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VALUATION STUDY OF THE PROPOSED TUN MUSTAPHA PARK



March 2011

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Valuation Study of the proposed Tun Mustapha Park

March 2011

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Front cover photo: The view of limestone cliffs of Pulau Balambangan. © WWF-Malaysia/Eric Madeja

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This report would not have been possible without the support of many people. We would like to convey our heartiest gratitude and appreciation to:

1. Sabah Parks
2. Sabah Fisheries Department
3. District Office of Kudat
4. Sub-district office of Banggi
5. Statistic Department
6. FELCRA Sdn. Bhd.
7. WWF-Malaysia Field staff - Kudat Project

and other relevant agencies in charge of natural resources and development projects within the proposed TMP.

EXECUTIVE SUMMARY

Sabah's proposed Tun Mustapha Park has approximately 1.02 million hectares. It comprises coastal areas of two peninsulas, more than 50 islands, and marine waters. Its physical formations include coral reefs, beaches, forested hills and karst formations (limestone hills), and its marine environment has extensive mangrove forests, seagrass beds and the second largest coral reef concentration in Malaysia. It is a Priority Conservation Area in the Sulu-Sulawesi Marine Ecoregion (SSME) because of the presence of migratory species and large and diverse coastal and marine ecosystems (mangrove forests, seagrass beds, and coral reefs) and productive fishing grounds.

The Tun Mustapha Park is under the administrative jurisdiction of Kudat, Pitas, and Kota Marudu districts in Sabah. The proposed park would be the largest marine park in Malaysia, and one of the largest in Southeast Asia, after the Berau Marine Managed Area in East Kalimantan and Savu Sea Marine National Park in eastern Indonesia.

Valuation Study of the proposed Tun Mustapha Park aimed to estimate the total economic value of the proposed Tun Mustapha Park (TMP) and to assess the cost and benefits of proposals to develop the proposed TMP, particularly the limestone/sand/silica mining and oil extraction off the west coast of Sabah.

The methodology for this study is the Total Economic Value (TEV) approach - a standard methodology that classifies the ecosystem goods and services according to how they are used; and the Cost Benefit Analysis (CBA) method to evaluate the economic feasibility of various projects in the study area by comparing the proposed project with its alternatives using "with-without" project scenarios.

Several economic projects have been proposed for various parts of the TMP. Two proposals for extraction activities have been made in Balambangan Island with EIA report for the proposed limestone quarry analysed. Yayasan Sabah has applied for 2,431 hectares of land for a silica sand mining project, while SEDCO seeks 1,000 acres of land for the limestone quarrying project. Another proposal is the offshore, west coast oil field development. Information about this project is not available at this stage, not even its location, type and quantum of the reserves, potential value, etc.

The discounted value of the proposed park "without" project option is valued at RMI.47 billion for 25 years period. On the other hand, the present value changed to RMI.56 billion "with" project option. However, such projects, which are extractive in nature, would leave behind environmental impacts that would be incompatible with its status as a marine park and undermine its claim on a biodiversity reserve. As the environmental costs have not been included, the benefits of all these projects might seem large for the moment.

The study postulates that economically it is better to conserve and protect the proposed TMP through ecotourism (RM343 million) than to proceed with the proposed limestone and silica sand mining that are only worth approximately RM100 million. Another important recommendation is to develop the proposed TMP holistically as part of the larger development for the whole of Sabah.

In the nutshell, the proposed recommendation is an ecotourism strategy over mining (except for oil and gas for which limited information is available), and for a more holistic development strategy to ensure that the conservation values are protected for the greater good of Sabah and also the world.

ACRONYMS

AAGR	Average Annual Growth Rate
CBA	Cost Benefit Analysis
CPUE	Catch per unit Effort
DOF	Department Of Fisheries
DOS	Department of Statistics
DWT	Dead Weight Tonnage
EIA	Environmental Impact Assessment
FELCRA	Federal Land Consolidation and Rehabilitation Authority
Ha	Hectare
IUU	Illegal, Unregulated and Unreported
JPBD	<i>Jabatan Perancangan Bandar Dan Desa</i>
KK	Kota Kinabalu
MT	metric tonnes
NGOs	Non-governmental Organizations
NPV	Net Present Value
PPMS	<i>Program Penempatan Masyarakat Setempat</i>
PSCs	Production Sharing Contracts
PV	Present Value
RM	Ringgit Malaysia
SEDCO	Sabah Economic Development Corporation
SLUPS	Sabah Land Utilisation Planning Study
SSME	Sulu-Sulawesi Marine Ecoregion
TEV	Total Economic Value
TMP	Tun Mustapha Park
UMS	Universiti Malaysia Sabah
UNEP	United Nations Environment Programme

1. INTRODUCTION

Sabah's proposed¹ Tun Mustapha Park has approximately 1.02 million hectares. It comprises coastal areas of two peninsulas, more than 50 islands, and marine waters. Its physical formations include coral reefs, beaches, forested hills and karst formations (limestone hills), and its marine environment has extensive mangrove forests, seagrass beds and the second largest coral reef concentration in Malaysia. It is a Priority Conservation Area in the Sulu-Sulawesi Marine Ecoregion (SSME) because of the presence of migratory species and large and diverse coastal and marine ecosystems (mangrove forests, seagrass beds, and coral reefs) and productive fishing grounds.

The Tun Mustapha Park is under the administrative jurisdiction of Kudat, Pitas, and Kota Marudu districts in Sabah. The proposed park would be the largest marine park in Malaysia, and one of the largest in Southeast Asia, after the Berau Marine Managed Area in East Kalimantan and Savu Sea Marine National Park in eastern Indonesia².

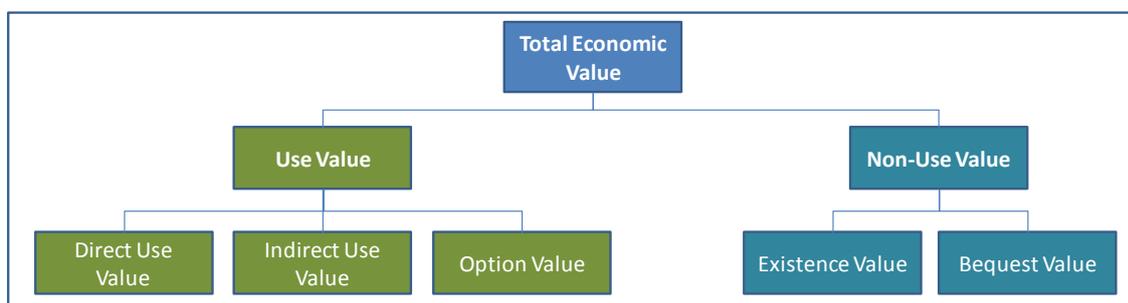
1.1 Objectives

The objectives of the study are:

- To estimate the total economic value of the proposed Tun Mustapha Park (TMP) and
- To assess the cost and benefits of proposals to develop the proposed TMP, particularly the limestone/sand/silica mining and oil extraction off the west coast of Sabah.

1.2 Approach and Scope of Work

The total economic value (TEV) approach is the valuation methodology used in this study. It is a standard methodology that classifies the ecosystem goods and services according to how they are used. Total Economic Value is made up of use value and non-use value, and is further disaggregated into sub-categories as illustrated in the figure below.



The Cost Benefit Analysis (CBA) method is used to evaluate the economic feasibility of various projects in the study area. The proper way to do a CBA is to compare the proposed project with its

¹ It is in the process of being gazetted.

² <http://www.odysseyinstitute.com/news-gallery/news2/6/47>

alternatives using “with-without” project scenarios. It requires all the quantifiable aspects of the project to be put into a single measure, i.e. money, so as to facilitate comparison and perhaps decisions about the developmental options. Thus, ecosystem services and elements that have no prices would be disadvantaged. Although economists have found ways to “value” ecosystem services and activities that have no markets or prices, such methods would not be used in this study due to limited resources. Hence, it is important to keep in mind the limitations of using the estimated values derived in this study.

There are good reasons for using the CBA. Most decision makers are familiar with the monetary value approach (more is better than less) than with other modes of comparison (heritage value of limestone formation against the value of jobs). In a sense, making decisions involves looking at trade-offs. CBA can make estimates of the monetary values and help facilitate decision-making. Bear in mind that it may not be able to comprehensively determine or capture all of non-economic values. In this study, that limitation is recognised and the study results are therefore qualified.

A standard CBA methodology comprises of the following steps:

- i. Define the stakeholders who have standing in the project;
- ii. Identify the portfolio of options, including the no-project and with-project option;
- iii. Catalogue all the physical impacts;
- iv. Define the no-project option, i.e. baseline condition;
- v. Predict the physical impacts over the lifetime of the proposed project;
- vi. Monetize the impact;
- vii. Use a discount rate to establish the present benefit and cost;
- viii. Calculate the net present value and other indicators;
- ix. Conduct sensitivity analysis;
- x. Make a recommendation based on the analysis above.

Note that the first five steps involve estimates of physical quantities and forecast of their impacts and these do not yet require any economic input. The economic component comes after the scientific and physical data is available, and it is an input to the economic component, which are steps vi to ix. Based on this method, the economic analysis will produce a result, i.e. which option is better from an economic perspective.

As mentioned earlier, these results take into account only the aspects that can be quantified and valued. In the final consideration, other non-quantifiable or even non-economic considerations may also be important, e.g. eradicating poverty, protecting the heritage values of the limestone formations, or conserving the ecological values of the rich marine life and the marine park, etc. Thus

a final decision may have to take all aspects into consideration, of which the economic perspective is only one of them. However, the economic perspective is an important one because social behaviour is based largely on economic factors and incentives. Not taking these into account could mean the project may not achieve its objective.

The tasks carried out in the study are as follows:

1. **Define the study area**

The study area is defined in order to establish the boundary for the valuation study, and also the cost benefit analysis modelling exercise (See **Figure 1**).

2. **Compile the baseline data for the proposed park**

The existing values of the park establish a baseline for the study area. It provides a basis for comparing against the potential impacts arising from the proposed developments. Economic information and data have been assessed and extracted from various reports, and these were used to derive the economic base of the park.

The exercise includes a literature review of available (primary and secondary) data and information from stakeholder meetings, i.e. relevant agencies in charge of natural resources, development projects, etc. Sources of secondary data are from Annual Statistics of Department of Fisheries, Population Census of Department of Statistics, *Laporan Akhir Kajian Pelan Pengurusan Terintegratif Taman Marin Tun Mustapha*, Tourism Area Concept Plans for Kudat, Kota Marudu and Pitas, Environmental Impact Assessment (EIA) report, etc.

3. **Determine the total value of the current flow of benefits from the proposed park**

All mutually-compatible ecosystem goods and services provided by the proposed TMP have been identified; and the value of ecosystem goods and services provided in the park has been estimated. A priori, the value of ecosystems has been estimated using the natural capital approach. It considers the present value of all current and future benefits that the TMP ecosystem will generate. Expert assistance and advice have been sought from scientists who understand the flow of ecosystem goods and services, and such information has been used to estimate the economic values. A TEV approach will guide the work in this area.

4. **Determine the net benefits of the proposed projects (limestone mining and sand/silica mining, off-shore oil field, etc.) that alter the proposed TMP conditions.**

Estimate how the quantity and quality of the ecosystem goods and services in the TMP would change as a result of the proposed developments, as compared to their quantity

and quality without the development. The marginal value of the ecosystem goods and services in the TMP will be estimated.

5. **Develop a CBA model and analyse the scenarios**

Using the available information, a cost benefit analysis model has been developed for three scenarios as follows:

- Scenario A: Marine park (No Option)
- Scenario B: Extractive industries (limestone and sand/silica mining)
- Scenario C: Offshore activities (west coast oil field development)

1.3 ***The key stakeholders of the proposed TMP***

Based on the discussion with WWF-Malaysia and Sabah Parks, the key stakeholders who would be impacted by the TMP and the alternative projects are the following:

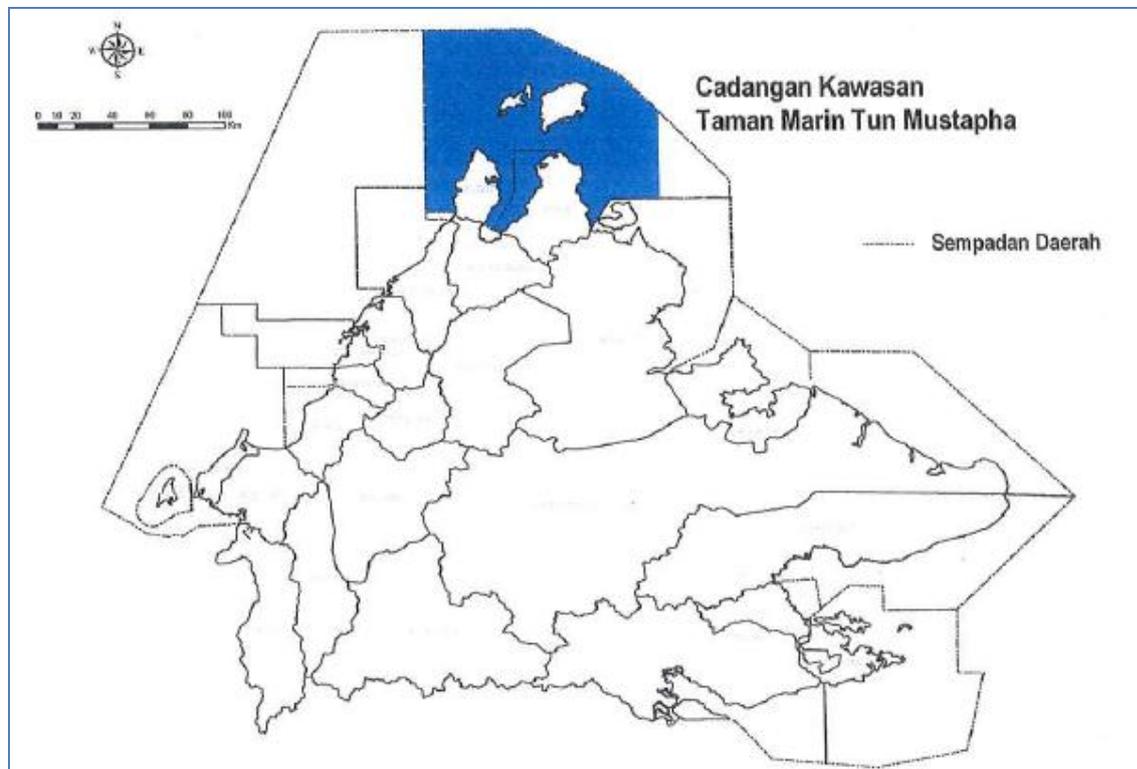
- The local communities in the proposed TMP;
- Fishermen from Kudat, Kota Marudu, Pitas and Sandakan;
- Yayasan Sabah, project proponent for silica/sand mining project;
- Sabah Economic Development Corporation (SEDCO), project proponent for limestone quarry project;
- Federal Land Consolidation and Rehabilitation Authority (FELCRA), project proponent of the agropolitan project;
- Sabah Parks, agency to oversee the management of the park;
- Tourists visiting the park;
- NGOs like WWF-Malaysia; and most importantly,
- The state government of Sabah.

All of the above stakeholders are certainly important but it leaves out one important stakeholder. As the TMP lies within the SSME area, which has been regarded as one of the most diverse marine ecoregions in the world, there are global benefits for conserving TMP. As the Malaysian Government has already made a commitment to assist in protecting and conserving marine resources, the world community at large – that would benefit from such conservation actions or may suffer if developments lead to disastrous environmental consequences – should also be included in this list. Thus it is proposed that the interest of this group of stakeholder, the world community, be represented through the collective interest of the SSME Tri-national Memorandum of Understanding and Coral Triangle Initiative Regional Plan of Action stakeholders.

2. EXISTING ENVIRONMENT OF THE STUDY AREA

This chapter describes the study area, i.e. the proposed Tun Mustapha Park or TMP.

Figure 1: Location map of the proposed Tun Mustapha Park



Source: Laporan Akhir Kajian Pelan Pengurusan Terintegratif Taman Marin Tun Mustapha

Figure 1 shows the location map of the Proposed Tun Mustapha Park (TMP) with blue colour zone. The proposed TMP is located within the districts of Kudat, Kota Marudu and Pitas and consists of more than 50 islands. Banggi Island (450 km²), Balambangan Island (150 km²) and Malawali Island (37.93 km²) are among the largest islands in the proposed park (see **Figure 2**). The proposed Tun Mustapha Park would be Southeast Asia's second largest marine park covering an area of more than 1 million hectares (see **Table 1**).

Table 1: Area of the proposed Tun Mustapha Park, in million Hectares

Proposed Tun Mustapha Park	Area (mil Ha)
Core area	1.02
Buffer area	0.063

Figure 2: Islands in the proposed Tun Mustapha Park (Study Area)



Source: Laporan Akhir Kajian Pelan Pengurusan Terintegratif Taman Marin Tun Mustapha

Table 2 shows the length of coastline, land and marine areas of Kudat, Kota Marudu and Pitas. The coastline for all three districts including the islands is about 930 km. Kudat District's marine area covers about 9,803 km², followed by Pitas District with 591 km² and Kota Marudu District with 129 km². Thus, Kudat has the lion's share of the proposed TMP.

Table 2: Coastline, land and marine areas of Kudat, Kota Marudu and Pitas

Length of Coastline (km)	Kudat	Kota Marudu	Pitas
	503	33	18
Land	49	4	76
Islands	112	33	102
Total	664	70	196
Land Area (km²)			
Islands	620	2	2
Coastal zone	630	467	1,291
Coastal	35	1,317	261
Marine Area (km²)	9,803	129	591

Source: <http://www.townplanning.sabah.gov.my/liczml/>

2.1 ***Biodiversity features of the proposed TMP***

The biodiversity features³ of the TMP comprise of the following:

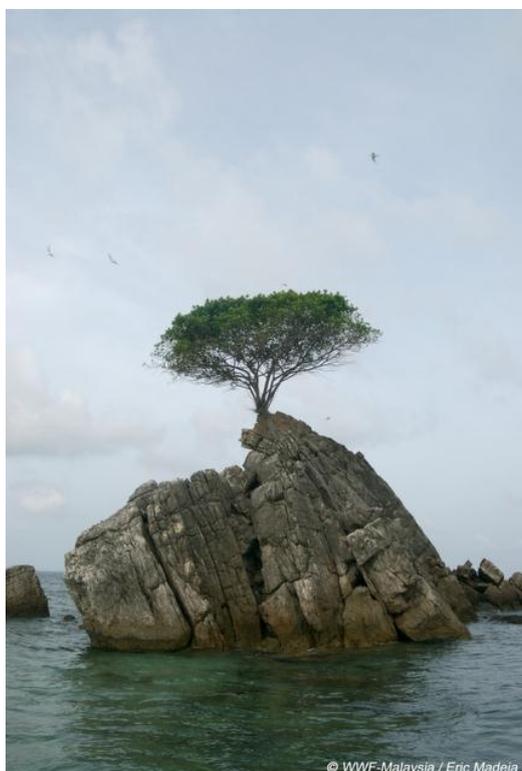
- Home to the second largest concentration of coral reefs in Malaysia;
- Habitats including coral reefs, mangroves, seagrass beds and open sea;
- Home to endangered green sea turtles and dugongs;
- Important passage for oceanic fish, sea turtles and marine mammals such as whales, whale sharks, dolphins and dugongs;
- Surveys to date recorded 252 species of hard corals and 350 species of fish, but more are being discovered.



The proposed TMP has a rich diversity of flora and fauna. The total estimated number of marine flora and fauna in the waters of the Banggi Island (observed from July 1999-September 2000) are listed below:

- 57 species of marine plants;
- 327 species of invertebrates animals; and
- 383 species of vertebrate animals.

The rocky coasts of southern Balambangan host clear waters, coral reefs, valuable fisheries (including sea cucumber) and unrivaled coastal scenery.



³ Source: *Laporan Akhir Kajian Pelan Pengurusan Terintegratif Taman Marin Tun Mustapha and Tun Mustapha Park Factsheet March 2010, WWF-Malaysia.*

The sea and sandy beaches of northern Balambangan are a paradise on Earth.



2.2 **Physical features of the islands in the proposed TMP**

The physical formations of the Islands in the TMP include forested hills and karst formations (limestone hills), white sandy beaches and etc.

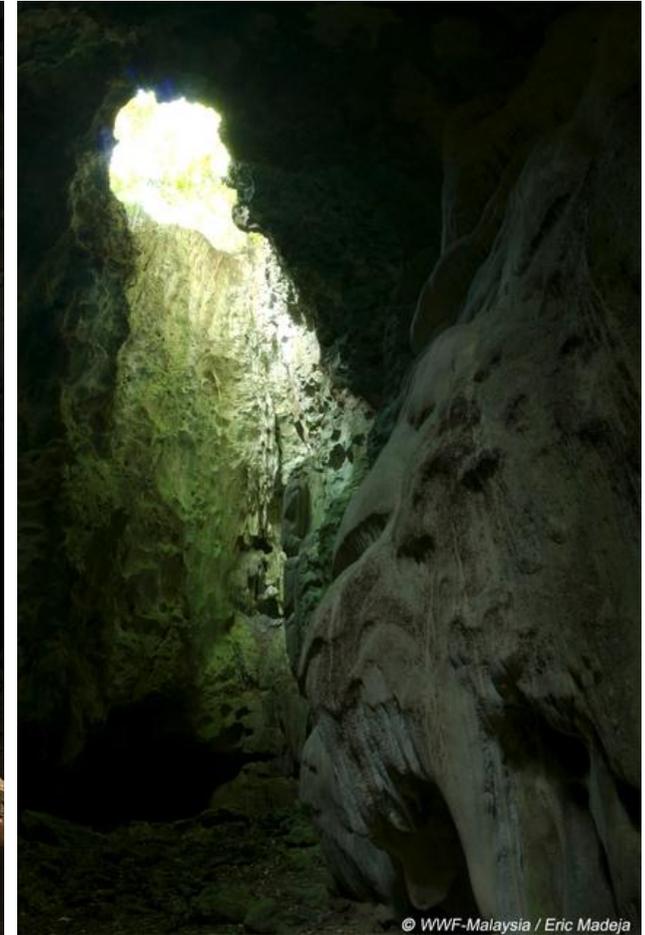
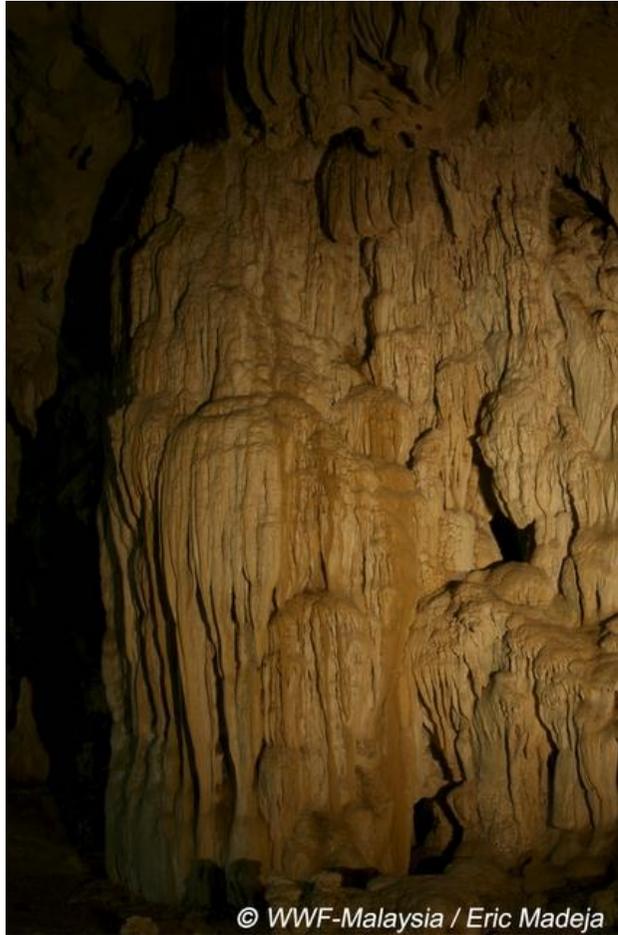
A composite view of the limestone cliffs of Pulau Balambangan



White Sandy Beaches



Limestone Caves



2.3 Existing land use of the proposed TMP

Banggi Island, the largest island in TMP, covers about 126,571 acres (**Table 3**). In 2005, 23 per cent of Banggi Island comprised Forest Reserve and one per cent was an integrated agricultural scheme. Since 2005 land use has changed due to a FELDA agropolitan rubber project on Banggi, as discussed below. Balambangan Island as the second largest island in the TMP covers 28,405 acres of land. More than 60 per cent of Balambangan Island has been set aside for sand mining and limestone mining to produce clinker. The Forest Reserve covers about 2.5 per cent of Balambangan Island (**Table 4**).

Table 3: Land use of Banggi Island, 2005

	Area (acres)	%
Banggi Forest Reserve	29,500	23
Karakit Forest Reserve	62	0.05
Integrated Agricultural Scheme Land	1,255	1
Others	95,755	76
Pulau Banggi	126,571	100

Source: Profil Daerah Kecil Banggi Tahun 2005

Table 4: Land use of Balambangan Island, 2005

	Area (acres)	%
Sites for Sorak Mining Sdn Bhd	14,315	50.4
SEDCO clinker site	3,000	10.6
Balambangan Forest Reserve	724	2.5
Seaweed farming/UMS	110	0.4
Others	10,256	36.1
Pulau Balambangan	28,405	100.0

Source: Profil Daerah Kecil Banggi Tahun 2005

About 23,109 hectares of the proposed TMP land area consists of Commercial Forest (48.5 per cent), Mangrove Forest (49.8 per cent), Virgin Forest Reserve, and Forest Reserve Class I (see **Table 5**).

Table 5: Types of Forest Reserve in TMP

	Area (Ha)	%
Commercial Forest	11,206	48.5
Mangrove Forest	11,505	49.8
Virgin Forest Reserve	27	0.1
Forest Reserve Class I	371	1.6
Total	23,109	100.0

Source: Laporan Akhir Kajian Pelan Pengurusan Terintegratif Taman Marin Tun Mustapha

2.4 Population profile

Sabah's population has grown from 2.5 million in 2000 to 3.2 million in 2009, with an annual growth rate of 2.9 per cent. There is evidence that population growth in later years is slowing down. In 2009, total population for Kudat, Kota Marudu and Pitas was estimated at 201,700, or about 6.3 per cent of state's population. As can be seen, the population growth of the study area is slightly slower than the rest of Sabah, but still higher than Malaysia as a whole. Thus, there is in-migration into this area of Sabah.

Table 6: Population by District, 2000-2009

State / District	Area (Sq Km)	Population ('000)				(per sq. km.) Population Density			Average Annual Population Growth Rate (%)
		2000	2007	2008	2009	2007	2008	2009	2000-2009
Sabah	73,631	2,468.2	3,063.6	3,131.6	3,201.0	42	43	43	2.9
Kudat	1,287	70.3	83.0	84.6	86.3	65	66	67	2.3
Kota Marudu	1,917	58.9	70.9	72.5	74.1	37	38	39	2.6
Pitas	1,419	32.4	39.5	40.4	41.3	28	28	29	2.7
Study area (3 districts)	4,623	161.5	193.4	197.5	201.7	42	43	44	2.5

Source:

- 1) *Population Distribution by Local Authority Areas and Mukims, Dos, Census 2000.*
- 2) *Basic Population Characteristics by Administrative Districts, 2008 and 2009, DOS.*

In terms of population density, Kudat district has 67 persons per square kilometre compared to only 43 for Sabah state. The population density of Kota Marudu and Pitas is 39 persons and 29 persons per square kilometres respectively, slightly lower than the mean for Sabah.

Currently, several communities have made their homes in the proposed TMP, such as Banggi and Balambangan. As reported in the "*Laporan Akhir Kajian Pelan Pengurusan Terintegratif Taman Marin Tun Mustapha*", about 6,612 households were living in the proposed park in 2007. About 73 per cent of the households were in Banggi Island, 11.9 per cent on Mandi Darah Island, and 9.0 per cent on Balambangan Island. The total number of households in each of the islands is shown in **Table 7**.

Table 7: Demographics of Tun Mustapha Park, 2007

Islands	Number of Households	%
Banggi	4,499	73.0
Balambangan	557	9.0
Malawali	267	4.3
Mandi Darah	731	11.9
Maliangin	108	1.7
Others	*	*
Total	6,162	100

Note: * No Information

Source: Laporan Akhir Kajian Pelan Pengurusan Terintegratif Taman Marin Tun Mustapha

More demographic information such as age profile, dependency ratio and economic information such as unemployment level are needed in order to make more definite recommendations about socio-economic development strategy. Such data is not easily available.

2.5 Baseline economic profile

This section describes the economic profile of Sabah and the districts of Kudat, Kota Marudu and Pitas. For marine fisheries, the analysis has included Sandakan District as its commercial fishing fleet harvests from the proposed TMP area and the Philippines⁴, and lands catch in Sandakan. As it is not possible to separate the share of Sandakan fisheries from that of the proposed TMP, the fishery catch statistics of the relevant districts including Sandakan are reported.

2.5.1 Fisheries production

This section will first describe trends in Sabah's fisheries since 2000, followed by the situation in the study area.

Table 8 presents Sabah's marine fish landings and wholesale value from 2000 to 2008. In 2008, marine fish landings dropped to 174,010 tonnes from 202,862 tonnes in 2000, declining by 1.9 per cent per annum over the period. Sabah's wholesale marine fish value declined from RM729 million to RM623 million in the same period.

The State Government's revenue from Sabah fisheries in 2008 was recorded at RM708,130 compared with RM437,955 in 2003 (see **Table 9**). The revenue came from the tax and regulatory

⁴ WWF 2009, The Marine Fisheries Sector in Sandakan: Trends and changes from 1995 to 2005.

activities such as fishing licenses, permits and fisheries fees, sale of fisheries products, sale of fisheries forms and printed materials, compounds fines/services and so on.

Table 8: Sabah Landings of Marine Fish and Value, 2000-2008

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sabah Marine Fish Landing (MT)	202,862	178,045	175,123	160,269	190,371	187,068	176,314	184,162	174,010
Wholesale Value (RM'000)	729,367	651,488	584,061	495,402	581,064	500,488	530,573	581,472	623,478

Source: Various Years of DOF Annual Fisheries Statistics

As there is no information on the trends in fisheries stock or fishing effort, we could not correlate the data on fishery stock, gears used (asset) with the level of the fishery resource harvest (yield). At this stage, only some regulatory information on the fishing industry in Sabah is available. **Table 9** shows an increase in fishing licenses issued since 2004 but at the same time, the Government's income from fishery permits and fees declined. Infringements as compounds and fines have also doubled in the same period. Unfortunately, data for the three or four districts that comprise our study area is not available.

Table 9: Sabah fisheries revenue, 2003-2008

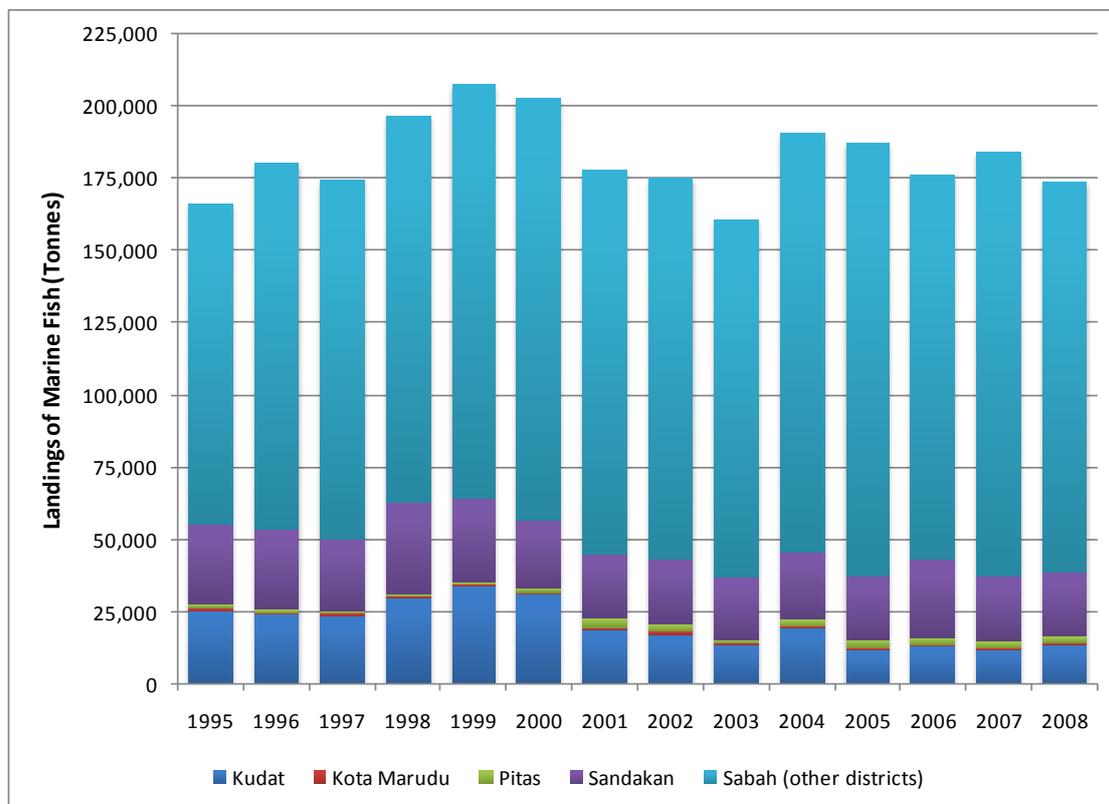
Type of Revenue	2003 (RM)	2004 (RM)	2005 (RM)	2006 (RM)	2007 (RM)	2008 (RM)
Fishing Licenses	123,307	140,032	203,039	309,311	330,129	380,437
Permits & fisheries fees	252,494	261,968	226,838	133,076	123,323	128,165
Sale of Fisheries Products	6,462	45,179	79,268	35,361	133,537	95,640
Sale of Fisheries Forms and Printed Materials	7,275	25,267	23,040	21,870	19,123	20,207
Miscellaneous (Compounds Fines / Services / etc.)	48,417	72,743	64,148	53,490	171,216	83,731
Total	437,955	545,189	596,333	553,108	777,328	708,180

Source: Various Years of DOF Annual Fisheries Statistics

In 2008, approximately 22 per cent of total marine fisheries productions in Sabah were from Kudat, Kota Marudu, Pitas and Sandakan (**Figure 3**). **Table 10** details the landings of marine fish and wholesale value for Kudat, Kota Marudu, Pitas and Sandakan. Landings of marine fish in Kudat recorded a decline of 4.5 per cent per annum to 13,847 tonnes in 2008 compared with 25,329 tonnes in 1995. Marine fish landings at Kota Marudu also recorded a decline of 11.5 per cent to 274 tonnes in 2008 since 1995. Over the period, the landings of marine fish in Sandakan reported about 27,566 tonnes in 1995 to 22,090 tonnes in 2008, which decreased by 1.7 per cent per annum.

Overall, marine fish landings in Kudat, Kota Marudu and Pitas recorded a decline while only Pitas district increased by 6.3 per cent from 1,105 tonnes in 1995 to 2,447 tonnes in 2008.

Figure 3: Sabah marine fisheries production by districts, 1995-2008



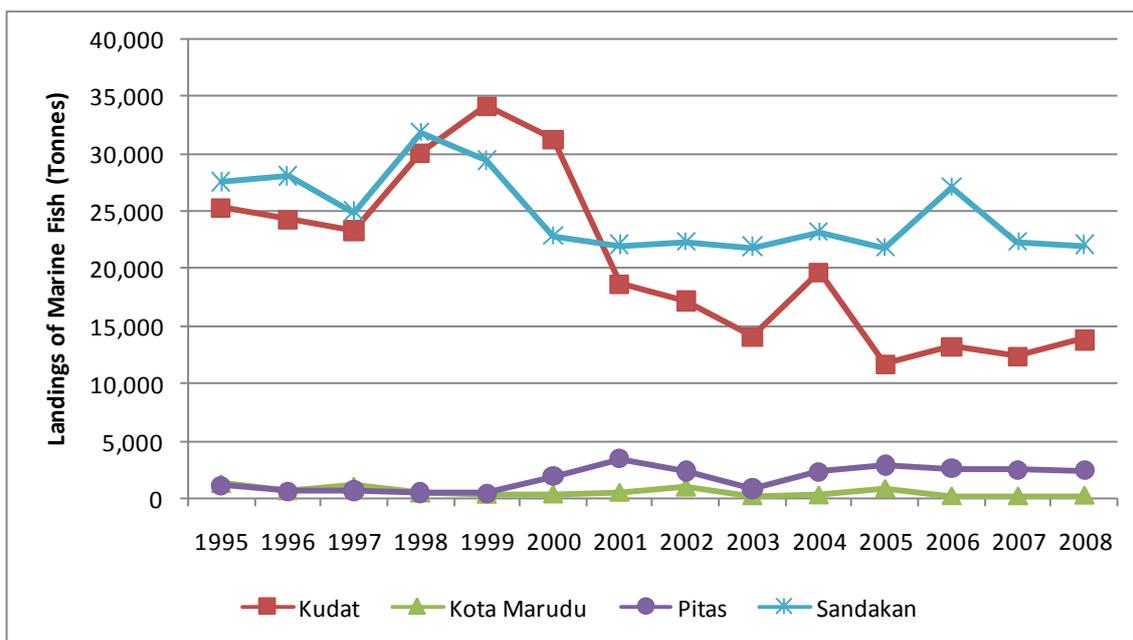
Source: Computed from Various Years of DOF Annual Fisheries Statistics

Overall, the fisheries landings have declined over the period. As no other correlated information is available, e.g. CPUE (catch per unit effort), only a general impression can be formed: fisheries catch has declined that may reflect a decline in the stock as well. The general trend of decline in fishery catch also applies to the study area as the relevant districts have reported declines.



Table 11 gives a summary of the fishermen in the Kudat, Kota Marudu, Pitas and Sandakan districts. **Table 12** shows the number of fishery licences issued in Kudat, Kota Marudu, Pitas and Sandakan. The total number of fishermen for these four districts increased from 7,068 in 1995 to 9,288 in 2008. About 5,990 fisheries licence were issued in 2008 compared to only 856 fisheries licences issued in 1995 for all the four districts.

Figure 4: Study Area's Marine Fish Landings, 1995-2008



Source: Computed from Various Years of DOF Annual Fisheries Statistics

Figure 4 shows that the total marine fish landings for Kudat, Kota Marudu and Sandakan have dropped over the period 1995-2008. This trend seems to indicate overfishing since late 1990s but this is only an impression (the proportion of trash fish in the catch may be a better indicator of overfishing).

The main threats⁵ to the fisheries in Sabah are considered to be:

- Mangrove destruction
- Overfishing
- Illegal, Unregulated and Unreported (IUU) fishing
- Agricultural runoff
- Seabed habitat destruction
- Fish bombing and cyanide fishing
- Land-use change

Table 10 shows that fishery landings have declined since 1995. For Kudat, which is the main fishery landing district, fisheries output increased from 1995 till 2000. Between year 2000 and 2001, fishery output dropped by 40 per cent and by another 10 per cent the following year. It has never recovered since then. Although the fishery industry in Kota Marudu is only 5 per cent of Kudat, its

⁵ Sabah Shoreline Management Plan, 2005: Sectoral Report – Fisheries and Aquaculture.

decline has been even more dramatic. Fishery output in Kota Marudu dropped five times between 1995 and 2008. Only Pitas seemed to have escaped the same fate, doubling the fishery output in the same period. However, it is important to note that the data for Pitas seemed to be quite variable, possibly pointing to the variability in terms of data collection.

For Sandakan, the fishery output seemed to have stabilised over the period. As the fishing capacity in Sandakan is much greater than those of the other three districts, it is possible that the fishery landings in Sandakan could have come from other fishing grounds (e.g. the Philippines) as its traditional ones become less productive. It is important to note that many boats based in Sandakan travel to and fish in the waters of the proposed TMP and land their fish in Sandakan.

Turning attention to the fishing pressure, Kudat has issued 60 per cent more fishing licenses between 2005 and 2006, and another 40 per cent more licenses between 2007 and 2008. It is interesting to note that in this period fishery output grew 20 per cent but there was a 300 per cent increase in fishing licenses issued.

A similar situation has occurred in the other two districts. Kota Marudu issued 5 times more licenses between 2005 and 2008, while Pitas issued 10 times more licenses. It is interesting to note that fishery output in Kota Marudu declined 3 times while in Pitas, its fishery output doubled.

The analysis suggests that the socio-economic dependence on the fishery resources may have become greater, despite a decline in fish landings. There are several possible reasons for the massive increase in the indicators of fishing pressure. They may arise from outside of the fishing industry, e.g. diesel subsidy for the fishing industry, the failure of other socio-economic development programs to generate sufficient jobs and employment or substantive in-migration into the area such that there is a need to provide opportunities for the new populace.

These statistics corroborate the findings of a regional time-series study of demersal fisheries resources of Malaysia, Thailand and the Philippines. The study concluded that there has been overfishing in the marine waters of these countries. In Malaysia, the study covered the east and west coast of Peninsular Malaysia, and the east coast of Sabah and Sarawak. The general conclusion of the study⁶ was that the declines were greatest for shallow depths (<50 m) where the biomass declined 4 per cent to 20 per cent of the original estimates. The study was carried out for 1971 till 1998. Although the research for Sabah was not reported, the general picture shown was that the near shore fishery resources had declined dramatically, and overfishing and environmental pollution were

⁶ Stobuki, I.C. et.al. (2006). "Decline of demersal coastal fisheries resources in three developing Asian countries", in Fisheries Research 78 (2006), 130-142.

the attributed causes. The overfishing was due mainly to fishermen acquiring better gears and equipment and which were more effective at fishing. It is also estimated that the financial loss due to the illegal, unregulated and unreported (IUU) fishing is about one third of the total annual value of marine fisheries reported⁷.

When combined with the earlier analysis, our conclusion is that both the decline in fishery resources as well as overfishing (as evidenced in the increase in fishing effort and pressure) suggest that this level of fishing pressure is not sustainable. In fact, issuing more licenses could have negative impact for all fishermen. They are competing for a declining resource base; expanding more effort would mean catching fewer fish over the short and long run. In this regard, the solution to poverty in these remote areas may be found in other socio-economic programs such as tourism, agriculture, or aquaculture that do not add pressure to an already depleted resource so as to relieve the pressure on the natural marine resources within the proposed TMP area.

⁷ Case Study on the Impacts of Illegal, Unregulated and Unreported (IUU) Fishing in the Sulawesi Sea, Apec Fisheries Working Group (April 2008).

Table 10: Landings of marine fish and value, 1995-2008

District	Landings of Marine Fish (Tonnes)														AAGR 1995-2008 (%)
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Kudat	25,329	24,317	23,368	30,139	34,191	31,282	18,729	17,242	14,122	19,658	11,714	13,271	12,382	13,847	-4.5
Kota Marudu	1,342	675	1,109	463	355	385	542	1,016	222	298	897	227	217	274	-11.5
Pitas	1,105	586	654	541	470	1,929	3,410	2,398	873	2,313	2,870	2,596	2,477	2,447	6.3
Sandakan	27,566	28,053	24,977	31,871	29,416	22,808	22,099	22,398	21,926	23,193	21,856	27,115	22,398	22,090	-1.7
Study area (4 districts)	55,342	53,631	50,107	63,014	64,432	56,404	44,780	43,054	37,143	45,461	37,336	43,209	37,474	38,659	-2.7
Sabah	166,462	180,143	174,265	196,227	207,213	202,862	178,045	175,123	160,269	190,371	187,068	176,314	184,162	174,010	0.3
District	Wholesale Value of Marine Fish (RM'000)														
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Kudat	58,980	62,050	95,467	130,901	155,497	216,006	120,603	94,600	68,569	n.a.	40,505	40,377	43,807	55,566	
Kota Marudu	2,937	3,142	2,458	2,298	2,518	3,782	1,975	941	1,706	n.a.	1,555	1,841	1,514	1,929	
Pitas	2,162	2,047	1,373	1,727	1,794	11,057	12,064	4,787	2,138	n.a.	6,981	6,577	9,101	11,123	
Sandakan	05,799	114,171	116,829	151,392	134,227	160,438	112,466	120,486	117,315	n.a.	120,072	139,061	131,733	120,438	
Study area (4 districts)	69,878	181,410	216,127	286,317	294,036	391,284	247,109	220,814	189,729	n.a.	169,112	187,856	186,155	189,056	
Sabah	n.a.	n.a.	n.a.	660,079	698,495	729,367	651,488	584,061	495,402	581,064	500,488	530,573	581,472	623,478	

Source: Various Years of DOF Annual Fisheries Statistics

Table 11: Number of fishermen for districts of Kudat, Kota Marudu, Pitas and Sandakan, 1995-2008

District	Number of Fishermen													
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Kudat	1,876	2,625	2,625	2,915	2,915	2,915	2,915	2,962	2,915	2,915	2,915	2,915	2,915	2,133
Kota Marudu	825	832	832	713	713	713	713	717	713	713	713	713	713	989
Pitas	791	791	791	650	650	650	650	591	650	650	650	650	650	626
Sandakan	3,576	3,987	3,987	3,987	3,987	3,987	3,987	3,835	3,987	3,987	3,987	3,987	3,987	5,540

Source: Various Years of DOF Annual Fisheries Statistics

Table 12: Number of fisheries licences issued in Kudat, Kota Marudu, Pitas and Sandakan, 1995-2008

District	Number of Fisheries Licence Issued													
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Kudat	134	176	256	247	260	240	203	238	299	287	319	511	602	1,042
Kota Marudu	64	50	42	62	51	48	39	44	60	69	61	153	185	336
Pitas	2	6	13	17	12	3	27	17	24	67	23	78	116	284
Sandakan	656	691	800	972	992	1,040	1,272	1,101	1,537	909	1,232	2,743	2,984	4,328

Source: Various Years of DOF Annual Fisheries Statistics

2.5.2 Seaweed production

In 2008, Sabah reported 19,102 acres of farms and about 950 farmers involved in seaweed industry. The average farm size for the state is about 21 acres. The main seaweed cultivation sites in Sabah are located at Semporna, Lahad Datu and Kunak. Total production of wet seaweed in Sabah gradually increased from 25,000 tonnes in 2005 to 138,856 tonnes in 2009. The wholesale value for seaweed in Sabah increased 6 folds during the period of 2005 to 2009 (See **Table 14**). The total acreage of seaweed farms in Banggi district covers only 79 acres for 81 farmers (**Table 13**).

Table 13: Distribution of seaweed farms in Sabah, 2008

District	Area (Acre)	Total Person	Farm Size (acre/ person)
Semporna	15,415	511	30.17
Lahad Datu	3,500	250	14
Kunak	108	108	1
Banggi	79	81	0.98
Total	19,102	950	20.74

Source: DoF Sabah, Pengenalan Kepada Industri Rumpai Laut Negeri Sabah

Table 14: Seaweed production in Sabah

Sabah	2005	2006	2007	2008	2009
Seaweed culture (Tonnes) (wet)	25,000	43,200	90,270	111,130	138,856
Wholesale Value of Seaweed (RM)	4,300,000	6,910,000	22,570,000	44,520,000	27,771,180

Source: DOF Sabah Statistics

Table 15: Seaweed production of Banggi Island, 2007-2008

Seaweed	Banggi Island (Tonnes)	Wholesale Value (RM)	Wholesale Value (RM'000/tonne)
2007	21	52,500	2.5
2008	37	147,160	4.0

Source: Various Years of DOF Annual Fisheries Statistics

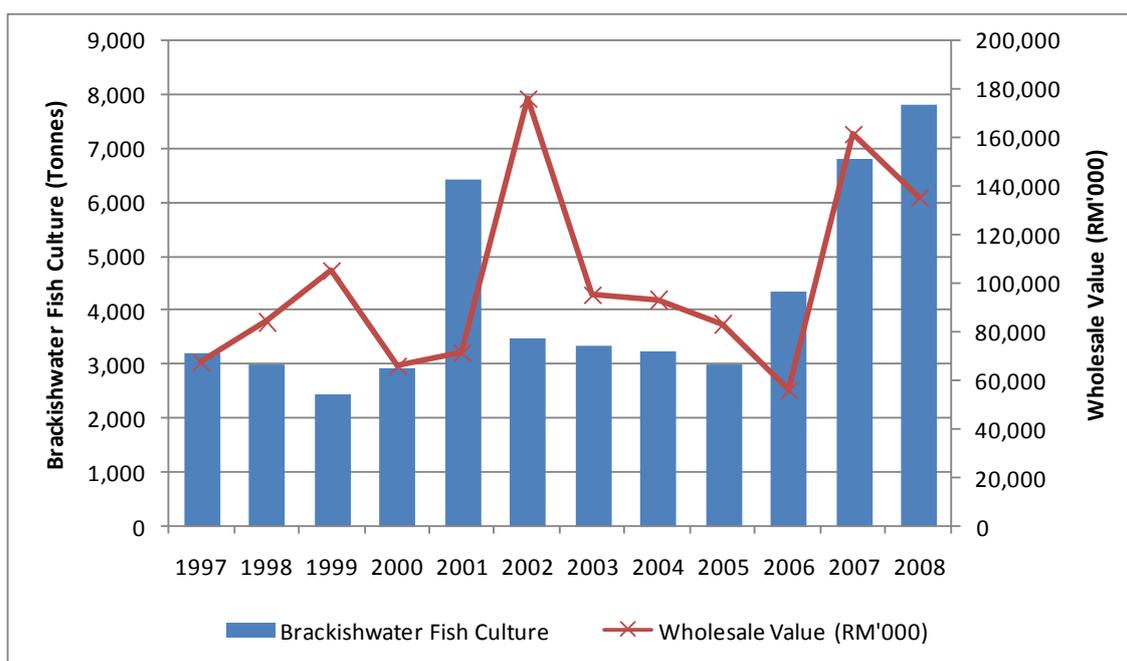
In 1999, Universiti Malaysia Sabah (UMS) introduced seaweed cultivation to the communities of Banggi Island and Balambangan Island for the first time. This was a joint project between the Federal Ministry of Rural and Regional Development, Sabah State Government and UMS. Total production of seaweed for Banggi Island in 2008 was 37 tonnes with the wholesale value approximately RM0.15 million compared to 21 tonnes with wholesale value at RM0.05 million in 2007. Seaweed farming in

Banggi Island is not very productive, as it accounted for only 0.3 per cent of total state seaweed production in 2008.

Seaweed aquaculture is a miniscule industry within Sabah. Local sources confirm that there are many production problems that plague the industry here.

2.5.3 Aquaculture production

Figure 5: Sabah brackish water fish culture production and value, 1997-2008



Source: Computed from Various Years of DOF Annual Fisheries Statistics

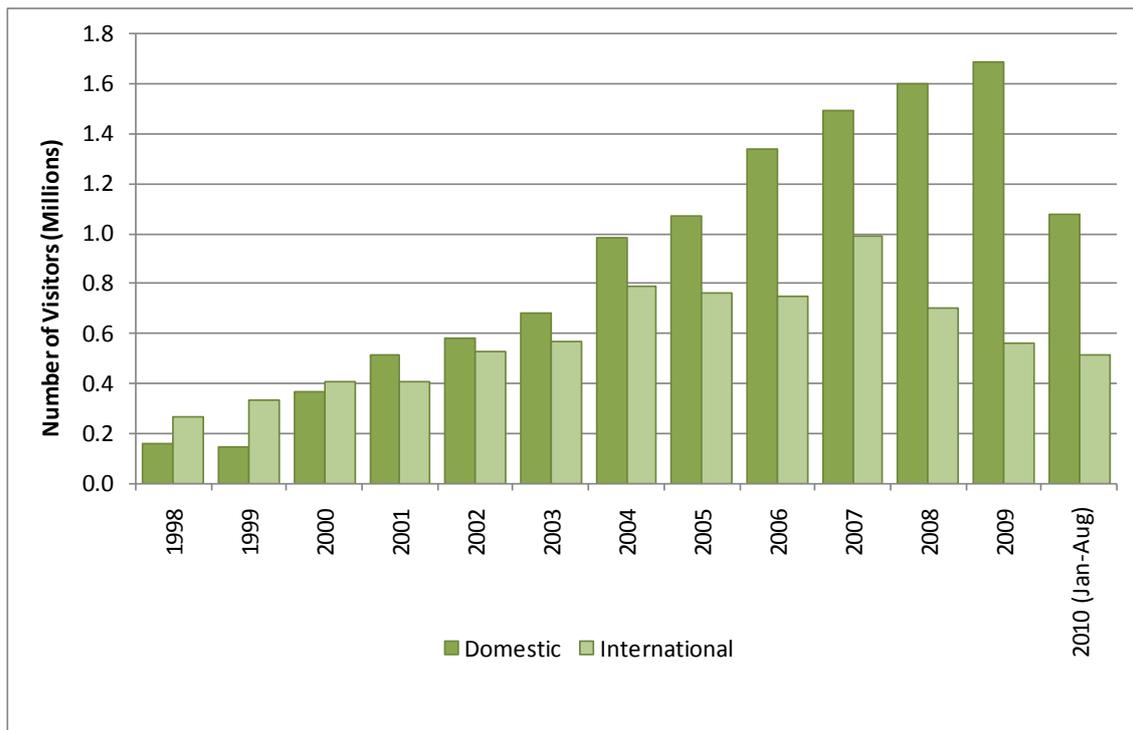
Figure 5 shows Sabah's production and wholesale value of brackish water fish culture industry which comprises of fish, prawn, mussels, oyster, mud crab, abalone and sea cucumber. The output of brackish water fish culture industry increased from 3,229 tonnes in 1995 to 7,822 tonnes in 2008, growing by 8.4 per cent per annum over the period. In 2008, Kudat, Kota Marudu and Pitas produced about 4.5 per cent of Sabah's brackish water fish culture.

2.5.4 Tourism

Sabah's tourism increased drastically over the period of 1998 to 2009. International tourist arrivals in Sabah increased by 112 per cent, recorded a total of 0.56 million of foreign visitors in 2009. It is important to bear in mind that 2008 was the first year of the global financial crisis and could have accounted for a significant drop in international visitors. Domestic visitors, which increased from 0.16 million in 1998 to approximately 1.8 million in 2009, grew 24 per cent per annum in that period (see **Figure 6**).



Figure 6: Sabah Visitors Arrival, 1998-2010



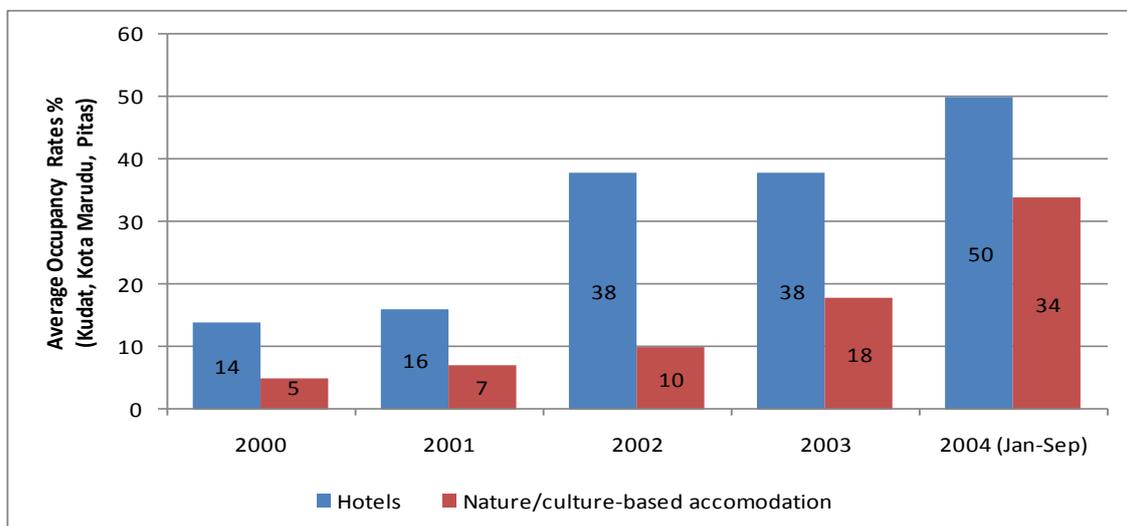
Source: www.sabahtourism.com/corporate/visitor-arrival-statistics/

In 2005, Tourism Area Concept Plans for Kudat, Kota Marudu and Pitas was produced by Sabah's Ministry of Tourism, Culture and Environment. The study showed that average occupancy rates increased between 2000 and 2004. For nature/culture-based accommodation, it increased from 5 per cent in 2000 to 34 per cent in 2004 (See **Figure 7**).

In 2005, an average of 20 guests per month stayed at the guesthouse in Banggi⁸. The majority of visitors are government officers on field duties. The Tourism Area Concept Plans for Kudat, Kota Marudu and Pitas in 2004 estimated that the visitors who are from Kudat, Kota Kinabalu and Peninsular Malaysia visited Pulau Banggi for recreational fishing, paying between RM100-500 per day for boat rental, fuel and food on board. Visitors spent up to three nights fishing, mainly staying on the boat while a smaller number stayed at the government rest house⁹. There is limited tourist information or infrastructure available for the proposed Tun Mustapha Park, even until today. In 2007, only 672 visitors stayed at the Chung Pa Ocean Resort at Balambangan Island¹⁰. In 2010, the overall occupancy rate for the Bonggi Resort between September and October 2010 was 18.5 per cent¹¹. Foreign tourists rarely visit Banggi Island.

The proposed Tun Mustapha Park has the potential to be a tourist attraction. For instance, Balambangan Island has limestone caves and beautiful beaches, i.e. geo-tourism and nature potential. As stated in a study of the Balambangan Cave¹², the Balambangan limestone hosts more than 20 caves with fascinating cave formations, beautiful landscape and other geological elements that bear high ecotourism potential. Proposals to extract limestone from these caves would directly threaten their heritage and ecological values as well as the water quality and aesthetics of the proposed park.

Figure 7: Average occupancy rates 2000-2004 (Kudat, Kota Marudu, Pitas)



Source: Tourism Area Concept Plans for Kudat, Kota Marudu and Pitas

⁸ L. Teh, A.S. Cabanban / Journal of Environmental Management 85 (2007).

⁹ Tourism Area Concept Plans for Kudat, Kota Marudu and Pitas Final Report, July 2005.

¹⁰ Kajian Tahap Tampungan dan Garis Panduan Pembangunan Pulau Balambangan, JPBD 2007.

¹¹ Information collected by the WWF-Malaysia team during the site visit at Banggi island in October, 2010.

¹² Geological Society of Malaysia, Bulletin 54, November 2008, pp. 91 – 95, Geoheritage of Pulau Balambangan, Kudat, Sabah.

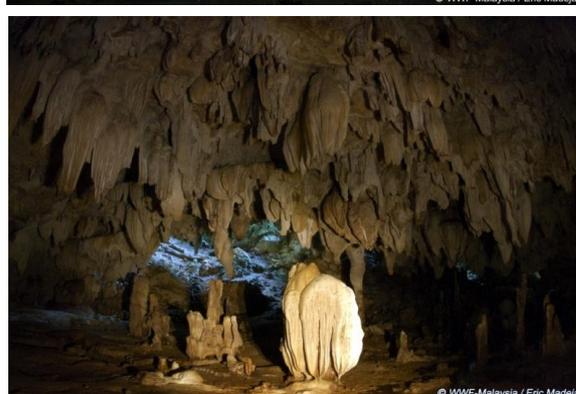
The major constraint for tourism development is the monsoon season with strong winds and rough seas. Accessibility is a key issue as the proposed TMP is located in a remote part of Sabah. The current transport infrastructure cannot support a high volume of visitors, and services are minimal. It serves mainly local economic activities. The current hotel industry cannot cope with a large increase in tourists as seen in the number of hotel rooms and their low occupancy rates.

Thus, it is fair to conclude that there is hardly any tourism in the proposed TMP at this stage. The accommodation facilities comprise rest houses and lodges serving mainly government officers carrying out their duty on the islands. There are no tourist infrastructure, e.g. boats, guides, food and beverage, transport, souvenirs and shopping, etc. Even the natural assets in the islands within the study area are not enhanced and protected so that their values and services can be sustained over time. Not conserving them would likely mean that their attractiveness may be short-lived.

Although a potential for ecotourism is there, it needs to be further “developed”. Investments are required as part of an integrated plan since the proposed TMP will not only be an ecotourism destination but a marine park. Zoning to enable multiple-use of the proposed TMP will sustain its use over a longer period of time. As Sabah itself is a major ecotourism destination, developing the proposed TMP along these lines would be consistent with the overall state strategy.

The development of ecotourism needs to be balanced with its overall development strategy. If development is not coordinated, certain projects, especially extractive ones such as sand mining, could end up destroying ecotourism assets like marine life and would undermine tourism potential. As such, an integrated development strategy and collaborative management plan for the proposed TMP needs to be urgently drawn up and implemented.

The interior of the caves of Pulau Balambangan. Archaeology shows evidence of human habitation from 16,000 years bpa.



Archaeological remains from early British and Chinese settlements on Northern Balambangan.



2.5.5 Banggi Island Agropolitan Project¹³

Banggi Island has 16,000 people with a population growth rate of 4 per cent per annum¹⁴. In August 2007, the Banggi Agropolitan Project was launched as a joint project between the Sabah State Government and FELCRA. It sought to develop 4,500 hectares¹⁵ of land on the island of Banggi into rubber cultivation. An integrated development was envisioned to increase the living standard of the hardcore poor, i.e. households earning less than RM500 per month. The agropolitan project has three components: i) Economic development, ii) Physical development and iii) Capital development. Today, about 1,700 hectares of rubber land have been established in the centre of Banggi Island. This project has created many jobs for the locals who were mainly involved in fisheries activities.

Table 16 shows the proposed rubber plantation project as stated in the EIA report. The project site will be developed into equal three phases, with 1,500 hectare in each phase. About 1,000 participants will be given a “share” in the project which is equivalent to about 4 hectares of land. The suitable area¹⁶ for rubber cultivation is estimated at 2,896.64 hectare or 64.4% of the 4,500 hectare.

Table 16: Development phases of the rubber plantation

Phase	Area (ha)	Year
Phase I	1,500	2007
Phase II	1,500	2007-2008
Phase III	1,500	2008-2009

Source: EIA Study for the Proposed Rubber Plantation at Pulau Banggi, Sabah, 2006

As the project is already on going, this section only describes the potential impacts during the planting, maintenance and production stage for the rubber plantation as stated in the EIA report.

Table 17: Anticipated impacts and mitigation measures of Banggi Island Agropolitan Project

Anticipated Impacts	Mitigation Measures
Use of fertilizers, pesticides and other types of chemical for crop maintenance	<ul style="list-style-type: none"> • Appropriate fertilizer and chemicals application rate; • Proper application techniques of fertilizers and chemicals (ring weeding, spilt dressing of fertilizers, use of slow release fertilizers, avoid application of fertilizers and chemicals during wet season and integrated pest management technique); • Proper selection of chemical substances; • Store chemicals and fertilizers properly; and

¹³ Discussion with En. Lokman from Ministry of Rural and Regional Development Malaysia, Nov 2010.

¹⁴ The Banggi District Profile, 2004.

¹⁵ EIA Study for the Proposed Rubber Plantation at Pulau Banggi, Sabah, 2006.

¹⁶ “Soil Survey Report for Rubber Cultivation at the Proposed FELCRA Plantation at Pulau Banggi, Sabah, 2006”

Anticipated Impacts	Mitigation Measures
	<ul style="list-style-type: none"> Control of irrigation.
Solid waste disposal and effluent discharge from staff quarters and office building operation	<ul style="list-style-type: none"> Provision of garbage bins to ensure proper disposal of solid waste on site; Designated area for waste disposal; and Burning of waste is strictly prohibited.
Soil erosion	<ul style="list-style-type: none"> Maintenance of newly constructed or already existing plantation roads to minimise turbidity of surface run-off and to keep all drainage systems operating.
Air pollution	<ul style="list-style-type: none"> Exhaust emission and dust control

Beneficial impacts of the project, according to the report, comprise of the following:

- Long term employment opportunities
- Improved drainage system
- Economic gains through sales of the rubber latex and timber
- Future development of the region

2.5.6 Program Penempatan Masyarakat Setempat (PPMS)¹⁷ at Banggi Island

The PPMS project will develop a new township in Banggi on approximately 23.31 hectares of land and comprising 200 units of PPMS lots, 50 units of PPMS house reserve, one mosque, a kindergarten, a hall and shop lots. Today, about 100 houses have been completed and are located about 10km away from Kg. Karakit. The main objectives of this project are to eradicate poverty, to improve the standard of living of the local population and further improve their living conditions like houses with proper sanitation, clean water supply and public facilities.

¹⁷ EIA Study for the “*Cadangan Kerja-Kerja Pembinaan dan Menyiapkan PPMS (Program Penempatan Masyarakat Setempat) di Pulau Banggi, Daerah Kudat, 2009*”.

3. DEVELOPMENT PROPOSALS

Several economic projects have been proposed for various parts of the TMP. Several are in the mining sector and their intention is to extract limestone, silica sand, and oil and gas that have been found in the TMP.

For extraction activities, two proposals have been made in Balambangan Island (see “*Kajian Tahap Tampungan dan Garis Panduan Pembangunan Pulau Balambangan, Department of Town and Country Planning 2007*”). The EIA report for the proposed limestone quarry at Balambangan Island has been analysed.

Yayasan Sabah has applied for 2,431 hectares of land for a silica sand mining project, while SEDCO seeks 1,000 acres of land for the limestone quarrying project. **Figure 8** indicates the proposed sites for silica sand mining and limestone quarrying at Balambangan Island.

Another proposal is the offshore, west coast oil field development. Information about this project is not available at this stage, not even its location, type and quantum of the reserves, potential value, etc.

It may be important to note that two of the three projects are located in Balambangan Island and may not affect the other islands in the proposed TMP.

3.1 **Limestone mining**

3.1.1 **Key stakeholders**

The key stakeholders¹⁸ of the proposed limestone mining project are as follows:

- The local community at Balambangan Island, i.e. Kg. Batu Sirih, located approximately 1.4 km southwest of the project site and Kg. Kouk Simpul (2.4 km west-northwest) and Kg. Selamat (3 km north-northeast);
- The fishing community (which could be the same as the local community above) that depend on the marine resources that might be polluted as a result of the quarrying activities;

¹⁸ Source: EIA of proposed Limestone Quarry Pulau Balambangan Kudat Sabah, 2005.

- The Chung Pao Ocean quarters near to the proposed jetty area. As stated in the EIA report, the Chung Pao Ocean is operating without official land authority’s information and their cage culture activity would be affected when limestone quarry project commences;
- Sabah Economic Development Corporation (SEDCO) as project proponent; and
- The Sabah State Government that is in charge of socio-economic development but also would be collecting royalty on the quarried limestone.

3.1.2 The No-Project option

Without the proposed project, the project site would be the secondary forest/vegetation and limestone cave, cliff and sinkhole as there is no human settlement currently. However, several communities live within a 3-km radius of the proposed site.

3.1.3 The With-Project option

The Environmental Impact Assessment (EIA) report for the proposed limestone quarry at Balambangan Island indicated that the proposed limestone mining project is part of an integrated clinker plant project at Sepangar Bay, Kota Kinabalu. The proposed quarry area is approximately 212.14 hectares with a quarry reserve of 65.3 million metric tonnes (MT). The quarry has a lifespan of about 52 years with the maximum production capacity of 117,000 MT per month and to be operated for 25 days per month. The State Government of Sabah is the project proponent and the developer is SEDCO.

The project site consists of secondary forest/vegetation and limestone rock outcrops (cliffs, cave and sinkhole). About 35,000 MT of biomass have to be removed during the site clearing process (see **Table 19**).

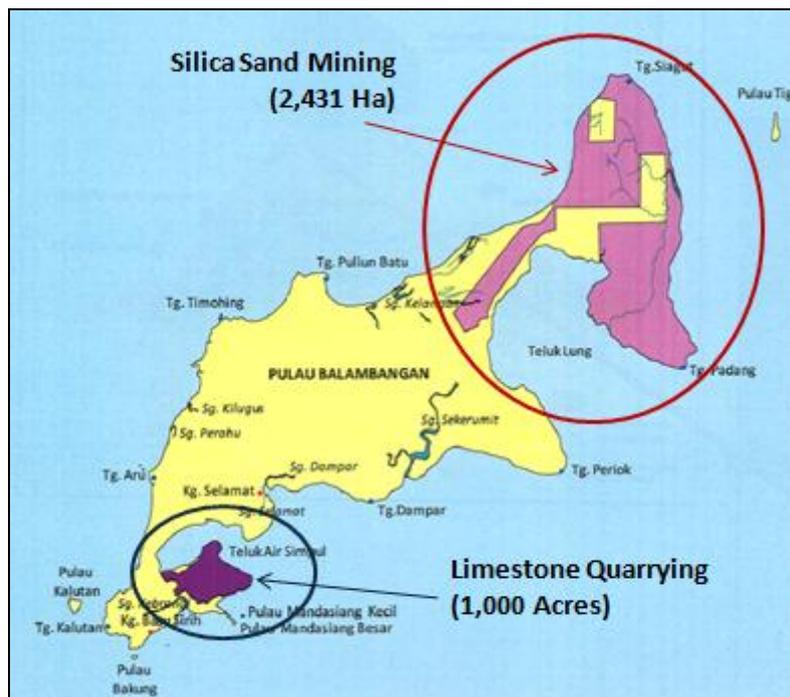
Another development component of the proposed limestone quarry project is the construction of two new jetties, 450 m in combined length and 150 m for an unloading jetty, to support the proposed quarry operation. The limestone will be transported to the shipping jetty by conveyor belt and then barged (via 5,000 to 6,000 DWT) to a clinker plant at Sepangar Bay. The KK area which is experiencing rapid development is the source of demand for the quarried material.

Table 18: Development proposals at Balambangan Island

Project	Area	Applicant
Silica Sand Mining	2,431 ha	Yayasan Sabah
Limestone Quarrying	1,000 acres	Sabah Economic Development Corporation (SEDCO)

Source: *Kajian Tahap Tampungan dan Garis Panduan Pembangunan Pulau Balambangan, JPBD 2007*

Figure 8: Location of the proposed silica sand mining and limestone quarrying at Balambangan Island



Source: *Kajian Tahap Tampungan dan Garis Panduan Pembangunan Pulau Balambangan, JPBD 2007*

Table 19: Key characteristics of limestone quarrying

Limestone Quarrying		
Quarry Operational Area	212.14	ha
Total land area	404.7	ha
Quarry reserve	65.3	million MT
Years of operation	52	years
Consumption Limestone per year	1.25	million MT/year
Production Capacity per month	117,000	MT per month
Operating days	25	days per month
Production per day	4,680	MT per day
Site Clearing- Quantity of Biomass remove	35,000	MT

Source: *EIA of proposed Limestone Quarry Pulau Balambangan Kudat Sabah, 2005*

The potential environmental risks and impacts of the proposed limestone project are summarised in **Table 20**. The anticipated environmental impacts of the project are expected from blasting, dust and air pollution, noise pollution, water pollution, ecological impacts, soil erosion, traffic and transportation risks, archaeology, socio-economics, overburden materials disposal, waste disposal, etc. Although the environmental impacts have been identified, they have not been quantified or monetized.

Table 20: Environmental risks of proposed limestone quarry at Balambangan Island

Environmental Risks	Impacts	Monetize the impact
Blasting Safety	Physical and psychological impacts related to vibration, air blast pressure, noise and fly rock.	The impacts have not been monetized in the EIA report of proposed Limestone Quarry Pulau Balambangan, Kudat Sabah, 2005.
Dust and Air Pollution	Dust generated from processing and transportation.	
Noise Pollution	Noise generated from processing and transportation activities that could affect the tranquillity of the area.	
Water Pollution	Processing discharge that could affect water quality of existing seawater.	
Ecology	Impacts to local flora, fauna and marine habitat within and in the immediate vicinity of the project site.	
Soil Erosion	Water quality deterioration from land clearing activity that could affect water quality of existing seawater.	
Traffic and Transportation Safety	Increase in shipping traffic from transportation of materials that could affect capacity and safety.	
Archaeology	Impacts to archaeological sites that could affect local community heritage.	
Socio-economics	Impacts to local population in terms of fishing and navigation activities.	
Overburden Material Disposal	Impacts on land and water quality due to overburden material handling and disposal.	
Waste Disposal	Disposal of oil waste, garbage, sewage and biomass that could affect soil and water quality and drainage pattern of the area.	
Abandonment	Impacts on safety, water quality and aesthetic from abandoned site.	

Source: EIA of proposed Limestone Quarry Pulau Balambangan Kudat Sabah, 2005

An earlier study by WWF-Malaysia for the Sabah Government titled the Sabah Land Utilisation Planning Study (SLUPS) has documented the heritage values of the limestone formations on Balambangan Island. The findings show that these formations also have potential ecotourism values,

as they are comparable to other sites with similar assets, e.g. Mulu in neighbouring Sarawak. It is therefore important to make an estimate of the potential value of these assets (which is attempted in later sections).

The proposed limestone quarry project is considered important as it will support the construction industry in Sabah. With the project, a continuous supply of limestone for steady production of clinker will be ensured, catering to an anticipated increase in demand for cement both locally and internationally and coping with an increased demand of cement for development and infrastructure projects in Sabah¹⁹. Furthermore, it is estimated that the limestone quarry will provide alternative sources of employment and improve the living standard of the local communities of Balambangan Island.

3.2 Silica sand mining

Balambangan Island has been identified as having resources for silica sand mining. An area of 2,431 ha on the northern side of the island has been identified by Yayasan Sabah, the project proponent, who is acting on behalf of the Sabah State Government.

3.2.1 Key stakeholders

The key stakeholders of the project are:

- The local communities at Balambangan Island;
- Yayasan Sabah as project proponent; and
- Sabah Government (state and local) as the project developer.

3.2.2 The No-Project option

Without the proposed project, the project site would remain more or less the same condition, i.e. a state of ecological balance between the marine areas and the terrestrial land mass.

3.2.3 The With-Project option

If the proposed silica sand mining project were launched, potential environmental risks and impacts are anticipated as summarised in **Table 21**. Although there is no EIA report for this proposed project, literature review shows that the sand extraction operations, clearing operations and construction of the new components in the project site may generate environmental impacts. In terms of economic benefits, the proposal will create employment and expenditure on services and supplies for the local communities. In the project document, economic impact has not been

¹⁹ Source: EIA of proposed Limestone Quarry Pulau Balambangan Kudat Sabah, 2005

estimated: no mention of how many jobs would be created or what levels of businesses are anticipated or how much supplies would accrue to the local businesses.

Table 21: Potential environmental risks and impacts of the proposed silica sand mining at Balambangan Island

Environmental Risks	Impacts
Dust and Air Pollution	Sand extraction operations, clearing operations access and construction of the proposed road may generate minor dust which could impact on local residences.
Noise pollution	Sand extraction operations, clearing operations access and construction of the proposed road may generate noise which could impact on local residences.
Water pollution	Processing discharge that could affect water quality of existing seawater.
Ecology	Loss of native flora and fauna.
Soil erosion	Sedimentation of local waterways.
Traffic and Transportation Safety	Increase in shipping traffic from transportation of materials that could affect capacity and safety.
Socio-economics	Impacts to local population in terms of fishing.
Overburden material disposal	Impacts on land and water quality due to overburden material handling and disposal.
Waste disposal	Pollution / contamination due to incorrect disposal. Inefficient use of resources.
Visual amenity	Vegetation clearing and sand extraction could create visual impacts for some view sheds.
Abandonment	Impacts on safety, water quality and aesthetic from abandoned site.

Source: Extracted some relevant impacts from "Preliminary Environmental Assessment of Sand Extraction Operations from Lots 218 and 220, Salt Ash, 2008, Umwelt (Australia) Pty Limited".

Given the level of information, it is not possible to assess which of these impacts would do the greatest damage to the environment.

3.3 Offshore activities (west coast oil field development)

There is only technical information available about this project, and a basic description is given below.

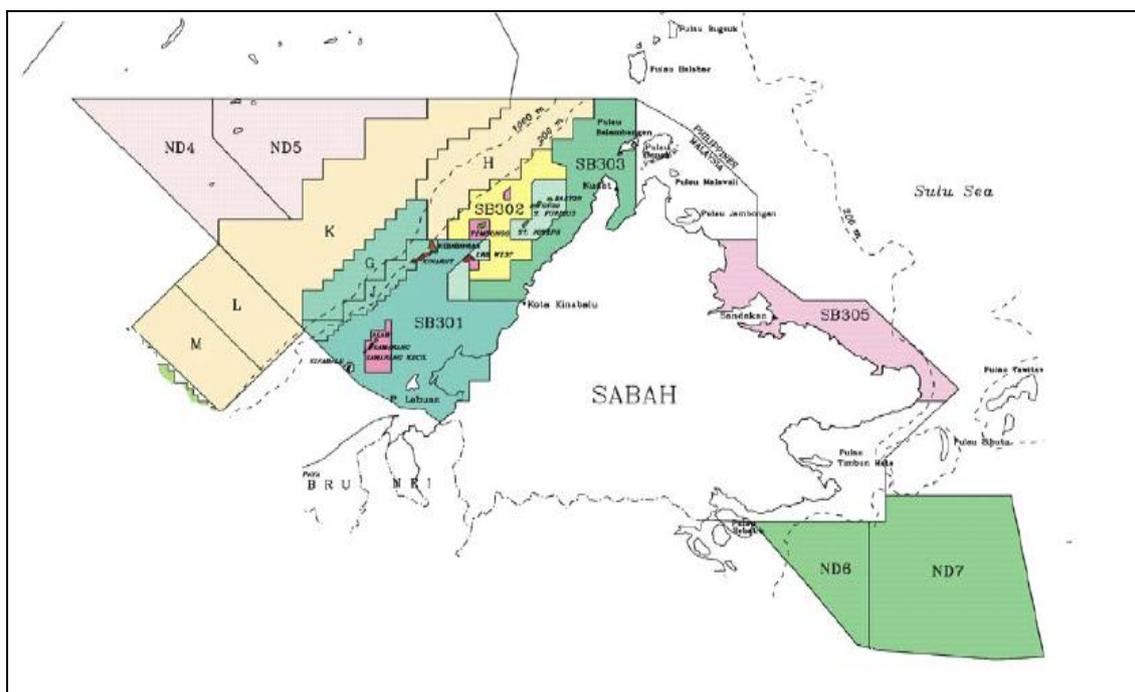
3.3.1 Key stakeholders

The key stakeholders of the projects are:

- The local communities;
- Petronas, Lundin Petroleum and others as project proponent; and
- The Sabah State Government that is in charge of socio-economic development but would be collecting royalty on the oil and gas.

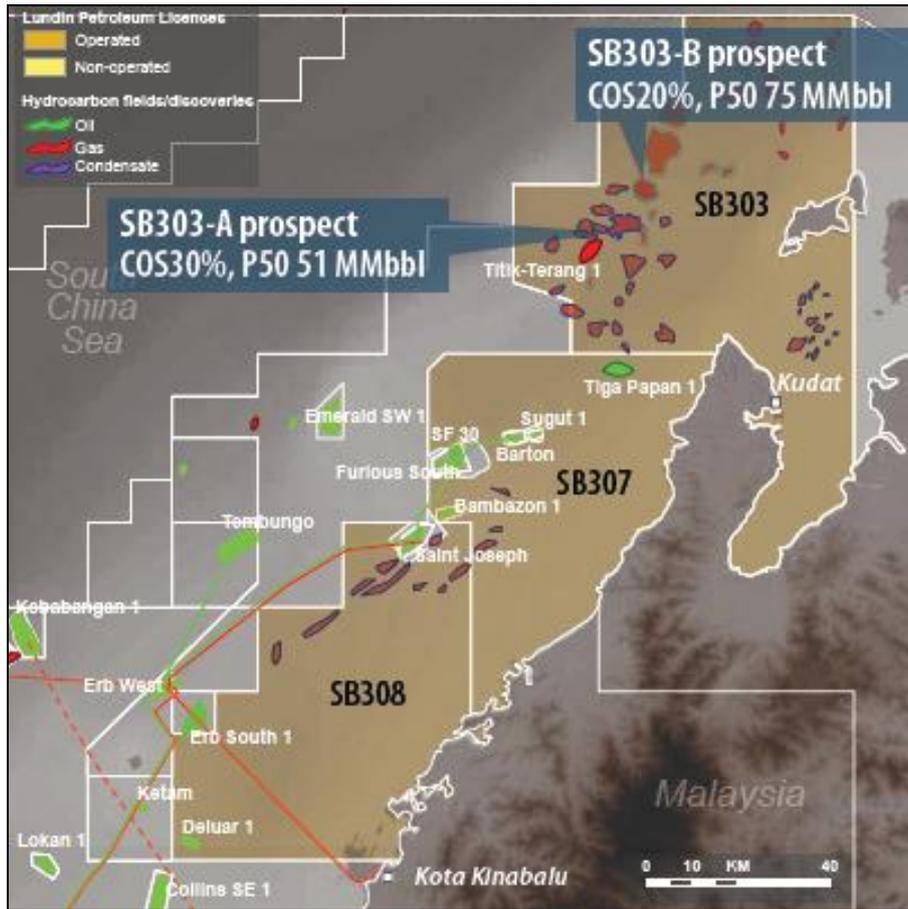
Figure 9 shows the snapshot of oil blocks in Sabah. Lundin Petroleum has signed the Production Sharing Contracts (PSCs) for the exploration and production of oil and gas in two licences located offshore Peninsular Malaysia and two offshore Sabah (SB303 and SB308). Block SB303 and SB304 are located within the proposed TMP boundary.

Figure 9: Snapshot of Oil Blocks in Sabah



Source: Aseambankers. *Equity Focus*, 3 April 2007.

Figure 10: Titik Terang Gas Field



Source: http://www.lundin-petroleum.com/eng/operation_malaysia.php

Figure 10 shows the location map of the Titik Terang Gas Field discovery by Lundin Petroleum. Exploration drilling is expected to commence in 2011. The SB303 block covers an area of 5,000 km² in water depths ranging from 0 to 150 meters and is situated offshore in the north-eastern most portion of Sabah. Only a small gas/condensate discovery at the Titik Terang has been found to date.

Table 22 summarises the potential environmental risks and impacts of the oil and gas development in a general way. As the project has not quantified any of these impacts, it would not be possible to analyse the project along the lines that are indicated in the methodology for this study.

Table 22: Potential environmental risks and impacts of the proposed oil and gas development

Environmental Risks	Impacts
Human, socio-economic and cultural impacts	<p>The key impacts may include changes in:</p> <ul style="list-style-type: none"> land-use patterns, such as agriculture, fishing, logging, leading to unplanned settlement and exploitation of natural resources; local population levels, as a result of immigration (labour force) and in-migration of a remote population due to increased access and opportunities;

Environmental Risks	Impacts
	<ul style="list-style-type: none"> • socio-economic systems due to new employment opportunities, income differentials, inflation, differences in per capita income, when different members of local groups benefit unevenly from induced changes; • socio-cultural systems such as social structure, organization and cultural heritage, practices and beliefs, and secondary impacts such as effects on natural resources, rights of access, and change in value systems influenced by foreigners.
Atmospheric impacts	<p>The primary sources of atmospheric emissions from oil and gas operations arise from:</p> <ul style="list-style-type: none"> • flaring, venting and purging gases; • combustion processes such as diesel engines and gas turbines; • fugitive gases from loading operations and tankage and losses from process equipment; • airborne particulates from soil disturbance during construction and from vehicle traffic; and • particulates from other burning sources, such as well testing.
Aquatic impacts	<ul style="list-style-type: none"> • In exploratory drilling the main aqueous effluents are drilling fluids and cuttings, whilst in production operations—after the development wells are completed—the primary effluent is produced water. • Leakage and discharge of drainage waters may result in pollution of ground and surface waters. • Ocean discharges of water-based mud and cuttings have been shown to affect benthic organisms through smothering to a distance of 25 metres from the discharge and to affect species diversity to 100 metres from the discharge. • Oil-based muds and cuttings affect benthic organisms through elevated hydrocarbon levels to up 800 metres from the discharge.
Terrestrial impacts	<p>Potential impacts to soil arise from three basic sources:</p> <ul style="list-style-type: none"> • physical disturbance as a result of construction; • contamination resulting from spillage and leakage or solid waste disposal; and • indirect impact arising from opening access and social change.

Source: Extracted from UNEP (1997). “Environmental management in oil and gas exploration and production: An overview of issues and management approaches”.

3.4 **Present value of benefits for proposed TMP “with” Projects Option**

From the limited information available, **Table 23** summarises the present value of the benefits for the proposed TMP with-project option. We have identified the proposed projects in the TMP and the present values were projected over 25 years using a 5 per cent discount rate per annum.

Table 23: Present value of benefits for proposed TMP with projects

Present Value With Projects	
Direct Use Values	
Limestone Mining	<ul style="list-style-type: none"> • Sale value of limestone quarry less cost of production. • The present value of the limestone is estimated at RM92.2 million.
Sand Mining ²⁰	<ul style="list-style-type: none"> • Sales value of sand less cost of production. • The present value of the sand is valued at RM8.6 million.
Oil Field Development	<ul style="list-style-type: none"> • Information is not available.

²⁰ Assuming that the sand mining production capacity is 50,000 MT per year.

4. TOTAL ECONOMIC VALUE FOR THE PROPOSED TMP

Using the findings derived from the other parts of the study, the Total Economic Value (TEV) of the proposed Tun Mustapha Park is estimated in **Table 24**.

Table 24: Total Economic value of the proposed TMP with projects

Present Value With Projects		
Direct Use Values		RM
Fisheries	Sales value of marine capture fish less cost of production.	561,000,000
Limestone mining	Sale value of limestone quarry less cost of production.	92,000,000
Sand mining	Sales value of sand less cost of production.	8,600,000
Oil field development	Information is not available.	N/A
Plantation	Sales value of rubber plantation output minus the cost or production.	718,000,000
Aquaculture (brackish water)	Sales value of brackish water aquaculture production less cost of production.	9,300,000
Tourism / recreational	Currently extremely limited in TMP.	2,900,000
Indirect use values		
Carbon sequestration	Tonnes of green and blue carbon stored per hectares valued at international accepted rates.	23,000,000
		34,000,000
Coastal protection	Benefit transfer used for the islands and coastal zones in the proposed TMP.	110,900,000

Note: PV using 5% discount rate, 25 years.

While the proposed projects would have environmental impacts on the proposed TMP, it is not clear exactly how much impact they would have. Based on the available information, it seems the limited scale, location and relative concentration of the sand mining activities on Balambangan Island may be significant in the localised waters, given the identified impacts in the EIA report. The proposed sand mining and limestone mining projects are expected to be approximately over 2,836 hectares, and the coastal regions that surround the projects could be significantly affected. Note that the identified list of impacts is quite extensive but no quantification has been made. Hence, localised impacts and resulting pollution could be anticipated.

Fishing is the main source of income for the majority of local communities in the proposed Tun Mustapha Park. The estimated present value of marine fish landings is about RM561 million for 25 years at 5 per cent discount rates and present value of brackish water aquaculture is valued at RM9.3 million. However, with proven track records of marine protected areas increasing fish biomass, the potential for increased fisheries landings within the proposed park is high.

If the average of IUU fishing losses were taken into account, the financial loss is estimated at RM187 million for 25 years at 5 per cent discount. IUU fishing would likely exacerbate the fishing pressure on an already overfished resource.

In 2000, the average yield for Malaysian rubber was about 1,266 kg per hectare per year compared to 1,450 kg per hectare per year in 2009, or approximately 1.9 per cent for the average annual growth rate. Rubber trees take 5 to 10 years to reach maturity²¹. Assuming that the yield of rubber tree starts from year six of the plantation cycle with 1.9 per cent growth for the rubber yield per annum, it is estimated that the present value of the entire rubber plantation is estimated to be RM718 million at 5 per cent discount rate.

The EIA report of the proposed Limestone Quarry Pulau Balambangan, Kudat, Sabah, 2005 showed that about 1.4 million tonnes of limestone will be extracted from the project site every year. Assuming the limestone quarry will operate at the same level for the 25 years, its present value is estimated at RM92.2 million. Mining the limestone hills will destroy the surrounding ecological ecosystem of the project site and definitely put off any tourist visiting the area. The limestone caves of Balambangan Island not only have high heritage value, they also enhance the ecotourism values.

As shown in **Figure 8**, the silica sand mining site covers most of the northern part of the island, especially the coastal areas of Balambangan Island. Silica sand mining extraction is only worth RM8.6 million (NPV) over 25 years. The mining activities will generate significant negative social and environmental impacts to the coastal area, marine habitats and coral reefs in the proposed park. The key issue is the cost of environmental destruction of the relatively pristine conditions of Balambangan, which has not been quantified due to a lack of details in the available reports.

In the case of recreation/tourism in the proposed Tun Mustapha Park, the current number of tourists who visit the park is miniscule. Based on the present value of tourism and recreation over 25 years, it is worth only about RM2.9 million. More tourists could be attracted to this part of Sabah, which has escaped much development until now. The proposed TMP has been recognised as having

²¹ <http://www.unctad.org/infocomm/anglais/rubber/crop.htm>

rich marine biodiversity and thus has a variety and scale of nature assets for its visitors. This potential tourism value has not been included in these estimates.

The carbon sequestration values (due to forest conservation and plantation) are based on the amount of carbon removed per hectare per year as shown in **Table 25**. When forest is cleared for limestone quarrying and sand mining, carbon is released into the atmosphere. Therefore, the carbon sequestration benefits of the Tun Mustapha Park will be impacted by the proposed development projects in terms of the amount of carbon removed per hectare. It is increasingly recognised that blue carbon also plays an important role in mitigating global warming. **Table 26** shows that the organic carbon burial for mangrove forest is 1.39 tonne per hectare per year and 0.5 tonnes of carbon burial for estuaries. The present value of the carbon sequestration is valued at RM56.3 million over a 25 years period with 5 per cent discount rate, and a carbon price of US\$10 per tonne.

To estimate the benefits of coastal protection, economic values are calculated based on the potential erosion of land occupied by the proposed development sites (as a proportion of the total area of islands and coastal zones in Kudat, Kota Marudu and Pitas districts). A benefit transfer method is used to estimate the benefits of the coastal protection by the proposed park. In this case, the benefit of the coastal protection is estimated by applying the “transferred” benefits from a study conducted at Indonesia’s Wakatobi National Park in Southeast Sulawesi²². The result showed that the estimated present value of indirect benefit of coastal protection is RM110.9 million using a 5 per cent discount for 25 years.

Thus, this means that the coastal protection benefits are fairly substantial, as otherwise the government would have to spend an estimated RM111 million over the next 25 years on coastal protection.

Table 25: Amount of green carbon removed for forest and plantation (t/C/ha/yr)

	Amount Carbon removed (t/C/ha/yr)	Carbon Stock (t/C/ha)
Forest	4.0	60 -150
Plantation	5.8	50-70

²² The indirect benefit of coastal protection at Indonesia’s Wakatobi National Park in Southeast Sulawesi was estimated to be worth \$1,320 annually or \$473/km² (Hargreaves-Allen, 2004).

Table 26: Amount of organic carbon burial (t/C/ha/yr)

Component	Organic Carbon Burial Ton C ha-1 y-1 (mean)
Mangrove	1.39
Estuaries	0.5

Source: Blue Carbon – The Role of Healthy Oceans in Binding Carbon, UNEP.

Table 27: Amount of Carbon removed by type of forest and vegetation in the proposed TMP (t/C/yr)

	Area (Ha)	Amount Carbon removed (t/C/yr)
Commercial Forest	11,206	44,824
Virgin Forest Reserve	27	108
Forest Reserve Class I	371	1,484
Mangrove Forest	11,505	15,992
Estuaries ²³	103,000	51,500

²³ The marine ecosystem is divided into estuarine zone and the oceanic zone. The estuarine zone represents less than 10% of the total ocean area but contains 90% of all the marine life.

5. DISCUSSION ON THE POLICY IMPLICATIONS

Table 28 provides an estimate of the economic value of the “with” and “without” project options for the proposed Tun Mustapha Park. The discounted value of the proposed park “without” project option is valued at RM1.47 billion for 25 years period. On the other hand, the present value changed to RM1.56 billion “with” project option.

Table 28: Economic Value of the “with” and “without” Project Options for the Proposed TMP

	Present Value “Without” Projects	Present Value “With” Projects
Direct Use Values (RM)		
Fisheries • The present value (PV) of the marine fish capture is valued at	561.1 million	561.1 million
Seaweed • The present value of the seaweed is estimated at	0.6 million	-
Plantation • The present value is valued at	718 million	718 million
Aquaculture (Brackish water) • The present value of brackish water aquaculture is estimated at	9.3 million	9.3 million
Tourism / Recreational • Currently extremely limited in TMP. • The present value of recreational activities for Banggi and Balambangan Island is valued at	2.9 million	2.9 million
Limestone Mining • The present value of the limestone is estimated at	-	92.2 million
Sand Mining • The present value of the sand is valued at	-	RM8.6 million
Oil Field Development	-	N/A
Indirect Use Values		
Carbon Sequestration • The present value for the forest and plantation in the proposed TMP is estimated at • The present value for mangrove forest and estuaries is valued at	28 million 34 million	23 million 34 million
Coastal Protection		

• The present value of indirect benefit of coastal protection is estimated approximately at	112 million	110.9 million
Non-Use Values		
NGO funding (WWF-Malaysia)	International support for support for TMP (as part of SSME) estimated at RM0.41 million (for 2009 only);	International support for TMP (as part of SSME) could rise significantly if TMP were to be given proper protection
Total (RM)	1.47 billion	1.56 billion

Note: PV using 5% discount rate, 25 years.

Based on these findings, the conclusion is that the proposed mining projects, particularly sand mining and limestone mining, would an estimated RM100 million in present value terms over the next 25 years, using a 5 per cent discount rate. However, such projects, which are extractive in nature, would leave behind environmental impacts that would be incompatible with its status as a marine park and undermine its claim on a biodiversity reserve. As the environmental costs have not been included, the benefits of all these projects might seem large for the moment.

The study postulates that ecotourism is the answer. If the next 5 years were spent on developing and promoting the TMP as an ecotourism destination that is consistent with the philosophy as a Marine Park, it could then attract tourists. Assuming 10,000 tourists would visit the park every year (equivalent to that of Turtle Islands Park, Sandakan), with an average length of stay of 6.25 days and an average tourist expenditure per day at RM288.47, then the net present value of tourism could be RM343.4 million for 20 years. Using these values, the ecotourism value of ecotourism would be three times greater than all the presumed benefits of mining activities. They would certainly create more jobs and bring similar if not greater investments to the proposed TMP, as tourism is known to have multiplier effects that are much greater than those of mining industries.

Thus economically it is better to conserve and protect the proposed TMP through ecotourism (RM343 million) than to proceed with the proposed limestone and silica sand mining that are only worth approximately RM100 million (see **Table 29**).

Table 29: Comparison of the Total Present Value for the proposed TMP

Present Value “Without” Projects	Present Value “With” Projects
The present value of tourism is valued at RM343.4 million.	The present value of the extractive industries is estimated at RM100.9 million.
Total present value with “ecotourism”	Total present value with “extractive industries”
RM 1.81 billion	RM 1.56 billion

Another important recommendation is that the proposed TMP alone would not be able to solve all the issues of socio-economic development. In particular, if there were high levels of unemployment, then it is important to create more job opportunities. This can be done on mainland of Sabah and the island population can be encouraged to shift there. A good example is Pulau Tioman, where a significant number of families that wanted to farm were offered plantation land in Mersing District. Such a strategy could also be implemented for the TMP as several areas are opening up in Kudat, Pitas (Paitan, for instance) for agriculture (mainly palm oil). The strategy for developing the proposed TMP should be undertaken holistically as part of the larger development for the whole of Sabah.

Indeed, Sabah will be able to develop sustainably if it pursued an environmentally friendly path, which is consistent with the State Government’s policy rather than one which is based on extractive activities which have both irreversible and long term impacts on the pristine areas of Sabah’s northern marine waters. In this regard, the proposed recommendation is an ecotourism strategy over mining (except for oil and gas for which limited information is available), and for a more holistic development strategy to ensure that the conservation values are protected for the greater good of Sabah and also the world.

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APPENDIX I: NEWS ARTICLE

THE BORNEO POST
26 JANUARY 2011
PAGE A2

CIS wants government to speed up approval for clinker plants

KOTA KINABALU: Cement Industri Sabah (CIS) Sdn Bhd is urging the state government to expedite the approval of its proposal to set up clinker plants in Sepanggar and Pulau Balambagan in Kudat respectively.

According to CIS chairman Datuk Yahya Lampong, the proposal was submitted quite sometime ago but has yet to be approved.

"We understand that there are a few problems including environment-related that need to be resolved, therefore we seek the government's consideration to expedite the process," Yahya added.

Speaking to reporters after a tithe and dividend presentation here yesterday, Yahya pointed out that once completed, the clinker plants would provide job opportunities to the local community in Sepanggar and Kudat.

The facilities would also help CIS reduce its expenses as there will not be any need to import the material, he said, adding that there will be business potential in the two areas for the local communities.

During the ceremony yesterday, CIS paid its business tithe amounting to RM100,000 to the Pusat Zakat Sabah.

It also paid dividends

amounting to RM28 million to three of its agencies namely, SEDCO, Batu Luga Sdn Bhd and Tasek Corporation Sdn Bhd.

SEDCO received RM14,988,000, Batu Luga RM5,958,000 and Tasek Corporation Sdn Bhd RM9,000,000.

Yahya said that the dividend payments were based on CIS' pre-tax profit of RM86 million for 2010 compared to RM60 million in 2009.

"We hope to make profit annually so that we can contribute more to the needy through the tithe and dividend," he said.

He added that CIS is the

biggest cement marketing company in the state with a sales return of RM440 million last year.

Currently, CIS imports about 700,000 metric tonnes of clinker a year from Peninsular Malaysia, China, Indonesia, Taiwan and Japan, he said.

While there is no problem with obtaining the supply, CIS sometimes has to bear with delay in delivery by sea because of the weather, he stressed.

He added that CIS is targeting to produce 1.5 metric tonnes of clinker this year, an increase from 1.3 metric tonnes in 2010 and 1.2 metric tonnes in 2009.



Cement Industries (Sabah) Sdn Bhd chairman Datuk Yahya Lampong (second left) presenting a mock cheque to SEDCO Group general manager Maisuri Besri (right), witnessed by SEDCO chairman Datuk Mohd Arifin Mohd Arif (second right) and Cement Industries (Sabah) Sdn Bhd CEO A.M Yusof Abdul Razak (left).

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