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EDITORIAL

HIGH EARLY YIELDS

Many of us who work in the plantation industry and are not strictly businessmen, often do not fully appreciate or sometimes forget that the plantation business is exactly what it is - a business! And that business terms such as production cost , profitability, opportunity cost, cash flow, net present value (NPV) are not abstract concepts in college business or economics textbooks but are very much everyday computations used in the plantation business.

High crop yield is the main objective of the plantation business as it is the underlying factor in contributing towards reduction in production cost, increased profits and high return to investment. This had been highlighted in a previous issue of the Newsletter. In this issue an important constituent of this high crop yield attainment objective is emphasised i.e. **High Early Yield.** This is particularly important in our plantation business. Firstly the crops are perennial tree crops having a relatively long immature and non-productive period. Secondly, the investment or establishment costs of the crops are high. A high early yield or precocity will thus ensure reduced establishment cost and a faster return to investment. Furthermore (and it is not often appreciated) **high early yield is the key step to sustained high yields throughout the life of the crop.**

Soh, A.C.

MANAGING FOR SUPER OIL PALM NEW PLANTINGS

INTRODUCTION

The oil palm industry in Malaysia may now be considered a mature industry after its hectic expansion and activity over the past 25 years. Increasing areas are reaching the end of their economic life and will need replanting. New areas from jungle are still being developed albeit from mostly increasingly difficult areas while conversion from other crops such as rubber is still continuing but at a slower pace than in the 60's and 70's.

Vast knowledge and experience have been built-up for successful cultivation of the crop in different terrains, soils and climatic regions of the country. In view of the critical stage of replanting being reached in many older established estates, it is opportune now to discuss the important factors and practices which determine the success of a replant and new planting generally. Increased oil palm cultivation in difficult marginal areas also reinforce the need to understand the critical factors in the successful establishment and development of new oil palm plantings. Henceforth in this paper, the term 'new' plantings will cover new plantings from jungle or rubber areas etc. and oil palm replantings.

It is widely accepted in the plantation industry that reduction of the period of immaturity is highly desirable to maximise profitability. This is especially so from the rubber experience of long immaturity periods. Fortunately, the oil palm is a very precocious crop and comes into maturity at 26 months from field planting or earlier. However peak yields are realised only at 4 or more years after commencement of harvesting. Management objectives for super oil palm new plantings therefore could be redefined as to obtain the shortest period to peak cropping yields and the highest possible yield levels for the site. This will take advantage of the facts that current oil palm planting materials are generally very precocious and have very high yield potentials (as compared to commonly achieved commercial yield levels) and that the oil palm is very responsive to management inputs.

However, managers need some useful guidelines on the sort of yield levels and patterns that could be obtained realistically to measure their achievements. Simultaneously, a discussion on the key factors required and type of results expected in oil palm new plantings required to put our estates and companies at very competitive levels of achievement will highlight specific areas of achievement required.

Many basic factors and decisions at the time of planting affect the final yield levels attainable eg. choice of planting materials, lining distances and practices, soil and land clearing practices, moisture conservation etc. have effects throughout the life of the planting.

The focus on key factors for good results will therefore hopefully result in better understanding of the agronomic requirements of the oil palm by managers and direct attention possibly to development of better planting practices and improved techniques for implementation of the required inputs.

Oil Palm Yield Patterns

It is important to emphasise that the oil palm is a very responsive crop i.e. given the correct environmental and management inputs, fast growth and high early yields are readily attainable.

The range of annual yields of individual oil palm fields of all ages over a number of years in the early 1980's in a large plantation company is shown in Figure. 1.

Yields achieved varied widely for individual fields of similar ages and the average, best and worst yields at individiual ages are indicated. At Year 5, many of the fields realised FFB yields exceeding 22 t/ha/year i.e. close to the overall average yield levels for palms up to 15 years old in the Company. A significant number of areas exceeded 24 t/ha/year at 5 years old. This confirms that given the correct growing conditions and management inputs, new oil palm plantings should be able to contribute very significantly to overall estate yields by year 5.

The very highest yields of 38 to 46 t/ha/year were achieved in plantings at years 7-9, but overall, yields peaked at years 6 and 7.

HIGHLIGHTS

Early Yield Targets

The growth rate of oil palm is most rapid from the second to the fifth year after field planting. This coincides with the immature and early mature stages of its life.

The result achieved during this period determines the yield precocity of the planting and the time required to reach the peak yields. It also determines the level of peak yields attained i.e. the success of the new planting.

The actual yield pattern and peak yields achieved will largely depend on the realised growing conditions and inputs under management control and climatic conditions experienced. Allowing for satisfactory management inputs, it is possible now to draw up tentative early yield targets for young oil palm grown on different soils and different climatic regimes (AAR Newsletter, Jan. 1989)

An example of the yield target for the best type of soil i.e. deep soil areas is shown in Fig. 2 and if the yield figures are superimposed over Fig. 1 it is seen that these figures are realistic and that the target yields are exceeded by a number of fields.

Further examples of the yield targets set and actual realised yields in some recent plantings in current AAR advisory estates are shown in Fig. 3 and Fig. 4. These again indicate that some plantings achieved or even exceeded the targets, but many lagged behind.

While it is important to minimise costs and expenditure, early maturity and higher peak yields are easily justified in economic terms.

Managers and agronomists are therefore advised to plan to realise these high early yields for their new plantings. Given some luck with the weather, the yield targets will be exceeded in many situations.

Key Factors for Super New Plantings

The key factors involved to achieve the super new plantings come broadly under 3 headings:-

1. Land preparation factors.
2. Factors affecting growth of seedlings.
3. General management standards.

A number of correct vital management operations and decisions are required to achieve good results and effects. Some of these have common effets. These operations and decisions and their effects are briefly discussed.

Land preparation factors

These are factors involved in the initial clearing and prearation of the land for planting. Many of thse factors are very important as their result are irreversible and have long lasting or permanent effects on palm performance for the life of the planting. This period also is often the only or easiest opportunity to rectify basic agronomic and management problems associated with the land affecting the growth and yield of the planting. The factors are:-

1. Well planned clearing of the old crop stand/jungle.
2. Minimal damage to surface soil structure and minimal soil loss.
3. Minimal perennial weed problems.
4. Good drainage.
5. Correct lining and planting pattern.
6. Good road system.

The management operations and decisions required to achieve an excellent clearing therefore include choice, selection and achievement of the following:-

1. Well planned clearing of old stand. Appropriate technique used . Appropriate equipment chosen for terrain and location. Dry weather period selected.

2. Minimal soil structure damage and soil loss. Clearing technique and equipment used.. Weather at operations. Implementation of soil and moisture conservation techniques. Speed and success of establishment of soil covers.

3. Minimal perennial weed problems. Land clearing technique and equipment used. Speed and success of establishment of soil covers. Weeding techniques used.

4. Good drainage. Identification of problem areas. Knowledge of terrain and water courses. Adequate intensity and capacity of drains. Coordination with roads and FFB evacuation systems to be used.

5. Correct lining and planting distance. Appropriate planting distance and pattern for soil, terrain, climate and planting material. Adjustments at time of planting to correct distance and pattern. Coordination with roads and drainage systems.

6. Good road system. Adequate intensity for terrain. Adequate bearing strength and sizes for traffic. Straight roads where possible.Coordination with drainage and FFB evacuation systems.

Factors affecting growth of seedlings.

The factors considered here are those that come into play after field planting. A minimal non-productive period of the land is desired. So it is vital that nursery materials are ready on time and planting of the oil

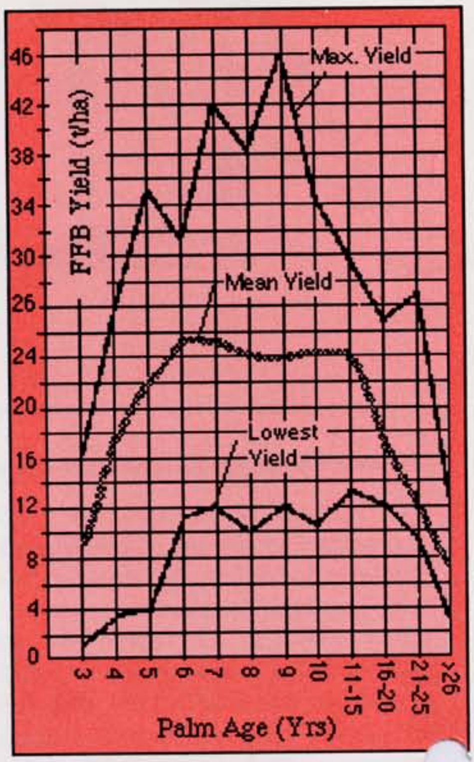

FIG. 1 : FFB YIELDS AT VARIOUS PA[illegible] AGES

palm seedlings is completed as soon as possible after land clearing is completed. The key factors to achieve are:-

1. Uniform vigorous well grown nursery seedlings.
2. Minimal transplanting shock and very quick establishment after planting in the field.
3. Uniform good growth in the field.

There is minimal inter-palm competition for light, nutrients and moisture in the first few years of growth of the oil palm and each palm should be treated individually with regard to inputs for maximal growth and high early yield. The usual stand planted is sub-optimal for maximum yields per hectare in the first few years of planting. Achieved yield per hectare nevertheless can be maximised if every single palm planted achieves its maximum yield.

The management operations and decisions required to achieve the desired results therefore are:-

1. Vigorous well grown seedlings for field planting. High quality germinated seed. Good soil medium. Adequate watering in nursery. Adequate spacing in nursery. Adequate fertilser in nursery. Minimum loss of leaves and roots through pests and diseases or scorch by fertiliser, herbicides etc.

2. Minimal transplanting shock and very quick field establishment. Vigorous well-grown seedlings. Minimal damage to seed- and moisture stress from nursery to field.

Minimal moisture stress for at least 2 months after planting. Correct shape and size of planting hole to minimize damage to ball of earth of seedling. Also to fill top soil in very poor soil areas. Good planting technique. Use empty fruit bunch (EFB) or other suitable mulch.

3. Uniform good growth in field. Quick replacement of very poor or non-yielding seedling in field with good nursery material. Easy field and seedling access. Good soil and water conservation techniques including good soil cover of lequmes. Use of EFB or other suitable mulch. Minimal damage and loss of fronds and roots by pests and diseases, herbicides, weeding, fertilisers, pruning etc. Adequate and correct nutrient inputs. Minimal weed competition in palm circles.

General management standards

Good management of the whole planting is of course the vital factor for excellent results and to minimise the role of luck in the results obtained. Managers who strive for high standards put in more effort in the planning and implementation of the work and usually achieve better results.

The mechanics of the management operations and decisions involve the following:-

1. Listing of objectives.
2. Identification and choice of techniq ues nd equipment, staff and labour etc. for the tasks.
3. Schedule of work.
4. Secure materials and mobilise staff, workers, equipment etc.
5. Organise work,labour and materials for implementation.
6. Supervision of work.
7. Keep good records and accounts.

The management objectives and operations involved have been listed earlier. However the **quality** of the operations and decisions and the final results will depend largely on the standards desired and the following inputs:-

1. A clear knowledge of the objectives and policies to be pursued with regard to the planting.
2. Understanding and knowledge of the planting practices and systems to be adopted.
3. Understanding and knowledge of the use of materials (e.g.agricultural chemi cals) and equipment to be used.
4. Knowledge of local weather patterns
5. Knowledge of area for planting especially soil and terrain factors
6. Trained staff and labour

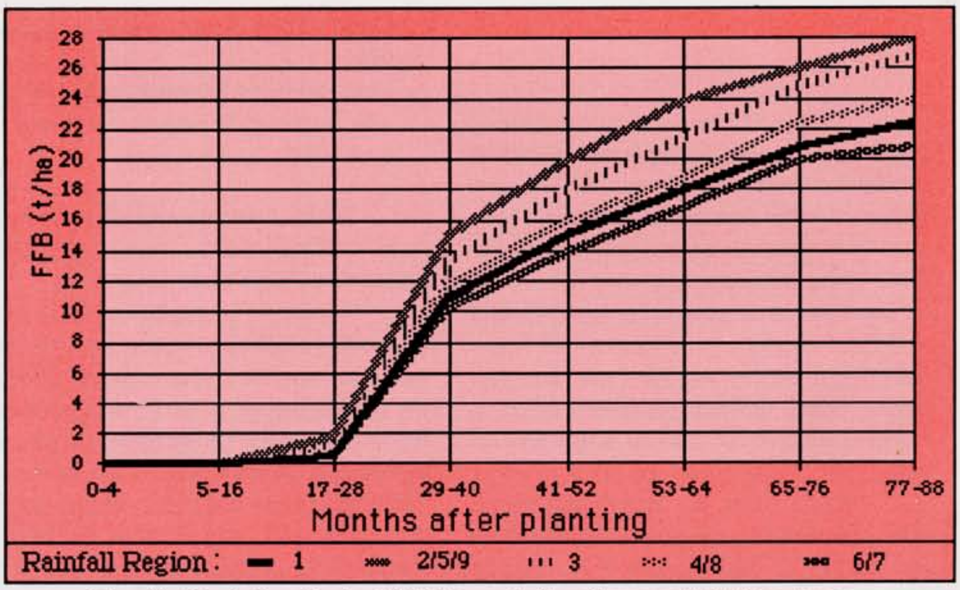

Fig. 2 : Tentative Early Yield Targets For Young Oil Palm Areas

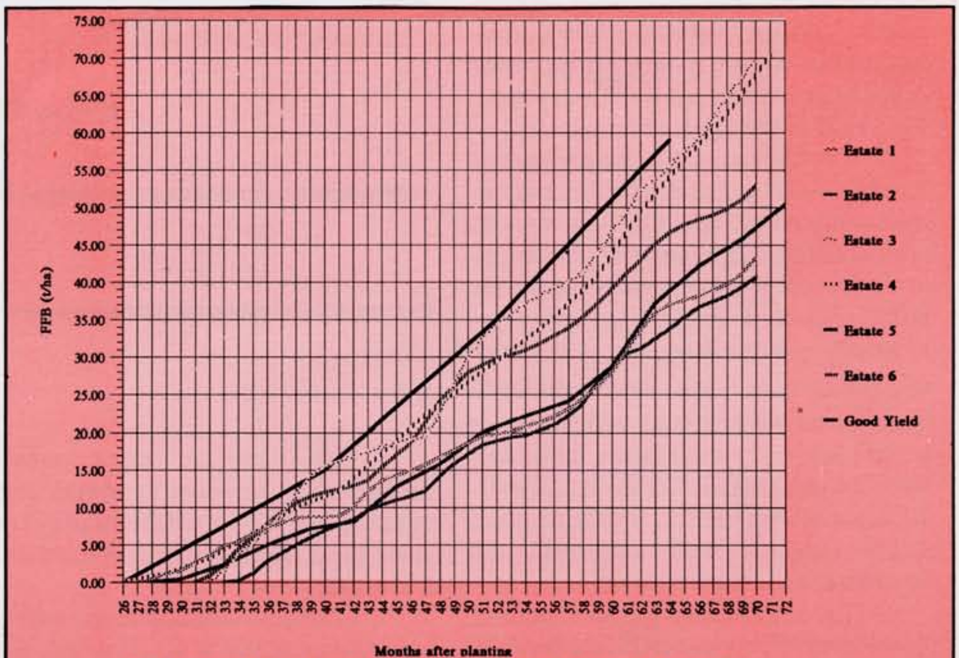

Fig. 3 CUMULATIVE FFB YIELD FOR 1983 O.P. PLANTING IN REGION 2

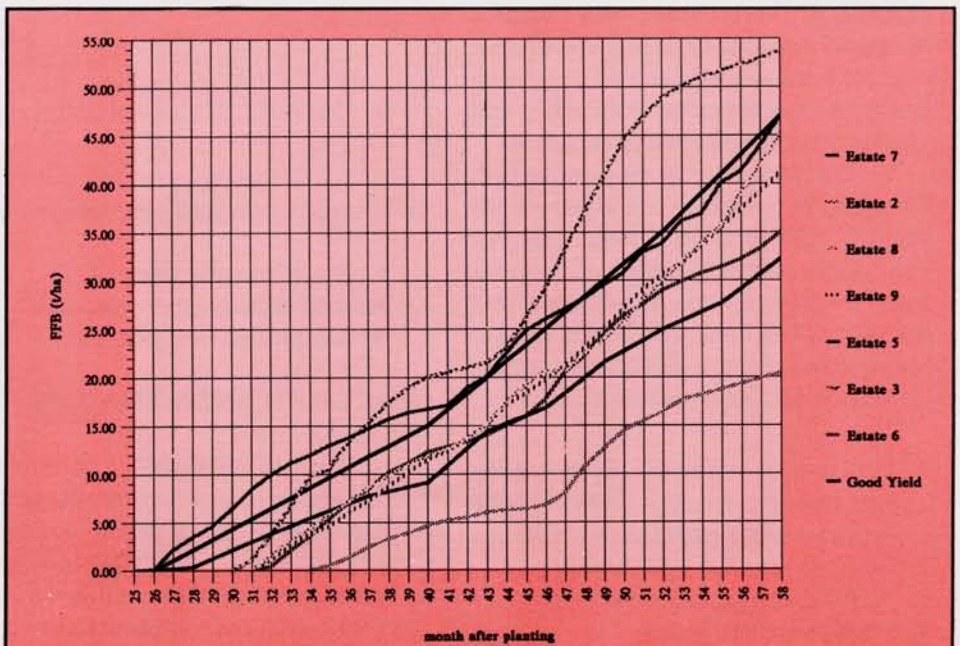

Fig. 4 CUMULATIVE FFB YIELD FOR 1984 O.P. PLANTING IN REGION 2

DISCUSSIONS AND CONCLUSIONS

The key factors involved in planning and achievement of the super new plantings of oil palm discussed are largely well-known and practised by experienced planters. However their significance and role in achievement of the desired results may not always be appreciated. Highlighting these factors and their key roles in this paper will hopefully focus further attention on them and ensure that a definite conscious effort is made to achieve the desired action and results.

While often the individual operations and decisions are simple, the whole art and science of management is required to achieve correct and timely implementation of all the vital operations to achieve the interactions and play of factors in the complex agricultural system to achieve excellent growth and yield results. Wrong timing or implementation of just a single key factor may result in disastrous consequences.

It is appreciated that the current and future availability of agricultural labour scenario is disconcerting or discouraging with consequent increasing pressure on management to accomplish even routine tasks. This is likely to be the main challenge to management and the research workers in the industry in Malaysia in future. Identification and focusing on the key tasks and factors to accomplish well should be the initial first steps towards overcoming these problems. High labour costs together with highly paid, qualified and motivated management must be inevitable for the industry.

The survival of the high cost industry in Malaysia will depend on the productivity of its plantations and the first steps must be taken now with super new plantings and replantings. This is the only way ahead for adequate returns on the heavy investments required in the industry and will also ensure that future developments in breeding and cloning oil palm can be fully exploited.

The final proof of the pudding is in the eating. The tentative yield targets whicch could be refined allow a more objective basis of assessment at maturity. However while the palms are still growing and have not yet reached final yield peaks, the following characteristics should all be present for areas judged as super new plantings:-

1. Full stand of uniformly grown, healthy and highly productive palms, evenly spaced at specified pattern and distance.
2. Minimal potential P&D problems
3. Minimal non-productive period
4. High precocious yields
5. Good soil and water conservation measures
6. Good layout of roads and drainage system
7. Non-excessive expenditure for locality soil, terrain and climatic conditions encountered.

These characteristics allow us therefore to define results achieved and assess standards of work more objectively.

Finally, it is emphasised that management is all about overcoming problems and unfavourable 'circumstances' and taking full advantage of good circumstances. Knowledge, good preparation, striving for high standards and objective assessment of individual results and shortcomings for improvement will help achieve the desired results of the shortest period to peak cropping yields in all new plantings and attainment of the highest possible yields for the areas.

Chew, P.S.

REDUCTION IN PERIOD OF IMMATURITY OF RUBBER

INTRODUCTION

Rubber has the longest immature phase among the major plantation crops, requiring 5-6 years to attain maturity compared to 2-2 1/2 years for oil palm and about 2 years for cocoa.

In order to enhance returns from investment in rubber, it would be advisable and logical to direct efforts to reduce this long immature period.

METHODS OF REDUCING IMMATURITY PERIOD

These involve principally the following:-

1. Choice of planting material
2. Recommended nursery practices
3. Recommended field practices

CHOICE OF PLANTING MATERIAL

Since the early 1960's, various attempts have been made to reduce the period of immaturity by using various forms of planting material. Tinley (1962) improved the green budding technique by Hurov (1960) for large scale implementation and obtained three to four months reduction in immature growth from field planting/green budding as compared to field planting/brown budding.

Tinley also showed that a saving of about 6 to 8 months of immature growth could be achieved when budded materials were planted at the two whorl stage as compared to the former field planting/green budding method. Other approaches made at the same time were the use of budded stumps and soil core transplanting of budded stumps.

Reports by several workers subsequently (Shepherd *et al.* 1967, Sivanadyan *et al.* 1973) have shown that advanced planting material (APM) such as large buddings in polybags and stumped buddings could reduce immaturity period significantly.

The range of popular planting materials currently used are:-

a. conventional two whorl buddings
b. young buddings
c. stumped buddings (bare rooted).
d. 'core' stumps (with active root mass).

The choice of planting any of these materials depends on the size of the planting, local conditions eg. rainfall, terrain, availability of labour etc. In general, conventional buddings and young buddings are employed for plantings larger than 20 hectares and also on difficult terrain while stumped buddings and 'core' stumps are used for smaller plantings and gentler terrain. A higher establishment success is expected to be obtained from 'core' stumps with their active root mass than from bare-rooted stumped buddings.

Estimated years of immaturity of these materials for clone PB260 are:-

a. conventional two whorl buddings : 5 - 5 1/2 yrs
b. young buddings : 5 - 5 1/2 yrs
c. stumped buddings (bare rooted) : 4 1/4 - 4 3/4 yrs
d. 'core' stumps (with active root mass) : 4 - 4 1/2 yrs

RECOMMENDED NURSERY PRACTICES

Correct nursery practices are a prerequisite to good vigour of rootstocks and consequently of the budded material. These include :

a. correct choice of rootstocks
b. leaf disease control
c. use of soluble phosphate

a. Rootstocks

Scion growth and yield can be enhanced by the correct choice of rootstocks. Recommended rootstocks are:-
PB5/51, RRIM623, PBIG, GT1, RRIM605

Cumulative yield over 10 years of clone RRIM600 was about 20% higher when PB5/51 was used as rootstock compared with RRIM600 rootstock.

b. Leaf disease control

Helminthosporium leaf spot (Bird's Eye Spot) is the most common leaf disease in nurseries while *Gloeosporium* and *Oidium* could be problematic. Disease infection weakens growth and retards development of both seedlings and buddings. Repeated attacks may also result in defoliation of growing shoots.

Control of infection may be affected by spraying twice weekly with Dithane M-45 and Daconil when new leaves are emerging.

c. Use of soluble phosphate

Soluble phosphate has been found to promote early growth of rubber as shown in Table 1. The application of soluble phosphate may be in the form of foliar spray,slurry or slow release fertilisers.

At the nursery stage,culling is very important and stringent culling at both seedlings and buddings must be carried out to ensure only the most vigorous seedlings and buddings are retained for eventual field planting.

RECOMMENDED FIELD PRATICES

The recommended field practices are:-

a. Planting leguminous covers
b. Mulching
c. Branch induction
d. Controlled pruning

a. Leguminous covers

Legumes improve both soil physical and chemical properties and in the process enhance tree growth and latex production.

Pushparajah and Chellapah (1960) obtained more vigorous trees equivalent to 6 to 9 months growth advantage from leguminous plots as compared to grass plots. Mainstone (1969) also reported 20% higher cumulative yield over a 10 year period from trees with a legume policy compared with trees with natural covers.

b. Mulching

Early rubber growth can be improved by mulching. Sivanadyan *et al.*(1973) estimated that application of lallang mulch to stumped buddings improved growth by three months.

The beneficial effect of mulch would be felt more significantly in lateritic soil areas coupled with low rainfall. Where empty oil palm bunches are readily available, their use as mulch should be considered.

c. Branch induction

Improvement in leaf area through branch induction enhances early growth as illustrated in Table 2.

Branch induction was introduced by the RRIM (1974) initially using the double blade ring- cut device.It was superceded by the leaf folding method in 1976 which does not require any special equipment.

d. Controlled pruning

Leong and Yoon (1983) found that low and controlled pruning enhanced girthing increased dry matter production,increased canopy density and also produced better branching habits. This has become a more popular method of increasing leaf area during early growth than branch induction as it also produces a more balanced tree eliminating the need to prop up trees as is sometimes necessary in branch induction.

Table 1 : Effect of soluble phosphate on polybag seedling (Sivanadyan, 1973)

Phosphate fertiliser	Girth at 5 months (cm)
CIRP	3.0
Soluble phosphate	3.2

Table 2 : Effect of branch induction on girthing (cm) of RRIM600 (Yoon, 1976).

Treatment	Months after branch induction			
	0	12	24	36
Control	6.8	14.6	25.7	34.5
Branch induction	6.4	15.6	27.2	36.4
Net gain		+1.0	+1.5	+1.9

Table 3 : Estimated future profits and savings expressed in terms of net present value (NPV)per ha at $2.50/kg rubber and yield level of 1900 kg/ha

Item	Immature Period		
	4 Years	5 Years	6 Years
Future profits	6,550	5,800	5,150
Upkeep and GC Savings ($)	7,250	6,150	5,100
Total NPV	700	350	–
Differences from 6 years ($)	2,100	1,000	–

ECONOMICS OF REDUCING IMMATURE PERIOD

The economic importance of a reduced immature period is highlighted in Table 3. Based on a rubber price of $2.50/kg, a study undertaken by HMPB in 1983 showed that at a yield level of 1900 kg/ha/yr, reduction in the immaturity period by one or two years could give a potential increase of $1000/- or $2100/- in net present value per hectare.

GENERAL

Among the methods discussed, the use of 'core' stumps is likely to contribute most towards achieving a significant reduction in immaturity period. However all the various techniques discussed should be carried out to obtain the best possible growth during immaturity.

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Chan, W.H.

THE ECONOMICS OF REDUCTION IN IMMATURITY PERIOD AND HIGH EARLY YIELD IN COCOA

Every planter knows that by reducing the immature period of a planting and achieving high early yield, one will make more profits.

For the plantation crops like oil palm, rubber and cocoa, the required technical know how to achieve these objectives are readily available. However, the availability of the technical know-how alone cannot guarantee success in most cases. Good results can only be achieved when all the production factors are applied correctly and efficiently (in the absence of natural calamities-of course).

In brief, we need favourable weather (which is beyond our control), good support from the head office and good estate managers, staff and workers to produce the desired results.

The subject of "how" has been discussed in great detail in previous AAR publications and will not be discussed here. The main aim of this article is to quantify the benefits of the reduction in immaturity period (RIP) and high early yield (HEY).

Table 1 : Effects of reduction in immaturity period (RIP) and high early yield (HEY)

		A good planting with RIP and HEY		A poorer planting with delayed maturity & poor early yield	
Year of production	Discount(1) factor	Yield profile	Present(2) yield	Yield profile	Present(2) yield
0	1.0000	1000	1000	0	0
1	0.9090	1250	1136	500	455
2	0.8264	1500	1240	750	620
3	0.7513	1750	1315	1000	751
4	0.6830	1750	1195	1250	854
5	0.6209	1750	1087	1500	931
6	0.5645	1750	988	1750	988
7	0.5132	1750	898	1750	898
8	0.4665	1750	816	1750	816
9	0.4241	1750	742	1750	742
10	0.3855	1750	675	1750	675
11	0.3505	1750	613	1750	613
12	0.3186	1750	558	1750	558
13	0.2897	1750	507	1750	507
14	0.2633	1750	461	1750	461
15	0.2394	1750	359	1750	359
16	0.2176	1500	326	1500	326
17	0.1987	1500	297	1500	297
18	0.1799	1500	270	1500	270
19	0.1635	1500	245	1500	245
20	0.1486	1250	186	1250	186
21	0.1351	1250	169	1250	169
22	0.1228	1250	154	1250	154
23	0.1117	1250	140	1250	140
24	0.1015	1250	127	1250	127
Total			15504		12142

Key :

1) Discount factor = $1/(1+r)^n$ Where, r = discount rate taken as 10%, n = years

2) Present yield = yield profile x discount factor

To simplify matters, the cost of inputs and commodity prices have been excluded. Only the crop yield will be considered.

For valid comparison of crop yields between plantings over a period of time, it is necessary to express the yield on a common basis. A simple way is by the use of *present yield* (PY) method which is defined as the yield obtained by discounting separately for each year, the future yield of a planting at a fixed, predetermined discount rate. The PY's obtained for the economic life of the planting are added to obtain the project PY as follows:-

$$PY = Y0 + (Y1 \times a1) + (Y2 \times a2) + ..(Yi \times ai) + ..(Yn \times an)$$

where,

Yi = Yield in years 0, 1, 2, 3, ..i, ..n

ai = discount factor in years 1, 2, 3, ..i, ..n, appropriate to the discount rate applied. A discount rate of 10% equivalent to the cost of funds (interest rate) has been adopted for this study.

The relevant discount factor was c[illegible]puted using the following formula and tabulated in Table 1.

Discount factor = $1/(1+r)^n$

where,

r = discount rate taken as 0.1 (or 10%)

n = years.

From Table 1, it is obvious that crop yield in the future if converted to *present yield* will diminish proportionately with the lapse of time. For example, yield in 10 years from now if converted to *present yield* will have to be multiplied by the discount factor 0.3855. This means that a yield of 1000 kg in 10 years' time is only worth 386 kg in the present term. Similarly, 386 kg harvested at present is worth 1000 kg in 10 years' time.

To illustrate the importance of RIP [illegible]d HEY let us consider the following two hypot[illegible]cal cases.

1. A good planting having RIP and HEY.

2. A poorer planting with delayed maturity (1 year delay) and poorer early yield. The yield eventually caught up at the 6th year. This is an optimistic assumption as a poor starter is seldom able to catch up with a good planting.

The yield profiles and the *present yields* discounted at 10% are tabulated in Table 1 attached.

Over the duration reviewed, the good planting outyielded the poorer planting by 3362 kg/ha (expressed as *present yield*) or by about 28% (15504 kg versus 12142 kg), all arising from yield differences in the first 6 years.

It is certainly sensible for us to strive for RIP and HEY!

Ooi, L.H.

HIGHLIGHTS OF RUBBER GROWERSCONFERENCE 1989

The RGC '89 was held on 21-23 August 1989 in Malacca. The papers of relevance to rubber agronomy are clonal evaluation, nursery planting materials, crop protection-new diseases, new fungicides formulation for black stripe, new range of herbicides, exploitation and nutrition i.e. comparison of N (nitrogen) sources for rubber. The other papers touched on rubber planting in non-traditional regions of India and Thailand, waste utilisation, d.r.c. (dry rubber content) determination by microwave technique, rubber creping machine and packaging.

Highlights of agronomic issues of interest are as follows:-

1. Clonal evaluation:

Very preliminary yield results (two years of tapping) for promising new clones were reported. Promising RRIM 900s' clones outyielded RRIM600 by 41-87%, while Promotional Plot Clones outyielded RRIM600 by 68-113%

Commercial clonal performance reported by AAR and Ebor researchers confirmed high yield precocity for PB260 and PB235. These clones were found to outyield RRIM600 by 25% and 20% respectively over the first 13 years from planting.

2. Nursery planting material :

A joint RRIM-TPSB paper on further refinement of young budding technique recommended retention of snag leaves to minimise dieback and enchance vigour by 50%.

AAR-TPSB paper on commercial planting of young buddings dwelt on the experience in practical aspects of raising young seedlings and reported on their satisfactory growth over large hectarage, and advantages in cost and field uniformity.

The paper by RRIM on core-stump production emphasised the importance of obtaining active root mass within the polybag soil core through appropriate choice of slow release fertiliser. Other aspects such as spacing, bag sizes and burial of polybags were discussed.

3. Crop protection:

Two new leaf diseases of rubber were threatening the Malaysian rubber industry.*Corynespora* and *Fusicoccum* could defoliate RRIM600, with the latter being more clone-specific on RRIM600. Control measures were still not forthcoming.

A new generation of herbicides in combination with *Glyphosate* were found to provide good weed control. *Solo* mistblowing was a promising technique. It was stated that 'cost-saving' by delaying spraying could be false economy. It is better to re-apply herbicides on response basis i.e. as soon as weed regeneration is about 50%.

Black stripe panel disease could be effectively controlled by less frequent application of fungicide (*Difolatan* or *Fruvit* or *Sandofan* or *Ridomil*) and methyl cellulose as adjuvant.

4. Exploitation

The results of short-term trial finding on periodic tapping (tapping rest + use of *ethrel*) was found to be promising.

Stimulation trials on virgin panels of RRIM600 and GT1 by Ebor showed good response to booster dose of single application of 10% *ethrel* (at opening tree or change of panel). Intensive stimulation resulted in yield decline below the control after the 4th year of application.

Extended task size studies by Chemara and RRIM gave rather illogical findings or dealt with matters of academic interest only.

Trial data on effects of exploitation systems on tree dryness generally confirmed increasing tree dryness with intensive exploitation.

Papers on Ebor Eaves, RRIMGUD and Motoray's tapping tool dealt with favourable findings from their respective applications.

5. Nutrition

RRIM trials on various N sources for rubber showed no superiority of ammonium sulphate over other N sources. It was claimed that urea could be used successfully and can be applied directly on the soil surface.

Our main impression of the value of the conference is in the development and refinement of the nursery technique to produce better planting material for better standard of replanting and the shortening of immaturity period. For probable long term benefits, RRIM recommended some promising high yielders for the industry to evaluate on a commercial scale. *Corynespora* and *Fusicoccum* leaf diseases are new threats to the rubber industry and all concerned should avoid planting susceptible clones since suitable control measures are not available as yet.

Ong, T.S.

MCGC-Malaysian Cocoa Board Workshop on Cocoa Agricultural Research

The workshop was held on 25th and 26th July '89 in K.L. A total of 18 papers were presented. They comprised 5 papers each on breeding/ selection,pests/diseases and agronomy/nutrition and 3 papers on yield trends. AAR collaborated with other researchers in three of the papers.

Highlights of the papers presented are summarised below:-

Breeding / Selection

The two papers on germplasm resources reported that there are over 500 FO and 1500FI clones in Department of Agriculture (DOA) Sabah's genebank. MARDI also has 304 FO and over 1000 FI clones.

These collections are being characterised and their commercial/breeding values evaluated.

The private sector organisations through the UPAM and MCGC facilitated joint importation schemes had also introduced over 200 F0 clones from U.K. and USA and are now in a good position to produce new hybrids for evaluation.

The paper on the progress in seedling cocoa improvement by Ooi *et.al.* showed that while much improvement in yield was achieved with the introduction of hybrids in 1960's and 1970's, there was virtually no further improvement in 1980's. This was mainly due to the lack of breeding effort.

Fortunately, with the availability of more germplasm resources and more active participation by the private agency research organisations, cocoa breeding had been revitalised. A large number of new progeny trials has since been laid down particularly by the private sector research organisations.

Judging from the very impressive early results reported by Ang and Lim, it is anticipated that some new hybrids will be available for commercial planting in the near future. The mean yield for three of their progeny trials planted in 1986 at 33 months after field planting was about 2 t/ha.

The paper on commercial cocoa clones by Chong *et al.* indicated that clones were superior to seedling hybrids. This is not surprising as no improvement was made in the yield of seedling hybrids since the release of DOA Sabah Series II hybrids in the 1970's.

Pests and diseases

Under the P&D section, VSD, CPB, *Helopeltis, Phytophthora* pod rot and debilitating insect pests were discussed.

Musa and Bong discussed the different control methods for the different stages of growth of cocoa. These control methods are now already well-known. Our experience is that the best way to minimise the VSD problem is to plant VSD tolerant materials and it is only worth controlling the disease in the nursery and during the immature stage.

Tey and Bong reported that crop loss to *Phytophthora* pod rot in Malaysia has been relatively low. However, the disease is potentially very damaging. It is therefore important that good cultural practices (the most cost-effective control method in Malaysia currently) are imposed at all times to minimise crop loss to the disease.

Tay *et al.* provided a comprehensive account of CPB research and management in Malaysia. The need to develop new control methods was emphasised as the current control method depended too heavily on synthetic pyrethroids. Extensive use of insecticides particularly synthetic pyrethroids had probably contributed to the higher incidence of debilitating pests particularly the *Empoasca* cocoa plant hopper reported in Sabah recently.

Salman and Teh reviewed the debilitating insect pests of cocoa and provided a good account of the life cycles and control methods for the following pests:-

Coleopteran pests

1) stem borer, *Cerosterna sp.*
2) Iridescent beetle, *Rhyparida iridipennis*
3) *Hypomeces squamosus*
4) Leaf roller, *Paroplapoderus basalis*
5) Cockchafer, *Exopholis hypoleuca*

Lepidopteran pests

1) Branch borer, *Zuezera coffeae*
2) Ring bark borer, *Endoclyta hosei*
3) Blue coppers, *Nacaduba normani*

Hemipteran pests

1) Mosquito bug, *Helopeltis spp.*
2) Bee bug, *Platygomiriodes apiformis*

Homopteran pests

1) Cocoa leaf hopper, *Empoasca*

Acarina pests

1) Scarlet tea mite, *Brevipalpus phoenicis*

The long list of debilitating pests reported clearly suggests that good pest control is a prerequisite if good yields are to be achieved.

Ho *et al.* tackled the *Helopeltis* research and management in cocoa in great detail. Currently, the standard chemical for the control of this pest is still *Gamma-HCH* and mistblowing is recommended.

Agronomy and nutrition

Ling reported the nutritional requirements of cocoa and emphasised that adequate and discriminate fertiliser applicatons are required for sustained high yield of cocoa.

The shade management in mature cocoa was discussed by Chan *et.al.* in the form of a survey in commercial plantings. Obviously, the shade management practices varied greatly The current popular trend is for minimum shade. Our experience is that different shade regimes are required for different soils and climates.

The two papers on planting densities and patterns indicated that there is probably some merits in high density planting but more work and results are still required before such systems could be implemented on commercial scale. Under conventional management practices, planting density of about 1000/ha is a good compromise.

Chung *et al.* reported that some progress has been achieved in the mechanization of pesticide application. With the ever increasing cost of labour and labour shortage, the need to mechanise is great.

The two papers on irrigation discussed the use of drip irrigation in cocoa. The merits for irrigation on commercial scale is rather doubtful at present.

Yield trends

The three papers on yield trends provided a great deal of information on the yield and yield trends of cocoa in Sabah and Peninsular Malaysia. These information are now being monitored closely in all our cocoa estates for the purpose of determining the input requirements and timing of application of inputs and also for management purposes.

AAR News

Staff Changes

Mohd. Mat Min, research officer specialising in crop protection, resigned from AAR in Sept 1989 to return to his kampung to look after his own properties. Mohd. was responsible for drawing up many of our estate crop protection policies currently practised and for the successful control of many P&D outbreaks in our estates e.g. bagworm outbreak in KDC. AAR will miss the valuable services and company of Mohd. and wish him all the best in his new endeavors.

Dr. Kee Khan Kiang, became the proud father of a baby girl in July.

Three new officers have since joined the organisation.

Quah Yin Thye, B. Forestry Sc., Dip. B. Adm. (Canterbury, N.Z.) joined as research officer in oil palm agronomy and advisory in June. He was formerly an agronomist in Lam Soon Management.

Samsudin Amit, M.S. (Illinois) majoring in entomology, joined AAR in July as a trainee research officer and will specialise in crop protection.

Tey Seng Heng, B. Agr. Sc. (UPM), also joined AAR in June as a trainee research officer in oil palm agronomy and advisory.

LIES (A Fairy Tale)

Once upon a time, a fine young man lived on a beautiful farm. He was ambitious, worked hard, and wanted to succeed.

One day his father called him and said, "Son, you're working too hard. You're out of date. There is a new philosophy — a new approach to life today. It is known as **Low Input Ensures Success, or LIES**. Try less input."

The young man went off to college. He decided to try "low input". He studied a little, but less than his classmates. It was great; but to his amazement he flunked out of school!

He got a job as saleman. Again, "low input" was his creed. He became the poorest saleman in the company. So, he quit and decided to go back to the farm.

There he followed the "low input" completely. He reduced all his inputs — lime, fertiliser, pesticides and, finally, labor — and waited for the success he had been promised.

As he sat and pondered his fate, he said to himself, "Is it possible that my own father misunderstood the new approach? Perhaps it was 'Proper Input Ensures Success (PIES).' "

This fairy tale might have a happier ending if it had been **PIES** instead of **LIES.**

— Better Crops, J. Fielding Reed