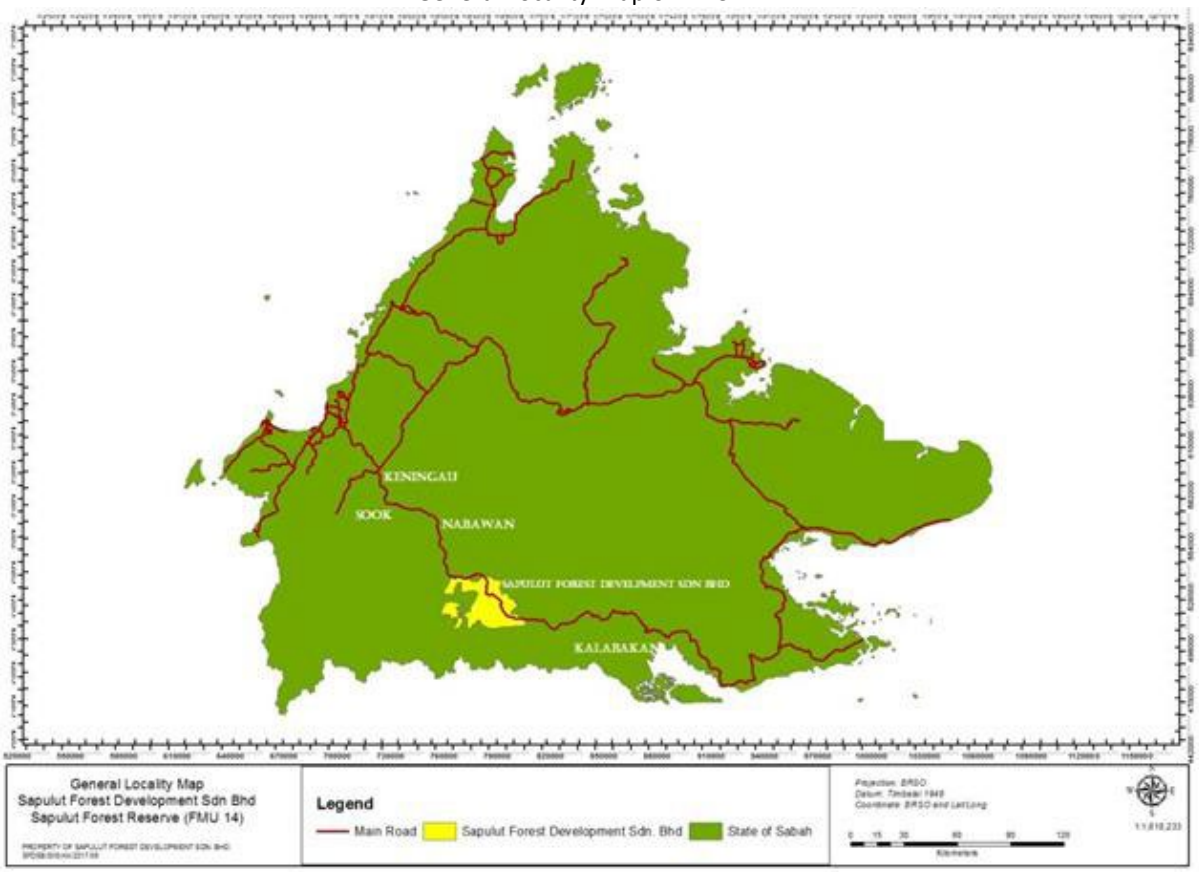
General Locality Map of FMU 14



CHAPTER 1 - INTRODUCTION

1. General Background

Repeated and bad logging practice within the Sapulut Forest Reserve (FR) in the past has made the forest poor in terms of timber productivity, standing timber stock as well as regeneration. This was the condition of the Licensed Area before it was handed over to SFDSB in 1997, to be managed based on Sustainable Forest Management (SFM) principles. SFDSB signing the Sustainable Forest Management Licensed Agreement 04/97 (SFMLA 04/97) in September, 1997 with the State Government of Sabah, with a total area of 95,300 ha.

i. 1st FMP (1st January 2004 - 31st December 2013). The SFMLA 04/97 or called as Licensed Area of 95,300 ha, was managed by SFDSB based on the 1st FMP. It was first approved on 2nd December 2003. Later, it was revised and approved on 20th December 2004.

ii. ii. 2nd FMP (1st January 2014 - 31st December 2023) - approved on 16th December 2016. Based on the First Supplemental of SFMLA which was signed on 21st February 2014, approximately 7,644 ha of the Licensed Area were excised and converted into a Class 1 Protection Forest Reserve which is now known as Maliau Buffer Zone Forest Reserve. The excised area has been placed under the Maliau Basin Management Committee (MBMC) which includes SFDSB as a new member of the Committee. The 2nd FMP was prepared to replace the 1st FMP with the total remaining Licensed Area of 87,656 ha.

iii. iii. 3rd FMP (1st January 2016 - 31st December 2025) - approved on 17th March 2017. Subsequently, second supplementary agreement was signed on 3rd November 2015, where approximately 11,043 ha of the Licensed Area was excised for the purpose of socio-economic development of the State. The new 3rd FMP is necessary to incorporate changes in land use of the Licensed Area and update the prescribed activities for the management. It is prepared under the guidance of the Sabah Forestry Department (SFD). The remaining Licensed Area in the 3rd FMP is now 76,613 ha.

The 1st PDP (1st January 2004 to 31 December 2013) was prepared and approved by the Directory of Forestry on 30th March 2005. Due to the excision of area mentioned above, the preparation for the next 10 years PDP has been delayed. The 2nd PDP was prepared in 2020 with the new harvesting and planting approaches. the remaining area designated for Industrial Tree Plantation (ITP) now is estimated at 21,760 hectares for the Second Plantation Development Plan (2nd PDP).

The 2nd PDP includes several significant changes and here are some of the highlights:

- Excision of 11,043 ha from ITP compartments to pave the way for the socio-economic development of the State. This is in addition to 7,664 ha of licensed area that has been excised previously for the establishment of the Maliau Buffer Zone Class I Forest Reserve (Protection).
- Adoption of Buffer Alternate Strip Planting (BASIL 100) system in the entire ITP areas, as a natural evolution from the BASIL system.
- Subscribe to log-fisher and adoption controlled mechanical spreading to ensure a soil friendly land preparation technique.
- Sapulut had officially part of Borneo Forestry Cooperative (BFC) members with the goal to in managing forest plantation operations by improving staffs' technical skill and knowledge.
- Incorporating the requirements of forest management certification for Malaysian Criteria and Indicator for Sustainable Forest Management (MC&I SFM) into the 2nd PDP.

2. Policy Statements and Management Objectives

As a licensee, SFDSB is committed to manage the Licensed Area in accordance with the terms and conditions as stipulated in the SFMLA 04/97 and conform with the principles of sustainable forest management as prescribed by the Malaysian Criteria and Indicators (MC&I) for Sustainable Forest Management (MC&I SFM) under the Malaysian Timber Certification Scheme (MTCS), and all existing State Forest policies, environmental policies, legislation and regulations, as follows:

- Ensure the sustainable management of forest resources over the long-term in order to provide optimal benefit and financial return for the Company, as well as, the socio-economic benefits to the state;
- Recognize that environmental protection is given due consideration in all the company's business operations so as to minimize any negative impact on the natural environment;
- Ensure the SFM commitment is integrated with other key business objectives of financial performance, operating efficiency, customer satisfaction, health and safety and good corporate citizenship;
- Ensure that our business partners, contractors and employees are committed to the Company's SFM Policy;
- Work in partnership with other business organizations, the Government and interested groups where opportunities exist to benefit both our business and the environment;
- To protect from illegal activities, such as encroachment, hunting, felling and forest fires, to enhance the safe, sound and responsible management of forest for future generations.

3. Overall Objective

The overall management objectives of the ITP areas are to plant and/or replant fast growing tree species on a shorter rotation period which will enhance the yield per unit area with higher operating efficiencies at optimum cost as to ensure the perpetuity of the area as a plantation resource, which is managed to balance a variety of uses and values in an ecologically sustainable manner.

4. Specific Objectives

The specific management objectives over the 10-year planning period of the PDP are as follows:

1. To establish industrial tree plantations in the highly degraded areas in order to enhance the productivity and economic forest values while at the same time, to relieve pressure to use the remaining natural forests as a source of timber supply for local industries in the State;
2. To ensure that the area is managed sustainably in order to provide optimum continuous supply of high-quality timber and other wood products based on the application of Environmentally-Friendly practices;
3. To maintain or enhance the trees growth of planted timber through active intervention management such as, enrichment planting and silvicultural treatment, monitoring, prevention, and suppression of destructive forest agents especially fires, pests, etc.
4. To provide employment opportunities to the local communities especially those living adjacent to the licensed area through forestry related activities; and
5. To manage certified ITP area (12,486.42 ha) economically and sustainably. Sapulut intend to certify the remaining ITP area (9,483.58 ha) in the future.

CHAPTER 2 - GENERAL INFORMATION

1. Meteorology

1. Rainfall
   The licenced area is located in one of the wettest parts of Sabah with an average annual rainfall of 3000 mm. The monthly rainfall shows a very broad variation, from 13.7 mm (minimum) in January 2006 to 1959 mm in August 2010.
2. Temperature
   The day temperature is between 25°C and 30°C and night temperature is between 18°C and 20°C in the licenced area, where the elevation is above 1,000 m.
3. Relative Humidity
   The average annual relative humidity at the licensed area ranges from 66.3% to 72.0%.
4. Wind
   The wind is predominantly southerly and the speed ranges from a low of 0.3 m/sec to a high of 3.4 m/sec.
5. Sunshine and Solar Radiation
   On the average, Sabah receives about 6 hours of sunshine per day. Solar radiation is closely related to the sunshine duration. Its seasonal and spatial variations are thus very much the same as in the case of sunshine.
6. Evaporation
   The air temperature at the licensed area is lower with evaporation rate of about 2.5 mm/day.

2. Geology and Soil

1. Geology
   The licensed area is formed of mainly the Sapulut Formation, Tanjong Formation and the Labang Formations. A small area on the southeast corner of the licenced area is derived from Kapilit Formation. Most of the streams, creeks and rivers in the licenced area are either stones or gravel bedded.
2. Soil
   The main soil associations found in the licenced area are Lokan (43%), Crocker (35%) and Maliau (16%). Some pockets of minor association of Labau, Kalabakan, Serudong and Gomantong are also found. These associations are generally associated to the geological land form of the area.

3. Physical Features

1. Topography
   The topography of the licenced area is undulating, which is very ideal for forestry development particularly for commercial forest plantations.
2. Elevation
   Ground elevations within the licenced area vary between 200 to 1,200 m above mean sea level (AMSL).

4. Hydrology

1. Drainage system
   The FMU14 natural landscapes vary from low hills and undulating terrain in the lowland and steep and dissected in upland and montane region. It is an important catchment that supply water to eleven tributaries that eventually feed to two major rivers, Sapulut and Kinabatangan Rivers. Ten tributaries namely Sansiang, Saburan, Siliawan, Tibow, Palagan, Sabunutan, Beliar, Lambunaan and Sablangan converge to Sapulut River that eventually drained to the Kalimantan. A tributary of Pinangah River

originated from the northern part of the FMU and flow to the major Kinabatangan River. The largest minor catchment is Sansiang River, and followed by Saburan and Salung rivers.

5. Timber Production from Forest Plantations (1st Rotation)

Two planting systems or designs were implemented during the 1st PDP namely, conventional linear planting and BASIL system in compartments zoned for Industrial Tree Plantations (ITPs). Conventional linear planting was conducted in 31 compartments during the 1st PDP, covering a total area of 14,475 ha, with an estimated 61% of the area planted or about 8,846 ha. The production for planted compartments, 8-10 years after the initial planting are estimated at 80 $m^3 ha^{-1}$, originating from a mix production from a number of tree species planted (Batai, Laran, Binuang, etc.). This equates to a mean annual increment of 8 -10 $m^3 ha^{-1} yr^{-1}$; and total estimated production of 738,778 m^3.

As for the BASIL system, 11 compartments were previously planted during the 1st PDP and onward 2019, covering a total area of 2,176 ha, of which about 45-50% of the compartment area had been planted, or about 1,088 ha and ready to be harvested within this planning period. Estimated production for BASIL system planted compartments, 8-10 years after the initial planting is projected to be about 150-250 $m^3 ha^{-1} yr^{-1}$. Timber production is expected to originate from a mix source, from the planted strips with fast growing timber trees and from trees retained along the natural forest strips. This equates to a mean annual increment of 11-13$m^3 ha^{-1} yr^{-1}$; and total estimated production of 75,381 m^3.

6. Flora and Fauna Diversity

A. Flora

A total of 442 taxa (identified to specific and infraspecific level) were recorded from the reserve, i.e., 2 lycophyte family, 6 ferns, 10 angiosperms (Monocotyledon) and 73 angiosperms (Dicotyledon) based on the collections (herbarium and voucher specimens) made during the recent High Conservation Value (HCV) survey and additional data retrieved from plant database (BRAHMS) and other research plots. Out of these 442 plant taxa, 112 plant species are endemic to Borneo, including 23 to Sabah but none is endemic to Sapulut FR. There are ten most speciose families within Sapulut FR which are Diperocarpaceae,Euphorbiaceae,Lauraceae, Annonaceae, Fabaceae, Orchidaceae, Rubiaceae, Phylla nthaceae, Meliaceae, and Myrtaceae.

B. Fauna

A wildlife survey was carried out by the HUTAN-Kinabatangan Orang-utan Conservation Programme (HUTAN-KOCP) in December 2011. The survey had recorded 10 mammal species and 57 bird species. There are several totally protected species Borneon Pygmy Elephant, Bornean Orang-utan, Tembadau, Malayan Sun Bear and the Bornean Gibbon that are known to occur in Sapulut FR. Other large animals that could be found in this forest are the Sambar Deer, Bearded Pig, Barking Deer, Mouse Deer, Long-tailed Macaque, Pig- tailed Macaque, Silver Leaf Monkey and Porcupine. During night spotting by HUTAN- KOCP, the Masked Palm Civet, Malay Civet and Thomas's Flying Squirrel were sighted.

There are three Hornbill species, namely Rhinoceros, Helmeted and Bushy Crested, as well as the Great Argus Pheasant was recorded from this survey. Raptors, forest specialists, forest edge birds and generalists were recorded as well during the survey.

7. High Conservation Value Forests

The HCV assessments were carried out by a team of experts from the University Malaysia Sabah (UMS). Based on the assessments, all HCVs attributes (1 to 6) are present in FMU 14.

Summary of the HCVAs and HCVMAs in FMU14

HCV	Attributes	Compartments	Land use	Area (ha)
HCVA				
1	Buffer zones protecting PAs			
	- Batu Punggul FR & Sungai Sansiang	207, 208 & 220B	ITP	46
	- Sungai Siliwan FR	19, 20, 21, 22, 24, 26, 27 & 31	NFM	74
	- Maliau Buffer Zone FR & extensions	78, 79, 80, 100, 108, 117, 118, 123, 124, 135, 136, 137, 144 & 145	NFM	278
	Critical use habitats			
	- Batu Tantaliwau	229	NFM	23
	- Batu Saap	197B	ITP	31
	- Salt Lick	218A	ITP	7
	- Arboretum pond	167		6
	RTE flora			
	- Batu Tantaliwau	229	NFM	As above
	- Batu Saap	197B	ITP	As above
	- Rafflesia	192, 218A	ITP	9
	- Kerangas 1	189	ITP	48
	- Sungai Tibow	140	NFM	22
	- Salt Lick	218A	ITP	As above
	- Kerangas 2	146	NFM	33
3	Kerangas forest	146 & 189	ITP	As above
	Limestone vegetation			
	- Batu Tantaliwau	229	NFM	As above
	- Batu Saap	197B	ITP	As above
	Lowland MDF on	127, 129, 130, 140	MDF	312*
	Labau soil		ITP	794‡
4	Water Catchments			
	1	3, 4, 5, 6, 7, 8 & 9	NFM - Central	545
	2	229	NFM – West	67
	3	266 & 269	NFM – West	337
	4	270 & 273	NFM - West	364
	Steep Areas	Numerous (See Figure 4.8)	ITP NFM	276 2890
	Riparian buffer[a]	Numerous (See Figure 4.8)	ITP	914
		Numerous (See Figure 4.8)	NFM	44

5	Water catchment	As 4.1	As above	As above
6	Burial site	192	ITP	1
HCVMAs				
1	Flora	NFM all	NFM	
	RTE fauna	All	NFM & ITP	
2	Connectivity	NFM – Central & East	NFM	-

*Area containing infrastructure (roads, nursery, forestry HQ) needs to be subtracted
‡Area that has already been developed into ITP needs to be subtracted
[a] This is calculated for a 30-m wide buffer on major rivers only, and underestimates the extent of the riparian buffers in FMU 14

8. Current Infrastructure

The current infrastructures available within FMU14 area are roads, building (office and living quarters), clinic, workshop, and basketball/volleyball court. The other facilities include diesel tanks, genset rooms, a chemical store, a spare part store, security guard's house, toilet and fire tower.

9. Social Impact Assessment (SIA)

SIA is an important and the most commonly used social assessment tool to determine the presence status, influence and possible impact of SFDSB operations on the local community. The First SIA (Social Impact Assessment) was conducted by Kiwiheng Wood and Environmental Consultant Sdn. Bhd in 2010 and the Second SIA was conducted in April 2015 by SFDSB own staff. There are no village or human settlement within the FMU14 area. However, there are 6 nearby village adjacent to FPMU boundary, i.e. Kg. Tataluan, Kg. Bangau, Kg. Sandukan, Kg. Salarom Taka, Kg. Mawantul and Kg. Maatol.

A. Population and Demographics

Based on SIA data, majority of the population are Murut community. Their education level was typical for a rural area with 47% of the population had attained secondary education and 35% attended primary school. Most of the communities were involved in agriculture activity as a farmer, and 26% work with private sector such as Forest Management Unit (FMU) and nearby estate companies. Their economic level is considered as low with majority having incomes of less than RM500 per month.

Majority of the population rely on river water for daily use and consumption. However, respondents face difficulties to obtain clean water especially during dry and rainy season where river may dry out or become murky. For electricity connectivity, there are some of them with no proper electricity and had to rely solely on generator. Generally, roads within the settlements are accessible. However, the roads condition is poor and in need of maintenance. Therefore, some of these villages took initiative to improve their road condition by seeking assistance from nearby companies such as SFDSB and Oil Palm Plantation Company. The community use motorbike as their primary mode of transportation whereas others travel via share-ride with those who owned vehicles. Car ownership is very low. The telephone line connectivity within the settlements is getting better with 97% of the respondents have received good service.

B. Public Perception and Acceptance of the Proposed Project

Majority of the respondents agreed with the SFDSB's operation and stated that the positive impact from the project is;

a) increase in employment opportunities,
b) increase in income resulting in decreasing poverty levels,
c) increase in village facilities,

d) increase in the economy of the surrounding areas, and
e) better road network.

As for those who disagreed, their concerns are water source quality and social problem caused by illegal immigrants. However, SFDSB has taken mitigation measures to tackle these issues:

Issues	Mitigation Measures
Water source quality	• Monitoring to significant sites; water catchment area with village representative to be done every quarter. Every aspect of the area such as water quality, signboard condition and rentice shall be recorded for future management plan; • Map location of village watershed/water catchment area should be updated as reference prior to commencing operation; • Report of water sample result taken by environmental consultant to measure the water quality should be kept accordingly.
Social problem caused by illegal immigrants	• Recruitment of workers from nearby village to be kept record by Human Resource (HR) Department. • Ensure every job advertisement are well informed to all village. Information given either by pasting advertisement, goodwill visits by Community Officer, social media as well as information from local community who is currently working with SFDSB.

C. Management Implication of the SFMLA

The aspect of local population indeed provides several management implications to the SFMLA. Issues that need to be deal with are:

a) Encroached Area - Three areas have been identified and inspected as being encroached by the farming local communities. SFDSB will resolve this case according to the present rules and regulations with the guidance and assistance of the SFD.

b) Hunting and Other Illegal NTFP Extraction - Hunting and other illegal NTFP extraction (such as medicinal plants, gaharu, rafflesia, orchid, jungle fruits, handicraft plants and other) are difficult to control due to close proximity to Sapulut-Kalabakan main road that cuts across Sapulut FR and open area along the eastern bank of Sg Sapulut. SFDSB provide appropriate CSRs as before to keep the good relationship with the local communities and carried out activities such as awareness education and others; conducted

monitoring and enforcement; and placement of appropriate and adequate permanent signboards on all strategic places along the Sapulut - Kalabakan main road and Sg Sapulut.

c) Village Watershed Area - SFDSB will cooperate and assist the local communities in providing clean gravity water supply should there be any request and depending on the availability of funds. The watershed area will be mapped within the SFDSB master map and excluded of any timber harvesting activities including RIL technique.

d) Organic Hill Rice Farming - Introduction of new system of organic hill rice farming, SRI system, would provide the local communities with much fertile rice clumps and higher rice yield. SRI system is an environmentally friendly, low cost, result in higher yields and allow for permanent cultivation on one farm area. It is hoped that it will lessen open-up new lands for shifting cultivation and would not encroach into Sapulut FR anymore in the future.

e) Establishment of Sapulut FR Social Forestry (SF) Committee - The purpose of the establishment is to provide a bridge communication between the SFDSB management and the local communities where it was suggested that three groups of SF Committee to be established namely Sg Sansiang & Sg Sansiang Cluster, Sapulut Town Cluster and Sg Sapulut Cluster.

CHAPTER 3 - REVIEW OF PAST MANAGEMENT

IMPLEMENTATION & ACHIEVEMENT

1. Land Use Planning

In the 1st PDP, the ITP area was divided into three sub-zones with their respective management regimes, ITP with RIL (15,801 ha), ITP conventional (12,453 ha), and Buffer Alternate Strip Planting (4,759 ha). During the period, 2nd excision of 11,043 ha in 2015 to pave the way for socio economic development of the state. The areas in ITP were revised to 21,970 ha.

2. Infrastructures

Various physical infrastructures were built, maintained and repaired by SFDSB such as Base Camp, Forestry Complex, Nursery, Fire Lookout Tower, Road and Parameter Boundary.

3. Community Programme

SFDSB had actively engaged with the local community living adjacent to the licensed area through providing direct employment and conducting various community programmes such as training, free rubber seedlings, promoting local handicrafts, offering scholarships and conducting dialogues. The programmes have a direct impact on the economic well-being of the local communities. Currently, approximately 40% of the SFDSB's staff and workers are the villagers living at the vicinity of the licensed area.

4. Silviculture Treatment in the ITP Area

During the period, silviculture treatments was also carried out in ITP's SKT Planting compartments and buffer stripes of BASIL compartments in the form of bamboo and climber cutting. The total silvicultural treated area from 2014 to 2015 is shown as in the table:

Silviculture treatments in ITP area

Year	Compartment	Area treated (ha)
2014	211, 212, 213A, 213B, 213C, 214A, 214B, 214C, 215A, 215B, 216A, 216B, 219A, 219B	2,259.00 (ITP RIL)
2015	220A, 220B, 209A, 209B, 222A, 222B, 223A, 223B, 223C, 224A, 224B, 224C, 225A, 225B	2,624.00 (ITP RIL)
	175, 176, 179, 180	488.00 (BASIL)
	TOTAL	5,371.00

5. Planting Progress

Based on 1st PDP, approximately 24,495 ha of the ITP compartments were scheduled to be developed for forest plantation based on conventional practice in which the areas were clear felled prior to planting. In 2011, there was a slight changed in SFDSB's management approach in which RIL practice was introduced and implemented to replace conventional practice of clear fell. Enrichment SKT planting was implemented to replace conventional ITP planting.

A total of 40 compartments covering a gross area of 15,316 ha were scheduled to be developed during the pre-preparation of 2nd PDP planning period. In addition, approximately 13 compartments that were harvested in the 1st PDP with a gross area of 4,759 ha were scheduled for planting using a BASIL approach. It is projected that some of the compartments with a total area of about 8,541 ha that was planted in the 1st PDP are supposed to be scheduled for harvesting in the 2nd PDP and then replanted with BASIL planting. For the period of 2014 to 2015, a total of 2,844 ha was under enrichment planting, and 453 ha BASIL planting. The summary of enrichment and BASIL planting are shown as in the table:

Enrichment planting and BASIL planting in ITP compartments (2009 – 2015)

Year	Compartment	Species Planted	Planting Method	Net Area Planted (ha)
2009	198, 199, 202 & 204	Batai	Gap Planting	629
2010	178, 189, 199, 200, 201, 203, 204, 205, 206, 207 & 208	Indigenous Species	Gap Planting	2,269
2011	167, 169, 178, 207 & 208	Indigenous Species	Gap Planting	685
	195, 196, 197 & 218	Indigenous Species	Line Planting	1,278
2012	195, 210, 216 & 217	Indigenous Species	Line Planting	993

2013	211, 212, 213, 214, 215, 216 & 219	Indigenous Species	Skid Trail Planting	2,076
2014	220A, 220B, 209A,209B, 222A, 222B, 223A,223B, 223C, 224A, 224B,224C, 225A & 225B	Indigenous Species	Skid Trail Planting	2,121
2015	226A, 226B, 228A, 228A,246, 221A, 221B	Indigenous Species	Skid Trail Planting	723
	174, 182, 186, 187, 189, 191 & 192	Albizia and Kelampayan	BASIL	453
			TOTAL	11,227

LESSON LEARNED AND MANAGEMENT IMPLICATIONS (2004 - 2015)

The following are some the lessons that SFDSB has learned which may useful for the improvement in managing of the area.

1) Sustainable issue

Sustainable forest management has to keep the balance between three main pillars: ecological, economic and socio-cultural. In view of this fact, the management strategies to managed the Licensed Area should be based on the combine needs between the sustainable of forest resources and sustainable of company's resources, financially in particular, as the long-term project resilience can only be achieved by increasing all success factors in equal way.

2) Issues on Planted Trees

The mortality rate for other species of planted trees was high due to early maintenance such as weeding was not regularly carried out. There was also no replacement of the dead trees during the initial forest plantation establishment period. Hence, conditions of some of the SFDSB's forest plantation were poor in terms of stocking and stem form. The SFDSB realized the importance to carry out forest plantation maintenance at regular interval and has decided to include additional budget for this activity in the 2nd PDP period.

3. Protection of the Licensed Area

Encroachment is one of the main challenges faced by the SFDSB. This includes encroachment by local communities living adjacent to the licensed area. SFDSB acknowledges that the issues need to be addressed properly, and has decided to implement the following activities in the subsequent 2nd PDP:

- Carry out perimeter survey using the Class II survey in order to prevent any further boundary complications.
- Enhance the community forestry programme and engage local communities as employees and contractors, to give them economic benefit from the activities undertaken in the licensed area.
- Intensify surveillance efforts in collaboration with SFD and other SFMLA holders bordering with FMU 14.

Besides encroachment, fire is also one major threat to forest. It is essential to develop systematic procedures in implementing and maintain the fire precautionary as well as a control measures, patrolling and monitoring of fire are conducted regularly, and the intensity will be increased during a long dry spell.

4. Land Preparation for ITP Development

Land preparation for the ITP development must be undertaken in an environmentally friendly manner and avoid encroaching into the sensitive areas such as steep areas and riparian reserves, HCVs, etc. Besides that, briefing on the rules and regulations related to the sensitive areas will be given regularly to the relevant operators involved in salvage logging and land preparation. SFDSB will also closely monitored salvage logging and land preparation activities in order to avoid any encroachments into the sensitive areas.

5. Harvesting of Planted Timber

In year 2016, the compartment 181 which was previously planted with Albizia, harvested and re-developed under BASIL system. An approximately 16,448.51 m3 has been harvested from the planted compartment. A total of RM 3,877,572.82 managed to generated based on market price. The decision to harvest the planted Albizia trees was to test the market value and demand. However, the harvesting was put on hold for the rest of planted trees was due to low market value for the species at that time.

6. BASIL Design

With the **BASIL** system, SFDSB adopted the 10-8-3" approach, based on a 10-year cycle, 8 steps and 3-year maintenance regime. SFDSB devotes a large amount of resources to post-planting management, namely maintenance, tree protection, data collection, its syntheses, analysis and dissemination to the entire team for them to monitor their performance and take necessary actions. However, as BASIL is an evolving concept, in the midst of 2019 - the 5th year of the BASIL planting system, SFDSB decided to evolve to the **BASIL 100** system.

7. Upkeep and Maintenance

SFDSB maintenance operations including circle weeding, blanket slashing and strip slashing.

Maintenance programme for ITP plantation

Treatment	**Year 1**	**Year 2**	**Year 3**
Circle Weeding	**1st** and **2nd month** after planted within a radius of 0.5 meter from the planted seedlings. Mulching is placed following circle weeding to control weed growth and to maintain soil moisture.	N/A	N/A
Blanket Slashing	**Month 3, 6, 9** and **12**	**Month 16, 20** and **24**	N/A
Strip Slashing	N/A	N/A	**Month 30** and **36**

SSCCEPNG

For BASIL area, which previously planted with commercial trees such as Laran, Albizia, and Binuang but the trees do not achieve size acceptable for timber sales, harvesting will not be carried out in these compartments during the plan period. Instead, SFDSB will carry out maintenance through "SSCCEPNG". SSCCEPNG is an acronym for Strip Slashing, Climber Cutting and Enrichment Planting. The importance of SSCCEPNG treatment is justified as follows:

a. Planted trees which still have growth potential, thus, due to under-sized planted timber which has potential to increase in size, their harvesting is deferred;
b. Gaps on the ground will be supplemented with enrichment planting;
c. To regulate supply of planted timber to meet market requirements.

RUBBER PLANTING

SFDSB has ceased planting of rubber trees, rubber will not be a main income generator during this 2nd PDP. Therefore, SFDSB is now in progress re-organizing its rubber tapping strategies to increase the production of latex volume.

a) Upkeep and Maintenance

Weed control; i.e. circle weeding and inter-row slashing will be carried at least once a year or when it necessary. Creepers cutting or de-creeping will also be carried out to remove all types of creepers climb on the trees.

b) Rubber tapping

From 2021 onward, the production is expected to be maintained at ±300,000 kg per annum. Therefore, SFDSB will maintain the existing 22 tappers and encourage their family members to achieve this production target.

c) Rubber inter-planting

In 2015, 8,000 Red Laran trees were planted in sporadic gaps in the rubber area to utilize the available area for more efficient land use. It is the policy to undertake rubber inter-planting to make full use of available land. Payung-Payung species (*Terminalia Copelandii*) also will be planted for the inter-planting.

RECORDS AT COMPARTMENT LEVEL

The problem at the compartmental level was that records on the demarcation of plantation block boundaries were not properly done. Besides that, the planted trees in each compartment were also not properly recorded. Therefore, SFDSB decided that the Compartment Register Book (CRB) must be recorded properly and updated regularly during the 2nd PDP period.

CHAPTER 4 – MANAGEMENT PRESCRIPTIONS

1. Industrial Tree Plantation (ITP) Zone

The ITP zone is confined to mainly degraded areas that fall under stratum 4 and stratum 5 while the development of trees plantation will be limited to areas with slope gradient below 25 degrees and subject to statutory constraints such as riparian buffers, etc. Over the current planning period 68 compartments planted during the previous PDP covering a total area of 21,760 ha and an estimated planted area of 20,436 ha is expected to be harvested. Two planting systems or designs were implemented during the past PDP, namely, conventional line planting, BASIL planting and more recently the **BASIL 100.**

2. Management Objectives

The overall management objective of the ITP zone is to establish a short rotation timber plantation as a way to generate revenue and to supply consistent, predictable and sustainable supplies of timber to SFDSB's Timber Complex (TC). The specific objectives of the ITP areas are:

a. To produce a reliable and sustainable volume of plantation timber on a continuous basis for our customers;
b. To complement and play an integral part in maintaining the financial sustainability of SFDSB as it allows short term plantation timber to be produced while complementing the growing of longer-term rotation of quality timber from the NFM area;
c. To adopt **BASIL 100** method as the main approach from 2020 onwards, at the same time maintaining the environmental and biological values of the forest while satisfying the need for short term rotation of plantation species;
d. To manage the forest plantation areas based on a 10-year rotation cycle and expected to produce more than 100,000 m^3 yr^{-1} of plantation timber at sawmill and peelable sizes, on a consistent and sustainable basis by 2029.

3. ITP Establishment

In the midst of 2019 SFDSB had decided to adopt the **BASIL 100** planting system. This change is data-driven by the management with supporting data provided by the Research & Development team in conjunction with the ground team and benchmarking taken from the Borneo Forestry Cooperative (BFC) Group. The adoption of **BASIL 100** system will reduce soil compaction, increase in timber yield in the future, easier mobility for harvesting operators and increase in seedling numbers to be planted by planters.

A) Management approach of BASIL 100 Planting

BASIL 100 system planting will be a 10-year rotation cycle of fast growing Albizia (*Paraserianthes falcataria*) and Laran species (*Neolamarkia cadamba* and *Neolamarkia macrophylla*). Besides these species, SFDSB will plant *Eucalyptus pellita* due to availability of good planting materials, planting and technical support and diversification of risks. SFDSB will also adopt the following approach to maintain the biological values of the soil for next cycle of harvest:

a. To maintain and enhance the environmental values of the concession by increasing the width of riparian

buffers for rivers. Permanent rivers with Class 3 and above (according to Strahler's stream order) are given a 100-meter riparian buffer of each side. Lower order rivers will follow the requirements as stated by the Forestry Department;

b. To explore the adoption of low environmental impact harvesting system for the BASIL 100 planted areas in order to lower the costs of harvesting and reduce the compaction of soil for the next cycle of replanting;
c. To source and evaluate better quality planting materials of Laran, Albizia and Pellita species selected for BASIL 100 planting areas;
d. To undertake audit, PSPs and TSP's after planting, and update the compartment register.

B) BASIL 100 System Planting Design and Concept

- **Harvesting and land preparation methodology**

  - Demarcation will be done for the compartment and/or plot boundary. HCVF areas, riparian reserves, waterlogged areas, rocky areas and roads are all to be included in demarcation works. This will be done prior to salvage harvesting.
  - Compartments are to be divided up into several plots of 25 to 50 hectares according to topography conditions. This will ensure a plot boundary that makes more sense as it works with the existing topography.
  - Water courses and ponds are made at each plot to ease water collection for watering of seedlings, emergency firefighting and potentially weedicide activities.

- **Low impact harvesting approach**

Salvage logging will be done by using low impact system such as excavator, log fisher and bulldozer which is more effective cost of harvesting and nature friendly way of harvesting because it will help to minimize soil compaction, soil erosion that may reduce future growth of tree plantation.

- **Land preparation approach**

To undergo the BASIL 100 System great precaution will be taken to reduce soil compaction and topsoil loss. This will be done through a crush and spread methodology for the land preparation whereby the excavator will crush and spread any leftover debris in the field. The crushed debris on the field will provide organic matter for future planting, reduce soil erosion and retain soil moisture.

C). Choice of Species

The selection of species for 2nd PDP are shown as in the table below:

Species selected in 2nd PDP	Reasons for Change in 2nd PDP
Laran	• No change, continue to plant • Availability of superior planting materials • Indigenous species, pre-selected and low risk • High performance (PSP 1st year +7cm dbh increment) • Good demand from buyers
Batai/Albizia	• No change, continue to plant • Availability of good planting materials from FRC, FRIM, and plus trees in Sapulut • Good and proven performance from planted trees • Moderate demand from buyers
Eucalyptus	• A potential tree species being considered for planting • Growth rates a moderate to good • Excellent form and wood properties which offer the option of producing high value solid wood, applicable for range of high value and end products • Improved seed is readily available from organisation such as BFC • Tolerant of most current pest and disease
Rubber	• Discontinue • Capital and labour intensive • No direct access to market- sell through middleman/LIGS Not economically viable unless rubber price remains above RM 8 per kg for SMR 20
Binuang	• Difficulty in getting good planting materials • Site specific thus very limited areas available • Discontinue
Payung-Payung	• A potential tree species being considered for planting • Reported as a fast-growing species • Planting suitability and availability a constant supply of quality planting material is being explored.

D). New Nursery

SFDSB decided to upgrade their nursery facilities to scale up planting under BASIL 100 system. The new nursery will be improved in many aspects such as drainage, irrigation system, water filtration, water storage, ergonomics and benches. Nursery operations still following the existing practice, i.e. the application of media, potting medium, transplanting and seedlings maintenance.

E). Species Site Matching

Distance from riparian reserves and water sources are the main aspects for our current species site matching criteria. As such it is preferable to place Laran plots closer to water sources and riparian reserves as compared to Albizia and Pellita.

F). Field Planting

SFDSB has decided to adopt the planting spacing 4m x 5m for Laran and 3m x 3m for Albizia in BASIL 100 planting system as SFDSB wants to increase their stocking per hectare and establish earlier canopy closure to supress weeds which will in turn reduce the future maintenance cost. Planting area will be lined first followed with digging a hole of 30 cm in width and 25 cm depth. One to two rounds of Before Planting Spray (BPS) will be conducted to kill all weeds prior planting. Planting will commence around two weeks from BPS.

G). Upkeep and Maintenance

SFDSB will be introduce herbicides as a weed control in ITP area to increase trees growth and survival rates. The application of chemical herbicides is divided into 3 different sections:

a) Before planting

Before planting spray is done to provide a totally competition free environment which seedlings are planted in, to enhance growth and reduce mortality.

b) Pre-canopy closure

The objective is to eliminate all weed growth which is providing direct competition to young seedlings. This control is to enhance growth to effect canopy closure in the shortest time possible.

c) Post-canopy closure

1. Once the tree canopy has developed to a point of closure or partial closure, maintenance of weeds is to target competitive weed species with prolific growth characteristics.
2. In early post canopy closure, care must be taken to protect trees especially in areas of constrained tree growth where there is a high number of low-level branches.

Two types of spraying operations will be carried out, namely: Before Planting Spray (BPS) and After Planting Spray (APS). BPS is conducted as a blanket spray and APS as a spot spray.

H). Plantation Measurement and Research

a) Permanent Sample Plots (PSP)

The establishment of the PSP has commenced in 2014 and re-establish in 2020 with different plot design. The measurements are carried out at least once a year. More PSP will be established if and when necessary, according to the progress of plantation development.

b) Temporary Sample Plot (TSP)

Temporary sample plots (TSP) are introduced in year 2020 to monitor the planted seedling stock level in different growing stages. Principally, there are three important points obtained by TSP, namely survival rate, stand volume increment, and stock.

c) Research

Research in plantation forestry is important. Sapulut joined BFC in year 2019 in order to continuously improve the capabilities of our Research and Development (RnD) department. Exchanging information with other BFC members in terms of nursery development, silvicultural treatments, harvesting systems and pest and disease response actions to enable Sapulut to increase its performance from the ITP areas.

I). BASIL 100 Annual Planting and Estimated Yield

With 20,851 ha (gross) of ITP areas available for BASIL 100 planting system (after deduction of 1,119 ha designated for rubber) based on a 10-years rotation cycle, approximately 2,100 ha (gross) are available for BASIL 100 planting per annum basis. The yielding about ca. 18 – 40m^3 ha^{-1} yr^{-1}. Our internal requirement is 150,000 m^3 p.a. Details of BASIL 100 system planting ratio and estimated yields are as below:

Annual Planting	**LARAN**	**PELLITA**
Spacing	4 x 5 M	3 x 3 M
Planting ratio (area)	6	4
Planting Points per Ha	500	1,111
Ha for planting p.a (net)	873.19	582.12
Seedlings planted p.a	436,593	646,740
Survival	70%	70%
Length of rotation cycle	10 years	10 years
Average volume per tree	0.6 M^3	0.6 M^3
Volume on maturity p.a	183,369.06 M^3	271,630.7 M^3
Sawlog wood – 50%	91,684.53 M^3	135,815.35 M^3
Pulp wood – 50%	91,684.53 M^3	135,815.35 M^3

J). Harvesting of Planted Trees

The management objective of ITP area is to produce wood in a shorter 10-year rotation by adopting BASIL 100, therefore, there are mature trees that have been planted during the previous PDP are available for 1st rotation harvest. The harvesting is expected to begin in 2016 until 2019, and then continue in 2024 to 2025 for the 2nd cycle. Over the 10-year planning period, a total of about 27,171 ha gross area of planted trees with an average of 2,100 ha is scheduled to be harvested annually and yielding about 100,000-150,000 m^3 of plantation timber harvesting and 20,000 m^3 of mixed-timber from the buffer lines. After harvesting is completed, the areas will be consecutively replanted for a second phase, following the BASIL 100 planting method. The first 10-year cycle of BASIL 100 will be from 2020 to 2025, and the second cycle will commence on 2026 to 2031.

K). Harvesting of Natural Regenerated and Remnants Trees under ITPs Area

There are natural regenerated and remnants trees which naturally grow up to marketable size and value for the current market. Thus, the natural regenerated and remnants trees will be harvested for clear felling under the BASIL 100 regime. The natural regenerated and remnants trees, regardless under certified and non-certified ITPs area, to be harvested by clear felling the area under BASIL 100 regime which to will be planted back with Laran, Albizia and Pellita tree species.

4. Forest Certification

Sapulut's ITP area is 21,760 ha and 12,486.42 ha have been officially certified for Malaysian Criteria and Indicator for Forest Plantation (MC&I FP. v2) under the Malaysian Timber Certification Scheme (MTCS) – Programme for the Endorsement of Forest Certification (PEFC) on the 3rd July 2020.

The 12,486.42 ha has been developed and planted with forest plantation timber species, rubber plantation and dipterocarp species for reforestation prior the year 2010. The balance of the area, approximately 8,970.64 ha were not eligible for certification due to its inability to meet the Criterion 6.10 of MC&I FP standard.

For the latest update by the Malaysian Timber Certification Council (MTCC), the Malaysian Criteria and Indicator for Sustainable Forest Management (MC&I SFM) has been launched on 1st April 2020 and come into force on 1st January 2021 replacing the MC&I NF and MC&I FP. v2. Sapulut will undergone the surveillance audit according to the new standard for its certified ITP and NFM area.

5. Demarcation of the Natural Forest in Industrial Tree Plantation (ITP) Area

The following natural forest area which has been identified and excised is as following; -

Area of natural forest left intact

Area	Gross Ha
Steep Slope (>25 degree)	1,092.98
Kerengas Forest	118.14
Riparian Reserve	678.65
Labau Soil (HCV 4)	451.37
Gross Ha:	2,341.14

CHAPTER 5 - ENVIRONMENTAL IMPACT ASSESSMENT

Environmental impacts of harvesting and other operations

EIA is required under the Environmental Protection (Prescribed Activities) (Amendment) Order 2013 for any forest management activities, especially logging and plantation activities within an area in excess of 500 ha.

Forests management in SFDSB involves various activities where some can be detrimental to the environment if they are not given appropriate control measure. Therefore, comprehensive environmental impact assessment is essential prior to the implementation of various activities so that appropriate mitigation measures can be identified to minimize the consequent negative impact.

The mitigation measures identified from the assessment can be categorized as follows:

Environmental Issue	Mitigation Measures
Soil Erosion	a) Protection of steep areas; b) Reducing land area disturb; c) Minimize cutting and filling in all types of road construction; d) Proper bridges and culverts for stream crossing.
Water Quality	a) Preservation of riparian reserves; b) Protection of sensitive areas e.g. watershed.
Flora and Fauna Ecology	a) Reducing damage to residual trees and vegetation; b) Protection of significant forest formation and landscape; c) Wildlife Management.
Socio Economic Consideration	a) Provision of employment opportunities; b) Protection water sources and supply;

	c) Worker's safety and health.
Biomass and Waste Pollution	a) Proper disposal of all types of waste.
Remedial Operation	a) Rehabilitation of degraded areas; b) Reducing surface flow current; c) Removing structures affecting streams and rivers flow.
Forest Fire Risk	a) Forest Fire Management Plan.

A comprehensive mitigation framework to manage the impact of the forestry activities in the Licensed area are shown as below:

Mitigation of environmental impact of forest management activities

Forest Function	Activity	Objective of Mitigation	Mitigation of Impact
Protection	Watershed Management	Reduction of accelerated run off and sedimentation	• Forest zoning by forest function • Delineation of protection compartments according to management restrictions • BASIL harvesting method • No ground skidding across streams • Alignment of roads away from key habitats • Road constructions during dry season only • Stabilization of road banks
	Wildlife management	Minimum disturbance of habitats of endangered mammals	• Forest zoning • Road construction and harvesting according to standards given above
	Fire Control	Reduction of fire hazard	• Fire management plan for the forests based on prevention, detection and suppression
	Pest and Disease Control	Prevention of contamination of soils and vertebrate fauna with pesticides	• Application of bio-degradable pesticides in nursery level • Environmentally friendly method such as buffer left intact after harvesting • Safe disposal of waste
Timber Restoration	Forest Tending (Silvicultural operation)	Minimum disturbance of natural succession and bio-diversity	• Elimination of immediate competitors of commercial trees only • No eradication of weeds; only liberation of commercial regeneration

			• Silviculture, slashing, climber cutting & enrichment planting (SSCCEPNG) method
Conversion to Industrial Tree Plantation		Reduction of accelerated soil erosion and safeguarding minimum water quality	• Forest zoning according to site suitability (slope, depth, nutrients) • No blading of top soil • No burning • No terracing • Apply slow-release fertilizer
Timber Production	Harvesting	Safeguarding of future forest stands at compartment level	• Felling of trees based on silvicultural tree marking • Directional felling • Employment of low impact yarding systems
	Road construction	Reduction of accelerated soil erosion	• Minimizing road density by employment of LDCCS • Road gradient, width, drainage system and stabilization of banks according to minimum standards
Community Needs	Community forestry	Prevent encroachment	• Awareness campaigns • Provision of employment through long-term forest operations • Joint Community Forestry Service

Other than EIA, Social Impact Assessment (SIA) is used to determine the possible impact of SFDSB operations on the local community. The SIA usually includes consideration of mitigation possibilities for any significant effects and likely post mitigation outcomes by recommends mitigating measures to minimize these impacts. Furthermore, monitoring activity is conducted regularly within operational area including contractor campsites. Engagement with environmental consultant helps in assessing the environmental practices within SFDSB area ranging from water quality to proper disposal of waste.

CHAPTER 6 – MONITORING, AUDITING AND REPORTING

1. Monitoring

A) Operational Monitoring

Regular internal monitoring is essential to ensure compliance and early recognition of problems; and to take corrective actions immediately. A summary of the "key" aspects of monitoring operational performance is illustrated in the table below:

"Key" Aspects for Monitoring

Key Sections Monitored	Key Topics	Monitoring Mechanisms	Frequency
Boundary maintenance	Boundary	Length maintained	Forest verification
Silvicultural Tending	AWP Prescription	Records/Forest Verification	Monthly
Road Construction	Length; Road types	Forest Verification	Monthly
Forest Security & Protection including Wildlife	AWP Prescriptions	Records/Forest Verification	Monthly
Environmental Management	FMP Prescriptions	Records/Forest Verification	Annually
CF Project	AWP Prescriptions	Records/Forest Verification	Bi-annually
CFI	TSP, PSP Establishment	Records/Forest Verification	

B) Resource Monitoring

a) Forest Plantation Growth and Stock Monitoring

- Permanent Sample Plot

  The growth performance of the planted timber can be monitored via permanent sample plots (PSP). The data captured annually in the PSP use to derive mean annual increment (MAI) in terms of diameter increment, height increment, and stand volume increment.

- Temporary Sample Plot (TSP)

  Temporary sample plots (TSP) are used to monitor the planted seedling stock level in different growing stages. Principally, there are three important points obtained by TSP, namely survival rate, stand volume increment and stock. The practical purposed of the diameter increment is to estimate the harvestable volume for the planted area.

b) Wildlife Monitoring

All wildlife that is found in Sapulut FR should be identified and monitored. The survey technique include transects for recording direct and indirect species observation (direct sightings and indicative presence of wildlife species through calls, footprints, feeding and other notable signs) for Orang-utans, Wild Cats, Sun Bears, Bornean Gibbons and Bornean Pygmy Elephants. However, this monitoring requires time, monetary resources and capacity building to be implemented.

2. Auditing

Internal Auditing

SFD and other third-party auditors will carry out their periodic and continuous surveillance and auditing in SFDSB operations. SFDSB as well has established its own internal auditing to carry out regularly internal monitoring and auditing of all forestry activities in the Licenced Area to ensure that SFDSB and/or their contractors are in conformance with the legal requirements and other regulations, code practices, etc.

3. Reporting

The information generated by the monitoring system is to be reported to the General Manager regularly by the Managers and Unit Heads. The frequency of reporting as follows:

Report	Reported to	Frequency
Internal Report	General Manager	Monthly Quarterly Annually *Depends on the sensitivity of the key topics
Environmental Compliance Report (ECR)	Environmental Protection Department	Once in every 4 months
SFMLA Compliance Report	Sabah Forestry Department	Once a year
ITP Pioneer Status Investment Incentive progress report	State Technical Committee	Once in every six months

4. Compartment Register Book

Compartment Register Book (CRB) serves as a permanent record of site and stand condition, management prescriptions and activities undertaken in each compartment. Thus, the CRB for the Licenced Area will be prepared and updated regularly.

5. Plan Review

The 2nd PDP is subject to a review by the year 2024/25. The following aspects shall be considered during the mid-review:

- Comparison between the targets and actual achievements of all management activities carried out;
- Assessment of the forest resources (especially yield) through the evaluation of growth data from the CFI;
- Evaluation of the development in terms of species diversity, soil, water and wildlife protection, and community forestry development; and
- Assessment of any major changes in the environmental and socio-economic conditions.

6. Forest Management Certification

SFDSB had initiated the certification process since 2014 for its ITP area. In 2020, partly of the ITP area, approx. 12,486.42 ha, was certified under the MTCS-PEFC certification scheme. Besides complying with the social and environmental standards of Principles and Criteria for certification, SFDSB will carry out its forest management in accordance with the following guidelines:

a) To have strong forest and environmental protection standards, which require protection of HCVFs and good forestry practices that reduce toxic chemical use;

b) To have strong community protection standards by protecting native people rights, require workers to be paid competitive wages and require compliance verification with social and international policies and laws;

c) To be transparent in which the forest management system is governed by an equal balance of economic, social and environmental; and

d) To ensure good governance in every aspect and to be legally verified in its timber production.

CHAPTER 7 - MANPOWER AND BUDGET REQUIREMENT

1. Manpower

Overall manpower summary as of July 2020:

LOCATION	TOTAL
Kota Kinabalu	28
Tawau Office	5
Sandakan Office	2
Base Camp	236
Overall Total	**271**

2. Budget and Cost Distribution

The Licenced Area is to be funded partly from profits generated from logging in the ITP compartments (internal sources) and borrowings from the Federal government agency to support forest operations/activities. A total of RM683.3 million is required to finance the activities as prescribed in this Plan for the next 10 years. The cost centers are largely confined to forest restoration (36%), silviculture (17%) and roading (13%) the total budget requirements respectively. Other cost centers are general expenses (2%) and administrative cost (9%), etc.

CHAPTER 8 – FINANCIAL ANALYSIS

A total of RM683.3 million is required to finance the activities as prescribed in this Plan for the next 10 years. The cost centers are largely confined to forest restoration (36%), silviculture (17%) and roading (13%) the total budget requirements respectively. Other cost centers are general expenses (2%) and administrative cost (9%), etc. Timber revenue is projected to generate RM289.5 million with harvesting direct cost at RM169.2 million. Net profit from harvesting income is RM120.3 million and the profit margin throughout the 10 years range from 35 percent to 51 percent.

SFDSB will spend RM72.8 million direct plantation cost such as seedling cost, land preparation including before planting spray cost, planting cost and plantation maintenance cost such as after planting spray. A total of RM77.0 million will be spent on direct plantation cost overhead, support department and admin department. Rubber operation is projected to generate a loss throughout 10 years amounting RM1.5 million and financial cost projected to be RM2.1 million. Inflation rate throughout the year is assumed to be 3 percent. Based on the 10 years cash flow, Industrial Tree Plantation expenditure will require the support from Natural Forest revenue to fund the operation.