AGRICULTURAL GUIDE

1972

CEYLON FERTILIZER CORPORATION

Re. 1/-

Parakrama Samudra, Polonnaruwa

Towards self-sufficiency-
THEN AND NOW.....

Built by Parakrama Bahu the Great (1153-1186 A.D.), The Parakrama Samudra contributed to Lanka's self-sufficiency in food during the Polonnaruwa Period in our history.

Similarly the People's Bank with its large net work of branches throughout Ceylon and its active participation in Agricultural credit plays a leading role in the country's attempt for self-sufficiency.

AGRICULTURAL GUIDE

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(Metric Conversion—Page 24)

ACKNOWLEDGEMENTS

The information incorporated in this Agricultural guide has been obtained from the following sources:—

(*a*) Fertilizer and their use—F.A.O. Pocket Guide 1970 (Introduction Only)

(*b*) Leaflets issued by the Department of Agriculture, Coconut Research Institute and Tea Research Institute.

(*c*) "Diseases of cultivated plants"—Dr. D. V. W. Abeygunawardene.

(*d*) Research and Production of Rice in Ceylon—Dr. D. V. W. Abeygunawardene.

(*e*) Handbook of Rubber Culture and Processing, 1970—Rubber Research Institute.

(*f*) "Soils of Ceylon and Fertilizer Use"—Dr. C. R. Panabokke.

READERS ARE KINDLY REQUESTED TO CONSULT THE RESEARCH INSTITUTES CONCERNED AND THE EXTENSION STAFF OF THE DEPARTMENT OF AGRICULTURE FOR ANY FURTHER GUIDANCE OR CLARIFICATION THEY REQUIRE.

PREFACE

The Agricultural Guide has been specially compiled by the Corporation's Marketing Division on the basis of the publications of the Department of Agriculture and the Research Institutes and is presented with their concurrence. Farmers are advised to consult the appropriate Research and Extension Organisations in case any clarification or any further information is required regarding any of the aspects of agriculture embodied herein, viz. (i) the appropriate Institutes, in respect of Tea, Rubber and Coconut and (ii) the Department of Agriculture (Research Division), Peradeniya or the nearest Agricultural Extension Officer, in respect of all other crops.

CEYLON FERTILIZER CORPORATION
746, Galle Road, Colombo 4.
1972.01.08

Department of Agriculture Extension Services

COLOMBO AREA

1. Agriculture Sales Centre : Edinburgh Crescent, Colombo 7.
*2. Demonstration Centre, Reid Avenue, Colombo 7. (Old Race Course site).
3. Sales Centre, Ministry of Agriculture, Vauxhall Street, Colombo 2.
4. Agriculture Office, Home Gardens Division, 120, W. A. D. Ramanayake Mawatha (Alston Place), Colombo 2.
5. Agricultural Information Office, 102, Union Place, Colombo 2.
*6. Agricultural Extension Centre, 357, Galle Road, Mt. Lavinia.
7. Agricultural Extension Centre, Urban Council Office, Kolonnawa.
8. Agricultural Extension Centre, Gangodawila, Nugegoda.

- SEED AND PLANTING MATERIAL
- AGRO CHEMICALS
- SPECIAL FERTILIZER MIXTURES

formulated by the Ceylon Fertilizer Corporation are sold at these Centres.

*Lectures and demonstrations open to the general public are held at the Centres on Fridays from 2 - 4 p.m.

ALL OTHER AREAS

Please contact your nearest Agricultural Extension Officer or Centre for advice and your requirements.

DEPARTMENT OF AGRICULTURE.

USEFUL INFORMATION

Nutrient Content of Fertilizer Materials

Common Names	PERCENTAGE					
	N	P_2O_5	K_2O	MgO	ZnO	CaO
Nitrogen Fertilizers						
Urea	46	—	—	—	—	—
Sulphate of Ammonia	21	—	—	—	—	—
Calcium Ammonium Nitrate	23	—	—	—	—	—
Phosphate Fertilizers						
Rock Phosphate	—	27.5	—	—	—	—
Ordinary Superphosphate (Water Soluble)	—	18.0	—	—	—	—
Triple Superphosphate (Water Soluble)	—	42.0	—	—	—	—
Potash Fertilizers						
Muriate of potash	—	—	60	—	—	—
Sulphate of Potash	—	—	48	—	—	—
Minor Fertilizers						
Commercial Epsom Salts (Water Soluble)	—	—	—	16	—	—
Kieserite (Water Soluble)	—	—	—	26	—	—
Dolomite	—	—	—	20	—	—
Zinc Sulphate	—	—	—	—	22	—
Zinc oxide	—	—	—	—	80	—
Organic Fertilizers						
Wood Ash	—	1-3	4-6	2.2	—	23.3
Bone Ash	—	35.0	—	1.0	—	46.0
Cattle Manure (dried)	0.6	0.15	0.45	—	—	—
Poultry manure	1.6	1.75	0.9	—	—	—
Compost	0.5	0.25	0.5	—	—	—
Coconut Poonac	7.3	1.5	1.3	—	—	—
Fish Manure	4-10.0	4-9	0.5-1.5		—	5.8

PLANT NUTRIENTS REMOVED BY SOME CEYLON CROPS

Crop	Yield/Acre	Nutrient Removed in lb./Acre		
		N	P_2O_5	K_2O
Rice	50 bushels (grain)	27	15	10
	(straw)	29	10	75
Tea	1000 made tea	65	16	35
Rubber	1000 lb. dry rubber	11	7	9
Coconut	3000 nuts with husks	41	21	108
Maize	50 bushels (grain)	41	19	15
	(straw)	27	10	50
Cotton	8 cwt. seed cotton	32	11	15
Sugar Cane	40 tons cane	105	63	312
Groundnut	1000 lb. unshelled nuts	35	10	15
Tobacco	1000 lb. cured leaf	105	30	210
Manioc	5 tons tubers	25	20	100

CEYLON FERTILIZER CORPORATION

Sole Importers of

AMMONIUM SULPHATE — UREA — ROCK PHOSPHATES — MURIATE OF POTASH — N. P. K. (COMPOUND) — AND SUPER PHOSPHATES, ETC.

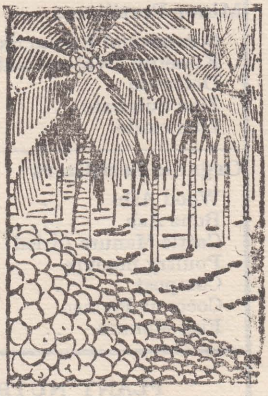
Head Office:

FINANCE: ADMINISTRATION AND OPERATIONS DIVISIONS

Tel: 83023; 83336-8 86685
T'Grams 'POHORA'

746, Galle Road, Bambalapitiya
P.O. Box 841, Colombo-4

Suppliers of Fertilizer under Subsidy Schemes



PADDY — Please Contact Agricultural Extensions Officers

COCONUT — } For details of Subsidy
TEA (SMALL HOLDINGS) — } Schemes please consult
CINNAMON — } respective departments

Distribution Division (Sales)
Tel: 35822; 35823 & 35824
T'Grams: 'POHORA'

64, W.A.D. Ramanayake Mawatha
(former Alston Place)
Colombo 2

Suppliers of Mixed Fertilizer for Paddy and other crops

PADDY FERTILIZER MIXTURES — FROM YALA 1971
PACKETED FERTILIZER FOR VEGETABLES AND HOME GARDENS

Installations Division

(Mixing Plant)

Tel: 70-472/423
T'Grams: 'POHORA'

Bishop's Hill
Hunupitiya

INCREASED FERTILIZER USE MEANS INCREASED PROFITS

INTRODUCTION

NUTRIENTS THAT PLANTS NEED FOR GROWTH
(From "Fertilizers and their Use"—F.A.O. 1970)

Plants are like people. If we do not get enough food, we go hungry and children grow poorly. If we do not get the right kinds of food, we get sick. The same thing happens to plants. However, plants cannot move around. Conditions must be made as favourable as possible for them where they are. To do this we have to know what plants need for growth.

Plants need 16 nutrient elements to grow. They get their nutrients from the air, soil water and soil minerals (or organic matter).

1. from the air and soil water: carbon (C), hydrogen (H) and oxygen (O);
2. from the soil, fertilizers and animal manures: nitrogen (N), phosphorus (P), potassium (K), calcium (Ca), magnesium (Mg), sulphur (S), iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), molybdenum (Mo) and chlorine (Cl).

SIXTEEN NUTRIENT ELEMENTS (PLANT FOODS) NEEDED BY CROPS

(Source and percent of total plant composition)

Plant Food from Soil

Primary nutrients	Secondary nutrients
Nitrogen (N)	Calcium (Ca)
Phosphorus (P)	Magnesium (Mg)
Potassium (K)	Sulphur (S)

Micronutrients

Iron (Fe)	Manganese (Mn)
Copper (Cu)	Boron (B)
Zinc (Zn)	Chlorine (Cl)

Molybdenum (Mo)

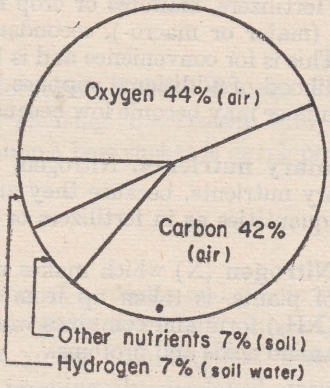


FIGURE 1: *The* 16 *nutrients needed by plants are provided by the air, soil water and soil (supplemented by animal manures, crop residues and fertilizers).*

These nutrients are the building blocks for the millions of tiny living cells that make up the plant. These nutrients and their sources are shown in Figure 1. Chemical elements other than these 16 are also absorbed, but are not essential.

Fertilizers, manures or crop residues are applied to soils to increase the plant's nutrient supply. Plants can use nutrients from either organic (manure or crop residues) or inorganic (soil minerals, fertilizers or ashes) sources.

Nutrients from the air and soil water

Plants are made up mostly of nutrients derived from the air and the soil water. The air is a gas consisting of almost 21 percent oxygen, 79 percent nitrogen and 0.03 percent carbon dioxide (CO_2). Carbon dioxide is especially important for plant growth: it is taken up by the plant from the air through pores in the green leaves and combines, with hydrogen (H) from soil water, to form carbohydrates (sugars) and other plant substances by energy from sunlight. This process is known as photosynthesis (see paragraph on photosynthesis).

Although air contains about 79 percent nitrogen, another essential plant nutrient, only legume crops such as clover, alfalfa, vetches and groundnuts can use air-nitrogen. They are able to do this because of special microbes (tiny organisms) which live in small nodules (ball-shaped clumps) on the roots of these plants. The plants provide the microbes with sugars, and the microbes supply the plant with all or at least part of their nitrogen in soluble compound form. In some countries legumes are grown and ploughed down (green manure) as a source of nitrogen. However, most plants must get their nitrogen from the soil solution rather than the air.

Nutrients from the soil, fertilizers or animal manures

Plants get 13 nutrients, in the form of solutions of their compounds, from the soil, fertilizers, manures or crop residues. These nutrients are divided into primary (major or macro-), secondary, and micro- (minor or trace) nutrient classes. This is for convenience and is based on the quantity of nutrient required and likelihood of additional supplies being needed. Soils may be naturally low in nutrients or may become low because of removal by crops.

Primary nutrients. Nitrogen, phosphorus and potassium are classified as primary nutrients, because they are the nutrients most likely to be needed in large quantities as in fertilizers or manures.

1. **Nitrogen** (N) which makes up from 1 to 4 percent of the dry weight of plants, is taken up from the soil in nitrate (NO_3) or ammonium (NH_4) form and combines with carbon compounds in the plant to form amino acids and proteins.

2. **Phosphorus** (P, usually represented by P_2O_5) which is deficient in most soils, makes up about 0.1 to 0.4 percent of the dry matter in the plant, and is essential for cell division and for the development of the plant tissues which form the growing points of plants. **Phosphorus deficiency retards plant maturation.**

3. **Potassium** (K, usually represented by K_2O) is not a constituent of the tissues of the plant but occurs in a state of solution in the cell sap. It makes up from 0.5 to 4 percent of the dry matter of the plant. **It accumulates in those parts of the plant in which cell division and growth processes are active. It appears to play a vital part in the utilization of other nutrients and in the synthesis of proteins and fats.**

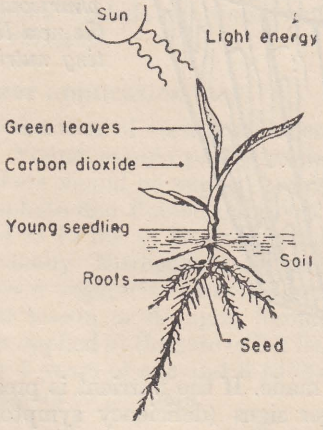
Secondary nutrients. Calcium, magnesium and sulphur are needed in moderate to small amounts, but they nevertheless play an important role in the formation of plant tissues.

Micronutrients or trace elements. Micronutrients are needed in only very small amounts. They are parts of key substances in plant growth.

Photosynthesis

By evaporating large amounts of water during the day, nutrients taken from the soil are carried to the leaves of the plant. It is the green leaves where the important action takes place which is called photosynthesis. This is nature's way of transforming the inorganic elements taken up by the plant from the air and the soil into a plant, with the help of the light-energy of the sun. The process may be compared with an organic-matter factory, working day shift with the sun as engine, to make the compounds that build a growing plant (Figure 2).

PLANTS MAKE SUGAR FROM SUNLIGHT, AIR, WATER AND SOIL NUTRIENTS



Light energy (sun)
Carbon dioxide (air)
Water (soil)
Other nutrients (soil or fertilizer)
+ Green leaves (plant)

=Sugars for plant growth

Roots take up soil water and essential nutrients from the soil.

FIGURE 2: Plants take nutrients from the soil, air and water and combine them in the green leaves, with the help of energy from the sun, to make sugars. This process is called photosynthesis.

Carbon dioxide and hydrogen are made into carbohydrates or sugars, which are used by the plant for growth or stored as starches, cellulose and fats or are made into proteins, in reaction with the absorbed nitrogenous nutrients. If any one of the 13 nutrients from the soil is not present, photosynthesis

CROP YIELD CANNOT BE GREATER THAN THE MOST LIMITING SOIL NUTRIENT PERMITS

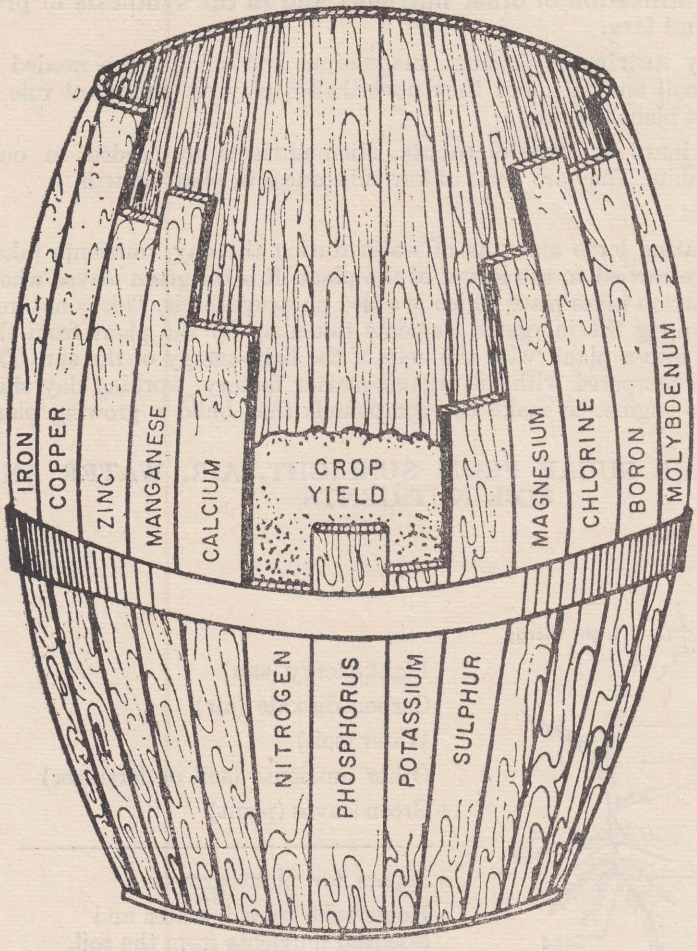


Figure 3: To get the highest possible yield no nutrient must be limiting. In this example, if nitrogen, phosphorus and potassium fertilizers were applied, sulphur would be the next limiting nutrient.

stops. No sugar, starch, fat or protein can be made. If the nutrient is present but short in supply, the plant develops hunger signs (deficiency symptoms) just as we do when we do not get the right food. Under these conditions, the plant does not grow properly and yields are low. The growth of a plant depends on its getting enough of each nutrient, and the yield is limited by the nutrients that are in short supply (Figure 3). In overall agricultural practice, nitrogen, phosphate and/or potash are the nutrients that mainly limit plant growth.

By kind courtesy of F.A.O.

PADDY

The Paddy Fertilizer Subsidy Scheme:

The subsidy scheme for the supply of fertilizer to paddy farmers at 50% cost has been in operation since 1951. The scheme has undergone several changes and refinements since its inception. From Maha 1971/72 all fertilizers, with the exception of Urea, are supplied in mixed form under this scheme. Paddy Fertilizer Mixtures have been introduced with a view to correcting the imbalance in fertilizer usage and thereby increasing paddy production.

Fertilizer Application

Basal Dressing

Three basal dressing mixtures containing N, P and K, are now available and are designated V1, V2, and V3 respectively. Compound pelletted fertilizer is also recommended for certain areas.

The recommendations for their use are broadly* as follows:—

Area	*Mixture*	*Districts*
Dry Zone	V1	Kurunegala, Puttalam, Kandy, Matale, Badulla, Moneragala, Jaffna, Vavuniya, Mannar, Anuradhapura, Polonnaruwa, Trincomalee, Batticoloa, Amparai and Hambantota.
Wet Zone	V2	Kegalle, Puttalam, Kandy, Matale Nuwara Eliya, Badulla and Hambantota.
Phosphate deficient areas in the Dry and Wet Zones	V3	Ratnapura and Kurunegala.
Low Country Wet Zone	N.P.K. Compound pelletted	Colombo, Kalutara, Galle, Matara and Ratnapura.

Top Dressing

Urea by itself, or applied seperately with the top dressing mixtures (TDM), is recommended for use in a standing crop of paddy. The recommendations for these are as follows:—

Mixture	*District*
TDM 1	Ratnapura, Kegalle, Kurunegala, Puttalam, Kandy, Matale, Nuwara Eliya, Badulla, Amparai and Hambantota.
TDM 2	Colombo, Kalutara, Galle, Matara and Ratnapura.
TDM 3	Colombo, Kalutara, Galle, Matara and Ratnapura.

N.B. **For further details refer to the appropriate leaflet issued by the Department of Agriculture.**

Disease and Pest Control

(1) *Blast* (*Pyricularia oryzae*)

Affects leaves, culms, panicles and flowers. Small leaf spots which are bluish green to start with enlarge and coalese forming large necrotic brown areas, sometimes involving the entire leaf. Transmission through seed is effectively checked by treating seed with Ceresan or Agrosan GN seed-dressing. The disease can be controlled by spraying Ferbam at the rate of 2 oz. in 10 gallons water or Kasumin or Blastin at the rate of 1 oz. in 6 gallons water.

(2) *Brown Spot.* (*Helminthosporium oryzea*)

Brown to reddish-brown spots appear on leaves. The fungus attacks the glumes of rice seed producing black spots. Since the disease is seed borne treatment of seeds with Ceresan or Agrosan GN will effectively control primary infection of seedlings. Soil amelioration by addition of 200 lb. silica per acre and a split application of Potash give some measure of control in areas where disease is endemic.

(3) *Stem Rot* (*Helminthosporium sigmoideum*)

Base of the stem gets discoloured due to rotting and plants lodge easily. Infected plants produce a large number of tillers from base of stem and sometimes from nodes above soil. Controlled by removal of infected crop residues and the use of a balanced fertilizer mixture.

(4) *Foot Rot and Bakanae Disease* (*Fusarium moniliforme*)

Diseased seedlings become pale and thin and finally die. Brown colour at the collar region. Adventitious roots appear from nodes at ground level. Tillers tall and lanky. Controlled by treating seed with Ceresan or Agrosan GN.

(5) *Sheath Blight* (*Corticium sasakii*)

Causes seedling blight. The fungus attacks leaf sheaths and causes the premature death of the lower leaves. Controlled by spraying with 'Tuzet' at the rate of 1oz. in 6 gallons of water at effective tillering, end of tillering and booting.

(6) *Bacterial Leaf blight* (*Xanthomonas oryzae*)

Causes wilting of leaves in basipetal succession. Cut end of wilted tiller when dipped into vessel containing water produces white slimy bacterial ooze. Controlled by treating seed with 'Ceresan' or spraying the plant with streptocycline at 3 grams in 135 litres of water.

(7) *Stemborer.*—Controlled by applying:—

Gamma BHC 6% granules at 33 lb./acre.
or Diazinon 10% granules at 20 lb./acre,
or Gamma BHC 20% E.C. at 1 fl. oz. in 2 gallons water,
or Fenitrothion 50% E.C. at 1 fl. oz. in 2 gallons water,
or Gamma BHC dust 1.3% at 20-30 lb./acre.

(8) *Paddy leaf Hoppers.*

Apply,
1.3% Gamma BHC dust at 20-30 lb./acre.
or Malathion 50% E.C.
or Fenitrothion 50% E.C.
or Phenthoate 50% E.C.
or Diazinon 60% E.C.
} 1 fl. oz. in 2 gallons water.

(9) *Paddy gall midge.*

Apply diazinon 10% granules at 20 lb./acre into standing water 3 weeks after transplanting.

(10) *Paddy Bug.*

Apply Gamma BHC 1.3% dust 20-30 lb./acre. Apply before grain hardens.
or Malathion 50% E.C.
or Fenitrothion 50% E.C.
} 1 fl. oz. in 2 gallons water.

(11) *Pentatomid Bug.*

Gamma BHC 1.3% dust—20-30 lb./acre.
or Trichlorfon 80% SP at 1 oz. in 5 gallons water.
or Malathion 50% E.C.
or Fenitrothion 50% E.C.
} 1 fl. oz. in 3 gallons water.

(12) *Stem Fly*

Trichlorfon 80% SP — 1 oz. in 5 gallons water.

(13) *Paddy Caterpillars*

Trichlorfon 80% SP — 1 oz. in 5 gallons water.
or Fenitrothion — 1 fl. oz. in 2 gallons water.
or D.D.T. 25% E.C. — 1 fl. oz. in 1 gallon water.
or Fenitothion 50% E.C. — 40 fl. oz.
or Diazinon 60% E.C. — 50 fl. oz.
or Monocrotophos 60%S — 30 fl. oz.
} in 60-80 gallons water/acre.

(14) *Paddy Thrips*

D.D.T. 25% E.C. — 1 fl. oz. in 1⅓ gallons water.
or Gamma BHC 1.3% dust — 15-20 lb./acre.
or Malathion 50% E.C. — 1 fl. oz. in 2 gallons water.

FOR FURTHER DETAILS CONSULT THE AGRICULTURAL EXTENSION OFFICER IN YOUR AREA

COCONUT

Coconut Fertilizer Subsidy Scheme:

Fertilizers for coconut have been available under a subsidy scheme in terms of which the Government bears 50% of the cost of fertilizer supplied for coconut lands.

Fertilizers are supplied by the Ceylon Fertilizer Corporation on permits issued by the Coconut Rehabilitation Department.

Applications for permits should be made direct to the Coconut Rehabilitation Department by estate owners where the extent is more than 20 acres. In the case of extents less than 20 acres such applications could either be made direct or channelled through the nearest co-operative society.

The fertilizers issued since 1956 have been mainly:—

1. C.R.I. General Mixture for young palms.
2. C.R.I. Mixture 'A'.
3. C.R.I. Mixture 'B'.
4. C.R.I. Mixture 'C'.

Based on research findings the compositions of these mixtures were changed in 1969. These new mixtures designated "Standard Mixtures" contained a higher percentage of Nitrogen.

Although in the past Sulphate of Ammonia has been used exclusively as the nitrogen source in the coconut fertilizer mixtures, alternate mixtures are now available with Urea which is a more concentrated form of Nitrogen.

Ground Dolomite limestone and Kieserite can also be obtained under the subsidy scheme.

Special mixtures could also be accommodated but the subsidy payable in such an instance is limited to the highest price paid for standard C.R.I. mixtures.

Co-operative Societies are allowed a discount of 6% on the cost of fertilizer purchased by them on credit. 1% of this is appropriated by the Coconut Rehabilitation Department and the balance 5% distributed equally among the co-operative and applicant. On permits obtained direct from the Coconut Rehabilitation Department the Ceylon Fertilizer Corporation allows a 5% discount on quantity lots of 10 cwt. and over.

The fertilizer subsidy scheme for coconuts has been very successful and the consumption of fertilizer by this sector has increased from 12,000 tons in 1956 to 62,358 tons in 1970. The fertilizer consumption is estimated at 75,000 tons in 1972.

PLANTING

Selected seedlings from high yielding mother palms can be obtained at the subsidised rate of -/25 cts. from the Coconut Research Institute, Lunuwila. Planting is usually done at the beginning of the South West (May/June) and North-East (October/November) monsoons. The recommended density for planting is 64 palms/acre. Any one of the following systems could be adopted :

Square system	—	26′ × 26′
Rectangular system	—	28′ × 24′
Equilateral triangle system	—	28′ × 28′ × 28′

The planting hole is usually 3′ × 3′ × 3′ and filled up to 6″ from the surface with top soil. In areas with unevenly distributed rainfall two layers of husks preferably dusted with 10% BHC dust, are placed on the bottom of each planting hole. If termite infestation is heavy in any area the following insecticides should be poured into the soil in each planting hole prior to planting using about 1 gallon of solution per hole:—

Aldrin	'Aldrex 2'	—	Two tablespoonsful in 5 gals. water.
	'Aldrin, miscible oil'	—	One tablespoonful in 6 gals. water.
Chlordane	'Chlordox'	—	One tablespoonful in 6 gals. water.
	'Intox 8'	—	One tablespoonful in 6 gals. water.

Fertilizer Application

1. **Basal Dressing** Mix the top-soil used for filling each planting hole with 2 lb. of ground dolomite limestone and 1 lb. Rock phosphate.
   When underplanting or filling vacancies add 1 lb. Rock phosphate, ½ lb. Muriate of potash, 1 lb. Sulphate of Ammonia (or ½ lb. Urea) and 2 lb. ground dolomite limestone into each planting hole.

2. **Top Dressing**
   (*a*) *Young Palms:* Until bearing apply the CRI General mixture for your palms every six months with the onset of the rains both in the South/West and North/East monsoons. Up to 12-18 months from planting the fertilizer should be applied about 1 ft. away from the base of the palm and as the palm grows older the manuring circle extended up to 5 ft. at flowering.
   The general mixture consisting of 4 parts of Sulphate of Ammonia, (or 2 parts Urea), 3 parts of Rock Phosphate 2 parts of Muriate of Potash is applied biannually at the rates of 1½ lb. in the 1st and 2nd years, 2 lb. in the 3rd year, and 2½ lb. in the 4th year at each application.
   Apply 3 lb. dolomite per seedling after the 3rd and 6th year.

   (*b*) *Adult Palm:* The choice of the mixture and the dosages for adult palms on an area basis are given below:

	Soil Type	*Mixture*	*Dosage (lb./palm/yr.)*
1. (*a*)	Cabook soils of the wet zone in the Southern, Western, Central and Sabaragamuwa Provinces, Kalutara, Galle, Matara, Kandy, Matale South, Ratnapura, Kegalle;		
(*b*)	Cinnamon sand soils of Chilaw/Negombo districts, coastal marine sands and lagoon sandy deposits of Puttalam, Chilaw, Negombo, Batticaloa, Mannar and Jaffna districts and the sandy soils of the Southern and Western coastal belts.	'C'	10
2.	Cabook soils of the intermediate rainfall zone in the North Western province (districts of Chilaw, Puttalam and Kurunegala).	'B'	9
3. (*a*)	Deep reddish brown loams, sandy loams and clay soils of the districts of Chilaw, Puttalam, Hambantota, Mannar, Anuradhapura, Vavuniya, Mullativu, Dambulla and Melsiripura in the intermediate and dry zones.		
(*b*)	Limestone derived chocolate brown loamy soils of Matale, Nalanda, Dambulla and Jaffna district.	'A'	8
(*c*)	Deep alluvial loams in valleys and flood plains of rivers and estuarine and lagoon clay soils.		

Disease and Pest Control

1. Leaf Blight (Pestalotiopsis palmarum and Helminthosporium incurvatum)

Small grey/brown lesions on the leaves of young palms. Lesions enlarge and coalesce. Controlled by half yearly application of Triple Superphosphate, ½ lb. per 1-2 year palms, 1 lb. per 3-4 year palms, 2 lb. per 5-6 year palms and 2½ lb. per 6 year old palm. Spray the fronds with a 50% Copper fungicide at the rate of 1 oz. in 1 gallon water at fortnightly to monthly intervals.

2. Bud Rot (Phytophthora palmivora and P. nicotianae)

Browning of central spindle of young leaves followed by withering and soft rot of these at their bases. Controlled by placing small jute bag containing coir dust soaked with 1% solution of a Copper or Antimucin fungicide in the axil of the topmost leaf. In the alternative pour copper fungicide mixture into the bud region of the young palm in wet weather.

3. **Magnesium Deficiency**
Yellowing of the tips of leaflets on the lower ends of mature fronds which spread backwards leaving a green zone in midrib region. Corrected by applying Kieserite at the rate of 2½ lb. per palm. Apply the same quantity 6 months later. 1 year after the initial application treat each palm with 3 lb. Kieserite and repeat until green colour is restored.

4. **Stem bleeding (Ceratocystis paradoxa)**
Reddish brown or rust coloured liquid oozes out through cracks in the stem. Chisel out the diseased tissue and apply Antimucin or coal tar.

5. **The Black Beetle**
Unopened leaves, crown and even flowers are cut by this beetle. As refuse heaps and decaying coconut trunks are the breeding places of this insect these should be sprayed with Dieldrin at the rate of 6 teaspoonsful in 1 gallon water or dusted with 10% B.H.C. powder. These insecticides could even be applied to the bud regions as a preventive measure.

6. **Red Weevil**
The adult female lays its eggs in the trunk and the larvae on hatching out start boring the stem. Controlled by injecting Metasystox into the tree.

7. **Coconut Caterpillar**
The larvae live in galleries on the under surface of the leaves and feed on the green tissue. Controlled biologically by releasing parasites which are obtainable from the C.R.I., Lunuwila.

8. **Scale Insects**
Yellowing of leaf appears in patches due to the sucking of the sap by this pest. A yellow mottling is usually observed. The lady bird beetle which is a natural predator keeps it under control. In the case of a severe attack prepare a stock solution of ½ lb. laundry soap in 1 gallon water and mix 2 gallons kerosene into it. Dilute 1 part of the stock solution with 10 parts water and spray on infected fronds. Keep mixture well agitated to prevent phytotoxic reaction.

9. **Promecotheca cumingii**
Leaf eating grub and beetle. Biological control is recommended.

FOR FURTHER ADVICE

Consult:

COCONUT RESEARCH INSTITUTE
AND
COCONUT DEVELOPMENT AUTHORITY

CINNAMON

Fertilizer Subsidy Scheme

Under this scheme fertilizer mixtures are supplied at 50% subsidy on permits which are also issued by the Commissioner of Coconut and Cocoa Rehabilitation. These permits are issued for the Yala season up to the 31st May and before 30th November for the Maha Season.

Nursery

Seed from selected mother trees are sown in beds 3 feet wide at a depth of $\frac{1}{2}$ inch after removal of outer pulp by washing. Cover seeds with cadjans and water in dry weather. Plants would be ready for planting in 8-12 months from sowing.

Planting

Plant 10-12 plants per hole 1′ × 1′ × 1′ at a spacing of 3′ × 4′. Approximately 3500 holes should be made per acre of land. Closer planting at 1 ft. intervals is recommended where the land is very steep and subject to erosion.

Fertilizer Application

The recommended dosage of the standard Cinnamon mixture is 2 Cwt. per acre twice a year at the commencement of the rains in the Yala and the Maha seasons.

Pruning

Pruning must be done about 2-3 months prior to the harvest. Unproductive branches are cut back to facilitate early harvesting.

Harvesting

The first harvesting is done $2\frac{1}{2}$-3 years after planting. Sticks with brown bark are cut every 8 months and the bark peeled. The peeling season begins in April and August soon after the first rains when the red flush of leaves assume the normal green colour.

Disease and Pest Control

1. *Grey blight* (*Pestalotia cinnamomi*)

Small brownish spots appear on the upper surface of leaves. These enlarge into round grey spots with a thin purple border. Centres of old lesions dry and fall leaving irregular perforations on the leaves. Controlled by improvement of cultivation standards and by application of a balanced fertilizer mixture. When the disease reaches epiphytotic proportions spray with 50% Copper fungicide at the rate of 4 oz. in 10 gallons water.

2. *Gall Formation*

Caused by small bugs. Spray 'Rogor 40' at the rate of 16 fl. ozs. in 50-100 gallons water with a knapsack or 16 fl. ozs. in 15 gallons water using a mist-blower. In the alternative dust with 1.3% B.H.C. dust one week before the flushing season and repeat one week later. D.D.T. 25% E.C. used at 4 pints in 1 gallon water would also give good control.

TEA

Tea (Small Holders) Fertilizer Subsidy Scheme:

The subsidy scheme for fertilizers is applicable to extents under 100 acres replanted with V.P. tea. Fertilizer is supplied on permits issued by the Tea Control Department. A 50% subsidy is given for fertilizers in such instances.

Fertilizer Application:

(*a*) *For Young Tea*

For the first two years after replanting a young tea fertilizer mixture (T 200) is recommended.

Although six doses of the above mixture is preferred in areas where prolonged droughts are encountered, the lower frequency of four doses may be used. The following dosages and frequencies are recommended:

	Quantity of T 200/ plant per application	No. of applications per year
First Year ..	½ oz.	6
	¾ oz.	4
Second Year ..	¾ oz.	6
	1⅛ oz.	4

The T 200 should be applied in a ring corresponding to the spread of the plant and not too close to the base as this could result in bark scorch. When the plants have grown sufficiently well the fertilizer could be applied in a band along the rows. Fertilizer application should be avoided during long periods of drought and heavy rainfall.

(*b*) *Fertilizer application from the third year until the first prune*

1,500 lb. per acre per year of T 750 is recommended, this to be applied in five applications of 300 lb. per round. The fertilizer could be broadcast close to the tea rows after the second year of planting.

(*c*) *For Mature Tea*

Four Fertilizer mixtures designated A, B, C and D are now recommended for mature tea on the basis of agro-climatic zones.

Mixture A or C has been formulated for the low-country and mid-country wet zones. Two applications of either of these with an additional 40 lb. Nitrogen is required for seedling tea.

Mixture D is recommended for the low-country and mid-country V.P. tea to be applied in 5 applications with additional applications each of 40 lb. Nitrogen in the second or third year cycle.

For up-country seedling tea the mixture A is applied in 2 doses in each year of the cycle. In the second and third year additional doses of 40 lb. Nitrogen should be applied.

Mixture B is for clonal up-country tea and is to be applied in 3 doses in each year of the cycle. In the second and third years one and two additional doses of 60 lb. Nitrogen respectively should be applied.

The best dose of Nitrogen is in the range of 40-60 lb. Doses smaller than this would be too small for distribution whilst for doses above 60 lb. the percentage losses would be large. Thus the minimum number of applications per year would be 2 (80 lb. N) and the maximum number 6 (360 lb. N).

The compositions of these mixtures are as follows:

	Weight of Component (lb.)		
	Nitrogen (S.A. or Urea)	Rock Phosphate	Muriate of Potash
Mixture A (Provides 80 lb. N)	388 (S.A.) or 174 (Urea)	72	100
Mixture B (Provides 180 lb. N)	874 (S.A.) or 391 (Urea)	106	150
Mixture C (Provides 80 lb. N)	388 (S.A.) or 174 (Urea)	72	67
Mixture D (Provides 200 lb. N)	971 (S.A.) or 435 (Urea)	106	150

The ideal times for applying the above fertilizers are at the commencement and during the South-West and North-East monsoons. These fertilizers could be broadcast uniformly between rows and may be applied in alternate rows if the bulk of fertilizer to be applied is low. Should the latter practice be adopted it would be better to switch rows at every application.

Disease and Pest Control

1. Blister Blight (Exobasidium vexans)

Translucent spots appear on young unfolding leaves. In 2-3 weeks these develop into characteristic blisters the under-surfaces of which become velvety white. Sometimes attacks young and vigorously growing stems eventually killing them. Controlled by spraying 3-6 ozs. of 50% Copper fungicide in 10 gallons of water per acre. Using knapsacks or in $2\frac{1}{2}$ gallons of water using mistblower.

2. Brown Blight (Colletotrichum camelliae)

Appears as yellowish diffuse spots which later acquire a brown colour on the leaves and stems of tea that are weekened by pest and disease attack or injured by frost, sun scorch, etc. Controlled by maintaining the health and vigour of the tea bush and by protecting it from insect damage.

3. Brown Root Disease (Fomes noxius)

Typical symptom of the disease is the presence of a crust of soil and small stones firmly attached to the tea roots. Fungal threads are closely intervowen and often tawny brown woolly masses of the mycelium in velvety patches are seen at the upper edge of the soil crust. Controlled by digging out completely the dead bush and burning.

4. Red Root Disease (Poria hypolateritia)

This disease manifests itself above ground by the wilting of leaves followed by sudden death of part or whole of the bush with withered leaves remaining attached to the branches for sometime. Examination of the roots would show the mycelium which is first white, soft and somewhat fluffy later becoming compacted into smooth, thin, flat dark red cords or sheets. These red cords darken with age. The fungus completely disintegrates the root tissues leaving a formless moist pulp. Controlled by removal and burning of the diseased material and fumigating the soil with methyl bromide.

5. Charcoal Rot Disease (Ustulina deusta)

The disease originates in stumps of Grevillea and Albizia which are intergrown with Tea and it is not unusual to find the tea bushes in the vicinity attacked. At first the fungus is seen on the root surface but at a later stage when bark is removed large white or brownish-white fan-shaped patches of mycellium will be visible on the wood surface. Charcoal like fructificarions are usually found at the collar region of diseased bushes. Controlled by removal and burning of the diseased bush.

6. Black Root Disease (Rosellinia arcuata)

The mycelial strands which are white, then smokey-grey and finally black run longitudinally on the surface of the root. Between the bark and wood white star-like patterns of inter-woven hyphae could be recognised. Controlled by removal and burning of the diseased bushes and the apparently healthy plants on the perimeter. After clearing the patches Gautemala Grass could be grown for a year before the vacancies are supplied.

7. White Root Disease (Fomes lignosus)

Mycelium forms white chords often united with one another to form a network, on the surface of the roots. Semi-circular shaped yellowish fructifications projecting as horizontal brackets are common on the stems of the diseased bushes. Controlled by removal and burning of diseased bushes.

8. Shothole Borer

Heptachlor	20-25% E.C.	6-8 pints in 80-100 gal. water by knapsack (K).
Heptachlor	40% E.C.	3-4 pints in 80-100 gal. water by knapsack (K).

9. Tea Tortrix

D.D.T.	18-25% E.C.	4-6 pints in 50-70 gal. (K) or in 10-15 gal. by motorized mist blowers (M).

10. Upcountry Livewood Termite Phostoxin

11. Lowcountry livewood termite —do— and good bush sanitation.

FOR ALL TECHNICAL ADVICE

Tea Research Institute
St. Coomb's Estate
Talawakelle

Tea Research Institute
Mid-Country Station
Hantana Estate, Kandy

Tea Research Institute
Mid-Country Station
St. Joachim, Ratnapura

Tea Research Institute
Uva Station
Gonakelle Estate, Debedde

FOR TEA (SMALL HOLDERS) FERTILIZER PERMITS

Apply to:

Tea Controller
Eastern Bank Building
Main Street
Colombo 1

RUBBER

Season for Planting

The best times for planting rubber are the latter half of May and the beginning of June. Planting during the North East Monsoon is not ideal except in certain areas of the intermediate zone in Moneragala and North Matale.

Planting

The theoretical stand per acre should be 180 trees which would allow for thinning on growth and yield characteristics after some natural thinning has occurred due to root diseases, wind and other causes.

A cover crop of Centrosema, Pueraria or Desmodium must be established immediately after clearing. The recommended size of planting hole is $2' \times 2' \times 2\frac{1}{2}'$. The planting distances are usually $15' \times 16'$, $25' \times 10'$, $22' \times 11'$, $8' \times 30'$ or $12' \times 20'$, and any one of these would give a stand of 180 trees per acre. The actual stand could work out to about 170-177 trees.

Fertilizer Application

In Nurseries

Apply compost, if available, at the rate of 5 tons per acre when the seed bed is prepared together with 100 lbs. of Rock Phosphate and fork in thoroughly. Alternatingly apply 3:1 mixture of Rock Phosphate and Dolomitic lime at the rate of 4 cwt. per acre and fork into soil to a depth of about 6-9 inches. One month after planting germinated seeds, a dressing of Sulphate of Ammonia and Muriate of Potash, mixed in the proportion of 4:1 should be applied on the surface, between planting rows, at the rate of $1\frac{1}{2}$ oz. per running yard. Subsequently apply the mixture R4 : 6:3 + Mg or R4 : 6:5 + Mg (RRIC B + Mg or RRIC C + Mg) every three months up to about three months prior to budding at the rate of 1oz. per plant.

Nursery plants after budding should be manured as plants in new clearings.

In New Clearings

During the first year the fertilizer should be applied a few inches from the base of the plant and lightly forked in. From the second year onwards the fertilizer is best "pocketed" or "envelope forked" at 4 or more points round the tree at every application.

Three N.P.K. mixtures are recommended for all rubber growing soils in Ceylon. These could either contain Ammonium Sulphate or Urea as the Nitrogen source. Their compositions are as follows:

Mixture	Sulphate of Ammonia	Rock Phosphate	Muriate of Potash 60%	Kieserite
R 4: 6: 2 + Mg	100 parts	100 parts	15 parts	13 parts
R 4: 6: 3 + Mg	100 parts	100 parts	25 parts	20 parts
R 4: 6: 5 + Mg	100 parts	100 parts	40 parts	33 parts

Mixture	Urea	Rock Phosphate	Muriate of Potash 60%	Kieserite
RRIC A + Mg	50 parts	100 parts	15 parts	13 parts
RRIC B + Mg	50 parts	100 parts	25 parts	20 parts
RRIC C + Mg	50 parts	100 parts	40 parts	33 parts

The use of Dolomite during the first two years is not recommended.

Disease and Pest Control

1. "Oidium" or Mildew (Oidium heveae)

White spots appear on the undersurface of leaves from the bronze to light green stage of development. The fungus also attacks flowers and young inflorescences. Controlled by dusting the tree with Sulphur at the rate of 8 lb. per acre per round commencing when 10% of the trees have refoliated after the wintering period. Six to eight rounds of dusting are recommended at the above dosage for susceptible clones as T jir 1.

2. Phythophthora Leaf Disease (Phytophthora palmivora)

Immature leaves when affected turn black and wilt rapidly. In the case of mature leaves a blackening of the stalk in patches is usually accompanied by the exudation of latex from the infected areas. These leaves fall eventually. Controlled by dusting with a 4% copper fungicide used at the rate of 8-10 lb. per acre per round commencing at the beginning of the monsoon rains. Copper in Oil preparations sprayed on the foliage have proved effective in Malaysia and India.

3. Bird's Eye Leaf Spot (Helminthosporium heveae)

Water soaked brown lesions appear on the young leaves and later become distorted. On mature leaves small spots are surrounded by marrow purple margins. Yellow centre of the lesions turns white and semi-transparent whilst the purple brown margin acquires a reddish brown colour and becomes surrounded by a yellow halo. Controlled by spraying with copper fungicides.

4. Bark Rot or Black stripe (Phytophthora palmivora)

Black vertically parallel lines appear just above the tapping cut. These remain distinct at the beginning but gradually thicken and coalesce to form a continuous depressed patch on the panel. On scraping the diseased area distinct black vertical lines are seen on the wood. If neglected it could lead to Canker. Apply Antimucin (1:200) Brunolinum Plantarium (15%) or "Fylomac 90 (1%) on the tapped bark every tapping day at the time of collection of the latex or later the same evening as a preventive measure. As a curative measure carefully excise the diseased tissue as soon as it is detected and apply any one of the above mentioned water-miscible fungicides. Treat the wound the following day when it is dry with tar.

5. White Root Disease (Fomes lignosus)

This disease usually affects young plants during the first five years of growth. They become more resistant with age. The leaves turn dull green or yellowish brown and fall off. The twigs and main stem die-back and the tree eventually dies. Characteristic white mycelium of the fungus is seen on the surface of the roots. The fungus permeates the tissues of the roots which as a consequence decay often becoming soft and friable. Controlled by removal and burning of infected trees. Infected sites should be treated at replanting with ¼ lb. sulphur per planting hole. Applying PCNB collar protectants after exising infected roots helps to protect the roots of healthy plants from fresh infection.

6. Brown Root Disease (Fomes noxious)

Russetting of the foliage is accompanied by partial leaf fall. Brown mycelium is seen on the surface of infected roots. Soil particles and small stones adhere firmly to the mycelial sheath forming an incrustation. Infected trees should be uprooted and burnt. Roots of adjacent trees should be examined for the fungus and treated as for White Root Disease.

7. Black Root Disease (Xylaria thwaitisii)

Staghorn-like fruiting bodies 2-3″ tall, ash coloured to start with, later becoming black, appear round the base of the tree. Method of controlling this disease is still under study.

8. Cockchafer Grubs

Grubs feed voraciously on roots of young plants in nurseries and young plants and the plants eventually fall over and die. Controlled by the application of Aldrex 2 or BHC or Intox 8 to the infected soil. In young plantings these insecticide solutions are poured round the bole of the plant into holes made within a circle of 12-18″ in radius.

TOBACCO

Beedi Tobacco

Beedi tobacco thrives well in the following districts:—

(*a*) *Zone between Matale and Jaffna*

Matale, Nikaweratiya, Anuradhapura, Vavuniya, Mannar, Kilinochchi and Jaffna.

(*b*) *Zone between Minipe and Tangalle*

Minipe, Bintenne, Wellassa, Moneragala, Wellawaya, Godakawela, Embilipitiya, Hambantota and Tangalle.

Nursery

Incorporate 100-200 lb. of cattle manure/100 sq. ft. Prepare raised beds 4′ wide separated by 2′ wide drains. Prior to sowing apply 3 lb. Sulphate of Ammonia (or 1½ lb. Urea) 2 lb. Super Phosphate and 2 lb. Sulphate of Potash per 200 sq. ft. Sow 2 cut, teaspoonsful of seed per 200 sq. ft. and shade with white cloth or jute. Water twice a day. Reduce shade at 3 weeks and transplant when 5 weeks old.

Transplanting

Apply 5-10 tons cattle manure or compost per acre and 1-2 cwt. Ammonium Sulphate (or ½ to 1 cwt. Urea) in two equal doses at planting time and 3 weeks after transplanting. Prepare ridges 3 ft. apart and plant at 2½ ft. spacing on ridge. Age of crop is about 3-3½ months. Best times for planting are in December in the Maha season and end April and mid-May in Yala season.

After Care

1. Remove lowest leaves (sand leaves) 3 weeks after transplanting.
2. When plants have developed 9 or 10 good leaves nip the bud at the top.
3. Remove all shoots or suckers that arise from the bottom or leaf axils after topping every week.
4. Weed 3 weeks after transplanting.

Harvesting

Harvest the crop when several leaves have attained a greenish-yellow colour. Do not harvest in rainy weather.

Cigarette Tobacco

The following districts are recommended for cigarette tobacco cultivation:

Nuwara Eliya	—	Nildandahinna, Walapone and Hanguranketha.
Badulla	—	Hali-Ela, Welimada and Aluthnuwara.
Kandy	—	Mayilapitiya, Teldeniya, Madugoda and Minipe.

Kurunegala	—	Padeniya and Melsiripura.
Matale	—	Galewala and Naula.
Polonnaruwa	—	Hingurakgoda, Polonnaruwa and Elahera.
Amparai	—	Gal-Oya Valley (Left Bank)
Jaffna	—	Kilinochchi and parts of the Mainland.
Vavuniya	—	Mankulam.
Moneragala	—	Badalkumbura Area.

Nursery

Prepare beds 50′ × 3½′ and 2″ high separated by drains 18″ wide. Sterilize the soil using D.D. or EDB. Apply the following basal fertilizer mixture per 50′ × 3½′ plot:—

Sulphate of Ammonia	—	2 lb. (or 1 lb. Urea)
Triple Superphosphate	—	3 lb.
Sulphate of Potash	—	1½ lb.
Magnesium Sulphate	—	½ lb.

Broadcast this fertilizer and incorporate to a depth of about 2-3 inches. One teaspoonful of tobacco seed would suffice to sow a bed 50′×3½′. Sowing is easily facilitated by adding the seed to water in a watering can with a fine rose and watering the plot. (Constant agitation is necessary to prevent the seed from settling out). Compact the soil lightly with a plank and water the plot with a fine rose can. Seed is sown in October and November during the Maha season, in February in between seasons and in March and April in the Yala season. Shade the plot with a cloth or jute. Water the beds lightly twice a day with a can having a fine rose, reducing the volume applied progressively. From the third week onwards, and at weekly intervals, spray the plants with Perenox at the rate of 2-5 ozs. in 10 gallons water using a knapsack sprayer.

Transplanting

Plough the field to a depth of about 9″ and level. The recommended planting distance is 3 ft. × 2½ ft. and on this basis an acre of land would require about 6000 plants. Transplant the seedlings when they are about 5-6 weeks old and about 4-6 inches high.

In rainfed highland areas 400-450 lb. of fertilizer should be applied per acre. The composition of the mixture is as follows:—

Sulphate of Ammonia	—	100 lb. (or 50 lb. Urea)
Triple Superphosphate	—	200 lb.
Sulphate of Potash	—	100 lb.
Muriate of Potash	—	25 lb.
Magnesium Sulphate	—	25 lb.

Apply 300 lb. of the above mixture per acre at the time of planting. This application is made into the planting hole about 4-5 in. deep. The balance quantity of this mixture should be applied within 3 weeks of planting at a distance of about 4 in. from the base of each plant and about 5 in. deep. (It is preferable to appy all of the Sulphate of Ammonia or Urea with the basal dressing).

In the Jaffna District and irrigated areas the following fertilizer mixture is recommended:—

Sulphate of Ammonia	—	75 to 100 lb. (or 37½ to 50 lb. Urea)
Triple Superphosphate	—	125-200 lb.
Sulphate of Potash	—	100-125 lb.
Magnesium Sulphate	—	25 lb.

Apply 300-450 lb. of this mixture per acre at the time of planting either into the planting hole or about 4 in. away from the base of the plant at a depth of 4-5 in. The fertilizer may also be applied in two strips between rows.

After Care:

1. Remove sand leaves and not exceeding 2 or 3 dead leaves.
2. Nip the terminal buds when about 10-15% of the plants have flowered.
3. Remove all axillary buds or suckers.
4. Weed for the first time 10-12 days after planting. A second weeding may be necessary before a good cover of the crop is attained.

METRIC CONVERSION

DOUBLE CONVERSION TABLES FOR WEIGHTS AND MEASURES

Note: The central figures represent either of the two columns beside them, as the case may be. Example:

1 Kilometer — 0·621 mile

and

1 mile — 1·609 kilometers

1.609	Kilometers	1	0·621	mile
0·454	Kilograms	1	2·205	Avoirdupois pounds
0.907	Metric tons	1	1·102	Short tons (2000 Av. lbs.)
1.016	Metric tons	1	0.984	Long tons (2240 Av. lbs.)
4.546	Litres	1	0.220	Imperial gallons
6.236	Grams per litre	1	0.160	Ounces per Imperial gallon
0.405	Hectares	1	2.471	Acres
1·121	Kilograms per Hectare	1	0·892	Pounds per acre

PROPOSED C. F. C. STANDARD SIZES (METRIC)

1	Kilogram	—	2·2 lbs-	(approx.)
3	Kilograms	—	6.6 lbs.	(approx.)
10	Kilograms	—	22 lbs.	(approx.)
25	Kilograms	—	55 lbs.	(approx.)
50	Kilograms	—	110 lbs.	(approx.)

POTATO

(A) Low Country Dry Zone—Jaffna

Recommended Varieties

Arka, Ginike, Condea.

Planting Times

The best time for planting is between mid-November and end December.

Fertilizer Application

The following fertilizers should be applied/acre at planting:

(*a*) *Jaffna District:*

Sulphate of Ammonia	—	2½ cwt.
or Urea	—	1¾ cwt.
Triple Superphosphate	—	2 cwt.
Muriate of Potash	—	2½ cwt.

B. Upcountry Region, (Nuwara Eliya and Badulla Districts):

Recommended Varieties

Arka, Condea, Ginike, Pamir, Wanda, Baku, Greta, Uran and Warta.

Planting Times

Best time for planting is February to March. During September to October plant only Arka, Condea and Pamir varieties. Do not plant from December to January in frost affected areas and from June to July in wind affected areas.

Fertilizer Application

The following fertilizers should be applied per acre at planting:

(*a*) *Black Soils*

Sulphate of Ammonia	—	3 cwt.
or Urea	—	1½ cwt.
Triple Superphosphate	—	5 cwt.
M.P. or Sulphate of Potash	—	1 cwt.

(*b*) *Jungle Soils*

Sulphate of Ammonia	—	4 cwt.
or Urea	—	2 cwt.
Triple Superphosphate	—	6 cwt.
M.P. or Sulphate of Potash	—	1 cwt.

Planting in (A) & (B)

Apply 15 cwts. Dolomitic lime per acre every 2-3 years to very acid soils. Add 5 tons of cattle manure per acre every season and dig soil to a depth of 8 inches. Prepare ridges about 6 inches high separated by furrows 1½ to 2 ft. between tops of ridges. 1 ton of seed potato is required to plant 1 acre. Sprouted tubers or cut pieces (not less than 1½ ozs. in weight) are dipped in Antracol, Lonacol M, Dithane M-45, Dithane M-22, Magnan Curit or Manzate used at the rate of 1 oz. in 3 gallons water and allowed to suberize. Plant these 10-12 inches apart in the furrows.

After Care

Weed when plants are 3-4 inches high and again 2 weeks later.

Harvesting

Lift the crop when the leaves begin to turn yellow and the skin of the tubers do not peel off easily. Store in well ventilated rooms.

Disease and Pest Control

1. Late Blight (Phytophthora infestans)

Brown lesions on leaves enlarging rapidly (1-4 days) killing the leaf. Tops blacken and wilt followed by a wet rot involving stems as well as leaves. Infected tubers become brown and a wet rot sets in. Controlled by spraying Dithane M-45, Manzate B, Dithane M-22, Lonacol M Magnan Curit and Antracol at 4 weeks after planting at 10 day intervals at the rate of 2 lb. in 100 gallons water per acre.

2. Bacterial Wilt (Pseudomonas solanacearum)

Drooping of leaf tips. White bacterial slime oozes out of cut stem of infected plants. Infected tubers show characteristic brown rot localized in vascular tissues. Uproot and destroy infected plants. Rotate potato with non-susceptile crops once every 2 years on highland and flood the fields with infected crops.

3. Leaf Roll (Virus disease)

Rolling of lower leaves. Transmitted by aphids. No chemical control. Uproot and burn.

4. Leaf mosaic (Virus disease)

Cause mosaic of light and dark green areas on leaves and dwarfing and distortion of plants. Uproot and destroy infected plants.

5. Dry Rot (Fusarium caeruleum)

Attacks potato tubers in storage. Causes shrinkage of tubers. Rotted tissue is dry and cavities are lined with whitish mycelium. Pinkish pustules containing numerous sickle-shaped spores appear on the skin of tubers. Controlled by avoiding damage to tubers at lifting. Seed potato should be treated with Antracol, Lonacol M, Dithane M-45, Dithane M-22 etc. at 1 oz. in 3 gallons water. Dry treated tubers or pieces before storage.

6. Cutworms

Seedling stems eaten at ground level and plants topple over. Spray around the base af plants 4 weeks after planting with D·D.T. 25% E.C. (1 fl. oz. in 2 gallons water) or Fenitrothion 50% E.C., (1 fl. oz. in 4 gallons water) or Malathion 50% E.C., (1 fl. oz. in 4 gallons water).

7. Root eating ants

Plants wilt suddenly due to the roots been chewed up. Spray the furrows prior to planting with Aldrin 20% E.C. or Birlane 25% W.P. at the rate of 1½ fl. oz. in 1 gallon water. Use 1 gallon solution per 200 ft. of furrow. Ant attack at tuberisation is controlled by spraying Aldrin at the rate af 1 fl. oz. in 5 gallons water around the base of each plant.

8. Tuber Moth and Larvae

Larvae eat the leaves and riddle the tubers. Spray D.D.T. 25% E.C. (1 fl. oz. in 1 gallon water) or Metacil 80% W.P. or Carbaryl 85% S.P. (1 oz. in 3 gallons water) at 40-80 gallons solution per acre.

9. Tortoise Beetle

Feeds on leaves. Orange brown in colour with black spots. Spray Metacil 80% W.P. or Carbaryl 85% or Malathion 50% E.C. or Fenitrothion 50% E.C. at 1 fl. oz. in 3 gallons water.

CHILLIES

Seed Disinfection

Dust the seed with "Agrosan GN" (1½ teaspoons per 1 lb. seed) or steep for 30 minutes in a solution of Ceresan Wet (1 oz. in 5 gallons of water). Sow immediately after treatment.

Nursery

Broadcast thinly or row seed 2 inches apart and cover with a fine layer of soil. Water regularly and safeguard against "leafcurl" by spraying at 10 day intervals with a mixture of Fenitrothion (¼ teaspoon) Sulphur Wettable powder (⅓ teaspoon) in ½ bottle water.

Planting

Transplant 3′ × 2′ apart when seedlings are 35 days old, two seedlings per planting hole 12″ × 10″ by 10″ deep.

Fertilizer Application

(1) Basal Application

Add two heaped teaspoons of the C.F.C.'s Special Chilli Fertilizer Mixture per planting hole before planting and mix with soil.

(2) Top Dressing

At 2 weekly intervals, commencing from the second week of planting, apply 1¼ teaspoons of C.F.C.'s Special Chilli Fertilizer Mixture per hole up to the 12th week. These should be applied in a ring about 4-5 inches from the base of the plant. Fork lightly and water immediately after fertilizing.

Disease and Pest Control

1. Anthracnose (Colletotrichum capsici and C. gloeosporioides)

Flowers discoloured and shrivelled, black patches spreading from flowers down the stem; circular depressions grey to brown in colour on the fruit. Spray 50% Copper fungicide every 10 days at the rate of 1 oz. in 5 gallons water or "Ziram" at 1 oz. in 3 gallons water.

2. Leaf spot (Cercospora capsici)

Yellow spots on leaves and stems; these enlarge in wet weather turning pale grey. Badly affected leaves fall. Spray with "ziram" or a copper fungicide as above.

3. Mildew (Oidiopsis taurica)

Greyish white patches on leaves. Controlled by dusting or spraying with Sulphur.

4. Leaf Curl

Vein clearing and upward rolling of the leaves. Spray fortnightly with a mixture of Fenitrothion E.C. 50% ($\frac{1}{4}$ teaspoon), and Sulphur Wettable powder ($\frac{1}{3}$ teaspoon) in $\frac{1}{2}$ bottle water using a flit-gun until plants are thoroughly soaked.

RED ONIONS

Time of Planting

Mid December to end July is the best time for planting. Avoid planting in April/May in wet zone and from October-December in both wet and dry zones. In the Islands off Jaffna October to December planting is permissible.

Planting

As onions are sensitive to wet feet the beds should be raised from 2-4 inches. Plant single bulbs 4″ × 4″ apart using 1 lb. bulbs that are at least 8 weeks old after harvest per 10′ × 3′ plot leaving tips above ground level. In the absence of rain water lightly each day. During wet weather cover plot with polythene sheet. Stop watering by about the 70th day when the leaves begin to yellow.

Fertilizer Application

(1) Basal dressing

Sprinkle 16 heaped teaspoons of C.F.C.'s Special Onion Fertilizer Mixture on the bed 10′ × 3′ and fork lightly before planting.

(2) Top Dressing

Sprinkle 8 heaped teaspoons of C.F.C.'s Special Onion Fertilizer Mixture between rows per bed of 10′ × 3′ at 3 weeks and 6 weeks after planting and fork lightly.

Disease and Pest Control

Bulb Rot (Fusarium solani)

Rapid die—back of leaves from tips when plants approach maturity. Root rot sets in due to growth of whitish mycelial growth. Diseased bulbs show brown discolouration which develops into a soft rot under moist conditions. In advanced stages the bulb becomes reduced to a semi-watery pulp and the plant finally dies. Dip bulbs for 5 minutes in 50% Copper fungicide at the rate of $\frac{1}{2}$ oz. in 1 gallon water and plant immediately afterwards.

Thrips and Caterpillars

If thrips are observed in clusters at the leaf bases or caterpillars attacking the leaves, spray as soon as these pests are detected and again 10 days later with a solution of Fenitrothion 50% E.C. at the rate of $\frac{1}{4}$ teaspoon in $\frac{1}{2}$ bottle of water.

Harvesting

Lift the crop when 75-85 days old.

BOMBAY ONIONS

Nursery

Two garden pots (each 12 inch diameter) or a wooden box 24″ × 12″ × 6″ deep may be used for the nursery. Place a layer of small stones over the bottom of either of these containers and on it loose garden soil mixed with one teaspoonful of C.F.C.'s special Onion Fertilizer Mixture. Spread the contents of a half ounce packet of seed thinly over the soil and cover with $\frac{1}{4}$ inch soil pressing lightly. Water lightly twice a day, morning and evening.

In the early stages dew and rain may cause a dieback of the leaves. This is prevented by covering the pots or box with a polythene sheet during rain.

Planting

Prepare raised beds 2-4″ high and of size 10′ × 3′ with 1 ft. wide drains round them.

Transplant the seedlings when 6-7 weeks old and about 9″ high. Select only vigorously growing seedlings having a white bulb $\frac{1}{2}$ to $\frac{3}{4}$ inch long. Plant seedlings, one seedling at each point, 6″ × 4″ apart and not more than $\frac{1}{2}$ inch deep. A half ounce seed packet will be adequate for about 4 beds. Water the plot very lightly every day up to the 90th day from transplanting. Stop watering thereafter.

Fertilizer Application

(1) Basal Dressing

Mix 16 heaped teaspoons of C.F.C.'s Special Onion Fertilizer mixture into the soil of each bed of size 10′×3′ prior to transplanting the seedlings.

(2) Top Dressing

Sprinkle 8 heaped teaspoons of C.F.C.'s Special Onion Fertilizer Mixture between rows at 3 weeks and again at 6 weeks after transplanting per 10′ × 3′ bed at each application and fork lightly.

Disease and Pest Control

Damping-off: If small seedlings at the nursery stage show signs of wilt and collapse suddenly, add a pinch of 50% Copper fungicide to a pint of water at time of watering.

Thrips and Caterpillars: If Thrips are observed in clusters at the leaf bases or caterpillars attacking the leaves, spray as soon as these pests are detected and again 10 days later with a solution of Fenitrothion 50% E.C. at the rate of $\frac{1}{4}$ teaspoon in $\frac{1}{2}$ bottle water.

Harvesting

Lift the crop when the leaves have turned yellow and begin to dry in 100-110 days after transplanting. Spread the bulbs with the dry leaves in the shade 4-5 days to dry.

USE C.F.C.'S SPECIAL ONION FERTILIZER MIXTURE

FOR BETTER RESULTS

USE "LANKA POHORA"—

USE FERTILIZER WISELY

PINEAPPLE

Grows well in well drained acid soils.

PLANTING

Propogated from "ratoons" which arise below ground level, "suckers" which arise in the axils of the lower leaves, "basal slips" which arise from fruit stalks and "crowns" which are borne on top of the fruit. Ratoons, although difficult to obtain, come to bearing in 12-14 months whereas suckers which are more readily available do so in 18-20 months from planting. Crowns take about 24 months to produce fruit. These are, however, readily available, produce a uniform stand of plants which come into fruit at the same time and are generally disease free. Strip the basal leaves of the planting material and disinfect by dipping for 2 minutes in a solution of Sumithion or Follithion used at the rate of 1fl. oz. in 4 gallons water. Dip planting material in Ceresan Wet solution used at 5 oz. in 10 gallons water to protect against fungal infection. Air dry for 3-4 days before planting.

If intercropped with coconut, plant 4000-5000 plants per acre in rows 6 feet apart and at a distance of 12-18 inches in the row. Alternatively plant in double rows 18 inches apart in the row and 2 ft. between rows with 6 feet between each pair of double rows giving a stand of about 8000 plants per acre. When grown as a pure crop about 14,000 plants should be planted per acre reducing the space between each pair of double rows to 4 feet.

FERTILIZER APPLICATION

Basal Dressing

Apply 6 cwt. of Rock Phosphate and 2½ cwt. of Muriate of Potash per acre before planting. Substitution of the Muriate with Sulphate of Potash improves fruit quality.

Top Dressing

1st year—Apply Sulphate of Ammonia at the rate of 1 oz. (or ½ oz. Urea) per plant 2 months after planting. A second application should be made at the same rate at 6 months. At 9 months apply 5 cwt. of Sulphate of Potash or Muriate of Potash per acre.

2nd year—15-16 months after planting or 6 months after the previous application of fertilizer apply 500 lb. Sulphate of Ammonia (or 250 lb. Urea) 50 lb. triple Superphosphate and 300 lb. Sulphate of Potash per acre. Repeat every six months thereafter.

Best time to apply the half yearly dose of fertilizer is about two months prior to flowering, roughly in December/January and July/August. All top dressings are broadcast and forked lightly into the soil.

A foliar application of Urea and cane sugar used at the rate of 8 oz. and 2 oz. respectively in 1 gallon water will help slow growing plants to grow faster.

Inducing Flowering

Plants which have produced about 30 leaves can be induced to flower and fruit uniformly either by pouring 1/3 cup of a freshly made up aqueous solution of Calcium Carbide (one handful in 4 gallons water) or Alpha-naphthyl Acetic Acid to the crown of each plant. Very small plants should not be treated this way as they would produce small fruits.

Disease and Pest Control

1. Base or Butt Rot (Ceratocystis paradoxa)

Underground parts of stem exhibit a soft rot and foliage turns yellow. Whitish lesions appear on leaves. Mature lesions exhibit straw coloured centre. Controlled by treating planting material with Ceresan Wet used at 5 oz. in 10 gallons water.

2. Pineapple Wilt (Virus)

Brownish-purple to orange-red colouration of leaves followed by their collapse and gradual die-back. Transmitted by the mealy bug. Spray Sumithion or Follithion at the rate of 1 fl. oz. in 4 gallons water.

3. Ants

Spray between rows with Aldrin or Chlordane 20% E.C. at the rate of 1 oz. in 2½ gallons water to prevent ants carrying the mealy bugs to the plants.

PASSION FRUIT

Passion fruit is best grown as an un-irrigated crop in the wet-zone and under irrigation in the dry-zone. Passion vines thrive well on well drained soils with good moisture retaining capacity. Sandy soils and soils with a high water table are unsuitable. Evenly distributed rainfall of not less than 35 inches is essential.

Propagation

1. Seeds

Seed from fully mature fruits obtained from selected vines are divested of the pulp by rubbing against a gunny bag and washing the seeds free. (Fermentation of pulp for a few days would facilitate easy removal). These seeds could either be dried and stored for sometime or planted immediately. Seeds could be germinated in beds and the seedlings transferred into polythene sleeves when they are about 6 inches high or raised in nursery beds and planted out directly in the field when 8-12 inches high.

2. Cuttings

Cuttings from high yielding, self pollinated strains of passion fruit obtained from fully grown but young branches with not less than 3 nodes planted in polythene sleeves strike root easily. Dipping the cut ends in Seradix, Phyomone or Planofix accelerates root development.

3. Grafting

Passion fruit can be successfully grafted. Seedlings of the common variety (*Passiflora edulis*), banana variety (*P. mollissima*) and bell apple (*P. laurifolia*) can be used as stocks. Stem tips about 6 inches long, or segments below it with about 3 nodes, selected from mother plants are grafted using the cleft or veener method. A waxed thread should be used to tie the stock and scion and the union covered with a polythene strip.

4. Planting

In home gardens, where space is limiting, passion vines could be planted along fences about 12-15 feet apart and trained to run on the barbed wire.

As an orchard crop the vines are trained on a trellis constructed with wooden or concrete posts planted 12-15 feet apart in the row and 6-8 feet between rows, the wires being fixed about 6½ feet above ground level.

Training and Pruning the vine

As passion fruits are borne on the current seasons lateral branches tendrils from these should be removed to encourage the downward growth. When the older laterals have ceased to bear fruits these should be pruned to 3 to 4 nodes from the main branch on the wire.

Fertilizer application

1. Basal Dressing

Add about 2 baskets of well rotted cattle manure or compost and 1-2 lbs. of Rock Phosphate per planting hole, mix well and leave for about 2 weeks prior to planting.

2. Top Dressing

Apply 4 oz. of Sulphate of Ammonia (or 2 oz. Urea) and 2 oz. Muriate of Potash in a ring about 18 inches away from base of the plant 2 months after planting. Cattle manure should be applied every 6 months progressively increasing the quantity by one basket.

If the vines show luxurious growth after coming into bearing apply a mixture of Sulphate of Ammonia, Super Phosphate and Muriate of Potash in the proportions 2:1:1 respectively at the rate of 1 lb. of mixture per year of age of vine. Apply the fertilizer about 2 ft. away from base of vine.

Disease and Pest Control

Leaf Spot (Alternaria passiflorae)

Occurs in warm muggy weather. Circular brown spots appear on leaves and stems. Later these become lighter in colour and angular. Diseased leaves fall. Stem lesion may completely ring-bark and eventually kill the vine. Dark green water-soaked spots on fruits later sinking inwards resulting in shrivelling of fruits and premature fall. Controlled by pruning old lateral branches every year and spraying fortnightly with 50% Copper Fungicide at the rate of 1 oz. in 1 gallon water. Spray residues on fruits may if necessary be removed by dipping in a weak solution of Citric Acid.

Woodiness Disease

A virus desease which is widely prevalent in the Kandy, Kegalle and Colombo Districts. This disease manifests itself as abnormal and deformed leaves. In addition to becoming curled and twisted the leaves often show a mild mottling. Stems near terminal shoots develop dark green areas. Fruits turn dark purple and are often asymmetrical and distorted. Infected fruits are generally small with abnormally thick pericarp and reduced pulp cavity. Since this disease is transmitted by contact and aphids it is advisable not to plant susceptible alternate crops such as chilli, cucurbits and banana in close proximity to passion vines.

MANGO

Varieties

Several indigenous and imported varieties are now available in Ceylon. Since mango needs a definite dry spell to facilitate pollination, fruit set and fruit maturity the selection of the most suited variety for any given area is necessary to cultivate this crop with any success. The following guide may be used in the selection of the appropriate variety:—

Wet Zone	—	Vellaicolomban, Parrot Mango, Willard, Peterpassand Neelam and Betti Amba.
Dry Zone	—	Karathucolomban, Ambalavi, Willard, Neelam and Vellaicolomban (Chembatan and Dilpassand may be grown in the Jaffna Peninsula).

Willard performs extremely well in the Dry Zone but as it has a tendency to overbear, fruit thinning is absolutely necessary in order to obtain good fruit set.

Planting

In order to produce plants which are "true to type" propagation is generally carried out by grafts, bud grafts and cleft grafts being common. Popular varieties such as Karathucolomban, Vellaicolomban, Ambalavi, Willard and Peterpassand are available as grafts. Parrot mango, Bombay mango and other local varieties are propagated from seeds.

Although normally mango is planted about 40 feet apart, in the case of Willard and Ambalavi it would suffice to plant them 35 feet apart as these are smaller varieties.

Fertilizer application

Application of fertilizer is best done just before or just after the rainy season. Young mango plants respond very well to cattle manure and about 4-5 baskets should be applied annually. On starting to bear, a generous supply of Phosphate and Potash improves the yield and quality of fruits. This can be supplied as 10 lbs. of Rock Phosphate and 2½-5 lbs. of Sulphate of Potash per tree annually. Nitrogenous fertilizer should not be applied unless the tree shows poor vegetative growth brought on as a result of heavy bearing in the previous season or drought. Should such be the case Sulphate of Ammonia could be applied at the rate of 2-3 lbs. (or 1-1½ lb. Urea) per tree in bearing which is under 5 years of age and 5-10 lbs. Sulphate of Ammonia (or 2½-5 lb. Urea) thereafter up to 20 years.

Placement of fertilizer should be in a circle about 18″ away from the base of the tree and lightly forked in. When the tree is young it could also be done by cutting a trench 1 ft. wide and 3″ deep about 18 inches away from the stem, progressievly widening the circle every year until it is finally about 4 feet wide.

Disease and Pest Control

1. Anthracnose (Gloeosporium mangiferae)

Commonly manifested as Leaf Spot, Withertip, Blossom Blight and Fruit Rot. Usually occurs in moist rainy weather.

Blossom blight is the most serious phase of the disease as it affects fruit set. Black spots on inflorescence cause the flowers to dry. If moist weather continues the flower stalk turns black. Dark angular lesions which coalesce later appear on young leaves. These fall off giving the leaves a perforated appearance. Young shoot tips when affected die-back. Black sunken spots occur on ripening fruit. Controlled by pruning infected shoots or by spraying 50% copper fungicide, or 'zineb' or a mixture of both, at the rate of 1 oz. copper in 1 gallon water and/or zineb at 1 oz. in 3 gallons water, 2-3 times during the blossoming period and at fortnightly or monthly intervals thereafter.

2. Mildew (Oidium mangiferae)

White patches of superficial mycelium appear on flowers, fruits, buds and new developing leaves. These are later transformed into white powdery masses. Controlled by dusting with Sulphur or spraying with Sulphur water wettable powder used at the rate of 1 oz. in 2 gallons of water soon after flowering and at 7-14 day intervals.

3. Leaf Spot (Cercospora mangiferae)

Small brown to grey spots on leaves the central tissues of which usually fall off resulting in a shot-hole appearance. Nursery plants should be sprayed every 14 days with a 50% copper fungicide used at 1 oz. in 1 gallon water.

4. Mealy bug

These insects attack leaves of young mango grafts causing "witches broom" condition. Spray with Malathion 50% E.C. at the rate of 1 fl. oz. in 3½ gallons water.

5. Mango Hopper

Sucks the juice from the flower heads causing them to wilt and drop. Controlled by spraying with Malathion 50% E.C. at the rate of 1 fl. oz. in 3-4 gallons water at bud break or dusting with B.H.C. 10% powder.

BANANA

Planting

Banana can be grown the year round and is propagated either by narrow-leaved "Sword Suckers" or broadleaved Maiden or Water Suckers. The former are preferable as these establish themselves much quicker and being more vigorous come into bearing earlier than the Maiden Suckers.

4-6 month old Sword Suckers should be taken from mother plants which have borne a bunch. In the dry zone these could be planted immediately but in the wet zone it is advisable to protect the suckers against fungal attacks by removing all the leaves, trimming the roots and dipping the bottom in a 2% solution of Copper Sulphate or dusting with sulphur. Dry in shade for 7-10 days before planting.

Plant in holes 2′ × 2′ × 2′ and spaced 10-12 feet apart. Mix 3 baskets of cattle manure and 2 handfuls of wood ash into the soil of each hole at planting. Alternatively add 3 lb. C.F.C.'s Special Banana Fertilizer Mixture to each hole 2-3 days prior to planting.

The number of suckers per mother plant should be regulated on the basis of two suckers to each plant in fruit. Suckers developed before flowering should be removed. At flowering one Sword Sucker and at maturity of fruit one other sucker should be allowed to grow.

Covering the developing bunches with polythene increases the fruit weight by 25%.

Fertilizer Application

Sprinkle 1 lb. Ceylon Fertilizer Corporation's Special Banana Fertilizer Mixture round each plant 2 months from planting, incorporate into soil by forking and irrigate lightly. Repeat every time a new sucker is developed.

Disease and Pest Control

1. **Bunchy Top (Virus)**

   Leaves bunched together in the form of a rosette and plants stunted. Irregular dark-green streaks appear along secondary veins of underside of the lower portion of first young unfolding leaf. Succeeding leaves yellowish in colour with prominently displayed dark green streaks. Controlled by roguing of diseased plants or by injecting MCPA weedkiller, 8 ml. per plant, at the rate of $2\frac{1}{2}$ pints in 1 gallon water. Healthy plants from infected clumps should also be destroyed to prevent further spread of the disease.

2. **Panama Wilt (Fusarium oxysporum)**
Leaves turn yellow from the margin inward or yellow blotches appear on the lamina. The leaves collapse at their bases and hang downwards from the pseudo-stem. Controlled by uprooting and burning diseased plants. Mix 1 part lime to 3 parts soil, sprinkle water and leave for a few days prior to re-planting.

3. **Anthracnose (Gloeosporium musarum)**
Discolouration of fruit at the flower end. Fruit becomes black and shrivelled. Usually attacks Ash Plantain in rainy weather. Spray young developing bunches with 50% copper fungicide at the rate of 1 oz. in 2 gallons water. Repeat if necessary at weekly intervals until the fruit is mature.

TOMATO

Two varieties are cultivated in Ceylon—the ribbed acid variety which grows well in the wet zone is used for curry and the smooth round variety in salads. Tomato thrives well in cold dry areas such as Bandarawela and Welimada. It grows well during the period October to December and even in Yala in irrigated areas such as Jaffna and the dry zone. The ribbed variety being less susceptible to Bacterial wilt is more suited for cultivation in the wet zone. The smooth variety is prone to this disease and hence does not perform well in the wet zone. A hybrid variety known as Katugastota tomato is recommended for the wet zone.

Planting

Two 4-6 week old seedlings are transplanted into holes spaced 2-3 feet apart. A short trellis or individual stakes should be provided to support the plant when it grows.

Fertilizer Application

Basal Dressing

Apply 2 handfuls of compost or cattle manure together with 2 teaspoonsful of C.F.C.'s Home Garden Fertilizer Mixture to each hole about 2-3 days prior to planting and mix well into the soil. (Do not use fresh cattle manure).

Top Dressing

Apply 1 tablespoonful of C.F.C.'s Home Garden Fertilizer Mixture in a circle about 8" away from the base of the plant about 2-3 weeks from planting and fork lightly.

Disease and Pest Control

1. Bacterial wilt. (Pseudomonas solanacearum)

Rapid wilting and complete collapse of the infected plants. Diseased plants are normally stunted and show yellowing of leaves. Adventitious roots from stems not uncommon. Uproot and burn diseased plants. Rotation of crops and planting resistant varieties helps to minimise incidence of this disease.

2. Leaf mould (Cladosporium fulvum)

Pale yellow spots on upper surface of older leaves. Fungus grows on under surface, greyish at the beginning turning brown. Checked by adopting good cultural practices such as weeding, not growing under shade etc. Controlled by dusting lower surfaces of leaves with sulphur.

3. Leaf spot (Septoria lycopersici)

Water-soaked spots with brown to grey centres appear on leaves. These coalesce causing blighting. Crop rotation and elimination of crop residues helps to eradicate this disease. Spray with a Copper fungicide, or Maneb or Zineb.

4. Anthracnose (Colletotrichum phomoides)

Brown spots on ripening fruits causing fruit rot. Crop rotation and destruction of infected crop residues reduces the incidence of the disease. Spray with "Ziram".

5. Leaf Curl (Virus)

Leaves show vein clearing, reduction in size and curling inwards or outwards. Plants stunted. Causes partial or complete sterility of plants. Transmitted by the whitefly. Alternate hosts—Tobacco, *Vernonia cineria* and *Synedrella nodiflora*. Controlled by eliminating carrier weeds.

BANDAKKA

Grows well up to 4000 ft. above sea level.

Planting

Avoid planting in rainy weather. Plant 4 or 5 seeds in each planting hole 1′×1′×1′ and spaced 2½-3 feet apart. After a fortnight leave two plants in each hole and remove the others.

Fertilizer Application

1. Basal Dressing

Mix half a basket of dry cattle manure and one heaped teaspoonful of C.F.C.'s Home Garden Fertilizer Mixture with the soil in each hole about 2-3 days prior to planting.

2. Top Dressing

Apply 2 heaped teaspoonsful of C.F.C.'s Home Garden Fertilizer Mixture in a circle about 6″ from the base of the plant 3 weeks from planting. A second top dressing of 3 heaped teaspoonsful should be given 6-7 weeks after planting.

Disease and Pest Control

1. Yellow Vein Mosaic (Virus)

Plants yellow and decline early. Plant resistant varieties like the Tinnevely Bandakka available from the Department of Agriculture. Uproot and destroy infected plants.

2. Leaf eating and Leaf rolling Caterpillars

Spray Fenitrothion 50% E.C. or Malathion 50% E.C. (¼ teaspoonful in 1 bottle water).

BRINJALS

Brinjal can be grown up to about 3000 ft. from sea level.

Planting

Transplant 4-6 week old seedlings in holes 3 ft. apart. Prune after 6 months and manure again.

Fertilizer Application

1. Basal Dressing

Apply 2 handfuls of dry cattle manure and 2 heaped teaspoonsful of C.F.C.'s Home Garden Fertilizer Mixture per hole prior to planting.

2. Top Dressing

Apply 2 heaped teaspoonsful of C.F.C.'s Home Garden Fertilizer Mixture in a circle 8 inches away from base of plant two weeks from planting and again a month later.

Disease and Pest Control

1. Bacterial Wilt (Pseudomonas solanacearum)

Plants wilt and die due to rot at ground level. Burn all wilted plants and plant resistant varieties.

2. Caterpillars

Cause folding of leaves and bore into buds and fruits. Spray Fenitrothion or Malathion 50% E.C. (1 fl. oz. in 3-4 gallons water).

3. Leaf eating beetle

Small black spotted beetles and thin hairy grubs eat the leaves. Control by spraying Malathion or Fenitrothion 50% E.C. (1 fl. oz. in 4 gallons water).

MANIOC

Manioc can be grown from sea level to an elevation of about 3000 ft.

Planting

Propagated from stem cuttings about 9 inches long obtained from the middle portion of mature stems. Loosen the soil to a depth of about 18 inches and plant the cuttings erect in shallow pits. Hills should be spaced about 3 feet each way.

Fertilizer Application

1. Basal Dressing

Add about 2 handfuls of dry cattle manure or compost and 3 teaspoonsful of C.F.C.'s Home Garden Fertilizer Mixture to each pit and mix well with the soil.

2. Top Dressing

Sprinkle 3 teaspoonsful of C.F.C.'s Home Garden Fertilizer Mixture per sq. yard between rows at a distance of 3 inches from the base of the plant and fork lightly. This should be applied about 6-7 weeks after planting.

After Care

Weed and loosen the soil round plants a month after planting. Weeding should be repeated every 3 weeks.

Harvest

Department of Agriculture varieties may be lifted in 5-6 months.

Preparation of Flour

Peel the tubers and slice the flesh. Spread evenly for about 24 hours in the shade to liberate the Prussic Acid and dry in the sun for 5 days. Pound into flour in a mortar.

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