

CHAPTER 4: PROJECT OPTIONS

The aim of this Project is to bring development and economic benefit to the State of Johor, thus the Project Options as in Build-Out and No-Build Options were also given due consideration as required in the EIA Guidelines.

4.1 SITE OPTION

The selection of this proposed Project site is based on the economic need for converting the land to a land use with economic value by planting palm oil trees and coconut which can generate revenue to the state. As for location or site settings, the Project site is surrounded by other oil palm plantations. Therefore, the same type of plantation will be developed at this area.

The plantation will also require fertilising which could have an impact on the water quality. However, it has to be noted that currently there are other oil palm plantations in the vicinity of the Project area which could already be contributing to runoffs containing these fertilisers.

It should also be noted that the Johor State Forestry Department has issued a logging licence for PTD 4085 and PTD 4118 in year 2020. The licence number for PTD 4085 is JT 04/5/20 with a licenced area of 404.69 ha and JT 04/2/20 for PTD 4118 with a licenced area of 809.38 ha. Logging was completed for both areas.

4.2 PROJECT OPTIONS

4.2.1 Build-Out Option

The Build-Out Option would mean that the Project will materialise as planned and the potential for increasing foreign investment, economic benefits and revenue to the State can be realised.

AASSB is a Malaysian company and will adopt operational standards that are recognised and commensurate with the local requirements. The Project

implementation will ensure compliance with Malaysia's environmental and safety standards, international and best industry practices.

With best practice policies and management systems in place, it is anticipated that related risks of implementation of the Project will be as Low as Reasonably Practicable (ALARP). The “**BUILD-OUT**” option presents an overview of the impacts from the Project implementation and a comparison be made with the impacts of non-implementation of the Project.

With the adoption of high standards of environmental protection measures and strict adherence to regulatory requirements in the land clearing and plantation activities, the environmental impacts can be reduced.

4.2.2 No-Build Option

No build option means no implementation of the Project, which would also mean that the potential development to increase investment and generation of income to the state will not be materialised.

Which will affect the continuous development within the state and will consequently result in a significant loss of economic and other benefits including the following: -

- Loss of employment opportunities related to the land clearing and planting activities of the Project;
- Loss of revenue to the State Government; and
- Loss of spin-off economic/business opportunities for suppliers of materials and equipment as well as labour forces.

4.3 TECHNOLOGY OPTIONS

As for technology options of this Project, the plantation process will adopt the best available management practices within the oil palm and coconut palm plantation industry to suit the local conditions. The development of proposed oil palm plantation here can be viewed as an important venture by AASSB to support the palm oil industry of Malaysia.

The technology used will be in line with current oil palm plantation practices. Planting method will consider the shortest time possible between land clearing and planting to reduce soil exposure. Nursery plants will be purchased from the nearest sources within Johor to generate income to the locals.

Access road is necessary to allow a proper access for the logging and plantation within the site. The current access road that is constructed for an existing oil palm plantation, AA Sawit Sdn. Bhd. will be used for this Project.

For the base camp, wooden base camp for the worker has been chosen to be constructed onsite. Portable toilet facility will be provided at the base camp for approximately 40 – 50 workers. The permanent toilet facility not provided because these workers only involve during site clearing up until planting stage.

During site clearing activities and site preparation, equipment and vehicles to be used are tractor, bulldozers, excavators and lorry. Chainsaw are used for cutting the trees during clearing activities.

4.4 RAW MATERIALS OPTIONS

Raw materials options include nursery plants, cover crop, fertilizer and pesticide.

Nursery Plants

The young nursery plants will be transported in polybags. The number of plants to be planted is estimated to be approximately 60 trees/acre. Planting will be carried out manually and excavators will be used, but only when necessary. After the young tree has been planted the unused polybags will be buried onsite.

Cover Crop

Runoff and erosion are the main causes of soil degradation in humid tropics, causing the transport of surface soil layers which are rich in organic matter and nutrient. It has an impact on the decrease in soil fertility and productivity. Therefore, an effort to control the runoff and erosion is needed, for example by using physic-mechanical, chemical and vegetative methods. However, the vegetative methods are mostly chosen because it can control the runoff, erosion, and also increase the soil fertility as well. An example of vegetative methods in controlling runoff and

erosion is cover crop planting, including legume cover crop (LCC). At this time the type of LCC which is widely used in oil palm plantations is *Mucuna bracteata* (MB). Planting of legume cover crop MB in immature oil palm plantation and coconut palm are aimed to control the weeds, suppress the runoff and erosion and increase soil fertility.

MB had significantly lower bulk density, higher organic carbon content and higher soil nitrogen than other treatments.

Fertilizer and Pesticide

Other raw materials are fertilizer and pesticides. The application will be carried out as a normal maintenance practice for a healthy grows of the plant. The usual practice of fertilizer usage is by once (1) in three (3) months and fertilizing the trees will be done by stages. The most common of fertilizer used will have N: P: K of 15:15:15. The amount of each fertilizer was specified. For the first year there will be 200 g, for the 2nd year is 0.5 kg and the 3rd year will be 1 kg. The benefits of each fertilizer component is nitrogen helps plant foliage to grow strong, phosphorous helps roots and flowers grow and develop while, potassium (Potash) is important for overall plant health.

For pesticides, the recommended type is Round up which is based of Glyphosate by using mechanical pump. Round up (Glyphosate) was chosen due to its properties as a highly effective weed-killer, safe to users and minimal impact to the environment.

4.5 PLANTATION METHOD OPTIONS

In order to facilitate mechanization and to improve soil or water conservation, mechanical terrace-paths will be constructed in between palm rows along the contour. The planting options will be considered depending on the slope degree.

4.6 LAYOUT OPTIONS

The layout will consider the best drainage for the plantation and minimise alteration of existing drainage pattern. Operation of the plantation will consider the use of environmentally suitable fertilisers and pesticides to reduce impact to the environment.

As for access road within the site, it will be developed as the stages progresses to allow for proper access for the logging and plantation. Type of the off road developed will be earth road made from laterite material. Laterite is a highly weathered material, rich in secondary oxides of iron, aluminium, or both.

For drainage systems, shallow drains can reduce excess water and maintain the high groundwater table.

Oil palm development stage	No. of oil palm rows between two (2) parallel field drains
Immature (1 to 3 years old)	>8
Young mature (4 to 7 years old)	8
Fully mature (>8 years old)	4

(Source: *Guidance on Drainage Construction by MPOB, 2011*)

- Optimal water level management at 50 -70 cm (in collection drain) results in a yield potential of 25 - 30 mt FFB/ha/yr. It is important to ensure that this water level is present in all collection drains.
- A flooded field will hinder all estate operations and add to methane/nitrogen oxide emissions.
- Weirs or water control structures with over-flows should be installed at strategic locations along the main and collection drains to achieve this water-level.
- The number of weirs will depend on the topography. They are best installed at every 20 cm drop in elevation. Soil bags and logs can be used to construct such weirs.

4.7 ALIGNMENT OPTIONS

Any plantation project would maximize the land usage. The approval of this project location and its layout was obtained from *Pentadbir Tanah Mersing*.

However, the alignment of the palm oil trees is designed based on the topographic profile to prevent future soil erosion. The distance between the trees is fixed in order to acquire the maximum sunlight, air and water captures and this also aids in disease controls. The best density can be achieved with distance between plants of nine (9) feet. The best yield could also be acquired through this alignment.

4.8 OPERATION OPTIONS

The main concern during operations is the use of fertilizer and agrochemicals. Thus, the usage will be in accordance with the industry practises approved for use in the oil palm plantations in Malaysia. The proposed fertiliser type and applications are as follows:

- Fertilizer usage is once in every three months
- N:P: K of 15:15:15
- Amount of fertilizer used:
 - 0.2 kg / 1 year
 - 0.5 kg / 2 year
 - 1.0 kg / 3 year
- Type of pesticides: Round Up
- Method usage of pesticides: mechanical pump
- Frequency of pesticides used: Manufacturer recommendation

Advantage of NPK 15:15:15

NPK 15:15:15 is used for the preparation of complex mineral fertilizers NPK which is fertilizer mixtures. NPK 15:15:15 is a balanced linear formula for Nitrogen (N), Phosphorus (P) and Potassium (K). It offers all the basic nutrients to agricultural and horticultural crops which increase plant resistance to drought and diseases. NPK 15:15:15 fertilizer have fast solubility in water, with very little residue in order to assures uniform spreading on soil. Fertilizer NPK 15:15:15 is non-toxic and non-explosive. It was transported by all types of surface transport.

Types of pesticides (Roundup)

The primary active ingredient in Roundup is glyphosate acid, a fast-acting contact herbicide. Glyphosate kills weeds by blocking proteins essential to plant growth. Glyphosate is an herbicide. It is applied to the leaves of plants to kill both broadleaf plants and grasses. The sodium salt form of glyphosate is used to regulate plant growth and ripen fruit. The glyphosate contains forms acid and several salts. The sodium salt form of glyphosate is used to regulate plant growth and ripen the fruits. It is non-selective herbicide and stops a specific enzyme pathway.

The original Roundup® herbicide allowed farmers to kill almost every weed that emerged from the soil, thus decreasing the need for tilling to control weeds and suffering soil erosion in the process.

i. Oil Palm

Fertilizer Application and Agrochemical

Fertilizer and pesticide (agrochemical) application will be carried out as a normal maintenance practise for a healthy grows of the plant. The usual practice of fertilizer usage is one (1) in three (3) months and fertilizing the trees will be carried out by stages.

General Field Upkeep

It is the usual practice that after one (1) month of planting, the area needs to be inspected for mortality. Any unhealthy or dead oil palm trees need to be replaced immediately with new seedlings. In the early stages of palm development, it is important to ensure that the young root system has a minimum of competition from the surrounding vegetation with respect to water and nutrients. Clean circle weeding normally commences immediately following field planting.

Weed control in young palms is normally done manually as the use of herbicides can be dangerous. During weeding, care must be taken to avoid damaging the young root system or producing a saucer like depression around the palm. Regular monthly weeding rounds are necessary in the early stages of growth, but the intervals between rounds can be increased as the shade in the circle increases with palm development. Palm fronds must not be damaged by weeding. During weeding rounds all creepers should be removed from the palm fronds and kept clear of the weeding circle.

Harvesting

Harvesting can usually commence three (3) years after planting. Harvesting is carried out manually using chisel. The harvesting activity include cutting bunches from the tree and collecting the loose fruit which falls from harvested bunch, transporting bunches to the nearest roadside where they can be loaded into vehicles for transport to the factory. The harvesting operations should be based on

the block or plot into which the plantation has been divided. Carrying the cut fruits from the oil palm tree to the collecting point is the costliest task in the operation of harvesting.

Transportation of Fresh Fruit Bunches to Oil Mills

The common vehicles used for in-field collection of oil palm fruit bunches is the industrial dump truck. The majority of these vehicles are powered by adequately sized diesel engines making for reliability and economy and maintenance is within the scope of the average plantation owner.

All the harvested oil palm fruit bunches is expected to be sub-contract by the Project proponent to the selected contractor to collect and transport the harvested oil palm fruit bunches from the proposed Project site to the buyers.

ii. Coconut Palm

Fertilizer Application and Agrochemical

Manuring program for coconut varies from different soil type and the age. Early-stage requirement was NPK 15:15:15 about 1 kg/tree/yr. Chemical fertilizer should be applied to supplement inherent soil nutrients to provide a steady supply of balanced nutrient range required for the healthy growth of palms. The quantity and quality of the fertilizer applied, and their timing and placement, are important aspects to be considered to ensure proper realization of this input.

The manuring regimes recommended are as follows:

500g urea + 500g MOP* + 250g RP

*Note: * MOP: muriate of potash*

This assumption is based on manuring programme for 4 times a year and apply for around canopy of the tree. When manuring, avoid spreading the fertilizer to broadly. It is important that the fertilizers are applied within the root zone area. Other alternatives that many growers do is to spread some of the fertilizer over the frond heap stacked at the inter-palm area. As the frond heap traps a lot of moisture and organic nutrients, coconut roots tend to congregate beneath the heap. Thus,

applying some fertilizer onto the heap would target the coconut roots there, thereby feeding the palms more efficiently.

Coconut pests was Rhinoceros Beetle (*Oryctes rhinoceros*) that attack whole tree and controlled by cultural method and chemical (moth ball or carbofuran). Kumbang Jalur Merah (*Rhynchophorus schach*) was a secondary pest and controlled with monocrotophos or methamidiphos (5-10 mL/tree). Artona Moths (*Artona catoxantha*) attack coconut leaves that cause a 'burnt symptom' especially during dry season. Heavy rain able to remove the moths. Caterpillars (*Setora nitens*) eats coconuts leafs and use monocrotophos to control. Haidari Moths (*Hidari irava*) larvae also attack coconut. Plesipa Beetle (*Plesisipa reichei*) with yellowish in colour also attack the leaves and spray with chemical. Coconut diseases was leaf Spot (*Curvularia maculans*) attack young leafs and use Capstan to control. Other pests were Squirrel that attack the nuts and during early stage there will see Wild Boar.

General Field Upkeep

Coconuts are normally self-pruning, meaning that dead fronds and bunch stalks will dry and fall on their accord. However, it is still a good practice to remove them off the palm where they do not fall naturally, and stack them neatly on the inter-palm heap. There is great value in keeping this practice; as the dead fronds and bunch stalks break down, they actually release micronutrients back into the soil. This helps increase the soil nutrient content and biomass over time, which will further improve your coconut palm's health. In addition, such frond heaps act as moisture traps, and help provide an alternate source of moisture to palm roots. As mentioned earlier, fertilizers may also be applied to this zone, as the coconut root mass tends to congregate here, thereby ensuring that the fertilizer is targeted to the roots of the palms.

Harvesting

Harvesting can usually commence three (3) years after planting. Tender nuts are harvested when the nuts are about 7 months old. Harvesting intervals are 17-21 days per round, depending on the preferences of the buyers and the consumers. This is usually pertaining to the thickness and harness of the soft coconut flesh; at seventeen (17) days, the flesh is very jelly-like, whereas at twenty-one (21) days, there is some firmness to the flesh.

During harvesting, the harvester must remove all dried fronds and place them along the field drain edges, or cut them into smaller section and place them in the inter-palm spaces. Harvesting operation is a two-man job. One person climbs up the coconut tree using a sturdy ladder, and attaches a harvesting harness (hook and rope) onto the bunch of coconut. The person below pulls the harness taut, to give some tension onto the bunch, and the stalk of the bunch is then cut and freed from the palm by the person on top. The person below will then carefully lower the bunch of coconut onto the ground.

This method of harvesting ensures that the tender young coconuts are not bruised or damaged, since this will not only affect the appearance of the nuts, but any internal damages will cause the nuts to spoil fast. Bunches harvested this way will have a shelf life of 4-5 days if kept in chilled room.

For mature nuts, coconuts are plucked when their exocarp (skin) turns fully brown. The harvesting for Dwarfs (Kelapa Pandan) is done every thirty 36 days (10 rounds per year).

The harvesting operation consists of plucking the ripe nuts from the palms, or shaking them loose from the bunch using a long pole.