KUMPULAN PENGURUSAN KAYU KAYAN TERENGGANU SDN BHD (KPKKT)

SOCIAL IMPACT ASSESSMENT (SIA) OF THE SUSTAINABLE FOREST MANAGEMENT OF DUNGUN TIMBER COMPLEX MANAGED UNDER THE 2ND ROTATION OF THE MALAYSIAN SELECTIVE MANAGEMENT SYSTEM (SMS)

By

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Bukit Besi, Terengganu
1 September 2018
(Revised & Updated 6 January 2020)

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Executive Summary

This Social Impact Assessment (SIA) on the sustainable forest management (SFM) on Dungun Timber Complex (DTC) in the State of Terengganu, Malaysia, represents a follow up to earlier series of SIA reports prepared in 2009 and 2013 on the same site and subject. It has always been the intention of Kumpulan Pengurusan Kayu Kayan Terengganu Sdn Bhd (KPKKT) as the manager and operator of SFM within DTC since four decades ago, to continue to conduct such social survey and assessment periodically from time to time and to see to it that the interest of the forest-dependent communities that live within the vicinity of DTC are well-catered for, by following as closely as possible the recommendations laid out in the SIA reports. The idea of the SIA is to enable KPKKT to continue to monitor and gauge and be mindful of all the positive as well as negative impacts to the local stakeholders, of the series of forestry activities and operations that make up what is called the Selective Management System (SMS) within DTC. KPKKT also maintains close relationship and rapport with other relevant interest groups, government agencies, academia, as well as non-governmental organisations (NGOs) to solicit their professional inputs on relevant issues raised by the affected local communities and act on them as appropriate. In this way, KPKKT hopes to be able to conduct its SFM activities in an informed and more-or-less transparent manner while at the same time carrying out the appropriate mitigative and corrective measures commensurate with the scale and intensity of the company's SFM operations. Such SIA initiative also serves to fulfil one of the Forest Stewardship Council® (FSC)'s Principles and Criteria (P&C) for forest stewardship to which KPKKT subscribes. Since 2008 KPKKT had been committed to follow and abide by FSC P&C which form the basis of FSC certification standard.

Among others, findings from the present SIA survey showed that most of the local stakeholders/villagers still live in poverty with about 50 per cent of them surviving on a level of income that is below national rural Poverty Line. Unemployment rate remained high despite a reasonably respectable literacy rate and a sound level of education of the people. Job opportunity is sorely lacking. This has subsequently

forced a section of the local community to rely on DTC forests for supplies of forest produce such as freshwater fishes and other non-timber forest produce (NTFP) as well as timber for construction material. Approx. 73 per cent of the people harvested the various forest produce for their own consumption while some 27 per cent engaged in the business and trade of them. The villagers also had had mixed perceptions on the impacts of SFM activities on the forest and environment and generally showed deep concern on the natural resource, while others expressed their satisfaction and support to KPKKT for its sound and responsible management of DTC forests. Among the main challenges faced by KPKKT in the future include the need to maintain a continued compliance with FSC® Principles and Criteria of Forest Stewardship, along with all the tenets of SFM which call for the maintenance of a cordial and healthy rapport with local stakeholders through a strategy that gears towards a heightened public awareness and enhancement of their economic well-being. A series of other recommendations are also outlined in this SIA report which would enhance the positive values while mitigating the negative impacts of SFM operations within DTC's forests. In this way, KPKKT would be able to contribute in a more positive and meaningful manner towards the welfare of the local population in a spirit of co-existence and mutual respect, while meeting the original social, environmental and economic objectives of its establishment and operation.

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Acknowledgement

We wish to express our profound thanks and appreciation to the management of KPKKT for the trust and opportunity given to us to conduct this social impact assessment of the sustainable forest management (SFM) operations within its DUNGUN TIMBER COMPLEX (DTC). The term SFM operations was deliberately used throughout this report instead of just "logging" or "selective logging" in order to reflect the array of programmes and activities that are systematically planned and judiciously executed on the ground by KPKKT. It was also to present the image of KPKKT as a responsible forest manager rather than a plain, profit-motivated logging concern. Together, those activities and operations carried out by KPKKT constitute SFM as a discipline which calls for such dedication and professionality in the part of all those involved, not only from KPKKT and its staff and contractors but also the Terengganu State Forestry Department (TSFD), along with the mutual understanding and respect shown by such stakeholders as local residents and relevant agencies. As has been shown there had been no apparent conflict between the SFM operations conducted by KPKKT within DTC and the local residents over the years, and both sides continue to maintain a cordial relationship and mutual respect, which had enabled KPKKT to move forward and successfully conduct its business virtually unhindered without causing undue stress to the people, environment or harassment to the wildlife. The spirit of goodwill and mutual co-existence between KPKKT and local villagers have always been on the high note.

We thank KPKKT's Senior General Manager Mr Suhairi Bin Sulong, as well as others who had been of such great help during the preparation of this report. Tuan Haji Wan Suhaimi Wan Aziz of Golden Pharos Berhad deserves a special mention for this dedication, professionalism, understanding, help and enduring friendship.

Thank you.

Abbreviations and Acronyms

DBH, dbh	diameter at breast height
C.L.	Cutting limit
DTC	DUNGUN TIMBER COMPLEX
CFC	Cherul Forest Concession
CPRF	Cherul Permanent Reserved Forest
CSR	Corporate Social Responsibility
EIA	Environmental Impact Assessment
FELDA	Federal Land Development Authority
FELCRA	Federal Land Consolidation and Rehabilitation Authority
FMP	Forest Management Plan
FMU	Forest Management Unit
FSC	Forest Stewardship Council
GLC	Government-Linked Company
GPB	Golden Pharos Berhad
HCVF	High Conservation Value Forest
HCVFMP	HCVF Management Plan
JaKOA	Jabatan Kemajuan Orang Asli (Aborigine People Development Department)
JPNT/ TSFD	*Jabatan Perhutanan Negeri Terengganu*/ Terengganu State Forestry Department (TSFD)
KETENGAH	*Lembaga Kemajuan Terengganu Tengah* (Central Terengganu Development Authority)
Kg	*Kampung* (Village)
KPKKT	*Kumpulan Pengurusan Kayu Kayan Terengganu Sdn Bhd*
OSH	Occupational Safety and Health
m.a.i.	mean annual increment
PCT	Potential Crop Tree
PERHILITAN	*Jabatan Perlindungan Hidupan Liar dan Taman Negara* (Wildlife Protection and National Parks Department)
PLI	Poverty Lime Income
PPE	Personnel and Protective Equipment
PRF	Permanent Reserved Forest
Pre-F	Pre-Felling (Inventory)
R&D	Research and Development
RIL	Reduced Impact Logging
RISDA	Rubber Industry Smallholders Development Authority
SFM	Sustainable Forest Management
Sg.	Sungai (River)
SIA	Social Impact Assessment
SMS	Selective Management System
TKL	*Tanaman Kawasan Lapang* (Open Area Planting)
TM	Tree Marking
TRF	Tropical Rain Forest
TSI	Timber Stand Improvement
UPM	Universiti Putra Malaysia
WWF-Malaysia	Worldwide Wildlife Fund – Malaysia Office

Social Impact Assessment (SIA) on the Sustainable Forest Management (SFM) of Dungun Timber Complex (DTC) Managed Under The 2nd Rotation Of The Malaysian Selective Management System (SMS)

1.0 Introduction

Economic development projects bring about both positive as well as detrimental and undesirable effects on human population, natural resources and the surrounding environment. While significant benefits may flow in from the various development actions, there is a need to identify and evaluate the attendant negative impacts. This can be done by identifying and measuring those impacts through appropriately designed and executed impact assessment, as well as managing those impacts in such a way that the positive externalities are maximized and the negative externalities are minimized (Center for Good Governance, 2006). Some of the negative and undesirable impacts many of which tend to be unintended, include the disruption of social organization and communal harmony and values; modification of ecosystem; impairment and loss of human livelihood, culture and life; introduction of new diseases; and the destruction of renewable resources, all of which could potentially overwhelm and eventually wipe out whatever benefits or positive consequences the project might have generated in the first place.

A social impact assessment (SIA) is usually conducted for this purpose at regular intervals or whenever the need arises, for the purpose of identifying, assessing, gauging and monitoring the impact of a project on the surrounding community, and to recommend appropriate mitigation and improvement measures.

At Kumpulan Pengurusan Kayu Kayan Terengganu Sdn Bhd (KPKKT), a series of social impact assessment of the company's sustainable forest management (SFM) programmes and activities within its 106,697-ha, long-term forest management unit (FMU) of DUNGUN TIMBER COMPLEX (DTC) in Terengganu had been initiated since 2009 and followed by another in 2014, conducted by appointed consultants. The present initiative therefore seeks to present a review and update of the earlier reports by incorporating findings from surveys conducted on the stakeholders namely the local communities and stakeholders living in villages in the vicinity of DTC.

2.0 Kumpulan Pengurusan Kayu Kayan Terengganu Sdn Bhd (KPKKT)

2.1 Company Profile

KPKKT which is one the 6 subsidiary companies under the Terengganu state-owned enterprise Golden Pharos Berhad (GPB) manages the timber concession area of Dungun Timber Complex (DTC) following the tenets of Sustainable Forest Management (SFM) principles as laid out in KPKKT's long term Forest Management Plan (FMP) which covers a 30-year period, from 2008 to 2037. The latter represents the second cycle of KPKKT's management of DTC under the Malaysian Selective Management System (SMS). All of the prescriptions contained in the FMP were formulated in such a way as to accommodate as much as possible the current as well as anticipated future changes in local and global attitudes and trends in the approaches towards forest resource management, biodiversity conservation, climate amelioration and environmental protection.

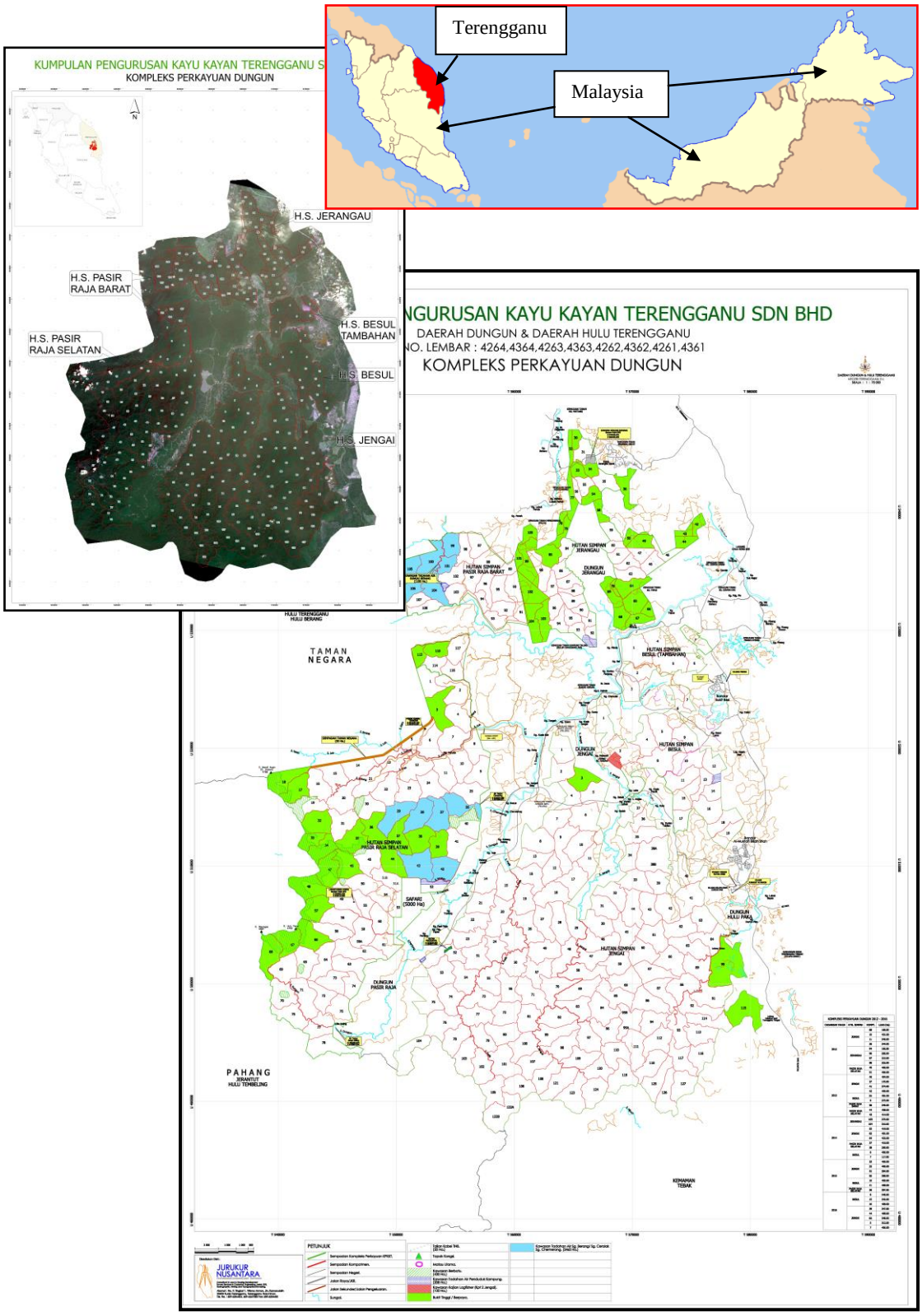


Fig. 1. Dungun Timber Complex in Dungun District, Terengganu, Malaysia.

The management of DTC by KPKKT complies with the environmental management standards as laid out by the relevant authorities, namely the Terengganu State Department of Forestry (TSFD) as well as Department of Environment, Terengganu. In this context, appropriate environmentally-benign forest management standards and practices have been and will continue to be duly observed by KPKKT in all of its forest management activities and field operations, in order to minimise potential negative environmental and social impacts of such operations. DTC was recognised and certified by the internationally-renowned Forest Stewardship Council (FSC) as a "Well-Managed Forest" since April 2008 after successfully complying all 9 FSC's Principles and Criteria of Forest Stewardship (FSC P&C). This certification was subsequently renewed for a further five years as from 2012.

The 6 Permanent Reserved Forests (PRFs) within Dungun District that presently make up DTC are: (1) Jengai PRF (51,840 ha), (2) Besul PRF (6,270 ha), (3) Jerangau PRF (9,810 ha), (4) Pasir Raja Barat PRF (6,547 ha), (5) Pasir Raja Selatan PRF (31,712 ha), and (6) Besul Tambahan PRF (518 ha); giving a total area of 106,697 ha.

The natural tropical rain forest comprised mostly the mixed dipterocarp forest (MDF) type. A total of 70,000ha of these forests falls under the "productive" category with an average estimated timber standing stock of 32 - 45–3/ha., and presently being managed under the second rotation of the Selective Management System (SMS) of 30 years. These forests are still rich in various tropical timber species including:

(1) Balau, (2) Balau laut merah, (3) Balau membatu, (4) Chengal, (5) Keruing, (6) Kempas, (7) Merbau, (8) Meranti nemesu, (9) Meranti bukit, (10) Meranti seraya, (11) Meranti sengkawang merah, (12) Meranti rambai daun, (13) Meranti kepong, (14) Keruing, (15) Meranti tembaga, (16) Resak, (17) Damar hitam, (18) Damar minyak, (19) Kapur, (20) Keladan, (21) Mersawa, (22) Meranti sarang punai, (23) Meranti melantai, (24) Meranti langgong, (25) Gerutu, (26) Meranti paang, (27) Nyatoh, (28) Sepetir, (29) Bintangor, (30) Durian, (31) Jelutong, (32) Kedondong, (33) Kembang semangkok, (34) Giam, (35) Kulim, (36) Merawan, (37) Melunak, (38) Merpauh, (39) Medang, (40) Simpoh, (41) Mengkulang, (42) Meranti bumbong, (43) Meranti belang, Kelat, as well as a host of "miscellaneous species". Based on a 5-year (2011 – 2015) production data, the productive forests were found to produce an average of 15.15 nett hoppus ton of round timber per ha from the species mentioned above. This is equivalent to approx. 28 m^3/ha.

2.2 **Management Objectives and Strategy**

In terms of its long term management objectives and strategy, KPKKT continues to embrace and practise the Malaysian Selective Management System (SMS) to manage the mixed dipterocarp forest within DTC. The company's long term commitment to remain viable while at the same time maintain its FSC-certified status, remains unchanged. These can be summarised as follows:

1. Strict adherence to and proper implementation of the prescriptions laid out in the Forest Management Plan and guided by the Terengganu State Forestry Department (TSFD).

2. Commitment to reducing the impact of logging on the natural environment by protecting residual Potential Crop Trees (PCTs), regeneration, biodiversity, soil, water resources, habitats and high conservation value forest (HCVF) and the human environment.
3. Maintenance of ecology and the ratio of dipterocarp vs non-dipterocarp species in the residual stands as in the original forest composition.
4. Commitment towards maximum utilisation of timbers and minimisation of wastes.
5. Continued investment in developing Reduced/Low Impact Logging (RIL) methodologies in all types of timber production areas,
6. Provision of necessary training and mentoring programmes to staff and contractors along with supervision on the ground on regular basis.
7. Management of the Concession Area as a self-sustaining, multiple-use FMU.
8. A full subscription to all FSC's Principles and Criteria for SFM.
9. To help uplift the economy and social wellbeing of the forest-dependent communities in the region through good neighbourliness and creation of employment and business opportunities for local population.
10. To foster good governance, sound professional ethics and business goodwill with stakeholders, thereby leading to appropriate recognition by the relevant international such as the Forest Stewardship Council (FSC), and local certifying bodies of SFM as subscribed and practiced by KPKKT.

2.3 Manpower Position

As of the date of this report (August 2018**)**, KPKKT employs a total of 86 staff comprising 76 males and 10 females. Of these, about 16.3% work at the management level (General Manager, Deputy GM, Senior Forest Manager, Forest Manager, Assistant Managers and Forest Executives), and 83.7% at the technical level (Forest Supervisors, Foresters and Machine Operators). The high proportion of technical staff reflects the importance attached by KPKKT on field and R & D operations. For road construction, tree felling and timber extraction, KPKKT engages a total of 6 contractors.

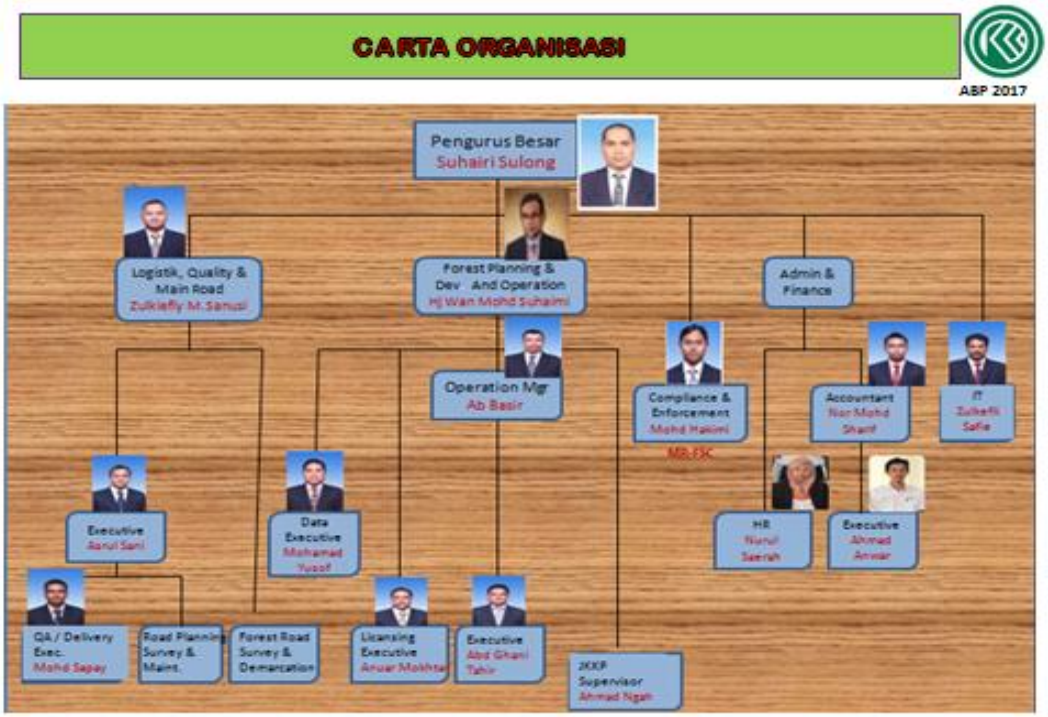


Fig. 2. Organisational Chart of KPKKT (June 2018)

2.4 Human Resource Development

Training and capacity building involving both KPKKT's personnel and those of KPKKT's contractors, are of utmost importance in order to achieve SFM within DTC and maintain its FSC-certified status as a "well-managed forest". As for the contractors and their staff, KPKKT provides the necessary support and incentives for training initiatives by, for instance, roping-in the contractors concerned into KPKKT's training programmes aimed at enhancing knowledge and skills in field techniques. **Table 1** below summarises the trainings, workshops and courses which were participated in by KPKKT during 2017 and 2018 in order to avail the workers to the latest thinking and development in areas related to their tasks and responsibilities.

Apart from that, training opportunities for staff in the following areas are also provided from time to time:

1. Training of machine operators in environmentally benign and damage-limiting harvesting and forest engineering techniques
2. Training in silviculturally significant tree marking procedures
3. Training in silviculturally relevant stand treatment techniques
4. Training on nursery technology and planting stock production.
5. Training on chain-of-custody (CoC)
6. Training on work safety and health.

Table 1.

Selected Short Courses, Seminars and In-Service Field Visits Organised for KPKKT Staff in 2017 and 2018

No	Date & Duration	Course Title	Venue	Participation
1	9 Oct 2018 (1 day)	Pengurusan Pekerja Asing	ILP, Kuala Terengganu	Selected Staff
2	2 Oct 2018 (1 day)	Disciplinary Procedure and Domestic Inquiry	Quinara Al Safir, Tok Jembal	Management Staff
3	22 Sept. 2018 (1 day)	Lawatan Ke Chengal Besar	Pasir Raja PRF	KPKKT Staff
4	22 Sept 2018 (1 day)	Golden Ride	KT	Management Staff
5	30 – 31 Jul 2018 (2 days)	MTR 2018	Darul Iman Training Centre, Kemaman	Management Staff
6	29 – 31 Jul 2018 (3 days)	Seminar For Emergency Response Team	Jab. Bomba & Penyelamat, Wakaf Tapai	Selected Staff
7	7 Sept 2018 (1 day)	EIA (Second Schedule)	Dept Environment, Putrajaya	Selected Management Staff
10	27 Sept 2018 (1 day)	World Tourism Day	KT	Selected Staff
11	19 Aug 2018 (1 day)	Stakeholder Consultation	UiTm Dungun	Management Staff, Supervisors & Contractors
12	20 Aug 2018 (1 day)	FSC Mentoring	UiTM Dungun	Staff & Contractors of KPKKT & Pesama
13	25 – 27 July 2017 (3 days)	Kursus Pemantapan Pensijilan MC&I	Pusat Latihan Perhutanan, Terengganu	Selected Staff
14	10 – 12 Jan 2017 (3 days)	Training on Dendrology, Pre-F, Tree Marking	Rest House Pasir Raja	Pembangunan Staff
15	24 July 2017 (1 day)	Kursus Panduan Jalan Hutan 2010 (Pindaan 2013)	KPKKT	Operasi Staff, Contractors
16	10 July 2017 (1 day)	Seminar Pengendalian Bahan Kimia	Hotel Permai Inn, KT	Selected Staff
17	25 – 26 July 2017 (2 days)	National Tax Conference	KLCC	Selected Mgt Staff
18	25 – 29 Sep 2017 (5 days)	CompTIA Network	Kuala Lumpur	Selected Staff
19	24 – 25 Oct 2017 (2 days)	Programme & Abstract Book	Magellan Sutera Harbour Resort, Kota KInabalu, Sabah	Selected Mgt Staff
20	14 Dec. 2017 (1 day)	Latihan Pengurusan Kanan, Terengganu Inc.	Hotel Permain Inn, KT	Selected Staff
21	20 Dec 2017 (1 day)	Kursus Akta Keselamatan & Kesihatan Pekerjaan 1994 & Peraturan-Peraturan	KPKKT	KPKKT Staff & Contractors

3.0 The SFM of DTC Forests and Phases of Activities/ Operations

The array of forestry programmes, planning and management, activities and operations conducted within DTC are governed and dictated by a long term Forest Management Plan (FMP) which is a planning document specifically prepared and designed to meet the three main pillars of SFM, namely

(1) economic viability, technical feasibility and financial growth,

(2) corporate's social acceptability and camaraderie, and

(3) forest protection, environmental safety and biodiversity conservation.

The FMP for DTC has been designed and prepared to serve as a general guide and instruction for KPKKT to protect, manage, develop and conserve in perpetuity, the invaluable natural mixed tropical rain forest (TRF) resource within DTC as a single and distinct Forest Management Unit (FMU), based on the precepts of **sustainable forest management (SFM) principles.** To this end, DTC forests are identified into several categories according to their functions based on their locations and characteristics as defined in NFA 1993 (**Table 2**).

3.1 Selective Logging Planning

Annual Working Area (AWA)

The 6 Permanent Reserved Forests (PRFs) within Dungun District that presently make up DTC are: (1) Jengai PRF (51,840 ha), (2) Besul PRF (6,270 ha), (3) Jerangau PRF (9,810 ha), (4) Pasir Raja Barat PRF (6,547ha), (5) Pasir Raja Selatan PRF (31,712 ha), and (6) Besul Tambahan PRF (518 ha); giving a total area of 106,697 ha. In managing the production forest category for sustainable timber production, KPKKT considers several

relevant factors, including the following, some of which are largely tentative and subject to revision as new facts come to light:

1) The dbh m.a.i's of trees larger than 30.0cm dbh under the Selective Management System are assumed to be in the range of 0.80cm – 1.00cm/tree/yr for both Dipterocarps and Non-Dipterocarp species,
2) It follows from the above, the rate of volume m.a.i. for all trees above 15.0 cm dbh is conservatively assumed to be 2.62m^3/ha/yr.
3) Net Timber production area: 70,000ha
4) The sustainable cut for timber production is approx. 80,000 $m^{3/}$year
5) Silvicultural tending and open area planting & rehabilitation programmes are conducted to enhance the stocking and growth of the dipterocarp component.

Table 2.
Forest Functions in DTC in relation to the Functions Defined in the NFA1993.

National Forest Policy 1992		National Forestry Act 1993	Forest Zonation in Dungun Timber Complex (DTC)	% DTC Area
Production Forest		Sustainable timber production	Timber Production (TP)	67%
Protection Forest	Soil protection	Soil protection	Soil Protection (SP)	14%
			Soil Conservation (SC)	37%
		Soil reclamation	-	-
	Flood control	Flood control	Flood Control Conservation (WFC)	-
	Safeguarding of water resources	Water catchment	Water Catchment Conservation (WCC)	37%
			Riparian Buffer Protection (WBP/ HCVF)	18%
	Preservation of biodiversity	Wildlife Sanctuary	Rare Ecosystem Protection (HCVF)	-
		Virgin Jungle Reserve	Protected Area Buffer (HCVF)	1%
	Climate amelioration	-	-	-
Amenity Forest	Recreation	Amenity	e.g. Chemerong Waterfall	<1%
	Ecotourism	-	e.g. Chemerong Waterfall	<1%
	Public awareness	-	-	-
Research and Education Forests (added in Rev. 1992)		Research	e.g Compts. 51 & 54 of Jengai FR.	<1%
		Education	e.g. Compartment 52 of Jengai FR.	<1%
		Forest for federal purposes	-	-

6) Volume m.a.i.'s are assumed to be 2.618m^3/ha/yr for all species; 2.09m^3/ha/yr for the dipterocarps; and 1.453m^3/ha/yr for the non-dipterocarp tree species.
7) A cutting cycle of 30 years as recommended by the Terengganu State Forestry Department (TSFD).

Timber Production 2012 - 2017

The progress with timber production from DTC over five years (2012 – 2016) can be summarised as in the following points:

- The average yearly round timber production over the past 5 years (2012 – 2016) was 44,567.225m^3/year from 1824.2 ha/yr.
- The round timber outturn from the second growth stands were extremely varied, ranging from as high as 48.84m^3/ha for Compt. 51A of Pasir Raja Selatan PRF to as low as 7.28m^3/ha for Compt. no. 88 of Pasir Raja Barat PRF, giving an average yield of 24.43m^3/ha calculated based on timber production data from a total of 31 compartments across the concession area.

3.2 Pre-Felling Operations

Boundary Demarcation

Boundary demarcation is the first step to be accomplished before selective logging could commence in any forest compartment. It involves surveying and marking on the ground the external boundary of the working area and buffer zones beyond which logging is prohibited, thereby facilitating monitoring and control in the field. Boundary demarcation is carried out by KPKKT staff under the supervision of the District Forest Office.

Pre-Felling Inventory

Pre-F Inventory is carried out by KPKKT staff for the purpose of determining the pre-felling stocking of the proposed working area, following the standard procedures as prescribed by TSFD. The data collected will be used to determine the set of minimum DBH cutting limits for dipterocarps and non-dipterocarp tree species as well as Chengal which is always accorded a higher minimum DBH cutting limits due to its high market value.

Tree Marking (TM)

TM operation is done once the minimum DBH cutting limits have been determined and prescribed based on calculation on Pre-F Inventory data. Trees above the minimum DBH cutting limits are marked by using plastic tags bearing the necessary information on species and serial numbers, which are nailed to the stem as well on the base to indicate the direction of fall when the tree was cut during felling operation. This is in conformity with the reduced impact logging (RIL) protocols to which KPKKT subscribes and practices.

The number of plastic tags nailed on the tree indicates the number of 5-metre logs that could be bucked and extracted from the tree during logging. The use of plastics tags and serial numbers is to facilitate the stump-to-millgate tracking of the timber which forms part of the accounting and chain-of-custody certification processes. Certain trees of special significance such as mother trees, fruit trees, nesting trees, protection trees and trees standing within the riparian buffer zones are however spared from logging for obvious reasons, regardless of their species and size.

3.3 Road and Bridge Construction and Maintenance

Road construction is carried out by appointed contractors upon approval of the road alignment by TSFD, well before the start of logging operation. The work is done under close supervision of TSFD as well as KPKKT staff. The designs of the road system follow the specifications in the Forestry Department guidelines, namely the Forest Road Specification, 2010. The specifications guide the construction of forest roads, skid trails, cross drains, side drains, culverts, sumps etc.

3.4 Selective Felling Operations

Tree Felling and Bucking

Trees are felled by using chainsaw following as much as possible the felling direction as recommended by the position of the tag on the stump, while observing all the precautionary and safety measures to the workers as well as the surrounding vegetation and ecosystem. No tree shall be felled into the buffer zones or into rivers, and no felling activity shall be carried out during rainy days or windy times. The instruction on felling direction also is to avoid hitting and injuring potential crop trees (PCTs) as well as mother trees, fruit trees and protection trees. The felled tree is then de-limbed by removing the crown parts, main branches and irregular buttresses, and the tree-length timber is then prepared for haulage operation and subsequent removal from the felling site. In order to minimise damage through destruction of vegetation and compaction of soil surface, the recommended combination of chainsaw: crawler tractor: skidder operating in an area shall ideally be 1:1:2.

Timber Haulage and Transportation

The timber is subsequently pulled by a cable withdrawn from a bulldozer sitting on the skid trail. From there it is skidded along the skid trail to the nearest matau to be bucked, sorted and recorded. A santaiwong would later transport loads of these timbers to the main matau where they are further sorted out for a long haulage on public roads to the recipient sawmills of either PESAKA (Bukit Besi town) or PESAMA (Chukai town). Timber harvesting, haulage and transportation are done by contractors under close supervision by staff of KPKKT.

3.5 Post-Felling Operation

Area Inspection and Closing Report (CR)

Upon completion of logging in a forest compartment, a closing report is prepared by the Range Officer on behalf of the DFO following a close inspection of the working area. This involves a scrutiny on the number of trees felled, the number of trees marked to be felled but not felled, the volumes of timber wastages, damage inflicted on the residual trees and regeneration as well as the buffer zones, rivers and general ecosystem. Findings recorded on the CR are used as a basis for computing the penalty to be levied to KPKKT as the concession holder and manager of DTC.

Area Rehabilitation and Timber Stand Improvement (TSI)

Logging operation causes damage to the remaining residual stand in terms of damage and injury to the PCTs and regeneration and compaction to the soil. These are assessed during CR preparation which is submitted to the DFO for subsequent decisions. Under normal circumstance, a post-felling inventory operation is

conducted at 2 – 5 years after completion of logging. The purpose of a post-F inventory is to assess the regeneration status of the residual stand and to help decide on the type of timber stand improvement (TSI) operations that would be appropriate to rehabilitate and bring back the forest into a "Regenerated Status" within the time period stipulated. At present the most common TSI operation is the "open-area planting" (*Tanaman Kawasan Lapang* – TKL) by using fast-growing indigenous species.

3.6 Logging Contractors

Road construction, harvesting operations and TSI activities are usually contracted out to capable and experienced contractors who are bound by an agreement signed by both parties to carry out the specific activities. The agreement spells out, among others, job specifications, terms of payments, as well as responsibilities and obligations of the parties involved.

3.7 Logging Camps

Logging camps are specially established temporary complex constructed by logging contractors to house their forest workers, machines and supplies. Covering an area of up to 2ha, a logging camp would usually contain units for temporary living quarters complete with facilities such as kitchen, bathrooms, toilets, surau, running water and electricity, television as well as basic recreational facilities. Electricity supplies are provided by a generator which is also connected to the nearby machine workshop and stores. Fuel supplies are provided by a large 15,000-litre tank of diesel. The choice of sites for a logging camp is influenced by such factors as accessibility to working areas, closeness to water sources as well as easy terrain

condition. An average-sized logging camp can accommodate about 20 – 30 workers depending on the size of operation and the amount of works still left to be completed. During a normal working day, workers tend to loosely follow normal working hours, but sometime may also put in extra hours in order to cover for lost time due to rainy periods or other reasons.

The living quarters can be made of sawn timber or metals with zinc or palm *attap* roofing and floor raised to serve as beds for the workers who usually sleep on simple, thin mattresses and covered with mosquito nettings. Bed time is at 10.00pm when the generator is shutdown till 06.00a.m the following morning. Workers are generally allowed to go back to their families during weekends and public holidays.

3.8 Occupational Safety and Health (OSH)

It is a common knowledge that working in the forests can be very physically and emotionally demanding, hazardous and unhealthy due to a combination of factors including the remote environment, the types of machineries involved (e.g. chainsaws, bulldozers, *santaiwong*s, timber trucks, etc), terrain and topographical features of working sites, nature of work and conditions of the logging camp and potential natural catastrophes such as incessant rains and floods. Consequently, appropriate measures must be taken to ensure the health and safety of the workers. To this end KPKKT provides Personal Protective Equipment (PPE) to its forest workers, notably hardhats and safety boots as well as basic medical supplies. KPKKT also requires its contractors to pay due attention to health and safety issues. Records maintained by KPKKT did not show any incidents of accidents or sickness

involving forest workers. Occupational diseases are not known amongst KPKKT staff as well as contract workers.

Fig. 3

Fig. 4

Fig. 3 & Fig. 4. Stakeholder Consultations & Training sessions are regularly conducted for KPKKT's staff & workers in order to equip them and upgrade their skills and level of competence. Photos show a joint training session conducted with staff of PESAMA.

3.9 Training & Stakeholder Consultation

As mentioned earlier, training and capacity building are regularly conducted as part of human resource development within KPKKT. The latest training programme conducted by KPKKT for its staff was the FSC Mentoring session conducted jointly wirth Pesama Timber Corporation Sdn Bhd on 20th September 2018. KPKKT also establishes coordination and consultation with the public, industry and other government agencies (such as the Wildlife Dept. (Perhilitan), Dept. of Environment, State Forestry Dept., FRIM, universities, etc.) as well as NGOs (such as WWF-Malaysia and GFTN) on a continuous basis while at the same time reviewing and developing appropriate guidance documents and standard operating procedures (S.O.P.). Apart from the main function of KPKKT to manage and harvest timber produce in a sustainable manner, the company also encourages and promotes local employment, recreation and tourism, visual landscape management, basic raw materials extraction, and bio-prospecting within DTC.

3.10 Implementation and Monitoring

Considerable emphasis is put on mechanisms for checking implementation and improving performance as well as monitoring on major aspects of operations such as timber production, forest road and bridge construction, buffer zones, boundaries, tree felling, reduced-impact logging (RIL), logging camps, workers' safety and health, etc.

Management Prescriptions for Stand Management and Conservation

Management decisions within DTC take into consideration of the following:

1) The concept of forest zonation by function in which different major groups of activities and uses of the forest should be conducted within the areas zoned up

for that particular activities/ uses. The idea is to minimise conflict of land uses as well as to maintain resource integrity.

2) The concept of High Conservation Value Forest (HCVF) covering aspects on delineation, census, documentation, planning, future development, formal assessment and monitoring of measurable effectiveness indicators, etc.
3) Standard and guidelines on the control of erosion, minimisation of forest damage during harvesting, road construction, and all other mechanical disturbances, and to protect water resources, as well as the relevant mitigation measures to minimise the negative impacts of those operations.

Ecosystem health and vitality

Ecosystem health is defined as a condition wherein an ecosystem has the capacity across the landscape for renewal, for recovery from a wide range of disturbances, and for retention of its ecological resiliency while meeting current and future needs of people for desired levels of values, uses, products, and services. Ecosystem health in DTC is being monitored throughout the planning period.

The likelihood of the damage incurred to soils from the use of heavy machinery in wet soil conditions is reduced by the introduction of controls on operational measures to limit soil damage from erosion. Water quality maintenance measures are through the buffering of all streams.

High Conservation Value Forests (HCVFs)

The two HCVF areas within DTC are still maintained and in good functioning condition. They are:

1. The Keruing sarawak plot in Compartment 31 Jerangau PRF covering a total of approx.. 63 ha.
2. The community watershed forest within Compartment 52 Jengai PRF which supplies continuous, clean water to the residents of Pasir Raja village.

4.0 Physical, Biological and Social Environments

4.1 Physical Environment

The Concession forest area lies in the Dungun Timber Complex (DTC), located about 120km to southwest of the state capital city of Kuala Terengganu, between latitude 3˚ 53" - 5˚ 51" North and longitudes 103˚ 30" - 102˚ 23" East, covering a total area of approx. 108,900ha (approx. 268,980acres). KPKKT administers and manage DTC from its main office located in the small township of Bukit Besi which is in turn situated some 75km to the south of Kuala Terengganu city, and about 32km to the west of Dungun town, in the Forest District of South Terengganu. Bukit Besi Town can be reached from Malaysia's capital city of Kuala Lumpur (in the southwest) by road via the East Coast Expressway which passes through Gambang, Jabor and Durian Mas. From the north, Bukit Besi can be reached from Kuala Terengganu as well as Dungun by the Terengganu state's coastal trunk road. There are at least 2 airports that serve Kuala Terengganu and thence the project area. These are the Kuala Lumpur International Airport (KLIA) and Sultan Mahmud (Kuala Terengganu) Airport.

DUNGUN TIMBER COMPLEX comprises a total of 308 forest compartments of approx. 400ha each in area. Selective logging under the first cycle of the Selective Management System (SMS) in the area was started in 1983 and ended around 2008.

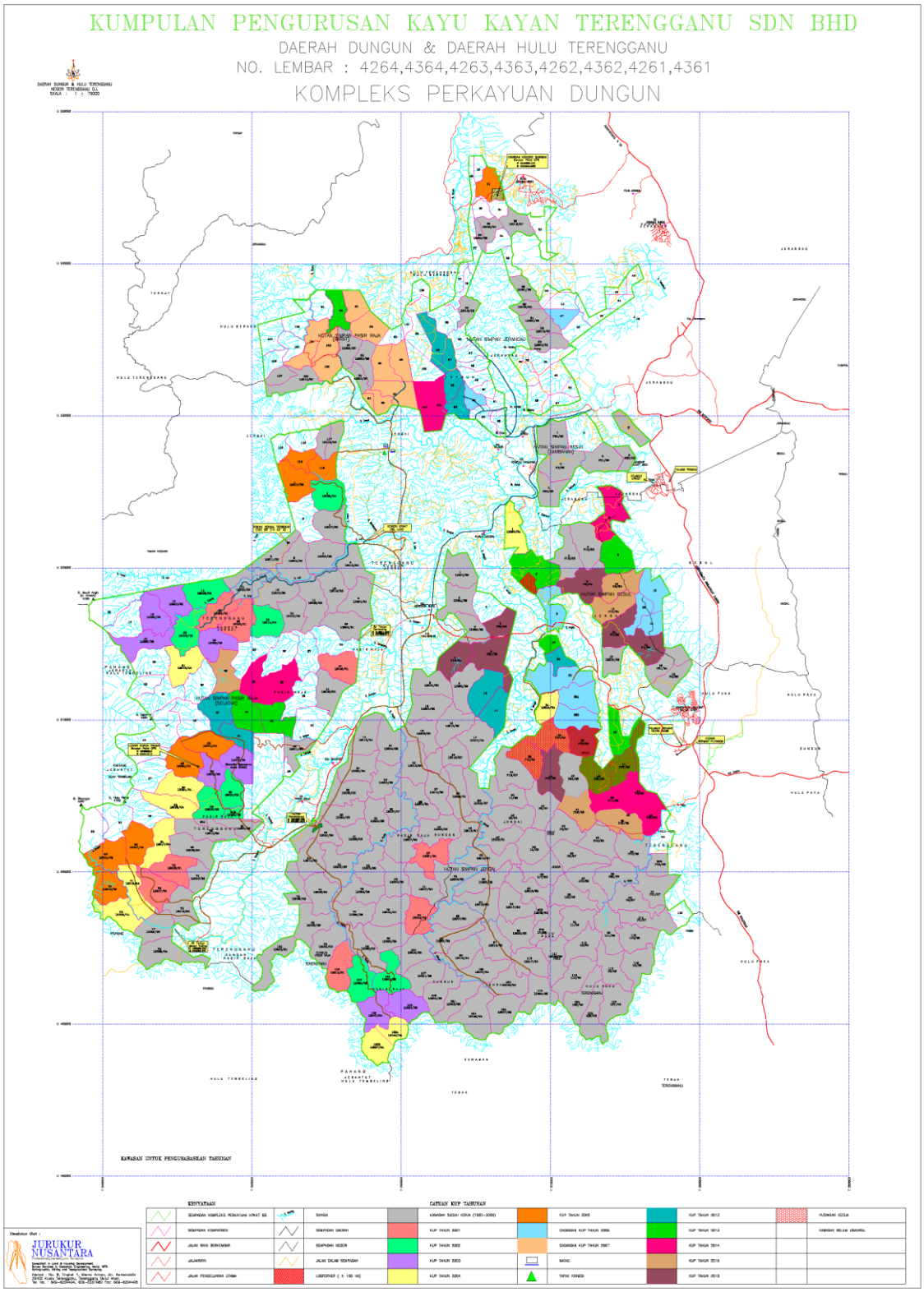


Fig. 5. Map of DTC (2016).

4.2 Natural and Biological Environment

Natural Environment

The natural TRF within DTC embraces various forest functions and zones as follows (*note*: a particular tract of forest can assume more than one function):

1) Soil and water conservation area (*i.e.*, areas with slope gradient between 21^{o} - 30^{o}),
2) Soil and water protection area (*i.e*., areas with slope gradient above 30^{o});
3) Riparian buffer protection;
4) Amenity forest;
5) Rare ecosystem protection;
6) Areas for sustainable timber production (TP);
7) Research forests.

Forest Types and Composition Before and After Selective Logging

The whole of DTC comprises the climatic climax natural moist TRF formations consisting of a series of **(1)** lowland mixed dipterocarp forests; **(2)** hill mixed dipterocarp forests; and **(3)** upper hill dipterocarp forests. Following along the line of Wyatt-Smith (1963) who had earlier classified forest types in Peninsular Malaysia according to emergent tree species dominance, the natural TRF resources in DTC can be classified into

1. Kapur forests, which grow on low hills, concentrated along the eastern fringes of DTC,
2. Meranti/ Keruing forests, which dominate the western part of Jerangau PRF, southern part of Besul PRF and the western part of Jengai PRF
3. Meranti/ Seraya forests which cover large parts of Jengai PRF, the whole of Pasir Raja Selatan PRF and Pasir Raja Barat PRF.

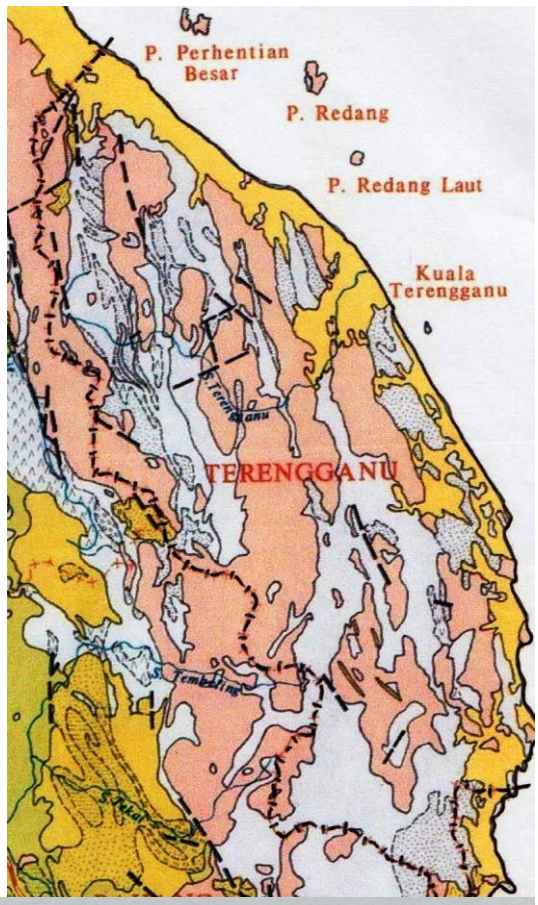
The differences in the vegetation types and species consociation in the above reserved forest seem to be mainly caused by the associated differences in soil properties, particularly so when climate was taken as uniform over the whole of DTC. Under natural conditions, the occurrence of a particular species in any particular spot is determined by the availability of seed bank and regeneration of that species at the time when a gap is formed. The occurrence of regeneration is largely governed by the distance with which seeds are dispersed from the parent trees followed by suitable conditions for germination and establishment.

Geology, Soil and Topography

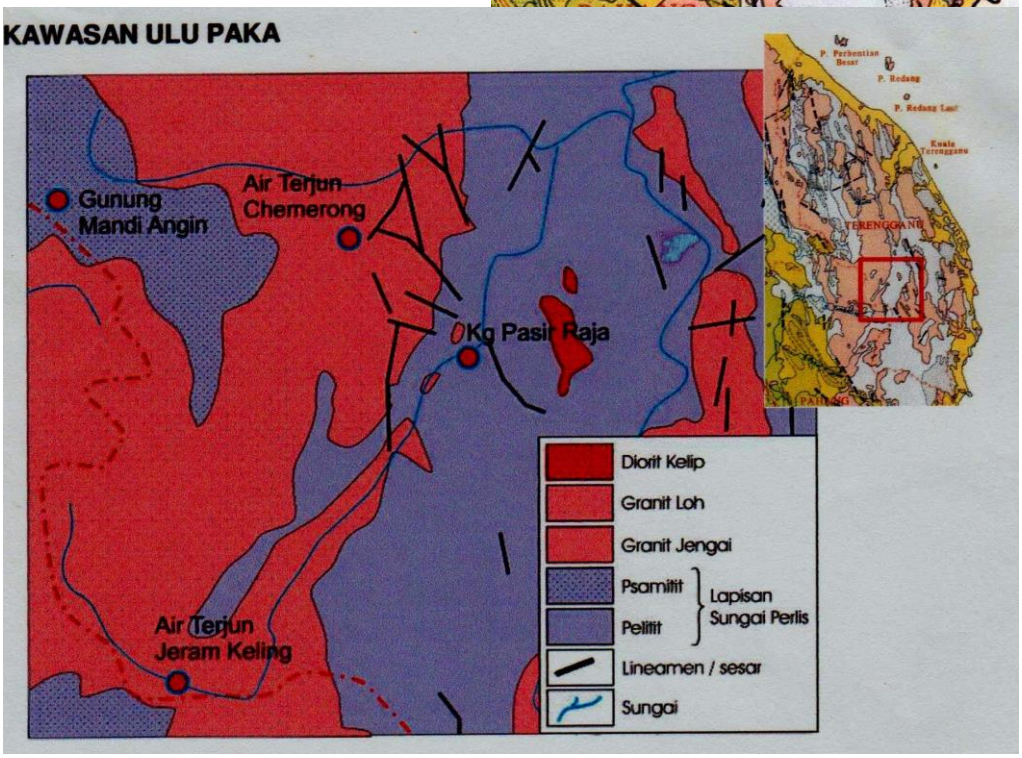
The whole region is underlain with a mixture of undifferentiated granitic rocks and shales, predominate with sandstones, mudstones and siltstones. Some minor pockets of gravel, sand, and clayey sandstone and siltstones are found here and there. The whole region is mainly on steepland with red yellow podzolics derived from granites on lower slopes. This is especially evident in the northern and southern portions of this region. Soils of sedimentary origin which are frequently associated with the granite-derived soils are mainly found on the foothills. In terms of site degradation risk, the slope gradient imposes particular restrictions on timber harvesting with some 60% of the Project Area having a gentle to moderately steep (0^o - 20^o) topography, 30% are steep (21^o - 30^o), and 10% are very or extremely steep (over 30^o). More than three fourth of the area were found to be poor, and less than a fourth was fertile.

Fig. 6. Geology of Terengganu and those of the Ulu Paka area.

(a)



(b)



Geologically, the whole of the state of Terengganu lies on the Eastern Stripe (Jalur Timur) of which the most dominant rock types are the sedimentary (including metasediment) from the Carboniferous (most prevalent) and Permian ages as well as Granite (Figs. 6a,b).

Hydrology

Sungai Dungun originates in the eastern side of the Titiwangsa Main Range at the south-western border of Terengganu is the most important river in the Project Area running through its length for about 55 kilometres to its confluence with Sungai Jerangau, virtually cutting the bell-shaped concession into two halves, east and west. On the eastern side are Besul Tambahan PRF, Besul PRF and Jengai PRF, whereas on the western half are Jerangau PRF, Pasir Raja West PRF and Pasir Raja South PRF. Each of these six PRFs constitutes its own catchment though some of them may lie contiguously with the other or separated by rivers. A majority of the rivers in the individual catchment flow into Sungai Dungun before draining into the South China Sea at Dungun town.

Jerangau PRF as a whole is drained by **(i)** Sg Jemelok which flows from north to south and **(ii)** Sg Melong with its tributary Sg Merong which flow in the northwest - southeast direction. In the south of Pasir Raja PRF major rivers include Sg Kelmin with its tributary Sg Tersat whereas in the north is Sg Berang which flows in the southwest – northeast direction. In Jengai PRF important rivers are Sg Jengai and its tributary Sg Angka both of which flow in the south-north direction through the middle of the watershed. The other rivers within Jengai PRF include Sg Paka in the east and Sg Perlis in the west. Both Sg Perlis and Sg Jengai are tributaries of Sg Dungun and they all flow to the north having originated in the south. Sg Perlis flows from the southeast to the northwest and drains into

Sg Dungun near Kg Balu. It has a catchment area of about 150km^2. The catchment area at Jerangau Bridge is 1,410km^2, while the total catchment area of the Project site is about 1,800 km^2. Sg Dungun's lowest streamflow rates are from January to July, at 36.5 to 66 cumecs (0.0247 to 0.0466 cumecs per 100ha). The highest rates normally occur during the monsoon period from the end of October to the end of December, at 105 to 859 cumecs. The peak discharge however, could be higher. It is not uncommon for the monsoonal rainfall to reach up to 70mm/ hour in this region. This is equivalent to about 1.94 cumecs per 100ha. The pattern of streamflow naturally coincides with the pattern of runoff, and so does the rate of suspended solids.

A study to monitor the water quality of Sg Perlis which could be considered as a representative of the rivers in the Project Area in 1997 showed that none of the parameters were found to violate the Sewage – Industrial Effluent Discharge Standards of the DoE (VYRAN Group Berhad 1998). However, based on the DoE 1986 Interim Standards, the overall water quality falls within Classes II for both domestic and aquatic life usages, which is "not good". The presence of high levels of ammoniacal nitrogen, bacteria, iron and a low level of dissolved oxygen is attributed to rotting vegetation in upstream logging areas.

Table 3. Classification of Sg Perlis according to DoE 1986 Interim Standards

Criteria	Domestic Usage	Aquatic Life Usage
Ammoniacal N	Class IV	Class IV
Mercury	Class III	Class III
Iron	Class III	-
Bacteria	Class II	-
Low dissolved oxygen	-	Class II

Climate

DTC forest area lies within the tropical monsoon climate belt which is characterised by high temperatures ($24^{o} – 30^{o}C$), high humidity (70% - 98%) and an average rainfall of more than 4,000mm per year. The wet monsoon season usually occurs from November to January during which period logging operations effectively halt. Daily sunshine period is about 6 – 7 hours but can reach up to 8 – 9 hours especially during the dry months of February – April where logging activities can be active. As a result of the heavy and often prolonged rainy season which frequently leads to floods in Dungun District, the proportion of really productive working days in the forest may range between 30% to 40% only per year. Rainfall in the Project Area is brought about by two monsoons: Northeast monsoon during October – February and Southwest monsoon during April – July, but peaks during the northeast monsoon, in November and December. It is not uncommon for monsoonal rainfall to reach up to 70mm/hour.

Usually, there are no logging operations conducted from November through to late January due to the unusually heavy downpour during these months. Goh K.S. (1995) puts the average annual rainfall in the Hulu Terengganu region at 3,500mm with Annual Potential Evapotraspiration of 1,500mm and Potential Runoff of 2,000mm approximately. This can be compared with Kuala Terengganu area which receives an average of 2,911 mm/ year or 242.6 mm/month of rainfall.

On average there are 182 days per year with more than 0.1mm of rainfall or 15.2 days with a quantity of rain per month. The driest month usually occur around February to June when an average of 109mm of rainfall occurs. The high annual rainfall also gives raise to a correspondingly high Mean Annual Runoff (MAR). According to DID (1995), Sg Dungun

which has a total catchment area of 1,410km^2 has an observed MAR of 2,675mm. This is about 22% higher than the MAR for the whole of Terengganu (catchment area = 13,257 km^2) at 2,080mm and 44% higher than that of Peninsular Malaysia (catchment area = 134,423 km^2) at 1,185mm.

Biological Environment

The general composition of the natural TRF in DTC is made up of the two main groups of tree species: the Dipterocarps and the non-Dipterocarps. Among the Dipterocarps, the following tree species were found: Meranti *(Shorea species, e.g.* incl. Meranti seraya (*Shorea curtisii),* Meranti sarang punai (S. *parvifolia),* Meranti rambai daun, Meranti langgung, Meranti tembaga (S. *leprosula),* and Damar hitam), Keruing *(Dipterocapus species),* Balau (Heavy hardwood *Shorea* species, *e.g.* Balau laut merah), Merawan (*Hopea spp.),* Mersawa (*Anisoptera spp.),* and Chengal (*Neobalanocarpus heimii).* Among the non-Dipterocarps, the following families and species dominate the tree flora: Kelat (*Syzygium species),* Medang *(Lauraceae),* Kempas *(Kompassia malaccensis),* Merbau (*Intsia palembanica),* Sepetir (*Sindora* spp.), Rengas (*Gluta* & *Melanochylla* species), Bitis, Machang (*Mangifera sp.),* Mengkulang (*Heritiera sp.),* Jelutong (*Dyera costulata),* Durian (*Durio s*pp.), Bintangor (*Callophylum inophyllum),* Kembang semangkuk (*Scaphium spp*.), Melunak (*Pentacme spp.),* and Mahang *(Macaranga spp.).*

4.3 Forest Sub-types and Population Dynamics

A detailed examination of a total of 18 growth and yield (G&Y) permanent sample plots (PSPs) within DTC and the second growth ecosystems around them revealed the unmistakable general characteristics of DTC as a mixed dipterocarp forest rich in the following tree species (arranged according to the order of abundance): Kelat >

Dipterocarps > Simpoh & Medang > Kasai, Perah, Minyak Beruk, Penarahan & Nyatuh. In terms of species consociations, the different species and forest vegetation form alliances or forest sub-types in the following combinations (the most abundant species/ species groups being mentioned first):

(1) Kelat – Simpoh

(2) Dipterocarps – Kelat

(3) Mixed Kelat

(4) Kelat – Dipterocarps – Medang

(5) Dipterocarps – Kelat – Simpoh

(6) Kelat – Dipterocarps – Rengas

(7) Kasai – Medang

(8) Dipterocarps – Kelat – Perah

(9) Kelat – Dipterocarps – Minyak Beruk

(10) Kelat – Dipterocarps –Penarahan

(11) Kelat – Dipterocarps – Nyatuh.

Table 4: Estimated Timber Stock By Forest Category During First Rotation (1983 – 2007)

Forest Category		**Ha**	**Net Round Timber Yield, m3 /Ha**	**Est. Total Stocking, m3**
Productive	Superior	25,731	63.00m^3	1,621,053m^3
	Good	19,625	54.00m^3	1,059,750m^3
	Moderate	41,036	45.00m^3	1,846,620m^3
Total Productive		**86,392**	**53.63m^3**	**4,633,398m^3**
Non-Productive	Poor , Upper hill, Disturbed	22,508	17.50m^3	393,890m^3

Table 5: Area Statement (ha) of Production PRFs Within DTC Before Logging During First Rotation (1983-2007)

Permanent Reserved Forest (PRF)	Timber Stocking Quality of Production Forest						Total
	Superior	Good	Moderate	Poor	Upper-hill	Disturbed	
Besul	-	1,548	1,927	-	-	-	3,475
Besul (T)	-	2,554	-	-	-	93	2,647
Jengai	9,004	7,362	29,587	179	-	158	46,290
Pasir Raja	16,123	8,038	4,568	2,100	4,590	-	35,419
Jerangau	604	123	4,954	805	-	-	6,485
Total	**25,731**	**19,625**	**41,036**	**3,084**	**4,590**	**251**	**94,317**

4.4 Socio-economic Environment

The district of DUNGUN wherein lies the forest concession of DTC covers an area of 273,503.1ha involving 13 Mukims and a total of 100 villages, constituting about 21.11% of the total area of the state of Terengganu of 1,295,512.10ha. The Mukims are:

Fig. 7. The 13 Mukims (Sub-districts) which make up Dungun District

(1) Abang (3,315.2ha), **(2)** Bandar Dungun (22.7ha), **(3)** Besul (14,251.8ha), **(4)** Hulu Paka (32,816.4ha), **(5)** Jengai (78,311.6ha), **(6)** Jerangau (41,632.5ha), **(7)** Kuala Dungun (6,345.5ha), **(8)** Kuala Paka (14,385.8ha), **(9)** Kumpal (10,764.6ha; **(10)** Pasir Raja (49,163.3ha), **(11)** Pekan Kuala Paka (27.9ha), **(12)** Rasau (19,568.2ha), and **(13)** Sura (2,897.6ha)

In terms of land use, slightly more than half i.e. 51.8% (or 141.640.0ha) the land in the district, is still under forest cover of which the 108,900-ha DTC constitutes the largest portion or 76.89%**.** About 17.51% (or 47,993.5ha) of the land in the district is taken up by agriculture which comprises mostly rubber, oil palm, fruit trees and paddy.

Major land development and agricultural schemes such as those under KETENGAH, FELDA and Ladang Rakyat have, for decades, contributed a great deal towards the economic well-being of the population in the rural areas. Statistics show that about 40% of the people of Terengganu live in the rural areas (UPEN Terengganu 2011). DUNGUN district however is endowed with fertile agricultural lands and abundant marine as well as inland (freshwater) fisheries resources, besides having a great potential for recreation and tourism industries, particularly along the coastal region and the vast natural TRF areas. As for the present, the potential for eco-tourism development is yet to be fully exploited.

The total population of DUNGUN in 2010 was estimated to be about 154,932 which to 190,300 persons in 2015 (population density = 70/km^2). At KPKKT, employment opportunities in the forest are still filled up by local population. Surveys have shown that in general, the local population in DUNGUN does not depend on the forest for their livelihood due largely to the availability of opportunities in the other sectors as mentioned above. For the few individuals

who still regularly entered the forest and collected the forest produce for their own consumption, these were limited to such produce as freshwater fishes, fruits, vegetables (e.g. ferns), timbers and rattans. Timbers were used for house repair or construction of chicken coop, while rattans were utilized for making fish traps. River fishes are a popular source of protein for the local communities.

Table 6. DUNGUN District – Land Use in 2011.

No.	Land Use	DUNGUN District	Terengganu State
1	Agriculture	47,993.5ha (17.5%)	287,496.30ha (22.20%)
2	Buildings	64276,460.4ha (2.4%)	40,228.10ha (3.10%)
3	Industry	729.1ha (0.3%)	6,636.80ha (0.50%)
4	Forest Reserve	142,640.0ha (51.8%)	557,661.00ha (43.00%)
5	Others	76,680.0ha (28.0%)	403.289.00ha (31.10%)
6	**Total**	**273,503.1ha (100.00%)**	**1,295,512.10 (100.00%)**

Extracted from UPEN Terengganu (2011). Data Asas Terengganu 2011.

5.0 Legislative and Administrative Frameworks

5.1 Legal Framework

Under the National Forestry Act (NFA) 1984, the State Government is the highest authority for forestry in a particular state. This authority is usually vested to the State Forestry Department (SFD) which is in turn responsible for the management, protection and conservation of the resource in accordance with the provisions as stipulated in the Act and other related legislation. One of the instruments used by Terengganu SFD is the State Forest Management Plan (FMP) the preparation of which is in accordance with NFA 1984 (i.e. *Akta 313, Akta Perhutanan Negara 1984)* and Forest Concession Agreement between the State Government of Terengganu and Terengganu SEDC (the Concessionaire).

***Section 20 of NFA**, 1984 states:-*

Unless otherwise stated by the State Authority, before any licence is issued the Director shall require the applicant to do any or all of the following:

(a) to demarcate on the ground the area or part thereof covered by the licence, the situation and extent of which shall be determined by the Director in accordance with the provisions of the licence, within which operations will be carried out by the applicant on becoming a licensee;

(b) to prepare –

*(i) a **forest management plan** or forest harvesting plan; and*

(ii) a reforestation plan in the manner to be specified by the Director.

According to the original Forest Concession Agreement signed on 14th September 1975 (and renewed in 2009) between the Terengganu State Government and the Terengganu State Economic Development Corporation (TSEDC), the latter is empowered to manage the concession area in accordance with a Forest Management Plan as approved by the State Government and/or its agents. Clauses 24, 25 and 26 of the Agreement further emphasise that:

Clause 24:

The overall management of the area as covered by this Agreement shall be carried out in accordance with the Forest Management Plan (FMP) to be prepared by the Corporation and submitted not later than 4 (four) years after the signing of this Agreement and as approved by the State Government. The said Forest Management Plan shall be based on a complete forest inventory data properly collected and compiled to a standard set by the State Government and the forest management principles shall be based on the Bicyclic System on a felling cycle of 25 (twenty-five) years or any other management systems directed by the State Director of Forestry, Terengganu.

Clause 25:

(a) A 5 (five) year Working Plan shall be submitted for each successive 5 (five) year period which plan shall give details of forest development and shall be in accordance with the principles as set out in the Forest Management Plan required by Clause 24.

(b) The first five (5) year Working Pan shall e submitted together with the FMP and shall be based on the latest forest inventory data available at the time of submission. Al subsequent Working Plans shall be submitted at least 6 (six) months prior to the expiry of currently approved Workng Plan.

(c) The cutting of trees in the Concession Area shall be in accordance with the correct Working Plan and under the constant supervision of the State Director of Forests, Terengganu or his agent.

Clause 26:

(a) The object of each succeeding Working Plan shall be to implement sustained yield in equal annual or periodic cuts, and the Plan may embody any method of attaining that objective, as approved by the State Government.

(b) Should the current Working Plan need revision due to emergency conditions, such as security reasons, insect (and) disease infestations, so that changes are required, these may be carried out with the approval of or on the direction of the State Government.

Other Relevant Legislation

Other relevant legislation include, but not necessarily limited to the following:

1) *Aboriginal Act – Akta Orang Asli, 1954*
2) *Akta Lembaga Penyelidikan dan Pembangunan Perhutanan Malaysia, 1985*

3) *Akta Lembaga Perindustrian Kayu Malaysia, 1973*
4) *Company's Act – Akta Syarikat, 1965*
5) *Criminal Procedure Code - Kanun Acara Jenayah, (FMS Cap. 6), 1903 (Amended 1995)*
6) *Electricity Act – Akta Elektrik, 1949*
7) *Employees' Social Security Act, 1969*
8) *Employment Act, 1955*
9) *Environmental Quality Act – Akta Kualiti Alam Sekitar, 1974 (Amended 1985)*
10) *Evidence Act - Akta Keterangan, 1950 (Amended 1993)*
11) *Factory and Machinery Act – Akta Kilang dan Jentera, 1967*
12) *Federal Constitution – Perlembagaan Persekutuan*
13) *Industrial Relations Act, 1967*
14) *Land Conservation Act – Akta Perlindungan Tanah, 1960*
15) *Mining Enactment – Enakmen Perlombongan, 1929*
16) *National Forestry Policy, 1992*
17) *National Land Code - Kanun Tanah Negara, 1965*
18) *National Parks Act – Akta Taman Negara, 1980 (Amended 1983)*
19) *National Policy on Biological Diversity, 1998*
20) *Occupational Safety and Health Act, 1994*
21) *Penal Code - Kanun Keseksaan, (FMS Cap. 45), 1948 (Amended 1993)*
22) *Registration of Company Act – Akta Pendaftaran Syarikat, 1956*
23) *Road, Drainage and Building Act – Akta Jalan, Perparitan dan Bangunan, 1974*
24) *State Forest Enactments*
25) *State Forest Rules*
26) *Taman Negara (Kelantan) Enactment, 1938*

27) Taman Negara (Pahang) Enactment, 1939

28) Taman Negara (Terengganu) Enactment, 1939

29) Town and Country Planning Act – Akta Perancang Bandar dan Desa, 1976

30) Trade Unions Act, 1959 (Act 262)

31) Water Act, 1920

32) Water Supply Enactment – Enakmen Bekalan Air, 1935

33) Wildlife Protection Act – Akta Perlindungan Hidupan Liar, 1972 (Amended 1988)

34) Workmen's Compensation Act, 1952.

5.2 Administrative Framework

KPKKT was incorporated on 13th March 1980 and is a wholly-owned subsidiary of Permint Timber Corporation Sdn Bhd (PTC) which is in turn a subsidiary of GPB (Golden Pharos Berhad). The latter is a holding company listed on the main board of Bursa Malaysia (Malaysian Stock Exchange) since 1993, with Terengganu Incorporated as its major shareholder. As a responsible company, KPKKT commits itself to protecting the environment while at the same time positively contributes towards the economy of the state and society by way of overcoming the shortfall in local timber raw material supply and providing employment opportunities for the people. The Terengganu State Forestry Department (TSFD) regularly guides, supervises and monitors the SFM activities conducted by KPKKT within DTC in order to ensure KPKKT's compliance with:

1) National Forestry Policy (NFP) 1992;
2) National Forestry Act (NFA) 1984;
3) the "DUNGUN TIMBER COMPLEX Agreement"; and
4) other relevant legislation as well as local and international certification

standards, such as those of the Forest Stewardship Council (FSC) to which KPKKT subscribes.

The FSC P&C has determined the following as the criteria for a successful SFM:

(a) the conservation of biodiversity,

(b) the maintenance of productive capacity,

(c) the maintenance of ecosystem health and vitality,

(d) the conservation and maintenance of soil and water,

(e) the maintenance of forests contribution to the global carbon cycle,

(f) the maintenance of natural heritage, and

(g) the contribution to and maintenance of socio-economic values.

6.0 Impact Assessment

6.1 Objectives

The main objective of this social impact assessment was to appraise the various programmes and activities conducted by KPKKT and its appointed contractors under the guise of SFM and SMS within DTC forests with the view of analyzing and evaluating their impacts to the surrounding communities, so as to enable KPKKT's management as well as the relevant parties to gauge the relevance and effectiveness of those programmes and activities in terms of their positive as well as negative impacts to the affected communities. Consequently through the knowledge and understanding gained from such analyse would help ensure that the design and implementation of the SFM project within DTC could be further mitigated, improved and enhanced and encourage relevant interest groups, especially residents of the surrounding villages and other disadvantaged social groups, to participate in and benefit from this project, to the extent possible. At the same time, the

social assessment also identifies and analyzes the social risks and opportunities of different interest groups. A set of data and information of the baseline survey have been established through this social assessment, as a reference for future monitoring and evaluation. Specifically the SIA was aimed at:

(1) identifying the project's benefits (and probable adverse effects) for the different beneficiary groups and to offer suggestions/recommendations on how to enhance project benefits while at the same time reducing the potential adverse effects to the local stakeholders;

(2) identifying and understanding the undesirable perceptions that might form obstacles that in turn hinder local communities from participating in project activities;

(3) analyzing and proposing the approaches for mitigating the negative social impacts of the SFM project;

(4) analyzing and proposing for the local stakeholder groups to actively participate in the project that may promote a better understanding and rapport between KPKKT and the local stakeholders.

In conducting this SIA the following approaches were used for data collection and information gathering:

i. Reviews of past reports, papers and records relevant to the subject

ii. Analyses of available secondary data on local socio-economic condition

iii. Consultations with local community leaders, workers and other stakeholders

iv. Surveys of sample populations of local households and workers.

v. Deliberations with the management of KPKKT.

6.2 Sampling Procedure

There are currently a total of 11 villages/settlements of different sizes scattered over the study area out of which 5 are large enough to safely represent the remaining 6 villages. The villages and settlements are also either spaced out at varying distance from one another or clumped together such that for practical reasons and for the purpose of this study we had decided to group them into a total of 4 distinct "clusters" based on the following considerations (see Table 7 and Maps 1 - 4 below):

(1) Villages nos. 1 – 4 (Cluster 1), and 8 – 11 (Clusters 3 & 4) lie along the banks of Dungun river which in turn flows through the DTC concession area, whereas villages nos. 5 – 7 (Cluster 3) are situated around and within the vicinity of KPKKT's main operation office at Bukit Besi township, sufficiently away from Dungun river.

(2) Villages/ settlements within a cluster lie within less than 5 km from one another in which case many of the residents in nearby villages tend to be conveniently connected by family ties due to inter-marriages. Under the circumstance the impacts if any, of SFM operations experienced by any one village within one "cluster" are always experienced/shared by the next nearest village with little or negligible variation.

Another point of interest emanates from the fact that the total number of villages in the area keep on changing over time, *i.e.* dwindling from 10 – 15 in numbers. This was a reflection of the changes that took place, from time to time, in the contemporary local and State-level socio-political landscape, which frequently made it necessary for certain close-

by villages to be "merged" and brought under a single administrative control or vice versa , thereby effectively reducing or increasing the number of villages from time to time Under the circumstance circumstance, the SIA researcher too had to keep up with the prevailing time and adjust his/her research approach accordingly, and by keeping in mind the 4 "clusters of villages" as mentioned above.

Table 7. List of Villages/ Settlement within "Clusters"

No.	Name of Village/ Settlement	Cluster No.
1	Rantau Panjang	**1**
2	Talong	
3	Minda	
4	Tepus	
5	Besul	**2**
6	Bukit Besi	
7	Perumahan Bukit Besi	
8	Jongok Batu	**3**
9	Kuala Jengai	
10	Pasir Raja	**4**
11	Syukor	

Such "scenario and arrangement" had inevitably influenced our decision on the sampling design and the choice of sampling whereby samples were drawn at random from among those villages, loosely based on clusters. This led us to narrow down to the following 5 villages from where data were collected. They were:

.

(1) Kampung Talong to represent Cluster No.1

(2) Kampung Besol, to represent Cluster No. 2

(3) Kampung Kuala Jengai to represent Cluster No. 3

(4) Kampung Shukur to represent Cluster 4

(5) (5) Kampung Pasir Raja to represent Cluster No. 4

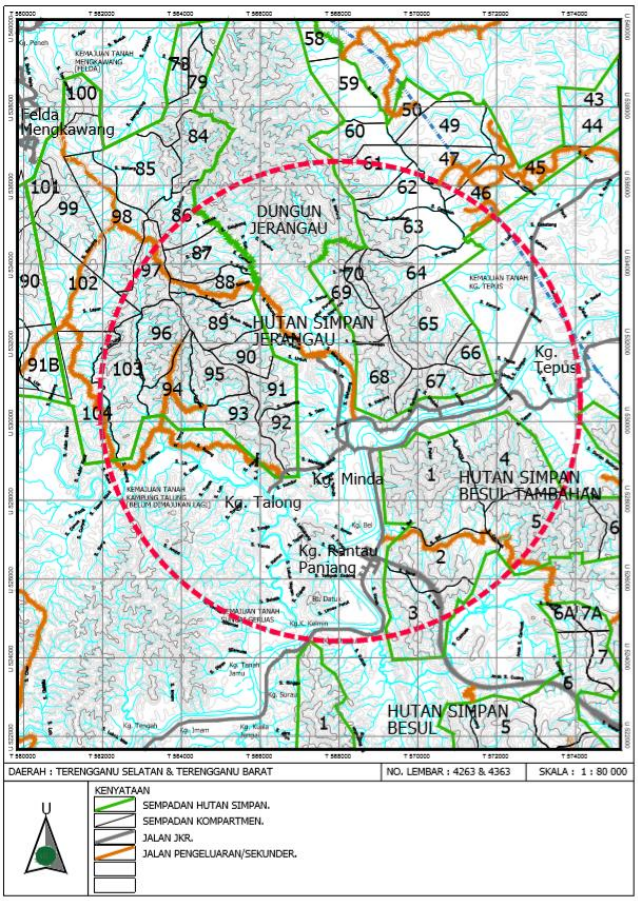


Fig. 8. Map showing Cluster No. 1 representing villages of (1) Minda, (2) Rantau Panjang (3) Talong (4) Tepus

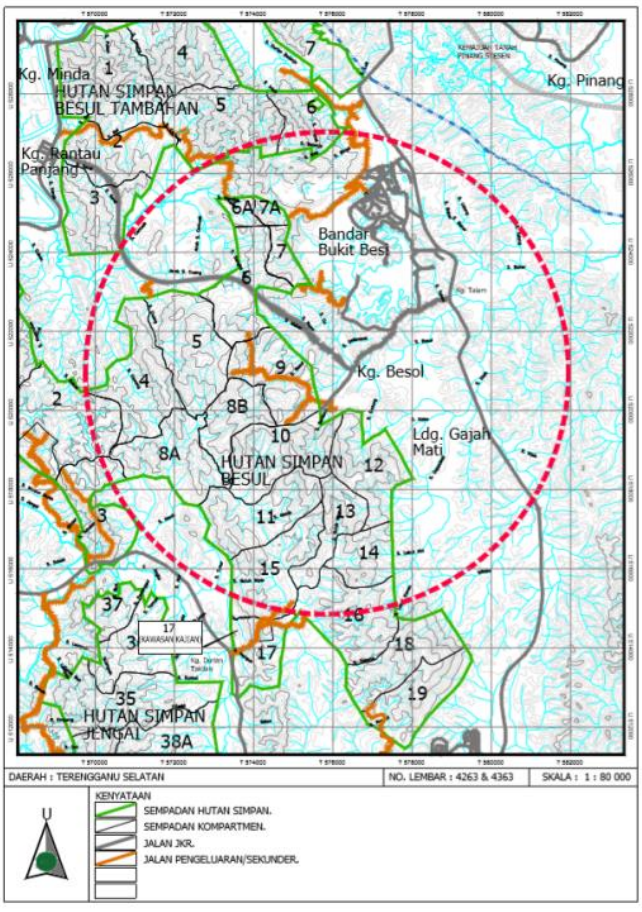


Fig. 9. Map showing Cluster No. 2 representing villages of (1) Besul, (2) Perumahan Bukit Besi, (3) Bukit Besi

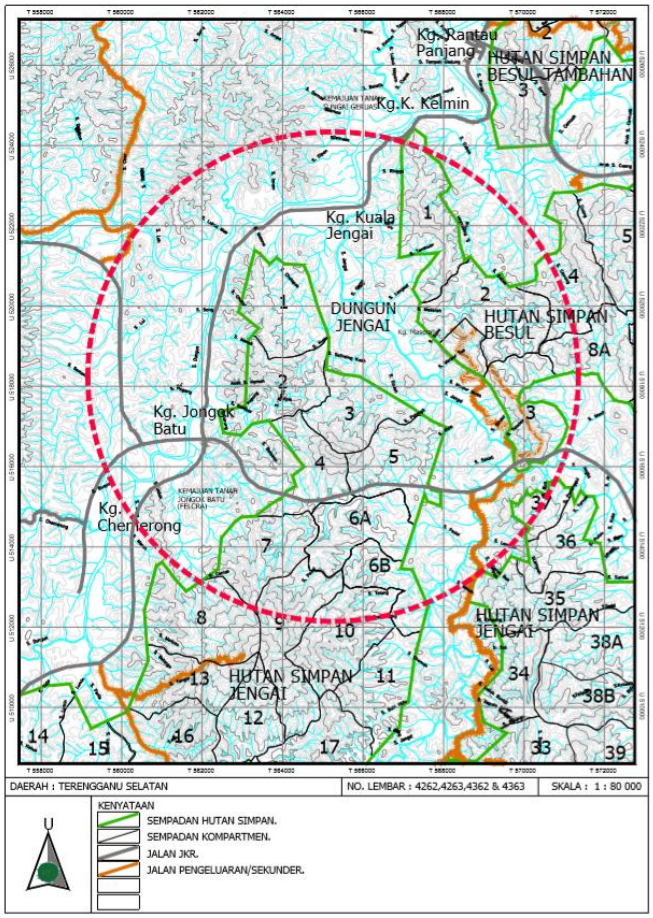


Fig. 10. Map showing Cluster No. 3 which represent villages of (1) Jongok Batu, (2) Kuala Jengai

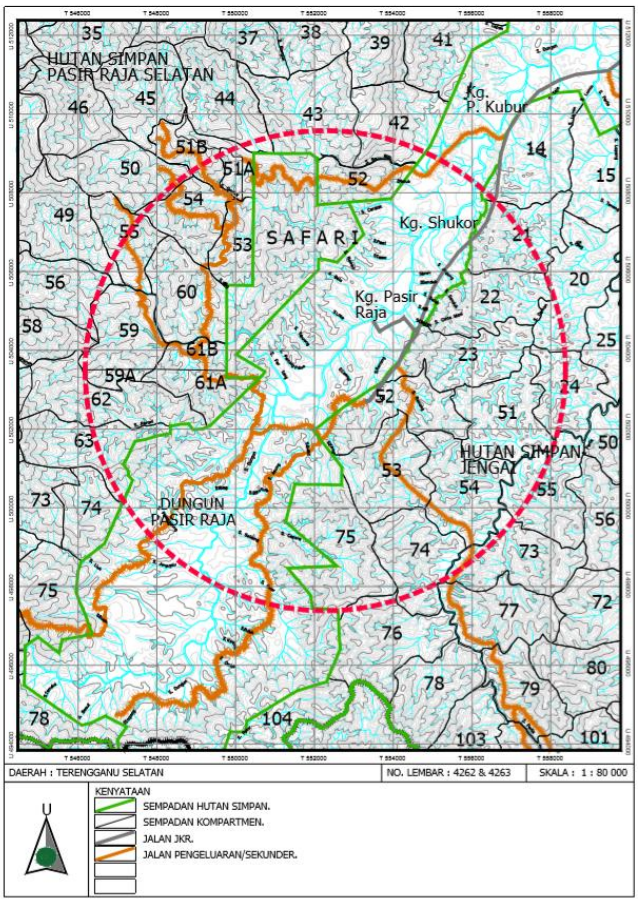


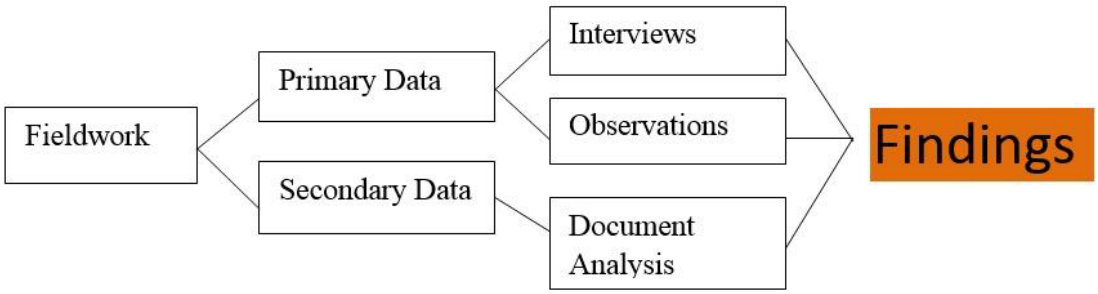
Fig. 11. Map showing Cluster No. 4 which represent villages of (1) Pasir Raja, (2) Shukor

As would be noticed, Cluster No. 4 was represented by two villages compared to the other three clusters. The idea was to cover as much as possible of the variation in the samples and to minimise any chance of bias in the survey while at the same time saving transportation costs and energy for data collection.

It is to be borne in mind that in a qualitative study such as this which is phenomenographic in nature, our main objective was to identify and qualitatively describe the different ways of experiencing by respondents (i.e. villagers), of sustainable forestry operations under the SFM conducted by KPKKT from a second order perspective, instead of first order perspective in which the phenomenon itself would become the main subject of the study.

In a major report from a landmark study jointly conducted by Yokohama (Japan) -based ITTO (International Tropical Timber Organisation) and FRIM (Forest Research Institute of Malaysia) in 1991- 1993, edited by Abdul Rahim Nik "A Model Project for Cost Analysis to Achieve Sustainable Forest Management" (PD31/95 Rev.3(F)) on page 251 it is stated that the Study only selected 4 villages out of 15 (at that time) for data collection.

Fig. 8. Organization of the Study (Adapted from Ramle et al. 2014)



7.0 Results and Discussion

7.1 Socio-economic Profiles of Respondents

Tables 7 – 10 provide summaries of the socio-economic profiles of respondents at the time of the survey. Details of the profiles, when understood in their proper context would provide some indications on the level and quality of life of the respondents, their level of literacy and their social environment which are in turn reflected in their answers to the questionnaires

Nearly 73 per cent of the respondents were males with the remaining 27 per cent females. In terms of age distribution approx. 84 per cent were in the 20 – 60 years old age group; and 60 per cent were married whereas 40 per cent single. In terms of ethnicity 98.57 per cent were Malays and 1.43 per cent was Chinese, which is not surprising given the fact that this part of Malaysia is the heartland of the Malay people. It is interesting to note that despite the poverty level which is the hallmark of the villages in the vicinity of DTC, about 17 per cent of the respondents received higher education up to college and university level; 45 per cent reached secondary education whereas about 37 per cent had had only primary education. The rather high literacy rate of the people however did not mean much when a large segment of them still remain in poverty as seen in **Table 9** which shows up to 65 per cent of the respondents were jobless.

Table 8: Breakdown of Respondents by Villages and Age Groups

No	Village	Age Group, Years							
		15<20	20<30	30<40	40<50	50<60	60++	Total	%
1	Kg Talong	4	1	3	4	1	2	15	21.43
2	Kg Besol	0	1	4	5	4	3	17	24.29
3	Kg Syukur	0	3	4	3	6	1	17	24.29
4	Kg Pasir Raja	0	5	4	0	1	0	10	14.29
5	Kg Kuala Jengai	0	1	3	3	3	1	11	15.71
6	**Total**	**4**	**11**	**18**	**15**	**15**	**7**	**70**	**100.0**
	%	**5.71**	**15.71**	**25.71**	**21.43**	**21.43**	**10.0**	**100.0**	

Table 9: Breakdown of Respondents by Social Parameters

No.	Parameter		Count	% of Total
1	Gender	Male	51	72.86%
2		Female	19	27.14
	Total		70	100.00
3	Marital Status	Single	28	40.00
4		Married	42	60.00
	Total		70	100.00
5	Ethnicity/ Race	Malay	69	98.57%
6		Chinese	1	1.43%
7		Indians	0	0
8		Indigenous People	0	0
9		Non-Malaysian	0	0
	Total		70	100.00
10	Education Level	Primary	26	37.14
11		Secondary	32	45.71
12		College & University	12	17.14
13		Islamic Religious School	0	0
	Total		**70**	**100.00**

Table 9: Breakdown of Respondents By Main Occupation/ Profession

No.	Sector	Occupation	Count	% of Total	
1	Private Sector (Non-Government)	Nil/ Unemployed	46	65.71	88.57%
2		Self-Employed	7	10.00	
3		Security Guard (Private)	1	1.43	
4		Student	4	5.71	
5		Housewife	1	1.43	
6		Farmer	3	4.29	
7	Public Sector (Government)	Educator/ Teacher/ Ustaz (Religious Teacher)	3	4.29	11.43%
8		Imam (Mosque Official)	1	1.43	
9		Policeman	1	1.43	
10		Government	2	2.86	
11		Clerk	1	1.43	
12	**Total**		70	100.00	100.00

Figures in **Table 9** clearly show that only about 11 per cent of the respondents were employed in the Government sector which include teachers, uztaz, imam or policeman. Those in the "private sector" were either small-time farmers, or self-employed or simply housewives or jobless individuals, which in turn reflects the gravity of the local economic situation of the people who largely live below the official Rural Poverty Line Income (PLI) of RM662.00 monthly for Terengganu in 2004 (Azahari Mohd Raslan 2006). This can be compared with the mean incomes for Malaysia and Terengganu State which stand at RM6,141.00/month and RM4,816.00/month respectively. From **Table 10** it can be estimated that roughly 50 per cent of the village residents live below the Rural PLI. It is not surprising therefore when many of these people had to turn their attention to the nearby forests to gather various forest products such as freshwater fishes (48%), Non-Timber Forest Produce (NTFP) such as vegetables and fruits (32%) as well as timber for

construction (5.1%) for their own consumption. To a certain degree our data did reflect the reality on the ground which deserves some urgent attention from the relevant parties.

Table 10: Household Income Level

	Average Income, RM/month	Count	%
1	<500	26	37.14%
2	500<1000	23	32.86%
3	1000<1500	6	8.57%
4	1500<2000	7	10.00%
5	2000< 2500	3	4.29%
6	2500 ++	2	2.86%
7	Not relevant	3	4.29%
	Total	**70**	**100.00%**

7.2 Forest Usage and Dependency Amongst Respondents

Of the six PRFs within DTC, Jengai followed by Pasir Raja Selatan and Pasir Raja Barat, in that order, were the most frequently visited forest areas by the locals. This can be depicted as follows (Fig. 9):

Fig. 9. DTC's PRF In Terms of Preference by Respondents

Jengai PRF > Pasir Raja Selatan PRF > Pasir Raja Barat PRF > Besol PRF / Jerangau PRF > Besol Tambahan PRF.

Table 11: Permanent Reserved Forest Most Frequently Visited

	Permanent Reserved Forest (PRF)	Frequency of Visit	%
1	Jengai PRF	31	35.63
2	Pasir Raja Barat PRF	12	13.79
3	Pasir Raja Selatan PRF	18	20.69
4	Besol PRF	10	11.49
5	Besol Tambahan PRF	5	5.75
6	Jerangau PRF	10	11.49
7	Not Relevant	1	1.15
	Total Visitations	**87**	**100.00%**

**Note: Some of the PRFs may be visited more than once, or visitors visited > 1 PRF in a month.

The reasons could range from accessibility, to distance, to the relative abundance/ availability of the desired forest produce (and services). Such knowledge is very critical for KPKKT as the forest managers of DTC and Terengganu State Forest Department to guide them for future planning and implementation, particularly in the area of forest monitoring, protection and control, or, whenever the situation permits, for infrastructure development. Forest areas that are more frequently visited tend to be more at risk of such threats as forest fires, theft of forest produce and illegal logging.

It is interesting to note however that distance was not the sole determinant that influenced respondents' decision to enter a forest. This was due to the availability of vehicles such as motorcycles which is the main mode of transport in rural areas due to its easy availability and affordability. Respondents travelled from as far as 10km or more to enter the forest, mostly entire by foot or on motorcycle or both (Table 12 and 13). It appears that about 86% of the respondents resorted to this method of transport, presumably due to the fast deteriorating condition of the forest road and bridges from abandonment once logging ends.

Forest travel by using saloon car and 4-wheeled drive vehicle was not popular due to obvious reasons, and seemed to be confined to the well-to-do, and perhaps more business-minded forest users.

Table 12: Average Distance (in Km) Travelled by Respondents to PRF

	Average Distance To The Forest, km	Count	%
1	<1 km	8	11.43%
2	1 < 3 km	15	21.43%
3	3 <5 km	16	22.86%
4	5 < 10 km	24	34.29%
5	10 ++ km	7	10.00%
	Total	**70**	**100.00%**

Table 13: Method/ Mode of Transport Used by Respondents to Enter the Forests.

	Method/ Mode of Transport to the PRF	Count	%
1	Walking/ By foot	34	36.96%
2	Motor cycle	41	44.56%
3	Saloon Car	1	1.09%
4	4-Wheeled Drive Vehicle (4WD)	4	4.35%
5	Walking + Motor cycle	11	11.96%
6	N.R	1	1.09%
	Total	**92**	**100.00%**

The survey also revealed that it was not the habit of the villagers to enter the forest regularly on daily, not even on weekly basis despite their low economic condition. Less than 10 per cent entered the forest on biweekly basis whereas only about 13 per cent did that on monthly basis. Most, i.e. nearly 75 per cent entered the forest only irregularly (**Table 14**). The explanation for this phenomenon might come from the fact that most of the villages lie next to, or within easy distance to the nearest rivers from where the residents could safely get their supply of freshwater fishes without having to go through the trouble of travelling to the forest with all the attendant risks, as well as costs. In other words,

being not too business-minded, the villagers seemed to be easy-going and contented with their life. This perception is reinforced by the findings in **Table 16** in which fishing for freshwater fishes was offered as the main reason for respondents to enter the forest, followed by collecting Non-Timber Forest Produce at 25.77%. The latter would cover such activities as catching birds such as punai (pigeon and dove), tiong (mynah) and serindit (budgerigar) as well as such wildlife as sambar deer, barking deer, and mousedeer. Other NTFP harvested include rattan and medicinal and aromatic plants (MAPs) such as gaharu, kacip Fatimah, mengkudu hutan/ segemuk and ginseng roots, ostensibly for sale.

Table 14: Frequency of Visits to PRFs By Villagers in the Different Villages.

	Village	**Rate/ Frequency of Visit By Villagers to PRF**				
		Daily	**Weekly**	**Biweekly**	**Monthly**	**Irregularly**
1	Talong	0	0	1	1	13
2	Besol	0	3	1	3	10
3	Syukur	0	0	4	1	12
4	Pasir Raja	0	0	0	1	9
5	Kuala Jengai	0	0	0	3	8
	Total	**0**	**3**	**6**	**9**	**52**
	%	**0**	**4.29%**	**8.57%**	**12.86%**	**74.29%**

Table 15: Average Length of Stay in the PRF Per Visit by Villagers

	Village	**Average Length of Stay Per Visit in PRF**			
		1 Day	**2 – 3 Days**	**3 – 7 Days**	**>7 Days**
1	Talong	13	2	0	0
2	Besol	11	5	2	0
3	Syukur	5	9	2	0
4	Pasir Raja	5	3	1	0
5	Kuala Jengai	3	7	1	0
	Total	**37**	**26**	**6**	**0**
	%	**53.62%**	**37.68%**	**8.70%**	

Table 16: Respondents' Purposes for Entering the PRF

	Village	Purpose For Entering the Forest									
		Official Duties	**Fishing**	**Catching Bird**	**Animal Husbandry**	**Recreation**	**Research**	**Non-Timber Forest Produce (NTFP)**	**Construction Material**	**Social**	**Other**
1	Talong	0	12	0	0	1	1	2	2		1
2	Besol	1	9	1	0	0	1	7	2		
3	Syukur	0	14	4	1	2	0	7			
4	Pasir Raja	0	7	0	0	3	0	4	1		1
5	Kuala Jengai	0	5	1	1	0	0	5			1
	Total	**1**	**47**	**6**	**2**	**6**	**2**	**25**	**5**	**0**	**3**
	%	**1.03**	**48.45**	**6.19**	**2.06**	**6.19**	**2.06**	**25.77**	**5.15**		**3.09**

Table 17. Gross Monthly Income Earned by Respondents From the Forest

	Village	**Gross Monthly Income From the Forest, RM/month**						
		<100	**100 < 300**	**300 < 500**	**500 < 700**	**700 < 1000**	**>1000**	**Other**
1	Talong	3	4	0	1	0	0	7
2	Besol	6	2	2	2	0	0	5
3	Syukur	5	9	1	0	0	0	1
4	Pasir Raja	6	0	2	0	0	0	0
5	Kuala Jengai	1	3	2	1	2	1	0
	N.R	4						
	Total	25	18	7	4	2	1	13
	%	35.71%	25.71%	10.00%	5.71%	2.86%	1.43%	18.57%

Given the above-mentioned background, it became clear why more than half (or 53.62%) of the villagers spend only 1 day or less in the forest whenever they enter it, 37.7% between 2 to 3 days whereas only 8.7% would stay between 3 – 7 days, and none was willing to stay longer than 7 days (**Table 15**).

Under the circumstance, it was not surprising when a great majority of respondents (or 71.42%) did not earn more than RM500.00 per month from the forest. This begets the question, whether or not such a situation is fully justified given the forest lying insanely too close to the villagers, and yet they don't seem to benefit meaningfully from it and, what would be the best course of alternative for them and the authorities alike? What would be the potential to use the forest resource to uplift the economic level and living condition of these rural poor?

This study had successfully shown that residents of the five villages surveyed earned very little from the forest in financial terms. This is clearly shown in Table 14 whereby slightly more than 70% of the respondents earned less than RM500.00 per month from the forest. This is not surprising considering the fact that 51, or approx.. 73% of the respondents claimed that the forest produces that they collected from the jungle were for personal use/ consumption, as opposed to 27% who admitted of doing business with them. Unfortunately out of this 27%, more than 18% of them refused to reveal the extent to which the business in forest produce had benefited them.

Fig. 10. KPKKT routinely provides assistance to poor and needy villagers living in the vicinity of DTC as part of its Corporate Social Responsibility (CSR).

The reasons could vary from the desire the keep secret of their earnings to the fear of "opening the can of worms" in the event that they were suspected of engaging in illegal activities such as theft of gaharu or poaching of wildlife. This is despite of our assurance of the confidentiality of the information shared by the respondents.

At this juncture, it is worth pointing out that the Malaysian national median and mean income levels for 2014 were RM4,585.00/month and RM6,141.00/month respectively of which the corresponding figures for the rural population were RM3,123.00/month and RM3,831.00/month respectively. As for the state of Terengganu the median income was RM3,777.00/month and mean income was RM4,816.00/month (Dept. of Statistics Malaysia, 2015).

7.3 Perceived Social and Economic Impacts of SFM Activities

Respondents were asked for their opinions on various issues that are often raised and talked about concerning forestry operations conducted by KPKKT and its contractors within DTC areas, and ranked these perceptions according to Likert scale of 1 to 5 where 1 means least and 5 means most intense or most severe impact. The findings from this investigation are summarised in **Tables 18 and 19**.

Whilst the residents of those villages enter the forest out of necessity to supplement their food and supplies of timber, others appeared to be more attached emotionally and culturally to the forests. They were sensitive and aware of the need to protect the environment and the natural forest resources. This is despite their preoccupation with other economic pursuits that generally deprived them from engaging full-time in forest-based

subsistence economy. Claiming having no problem with KPKKT, they however did expect more CSR contributions (CSR and Special Assistance scores of below 3 in **Table 18**) towards certain community and "*gotong royong*" activities organized by them by providing them with appropriate tools/ implements and supplies. **Table 18** also confirms our earlier finding that job and business opportunities in the study area were lacking whereas positive impacts on the environment and supply of clean water from the forests had not been encouraging either. However the question of whether or not the presence of KPKKT could be directly blamed for the lack of jobs and business opportunities for the locals is a subject that is open to debate. On the other hand, a majority of respondents did agree that KPKKT had managed DTC successfully and this had to a certain degree helped with the national image in this field.

Concerning the impact of the SFM activities by KPKKT, which has now entered and well into its second rotation under the Malaysia SMS, respondents were largely

Table 18. Perceived Positive Social and Environmental Impacts of SFM Operations in DTC by KPKKT (Note: 5 = Very Good, 0 = No Positive Effects)

Village	Job Opportunity	Business Opportunity	Infrastructure	CSR	Special Assistance	Assistance During Natural Disasters/ Emergency	Effects on Environment	Supply of Highland water (Air Bukit)	National Image	Safety
Talong	3.8	3.0	3.4	2.8	2.6	2.5	3.5	3.3	4.0	3.4
Besol	2.9	2.5	2.6	3.4	2.8	3.8	3.4	3.5	3.7	3.2
Syukur	3.3	3.0	3.2	2.9	2.8	3.1	3.2	3.1	3.5	3.2
Pasir Raja	2.6	2.4	3.2	2.9	2.6	1.8	2.9	2.9	3.2	2.4
Kuala Jengai	3.1	3.2	3.1	2.9	2.9	3.3	3.2	3.3	3.3	3.3
Mean	**3.2**	**2.8**	**3.1**	**3.0**	**2.7**	**3.0**	**3.3**	**3.2**	**3.6**	**3.2**

Table 19. Perceived Negative Social and Environmental Impacts of SFM Operations in DTC by KPKKT. (Note: 5 = Very Severe; 0 = No Negative Impacts)

Village	Water Quality	Water Quantity	Air & Noise	Traffic/ Accidents	Floods	Landslide	Fertility of Agricultural Land	Livelihood of Local Villagers	Threats from Wildlife	Diseases	Conservation	Moral / Ethical/ Religious Values
Talong	3.5	3.8	3.3	2.5	4.7	3.2	2.3	3.1	3.5	2.5	2.7	2.6
Besol	2.6	2.8	2.9	3.0	3.4	2.9	3.2	3.2	2.8	2.5	2.6	2.8
Syukur	3.2	3.3	3.0	1.5	3.9	3.3	1.6	2.6	3.3	1.8	2.1	1.2
Pasir Raja	4.0	3.8	3.2	3.0	4.8	4.1	3.2	4.1	3.8	3.2	3.0	2.6
Kuala Jengai	3.5	3.6	3.6	3.8	4.5	4.3	3.9	4.3	4.2	3.8	3.8	3.5
Mean	**3.3**	**3.4**	**3.2**	**2.7**	**4.2**	**3.5**	**2.8**	**3.3**	**3.4**	**2.6**	**2.7**	**2.4**

unequivocal on the undesirable effects of logging activities on water resources; drinking and non-drinking water, water recreation, fisheries as well as tourism. Sungai Kelemin with its Lubuk Panjang and Sungai Bangang with its Lubuk Kain, along other rivers in the area are known to have spots which attract recreationists from far and wide for their exceptionally beautiful sceneries and crystal-clear water as well as rich fishing grounds.

Uncontrolled and poorly-supervised forest activities are thought to negatively impact the non-timber forest produce (NTFP) and its trade, and the reduced resources would, in the long run threaten the livelihood and job opportunities for forest dependent communities. On the other hand, little concern was shown on the issues of road safety from the use of timber trucks of public roads. Diseases and social problems from the activities of forest workers and timber truck drivers were not an issue too, so were illegal hunting and disturbance to wildlife (**Table 19**).

7.4 Issues and Complaints

Besides the obvious services and environmental benefits of the natural forest, some of its produce are traditionally known to have high consumption and income values to certain segments of the communities living in its vicinity. While areas of DTC containing these resources may not be designated as HCVF, KPKKT is nonetheless, obliged to institute appropriate management prescriptions with the view to enhance the values of these forest produces and services and coordinate their utilisation in the context of current legislation governing such uses. KPKKT continues to ensure that all of its SFM activities, particularly selective timber harvesting operations, do not severely damage, and thereby reducing the values of the non-timber resources. At the same time, KPKKT will attempt, to the extent possible, to implement the necessary measures to enhance the quantity and quality of these resources.

On the other hand, the local communities on their part, should shoulder some of the responsibilities to safeguard the resources from being over-exploited while trying to gain economic benefits and services from them. In this respect, KPKKT will continue with the initiative to create and instil awareness about the relevant laws and regulations which govern the collection, keeping and utilisation of these resources. This will be done in cooperation with the relevant authorities which, in turn have their respective areas of responsibility and jurisdictions.

There will be regular consultations between KPKKT, the relevant households and the authorities concerned (incl. TSFD) to discuss on issues related to the collection and use of

forest produce. The non-timber forest products, medicinal plants and wildlife are very important for the future not only for the communities but also to the State and the society at large. Efforts in whatever forms, initiated and implemented by any parties will always be given the necessary support for the benefit of all.

The following are the negative opinions and perceptions brought up by the respondents during the interviews which largely reflect their sentiments on KPKKT and its activities. These negative opinions were voiced out despite the findings that pointed to the other side of the coin:

(1) Logging had caused losses to the villagers
(2) Logging by KPKKT has brought no benefit to the local residents, so it must be stopped!
(3) KPKKT did not fully follow relevant guidelines and specifications
(4) Over-logging damages watershed and water resources
(5) Logging has worsen erosion problems for the locals
(6) Over-logging causes floods.
(7) KPKKT did not conserve fruit trees
(8) KPKKT did not help protect river water quality
(9) KPKKT lacks in the rehabilitation of the logged forests.

8.0 Summary and Recommendations on Mitigation Measures

Based on the findings of this SIA, the following line of actions are recommended to be taken by KPKKT during the days to mitigate the negative impacts and improve its operation:

1) KPKKT is to build up its own database on pertinent social and economic information which will be useful for future reference and decision making process.
2) KPKKT is to develop appropriate strategy to maintain its image as a corporate neighbour that is friendly and socially acceptable to the surrounding communities, while at the same time continuing to maintain its financial strength and viability. This is necessary for the company in its effort to ensure business operational sustainability, protection and conservation of the forest resource, and interests of the forest-dependent communities.
3) KPKKT is to give a high priority towards capacity building and education of its staff as well as public education campaign as part of its CSR and community engagement programmes targeting communities living closest to the forest.
4) KPKKT is to strive to continuously improve its management of the forest and to get DTC being continuously accredited to the standards of established certification bodies such as MTCS and FSC.
5) KPKKT will continue to enhance the quality of its management of DTC by incorporating relevant provisions of Occupational Safety and Health for its staff and workers.

6) KPKKT will continue to undertake assessments of social and environmental impacts of its SFM operations, from time to time and to review relevant reports with the purpose of updating and improving upon those report, which will be followed up by appropriate actions.
7) KPKKT to enhance its cooperation on the matter of SIA and EIA with the relevant authorities and institutions, such as JaKOA, PERHILITAN, JPNT, WWF-Malaysia, UMT, etc.
8) KPKKT needs to be more efficient by cutting down losses through more efficient and less wasteful logging and increasing output of quality timber
9) KPKKT will embark into more aggressive forest rehabilitation programme, possibly through the involvement of local residents
10) There is a need for a better conservation measures by the KPKKT and the parties concerned such as Perhilitan, Forest Department, etc
11) KPKKT needs to improve and refine its working in the forest. About 36 per cent of respondents were aware of terms like ISO, MC& I and FSC and the need and value for their compliance.
12) KPKKT will enhance its public relations (PR) and image with local residents through (a) increased CSR contributions and activities; (b) more active awareness campaign on its activities and the value of conservation; (c) more friendly dialogues with local residence.
13) The authorities concerned need to improve relevant legislation.
14) KPKKT needs to pay particular attention to producing only quality timbers from DTC forests. This is possible through more relevant training of KPKKT's staff and contractors and appropriate enforcement.

15) KPKKT must have adequate forward planning in its management of DTC forests. This can only be done through the cooperation form the State and District forest offices
16) KPKKT may need to install fences around areas of the forest which are considered sensitive and prone to encroachment such as Besol PRF
17) KPKKT should help deepen the rivers which was claimed to have been made shallower by the sedimentation of soils attributed to logging operations upstream. This is a tall order and beyond the expertise of KPKKT. It could only be conducted by the relevant agencies such as the DID (Drainage and Irrigation Department)
18) KPKKT should be considerate to local villagers when conducting its operations
19) KPKKT should contribute to the local villages by constructing more and better infrastructure.
20) KPKKT should abide by the regulations that provides for the protection of fruit trees.

References:

Anon. (2012). Guidelines and Procedures for Social Impact Assessment and Monitoring of Forest Management Operations (Peninsular Malaysia). Inst. of Tropical Forestry and Forest Products, UPM & Malaysian Timber Certification Council. 33p. MPIC-UPM Bilateral Cooperation Programme, and MTCC. Printed by Jaybees Print Industries Sdn.Bhd. ISBN: 978-983-44426-4-4.

Azahari Mohd Raslan (2006). Poverty Line Income: Malaysia's Experiences (Powerpoint presentation). Jabatan Perangkaan Malaysia.

Borhan, M. (2017). Social Impact Assessment of the Sustainable Forest Management of Cherul Forest Concession (CFC) Managed Under the 2nd Rotation of the Malaysian Selective Management System (SMS). Pesama Timber Corporation Sdn Bhd. Unpub.

Centre For Good Governance (2006). A Comprehensive Guide for Social Impact Assessment. 42p. http://unpan1.un.org/intradoc/groups/public/documents/cgg/unpan026197.pdf

Dept. of Statistics Malaysia (2015). Press Release on Report of Income and Basic Amenities Survey 2014. https://www.dosm.gov.my

Ramle Bin Abdullah, Mohamad Hafis Bin Amat Simin Asmawi Bin Ibrahim (2014). Lifestyle Transformations Of The Orang Asli Through Participations In The Palm Oil Plantation Projects In Terengganu State, Peninsula Malaysia. European Academic Research Vol. II, Issue 2, May 2014: 1657 – 1676. ISSN: 2286 4822. Www.Euacademic.Org

Unit Perancang Ekonomi Negeri (UPEN) Terengganu (2011). Data Asas Terengganu 2011.

www.weather-forecast.com/location/kampong-ban-ho/.

http://skspDUNGUN.blogspot.com

ANNEX:

SURVEY QUESTIONNAIRES SCHEDULE

PENILAIAN IMPAK SOSIAL OPERASI PERHUTANAN KEATAS MASYARAKAT TEMPATAN

BAHAGIAN A – MAKLUMAT ASAS KAMPUNG

1. NAMA KAMPUNG: …….....

2. KEMUDAHAN ASAS: Tandakan √ jika ada atau X jika tiada

Jalan Tar	☐	Api Letrik	☐	Air Paip*	☐	Balai Raya	☐
Klinik	☐	Sek Ren	☐	Sek Men	☐	Masjid	☐

*Jika tiada, nyatakan sumber air: ……

3. JARAK KAMPUNG DARI HUTAN SIMPAN KEKAL: ……..km

4. Alat Pengangkutan yang lazim digunakan

BAHAGIAN B – MAKLUMAT KETUA KELUARGA DAN ISI RUMAH

1. UMUR: …….tahun

2. JANTINA: Lelaki ☐ Perempuan ☐

3. BANGSA: Melayu ☐ Cina ☐ India ☐ Lain2 ☐ _____

4. AGAMA: Islam ☐ Kristian ☐ Buddha ☐ Hindu ☐ Lain2 ☐

5. TAHAP PENDIDIKAN:

Tidak sekolah ☐ Sek Ren ☐ Sek Men ☐ Kolej/Univ ☐

6. TARAF PERKAHWINAN:

Bujang ☐ Berkahwin ☐ Duda ☐ Janda ☐ Bercerai ☐

7. PEKERJAAN: ……..

8. PENDAPATAN BULANAN DARI PEKERJAAN: RM……

9. BILANGAN ANAK: Lelaki ……..orang
Perempuan ……..orang

10. BILANGAN ISI RUMAH: ……..orang

11. HAKMILIK HARTA: Nyatakan

Ladang getah ……ekar
Ladang kelapa sawit ……ekar
Kebun buah2an ……ekar
Ternakan ……ekor
(Nyatakan jenis ternakan ……)

12. PENDAPATAN ISI RUMAH DARI PEKERJAAN, HARTA DAN ANAK:

RM……./bulan

BAHAGIAN C – KEPERGANTUNGAN KE ATAS SUMBER HUTAN

1. Nyatakan sumber hutan yang lazim diambil, seperti kayu, rotan, buluh, pokok ubatan, hidupan liar, ikan, dan sebagainya, jika ada.

2. Nyatakan anggaran pendapatan bulanan dari hasil hutan, sekiranya hasil hutan tersebut dijual

BAHAGIAN D – KESAN OPERASI PERHUTANAN KE ATAS MASYARAKAT

Berdasarkan kepada pemerhatian dan pengalaman tuan/puan, nyatakan samada operasi perhutanan, khususnya pembalakan, menjejaskan alam sekitar, ekonomi dan budaya masyarakat tempatan, menurut skala: 5 = kesan yang besar; 0 = tiada kesan

1. Sumber air untuk tujuan kegunaan isi rumah, seperti minuman, membasuh, mandi dan sebagainya.

2. Sumber air untuk tujuan pertanian seperti pengairan tanaman, bekalan air untuk kolam ikan, dan sebagainya.

3. Sumber air untuk rekreasi dan ekopelancongan

4. Bekalan hasil kayu dan bukan kayu hutan (rotan, buluh, ubatan, dll) untuk kegunaan sendiri

5. Bekalan hasil kayu dan bukan kayu hutan (rotan, buluh, ubatan, dll) untuk tujuan pemasaran

6. Peluang pekerjaan kepada masyarakat yang diwujudkan oleh industri perkayuan

7. Sumber perikanan sungai

8. Keselamatan masyarakat, seperti kemalangan jalan raya melibatkan kenderaan pembalakan

9. Kesihatan masyarakat seperti penyakit berjangkit akibat pergaulan dengan pembalak

10. Masalah sosial seperti dadah yang mungkin ada hubungkait dengan pembalak

11. Aktiviti pemburuan dan pengambilan hasil hutan secara haram yang mungkin ada hubungkait dengan peningkatan akses melalui jalan hutan

12. Kerosakan kepada tanaman seperti kelapa sawit dan getah disebabkan oleh hidupan liar yang sumber makanan berkurangan disebabkan oleh pembalakan

(Minta responden menceritakan pengalaman peribadi, jika ada, untuk menjelaskan lagi jawapan yang diberi)

BAHAGIAN D – KAWALAN DAN PEMANTAUAN

1. Pernahkah tuan/puan turut serta dalam apa2 program/aktiviti kemasyarakatan yang dianjurkan oleh pihak KPKKT?

2. Pernahkan tuan/puan membuat aduan atau memberi apa2 komen kepada KPKKT berhubung dengan operasi perhutanan yang mereka jalankan?

3. Nyatakan samada tuan/puan bersetuju untuk turut serta dalam program yang dianjurkan oleh KPKKT untuk membincangkan apa2 isu berhubung dengan operasi perhutanan