

INTEGRATION OF GROUNDNUT WITH OIL PALM IN DOUBLE AVENUE PLANTING SYSTEM

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Crop integration with oil palm is one way to maximize land productivity. To ensure oil palm growers can integrate their oil palm with other crops continuously, double avenue planting of oil palm was used. However, there is still need to identify the crops suitable for integration. In addition, a good production system for such crops also needs to be established.

Based on a study at MAAH plantation, Sepang, groundnut was found suitable for integration with oil palm. Flat to gently undulating oil palm areas are the most suitable for planting groundnut which does well in deep and well-drained soils, not prone to water-logging. A light texture and friable sandy loam is preferred since it permits easier pegging and harvesting. High yields can be obtained with good agronomic practices. Several varieties from India and Indonesia were evaluated and some found to produce high yield and were thus, recommended for integration with oil palm. Local production of groundnut is limited and most of the needs are imported. The demand is good, especially for roasting, confectionery and bakery products. Therefore, groundnut (*Figure 1*) production in oil palm is attractive.



Figure 1. A high yielding variety of groundnut suitable for integration with oil palm.

METHODOLOGY

Oil palm is planted in double avenues at spacing of 6.1 m x 9.1 m x 15.2 m with a planting density of 136 palms per hectare. The distance between palms in a row is 6.1 m, and between palms in two rows 9.1 m. The distance between palms in two avenues is 15.2 m (*Figure 2*). The groundnut is planted in this 15.2 m area. In the first year, 60% of the oil palm area can be grown with groundnut. In the second year, the cultivable area is reduced to 50% and continues to decrease in subsequent years. Two to three crops of groundnut can be planted every year depending on the weather conditions.

The planting area is cleared of bushes and debris of the previous crop. The area is ploughed three rounds to a depth of 20-30 cm. Two rounds of disc ploughing and one round of rotovation are sufficient to make the soil friable. Ground magnesium limestone (GML) is applied at 1-2 t ha⁻¹, incorporated into the soil by the ploughing at least 14 days before sowing. The seed beds are prepared using a bed former or ridger after the rotovation. The recommended bed size is 25-30 cm high and 90-100 cm wide at the top (*Figure 3*).

FIELD PLANTING

The groundnut is planted in the seed beds (*Figure 4*). This is to minimize weed and erosion problems, and for easy maintenance and harvesting. Planting is done at the onset of the rainy season for good early growth. Premium quality seeds are used and treated with fungicide such as Thiram at 1-2 g kg⁻¹ seed prior to sowing. Grooves or holes of 5-6 cm deep are made on the beds and one seed dropped per 10 cm for Spanish varieties and 15 cm for Virginia varieties. The seeds are covered firmly with soil to ensure rapid and uniform growth. Two rows can be planted in a bed, 40 cm apart, giving a density of about 102 000 plants per hectare for the Virginia types and 154 000 plants per hectare for the Spanish types.

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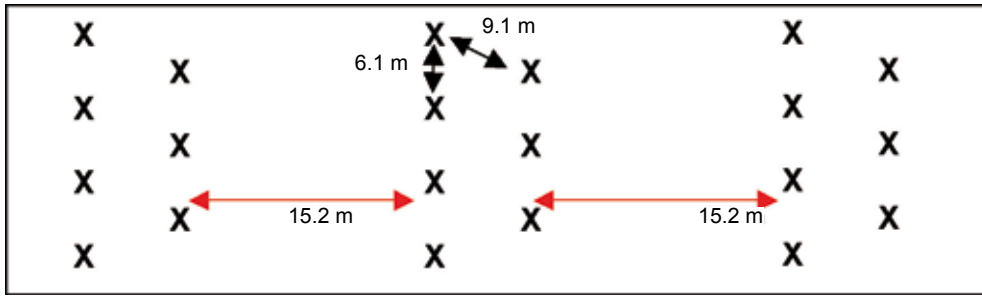


Figure 2. Double avenue planting system for oil palm.

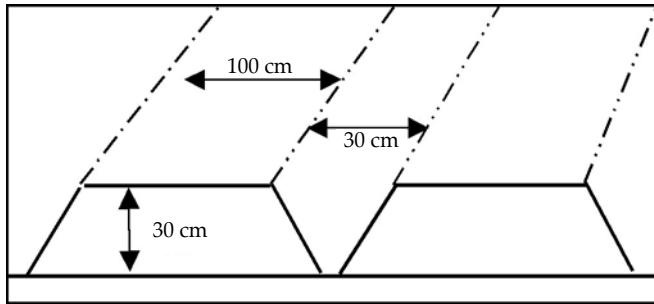


Figure 3. Seed beds for planting groundnut in oil palm.

AGRONOMIC PRACTICES

Fertilizer is applied in a band on the ridge or broadcast on the soil and worked in before sowing. The recommended rates are given in Table 1. At flowering, GML (1 t ha⁻¹) is broadcast around the pegging zones to promote pegging and pod development.



Figure 4. Three-week-old groundnut growing vigorously on seed beds between oil palm rows.

TABLE 1. RECOMMENDED FERTILIZER RATE FOR GROUNDNUT

Fertilizer	Rate (kg ha ⁻¹)
Sulphate of ammonia	170
Triple super phosphate	124
Muriate of potash	94

Weeds are controlled by spraying a pre-emergence herbicide immediately after sowing. Alachlor at 2.0 kg ha⁻¹ a.i. is recommended. Two rounds of manual weeding are sufficient for controlling subsequent weeds. Only hand weeding is done around the pegging zone to avoid damage to the nuts.

Rats are the major pest. They can be controlled by rat baiting and good field sanitation. Other pests and diseases and their controls are shown in *Table 2*.

HARVESTING

Timely harvesting is important to avoid crop loss from discolouration, germination and contamination. Normally, groundnut can be harvested 85–120 days after planting depending on the type. The Spanish types are harvested earlier than the Virginia types. The nuts are mature when the inside of the shell is spotted pale brown. Preferably, the soil is friable during harvesting to reduce pods retained in the hard soil. The nuts are detached manually or by a threshing machine, and cleaned and thoroughly dried before sale or storage.

TABLE 2. PEST AND DISEASE CONTROL FOR GROUNDNUT UNDER OIL PALM

Types	Chemical
Pest	
Pod borer	Carbofuran
Leaf eaters	Carbaryl, Deltamethrin, Trichlorofon.
Virus vectors	Dimethoate
Disease	
Early leaf spot	Benomyl,
Late leaf spot	Benomyl, Tebuconazole.
Limb rots	Tebuconazole

ECONOMIC EVALUATION

Groundnut integration with oil palm planted in double avenues can produce an average fresh nut yield of 2760 kg ha⁻¹ per crop. The nut can be sold at an average farm gate price of RM 1.20 per kg. The gross returns would be RM 3312 per hectare. The production cost is estimated at RM 1916 per hectare per crop (*Table 3*). Therefore, the gross margin is RM 1396 per hectare per crop. The return for every RM 1 invested is RM 1.73.

CONCLUSION

Integrating groundnut with oil palm is technically and economically viable. It maximizes land use, increases land productivity and generates additional income for the oil palm grower. It also contributes to soil fertility through biological nitrogen fixation by the groundnut.

TABLE 3. ESTIMATED PRODUCTION COST FOR GROUNDNUT INTEGRATED WITH OIL PALM PLANTED IN DOUBLE AVENUES (RM per hectare)

Work/input	Contract / input cost (RM)	Labour		Total cost (RM)
		Man-day	Cost (RM)	
Seed	173	-	-	173
Land preparation	390	-	-	390
Planting	-	7	140	140
Liming and fertilizer	298	4	80	378
Weeding	106	4	80	186
Pest and disease control	234	3	60	294
Harvesting	-	20	400	400
Total cost	1 201	38	760	1 916

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