DEPARTMENT OF AGRICULTURE SARAWAK

10th MALAYSIA PLAN (2011-2015)

FRUITS INDUSTRY DEVELOPMENT PROGRAMME

MECHANICS

TABLE OF CONTENTS

SECTION VI – AGRICULTURAL LAND RESOURCE IN SARAWAK

SECTION VII – SUPERVISION, MONITORING AND REPORTING

LIST OF APPENDICES

1Oth MP CROP DEVELOPMENT PROGRAMME MECHANICS

Name of Programme : Fruit Industry Development Programme

SECTION I: - BACKGROUND

1.0 Current Status

The fruit industry in Sarawak is characterised by unorganised production systems with hardly any value-added processing. Production is targeted mostly for the domestic fresh fruit market. Farm production is inconsistent while yields and fruit quality are generally low. Most plantings are undertaken by small holder farmers with average farm size of 0.4 hectare.

The export value of fruits and fruit products in 2008 was RM 196,159 while the import value was RM 59,201,137. The main fruits imported include mandarin orange, apple, grapes and dates in the form of fresh and preserved fruits.

In the 10th Malaysia Plan, the focus is on the production of fruits to meet the demand for fresh and processed tropical fruits in both domestic and international markets. Promoting marketing of fruit products such as minimally processed fruits, convenience food, and frozen for general and niche markets will be given priority.

The establishment of efficient supply chain in order to be more competitive in the export market will be given emphasis. Priority will be given to fruits which are popular locally and those with potentials for export markets. These fruits include rambutan (anak sekolah), sweet orange/honey orange (citrus), .banana, dabai, longan, honey pomelo, papaya, pineapple, durian and miscellaneous fruits such as soursop, melon and petai.

1.1 Implementation Problem and Constraints :-

a) The DOA has to depend on private nurseries for the supply of fruit tree planting materials. However it is not always possible to guarantee the quality in term of clonal/varietal authenticity.

b) Many farmers are still too dependent on scheme assistance. It is an uphill task for the Department to persuade farmers to use their own resources to top-up the subsidy assistance especially during times of low prices.

c) Some of DOA's field staff are still not fully competent in the technical aspects of fruit cultivation. This is due to the wide range of fruits involved in the programme.

d) Farmers face difficulty marketing seasonal fruit as the local market is small and limited opportunities for downstream processing or for the export market.

2.0 Prospects For Development

Sarawak has abundant land, rainfall and sunshine for fruit production. A wide range of tropical fruits can be planted in many parts of the State. Among the local fruits that are already widely planted are durian, mango, rambutan, langsat, citrus, jack fruit, cempedak, guava, star fruit, sour sop, papaya, pineapple, longan and banana. A variety of indigenous fruits such as durian kuning, durian nyekak, dabai and isau are already popular with the locals.

FAMA has indentified five (5) commercially potential fruits namely pineapple, papaya, melon, starfruit and mango (chok anan) for export market. For the domestic market, per capita consumption is expected increase to 65 kg in the year 2010 from 50 kg in 1995. For the export market there is good potential in the processed fruit industry, especially in minimally processed fruits, health foods, convenience foods, frozen food, and semi-processed food products.

3.0. Development Policies

The policies for the fruit industry as contained in the NAP3 (1998 – 2010) document will be adopted by the State. However, priority will be given to the following aspects :-

a) Production will be to meet the demand for fresh and processed tropical fruits in both the international and domestic markets.

b) Focusing on selected common fruits such as citrus, durian, jack fruit, rambutan, langsat, cempedak, guava, star fruit, banana, papaya, longan, melon and indigenous fruits such as durian nyekak, durian kuning, and dabai.

c) Emphasis will be given to HRD to generate highly skilled and innovative manpower in new and emerging science such as food, genetic engineering and biotechnology.

4.0. DOA Development Objectives in 10th MP

The DOA development objectives for fruit industry in the 10thMP are :-

i) To promote commercial planting of fruits to meet the demand for quality and safe ***fresh fruits*** in both domestic and international markets.

ii) To develop and support the ***fruit processing*** industry to meet the demand for processed tropical fruits in both local and international market.

iii) To increase the incomes of the fruit producers through their involvement in fruit production, processing and marketing.

5.0. Broad Development Strategies in 10th MP

i) To support the food production industry in increasing local food production and reducing the food trade deficit.

ii) To develop agriculture entrepreneurs within the smallholder sector as a means of commercializing smallholder agriculture.

iii) To increase rural farm incomes to a level at least above the poverty line.

iv) To support the sustained growth of the agriculture sector for increased economic growth.

v) To facilitate the participation of private sector in agriculture production

vi) To develop skilled and knowledgeable human resource within the agriculture sector.

vii) To promote the conservation and sustainable use of natural resources for agriculture production.

viii) To promote the adoption of quality assurance systems in agriculture production.

5.1. Increasing Efficiency and Productivity

i) Promoting the development of commercial fruit farms such as Fruit Mini estates, Entrepreneur Fruit Farms, and Group Planting system ton ensure consistent supply of quality produce.

ii) Establishing Fruit Collecting Centres to facilitate post-harvest handling and increasing marketing efficiency.

5.2. Strengthening Competitiveness

i) Focusing on selected fruit types which have good market potential including common fruits such as citrus, durian, jack fruit, rambutan, langsat, cempedak, guava, star fruit, banana, papaya, longan, melon and indigenous fruits such as durian nyekak, durian kuning, and dabai.

ii) Intensifying R&D on the critical aspects of the selected fruit types, covering production, processing and product development.

iii) Supporting the private sector in the production of quality planting materials for the selected fruit types ; (quality source bush, mother plants).

5.3. Strengthening institutional support by

i) Providing sufficient funding for R&D to generate technologies for the fruit industry and

ii) Strengthening the extension and communication programme of the fruit industry in order to provide quality advisory services and consultancies.

SECTION II : PROGRAMME COMPONENTS

The components of the fruit industry development programme consists of

i) New Planting ,
ii) Rehabilitation Programme,
iii) Continuation Projects,
iv) Fruit Collection Centre,
v) Institutional Support Services and
vi) Implementation, Monitoring and Evaluation

1.0 New Planting

Under the ***new planting***, assistance will be provided for land preparation and provision of farm inputs such as fertilizer, pesticides and farm tools. The assistance for fruits in general is valued at RM9,000.00 per hectare over a 3 - year period. For dabai, the value is RM12,500.00 per hectare spread over three (3) years. The basis for cost estimates are shown in **Table 1 and 2.** The implementation approach will be through,

i) Group planting and

ii) Entrepreneur Fruit Farms

This component will provide assistance for farmers to plant commercial, indigenous and other fruit crops to cater for both domestic and export markets. The priority fruits are:

- Export - Papaya, rambutan, honey pamelo, honey mandarin, and banana
- Domestic - durian, longan, sweet orange and nangka,
- Indigenous fruit: Dabai - for niche markets for domestic and export markets
- Other fruits - guava, soursop, petai melons, etc. (domestic)

1.1. Group Planting

The target group could be in the form of block or cluster planting. The participants will manage their own farms with the advice and supervision by DOA staff.

Participants are encouraged to market their farm produces in group basis through the collection centres setup by DOA or through PPK. The participants shall also be encouraged to register as “Ladang Kontrak “ participant and signed the Forward Agreements with FAMA.

a) **Selection Criteria**

The participants must fulfill the following criteria:-

i) Owned at least the minimum prescribed size of land holding within a designated block or "cluster-group" which have been identified for group planting.
ii) Have some experience in fruit farming.
ii) Have shown a genuine interest in commercial fruit farming.
Iii) Have sufficient labour to carry out farm activities.
iv) Able to cooperate with other project participants.
v) An applicant is preferably a member of the nearest PPK
vi) An applicant is preferably registered as "Ladang Kontrak" participant.
vii) An applicant is preferably a participant of "Taman Kekal Pengeluaran Makanan (TKPM).
viii) The age of an applicant is between 18 and 65 years old.

b) **Farm Size**

i) Minimum size of Block or Cluster-Group
- Annual fruits : 5 ha
- Perennial fruits : 10 ha

ii) Maximum size of Block or Cluster-Group
- Annual fruits : 50 ha
- Perennial fruits : 50 ha

c) **Value Of Assistance**

The scheme value of Group Planting component is indicated in Table 1 and 2 below.

d) **Implementation System**

The detailed work process and scheduling for the planning and implementation of Group Planting shall be vested to the Divisional Planning and Development Committee (DVPDC) or Department Planning Committee (DPC) depending on the total cost of the project.

The project financing plan should ensure that the technical recommendations for fruit planting and maintenance are adequately financed, even if it means that the farmer should have to top up the scheme funds. Refer to Appendix 1 for work flow chart on Project Implementation At District Level.

e) **Project Local Committee (PLC)**

To ensure the smooth running and efficient management of the Group Planting projects, a Project Local Committee (PLC) need to be formed at the project level. The main functions of this committee are as follow:-

i) To provide leadership and advise on project planning and implementation.
ii) To review and to rectify problems related to project implementation.
iii) Give the fullest cooperation to the DOA Staff supervised the project.

iv) To constantly evaluate the progress of project implementation.

The committee should consist of Chairman, Secretary, Treasurer and at least 4 members. Project Supervisor will be the advisor.

1.2 Entrepreneur Fruit Farms

The purpose of this component is to assist and develop interested a potential individual to establish commercial fruit farm. The assistance will be the form of Planting Material, Production Inputs, Infrastructure facilities along with advisory Services as indicated in table 1.

a) **Selection Criteria**

To be eligible for participation in the Entrepreneur Fruit Farm project farmers have to meet the following criteria:-

i) Have some experience in fruit farming or have attended basic agriculture training and have at least 1 ha. of existing farm.

ii) Have shown a genuine interest in commercial fruit farming.

iii) Have access to suitable land of adequate size.

iv) Proposal farm must be accessible to marketing centres.

v) Have access to sufficient labour to carry out farm activities.

vi) Have adequate capital resources to top up the financial assistance given by the Government to ensure that crop performance is not compromised.

vii) Have definite and realistic marketing plans for farm produce.

viii) Willing to allocate part or all of production for contractual market.

ix) An applicant is preferably a member of the nearest PPK .

x) An applicant is preferably registered as “Ladang Kontrak” participant.

xi) An applicant is preferably a participant of “Taman Kekal Pengeluaran Makanan (TKPM).

xii) The age of an applicant is between 18 and 65 years old.

b) **Farm size**

Annual Crops:

Minimum farm size : 1.0 hectare
Maximum farm size : 3.0 hectares

Perennial Crops

Minimum farm size : 2.0 hectare
Maximum farm size : 5.0 hectares

c) **Value Of Assistance**

These Scheme Value and Period of Assistance is applicable to both Group Planting and Entrepreneur Fruit Farm components as indicated in Table 1 and 2 below:-

d) **Implementation System**

The detailed work process and scheduling for the planning and implementation of Group Planting shall be vested to the Divisional Planning and Development Committee (DVPDC) or Department Planning Committee (DPC) depending on the total cost of the project.

New Planting Project requires, at the very minimum, an assessment of economic viability and marketing plan. The project financing plan should ensure that the technical recommendations for fruit planting and maintenance are adequately financed, even if it means that the farmer should have to top up the scheme funds.

e) **Project Local Committee (PLC)**

To ensure the smooth running and efficient management of the Group Planting projects, a Project Local Committee (PLC) need to be formed at the project level. The main functions of this committee are as follow:-

i) To provide leadership and advise on project planning and implementation.
ii) To review and to rectify problems related to project implementation.
iii) Give the fullest cooperation to the DOA Staff supervised the project.
v) To constantly evaluate the progress of project implementation.

The committee should consist of Chairman, Secretary, Treasurer and at least 4 members. Project Supervisor will be the advisor.

Table 1 : Basis for cost estimate per hectare (General)

No.		Expt. Code	Rate Per Hectare (RM)			Total
			YR 1	YR 2	YR 3	
1	Land Clearing	42501				800
2	Planting Material (general)	42501	800	-	-	800
3	Fertilizer : NPK 15:15:15 NPK 12:12:17:2 + TE Chicken Manure, Rock Phosphate and Dolomite	42501	1,000	1,500	1,500	4,000
4	Pests and diseases control	42501	200	200	200	600
5	Weedicides	42501	200	200	200	600
6	Farm tools & material		250	250	-	500
	Total		**4,950**	**2150**	**1900**	**9000**

Notes :

1. **Annual Crops**
   For scheme under **Annual Crops, Year 1 entitlement is applicable.**

2. **Perennial Crops**
   For scheme under **Perennial Crops, Year 1,2 & 3 entitlement are applicable.**

3. **For both Annual and Perennial Crops**

   This is only a guideline. Flexibility is allowed to use entitlement of other items as long as the total expenditure does not exceed the total scheme value for each current year with the endorsement of the DVPDC and subject to approval of virement of funds.

4.. **Amount (no.of bags) fertiliser per ha.**

   The amount (no. of bags) of fertilsers required per ha. of fruit farm depends of the type of fruits planted. For example, Mandarin Orange the fertiliser requirement is as follows:

   No. of trees per ha. (1.5 m x 5.5 m spacing)
   Fertilliser application :

   i) Amount of Rock phosphate required per ha. is,
   at planting – 0.2 kg. X 330 trees – 1.3 bag

   ii) Amount of Dolomite required per ha. is,
   at planting – 0.1 kg. X 330 trees – 0.6 bag

iii) Amount of chicken manure required per ha. is,
at planting – 5.0 kg. X 330 trees – 33 bags

iv) 15:15:15 Fertiliser
No. of trees per ha. (1.5 m x 5.5 m spacing)

Fertilliser application :
Year 1:
Amount of 15:15:15 Fertiliser required per ha. is,
0.5 kg. X 330 trees -3.3 bags

Year 2:
Amount of 15:15:15 Fertiliser required per ha. is,
1.5 kg. X 330 trees – 9.9 bags

v) 12:12:12:17:2 + TE
Amount of 12:12:12:17:2 + TE required per ha. is,
Yr. 3, – 2.5 kg. X 330 trees – 16.5 bags

Table 2: Basis for cost estimate per hectare (Dabai Only)

No.	Item	Expend. Code	Cost Per Hectare (RM)			
			YR.1	YR.2	YR.3	Total
1	Land clearing	42501	800	0	0	800
2	Planting material (general)	42501	6,000	0	0	6,000
3	Fertilizer : NPK 15:15:15 NPK 12:12:17:2 + TE Chicken Manure, Rock Phosphate and Dolomite	42501	800	1,600	1,600	4,000
4	Pests and diseases control	42501	200	200	200	600
5	Weedicides	42501	200	200	200	600
6	Farm tools & material	42501	250	250	0	500
	Total		**8,200**	**2,250**	**2,000**	**12,500**

Notes :

I. The rate for every activity mentioned in the table 1 and 2 maybe changed according to the situation and needs of the area but total expenditure cannot exeed the allocation as appears in the table. Prior approval must be sought from the Head Quarters Crop Divison Planning and Development Committee.

II. Quotation should be called for land preparation (chopping of old tress, drainage, field planting etc.)

2.0. Fruit Rehabilitation Programme

For fruit ***rehabilitation programme***, the one-off assistance of RM3,900.00 per hectare is given to cover farm inputs only. The purpose of the project is to revive unproductive smallholding to increase production. The assistance is focused in areas with concentration of fruit growing areas either planted in block or in clusters. Maximum assistant per participant is 2 hectare. The basis for estimates is shown in **Table 3.**

a) **Selection Criteria**

To be eligible for scheme assistance, the fruit orchard must fulfill the following criteria:-

i) At least 25% of the original fruit trees are in such a condition that with proper maintenance, they can be revived or brought into full production.

ii) An applicant is preferably a member of the nearest PPK .

iv) Priority given to ex fruit block farms of previous assistance.

v) An applicant is preferably registered as “Ladang Kontrak” participant.

vii) An applicant is preferably a participant of “Taman Kekal Pengeluaran Makanan (TKPM).

viii) The age of an applicant is between 18 and 65 years old.

b) **Farm Size**

Minimum Farm size	:	0.5 hectare
Maximum Farm size	:	2.0 hectare

c) Value Of Assistance

The Value Of Assistance and Period of Assistance of Fruit Rehabilitation Programme is as indicated in **Table 3.**

Table 3: Basis for cost estimate per hectare (Rehabilitation)

No.	Item	Expenditure Code	Rate Per Hectare (RM)
1	Planting material (general)	42501	2,500
2	Fertilizer	42501	1,000
3	Pests and diseases control	42501	200
4	Weedicides	42501	200
	Total		**3,900**

Note:

The rate for every activity mentioned in the table 3 maybe changed according to the situation and needs of the area but total expenditure cannot exeed the allocation as appears in the table. Prior approval must be sought from the Head Quarters Crop Division Planning and Development Committee.

3.0. Continuation Projects

For ***continuation projects*****,** fund is required to finance the second and third year fruit projects from the 9th. MP. The breakdown of physical targets and financial requirement is shown in **Table 4**.

Table 4 : Continuation Projects in 10th MP

No.	Component	Rate/ Ha (RM)	Target	Financial requirement by year (RM)					Total (RM)
				2011	2012	2013	2014	2015	
1	Continuation Project	1,000	757	537,000 (537Ha)	220,000 (220Ha)	0	0	0	757,000

4.0. Fruit Collection Center (FCC)

The purpose of setting up a Fruit Collection Centres (FCC) is to provide a place for farmers to gather their fruits for collection by buyers. It serves as a cleaning, sorting, grading, treatment, packaging and storage of fruit. The locations of FCC will be prioritised based on the concentration of fruit planting and existence of Group Planting projects. A total of six FCCs will be established in commercial fruit production areas in Kuching, Sri Aman, Samarahan, Sarikei, Sibu and Miri Divisions. The centre can also also be used as venue for extension teaching. The value of assistance is RM 75,000/unit. The cost item will include the cost of building construction and equipments such as weighing machines, fruit baskets, office, washing facilities etc

The fruit scheme participant/particpants whose land is used to build Fruit Collection Center are required to sign "Akujanji" (Appendix 2) inorder to protect the interest of other participants and DOA.

5.0. Institutional Support Services

The main purpose of this component are to facilitate the adoption of agricultural technologies , to ensure that the projects are regularly supervised and monitored. and to promote the marketing of fruits and fruit products.

This component consists of five (5) sub-components namely (i) agricultural extension services (ii) staff / farmers training (iii) farm trials and demonstration plots, (iv) Implementation, Monitoring & Supervision and (v) Marketing Support Services..

5.1. Extension Services.

The activities under agriculture extension services include:
(i) Technology Promotion,
(ii) Staff and Farmers Training and
(iii) Farm Trials and Demonstrations Plot.

i) Technology Promotion

The promotion of appropriate technologies needs to be actively carried out to increase the level of technology adoption by farmers in order to increase the productivity of the commercial fruit farms. The allocation will be used to purchase teaching aid, audio visual equipment and appropriate materials for demonstration and training purposes. Refer to Appendix 3, work flow chart on Agriculture Extension.

ii) Staff and Farmers' Training

The knowledge and skills of both the Agriculture Department personnels and the fruit farmers need to be upgraded in order to facilitate effective extension advisory service and technology adoption. They need to be exposed to the current technologies and knowledge in the fruit industry. As such, they need to be sent for training courses, seminars, conferences and study tours to successful farms and processing centres within and outside the State. The approach for farmers training includes the conduct of in-situ training, short courses, dialogues and study tours. Refer to Appendix 4, 5, 6 , 7 and 8 for work flow chart on Staff and Farmers' Training. The value of assistance will be much depending on the services and activities requested and the availability of fund, and the guidelines are as follows:

a) Eligibility For Farmers Training

- A farmer must be a Malaysian citizen domiciled in Sarawak
- A genuine farming community
- Able to read and write and is physically haelthy

- Preferably a member of Area Farmers Ogranisation.

b) **Allowance For Farmers' Training**

i) The farmers who are attending the formal residential short courses/training at ATCs and in-situ training at farm/District Office are NOT eligible for pocket money allowance. They are ONLY provided with food and refreshment at the rate of RM30.00 per night (for overnight course/training) and RM20.00 per person per day (for day trip course/training). In cases where transportation is not provided by the Department, the farmers are to claim the transportation allowance at the rate of RM15.00 from home to ATC/farm/District Office and RM15.00 ATC/farm/District Office back home.

ii) The farmers who going for study tour are eligible for food allowance at the rate of RM40.00 per person per day. They eligible for hotel accomodation at the rate of RM50.00/ /person/night in Sarawak and Sabah while in Semenanjung the rate is RM70.00 /person/night.

iii) The farmers who are attending farmers dialog and seminars are eligible to claim transportation, food and drink allowance at the rate of RM15.00 per person per session.

Table 5 : Rate Of Allowance For Farmers Training

Type of Training	Transport Incentives Per Person Per Session (RM)	Allowance Per Person	Food & refreshment Per Person		Remarks
			Overnight (RM)	Day Trip (RM)	
1. Formal Training at ATC	30.00	-	30.00	20.00	
2. In-Situ training at Farm/District	-	-	30.00	20.00	
3. Farmers' Dialogue & Seminars		15.00	**Hotel rate in Sarawak & Sabah**	**Hotel Rate in Semenanjung**	
4. Farmers Study/Tour		40.00			

iii. Farm Trials and Demonstration Plots

Research and Development (R&D) of new technologies represent the foundation for future advances in the fruit industry. To provide the necessary support for the industry, adequate emphasis must be given to both innovative and adaptive research at the project sites.

Funds are required to finance the cost of promoting technologies and products and the activities include

a) R&D and promoting the use of machinery and equipment on the processing of fruits,
b) R&D at farmers farm to evaluate the sustainability of the new technology used,
c) R&D in the production of value added products and
d) to establish market information system and promoting the new products in the market.

5.4 Implementation ,Monitoring and Supervision_

To ensure success of the project, regular monitoring and supervision need to be carried out to collect feed back, to ensure timely implementation and data collection. Fund will be used mainly for transport and travelling expenses. This budget represents about 10% of the total project costs.

5.5 Marketing Support Services

The provision of marketing support services is crucial to ensure fresh fruit and products have assured market and premium price for growers. This is important for the success and sustainability of the fruit projects. The cost items include costs of market promotions of products through advertisements, flyers, samples, packaging materials, market information research, nutrient labeling of products and participations in exhibitions.

6.0 Consultancy service

Expertise along the supply chain of the fruit industry (production technology, phytosanitary requirement etc.) is required to ensure the success of commercial projects. Adoption-diffusion study and impact study of the fruit projects are necessary to assess the success of the project and identify ways for further improvement.

SECTION III : FINANCE

The programme will be financed from the development funds as approved under the 10th MP and included in the annual budget of the State and Federal funds.

As a general guide, flexibility is allowed as long as the total expenditure does not exceed the total scheme value for each current year with the endorsement of the DVPDC.

Any balance of project fund may then be used to purchase appropriate items or inputs as required by the project participants.

SECTION IV : MARKETING

The demand for fresh tropical fruits in the domestic and international markets is growing rapidly. Sarawak, being on of the producing states in the region needs to take serious effort to improve marketing facilities and activities in order to be competitive in the global market. Therefore, these issues need to be adequately addressed to meet the challenges.

1.0 Market Requirements

1.1 Product quality

Overall fruit quality is one of the main factors that determine the final acceptance of the consumers. It is necessary to comply to the quality parameters as specified by the consumers.

1.2 Product uniformity

Consistent delivery of fruits with uniform size, grade, maturity, variety and packaging are essential in order to sustain the interest of the consumers.

1.3 Product presentation

It is important to inform the consumers on the unique and exotic features of tropical fruits. Important parameters include the nutrient content and other special attributes related to human health.

1.4 Packaging

Besides providing protection, packaging materials also serve to introduce the produce to the consumers. Packaging materials need to be labeled adequately with pertinent information, such as grade, variety, maturity and provide with attractive graphic presentation.

1.5 Marketing Agent

1.5.1 State Farmers' Organization (SFO) and Area Farmers' Organization (AFO)

SFO and potential AFO's should actively take the lead in the marketing and promoting of fresh fruits and processed products from the Fruit industry Development Programme especially from Group planting project. Potential fruits such as Dragon Fruit, Longan, Mango and Pomelo should be considered. As such a proper marketing plan should be prepared for each group project.

1.5.2. Federal Agriculture Marketing Authority (FAMA)

The Department of Agriculture should work closely with FAMA as the marketing arm to market the fresh fruits and processed products from Entrepreneur Fruit farm and Group Planting Project.

SECTION V : AGRONOMIC PRACTICES & CROP PROTECTION

MANDARIN ORANGE

1. Local Name : Limau Langkat, Limau Batu, Limau Jepun

2. Variety recommendation

Clone		Characteristic
Mandarin Orange		
Bidin	-	Big fruit, sweet and a good yielder.
Kong Ho	-	Good sized fruit, sweet and a heavy yielder.

Mandarin Honey Oranges

- Sweet-sour taste, good aroma and a heavy yielder.

3. Spacing

5.5 m x 5.5 m (330 trees/ha)

4. Planting Material

Recommended rootstocks are *Carrizo citrange* and Cleopatra Mandarin

5. Table 6 : Fertilizer Application

Year	Time of Application	Type of Fertilizer	Amount / Tree / Year (kg)	Rate/ Application (kg)
0	At planting	Rock Phosphate Dolomite Organic manure	0.20 0.10 5	0.20 0.10 5
1	Every 3 months	15:15:15	0.5	0.13
2	Every 3 months	15:15:15	1.5	0.38
3	Every 3 months	12:12:17:2+TE	2.5	0.63
4	Every 4 months	12:12:17:2+TE	4.0	1.33
5	Every 4 months	12:12:17:2+TE	5.0	1.67
6 & above	Every 4 months	12:12:17:2+TE	6.0	2.00

In addition, organic manure at 10-30 kg/tree/year and dolomite at 0.2 to 0.3 kg/tree/year is recommended.

6. Pruning

The young trees should be pruned at one year to form an open, well-balanced canopy. Each should have only a single trunk with three or four well-distributed primary branches originating at different points from 20 to 60 cm above ground level.

Dead twigs and fruit stalks are pruned off from the trees at harvest to give the tree an open, balanced canopy.

7. Fruit Thinning

Common practice is to allow one or two fruits per twig, thinned when the fruits are less than marble size.

8. Vegetable Stage

3 years

9. Economic Life

20-25 years

10. Harvesting and Yield

Ripe and sweet orange fruits are harvested manually by twisting or jerking the fruit from the branch. They are ready for harvest when they show a tinge of yellow and the skin becomes slightly shiny. Harvesting may be staggered over one to two months.

Fruit Yield

Age (Years)	Fruit Yield (mt/ha/yr)
4 -5	5-7
8 onwards	20-30

11. Pest of Mandarin Orange

11.1. Fruit piercing month

Damage symptoms:

Adult suck sap from mature fruits at night resulting in brown patches and hole son the skin. Damaged fruits will rot and drop.

Control:

(i) Collect and destroy rotten fruits.
(ii) Set up light trap.
(iii) No registered chemical for control

11.2. **Fruit fly**

Damage symptoms:

Infestation of fruits commences with the female making a puncture in the fruit skin when it lays eggs. The larva feeds inside the fruit causing it to rot.

Control:

(i) Collect and destroy damaged fruits.
(ii) Bagging of fruits with paper bags.
(iii) Trapping of fruits with methyl eugenol to reduce the male population
(iv) Spray with dimethoate or deltamethrin of fenthion.

11.3. **Citrus psyllid**

Damage symptoms:

Both nymph and adult suck sap from young leaves and shoots, resulting in curling leaves and stunted growth of plants. Honey dew secreted during feeding result in sooty mold.

Insect is a vector of citrus greening disease.

Control:

Spray with dimethoate or malathion during the on-set of new flushes before the fruiting season.

11.4. **Fruit Borer**

Damage symptoms

It is common in pomelo. Frass and gummy liquid oozing out are the obvious symptoms on the rind. Attacked fruits fall off prematurely.

Control:

(i) Bagging
(ii) Destroy infested fruits
(iii) Spray with pyrethroids, dimethoate, acephate or fenthion.

11.5. **Leaf Miner**

Damage symptoms

Newly hatched larvae bore into the epidermal tissue of the leaf and live inside by burrowing silvery coiled mines on them. Damaged leaf is distorted or curled up resulting in stunted growth.

Control

(i) Pluck infested leaves and destroy.
(ii) If necessary, spray with petroleum spray oils (e.g. D-C-Tron Plus), acephate or diazinon.

11.6. **Citrus Bug**

Damage symptom

Adults and nymphs suck sap from fruits, young shoots and leaves. Affected fruits turn brown at points of feeding and drop prematurely. Shoots wilt and shrivel.

Control

(i) Hand pick the nymphs
(ii) Spray with acephate or dimethoate or fenthion if necessary.

11.7. **Lemon Caterpillar**

Damage symptom

Larva eats up a leaf in a few minutes leaving only the midrib. Feeding impairs growth of young plants.

Control

(i) Hand pick and destroy
(ii) Spray with any common insecticide if necessary.

11.8. **Aphid**

Damage symptom

They suck sap from young shoots causing yellowing and curling or distorted growth.

Control

Spray with malathion and albolineum

DURIAN

1. Local Name :Durian

2. Varietal Recommendation

Clone	Characteristic
Commercial Clone	
D96	Medium sized fruit with green skin. Pulp is yellow, sweet and aromatic. Seed is big. Good yielder.
D24	Medium sized fruit, dropping in the mid season. Thick pulp with big seed. Excellent eating quality with yellow flesh that is smooth, fine textured, strongly flavored. Tendency of uneven ripening in larger size fruit. Good yielder.
D99	Small sized fruit (1.0 to 1.4 kg), roundish with prominent lobes. Thick yellow pulp with strong aroma, sweet and medium fine texture. Above average eating quality. Early dropping. Flowers are self-compatible. High consistent yielder.
DD123	Originally from Thailand and is also known as Chanee.Big fruit weighting 1.8 to 2.5kg, oval shaped, slightly compressed and is yellowish-green. Fruit quality is fairly good and a good yielder.
Clone	**Characteristic**
D168	Tree is of medium height and a good yielder. Fruit weights between 1.4 to 1.6 kg each and is round in shape. Fruit is brownish green in color and has a short stalk. The pulp is thick, sweet, reddish-yellow and tasty.
DS68	This clone is a local selection of big sized tree. The fruit is small weighting 0.5 to 1.5 kg, round in shape and has a bronzy colored skin. The pulp is light yellow in color, thick and with collapsed seeds. Fruit yield is high and consistent.
MDUR 78	Mid season cropper with high yield. Fruit is 1.5 to 1.8 kg. Roundish oval fruit has yellowish orange pulp which is of very good eating quality.
MDUR 79	Early dropping, medium sized fruit, lower yielding than MDUR 78. Roundish oval fruit has yellowish orange, thick pulp of very good eating quality.

MDUR 88	Mid season cropper with medium yielding ability. Medium sized fruit has golden yellow pulp that is sweet, medium fine and slightly drier than MDUR 78 and MDUR 79.

Local Clones :

a. Durian Kuning –	This local durian species is mainly cultivated in Northern Sarawak. Fruits of the selected clones have good eating qualities. It appears that cross pollination is necessary for fruit set and it is recommended to plant more than one clone.
DG5	Tree of medium size. Round fruit with green color skin and weights between 0.8-1.9 kg. Pulp is deep orange-yellow with fine, soft and sticky texture and taste sweet with good fragrance.
DG25	Originally from Kampong Quap in Kuching Division. Fruit is of average size (0.8-1.4kg), round with greenish-yellow skin. Pulp is orange yellow in color with fine and soft texture.
Suluk2	Originally from Limbang. Fruit is of reniform shape, average size (0.8-1.5kg) and with yellowish-green skin. Pulp is orange –yellow with sweet taste and is very fragrant.
Suluk3	Another local selection from Limbang. Fruit is fairly small (0.7-1.0kg) elliptical in shape with light yellow skin color. Pulp is orange-yellow in color, fragrant, soft and fine texture and has small seed.

Clone	**Characteristic**
b. Durian Nyekak	The Nyekak tree is small to medium in size. It is mainly cultivated in Central and Northern Sarawak. Fruit comes about a month after the common durian season. The recommended clones are:
DK5	Fruit is round, of average size (0.6-1.4kg) with orange-yellow skin. It has short, sharp but rather elastic spines. The locular lines are prominent and fruit is easy to open. Flesh is orange-yellow in color with fine and sticky texture and is sweet to taste with a fragrant flavor.
DK6	The fruit of this clone is round of rather small size (0.6-0.9kg) with yellow skin. Pulp is reddish yellow in color with medium soft and dry texture, sweet and fragrant to taste and has small seed.
DK8	Fruit is oblong in shape with a short stalk, of average size (0.6-1.2kg) and has yellow skin. The locular lines are prominent and fruit is easy to pen. Pulp is yellow

in color of medium soft and dry texture, sweet and fragrant to taste.

A mixture of clones including D99 as a pollinator has to be planted to improve fruit set.

3. Soil and Climatic Requirement

Deep, well-drain loamy soil with gentle to undulating slopes. A dry weather period is required to initiate flowering.

4. Spacing

11 m x 11 m (86 trees/ha)

5. Table 7 : Fertilizer Application

Year	Time of Application	Type of fertilizer	Amount/ Year (kg)	Rate/ Application (kg)
0	At planting	Rock Phosphate Dolomite Organic manure	0.20 0.10 5-10	0.20 0.10 5-10
1	Every 2 months	15:15:15	0	0.01
2	Every 3 months	15:15:15	0	0.25
3	Every 3 months	15:15:15	0	0.50
4	Every 3 months	15:15:15	3	0.75
5	Every 3 months	12:12:17:2+TE	4	1.00
6	Every 4 months	12:12:17:2+TE	5	1.67
7	Every 4 months	12:12:17:2+TE	6	2.00
8	Every 6 months	12:12:17:2+TE	8	4.00
9	Every 6 months	12:12:17:2+TE	9	4.50
10 and above	Every 6 months	12:12:17:2+TE		5.00

In addition, application of organic manure at 20 – 40 kg/tree/year is recommended.

6. Vegetative Stage

4 – 7 years.

7. Economic Life

25 – 30 years.

8. Yield

Age (years)	Fruit yield (mt/ha/yr)
7	1.3
8-10	5.3
11-13	10.6
14-25	13.2

9.0 Pest of Durian

9.1 Durian seed borer

Damage symptoms:

Newly hatched larvae feed initially on the skin of the fruit and later bore into the husk and then into the seeds. An exit hole measuring 5-8 mm in diameter surrounded by white orange excreta can be observed on the surface of the fruit.

Control:

i) Set up light trap to reduce moth population
ii) No registered chemical for control

10. Diseases of Durian

10.1 Rhizoctonia leaf blight

The causal organism is the fungus, *Rhizoctonia solani*. Symptoms on the leaf start with small water-soaked leasions, which coalesce to form larger irregular light brown patches with dark brown margins. Under warm humid conditions, the mycelium spreads to adjoining leaves when they come into contact. Sometimes, light brown sclerotia appear on the patches. Leaf drop and twig dieback occur during severe infection. This disease also affects seedlings at the nursery stage.

Disease control:

This disease can be controlled by spraying pencycuron. In the nursery, do not place the seedlings too close to each other and ensure that the nursery is not too wet.

10.2 Durian patch canker

This disease, which affects the main trunk and branches, is caused by *Phytophthora palmivora*. It causes dark brown to black lesions on the bark of the branches or trunk, especially at the crotch. A reddish brown gummy substance oozes out of the bark under wet conditions. Leaf defoliation and branch dieback can occur under severe conditions. The fungus can also infect the roots and fruit.

Disease control:
Treat the lesions by painting with metalaxyi or fosetyl-aluminium. For root infection, do drenching.

LANSIUM

1. Local Name : Langsat, Duku, Duku-Langsat, Dokong

2. Varietal Recommendation

There is as yet no recommended cultivars for langsat and duku. For duku-langsat, two cultivars, LDS 1 (Muar) and LDS 2 (Kuching) are recommended and for Dokong is Dokong (kering type).

3. Soil Requirement

Well drained, loamy, alluvial soils are most suitable.

4. Spacing

7.5m x 7.5 (178 trees/ha)

5. Table 8 : Fertilizer Application

Year	Time of Application	Type of fertilizer	Amount/ Year (kg)	Rate/ Application (kg)
0	At planting	Rock Phosphate Dolomite Organic manure	0.20 0.10 5-10	0.20 0.10 5
1	Every 3 months	15:15:15	0.50	0.13
2	Every 3 months	15:15:15	1.0	0.25
3	Every 3 months	15:15:15	1.5	0.38
4	Once every 4 months	15:15:15	2	0.67
5	Once every 4 months	12:12:17:2+TE	3	1.00
6	Once every 4 months	12:12:17:2+TE	4	1.33
7	Once every 4 months	12:12:17:2+TE	5	1.67
8	Once every 4 months	12:12:17:2+TE	6	2.00

6. Weed Control

Cover crop is recommended

7. Shading

In the first few years shading is necessary, using either artificial (shading net) or natural (banana, Gliricidia) shade.

8. Pruning

Keep one central leader with even spacing of branches.

9. Vegetative Period

7 years.

10. Economic Life

25-40 years.

11. Yield

15-30 t/ha
A distinct dry period is necessary to initiate flowering.

RAMBUTAN

1. Local Name : Rambutan

2. Varietal Recommendation

Clone	Characteristic
R3	Large round fruit with red skin. Flesh is firm, sweet and juicy
R4	Large, elongated, red fruit. Flesh is thick, sweet and juicy. High yielder.
R99	Elongated fruit with red skin. Flesh is very firm, very crispy, dry and very sweet
R169	Small,roundish, red fruit. Flesh is very firm, crunchy, dry and sweet.
R170	Large, elongated, red fruit. Flesh is firm, sweet and slightly juicy.
RS6	Large, elongated, red fruit with thicker skin and long hair. Flesh is thick, sweet, firm and slightly juicy.
R191	Fruit is roundish and red in color. Flesh is firm, medium sweet and not watery.

3. Soil Requirement

The best soils for rambutan are deep, loamy soils with good drainage. The terrain can be flat to undulating.

4. Spacing

9 m x 9 m (123 trees/ha)

5. Table 9 : Fertilizer Application

Year	Time of Application	Type of Fertilizer	Amount/ Year (kg)	Rate/ Application (kg)
0	Planting hole	Rock Phosphate Dolomite Organic manure	0.20 0.10 5-10	0.20 0.10 5-10
1	Every 3 months	15:15:15	0.50	0.13
2	Every 3 months	15:15:15	1.0	0.25
3	Every 3 months	12:12:17:2+TE	1.5	0.38
4	Once every 4 months	12:12:17:2+TE	4.00	2.00
5	Once every 4 months	12:12:17:2+TE	4.00	2.00
6	Once every 4 months	12:12:17:2+TE	4.00	2.00
7	Once every 4 months	12:12:17:2+TE	4.00	2.00
8	Once every 4 months	12:12:17:2+TE	4.00	2.00

Chicken dung @ 10 kg/tree/year apply after harvest

6. Weed Control

Cover crop establishment is recommended.

7. Pruning

Only minor pruning is required to obtain an open centre shape.

8. Vegetative Period

3 – 4 years

9. Yield

1.2 to 15 t/ha/yr with 2,000 to 6,000 fruits/tree starting from the fourth year of growth

10. Pest of Rambutan

10.1 Fruit Borer

Damage symptoms:

This pest is similar to the cocoa pod borer. The larva tunnels in the fruit until it reaches the fruit stalk. Ripened fruits are preferred.

Control:

Infestation is normally not serious to take up control.

10.2 Mealy bugs

Damage symptoms

Bug sucks sap from the fruits, resulting brown lesions on the fruits. Honey dew secreted during feeding results in sooty mold. This also attract ants and these ants assist in the dispersal of the bugs.

Control:

No recommended chemicals for control.

11 Diseases of Rambutan

11.1 Anthracnose

Anthracnose is both a pre- and post-harvest disease on rambutan. The fungus, Colletotrichum gloeosporiodes, infects the leaves, flowers and fruit, especially during wet seasons. Circular dark brown to black lesion appears on the fruit rind.

Disease control:

At the moment, there is no fungicide registered with the Malaysian Pesticide Board for rambutan.

STARFRUIT

1. Local Name : Belimbing Besi, Belimbing Segi, Belimbing Manis

2. Varietal Recommendation

Clone	Characteristic
B2	Large greenish yellow fruit with fine texture, sweet, juicy and with good aroma. The fruits do not keep well and softens easily. The tree is slower growing.

B10	Large, golden fruit with fine texture, juicy, sweet with good flavor
B17	large, orange color, broad winged fruit. The flesh is firm, fairly good textured and very sweet. This clone requires a pollinator like B2 to set fruit.

3. Soil requirement

Flat to very gently sloping terrain with well drained, light to medium textured soil is preferred.

4. Spacing

6m x 6m (278 trees/ha)

5. Table 10 : Fertilizer Application

Year	Time of Application	Type of fertilizer	Amount/ Year (kg)	Rate/ Application (kg)
0	At planting	Rock Phosphate Dolomite Organic manure	0.20 0.10 5-10	0.20 0.10 5
1	Every 3 months	15:15:15	0.50	0.08
2	Every 3 months	12:12:17:2+TE	1.00	0.25
3	Every 3 months	12:12:17:2+TE	2.00	0.67
4	Every 4 months	12:12:17:2+TE	3.00	1.00
5 and above	Every 4 months	12:12:17:2+TE	4.00	1.33

In addition, an application of organic manure at 15 to 45 kg/tree/year is recommended.

6. Pruning

Prune to an open center system by topping the main stem and allowing 3 to 4 main branches to develop. Another method of tree shaping is also practiced for trees of clone B17 which have long weak branches. In this method three to four branches are trained to grow horizontally on a wire frame. Old trees can be rejuvenated by pollarding the tree back to a meter above ground level and retraining several new branches.

7. Vegetative Period

2 years.

8. Economic Life

20-25 years.

9. Yield

Age (years)	Fruit yield (mt/ha/yr)
4 -6	40 -55
8 onwards	60 -70

10. Pest of Starfruit

10.1 Fruit fly

Damage symptoms:

The larva feeds in the fruit causing it to rot.

Control:

i) Bagging of immature fruits.
ii) Collect and destroy affected fruits.
iii) Trapping with methyl eugenol to reduce the male population
iv) Spray with cypermethrin or fenthion.

11. Disease of Starfruit

11.1 Cercospora leaf spot

This is usually not a serious disease. It is caused by the fungus, *Cercospora averrhoa.* It occurs more under high humidity. Small brown to red leaf spots appear first before enlarging to form larger spots with grayish white centre and reddish brown margins. Some spots may coalesce to form irregularly shaped lesions. In severe cases, infected leaves turn yellow and drop prematurely.

Disease control

Plant more tolerant cultivars. Cultivar “B17” is more susceptible to the disease. Since currently, only copper oxychloride is the only fungicide registered in Malaysia for use for starfruit, treat the infected plant with this chemical by spraying. Reduce the humidity within the canopy by carrying out selective pruning. Practice good field hygiene by removing the dead leaves.

11.2. Pink disease

This disease which is caused by the fungus, *Erythricium salmonicolor*, is usually serios in high-density planted areas or under shade during high rainfall.

GUAVA

1. Local Name : Jambu Batu

2. Varietal Recommendation

Clone	**Characteristic**
Gu Kong	Large (300-600 g) round to oval shaped fruits. Sweet, slight acidic, crispy.
Guava seedless (3rd generation)	Medium sized of longish shape fruit. Crispy and sourish-sweet taste.

3. Soil Requirement

Fertile, loamy well-drained soil. However, guava can grow on a wide range of soils with flat to very gentle slope.

4. Spacing

3m x 3m (1100 trees per hectare)

5. Table 11: Fertilizer Application

Year	Time of Application	Type of Fertilizer	Amount/ Year (kg)	Rate/ Application (kg)
0	At planting	Rock Phosphate Dolomite Organic manure	0.10 0.10 5	0.10 0.10 5
1	Every 3 months	15:15:15	0	0.08
2	Every 3 months	12:12:17:2+TE	1.2	0.2
3	Every 3 months	12:12:17:2+TE	0	0.50
4 onwards	Every 3 months	12:12:17:2+TE	0	1.00

In addition, a yearly application of organic manure at 10 – 20 kg/tree is recommended.

6. Weed Control

Keep the weeds low by regular cutting or spraying with weedicide.

7. Pruning

Prune back the budded plant to a height of 0.5m from the budding point to encourage 3-4 main branches to grow. Prune back these main branches to two nodes to allow side branches to grow. Keep plants low to a height of 1.6m for easy wrapping of fruits.

8. Vegetative Period

One year.

9. Economic Life

15-20 years with maximum yield at 5-8 years.

10. Yield

Age (years)	Fruit yield (mt/ha/yr)
4	8-18
5-6	24-30
7 onwards	30-45

11. Pest of Guava

11.1 Fruitfly

Damage symptoms

Larva feeds in the fruit causing it to rot
Control:

i) Bagging of immature fruits
ii) Collect and destroy affected fruits
iii) Trapping with methyl eugenol to reduce the male population
iv) No registered chemical for control

11.2 Whitefly

Damage symptoms:
Both adult and nymph suck sap from the leaves. Honey dew secreted during feeding results in sooty molds.

Control:

i) Remove affected shoots and leaves.
ii) Spraying with detergent may repel them.
Iii) No registered chemicals for control.

DABAI

1. Local Name : Dabai, Sibu Olive

2. Varietal Recommendation

There is no specific variety recommended yet. Use seeds from trees bearing very good quality fruits or vegetatively propagate these trees by budding. Select upright water shoots for budwood.

3. Soil Requirement

Though dabai will grow on a wide range of soil, they are most vigorous on well-drained, loamy, alluvial soils found along riverbanks. They prefer flat to gently sloping land.

4. Spacing

9 m x 9 m (123 trees/ha). For seedling trees, sometimes two trees are planted close together on one planting point. If one happens to be a male tree, it is chopped down.

5. Table 12 :Fertilizer Application

Year	Time of Application	Type of Fertilizer	Amount / Year (kg)	Rate/ Application (kg)
0	At planting	Rock Phosphate Dolomite Organic manure	0.20 0.10 5-10	0.20 0.10 5-10
1	Once every 3 months	15:15:15	0.50	0.13
2	Once every 3 months	15:15:15	1.0	0.25
3	Once every 3 months	15:15:15	1.5	0.38
4	Once every 4 months	12:12:17:2+TE	2.00	0.67
5	Once every 4 months	12:12:17:2+TE	2.50	0.83
6	Once every 4 months	12:12:17:2+TE	3.00	1.00
7	Once every 4 months	12:12:17:2+TE	5.00	1.67
8 onwards	Once every 4 months	12:12:17:2+TE	7.00	2.33

In addition, a yearly application of organic manure at 10-40 kg per tree per year is recommended.

6. Vegetative Stage

Seedling: 7-10 years
Budded Trees: 4-6 years

7. Economic Life

25-40 years.

8. Yield

30-100kg in younger trees. Mature trees can yield up to 300kg.

LONGAN

1. Local Name : Longan, Isau, Mata Kucing Masak Hijau

2. Varietal Recommendation

Clone	Characteristic
Diamond longan	Free flowering variety. Fruit tends to be watery and tastes sweet.
Kohala Longan	Large fruits with small seeds and of good eating qualities.

Flowering of this variety need to be induced artificially.

Edaw longan	A popular Thai variety with very good eating qualities. Fruits are large with small seeds. Flowering also need to be induced.
Isau 7	This is a local isau selection. Fruits are large with green color skin. The eating qualities of this variety is very good.

3. Planting material

Obtain inarched or marcotted plants from trees that bear heavily and have fruits that are large with thick, crispy, sweet flesh and small seeds.

4. Soil and Climatic Requirement

Isau trees grow best on well drained, deep, fertile loamy alluvial soils found along river banks. Terrain should be flat or only gently sloping. The trees fruit faster and more consistenly in areas with a more pronounced dry weather.

5. Spacing

9 m x 9 m (123 trees/ha)

6. Table 13 : Fertilizer Application

Year	Time of Application	Type of Fertilizer	Amount/ Year (kg)	Rate/ Application (kg)
0	At planting	Rock Phosphate Dolomite Organic manure	0.20 0.10 5-10	0.20 0.10 5-10
1	Every 3 months	15:15:15	0.50	0.13
2	Every 3 months	15:15:15	1.0	0.25
3	Every 3 months	12:12:17:2+TE	1.5	0.38
4	Every 4 months	12:12:17:2+TE	2.00	0.67
5	Every 4 months	12:12:17:2+TE	2.50	0.83
6	Every 4 months	12:12:17:2+TE	3.00	1.00
7	Every 4 months	12:12:17:2+TE	4.00	1.33
8 onwards	Every 4 months	12:12:17:2+TE	6.00	2.00

In addition, a yearly application of organic manure at 10-40 kg per tree per year is recommended.

7. Weed Control

Establishment of a cover crop is recommended.

8. Pruning

Vegetative propagated trees require only slight pruning to obtain a semicircular canopy.

9. Vegetative Stage

5 – 6 years.

10. Economic Life

30 – 40 years.

11. Yield

30-100kg in younger trees. Mature trees can yield up to 300kg.

JACKFRUIT

1. Local Name **:** Nangka

2. Varietal Recommendation

Clone	Characteristic
J29	Fairly large, oval fruit (10kg) with greenish yellow skin. Pulp is large, thick, orangy, fine, firm and sweet. Less latex.
J31	Small to medium sized, elongated frit (6kg). Greenish yellowskin. Pulp is round with small seeds. Pulp is deep yellow, firm, fine, sweet and strongly aromatic.
Mastura	Average fruit size of 15-25kg. Pulp is golden yellow with a pleasant after-taste.

3. Soil Requirement

It is a hardy tree, but do best on deep, loamy soil.

4. Spacing

9m x 9m (123 trees/ha)

5. Table 14 : Fertilizer Application

Year	Time of Application	Type of fertilizer	Amount/ Year (kg)	Rate/ Application (kg)
0	At planting	Rock Phosphate Dolomite Organic manure	0.20 0.10 5-10	0.20 0.10 5-10
1	Every 3 months	15:15:15	0.50	0.13
2	Every 3 months	15:15:15	1.00	0.25
3	Every 4 months	15:15:15	1.50	0.50
4	Every 4 months	12:12:17:2+TE	2.00	0.67
5	Every 4 months	12:12:17:2+TE	3.00	1.00
6	Every 4 months	12:12:17:2+TE	4.00	1.33
7	Every 4 months	12:12:17:2+TE	5.00	1.67
8 onwards	Every 4 months	12:12:17:2+TE	6.00	2.00

6. Weed Control

Cover crop is recommended to reduce weeds.

7. Pruning

Allow one central leader (trunk) to develop and space branches evenly.

8. Vegetative Period

3-4 years

9. Economic Life

5-10 years will maximum yield at 5-7 years.

10. Yield

4 – 12 t/ha/yr at third to fifth year, increasing to 20-30 from the sixth year.

11. Pest of Jackfruit

11.1. Fruit borer

Damage symptoms:

Larva bores and feeds in the fruits and seeds causing it to rot. Frass seen on the outside.

Control:

i) Bagging of fruits
ii) Collect and destroy affected fruits
iii) No registered chemical for control

12. Diseases of Jackfruit

12.1. Jackfruit Wilt/Dieback

This disease is caused by the bacterium, *Erwinia carotovora*. Dieback of branches occurs. This is usually the first obvious symptom that is observed. White latex can be seen oozing out of the dark stains on the branches. When the infected bark is removed, a brown patch can be observed underneath. When a branch is infected, the leaves turn yellow to brown, wilt and drop. As the disease spreads between branches, the whole tree eventually wilts and dies. Fruits from infected trees are smaller and they ripen prematurely.

Disease control

Since this is a bacterial disease, there is no chemical cure. Plant tolerant cultivars, if available. Observe good management practices, by sterilizing

pruning implements after each pruning. Look out for any insects that may be helping to spread the disease.

12.2. **Pink disease**

This disease which is caused by the fungus, *Erythricium salmonicolor*, is usually serious in high-density planted areas or under shade during high rainfall.

Symptoms include silky-white mycelial threads on the bark of branches and trunk. Under wet conditions, they turn slightly pink in color and rough pink encrustrations are formed. The bark later cracks and the branches dry up and wilt.

Disease control

Avoid close planting or intense shading. Prune off infected parts of the plant, and practice good field hygiene by removing all plant debris. Monitor the disease in the field closely for recurrence of the disease. At the moment, there is no fungicide registered with the Malaysian Pesticide Board for jackfruit.

CEMPEDAK

1. Local Name : Cempedak

2. Variety recommendation

Clone	Characteristic
Ch 27 :	Large (2.6 kg), elongated greenish-yellow fruit with sweet, thick, yellow pulp.
Ch 28 :	Medium sized fruit (1.8 kg). Yellowish fruit with orangy yellow, very sweet pulp and small seeds.
Sri Gading	Average size fruit (2 kg) with green skin color and orange flesh that tastes very sweet.

3. Soil Requirement

Tolerates a wide range of soil but does best on deep, well drained soil.

4. **Spacing**

9 m x 9 m (123 trees/ha)

5. Table 15 : Fertilizer Application

Year	Time of Application	Type of Fertilizer	Amount / Tree/Year (kg)	Rate/ Application (kg)
0	At planting	Rock Phosphate Dolomite Organic manure	0.20 0.10 5.10	0.20 0.10 5.10
1	Every 3 months	15:15:15	0.50	0.13
2	Every 3 months	15:15:15	1.00	0.25
3	Every 4 months	15:15:15	1.50	0.50
4	Every 4 months	12:12:17:2+TE	2.00	0.67
5	Every 6 months	12:12:17:2+TE	3.00	1.00
6	Every 6 months	12:12:17:2+TE	4.00	1.33
7	Every 6 months	12:12:17:2+TE	5.00	1.67
8onwards	Every 6 months	12:12:17:2+TE	6.00	2.00

6. Weed Control

Establishment of cover crop is recommended to control weeds. Keep ground area under canopy free of vegetation.

7. Pruning

Little pruning is required to achieve a central leader with a single trunk and well spaced branches.

8. Vegetative Period

3 – 5 years.

9. Economic Life

10 – 30 years.

10. Yield

5 – 40 t/ha/yr with peaks after 6 – 8 years

11. Pest and Diseases of Cempedak

Same as nangka

MANGO

1. Local Name : Mangga

2. Variety recommendation

Clone	Characteristic
Ma TS 17	Medium to large fruit (500 – 800 g), with light yellow skin whenripe. Flesh is yellow, with medium texture and good aroma. Good fruit set and heavy yielder.
Ma TS 38	Medium sized fruit (400 - 500 g) fruit with pale green skin that ripens to yellow. Flesh is orangy yellow, sweet and fairly fine textured. Good fruit set and heavy yielder.
Ma 128 Harumanis	Medium sized fruit (400 – 500 g) with green skin. The thick yellowish orange flesh is fine textured, very sweet and has good aroma
Chok anan	This is a dwarf mango which can be used fo high density planting. It is fairly free flowering in habit. The fruit is medium sized, very sweet with paper thin seed.

3. Soil and Climatic Requirement

Mango is a hardy plant, capable of thriving on a wide range of soils. Silty loam to clay loam is most suitable. Good production of flowers and fruits is only possible in regions with a distinct dry weather condition. Northern parts of Sarawak are more suited for this fruit.

4. Spacing

9 m x 9 m (123 trees/ha)

5. Table 16 : Fertilizer Application

Year	Time of Application	Type of Fertilizer	Amount/ Tree/ Year (kg)	Rate/ Application (kg)
0	Planting hole	Rock Phosphate Dolomite Organic manure	0.20 0.10 5.10	0.20 0.10 5.10
1	Every 3 months	15:15:15	0.50	0.13
2	Every 3 months	15:15:15	1.00	0.25
3	Every 3 months	15:15:15	1.50	0.38
4	Once every 6 months	12:12:17:2+TE	2.00	1.00
5	Once every 6 months	12:12:17:2+TE	2.50	1.25
6	Once every 6 months	12:12:17:2+TE	3.00	1.50
7	Once every 6 months	12:12:17:2+TE	4.00	2.00
8 & above	Once every 6 months	12:12:17:2+TE	5.00	2.50

In addition, a yearly application of dolomite at 200 – 300g/tree/year is suggested. This will help reduce the incidence of fruit cracking.

6. Weed Control

Cover crop establishment is recommended.

7. Pruning

Prune to achieve an open center shape by following 3 to 4 main branches to develop starting one meter above the ground.

8. Vegetative Period

3 – 5 years depending on clones.

9. Economic Life

20 – 25 years.

10. Yield

Mango yields can be inconsistent due to weather conditions and anthracnose disease outbreaks. Trees over five years can yield over 100 fruits and increasing with age to several hundred fruits per season.

11. Pest of Mango

11.1 Mango stone weevil

Damage symptoms :

The grub tunnels and feed in the fruit, causing it to rot inside.

Control :

i) Bagging of immature fruits.
ii) No registered chemical for control.

11.2 Fruit fly

Damage symptoms :

Larva feeds in the fruit causing it to rot.

Control:

i) Bagging of immature fruits
ii) Spray with dimethoate or cypermethrin or fenthion.

11.3 Branch borers

Damage symptoms :

Grub tunnels in the branches, resulting in dieback. Frass seen on the outside.

Control :

i) Remove and destroy affected branches.
ii) Plug the entrance holes with sticks or mud to suffocate the grubs.

12. Disease of Mango

12.1 Anthracnose

This disease is caused by the fungus, Colletotrichum gloeosporioides. This disease is very common on mango, especially during the wet season. It affects the inflorescence, leaves and fruit.

Symptoms on the inflorescence are the presence of small black spots on the flower buds, flowers and flower stalks. These spots enlarge and coalesce, and eventually the flowers turn black, wit and drop.

Leaf symptoms start with tiny brown spots on the surface. These spots may have chlorotic haloes, and may enlarge and coalesce to form patches of different sizes. Sometimes, the centre of the spot might dry up and drop,

thereby producing a shot-hole appearance on the leaf. Emerging new leaves are susceptible to the disease during the wet season.

Fruit symptoms start off with tiny dark brown to black spots, which enlarge and coalesce to form dark patches. Fruit abortion can occur if infection is serious during the early stage of fruit development. The black lesions can sometimes be seen as streaks radiating downwards from the fruit stalk to the tip of the fruit. This can result in a black patch at the tip of the fruit. As the fruit matures, the superficial lesions start to penetrate deeper into the fruit.

Disease control :

Practice good field hygiene, by removing plant debris. Spray with carbendazim or mancozeb, even prior to flowering. This is to reduce the inoculums on the leaves and branches. To prevent post-harvest disease development, apply hot water treatment.

MANGOSTEEN

1. Local Name : Manggis

2. Variety recommendation

Seeds are apotimic and no clones are yet indentified. Use seeds or vegetatively propagated trees with sweet, large fruits and small seeds. The use of advanced planting materials (3-4 years old) is recommended.

3. Soil and Climatic Requirement

Mangosteen performs best on well-drain loamy, deep fertile soils on flat to very gently sloping land.

4. Spacing

7.5m x 7.5 m (178 trees/ha)

5. Table 17 : Fertilizer Application

Year	Time of Application	Type of Fertilizer	Amount/ Tree/Year (kg)	Rate/ Application (kg)
0	Planting hole	Rock Phosphate Dolomite Organic manure	0.20 0.10 5.00	0.20 0.10 5.00
1	Every 3 months	15:15:15	0.50	0.13
2	Every 3 months	15:15:15	1.00	0.33
3	Every 3 months	12:12:17:2+TE	1.50	0.38
4	Once every 4 months	12:12:17:2+TE	2.00	0.67
5	Once every 4 months	12:12:17:2+TE	2.50	0.83
6	Once every 4 months	12:12:17:2+TE	3.00	1.00
7	Once every 4 months	12:12:17:2+TE	4.00	1.33
8	Once every 4 months	12:12:17:2+TE	5.00	1.67
9	Once every 4 months	12:12:17:2+TE	6.00	2.00
10 onwards	Once every 4 months	12:12:17:2+TE	7.00	2.33

6. Weed Control

Establishment of cover crop is recommended.

7. Shading

Shading is important during the first few years of growth. Use artificial (shading nets) or natural shade (banana, Gliricidia).

8. Pruning

The tree requires only minimum pruning. On vegetatively propagated plants, stake the plant to grow upright.

9. Vegetative Period

Seedlings : 8 – 12 years
Grafted plant : 5 years

10. Economic Life

30 – 50 years.

11. Yield

Young trees yield less than 100 fruits/tree and then increase up to 1,800 fruits/tree at full maturity.

DRAGON FRUIT

1. Local name : Dragonfruit, pitaya.

2. Varietal recommendation:

a) Hylocereus undutas – red skin with white flesh fruit.
b) Hylocereus costaricensis and H.polyrhizus – both are of red skin with red flesh fruit.

3. Soil requirement :

Dragonfruit can grow on most soils provided it is not waterlogged. Prefers flat to gentle terrains.

4. Spacing : 2.4 m x 3 m (1388 stands per ha)

5. Plant support :

As dragonfruit is a climber, it requires support to grow on. Both concrete and belian posts with measurements of 13 cm square and 1.8 m length are recommended. Place about 0.45 m of the post into the ground with 1.35 m of it above ground.

6. Field planting :

Use clean and disease-free cuttings of recommended varieties from reliable suppliers. Cuttings of 30 – 40 cm length can be planted directly on prepared mound. Plant 2-3 cuttings, well spaced round the post. As new pseudostems emerge, select 3-4 of them to grow up the post. These new pseudostems must be tied to the post with strings to encourage growth of aerial roots. These roots being used to attach themselves to supports.

7. Table 18 : Fertilizer application :

Year	Time of application	Type of fertilizer	Amount per Year (kg)	Rate per Application (kg)
0	At Planting	Rock Phosphate Dolomite Organic manure	0.4 0.1 5.0	0.4 0.1 5.0
1	Every 2 month Once it starts flowering, every 2 month.	15:15:15 12:12:17:2+TE	0.4 0.3	0.1 0.1
2 and onwards	Every 2 month. Every 4 month.	12:12:17:2+TE Organic manure (e.g superorganics)	1.2 1.5	0.2 5.0

8. Pruning and training :

Pseudostems can reach the top of support by 2-3 month after planting, after which they will arch over and may break. Allow 3-4 secondary pseudostems to develop from each primary pseudostem from near to the support. Each secondary pseudostems in term is allowed to have 3-4 tertiary pseudostems. A good stand is recommended to have 30-40 pseudostems. Pseudostems that have fruited 1-2 times or those that are shaded should be pruned off progressively.

9. **Vegetative stage** : 8-12 months

10. Economic life : 10-15 years

11. **Yields** :

Estimated fresh fruit yield per stand is about 30-50 fruits (20-30kg) per year.

12. Pests of Dragon Fruit

There are a few minor pest problem in dragon fruit.

12.1. **Ants**

A few ant species are found feeding on the shoots of dragon fruit. They often nib away the soft parts of the shoot, resulting in injury which could result in favorable disease enrty.

No specific insecticide is recommended for ants on dargon fruit. However, for general control of ants, chlorpyrifos is often used.

12.2. Snails

A few snail species are found feeding on the stems and shoot of dragon fruit. They grasp away plant parts, resulting in injury. Biting marks are often obvious. Apply snail bait (eg. Siputox) at regular intervals, to prevent the built-up of population. Good fram sanitation is also useful to reduce the breeding ground for snails.

LONGAN

1. Local name : Leng-Keng

2. Varietal recommendation :

a. Diamond longan – free flowering.
b. Edaw longan – required flowering induction.
c. Kahola longan – required flowering induction.

3. Soil requirement :

Longan tree is adaptable to different soils and growth is best in fertile and deep soils. It does not tolerate waterlogging and saline conditions.

4. Spacing : 8m x 8m (156 trees per ha)

5. Table 19 : **Fertilizer application**

Year	Time of application	Type of fertilizer	Amount per Year (kg)	Rate per Application (kg)
0	At Planting	Rock Phosphate Dolomite Organic manure	0.2 0.1 5.0	0.2 0.1 5.0
1	Every 3 month	Compd 15:15:15	0.6	0.15
2	Every 3 month	Compd 15:15:15	1.2	0.3
3	Every 3 month	12:12:17:2+TE	2	0.5
4 and onwards	Every 4 month	12:12:17:2+TE Organic manure	3.0 20	1.0 20

6. Pruning :

General pruning to keep tree at about 3m height with well spread out canopy. Selective removal of some branches maybe necessary to facilitate good air circulation and light penetration.

7. Vegetative stage : 2-3 years.

8. Economic life : 15-20 years.

9. Yield : 50-80 kg of fresh fruit in medium sized trees (16-20 m2 canopy).

10. Flowering induction : Use NACLO3 at a rate of 15 g per m2 canopy.

11. Pests of Longan

There are two very common insect pests of longan.

i) False codling moth, Cryptophlebia sp. (Lepidoptera: Tortricidae)

Host plants: Citrus, maize

Life cycle:

Flattish, oval and whitish eggs are laid singly or in groups on the fruits. After 3 – 6 days the larvae emerge. They are whitish pink in color and grow to about 15 mm long. After 8 – 12 days, a small brown moth emerges with a wingspan of about 16mm. The females live for about a week and lay 100-400 eggs.

Damage pattern :

If the fruits are immature, the young larva will bore directly into the seeds, which is completely eaten. The entrance hole which the young larvae have bored into the fruit, leaves a yellow spot on the skin. The fresh of the fruit where the larvae are feeding becomes contaminated with their excrements. Infested fruits fall prematurely. Secondary infections due to fungus can also occur.

Control measures:

Sanitation:

Fallen infested fruits should be collected twice a week. This could be composted or buried 50 – 100 cm deep in the ground.

Bagging

Cover the fruit panicles with paper bags of fine net to exclude the pests.

ii) Fruit borer, *Conopomorpha* sp. (Lepidoptera:Gracillaridae)

Host plants: Rambutan, litchi

Life cycle

Yellow scale –like eggs are laid on the fruits as well as on the leaves and shoots. The eggs hatch in 3 – 5 days and the larvae immediately penetrate the fruits, leaves or shoots. Mature larvae are 6-10 mm in length and brownish in color, or green if they have fed on the leaves. After 8 – 12 days, they leave the feeding sites to pupate under mature leaves. The moth emerges after 5 – 7 days. During the off-season, when fruit is not available to the pest, it can survive by feeding on young leaves and shoots.

Damage pattern :

The larvae feed in the fruits and damaged fruits may fall from the tree. Damaged leaves and shoots are not serious as fruits are often preferred.

Control measures :

Sanitation:

Fallen infested fruits should be collected twice a week. This could be composted or buried 50 – 100 cm deep in the ground.

Bagging:

Cover the fruit panicles with paper bags or fine net to exclude the pests.

Pruning:

Prune branches to remove any remaining fruits that might harbour pupae of the pest.

Spraying:

No insecticide is recommended for these pests in Malaysia. However in other countries such as Taiwan, China and Thailand, the following chemicals are used.

- Permethrin
- Cypermethrin
- Deltamethrin
- Fenthion
-

Chemicals are sprayed during early fruit set to prevent pest damage during fruit maturation.

SECTION VI: AGRICULTURAL LAND RESOURCE IN SARAWAK

1.0 Land Resource and Fruit Cultivation

The Fruit zone was identified according to the specific climatic and physical requirements of the fruit crops. It indicates the location, extent and natural occurrence of the land for the cultivation for fruits in the State. An inventory of the land resource for the various fruits zone is summarized in Table 1.

1.1 Topographic and Soil Requirements

Depending on the type of fruits, generally tropical fruits can be grown in any land form ranging from flat to undulating terrain. Fertility problem in most sandy soil can be amended and lots of experience farmers had proven a success working on sandy soil. Potential acid sulphate soil is not recommended for tree crops but can be used for shallow rooted crops with proper liming and water management.

Shallow organic soil can be identified as area of high potential for fruits production. Once reclaimed the soil changed rapidly and turned into very shallow peat with organic soil thickness less than 1.0 m and with the presence of non acid sulphate clay substratum will enhance the crop growth. Steep slope of more than 28 degrees poses management and potential land degradation problem for the cultivation of large scale fruits plantation. Erosion can be reduced and with minimal soil disturbance during the land clearing stage. Massive soil disturbance caused lost of topsoil and organic matter leaving the barren subsoil with highly weathered parent material which are not favorable to crops.

1.2 Climatic Requirement and Cropping System

Tropical fruits can tolerate high amount of rainfall for growth but for the purpose of inducing flower and fruits, an acceptable dry period is required. In the high rainfall regime particularly the west and interior of Sarawak the weather are not conducive for quality fruit production. The mean annual rainfall within Bintulu and Miri of 3000 mm is advantage for the fruit zone in this region particularly for mango and durian. However certain fruits such as durian, specific variety suit best in their own humid region such as Pedawan, Batu Lintang and Sarikei area. Other fruits there is no apparent climatic limitation on their growth.

Table 20: Extent of agriculture capability classes

Fruit zones	Class 2	Class 3	Class 4	Class 5	Class 04	Class 05	Size F5
Sematan	8680	12705	83340	21095	3540	670	130030
Samarahan		2630	8805	3640	190	6185	21450
Lawas	1610	4425	1810	5815	2145	7116	22921
Melugu-Batu Lintang	13880	46610	26805	26142	450	13190	127077
Pedawan	16360	46530	43370	39015	2910	730	148915
Limbang	5415	7150	9190	4720	5620	2705	34800
Niah-Miri	7800	99765	28345	60655	700	8356	205621
Total Class	**53745**	**219815**	**201665**	**161082**	**15555**	**38952**	**690814**

Table 21: Agriculture Capability Classification

Class 1 or 01	Land with no limitation or one minor limitation to crop growth
Class 2 or 02	Land with two or three minor limitations or one moderate limitation that restricts the range of crops and/or requires moderate or some conservation practices
Class 3 or 03	Land with two or three moderate limitations or one severe limitation that restricts the range of crops, the degree of possible mechanization, or requires special conservation practices.
Class 4 or 04	Land with several moderate or two or three severe limitations that severely restrict the range of crops or require special conservation practices, or both
Class 5 or 05	Land with four or more severe limitations or at least one very severe limitation that with a few exceptions, precludes the use of the land for agriculture.

SECTION VII : SUPERVISION, MONITORING AND REPORTING

1. Supervision, Monitoring and Reporting

Project supervision involve not only field supervision but also includes monitoring and reporting, evaluation and record-keeping. The responsibility for project supervision lies at all levels of the DOA organization, starting from the project level, through to the District, Divisional and HQ levels. The centers for monitoring and reporting at the HQ, Divisional and District levels of DOA organization are their respective Project Management Unit (PMU). The PMU is expected to perform the role of Scheme/project and Project Secretariat, co-ordinating the management of project and scheme information at their respective levels.

An effective monitoring and reporting system is a critical part of scheme/project supervision Regular reports on physical and financial progress are essential. The monitoring format are specific and format below are recommended to be used.

a) Monthly Work Reports of Project Supervisor
b) Divisional Crop Project Team
c) Monthly Progress Reports of Crop Development Project/Scheme by PS/AS
d) Monthly Progress Reports of Crop Development Programmes by District PMU and Divisional PMU
e) Annual Assessment Reports by PS/AS
f) Annual Assessment Reports by SAAO/AAO

The District Project Implementation Team (PIT) should meet at least once a month to review progress and present monthly work plans. This is necessary since the District general meetings are expected to be held on a bimonthly basis. Proper records must be maintained and updated for the implementation of schemes and projects. The detailed records are to be kept at the District level.

The project supervisor and AS will have the primary responsibility for keeping the records current. The main records to be maintained at the District/Sub-District level include.

a) Register of Project/Scheme Application

b) Schedule of Recommended/Approved, Reserve and Rejected list

c) Project File

d) Project/Scheme record card

The individual Project File shall be used to keep copies of the following records:

a) Project application form

b) Letter of approval

c) Project development plan

d) Project AOP & budget

e) Reminder and warning notice

f) Certificate of Withdrawal, transfer and cancellation

g) Project Record Card

h) Acknowledgment Receipts of project materials

i) Other correspondence relating to specifically to the project.

Regular checks must be carried out by the Project Management Unit (PMU) at District, Divisional and HQ levels on the project/scheme Record Cards.

Refer Refer to Appendix 9 for work flow chart on Project Monitoring Visit.

2.0 Project Evaluation

Profile Format for preparation of evaluation report for Group Planting/Mini Estate.

2.1 Name Of Project :

2.1.1 Location :

2.1.2 Name Of Participants

List down the names (with IC Nos.) Of all the project participants.

2.1.3 Project Objective

Describe the objective of the project as spelled out in the original project proposal.

2.1.4 Year Started And Completed

This refers to the start and end of project assistance (i.e Funding) provided by DOA. The time span is normally referred to as the project period.

2.1.5 Project Development Plan And Achievement

Present the physical and financial targets at the time of project inception and at the end of the project period. Specify type of fruit varieties/clones.

2.1.6 Production Management System

Describe the management system adopted in the production stage, whether farmer-managed or centrally managed. Provide details of any agreements and profit-sharing formula between land owners and the management entity (eg. Leasing arrangements, rental rates, etc)

2.1.7 Use of New Technology

Provide a list of new farming technology and practices that were introduced to the project. Describe the extent to which the new technology was adopted by the farmers/management. Comment on the effectiveness and benefits arising from the use of the technology.

2.1.8 Current Production and Income From Project

State the yields production and income from the project. The information is to be presented on an annual basis, commencing from the year that the crop is in production.

2.1.9 Marketing System

Describe the marketing system for project output, indicating market outlets, volume, and pricing arrangements.

2.1.10 Loan Repayment (If any)

Comment on the current status of any loans that may have been taken for financing the project.

2.1.11 Reason For Winding-up

Explain why the time has come for the DOA to reduce its involvement in the project.

3.0 CONCLUSION

Project supervision involves not only field supervision but also includes monitoring and reporting, evaluation and record-keeping. The responsibility for project supervision lies at all levels of the DOA organization, starting from the project level, through to the District, Divisional and HQ levels.

An effective monitoring and reporting system is a critical part of scheme/projects supervision. Regular reports on physical and financial progress are essential.

The District PIT should meet at least once a month to review progress, achievement and resolving any problem until the project is fully completed.

Appendix 1

WORK FLOW CHART

Activity : Project Implementation At District Level

Schedule	Activities	Authority Responsible
April – July	Received Application	District PS/AS
August	Screening of Application Field investigation	DsPDC Approved
September	Submit recommendation List to Div	S/AAO District
December - March	Endorsement	DvPDC
April	Approval List received by District	ADA/S/AAO
April - December	Project Implementaion	S/AAO /PS/AS
April - December District/PS/AS	Supervision, T & V, Monitoring	S/AAO
April – December Div	Work Progress Report & Achievement	PS/AS/PMU Dist/PMU
	Evaluation	
January – February	Workshop	Annual

JABATAN PERTANIAN SARAWAK

AKUJANJI
Pembinaan Pusat Pengumpulan Buah-Buahan(FCC)

PERJANJIAN ini dibuat pada _____ haribulan _____ tahun _____

DI ANTARA

Jabatan _____ beralamat di _____

adalah satu Jabatan Kerajaan (selepas ini dirujuk sebagai JABATAN)

DAN

_____ No. K/P. _____

Beralamat di _____

_____

(selepas ini dirujuk sebagai PESERTA) sebagai satu pihak Lagi.

Bahawasanya, saya /kami dengan ini mengakui telah menerima bangunan/ pondok/mesin / peralatan / input bernilai RM _____ untuk diguna bersama oleh peserta projek di sekitar kawasan Pusat Pengumpulan Buah-Buahan(FCC) tersebut

membuat akujanji-akujanji seperti berikut :-

1. Peserta hendaklah menjalankan projek dengan berpandukan nasihat, rundingan dan panduan yang ditetapkan oleh Jabatan dan mengikut apa-apa latihan yang diarahkan oleh Jabatan.

2. Peserta tidak akan menjual, memberi sewa, memajak, menggadai, atau melepaskan pemilikan dan pemunyaan ke atas bangunan/ pondok/mesin / peralatan / input kepada pihak lain. Jabatan berhak untuk mengambil balik mesin / peralatan / input sekiranya disalahguna.

3. Pegawai Pemeriksa dari Jabatan/Agensi berhak untuk meneliti dan memeriksa,memantau dan menilai keberkesanan projek.

4. Peserta tidak boleh membuat apa-apa tuntutan gantirugi dari Jabatan jika berlaku kerugian dengan apa-apa cara sekalipun samada secara langsung atau tidak langsung.

DITANDATANGANI OLEH :

PESERTA

Tandatangan /Cap Ibu Jari Kiri : _____

Nama : _____

No. K/P : _____

PIHAK JABATAN

Tandatangan : _____

Nama : _____

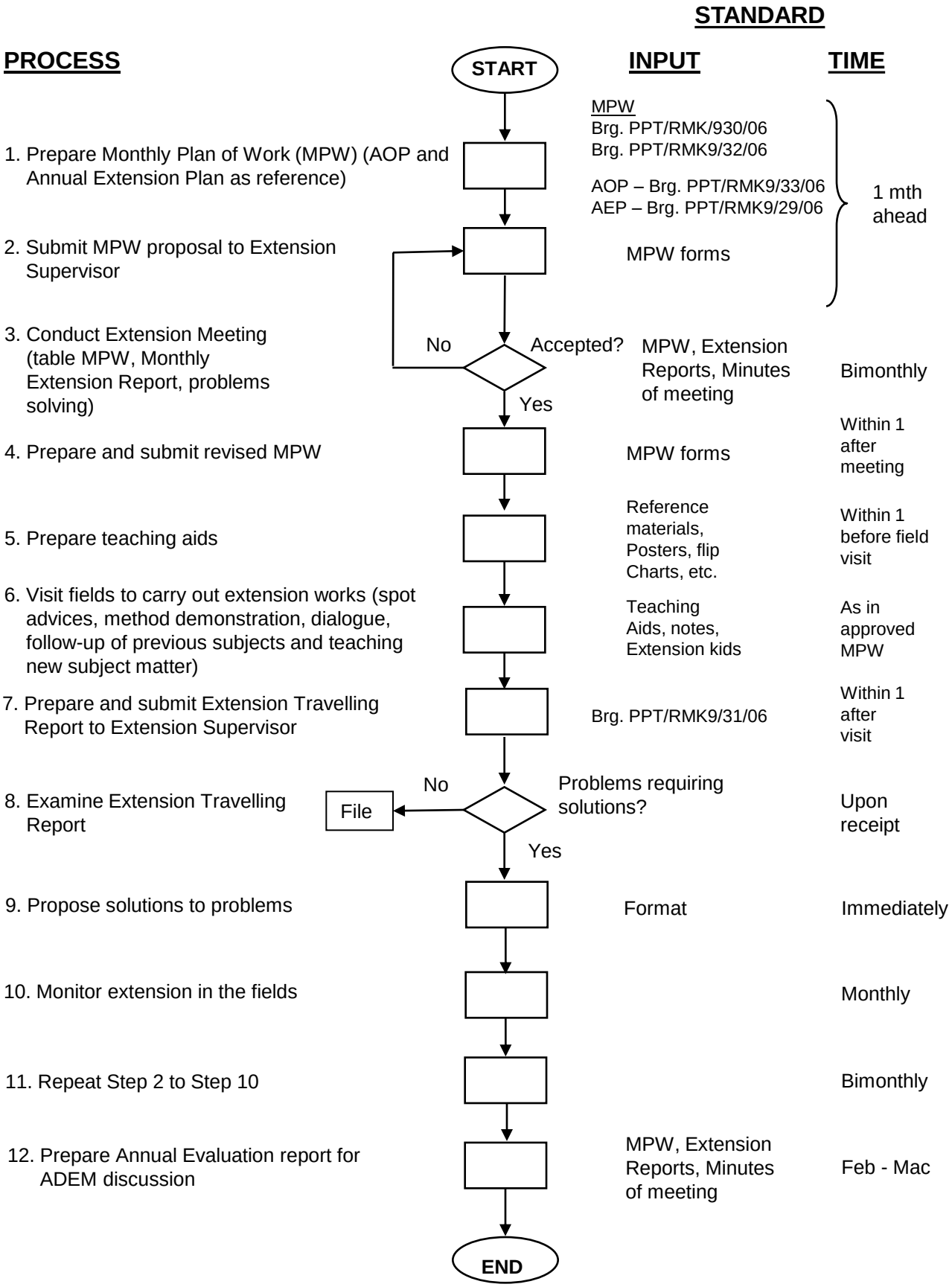
No. K/P : _____

Jawatan : _____

Cop Jabatan

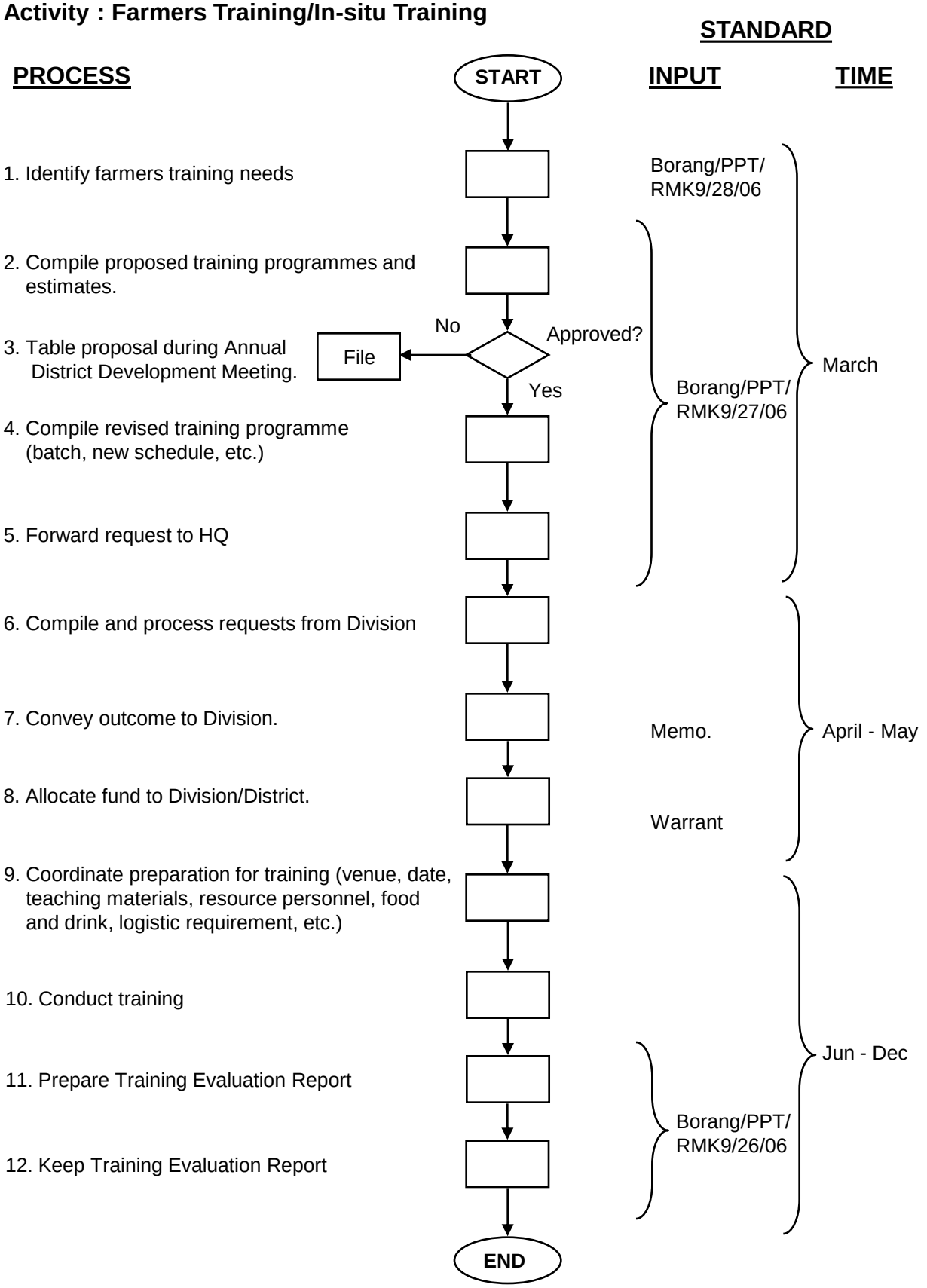
WORK FLOW CHART

Activity : Agriculture Extension



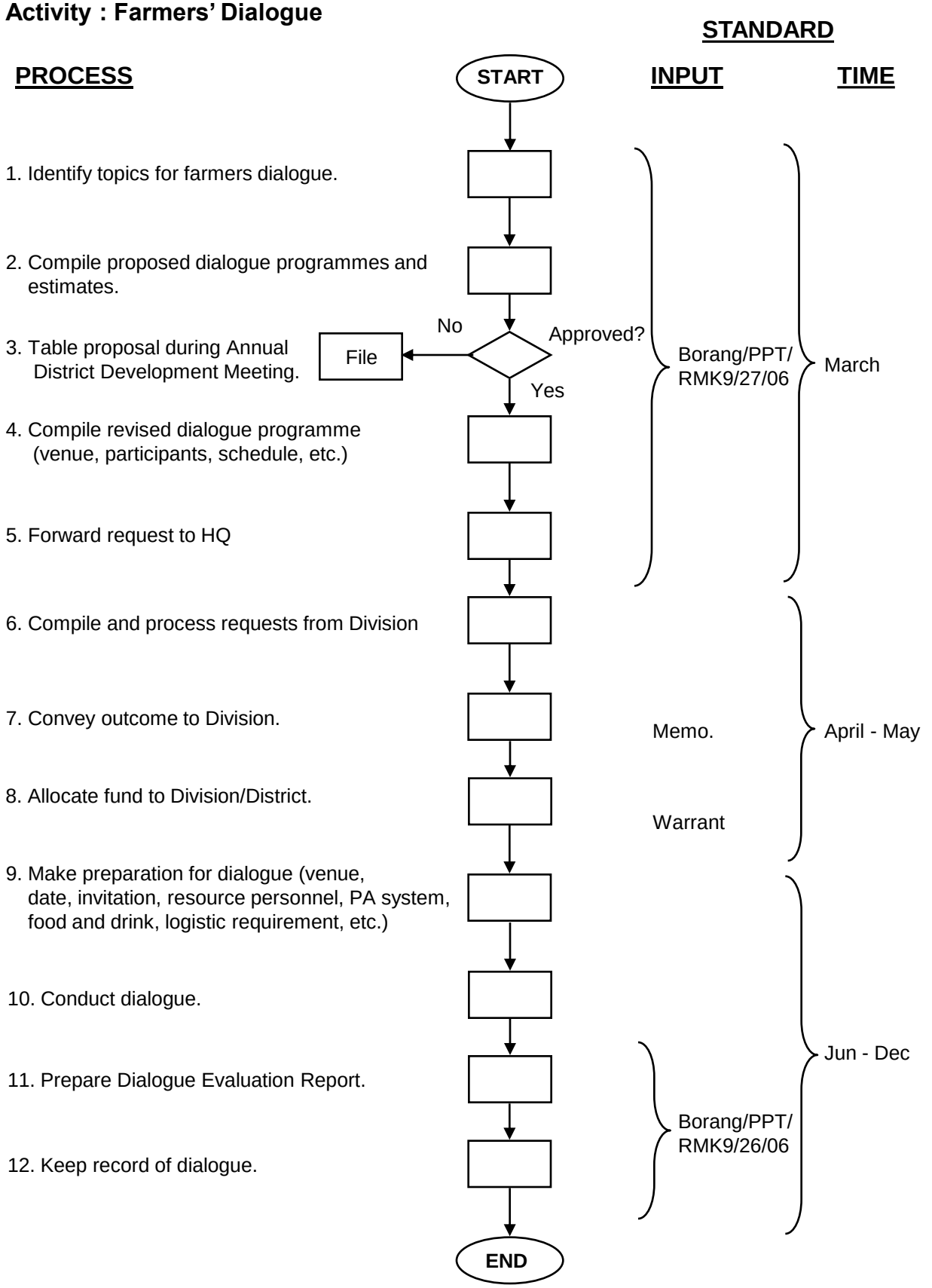
WORK FLOW CHART

Activity : Farmers Training/In-situ Training



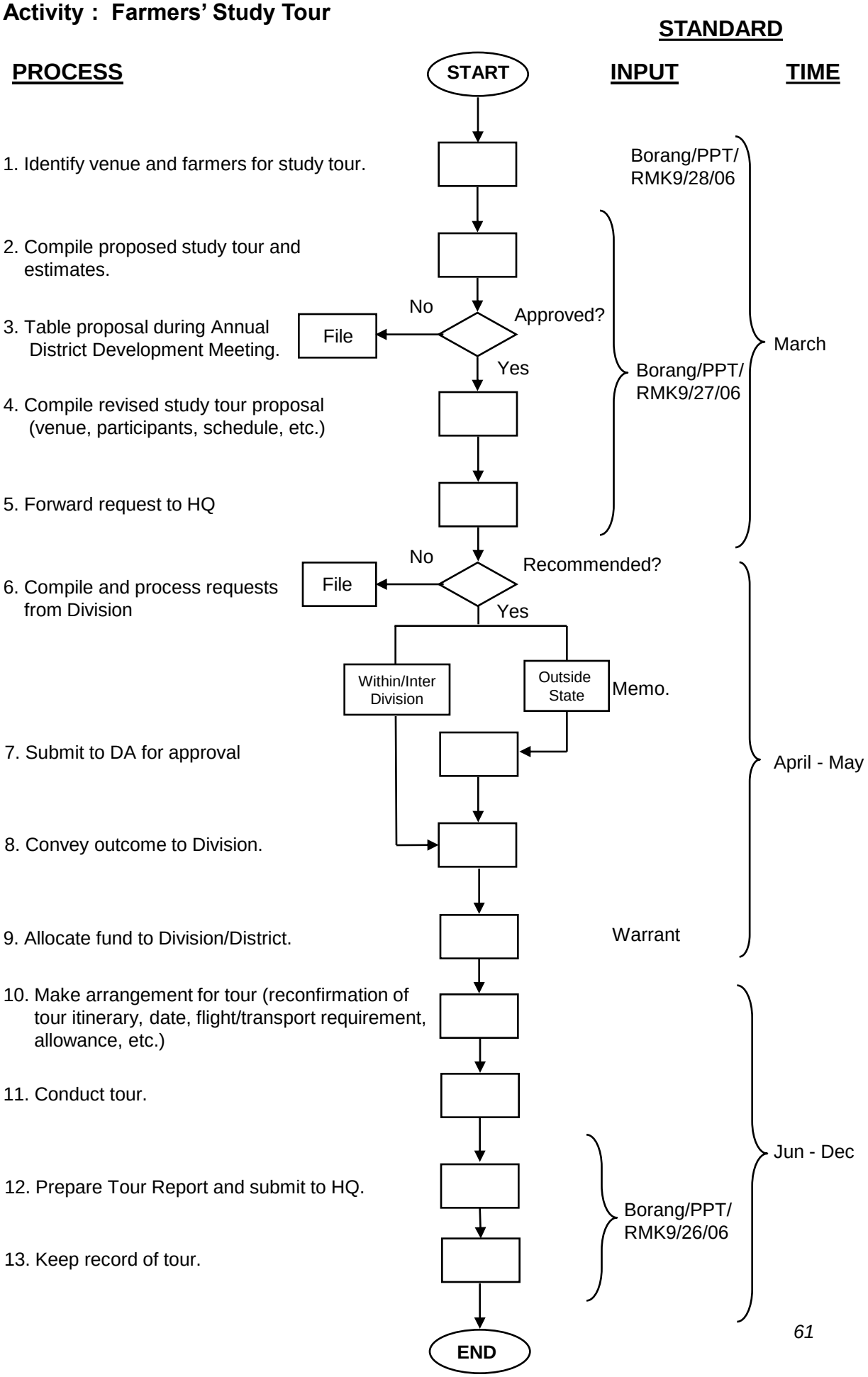
WORK FLOW CHART

Activity : Farmers' Dialogue



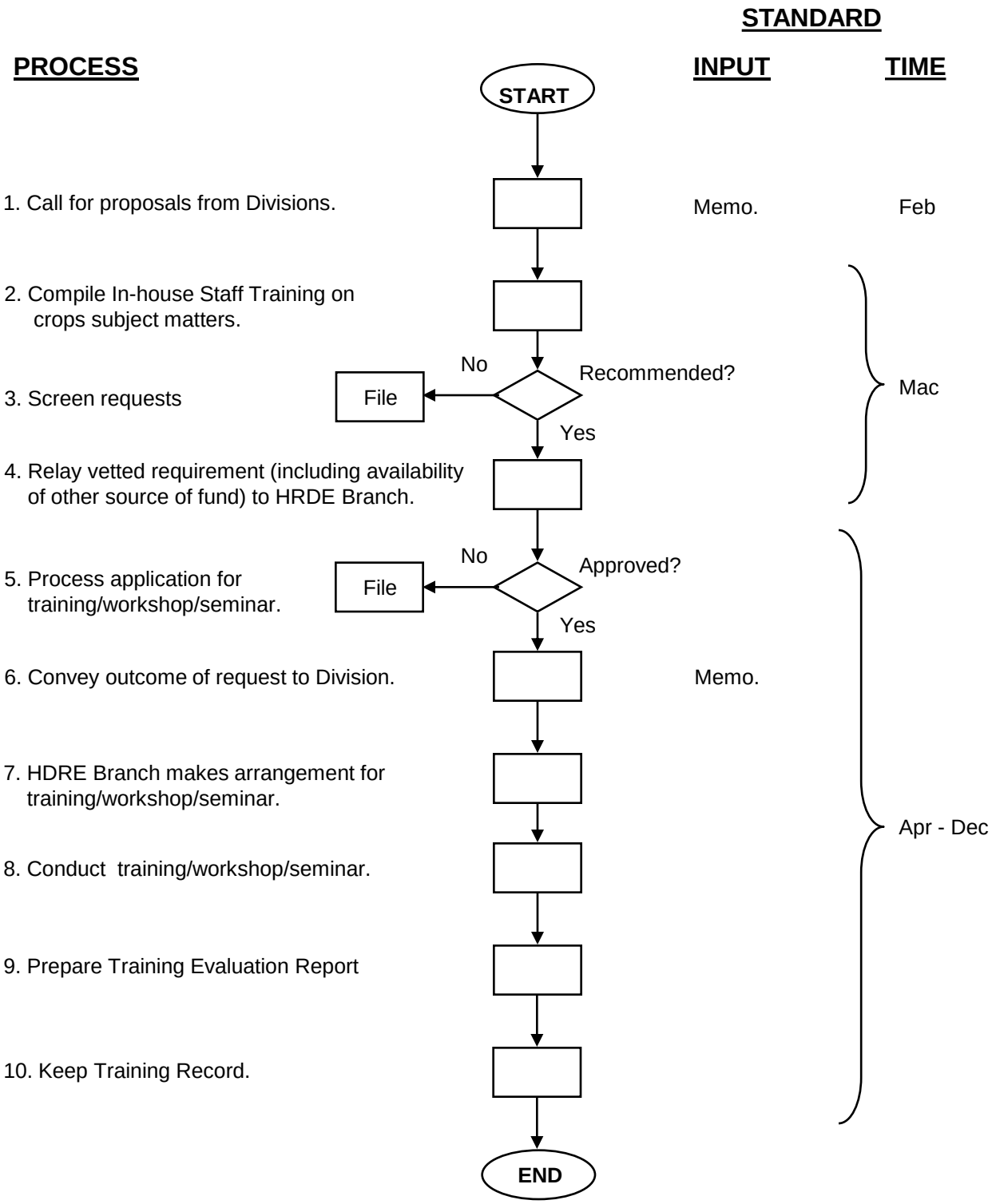
WORK FLOW CHART

Activity : Farmers' Study Tour



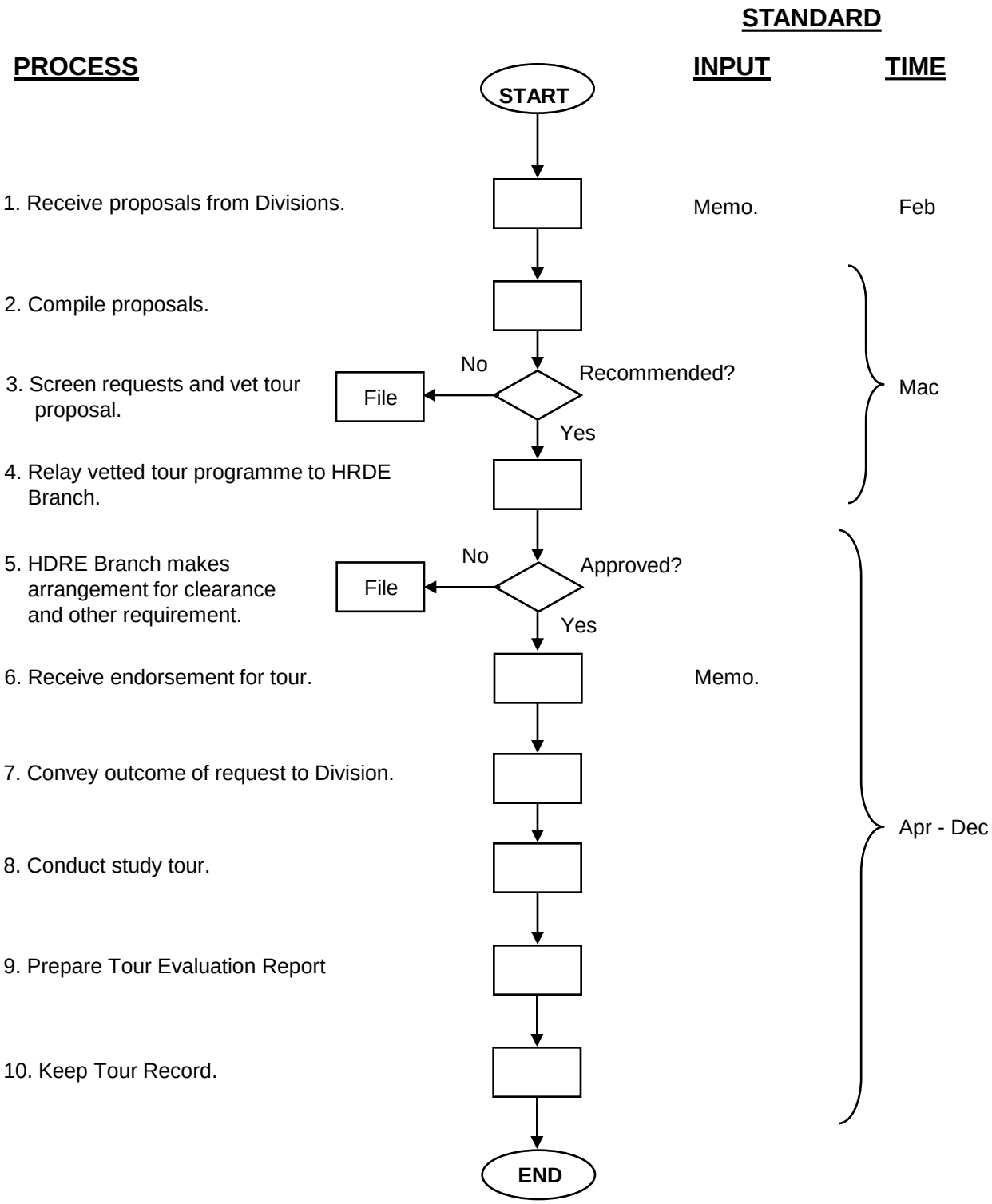
WORK FLOW CHART

Activity : In-house Staff Training/Workshop/Seminar (for Crop Division)



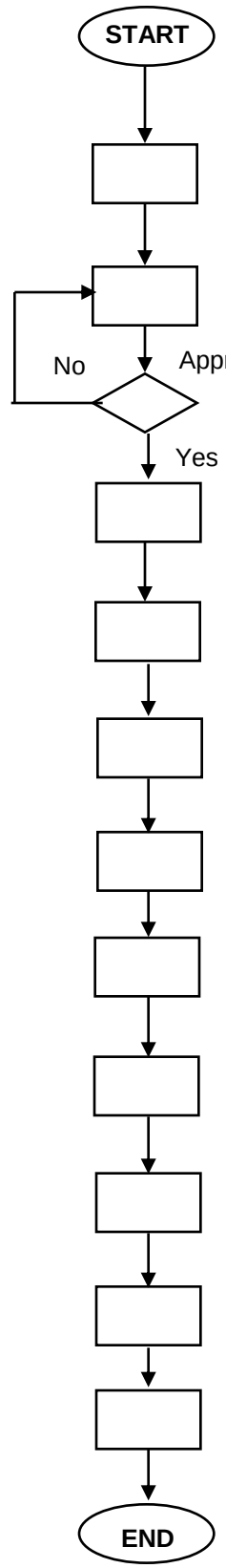
WORK FLOW CHART

Activity : Staff Study Tour (for Crop Division)



WORK FLOW CHART

Activity : Project Monitoring Visit



PROCESS	STANDARD INPUT	STANDARD TIME
1. Prepare travelling programme proposal.	Brg./PPT/RMK9/30/06 Brg./PPT/RMK9/32/06	1 day
2. Submit travelling programme.	Brg./PPT/RMK9/30/06 Brg./PPT/RMK9/32/06	2 wk before
3. Examine proposal.	Brg./PPT/RMK9/30/06 Brg./PPT/RMK9/32/06	1 day
4. Receive approved travelling programme.	Approved travelling prog..	
5. Inform receiving station.	Memo.	Immediately after prog. approval
6. Arrange transport/lodging requirement.	Transport booking form, S.O.	2 wk before
7. Proceed to destination.		According to schedule
8. Conduct task based on travelling purpose (checking of fund/expenditure/SPIP Ledger/Index Card/field inspection, etc.)	Ledger, Index Card, etc.	Within visit period
9. Write travelling report.	Brg./PPT/RMK9/31/06 Brg./PPT/RMK9/33/06	Within 1st wk of following mth
10. Submit travelling report to immediate Supervisor. .		
11. Extend travelling report to visited station.		
12. Follow up on action (s) taken.	Memo.	Following mth

BORANG PERMOHONAN PROGRAM PEMBANGUNAN PERTANIAN
JABATAN PERTANIAN SARAWAK

PERMOHONAN
PROGRAM PEMBANGUNAN PERTANIAN

BAHAGIAN : ..... **DAERAH :** .....

Sila tandakan kotak yang berkenaan [√]

Tanaman ☐ Perikanan Darat ☐

Ternakan ☐ Industri Asas Tani ☐

I : MAKLUMAT PEMOHON

Nama : ..... Kaum : .....

No. KP Baru : ..... PPK [No. Ahli] : .....

No. Tel : ..... Pekerjaan [Gaji Bulanan] : .....

Alamat Rumah : .....

Maklumat projek sedia ada/kegiatan aktiviti utama masa kini :

Bil	Jenis Aktiviti	Keluasan/Unit [Ha]	Keluaran/ Hasil [kg/Bil/Tahun]	Purata Harga Jualan [RM/kg]	Purata Pendapatan Tahunan [RM]

Maklumat Lesen/Permit/Syarikat : .....

Bantuan kerajaan yang pernah diterima [dalam tempoh 5 tahun] :

Bil	Jenis Bantuan	Tahun	Nilai Bantuan [RM]	Nama Agensi

II : MAKLUMAT PROJEK YANG DIPOHON :

Jenis Projek : ..... Keluasan/unit : .....

Nilai Bantuan [RM] : ..... Jenis Tanah : .....

Senaraikan Keperluan Bantuan : .....

.....

Status Tanah	Bergeran	**Sistem Perlaksanaan**	Individu
Sila [√]	TOL		Berkelompok
	PL [Provisional Lease]		Estet Mini
	NCR		
	Tanah Sewa		

Alamat Lokasi Projek : .....

Saya mengaku bahawa semua maklumat di atas adalah benar. Jika diluluskan, saya akan patuh kepada semua arahan, syarat/peraturan serta kaedah/prosidur perlaksanaan pembangunan pertanian Jabatan Pertanian Sarawak.

Tandatangan : ..... Tarikh : .....

III : PERAKUAN KETUA KAMPUNG/TUAI RUMAH [Jika berkenaan]

Saya memperakukan yang pemohon serta keluarga adalah penduduk kampung/rumah panjang ini dan telah mengusahakan kawasan tanah/projek pertanian yang dipohon.

Tandatangan : ..... Tarikh : .....

Nama : .....

Nama Kampung/Rumah Panjang: Cop Rasmi Ketua Kampung/Tuai Rumah

.....

.....

UNTUK KEGUNAAN PEJABAT PERTANIAN DAERAH

Cop terimaan borang : Tindakan:

Tanaman
Perikanan Darat
Ternakan
IATM

Tandatangan [OIC] : .....

Nama : ..... Tarikh : .....

Rujukan Pejabat : .....

Saranan

Tidak disokong
Tindakan lanjut

Tandatangan : .....

Nama : .....

Jawatan : ..... Tarikh : .....

Borang yang lengkap diisi hendaklah dikembalikan ke Pejabat Pertanian terdekat **pada atau sebelum 30 April.**