AGRICULTURE

For Fiji's Health & Wealth

CROP FARMER'S GUIDE

The CROP Farmer's Guide

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Mr. Ritesh Dass
The Permanent Secretary
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PREFACE

The Agriculture sector plays a pivotal role in Fiji's economy through its direct linkages with the rural population. In 2018, the sector contributed $686.9FJD million to the National GDP with a growth rate of 5.5% compared to $557.5 million in 2017, a growth rate of 11% from 2016. Agriculture has been increasing at an annual average growth rate of 4 percent in the last 5 years (2014 - 2018).

These are exemplary growth rates when considering the catastrophic effects of Cyclone Winston in 2016 and are comparative to the annual growth rates occurring in Fiji's significant tourism industry. Close to two-thirds of Fiji's labour force is involved in the agriculture sector. (source FARS/ FBOS).

We are all well-aware of the many challenges for agriculture. One of our central issues is about how we better empower our smallholder farmers to enable them to lift their production levels and even to transition to commercial-scale farming and/or the many opportunities along the value chain. Then there is also complex issue of climate change and how we secure our food systems, while at the same time continually increasing our marketable surplus to continue feeding our growing population.

Dealing with climate change requires a better understanding of the various key sources of risks and how each of these could be managed. These risks stem from increased temperatures, changing rainfall patterns and extreme weather conditions.

All of these risks pose a threat to our food systems including staple crops like Dalo, Cassava, Yam, Kumala, Dalo ni Tana, breadfruit and Rice, all of which provide food security - and have been central to household diets for many years.

This Crop Guide is an updated edition of the last Edition released in 2009. This Edition includes tips on Disaster Risk and Climate Change as well as information on Common Weeds of Fiji and its Control.

The Guide has been compiled for Crop farmers, Agriculture students, Backyard gardeners, Extension Officers and those interested in crop farming. In essence, it provides basic information on crop husbandry and management for better and quality crop production as well as food value. Many of the recommendations contained herein are the result of years of experiments by the Research Division of the Ministry of Agriculture. This book is a guide and wherever possible, should be complemented with the advice of Agricultural Field Officers and Food Specialists.

It is my sincere hope that this Crop Guide will provide you with a better harvest and good returns.

Permanent Secretary for Agriculture
Mr. Ritesh Dass

AMARANTHUS

Amaranthus
(Amaranthus viridis)

Recommended Varieties:
Local Selection

Seed Rate
4kg/ha

Planting time:
All year round

Planting Site:
Plant in an area that is close to a water source

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 75cm Within rows: 30cm Commercial (Export) Seedlings are raised in seed beds and transplanted. Seeds can also be broadcasted into well-made beds/ plots. Plants are usually pulled out, tied in bundles and sold in local markets. Germination: 6 to 10 days after sowing.	Soil analysis should be done before planting. Poultry Manure: 5 tonnes/ha. Mix well with soil before planting. Urea: 50kg/ha. Two weeks after after germination by side dressing	Fusilade at 60ml/15L of water. Spray at 3 to 4 leaf stage. Point nozzle directly at the weed and use spray shield.	No major disease of economic importance, however in case of wilt-dig out affected plants and remove from field.	Beet web worm: Spray with Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) Leaf miners and Aphids: Spray Phyrethroids at 40ml/15L (Sold as Attack) or Suncis at 12ml/15L of water or Dimethioate at 15ml/15L of water (Sold as Rogor) or Bifenthrin at 15 to 20ml/16L knapsack. Use protective clothing Caterpillar: Apply Steward at 7.5ml/15L or Superguard at 8ml/16L knapsack only when damage is visible. Thrips: Bifenthrin at 15 to 20ml/16L knapsack. Or Super-guard 8ml/16L knapsack	Harvest/Yield/Food Value: Follow the waiting period after spraying. Read label on containers. Harvest when stems and leaves are tender. Weekly harvesting is recommended for larger areas. Yield: About 12 tonnes/ha. Plant a new crop after the second harvest or plant in stages (phase planting). Food Value: Dietary fibre, Potassium, Calcium, Magnesium, Iron, Vitamin A, Vitamin B and Vitamin C	Fast growing good recovery crop. Floods: If flood prone area, plant in higher ground with drip irrigation system. Drought: Inter-crop or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

AVOCADO PEAR

Avocado Pear
(Persia americana)

Recommended Varieties:
Local Selection

Fruiting Season:
December to April

Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Boarder Planting 123 plants/ha Orchard Planting 204 plants/ha Planting time: All year round	Boarder Planting Plant seedlings 9m x 9m apart and away from other trees and buildings Orchard Planting Plant seedlings 7m x7m Germination: Seeds should be raised in the nursery and transplanted to the field after 2-3 months	NPK: 13:13:21 - Younger plants under five years, 230g/per plant in 1st year and thereafter apply 230g/ plant per each year of the plant. For e.g. in the 2nd year apply 460g/plant and 690g in the 3rd year and so on until five years and 1kg/ plant/year for plants over 5 years. Heavy mulch around the base of the plant ensures steady growth. Soil analysis should be done before fertilizer application.	Glyphosate at 75ml/15L knapsack using spray shield Or Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za hercide 20-40ml/16 L knapsack. Application done after planting	Root Rot: Apply Sundomil at 60g/15L of water. Maintain good drainage. Prune regularly to a reachable height and also it helps to maintain the tree.	No significant insect pests of concern Mealy Bugs/ Scales/Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water	Normally fruits appear after 6 to 7 years from planting but grafted/budded plants come into bearing earlier at about 4 to 5 years. Yield: About 10 to 15 tonnes/ha from an orchard of about 10 to 12 years. Prune regularly. Food Value: Dietary fibre, Potassium & Vitamin C	Floods: Avocado trees can be planted close to river, it will serve as a natural barrage against damage from debris. Avocado are susceptible to prolonged waterlogging All disaster Avocado trees are fairly resistant to high winds, short drought period and could therefore be a good source of food after a disaster. Good for climate change mitigation as it will absorb CO^2.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

BANANA

Banana
(Musa sapientum)

Recommended Varieties
- Veimama
- Jaina leka
- Lady finger
- Mili

Seed Rate
1666 suckers/ha

Planting Time:
Recommended from October to March otherwise all year round.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between Rows: 3m Plants within Rows: 2m Planting Materials: Select healthy and disease free as planting materials.	Soil analysis should be done before planting Banana usually planted on fertile soil for quality fruits and high yields. NPK: 13:13:21 Apply 90g/plant per at basal. Side dressed NPK 13:13:21 at 230g/ plant at every 3 months interval.	Carefully ring weed around the plants and spray Glyphosate between plants at 150ml to 200ml/15L of water (Sold as Round up, Champion 450, Rainbow & Rambo). Thining/ desuckering to maintain 3 plants per stand [Mother, follower & sucker]	Fungal & Viral disease: Remove infected plants & bury. Practice good field sanitation. Black Sigatoka Disease: No effective chemical control. Disease damage can be minimized by proper cultural practices e.g. proper spacing, removal & burning of dry leaves from plants & plantation; proper de-suckering & fertilization; drainage & weed control; proper selection of planting material, hot water treatment for Nematodes; proper preparation or trimming of corm & treating with fungicide before planting. For Nematodes, treat soil with Basamid at 60g per square metre. Mix well with soil & cover soil with plastic after treatment. Removal(bury or burn) infected plants Use of clean planting materials	Banana Aphid: (Vector for transmitting virus). Spray Dimethioate at 15ml/15L of water (Sold as Rogor) Banana weevil: Keep plantation clear of any plant debris and weeds. Banana root nematodes: Use suckers from non-infected areas. Good husbandry practices. Mealy Bugs/Scales/ Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water	Fruits appear after 9 to 10 months from planting and ripens about 3 months from fruit set. Yield: 20-30 tonnes/ ha . Food Value: Potassium & Vitamin A & Vitamin C	Banana can be planted on higher ground, along roads and be used as 'reserve' food after floods or cyclones. Some varieties are salt resistant and can be planted along the coast. Banana can be grown as an intercrop with sweet potato and coconut to increase soil coverage and to allow the growing of crops of different growth durations on the same plot, reducing the risk of complete crop failure during disaster. Before cyclone and high winds, banana plant can be cut short to prevent uprooting. Fallen bunches can be kept attached and covered till matured. Good for climate change mitigation as it will absorb CO^2. Ratoon if knocked over or broken down by winds/cyclones/floods Storm surges, floods: Plant banana on raised beds to protect against salt intrusion and uprooting.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

BELE

Bele
(Abelmoschus manihot)

Cropping Season:
All year round

Recommended Varieties:

Local Selection
- Round Leaf
- Star Leaf

Planting time	Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Can be grown all year round Planting material: Mature stems are cut to a length of 30cm and planted directly to prepared soil. Land Preparation: The field should be prepared very well as 2 ploughings and 2 harrowings are recommended.	Between rows: 1m -1.5m Plants within rows: 0.5m Germination: Sprouts 1 to 2 weeks after planting. Site of planting: Bele should be planted at an area that is well drained and is close to water source.	Soil analysis should be done before planting Poultry Manure: Apply 5 tonnes/ ha at land preparation 2 weeks before planting. NPK: 13:13:21 Apply 200kg/ ha at basal application. Urea: Apply 100kg/ha. In 4 split applications of 25kg/plant at every 3 months interval.	Glyphosate at 75ml/15L knapsack using spray shield Or Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za herbicide 20-40ml/16 L knapsack. Application done after planting Read instructions on labels and spray carefully. Spray directly on weeds using a spray shield. Hand weed or hoe as necessary	Root and Collar Rot: Use disease free planting materials and make good drains. (Dip cutting in to Sundomil at 3.5g/litre of water for 5 minutes before planting. Do not plant soon after a crop of Pawpaw, okra or dalo.	Spiny Ballworm: Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) Or Spray Phyrethroids at 40ml/15L of water. (Sold as Attack) Or Suncis at 12ml/15L of water. Leaf Miners & Slugs: Apply Carbaryl at 40g/15L of water) (Sold as Sevin) Or Malathion at 30ml/15L of water and for Slugs use Metaldehyde Baits.	Normally leaves become ready after 7- 8 weeks. Harvest at 2 to 3 weeks interval depending on individual preference. Food Value: Dietary fibre, Potassium, Calcium, Magnesium, Iron, Vitamin A, Vitamin C & Riboflavin	Can be a good source of food and income after disaster as Bele is quick to mature and has good market value

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

BREADFRUIT

Breadfruit
(Artocarpus altilis)

Fruiting season:
Main season
December to May
Mini season
August-September

Recommended Varieties:

- Uto Dina
- Balekana dina
- Balekana ni Samoa
- Uto buco

Seed Rate	Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Boarder planting 100 plants/ha Orchard Planting 156 plants/ha Planting time: Planting is recommended during the wet season (November to March)	Boarder Planting Between rows: 10m Plants within rows: 10m Orchard Planting Plant seedlings 8m x 8m Planting Method Root suckers Root cuttings Marcotting & tissue culture	Soil analysis should be done before planting NPK: 13:13:21 can be used in small amounts as basal during planting. Side dressed with NPK 13:13:21 apply 230g/plant at 3 every months interval.	Ring weed around plants and spray Glyphosate between plants at 75ml/15L knapsack using spray shield. Apply herbicides carefully around the plants. Prune regularly to maintain height/ shade	Fruit rot: Good site selection and field sanitation. Remove diseased fruits to avoid spread of disease. Brown Stem rot: Remove diseased fruits to avoid spread of disease	Fruit flies: Trees must be sprayed with Protein Bait each week for a period of seven weeks prior to harvest for export market. Mealy Bugs/Scales/ Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water.	10-15 tonnes/ha (70 kg/tree/yr)- 4-5 year old trees 20-30 tonnes/ha (150kg/tree/yr)- after 5 years Food Value: Fair source of Vitamin C, rich in Fibre and good source of Iron and Calcium.	Can be a good source of food or income, after a disaster. Can be dried and used as a source of carbohydrate and used in time of food shortage. Can be stored fermented in a pit for long term preservation (up to 6 months). Storm surges, floods: Breadfruit is a salt tolerant tree and can be planted in low level atolls and in soil subject to pollution with saline water. Good for climate change mitigation as it will absorb CO^2.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CAPSICUM

Capsicum
(Capsicum grossum)

Recommended Varieties:
- Yolo Wonder B
- Yolo Wonder Y
- Hybrid Ace
- Summer Bell
- Blue Star
- Golden Bell

Seed Rate
300 grams/ha

Plant Density:
44,000 plants/ha

Planting Time
Cool season
(April to September)

Can be grown all year round under greenhouse/ protected structure.

Land Preparation:
The field should be prepared very well as two ploughing and two harrowing is recommended. Rotovate the soil before planting.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 0.75m Plants within rows: 0.3m Germination: 6 to 10 days after planting. Seedlings should be raised in the nursery and transplanted at 3-4 weeks after germination. Transplanting: Transplanting should be done during cloudy days or late in the afternoon. Irrigation: Irrigate immediately after transplanting; as and when required.	Soil analysis should be done before planting. a) Poultry Manure: 10 tonnes/ha Broadcast and mix well with 2 weeks before planting. b) NPK - 13:13:21 200kg/ ha basal application c) Urea: 100kg/ ha. Side dressed in 2 split applications i.e 50kg/ ha @ 2 weeks and 50kg/ha @ 4 weeks after transplanting.	Practice inter-row cultivation, hoeing or hand weeding. A small power tiller can be used for inter row cultivation.	Anthracnose Pathogen-free chilli seed should be planted and weeds eliminated. Crops should be rotated every 2-3 years with non-alternative hosts. Use of resistant varieties and field should have good drainage and be free from infected plant debris. Wounds in fruit from insects or other means should be reduced as it provide entry points for the disease and other pathogens such as bacteria that cause soft rot. Locally available fungicides can be used such as Benomyl (15g/15L water, spray at early flowering stage as a protectant fungicide); Kocide (15-20g/15L water, spray weekly before and after harvest) and Manzate (30g/15L water, spray every 2 weeks). Chemical control: Apply Benomyl at 15g/15L of water (Sold as Benlate). Spray at early flowering stage. Use Kocide at 15-20g/15L of water. Spray weekly, before and after harvest Or Manzate 30g/15L of water. Spray every 2 weeks	Mites & Aphids: Apply Dimethioate at 15ml/15L of water (Sold as Rogor), or Bifenthrin at 15 to 20ml/16L knapsack. Cutworms: Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) or Suncis at 12ml/15L of water or Endosulfan at 10ml/15L of water. Mealy Bugs/Scales/ Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water	Fruits are ready for harvest at 3 months after planting and picking continues for 2-3 months. Yield: 10 to 15 tonnes/ha. Food Value: A rich source of Vitamin A and Vitamin C.	Best planted after disaster if weather allows, as a fast-growing source of food and income.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CARDAMOM

Cardamom
(Elettaria cardamomum)

Recommended Varieties:

- Malabar
- Mysore

Seed Rate
1.1 kg/ha
3086 plants per hectare.

Planting Time:
Can be planted all year round.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between Rows: 1.8m Plants within Rows: 1.8 Germination: Seedlings are raised and are transplanted after 3-4 months into the first nursery beds, then transplanted again after 6 months to the second nursery beds. The younger plants are hardening off and are planted out in the fields when 2 years old.	Soil analysis should be done before planting. NPK: 13:13:21 200kg/ha @ planting. Urea: 100kg/ha to be apply as side dress after 8 weeks from planting.	Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za hercide 20-40ml/16 L knapsack. Application done after planting or Glyphosate at 75ml/15L knapsack using spray shield	No significant disease pests of concern.	Ants, Thrips, Caterpillars and Boring Insects: Apply bifenthrin 15-20ml/16L knapsack Practice good field sanitation.	Harvesting is carried out in the 3rd year. Fruits ripens over an extended period, usually gathered at intervals of 30-40 days. Yield: 250-500kg (Dry) Food Value: Food flavour.	Cardamom deep taproots make it extremely tolerant to heat and drought. Floods: If flood prone area, plant in higher ground with drip irrigation system. In low lying areas, provide central and lateral drains to prevent water from stagnating. Drought: Intercrop or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CARROT

Carrot
(Daucus carota)

Recommended Varieties:
- Chantenay
- Baby Carrot
- New Kuroda
- New Kuroda Improved

Seed Rate
2.5kg - 4kg/ha

Planting Time:
Cool season (April to Sept) for better yield.

Land Preparation:
Field should be well prepared, 2 ploughing & 2 harrowing is recommended.

Rotovate the soil if rotovator is available.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 50cm Plants within rows: 8cm Germination: 6 to 10 days after sowing. Sow thinly in rows and thin out to correct spacing.	Soil analysis should be done before planting. a) Poultry Manure: 10 tons/ha Broadcast and mix well with soil before planting. b) NPK: - 13:13:21 200kg/ha apply before sowing c) Urea: 100kg/ha. Top dress when plants are about 3-5cm high, keep Urea away from the base of the plant.	Linuron as a pre-emergence apply 1.5kg/ha. Hand weed and hilling	Alternaria blight: Make good drains. Dust seeds with Mancozeb. Soft Rot: Apply Mancozeb at 50g/15L knapsack or Copper Oxychloride at 60g/15L of water (Sold as KOPI) Or Use Kocide at 15-20g/15L knapsack to prevent fungal infections Root Knot Nematodes: Avoid areas known to be infested with root knot nematode.	Aphids: Spray Dimethioate at 15ml/15L of water (Sold as Rogor) or Suncloprid at 3.75 to 7.5ml/15L of water or Bifenthrin at 14 to 18ml/15L of water. Cutworms: Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) Or Endosulfan at 10ml/15L of water.	After 15 to 18 weeks from planting. Harvesting Forks are usually used to dig the roots from the ground. Do not pull the plants. Carrots can be stored for as long as 16 - 20 weeks at 2-3°C. Yield: 10 to 15tonnes/ha Food Value: Dietary fibre, Potassium, Vitamin A, Vitamin C, Vitamin K.	Can be a good source of food after disaster as carrots can be stored for a long period. Also a good source of income. Can be stored in soil for some time before harvest.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CASSAVA

Cassava
(Manihot esculenta)

Recommended Varieties:
- Beqa
- Yabia Damu
- New Guinea
- Sokobale
- Nadelei
- Vulatolu

Seed Rate
Mechanized:
20,000 cuttings/ha.

Traditional:
20,000-30,000 cuttings per ha.

(All the above varieties are the sweet types)

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Mechanized: Ridges: - 1m between rows Plants within rows: 50cm Cutting: 30cm in length. Mounds: 0.5m in diameter. Traditional: - 1m x 1m	Soil analysis should be done before planting. NPK - 13:13:21. Poor soil; apply 200kg/ha @ planting. Rich Soils - NPK 13:13:21 100kg/ha at planting. Urea: 100kg/ha at split application 50% at planting & 50% after 4 weeks.	Paraquat @ 100ml/15L Water. Hand Weeding is also recommended. Glyphosate at 100ml/16 L knapsack at 2 weeks using of spray shield after planting and 3 months before the canopy closes Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za hercide 20-40ml/16 L knapsack. Application done after planting	Leaf Spot: Not an economic disease.	Red Spider Mite: Spray Dimethioate at 15ml/15L of water (Sold as Rogor) Black Scale & White Peach Scale: Spray Deltamethrin at 8ml/15L of water (Sold as Turbo). Spiraling white fly: Spray Diazinon at 60ml/15L of water. Use-Biological control agent Nephasis bicolor active in field. Mealy Bugs/Scales/ Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water.	Early Varieties: - Mature in 7-8 months. Late Varieties: -Mature in 10-11 months. Yield: With proper management -20-25 tonnes/ha Food Value: Source of Vitamin A and Vitamin C contains Starch (Energy).	Cyclone High winds Trim cassava leaves before cyclone or high winds to prevent uprooting. Drought Cassava is tolerant to drought. All disasters Can be a good source of food after disaster as cassava can be stored for a long period. Can be preserved grated and stored underground for 6 months and up to 5/6 years (massi). Cassava can be grown as an intercrop with sweet potato and coconut to increase soil coverage and allows growing crops of different growth durations on the same plot, reducing the risk of complete crop failure during disaster. Storm surges: Plant on raised beds in areas subject to salt saturation.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CAULIFLOWER

Cauliflower
(Brassica oleracea botrytis)

Recommended Varieties:
Local Selection
- Tropical Sureheart
- Snowqueen
- White Contessa
- Market Wonder
- Pioneer

Other varieties available
• Silver moon

Seed Rate
300g/ha

Planting time
April to August but performs best during cool and dry months. The flower will form only in cool season.

Planting Method:
Seeds are sown in well prepared seedbeds or seedling trays and transplanted in the field after 3 to 4 weeks or at 3 leaf stage

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 75cm Plants within rows: 40cm Germination: 3 to 5 days after sowing. Transplant after 3-4 weeks.	Soil analysis should be done before planting NPK: 13:13:21 200kg/ha during planting. Urea: 100kg/ ha. Side dress 2 and 4 weeks after planting. Poultry Manure: 5 tonnes/ha. Mix well in soil 2 weeks before planting.	Hand weeding and interrow cultivation.	No significant disease pests of concern.	Lepidopteran pest, Diamond Back moth, Large cabbage moth, Centre grub, Greasy cutworm: Apply Superguard at 7.5ml/15L of water only when damage is visible. Or Steward at 7.5ml/15L of water. Practice Integrated Pest Management. Steward at 5ml/10L of water only when recent damage is visible. Or Prevathorn at 10-15ml/10L of water Or Bt 8g/16L knapsack Or Multiguard 8-10ml/16L knapsack	Yield: 10 tonnes/ha Food Value: Dietary fibre, Folate, Vitamin C, Thiamin, Iron and Zinc.	Can be a good source of food after disaster as fast growing plant Source of income.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CELERY

Celery
(Citrofolia sinensis)

Recommended Varieties:

Local Selection
- Green Giant
- Utah Green

Seed Rate:
250g/ha

Planting Method:
Raise the seedlings in trays/seedbed and transplant after 4 weeks.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 0.60 – 0.90m Plants within rows: 0.15 - 0.25m Germination: Needs a well drained soil with sufficient moisture. Grows well under sarlon cloth and needs optimum temperature of 16-21° C for germination.	Soil analysis should be done before planting NPK: 13:13:21 200kg/ha during planting. Urea: 100kg/ha. Top dress 50% at 2 weeks and 50% at 4 weeks after planting. Poultry Manure: 5 tonnes/ha. Mix well in soil 2 weeks before planting. Soil analysis should be done before fertilizer application.	Hand weeding regularly or use hoe.	No significant disease pests of concern. Apply Benomyl at 15g/15L knapsack (Sold as Benlate). Spray at early flowering stage. Use Kocide at 15-20g/15L knapsack. Spray weekly, before and after harvest Or Manzate 30g/15L of water. Spray every 2 weeks	No insect pests of economic importance	Harvest within 80 - 110 days (14 - 18 weeks). Yield: 8 - 10 tonnes/ha. Food Value: Protein, Iron, Vitamin A & C, Thiamin, Riboflavin, Niacin, Potassium, Calcium and Magnesium.	Floods: Celery needs a lot of water and can tolerate being in water logged soil Drought: Celery can not tolerate drought of any kind. Inter crop with leek and/or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CHILLIES

Chillies
(Capsicum annuum)

Recommended Varieties:
- Red Fire
- Long Red Cayenne
- Bird's Eye
- Bongo Chilly

Seed Rate
300 grams/ha

Planting Time:
Best to plant during hot weather season from September to February. Can be planted all year around.

Planting Methods:
Seeds are sown in well prepared seedbeds or seedling trays and transplanted in the field after 3-4 weeks or at 3 leaf stage

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 0.75m-1m Plants within rows: 0.30-0.50m Transplanting: Transplanting can be done during cloudy days or late in the afternoon. Seedlings raised in seed trays can be planted any time of the day. Water the plants after transplanting and continue afterwards.	Soil analysis should be done before planting. Poultry Manure: 5 tonnes/ha. Mix well in soil 2 weeks before planting. NPK: 13:13:21 200kg/ha during planting. Urea: 100kg/ha. Side dress 2 and 4 weeks after planting. Sidedress 50kg/ ha @ 2 weeks and 50kg/ha @ 4 weeks after planting	Inter row cultivation using scarifier or small power tiller Paraquat at 100ml/15L of water (Sold as Gramazone, Agazone & Royal paraquat) or Glyphosate at 150ml to 200ml/15L of water (Sold as Round up, Champion 450, Rainbow & Rambo) Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za herbicide 20-40ml/16 L knapsack. Application done after planting	Anthracnose Apply Benomyl at 15g/15L of water (Sold as Benlate). Spray at early flowering stage. Use Kocide at 15-20g/15L of water. Spray weekly, before and after harvest Or Manzate 30g/15L of water. Spray every 2 weeks. Pathogen-free chilli seed should be planted and weeds eliminated. Crops should be rotated every 2-3 years with non-alternative hosts. Use of resistant varieties and field should have good drainage and be free from infected plant debris. Wounds in fruit from insects or other means should be reduced as it provide entry points for the disease and other pathogens such as bacteria that cause soft rot. Locally available fungicides can be used such as Benomyl (15g/15L water, spray at early flowering stage as a protectant fungicide); Kocide (15-20g/15L water, spray weekly before and after harvest) and Manzate (30g/15L water, spray every 2 weeks).	Aphids & Mites: Apply Dimethioate (Sold as Rogor)at 15ml/15L of water or Bifenthrin at 15 to 20ml/15L knapsack. Cutworm: Spray Acephate 75% a.i at 20g/15L of water (Sold as Orthene & Sunthene) White Fly: Spray Acephate 75% a.i at 20g/15L of water (Sold as Orthene & Sunthene) BQA Requirements Red fire and Birds eye seeds - to be sourced only from Sigatoka Research Station. Mealy Bugs/Scales/Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water	Fruits appear 90 - 120 days after planting and harvest weekly for one year. Yield: Fresh 16tonnes/ha Dried 4-6 tonnes/ ha Food Value: Dried - Dietary Fibre, (Very High) Calcium; Vitamin A, Riboflavin and Niacin.	Harvest as much as possible before disaster, can be a source of income after disaster. Plant on raised beds against salt pollution.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CHINESE CABBAGE

Chinese Cabbage
(Brassica chinensis)

Recommended Varieties:
- Pak Choy
- Kwang Moon
- Wong Bok
- Joi Choy

Seed Rate
300 grams/ha

Planting Time
Best if planted during the cool season but can be grown throughout the year.

Planting Methods:
Seeds are sown in well prepared seedbeds or seedling trays and transplanted in the field after 3-4 weeks or at 3 leaf stage.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 0.5- 0.75m Plants within rows: 0.3m Germination: 4 to 6 days after sowing. Transplanting: Transplanting can be done during cloudy days or late in the afternoon. Seedlings raised in seed trays can be planted any time of the day. Water the plants after transplanting and continue afterwards.	Soil analysis should be done before planting. a) Poultry Manure: 5 tons/ha Broadcast and mix well with soil 2 weeks before planting. b) NPK: - 13:13:21 200kg/ha broadcast and work into the soil before transplanting. c) Urea: 100kg/ha. Side dressed in 2 split applications i.e 2 -4 weeks after transplanting.	Practice manual weed control. Hand weed with hoe Fusilade at 45ml/15L of water. Spray at 4 to 5 leaf stage of weeds.	Soft Rot: Avoid planting during wet weather; remove any sick plant as soon as you see one; avoid damaging the crop during weeding and use disease-free seeds and seedlings. Remove (bury or burn) all diseased plants after harvest. Maintain good drainage	Lepidopteran pest, Diamond Back moth, Large cabbage moth, Centre grub, Greasy cutworm: Apply Superguard at 7.5ml/15L knapsack Steward at 5ml/10L of water only when recent damage is visible. Or Prevathorn at 10-15ml/10L of water Or Bt 8g/16L knapsack Or Multiguard 8-10ml/16L knapsack Aphids: Dimethioate at 15ml/15L (Sold as Rogor) or Bifenthrin at 15 to 20ml/15L of water.	Usually takes 30 - 60 days to get ready depending on variety. Yield: 10- 12 tonnes/ha Food Value: Source of Vitamin A, Vitamin B & Vitamin C.	Can be a good source of food and income after disaster as Chinese cabbage is very quick to mature and has good market value.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CITRUS

Citrus
(Citrofolia sinensis)

Recommended Varieties:
Orange (C. Sinensis)
a) Late Valencia
b) Washington Navel

Mandarin (C. reticulate)
a) Satsuma
b) Emperor

Lemon (C. limon)
a) Meyer Lemon
(C. aurantifolia)

Lime
a) Seedless Lime
(Tahitian Lime)
b) West Indian Lime

Other varieties
Kumquat
Rangpur Lime
Bush Lemon

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
For Meyer lemon and seedless lime Between rows: 7m Plants within rows: 6m (238 plants/ha). Planting Material: Grafted/Budded seedlings enhance early fruiting. Planting Time: Planting is recommended during the west season (November to March Year round planting can be done if plants are irrigated.	Soil analysis should be done before planting. NPK: 16:16:16 90g/plant at planting. N.P.K: 13:13:21 at 230g/plant at every 6 months for first year thereafter 300g/ plant at 6 month interval for the second year. 375g/ tree at 6 months interval for third year. For established trees, 375g/tree at 6 months interval. Apply Urea at 250g/ trees/year (2 split applications every six months). Soil analysis should be done before fertilizer application.	Ring weed around plant and spray Glyphosate between plants at the rate of 75ml/15L knap-sack using spray shield. Apply herbicides care-fully around the plants.	Citrus Scab: Good sanitation in orchard. Spray white oil or spray Copper Oxychloride at 60g/15L of water (Sold as KOPI) Or use Kocide at 15-20g/15L knapsack to prevent fungal infections. Citrus Canker: Remove and destroy infected plants. Plant resistant varieties.	Fruit Flies: Setup protein bait traps. Pick all the fallen fruits and clean the surrounding. Fruit Piercing Moth: Good field sanitation. Biological control agents released in field to control the pest. Backyard farmers can practice bagging of fruits to prevent damage from piercing moth. Mealy Bugs/Scales/ Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water	Grafted and budded plants bear fruits in 2-2½ year. Yield: 20-30 tonnes/ ha. Food Value: Good source of Vitamin C and fair source of Vitamin A.	Floods: Citrus trees can be planted close to rivers, it will serve as a natural barrage against damage from debris. All disaster: Citrus trees are fairly resistant to floods, high winds, and short drought periods and could therefore be a good source of income and food after a disaster. Good for climate change mitigation as it will absorb CO_2.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

COCOA

Cocoa
(Theobroma cacao)

Recommended Varieties:
- Amelonado
- Trinitario
- Keravat

Cropping season:
October - April

Seed Rate:
2500 plants/ha

Planting Time:
Can be planted all year around but best planting time:

Dry Zone: Mid September to December

Wet Zone: October to December.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between Rows: 2m Plants within Rows: 2m Planting Materials: Select healthy and disease free as planting materials.	Soil analysis should be done before planting. Super Phosphate: Apply 10g per plant, basal application at planting. NPK: 13:13:21 200kg/ha @ 2 split application, @ 4 months and 8 months. Apply fertilizer around the plant based on canopy diameter. Soil analysis should be done before fertilizer application.	Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za hercide 20-40ml/16 L knapsack. Application done after planting Or Glyphosate at 75ml /15L of water Ring weeding [1 m around plants to control black ants	Black Pod: Spray with at 60g/15L of water every 2 weeks. Black Pod: Plant cocoa not less than 3m apart. Remove disease pods as often as possible and bury them. Amelonado is more resistant than any other varieties. Copper sprays every 2 weeks are useful during main season.	Green Semi Hopper: Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) Green Semi Hopper: Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene)	Harvest @ 3 years after planting. Yield: 2.5 tonnes/ha Wet beans. Or 2.0 tonnes/ha Dry Food Value: Source of Thiamin, Niacin & Vitamin B12.	Plant windbreak trees nearby to protect plants against high winds. Can be a good source of income after disaster. Consider drainage in low line areas, grow on higher grounds to avoid flooding impact. Good for climate change mitigation as it will absorb CO_2.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

COCONUT

Coconut
(Cocos nucifera)

Recommended Varieties:
- Fiji Tall
- Rotuman Tall
- Niu Leka
- Niu Magimagi
- Niu Drau
- Niu Kitu
- Niu Yabia
- Malayan Red Dwarf
- Malayan Green Dwarf
- Malayan Yellow Dwarf

Hybrids:
- Malayan Red Dwarf x Rotuman Tall
- Malayan Yellow Dwarf x Rotuman Tall

Cropping Season:
All year round

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Spacing depends upon the planting system & soil type. - Triangular : 9m x 9m - Square : 10m x10m Seed Rate: 123 plants/ha - Propagated through seedlings raised from selected seed nuts, 6 to 7 months old seedlings are used as planting materials.	Ammonium Sulphate - Year 1 - 0.3kg/tree, Year 2: 0.6kg/ tree, Year 3: 0.9kg/ tree, Year 4: 0.9kg/tree Triple Superphosphate: Year 1: 0.1kg/tree, Year 2: 0.2kg/tree, Year 3: 0.3kg/tree, Year 4: 0.4kg/tree; Muriate of Potash - Year 1: 0.4kg/tree; Year 2: 0.8kg/tree; Year 3: 1.2kg/tree; Year 4: 1.2kg/tree; Year 5:1.2kg/tree; Year 6 1.2kg/tree. Soil analysis should be done before fertilizer application.	Ring weeding manually metre radius around palms for the first 1 to 2 years. - Paraquat at 100ml/15L of water (Sold as Gramazone, Agazone & Royal paraquat) Or Glyphosate at 150ml to 200ml/15L of water (Sold as Round up, Champion 450, Rainbow & Rambo) Glyphosate at 75ml/15L of knapsack	Bud Rot In early stages of the disease, cut down and burn affected trees. As soon as symptoms are seen apply Bordeaux paste to the centre (crown) of the coconut palm after removing all the infected fronds and cleaning with water. Bordeaux paste is made by mixing together 100g copper sulphate with 100g quick lime (calcium oxide), each dissolved in 500ml water, and then mixed together. Other copper-based fungicides are probably as effective. As a prophylactic measure small-perforated sachets containing 2 gms of mancozeb may be tied to the leaf stalk of the uppermost opened leaf. When it rains, a small quantity of the fungicide is released from the sachet to the bud region thus protecting the palm.	Rhinoceros beetle controlled by biological control methods, using virus, fungus and pheromone traps. Stick insect controlled by cultural methods, parasites.	Bearing Tall: 5-7 years to bear nuts Dwarf: 3-4 years to bear nuts. Hybrid: 3-4 years to bear nuts. Yield: Tall : 0.7 - 1.3 tonnes/ha (dried Copra) Dwarf: 0.7 - 0.8 tonnes/ha (dried Copra) Hybrid 2-3 tonnes/ ha (dried Copra) Food Value: Vitamin C, Vitamin B1, B2 & Iron.	Cyclone, high winds All varieties are resilient to high winds and fast to grow. Can be used as windbreaks. Soil erosion, landslides Can be used for coastal protection against erosion. All disaster Can be a good source of food after disaster as dried un-husked nut can be stored for a few months to one year. Green un-husked can last up to 1 month. Leaves are cut and used as roof protection prior to cyclones. Sweet potato, cassava, coca, bananas, breadfruit, vegetables can be grown as an inter crop in coconut plantation to increase soil coverage and allows growing crops of different growth durations on the same plot, reducing the risk of complete crop failure during disaster . Good for climate change mitigation as it will absorb CO2.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

COFFEE

Coffee
(Coffea arabica)

Recommended Varieties:
- Robusta

Cropping Season:
September to October

Seed Rate
1,115 seedlings/ha

Planting Time:
August to November

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 2.5m apart Plants within rows: 3.6m apart	Soil analysis should be done before planting. Super phosphate: At planting apply 10g/plant. Bearing Plants: N.P.K: 13:13:21 - 200kg/ha in split application. - 50% in April - 50% in October Fertilizer should not be applied when it is too dry.	Ring weed by slashing weeds as necessary. Glyphosate at 75ml /15L of knapsack Paraquat at 100ml/15L of water (Sold as Gramazone, Agazone & Royal paraquat) Or Glyphosate at 150ml to 200ml/15L of water (Sold as Round up, Champion 450, Rainbow & Rambo)	Rust: No effective fungicide control Brown Eye Spot, Berry Blotch and Thread Blight: Proper cultural methods - good spacing, pruning	Shot Hole Borer: - Remove & Burn dead and dying wood.	After 3-5 years from planting. Yield: 1 tonne/ha Economic life about 30 to 50 years. Food Value: (Powder) Protein, Iron, Riboflavin, and Calcium. Very high in Dietary fibre, Niacin, Potassium, and Magnesium. (Nutritionally a good source but the quantities are too small to be significant)	Plant windbreak trees nearby to protect plants against high winds. Can be a good source of income after disaster. Consider drainage in low lying areas, grow on higher grounds to avoid flooding impact. Is susceptible to waterlogging. Good for climate change mitigation as it will absorb CO_2.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CORRIANDER

Corriander
(Coriandrum Cilantro)

Recommended Varieties:
Corriander

Seed Rate:
10kg/ha

Planting time:
All year round but better in April to August

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 22.5 to 30cm Plants within rows: 4-6cm Germination: 6 to 10 days after sowing	Soil analysis should be done before planting. Poultry manure: 5 tonnes/ha Broadcast, mix well into the soil before planting. NPK: 13:13:12 200kg/ ha basal application at planting. Urea: 100kg/ha. Side dress 2 weeks after sowing.	Hand weed or hoe when necessary. Carry out inter-row cultivation	No significant disease pests of concern.	Generally it is pest free	Regular harvest when the plants are 15-20cm about the ground. Yield: 6 to 8 tonnes/ ha Use in flavoring, curries and soup. Food Value: (Leaves) Calories, Protein, Iron, Vitamin A, Thiamin, Riboflavin, Niacin, very high in Vitamin C, Potassium, Calcium, Magnesium. Nutritionally a good source but the quantities eaten are too small to be significant.	Floods: If flood prone area, plant in higher ground. Drought: Coriander is quite tolerant to drought,if prolong drought period, Intercrop or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system Tsunami: Plants can tolerate moderate salinity.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

COWPEA

Cowpea
(Vigna uguiculata)

Recommended Varieties:
- Tara
- Mana
- Rachna

Seed Rate:
Tara & Mana - 28kg/ha
Rachna - 23kg/ha

Planting Time:
Can be planted all year around.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Mechanized: Between rows: 65cm Plants within rows: 10-20cm Manual: Insert within rows 10-20cm Between rows: 50cm	Soil analysis should be done before planting. 200kg/ha mixture of Blend A & B at 100kg/ ha of each blend applied as basal. (Lower rates on more fertile soil) and Foliar application of Sodium Molybdate at the rate of 1g/1L of water at 2 weeks and 6 weeks before flowering. Only apply for crops planted in red soil (talasiga soil).	Hoeing or mechanical inter row cultivation	No significant disease pests of concern.	For control of Maruca testulalis (Pod Borer) apply Lannate at 30ml/15L of water. Spray Phyrethroids at 40ml/15L (Sold as Attack) For control of Aphids, Leaf Miners and other pests. Dimethioate at 15ml/15L of water (Sold as Rogor or Bifenthrin at 15 to 20ml/16L knapsack. or Suncis at 12ml/15L of water Spray when eggs of Maruca are noticed on flower buds.	Harvest green pod 65 to 70 days after planting. Dry seed: 80 -100 days. Yield: 3-7 tonnes/ ha green pod. Dry seed: 1.5 - 2.5 tonnes/ha. Food Value: Good source of Vitamin B-complex group of Vitamin, Vitamin C also has useful amount of Iron, Zinc and Calcium.	Good source of food after a disaster, as it is relatively quick to grow. Good crop to reduce erosion and improve soil fertility (nitrogen).

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CURRY LEAVES

Curry Leaves
(Murraya koenigii)

Recommended Varieties:
Local Selection

Cropping Season:
All year round

Seed Rate
Grown as
backyard plant

Planting Time:
Can be planted all year around.

Spacing	Fertilizer/Manure	Weed Control/Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 1m Plants within rows: 1m Germination: 10 - 15 days after sowing	Soil analysis should be done before planting. Poultry Manure: 5 tonnes/ha Broadcast, mix well into soil before planting.	Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za hercide 20-40ml/16 L knapsack. Application done after planting Or Glyphosate at 75ml/15L knapsack	No significant disease pests of concern.	Generally it is pest free	Harvest when plants give good size leaves. Economic life span: 5 - 6 years Food Value: Food flavour	Floods: Curry leaf tree are flood tolerant Drought and salt spray: Tolerant to drought and can withstand minor salt spray. If prolong drought period, Intercrop or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

CUCUMBER

Cucumber
(Cucumis sativus)

Recommended Varieties:
- Greengo
- Cascade
- Bountiful No. 2
- Lissome swallow
- Merry swallow
- Zingpangu (Lebanese cucumber]
- Genuine

Seed Rate
2kg/ha

Planting Time:
All year around, fruits best during cool season.

Planting Methods:
Seeds are sown directly into well cultivated soil.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 1m Plants within rows: 30cm (trellising) - 50cm (ground creeping) Germination: 5 to 7 days after sowing.	Soil analysis should be done before planting Poultry manure: 5 tonnes/ha Mix well in the soil before planting NPK: 13:13:21 Apply 200kg/ha basal application at planting. Urea: 100kg/ ha. Apply 50% at 4 weeks & 50% at 8 weeks after planting.	Hand weed or hoe as necessary. Weed Control: Weeds are hoed out when the plants are still standing. Inter row cultivation using horse drawn scarifiers can be used for clearing weeds in the rows and also for hilling the plants. Practice staking for quality fruits.	Anthracnose: Use healthy seeds Apply Benomyl at 15g/15L of water (Sold as Benlate). Spray at early flowering stage. Use Kocide at 15-20g/15L of water. Spray weekly, before and after harvest Or Manzate 30g/15L of water. Spray every 2 weeks. Gummy Stem Blight, Powdery Mildew: Manzate 30g/15L of water. Spray every 2 weeks. Or Chorothalonil spray every 7-10days	Aphids: Apply Dimethioate at 15ml/15L (Sold as Rogor) or Bifenthrin at 15 to 20ml/16L knapsack.	Harvest at 50 - 60 days after planting, continue picking of fruits for 3 weeks. Yield: Fresh 12 tonnes - 15 tons per hectare Food Value: Vitamin C	Good food alternative after a disaster, as it grows very fast. Good source of income.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

DALO

Dalo
(Colocasia esculenta)

Recommended Varieties:
- Wararasa
- Dalo vialoa
- Tausala - ni - Samoa
- Uro ni vonu
- Vula Ono
- Maleka Dina
- Dalo Ni Toga
- Toakula
- Mumu ni viti

Seed Rate
Traditional Farming System: 10,000 plants/ha

Mechanize System: 12,500 plants/ha

Planting Time:
July to January

Off Season: March to June

Wet Zone: Through out the year
Intermediate Zone: Sept to March

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Traditional: - Between rows: 1m - Plants within rows: 1m Mechanize: - Between rows: 1m - Between plants: 0.8m	Soil analysis should be done before planting Poultry Manure: 8 tonnes/ha apply 1-2 weeks before planting NPK: 13:13:21 200kg/ha at first leaf stage Or apply single fertilisers: • Super Phosphate 25kg/ha • Muriate of Potash 100kg/ha at planting. Top dressing Urea: Apply 45g (46% N) per plant in 2 split applications after planting at 15g after 5 & 10 weeks	Glyphosate apply 120ml/16L knapsack 1-2 weeks after the final land preparation. This is to control the weeds before planting. Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za hercide 20-40ml/16 L knapsack. Application done after planting Hand weeding is highly recommended based on visual observation	Corm Rot: Improve drainage. Shot hole Leaf Spot: A seasonal disease. It will disappear when the weather changes so no need for chemical control. • Good husbandry, regular weeding and proper fertilization helps to minimize the disease.	Plant Hoppers, Cutworms, White Fly, Cluster Caterpillar: Spray Malathion 50% EC, 30ml/15L of water Or Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) Or Spray Phyrethroids at 40ml/15L of water (Sold as Attack) Or Diazinon at 60ml/15L of water Taro Beetle: • Apply Bifenthrin at 2.5 /L of water at planting and 3 months after planting on infested areas. • Dip planting materials or suckers at 2.5ml/L of water bifenthrin for 10 minutes when transferring planting materials from infested to non-infested areas • Use of clean planting materials and avoid transferring host plants (dalo, dalo ni tana, via, ornamental dalo plants or potted plants) and poultry manure from infested sites to non-infested sites.	Improved varieties matures in 6 to 8 months and traditional varieties mature in 9 -12 months after planting Optimum Yield: 18 to 22 tonnes/ha Food Value: Contains large amount of Vitamin A, Vitamin B1, Vitamin B2 and Vitamin C.	Floods, cyclone: Plant swamp taro and Chinese taro varieties, as they will sustain high moisture and will be a good source of food during and after disaster. Taro can grow in moving water and light shade. Tsunami: Plant salt tolerant varieties (stem taro-alocasia species), or plant on raised beds (kang kong taro (xanthosoma species) and true taro (colocasia esculanta). All disaster Plant different varieties of taro, with different harvesting time, it will provide food all year round. Chinese Taro survives on poorer soils but not wet soils. Giant taro are perfect for Atolls. Swamp taro and giant taro can be planted and left to grow as a food bank or reserve

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

DALO-NI-TANA

Dalo-ni-Tana
(Xanthosoma saggitifolium)

Recommended Varieties:
- Vula
- Dravuloa

Cropping Season:
All year round

Seed Rate:
10,000 plants per hectare.

Planting Time:
January to December.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 1m Plants within rows: 1m Planting depth: 30cm	Soil analysis should be done before fertilizer application. Poultry Manure: 10 tonnes/ha. N:P:K: 13:13:21 200kg/ha - Basal application. Urea: 100kg/ha 50% at 5 weeks.	Paraquat at 100ml/15L of water (Sold as Gramazone, Agazone & Royal paraquat) - Hand Weed.	No significant disease pests of concern.	Plant Hoppers and Cut-worms: Apply Malathion at 30ml/15L of water Or Diazinon at 60ml/15L of water when appropriate. Taro Beetle: • Apply Bifenthrin at 2.5 /L of water at planting and 3 months after planting on infested areas. Dip planting materials or suckers at 2.5ml/L of water bifenthrin for 10 minutes when transferring planting materials from infested to non-infested areas Use of clean planting materials and avoid transferring host plants (dalo, dalo ni tana, via, ornamental dalo plants or potted plants) and poultry manure from infested sites to non-infested sites.	Harvest 12 months after planting Yield: 15-20 tonnes/ ha.	This traditional taro variety is perfect to be planted as a prevention against disasters. Dalo-ni-tana will sustain high moisture and will be a good source of food during and after disaster.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

DRAGONFRUIT

Dragonfruit
(Hylocereus sp.)

Recommended Varieties:
- Red skin with dark red flesh
- Red skin with white flesh

Fruiting Season:
June to November

Seed Rate:
2652 cuttings/ha
i.e 2 plants/post

Planting time:
Can be planted all year round

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/Food Value
Between rows: 4m Plants within rows: 2m Planting materials: Propagated through cuttings. Must be sourced from healthy (disease free) mother plants which have been fruiting previously. Planting: Plant 2 cuttings beside the concrete or wooden posts, with fixed iron bars at the top to support the plants and trellis.  Note: Soil analysis should be done before planting.	NPK: 16:16:16 or 15:15:15 or 13:13:21 Basal: Apply 50g/plant at planting. Top dress: First Year Apply 100g/plant in 3 monthly intervals (i.e 4 split applications per year) Second Year and thereafter Apply 200g/plant in 3 monthly intervals (i.e 4 split applications per year) Mulch: Organic materials (dry leaves, grass and twigs) should be applied around the base of the plants to suppress the weeds.	Weed control: Hand weed around the plants. Spray Glyphosate between the rows at 150ml to 200ml/15L of water. Prunning: Prune excess branches to obtain an open, manageable and productive umbrella-shape canopy. This will induce new shoots for the next cropping season. Irrigation: Irrigation is applied as and when required. Drip irrigation is highly recommended for better yield.	Stem Canker: Spray with Mancozeb @ 32g/16L of water; alternate with Benomyl @ 16g/16L of water at 2 weeks interval. Remove infected plants and practice good field sanitation.	Mealy bug: Spray with Malathion @ the rate of 32ml/16L Or Bifenthrin @ the rate of 32ml/16L Or Diazinon @ the rate of 60ml/16L.	Fruiting season: November to April Fruits appear in 12 months after planting and ripen around 30 to 35 days after fruit set. Yield: 10-20 tonnes/ha Food value: Rich in vitamins and minerals such as magnesium, phosphorus, potassium, vitamin A & C and zinc. It also contains several antioxidants.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

DRUMSTICK

Drumstick
(Moringa oleifera)

Recommended Varieties:

- Local Selection (Moringa oleifera Sym. M. Pterygosperma)

Fruiting Season:
June to November

Seed Rate:
1111 plants/ha

Planting time:
All year round

Spacing	Fertilizer/ Manure	Weed Control/Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 3cm Plants within rows: 3m	Soil analysis should be done before planting. NPK: 13:13:21 at the rate of 200kg/ha during planting. Urea: side dress at 10g/plant at 4 weeks after planting & every 3 months thereafter.	Hand weeding around plants and application of Glyphosate:150ml to 200ml/15L water (Sold as Round up) Glyphosate:75ml to /15L water using spray shield	Insignificant	Insignificant	Three months after planting for leaves and 7 months for pods. Pods usually bear in the dry cool months of the year. Use while fresh Food Value: Protein, Dietary fibre, Potassium, Calcium, Magnesium, Iron, Vitamin A, Vitamin C, Riboflavin, Niacin.	Drumstick tree is drought tolerant. A very good source of food after a disaster as it fruits quickly and the leaves and roots are edible

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

DURUKA

Duruka
(Saccharum edule)

Recommended Varieties:
- Baribari
- Duruka leka
- Wainikoro
- Thick White
- Pilpit Red

Harvesting Season:
Oct - Nov: Red Variety
Feb - March: Green Variety

Seed Rate:
12, 821 cuttings/ha

Planting Time:
All year round

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 1.3m Plants within rows: 0.3m	Soil analysis should be done before planting. Super phosphate: 225kg/ha at planting time. Top dress: a. With 60kg/ha of potash at 8 weeks b. Urea 200kg/ha 8-10 weeks after planting. Soil analysis should be done before fertilizer application. Fertilizer should not be applied when it is too dry.	Inter row cultivation. Diuron 80 at 120g/15L of water Gesaprim at 120g/15L of water.	No significant disease pests of concern.	Brown Hoppers: Not a problem when population is low. Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene)	Harvest 8-10 months in the following years cropping season. Yield: On average 1200 bundles/ha. Food Value: Protein, Dietary fibre, Vitamin C, Potassium, Magnesium, Zinc, Iron.	If on season, can be a good source of food and income after disaster as Duruka has a very good market value.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

ENGLISH CABBAGE

English Cabbage
(Brassica oleracea)

Recommended Varieties:

Green varieties

- FS Cross
- KK Cross

FY Cross

Grand KK Cross

Summer Autumn

- Green coronet

Baseball

Green fighter

Purple varieties

Ruby mart

Scarlet

Cropping Season:

Main Season:
April to September

Seed Rate:
300grams/ha

Planting Time:
Best if planted during the cool season but can be grown all year around.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 0.75m Plants within rows: 0.3- 0.6m Germination: 4 to 6 days after sowing. Transplant 3-4 weeks after sowing. Transplanting can be done during cloudy days or late in the afternoon. Water the plants after transplanting and continue afterwards. Seedlings raised in seed trays can be planted any time of the day	Soil analysis should be done before planting. Poultry Manure: 5 tonnes/ha Broadcast and mix well with soil 2 weeks before planting. NPK: - 13:13:21 200kg/ha basal application at planting. Urea: 100kg/ha. Side dressed in 2 split applications i.e 2 - 4 weeks after transplanting. - Soil analysis should be done before fertilizer application.	Manual hand pulling and use hoe for small area. Inter row cultivation using scarifier or small rotovator. Fusilade at 45ml/15L of water. Spray at 4-5 leaf stage of grass weeds. As post emergence.	Black Rot: Dithane M-45 at 22g/15L of water or Use Kocide at 15-20g/15L of water. Buy seeds from reliable Suppliers. Leaf Spot: Brown or black spots on the leaves. Under favourable conditions spots merge causing leaf to dry out and appear burnt. Remove all remains of last crop. Practice crop rotation. Downey mildew: develops quickly in wet conditions. Upper leaf surface turns yellow to pale brown spot. Remove all harvested crop. Practice proper sanitation in seedling stage. Apply Sundomil at 50g/15L of water.	Lepidopteran pest, Diamond Back Moth, Large cabbage moth, Centre grub, Greasy cutworm: Steward at 5ml/10L of water only when recent damage is visible. Or Prevathorn at 10-15ml/10L of water Or Bt 8g/16L knapsack Or Multiguard 8-10ml/16L knapsack	Harvest at 60-90 days after planting. Yield: 20 to 30 tonnes/ha Food Value: Good source of Vitamin A, Vitamin B and Vitamin C.	Can be a good source of food and income after disaster as English cabbage is very quick to mature and has good market value.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

EGGPLANT

Eggplant
(Solanum melongena)

Recommended Varieties:
- Chahat
- Round Purple
- Pritam/Long purple Longhat

Seed Rate:
300grams/ha

Planting Time:
Best if planted during the cool season but can be grown all year around.

Spacing	Fertilizer/ Manure	Weed Control/Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 75cm Plants within rows: 45-60 cm Germination: 4 to 6 days after sowing. Transplant 3-4 weeks after sowing. Transplanting can be done during cloudy days or late in the afternoon. Water the plants after transplanting and continue afterwards. Seedlings raised in seed trays can be planted any time of the day	Soil analysis should be done before planting. Poultry Manure: 5 tonnes/ha Broadcast and mix well with soil 2 weeks before planting. NPK: - 13:13:21 200kg/ha basal application at planting. Urea: 100kg/ ha. Side dressed in 2 split applications i.e 2 - 4 weeks after transplanting. - Soil analysis should be done before fertilizer application.	Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za hercide 20-40ml/16 L knapsack. Application done after planting Apply Paraquat at 100ml/15L of water (Sold as Gramazone, Agazone & Royal paraquat) Inter row cultivation Hoe in the rows carefully. Consult locality officers if you intend to export eggplants.	Bacterial Wilt: Practice crop rotation with grain and avoid solanaceous crops (tomatoes, chillies & tobacco). Damping Off of seedlings. Plant on well-drained soil. Blossom End Rot (Lack of Calcium in the soil) Apply Aglime or poultry manure to improve soil pH level Improve soil drainage.	Lygus Bug: Apply Malathion at 30ml/15L of water or Diazinon at 45ml/15L of water Tobacco Flea Beetle: Apply Malathion at 30ml/15L of water or Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) Abamectin (Crop guard) apply 12ml/15L knapsack Thrips: Bifenthrin at 15 to 20ml/16L knapsack. Or Super-guard 8ml/16L knapsack	Harvest 60 to 90 days after planting and continues for 6 months for export market and further harvesting should be reviewed For local market harvesting can continue for a longer period. Yield: 30 - 35 tonnes/ ha Food Value: Dietary fibre, Vitamin C.	Good food and income alternative after a disaster, as it grows relatively fast Hardy plant that can withstand some flooding and dry periods

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

FRENCH BEAN

French Bean
(Phaseolus vulgaris)

Recommended Varieties:
- Contender
- Butter Bean
- Labrador

Seed Rate:
45kg - 50kg/ha

Planting Time:
Best yields from April to September.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 50cm Plants within rows: 15cm - 20 cm Germination: 3 to 6 days after sowing.	Soil analysis should be done during site selection. a) Poultry Manure: 10tonnes/ha. Broadcast and mix well with soil 2 weeks before planting. b) NPK: 13:13:21 200kg/ha Basal application at planting c) Urea: 100kg/ ha. Top dress 2 & 4 weeks after planting.	Inter-row cultivation and mulching. Hand weed or hoe when necessary and apply weedicide as directed. Spray at 4 to 5 leaf stage of weeds. Fusilade at 45ml/15L of water.	Plough plant remains after harvest and rotate with mildew resistant vegetables like cabbage, tomato and eggplant Powdery Mildew: Apply Benomyl at 15g/15L of water. (Sold as Benlate) or Copper Oxychloride at 60g/15L of water (Sold as KOPI) Rust, Root Stem rot, Angular leaf spot: Apply Benomyl at 15g/15L of water (Sold as Benlate) or Mancozeb at 50g/15L water. Or Use Kocide at 15-20g/15L of water to prevent fungal infections	Aphids: Apply Dimethioate at 15ml/15L of water. (Sold as Rogor or Bifenthrin at 15 to 20ml/16L knapsack.	Harvest tender pods 40-60 days after planting. Picking continues for 4-6 weeks. Yield: 7 -10 tonnes/ ha. Food Value: Dietary Fibre, Vitamin C.	Plant after disaster as a quick source of food and income. Inter-crop or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

GARLIC

Garlic
(Allium sativum)

Recommended Varieties:
- Contender
- Butter Bean
- Labrador

Cropping Season:
Cooler months

Seed Rate:
45kg - 50kg/ha

Planting Time:
Best yields from April to September.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 50cm Plants within rows: 15cm - 20 cm Germination: 3 to 6 days after sowing.	Soil analysis should be done during site selection. a) Poultry Manure: 10 tonnes/ha. Broadcast and mix well with soil 2 weeks before planting. b) NPK: 13:13:21 200kg/ha Basal application at planting c) Urea: 100kg/ha. Top dress 2 & 4 weeks after planting.	Inter row cultivation using scarifier Apply Linuron as a pre-emergence apply 1.5kg/ha.	No significant disease pests of concern.	Thrips: Bifenthrin at 15 to 20ml/16L knapsack. Or Super-guard 8ml/16L knapsack Aphid: apply Dimethioate at 15ml/15L (Sold as Rogor) or Bifenthrin at 15 to 20ml/16L knapsack.	Harvest tender pods 40-60 days after planting. Picking continues for 4-6 weeks. Yield: 7 -10 tonnes/ha. Food Value: Dietary Fibre, Vitamin C.	Garlic is resilient, easy to grow, highly nutritious and is drought tolerant. Very good source of food and income after a disaster

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

GINGER

Ginger
(Zingiber officinale)

Recommended Varieties:
- White Ginger (canton)
- Red Ginger

Cropping Season:
- Green ginger: Sept - March
- Mature Ginger: Sept - July

Seed Rate:
Immature:
7500kg

Mature:
5000kg

Planting Time:
September

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Slope Land Immature: 60cm between rows & 15cm within rows. Mature: 60cm between rows & 20cm within rows. Flatland: Immature: 90cm between rows, 15cm within rows. Mature: 90cm between rows & 20cm within rows.	Soil analysis should be done before planting. Poultry manure: 10t/ha. Mix well with soil at land preparation 2 to 3 weeks before planting. N:P:K: 13:13:21 1tonne/ha at 3 months after planting. Apply 500kg/ha at planting and 500kg/ha at 3 months after planting. Urea: 300kg/ha. Top dress immature and premature in 3 split applications of 100kg/ha first at 2 to 3 leaf stage, second at 8 wks after first application and third at 4 wks after second application. Or Alternative to NPK/Urea Hydro complex Fertiliser: 700 kg/ha in 2 split applications at planting and 3 months after planting Hilling to be followed after each application of Urea.	Altrazine: 3.4L/ha spray immediately after planting when the soil is moist Altrazine at 64g/16L knapsack. Glyphosate 100ml/16L knapsack for weed control inter row or in the drains. Hand weeding is highly recommended	Pythium rot: Treat planting material with Sundomil 3.5g/L water for 5 min. -spray affected plants with Sundomil at 50g/15L of water Bacteria Rot (Erwnia): 52° C treat planting material -3.5g/L. - Remove & destroy disease plants. - Improve drainage. Eelworms or Nematode: 1. Root knot nematode & Burrowing nematode - hot water treatment of planting material at 52° C for 10 minutes. -Crop rotation with Dalo & Cassava and fallow -Sanitation-remove all rhizomes from the field after harvesting. -Proper selection of seed-choose healthy seeds. Apply poultry manure/ sawdust amendments (20tonnes/ha) 6-8 weeks before planting	Tuber Scale Insect: Apply Diazinon. Pre-Plantation treatment 1) Use clean planting material and dip in Ridomil and water. 2) Ridomil rate at 55g/15L of water to control fungal disease. Dipping of rhizomes in Diazinon at 60ml/15L of water before planting.	Harvesting: Green: Harvest Feb-March Mature: Harvest July -August Yield: Green: 20-25 tonnes/ha Mature: 25-30 tonnes/ha Food Value: Good source of energy, potassium, calcium and sodium.	Good for control of soil erosion. Plants reshoot from the rhizome if tops are damaged or broken.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

GOURD

Gourd
(Family Cucurbitceae)

Recommended varieties:

- Bottle gourd (Lauki)
- Snake gourd (Chichinda)
- Bitter gourd (Karela)

Cropping Season:
April to September

Seed Rate:
6kg/ha

Planting Time:
All year round

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 3m Plants within rows: 2m Germination: 10 - 15 days after planting. Suitable for planting on trellis.	Soil analysis should be done before planting. NPK: 13:13:21 200kg/ha Basal at planting. Urea: 100kg/ha Side dress 3-4 weeks after planting. Poultry Manure: 5 tonnes/ha. Mix well in the soil before planting. Soil analysis should be done before fertilizer application.	Hoe or hand weed.	No significant disease pests of concern.	Brown Weevils: Pumpkin Beetle: Malathion 50% EC at 30ml/15L of water. Squash Bugs: Lannate at 30ml/15L of water. or Suncis at 12ml/15L of water. or Spray Phyrethroids at 40ml/15L (Sold as Attack)	Fruits after 7 weeks from planting. Harvest when tender. Yield: 10 to 12 tonnes/ha. Food Value: (Bitter, raw) Dietary fibre, Potassium, Vitamin C.	Good food and income alternative after a disaster, as it grows fast. Not common used as a food. Dried old fruit are used as containers

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

GUAVA

Guava
(Psidium guajava)

Recommended Varieties:
- Green Pearl

Seed Rate
625 seedlings/ha

Planting Time:
All year round

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 4 m Plants within rows: 4 m Germination: Seedlings are ready for transplanting at 3 month after grafting.	Soil analysis should be done before planting. Poultry Manure: Apply 10 tonnes/ha Broadcast, mix well in the soil 2 weeks before planting. NPK: 13:13:21 Apply 50g/plant Basal at planting Side dress NPK 13:13:21 at 400g/ plant in yr 1 and 800g/plant/yr thereafter.(130g/ plant every 2 months).	Hand weed or hoe when necessary. Practice mulching to control weeds and retain soil moisture. Avoid use of chemical herbicide.	Colletotrichum gloeosporioides (Fruit Rot)- practice good field sanitation	Pests are controlled by practicing integrated pest management [IPM] including fruit bagging and field sanitation White fly & Mealy bug Control-prune lower branches for more aeration. Spray with Sevin at 27g/15L of water or Lannate 15ml/15L of water. Guava Leaf and Shoot webber- spray Sevin at 27g/15L of water Thrips Palmi –spray with bifenthrin 15-20ml/16l of water Fruit fly- control is bagging of fruits and avoid leaving over riped fruits in the field. Bag fruits to avoid physical and insect damage.	Harvest 8 to 12 months after planting Yield: 20 to 25 tonnes/ha/yr after 3years. A well-managed tree produces 12 fruits per month Food Value: Dietary fibre, and Vitamin C.	Good food and income alternative after a disaster, as it grows fast. Not common used as a food. Dried old fruit are used as containers

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

HERBS

Herbs
(Family Cucurbitceae)

Recommended varieties:
- Herbs in addition to Mint, Coriander and Parsely.

- These include many plants, which have highly flavoured leaves.

- Some can be used to flavour foods.

- Most fish, meat and vegetable dishes become more appetizing when blended with the right condiment.

Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control Management	Insect Control/ Management	Harvest/Yield/Food Value
One plant is sufficient for an average size family's supply. Replant every two years.	Chives are grown from seeds or bulbs. Plant in a well-drained area. Two to three plants are sufficient. The young leaves have a flavour of onion.	Sow seed in a prepared bed. Cover with one-quarter inch soil. Thin plants to 26cm apart. Two to three plants are sufficient. Replant every year.	May be grown from seed or cuttings. One bush is sufficient for an average sized family's supply. Replant when necessary	Sow seed in the cool season in a box or pot. Plant when one to two inches high. Plants may also be grown from cuttings. Replant every two years.	Sow seed in a cool season. Sprinkle on a prepared seedbed. Leave eight inches between plants. Thymes may also be grown from cuttings and they thrive well in fairly dry position. Replant every two years.	Other herbs known to do well are Borage, Savoury lemon balm, Tarragon, Fennel, Mint and Coriander. Food Value: Good source of Energy, Potassium, Calcium and Sodium.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

KAWAI

Kawai
(Dioscorea esculenta)

Recommended varieties:
- Kawai tabua
- Kawai cagocago
- Tabo dina
- Sarau dina
- Kawai cikobia

Cropping Season:
July to September but can be grown throughout the year and it is a drought-tolerant crop and resistant to major yam diseases

Seed Rate:
10,000 mounds/ha.

Traditional:
4 tonnes/ha

Mechanized: 16,700 sett/ha

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 1m Plants within rows: 1m Mechanized: Between rows: 1m Plants within rows: 0.5m	Soil analysis should be done before planting. N:P:K: 13:13:21 - 200kg/ha at planting time. Urea: 100kg/ha at 8 weeks - 100kg/ha at 12 weeks. Soil analysis should be done before fertilizer application. Kawai is favourable to high organic matter in the soil by applying 8 ton/ha of poultry manure but can be grown in poor soil. For back yard practices use kitchen wastes and rootcrop peelings can be added as compost.	Pre emergence Altrazine at 120ml/15L of water Paraquat at 100ml/15L of water (Sold as Gramazone, Agazone & Royal paraquat) - Use spray shield, avoid touching crop plants. Always encourage hand weeding.	No significant disease pests of concern.	No major insect problem.	Yield: 8-10 tonnes/ha Ensure to minimize tuber damage during harvest as Kawai has short shelf life Kawai can be grown similar to Tivoli and can be harvested 2-3 years for food security purpose. Food Value: Source of Vitamin E, Vitamin C, Thiamin and Riboflavin.	Could be a good source of food during and after a disaster as it stays edible for a long time. Can be stored 3 months after harvest in dry places. Can be stored in the soil and only harvested in time of need. If no fertile lands are available Kawai can be grown in sacks. Tsunami: Plant on raised beds.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

KUMALA

Kumala
(Ipomoea batatas)

Recommended varieties:
- Golden brown
- Kabara
- Honiara
- Vulatolu
- Korolevu red
- Carrot

Cropping Season:
Optimum growing season is the cooler months March-June

Seed Rate
Traditional:
-30,000 mounds/ha

Mechanize:
-33,000 -plants/ha

It is highly recommended for farmers to select from healthy vine cuttings with 20-30cm length from the tip with 4 nodes.

Kumala slips (vines produced from tubers) are the best materials for kumala production.

Planting Time:
April/May

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Traditional: Between rows - 80cm Within rows - 50cm Mechanized: Between rows - 1mtr Plant Within rows - 30cm Length of Vine - 40cm Soil Requirement: Kamala grows best on looses, fertile soil with good drainage.	Soil analysis should be done before planting N:P:K: 13:13:21 100kg/ha at planting. Or use single fertilisers Triple Superphosphate 200 kg/ha or Muriate of Potash 150 kg/ha Urea: 100kg/ha at 6 weeks after planting.	Hand weed or hoeing. Apply Glyphosate 90ml/16L knapsack after 3-4 days after planting. Application should done early in the morning or late in the afternoon Recommended to coil the vines during weeding. It provides good air circulation and tuber formation	Kumala Scab: Grow resistant or tolerant varieties. Some management tips: Good selection of planting materials Removal of host plants	No major insect problem.	Kumala matures around 3-5 months depending on the variety. Yield: 15 to 20 tonnes/ha. Recommended to cure tubers at 95% relative humidity and 32°c for 3-5 days before consumption and sales. Food Value: Dietary fibre, potassium, Vitamin C. A good source of Vitamin A, Iron, Thiamin. Contains Sodium & Minerals.	Sweet potato can be grown as an intercrop with cassava, banana, vegetables and coconut to increase soil coverage and allows growing crops of different growth durations on the same plot, reducing the risk of complete crop failure during disaster. If no fertile lands (atoll Islands) are available sweet potatoes can be grown in sacks with organic material. Can be a good source of food directly after disaster as kumara can be stored for a few week. Early maturing varieties are available. Plant a range of early, medium and late maturing varieties after disaster to spread the harvest period of the first crop. Easy to replant damaged planting material after disaster (vegetative reproduction). Sprouts from old tubers can be used as planting materials.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

KURA (NONI)

Kura (Noni)
(Morinda citrifolia)

Recommended varieties:
- Local Selections
Small fruit varieties are preferred.

Cropping Season:
All year round

Seed Rate
625 seedlings/ha

Planting Time:
Can be planted all year round but best during October to March enhance plant growth.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 4m Plants within rows: 4m Germination: Seeds germinate in 25-30 days and within 12-16 weeks, plants are ready for transplanting	Soil analysis should be done before planting. Kura is grown naturally (organically) to be planted in new areas. Soil analysis should be done before fertilizer application.	Ring weed round and in between the plants during establishment stage. No herbicides to be used if grown organically. Pruning of main shoots to dwarf the trees for ease of harvest.	No significant disease pests of concern.	No economic pests	Fruiting will start at 13 - 15 months after transplanting. Yield: 1.0 to 1.5kg/ tree/week under optimum management practices. Food Values: Vitamin C	Noni is resilient to Natural Disaster

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

LABLAB BEAN

Lablab Bean
(Dolichos lablab)

Recommended varieties:
Head Type
- Great Lakes

Ballade
Box type
General

Leafy type
- Green Mignonette
- Butter crunch
- Coral lettuce

Kaiser
Red rapid

Cropping Season:
October to April

Seed Rate
10kg/ha

Planting Time:
All year round but best in cool season.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 0.5-0.75m Plants within rows: 0.30 – 0.40m Germination: 6-8 days after sowing. Suitable for planting on trellis	Soil analysis should be done before planting Poultry Manure: 5 tonnes/ha -broadcast and mix well in the soil before planting. NPK: 13:13:21 Basal at planting at the rate of 200kg/ ha. Urea: 100kg/ha 2 months after planting. Poultry Manure: broadcast, mix well before planting. Soil analysis should be done before fertilizer application.	Weed between rows. Fusilade at 45ml/15L of water. Spray when grass weeds are at 4-5 leaf stage. Hand weed or hoe when required.	No significant disease pests of concern. Practice crop rotation Benomyl at 15g/15L water (Sold as Benlate)	Thrips: Apply Bifenthrin at 14 to 18ml/15L of water. Or Super-guard 8ml/16L knapsack Bean Pod Borer: Spray Phyrethroids at 40ml/15L (Sold as Attack). Aphids: Dimethioate at 15ml/15L of water (Sold as Rogor) or Bifenthrin at 15 to 20ml/16L of water Or Super guard at 8ml/16L knapsack	6-8 weeks after planting, pick pods when still tender and harvesting continues for about 2 to 3 weeks. Yield: 15 - 20 tonnes/ha Food Value: Good source of Protein, Energy, and Calcium, Iron, Zinc, Vitamin B complex and Vitamin C.	Plant after disaster as a quick source of food (protein) and income. Drought: Intercrop or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system. Floods: contour planting, minimum weeding

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

LETTUCE

Lettuce
(Lactuca sativa)

Recommended varieties:
Head Type:
- Great Lakes
- Boxhill

Leafy Type:
- Green Mignonette
- Butter crunch
- Coral Lettuce
- Rapid

Seed Rate
300grams/ha

Planting Time:
Head Type:
March to October

Leafy type:
All year round.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 75cm Plants within rows: 30-40 cm Germination: 5 to 8 days after sowing. Raised the seedlings in seed trays/seed bed and transplant at 3 to 4 leaf stage. Seedlings raised in seed trays can be planted any time of the day	a) Poultry Manure: 5 tonnes/ha. Broadcast and mix well with soil 2 weeks before planting. b) NPK: 13:13:21 200kg/ha Basal application at planting c) Urea: 100kg/ ha. Top dress 2 & 4 weeks after planting. Soil analysis should be done before fertilizer application.	Manual weed control using hoe. Inter row cultivation	No significant disease pests of concern.	Thrips: Apply Confidor at 5ml/15L of water. or Suncloprid at 3.75 to 7.5ml/15L of water or Bifenthrin at 14 to 18ml/15L of water. Cutworm Caterpillars: Apply Malathion at 30ml/15L of water. Slugs: Keep surroundings clean, if need be spread around Blitzem pellet as per instructions on the label.	Leafy Lettuce matures in 50-80 days. Head Type matures in 12-15weeks. Yield: 8 -10 tonnes/ ha. Food Value: Dietary Fibre, Source of Vitamin A, Vitamin B and C	Can be a good source of food after disaster as fast growing plant Source of income.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

LONG BEAN

Long Bean
(Vigna sesquipedalis)

Recommended varieties:
- Yard Long [light green]
- Yard Long [Dark Green]

Seed Rate
7kg/ha

Planting Time:
All year around.
Performs best during hot and wet season.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 0.75m - 1m Plants within rows: 0.3m Germination: 3-6 days after sowing. Suitable for Planting on stakes for better quality.	Soil analysis should be done before planting. a) Poultry Manure: 10 tonnes/ha. Broadcast and mix well with soil 2 weeks before planting. b) NPK: 13:13:21 200kg/ha Basal application at planting c) Urea: 100kg/ ha. Top dress 2 & 4 weeks after planting. Soil analysis should be done during site selection.	Hand weed or hoe when necessary. Spray when grass weeds are at 4-5 leaf stage. Fusilade at 45ml/15L of water.	Plough plant remains properly after harvest, rotate with vegetable like cabbage, eggplant, tomato. Rust: Apply Benomyl at 15g/15L of water (Sold as Benlate) or Copper Oxychloride at 60g/15L of water (Sold as KOPI) Or Use Kocide at 15-20g/15L of water. Root and Stem Rot: Or Use Kocide at 15-20g/15L of water	Bean Pod Borer : Spray Phyrethroids at 40ml/15L of water (Sold as Attack) Or Lannate at 30ml/15L of water. Observe the waiting period. Thrips: Bifenthrin at 15 to 20ml/16L knapsack. Or Super-guard 8ml/16L knapsack	Harvest at 50-60 days from planting, pick pods when still tender and harvesting continues for about 2-3 weeks. Yield: 7-10 tonnes /ha. Food Value: Dietary Fibre, Vitamin C, Niacin, Vitamin B Complex, Iron and Zinc.	Plant after disaster as a quick source of food and income. Inter-crop to increase soil fertility and retain soil moisture.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

MAIZE

Maize
(Zea mays)

Recommended varieties:
- Nirala

Seed Rate
18kg/ha

Planting Time:
Can be planted all year around.

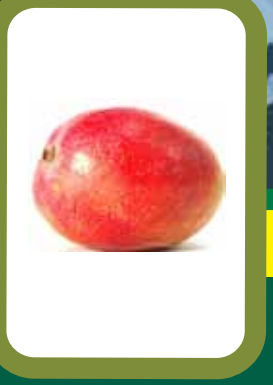
Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 75cm Plants within rows: 30cm	Soil analysis should be done before planting. Poultry Manure: 10 tonnes/ha at 2 weeks before planting. NPK: 13:13:21 300kg/ha at planting. Urea: 150kg/ ha 4 weeks after planting. (side dress) Soil analysis should be done before fertilizer application.	Inter-row cultivation at 4 weeks after planting. Pre-emergence Nutrazine at 200ml/15L of water to be applied soon after planting.	Maize Smut Remove infected plants before the galls rupture and burn the plant. Rotate crops on the same field; Avoid over-fertilizing with nitrogen as this increases susceptibility. Be careful not to injure plants during cultural operations. Seeds can be treated with fungicides (e.g. Thiram) as done in Australia.	Corn Earworm, Corn leaf hopper and Maize Aphids: Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene)	Harvesting after 60 to 80 days from planting. Yield: 2 to 3 tonnes /ha for dry grains. Green: 20 – 25tonnes/ ha Food Value: Contain Vitamin A, Protein, Dietary Fibre and Complex Carbohydrates	Before cyclone or floods, harvest green cobs if possible. Adapt planting time, plant outside cyclone season. Dried grain can be stored.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

MANGO

Mango
(Mangifera indica)



Recommended varieties:
- Kensington
- Tommy Atkins
- Mapulehu
- Mexican Kent
- Parrot
- Mango Dina
- Peach
- Baramasia

Seed Rate
125 plants/ha

Planting Time:
Planting is recommended during the Wet Season (November to March).

Fruiting Season:
Local varieties from August to January Hybrids from September to March. Depending on weather conditions at flowering & fruit set.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 9m Plants within rows: 9m Germination: Grafted seedlings enhance early flowering and fruiting. Grafted plants can be sourced from reliable nursery.	Soil analysis should be done before planting. NPK: 13:13: 21 110grm/plant at planting. 250g/plant at 6 months interval till 3 years after planting. Bearing trees: 2kg/tree annually before flowering	Ring weed around plants and spray Glyphosate between plants at 75ml/15L of water using spray shield. Apply these herbicides carefully around the plants	Anthracnose: Pruning trees for more ventilation and balancing the tree. Keep the surroundings clean. Spray Benomyl at 15g/15L of water. (Sold as Benlate) at flowering stage to minimize flower drops and maximize fruit set with 14 days interval.	Fruit flies: Setup protein bait traps. Pick all the fallen fruits and clean the surrounding. Mango Stone Weevil: Good field sanitation recommended. Bury all fallen fruits to prevent pest population build up. Mealy Bugs/Scales/ Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water	Grafted plants start to fruit within 3 years. Yields vary depending on the varieties age of tree & weather conditions @ flowering. Yield: Improved Varieties: 25-80kg/tree in 5th to 7th year. 70-150kg/tree in 8th to 15th Year. Food Value: Rich in Vitamin A as well as Vitamin C.	Floods: Mango trees can be planted close to rivers, it will serve as a natural barrage against damage from debris. Good for control of landslides. All disaster Mango trees are fairly resistant to floods, high winds, and short drought periods and could therefore be a good source of food after a disaster. Dried mangoes can be conserved for a long period and could be a good source of long term, preserved food (dried mangoes). Good for climate change mitigation as it will absorb CO_2.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

MINT

Mint
(Mentha arvensis)

Cropping Season:
Best for cool season but grows all year round.

Recommended varieties:
- Local Selection

Seed Rate
Grows from cuttings or root.

Planting time:
All year round

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value
Between rows: 30cm Plants within rows: 30cm Germination: 8-10 days after sowing.	Soil analysis should be done before planting. Manure: Use organic matter (Poultry manure or compost) Soil analysis should be done before fertilizer application.	Hand weed as necessary and practice inter-row cultivation	Cabbage heart center caterpillar Use Bt (Bacillus thurengiensis), but note the following: • The spray needs to be applied carefully so that there is good coverage of the plant as the insecticides has to be eaten by caterpillar to kill them. • Eggs are not susceptible to Bt. • Small larvae are more susceptible to Bt than fully grown ones. • Avoid using broad-spectrum insecticides (such as pyrethroids and Organophosphate) as they will kill natural enemies. OR • Use either Prevathon at 10-15ml in 10L or Superguard and Multiguard at 8 ml/16L of water.	Caterpillar: Spray Diazinon at 60ml/15L of water or Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) and also follow instructions on the label.	After 4-6 weeks from planting than after every fortnight. Economic life replant after 3 or 4 harvest. Food Value: Flavour for soups fish and meat dishes.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

MUNG

Mung
(Vigna radiata)

Recommended varieties:
Samraat

Seed Rate
18-22kg/ha
Treated seeds can be kept up to six months at room temperature.

Planting Time:
Can be planted all year around.

Spacing
Mechanised:
Between rows: 65cm

Plants within rows:
10-20cm

Manual:
Between rows:
50 cm

Plants within rows:
10 -20cm

Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Soil analysis should be done before planting 200kg/ha mixture of Blend A & B at 100kg/ha of each blend applied as basal. (Lower rates on more fertile soil). Foliar application of Sodium Molybdate growth at the rate of 1grm/1L of water at @ 2weeks & 6 weeks in red soils[talasiga]	Hoeing or mechanical inter row cultivation.	Cucumber mosaic virus: Malformed leaves with yellow and green blister. The plant is stunted Rogue off infected plants and destroy away from field. Control aphids (vector) Cercospora leaf spot, Round spots, reddish brown or purple in colour: Apply Benomyl at 15g/15L of water. (Sold as Benlate) or Mancozeb at 50g/15L of water or Bravo at 45ml/15L of water. Crop rotation and general field sanitation. Clean seeds should be used.	Maruca, Leaf miners and other pests: Apply Lannate at 30ml/15L of water. or Spray Phyrethroids at 40ml/15L (Sold as Attack) Spray when eggs of Maruca are noticed on flower buds. Aphids: Apply Dimethioate at 15ml/15L (Sold as Rogor) or Bifenthrin at 15 to 20ml/16L of water.	Harvest dry pods 55 to 90 days from planting. Yield: 1.6 – 2.8 tonnes/ha. Food Value: Good source of B-complex group of Vitamins, Vitamin C. Also contains useful amounts of Iron Zinc and Calcium.	Inter-crop or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

OKRA

Okra
(Abelmoschus esculentus)

Recommended varieties:
- Clemson Spineless
- Local Long White
- Dwarf long Pod
- Local Long green

Seed Rate
8kg/ha

Planting Time:
All year around but better during hot months.

Spacing
Between rows:
0.75-1m

Plants within rows:
10-15cm

Germination:
3 to 6 days after sowing.

Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Soil analysis should be done before planting. a) Poultry Manure: 10 tonnes/ha. Broadcast and mix well with soil 2 weeks before planting. b) NPK: 13:13:21 200kg/ha Basal application at planting c) Urea: 100kg/ha. Side dress 50kg/ha @2weeks and 50kg/ha @ 4 weeks after planting. Soil analysis should be done before fertilizer application.	Hand weed or hoe when necessary and practice inter row cultivation using animal drawn scarifier.	Powdery Mildew: Spray Apply Benomyl at 15g/15L of water (Sold as Benlate) or Copper Oxychloride at 60g/15L of water (Sold as KOPI) Rotate with crops of different family such as eggplant, beans, and root crops. Use Kocide at 15-20g/15L of water to prevent fungal infections Okra Galls - is associated with climatic conditions and affects the fruits of older plants. To avoid this problem plant Clemson Spineless from October to March or plant other varieties.	Thrips: Bifenthrin at 15 to 20ml/16L knapsack. Or Super-guard 8ml/16L knapsack Spiny Bollworm, Corn Ear Worm & Leaf miners: Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) Rose Beetle: Apply Malathion 30ml/15L of water. Aphids: Apply Dimethioate at 15ml/15L of water (Sold as Rogor) or Bifenthrin at 15 to 20ml/16L of water. Snails and Slugs: Use Blitzem Pellets. Burn crop residues. Crop rotation can also help reduce pest and disease attack.	Harvest 2 to 3 months after sowing Yield: 15-20 tonnes/ha Food Value: Dietary Fibre, Potassium, Calcium, Magnesium, Vitamin C.	Good food and income alternative after a disaster, as it grows fast.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

ONION

Onion
(Allium cepa)

Recommended varieties:
- Tropic Red
- Texas Early Grano
- Superex
- Gladallan Brown

Seed Rate
4kg/ha direct seeded.

2.5kg/ha for transplanting.

Planting Time:
May to August

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 50cm Plants within rows: 5-10cm Germination: 7-14 days after sowing	Soil analysis should be done before planting. NPK: 13:13:21 200kg/ ha Basal at planting. Urea: 100kg/ha side dress 4-6 weeks after planting. Poultry Manure: 12 tonnes/ha Broadcast and mix well in the soil before planting. Soil analysis should be done before fertilizer application.	Apply Linuron as a pre-emergence apply 1.5kg/ha. Weed or hoe where necessary and mulch with straw materials.	No significant disease pests of concern.	Onion Thrips: Bifenthrin at 15to 20ml/16L of water. or Super-guard at the rate of 8ml/16L knapsack	12-16 weeks after sowing. Yield: 12-15 tonnes/ha. Food Value: Source of Iron, Zinc, Thiamin and Vitamin C.	Good source of income after disaster as it grows fast..

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

PARSELY

Parsely
(Petroselinum crispum)

Recommended varieties:
- Triple Curled

Seed Rate:
3kg/ha

Planting Time:
April to September

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value
Between rows: 45cm Plants within rows: 30cm Germination: 10-12 weeks after sowing	Soil analysis should be done before planting. NPK: 13:13:21 200kg/ ha Basal at planting. Urea: 100kg/ha side dress 3 weeks after germination and planting. Poultry Manure: 5 tonnes/ha Broadcast and mix well in the soil. Soil analysis should be done before fertilizer application.	Hand pull or weed as necessary	No significant disease pests of concern.	Aphids: Apply Dimethioate at 15ml/15L of water (Sold as Rogor) or Bifenthrin at 15 to 20ml/16L of water.	Harvest 10 -12 weeks after sowing Pick fortnightly. Yield: 5tonnes/ha Food Value: Dietary fibre, Potassium, Calcium, Iron, Vitamin C (very high), Thiamin, Riboflavin. (Nutritionally a good source but the quantities eaten are too small to be significant)

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

PASSIONFRUIT

Passionfruit
(Passiflora edulis)

Recommended varieties:
Local Yellow
• Local Purple
(self-pollinated)

Fruiting Season:
All year round if hand pollination is done early in the evening when flowers open (2pm onwards)

Seed Rate
666 seedlings/ha (544 trellis posts/ha)

Planting Time:
Best planting time is in the cool and dry months (April to September)

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 3m Plants within rows: 5m Posts: 3m between rows. 6.2m within rows Germination: Seeds germinate in 10 days and ready for transplanting at 6-8 weeks. Vines to be trained on the trellis.	Soil analysis should be done before planting. NPK: 13:13:21 Apply 90g/plant at planting, 230g/plant every 3 months interval for 1st year and 300g/ plant every 3 months interval for 2nd and 3rd year.	Ring weed around and in between the plants during early stages of growth. Hilling around the plants is very important. When plants are well established, ring weed around the plants and carefully spray Glyphosate at 75ml /15L of water using spray shield. Hand pollination to be practiced to get maximum yield. Pollination is recommended early in the evening when flower opens (2pm onwards). Integrate apiculture farming with passion fruit for pollination purpose	Brown spot: Controlled by spraying Benomyl at 15g/15L of water (Sold as Benlate). Collar rot: The disease can be controlled by good site selection and planting on raised beds	Red Spider mite: Controlled by spraying Dimethioate at 15ml/15L of water (Sold as Rogor)	1st year: 12-18 tonnes/ha 2nd year: 20-25 tonnes/ha 3rd year: 10-12 tonnes/ha Food Value: Good source of Iron and Vitamin C.	Plant windbreak trees nearby to protect plants against high winds. Can be a source of income after disaster. Consider drainage in low lying areas, grow on higher grounds to avoid flooding impact. Is susceptible to waterlogging.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

PAPAYA

Papaya
(Carica papaya)

Recommended varieties:
- Sunrise Solo
  (Fiji Red) Waimanalo

Cropping Season:
All year round under irrigation

Seed Rate
1667 plants/ha

Planting Time:
Can be planted all year round.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 3m Plants within rows: 2m Germination: The seeds are sown in planter pots/bags and germinate in 10 to 12 days. The seedlings are ready for field planting in 6 to 7 weeks after sowing.	Soil analysis should be done before planting NPK: 13:13:21 Apply 90g/plant at planting; 140g/ plant at 3 months after planting and thereafter 230g/ plant at every 3 months interval. Borax: Apply 10g/ plant at planting; 10g/plant after 4 to 5 months and thereafter 10g/ plant every 6 months.	Ring weed around and in between the plants during early stages of growth. When plants are well established, ring weed around the plants and carefully spray Glyphosate at 75ml /15L of water using spray shield Use Plastic mulch/ weed mat with drip irrigation.	Anthracnose: Attacks ripe fruits, sunken brown spots that enlarge and results in rot as fruits ripen. Apply Benomyl at 15g/15L of water (Sold as Benlate) or Kocide at 15-20g/15L of water to prevent fungal infections or Sundomil at 50g/15L of water. Stem & Root rot: Plant pawpaw in well-drained fields. Phytophthora stem and fruit rot: Apply Mancozeb at 50g/15L water or Kocide at 15-20g/15L of water to prevent fungal infections or Sundomil at 50g/15L of water on the ground around the root area. Black leaf spot: Apply Mancozeb 50g/15L of water.	Fruit fly: Female flies lay eggs under the skin of ripe, fallen, damaged or rotten fruits and deteriorate the quality of fruits. Harvest at colour break, spray Protein bait & Malathion at 30ml/15L of water on plants. Good field sanitation, remove and bury fallen fruits.	Harvest fruits at 9 months after planting Yield: 60 to 80 tonnes/ha. Economic life 3 years from planting to get quality fruits for export market. Food Value: Excellent source of Vitamin A and Vitamin C.	Cyclone Harvest as many as you can before a cyclone hits. It will be a good food reserve for after the cyclone. Grows everywhere after disaster. Good source of food after disaster (grows fast). Eat cooked immature fruit from fallen trees as a vegetable Peel and dry the fruits after a disaster, for long term preservation

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

PEANUT

Peanut
(Arachis hypogaea)

Recommended varieties:

- Volasiga
- Local Spanish

Seed Rate:
8-22kg/ha
Treated seeds can be kept up to six months at room temperature.

Local Spanish 115kg/ha (unshelled).

Planting Time:
Can be planted all year around but avoid planting in wet months as yields will be low.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 65cm Plants within rows: 10-20cm Manual: Between rows: 50 cm Plants within rows: 10 -20cm	Soil analysis should be done before fertilizer application. 200kg/ha mixture of Blend A & B at 100kg/ha of each blend applied as basal. (Lower rates on more fertile soil). Foliar application of Sodium Molybdate growth at the rate of 1grm/1L of water at 2 & 6wks in red soils[talasiga] Only.	Hoeing or mechanical inter row cultivation.	Peanut Rust Remove any volunteer plants from the last crop. Plant new crops far away from older crops. Spay Chlorothalonil (Bravo) as soon as rust spots are seen; spray at regular intervals (10-14 days is best) and continue until 14 days before harvest. Spraying should begin 30-35 days after planting.	Cutworm: The younger plants are severed or partially at ground level. Spray Suncis at 12ml/15L of water.	Volasiga: Harvest at 110-130 days from planting. Local Spanish: Harvest at 105 days from planting. Yield (dry): Local Spanish: 2 tonnes/ha Food Value: Good source of B-complex of Vitamins, Vitamin C, Iron, Zinc & Calcium.	Plant peanut after disaster, it will provide a quick source of proteins. Good source of income. Nuts can be stored for years when well dried.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

PIGEON PEA

Pigeon Pea
(Cajanus cajan)

Recommended varieties:

Improved Varieties
(Non Seasonal)
- Uasivi (green pod)
- Bhapur (Dry Seed)
- Kamica (seasonal)

Seed Rate
Uasivi - 20kg/ha
Bhapur - 23kg/ha
Kamica - 30kg/ha

Planting Time:
Seasonal - February to June.

Non Seasonal: February to October

Avoid planting in the wet season.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Mechanised: Between rows: 65cm Plants within rows: 10-20cm Manual: Between rows: 50 cm Plants within rows: 10 -20cm	Soil analysis to be done before fertilizer application. 200 kg mixture of Blend A & B at 100kg/ha of each blend applied as basal. (Lower rates on more fertile soil) and Foliar application of Sodium Molybdate powder (1grm/L at 2wks and 6wks in red soils [talasiga]only.	Hoeing or mechanical inter row cultivation.	No significant disease pests of concern.	Bean pod borer (Maruca testulalis): Apply Lannate at 30ml/15L of water or Spray Phyrethroids at 40ml/15L (Sold as Attack) Spray when eggs are noticed on flower buds.	Dry Seeds - harvest 95 - 155 days from planting. Yield: 1.5 -3tonnes/ ha Green Pods - harvest 95 -120 days from planting. Yield: 3 to 5tonnes/ha Food Value: Good source of B-complex group of vitamins, Vitamin C, Iron, Zinc and Calcium.	Plant after disaster as a quick source of food and income. Intercrop or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

PINEAPPLE

Pineapple
(Ananas comosus)

Recommended varieties:

- Smooth Cayenne
- Ripley Queen

Fruiting Season:

Main Season
November to April
Off Season:
February to October.

Seed Rate
Sloppy Land: (37,037 suckers/ha)

Flatland - 48,000 suckers/ha

Planting Time:
Best time to plant is in the dry season
(April to July) to prevent base rot.

On flat lands, used raised beds.
Practice phase planting for all year round production.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Sloppy land 1.2m between ridges, 0.6m between rows per ridge and 0.3m between plants (Double rows) Flat land 1m between ridges, 0.4m between rows per ridge and 0.3m between plants (Double rows) Planting materials Crown (tops), slips & aerial suckers. Best planting material are suckers weighing 250 to 300g or 25 to 30cm high. Quartered plantlets from nursery. Contour planting practiced on slope land to avoid soil erosion under alley cropping with integrated approach.	Soil analysis should be done before planting Sloppy land Super phosphate: Apply 250kg/ha at planting. Urea: Apply 110kg/ha at 1 month after planting. NPK: 13:13:21 apply at 250kg/ha at 4 months interval after planting. Main season and Mini season apply Etherel (Ethyphon) at 75ml & in Off season at 100ml with 1kg Urea 250g Borax in 50 litres of water. Apply dose in the centre of plant at 50ml/plant. Application to be done after 3pm. Harvest 5 months after hormone application. Repeat application if it rains after 3 hours.	Manual weeding or inter-row cultivation from 1 to 3 months after planting. Then use herbicides to control weeds. Karmax (Diuron 80/Diuron 90) at 100g/15L of water to be applied to plot before or after flowering & fruit set.	Heart & Root rot: Planting during the dry season with good field drainage. Spray fungicide Sundomil at 50g/15L of water) Base rot: Dip the planting material in fungicide before planting. Dithane M-45 at 22g/15L of water or Apply Benomyl at 15g/15L of water (Sold as Benlate)	Mealy Bugs/Scales/ Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water	Sloppy land Plant crop: 40 to 60 tonnes/ha. 1st ratoon: 30 to 40 tonnes/ha 2nd ratoon: 20 to 25 tonnes/ha. Flatland 60 to 70 tonnes/ha. Food Value: Good source of Vitamin C and Vitamin B1 and also contains fibre.	Floods, heavy rains: Plant on raised beds. Good for soil erosion control, tolerant to a range of soil types. If not affected, can be a good source of income after disaster.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

PLANTAIN

Plantain
(Musa balbisiana)

Recommended varieties:
- Qamure
- Damuloa
- Vudi dina
- Blue java
- Vudi mami

Fruiting Season:
October to April.
Fruiting time may vary depending on variety

Seed Rate
1.5 tonnes/ha (seed size should be 75-100g)
Larger sized seeds should be sliced into half and treated with fungicide before planting.

Planting time:
April to early June

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 0.75m Plants within rows: 0.30m Planting Depth: 5.0-7.5cm Germination: 10 days from sowing	Soil analysis should be done before planting Plantain usually planted on fertile soil for quality fruits and high yields NPK: 13:13:21 apply 90g/plant during planting and 230g/plant every 3months.	Carefully ring weed around the plants and spray Glyphosate at 75ml /15L of water using spray shield.	There are a number of fungal and viral diseases in banana. The symptoms can be easily mistaken. Sigatoka Disease: Remove (burn or bury) diseased leaves. Use clean planting materials. Bunchy top virus Remove the infected plants from the field and bury. Practice good field sanitation. Use disease free planting materials.	Banana Aphid: (Vector for transmitting virus). Spray Dimethioate at 15ml/15L of water (Sold as Rogor) or Suncloprid at 3.75 to 7.5ml/15L of water or Bifenthrin at 14 to 18ml/15L of water. Banana weevil: Keep plantation clear of any plant debris and weeds. Banana root nematodes: Use suckers from non-infected areas. Good husbandry practices.	Harvest 12 months after planting. Yield: 30 to 40tonnes/ha. Food Value: Source of dietary fibre, Potassium, Calcium & Magnesium	Can be planted on higher ground, along roads and be used as 'reserve' food after floods or cyclones. Some varieties are salt resistant and can be planted along the coast. Can be grown as an intercrop with sweet potato and coconut to increase soil coverage and allows growing crops of different growth durations on the same plot, reducing the risk of complete crop failure during disaster. Before cyclone and high winds, banana plant can be cut short to prevent uprooting. Fallen bunches can be kept attached and covered till matured. Good for climate change mitigation as it will absorb CO_2. Ratoon if knocked over or broken down by winds/cyclones/floods Storm surges, floods: Plant banana on raised beds to protect against salt intrusion and uprooting.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

POTATO

Potato
(Solanum tuberosum)

Recommended varieties:
- Domoni
- Red Pontiac
- Dalisay
- Servance
- Sebago
- Sequioa

Seed Rate:
1.5 tonnes/ha (seed size should be 75-100g)
Larger sized seeds should be sliced into half and treated with fungicide before planting.

Planting time:
April to early June

Spacing:
Between rows: 0.75m
Plants within rows: 0.30m
Planting Depth: 5.0-7.5cm

Germination:
10 days from sowing

Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Soil analysis should be done before planting Poultry Manure: 10 tonnes/ha Broadcast, rotovate into the soil well before planting. NPK: 13:13:21 200kg/ha Basal at planting, Urea: apply 100kg/ ha in two split applications; 50% at 3-4 weeks after germination and 50% at 6-7 weeks after germination. Hilling should done after each application.	Alternatives for Paraquat Samurai at 75ml per 15L knapsack or Glufosinate Ammonium 90-150 ml/15Lknapsack or Target 10ml/15L knapsack or Za hercide 20-40ml/16 L knapsack. Application done after planting Use spray shield to prevent chemical drift.	Early Blight Plant only disease free, certified seed. Allow tubers to mature before digging, dig when vines are dry, not wet, and avoid excessive wounding of potatoes during harvesting and handling. Plow under all plant debris and volunteer potatoes after harvest. Avoid replanting potatoes (and tomatoes or eggplants) in the affected fields for at least 2 years if severe outbreaks have been experienced. Bacterial wilt Have good drainage around the plantation and remove all sick plants immediately. Do not compost diseased plants. Rotate your crops regularly away from host plants (e.g. tomatoes, peppers, capsicum, potatoes, etc).	Tuber moth: Apply Dimethioate at 15ml/15L of water (Sold as Rogor) Use clean seeds. Lady bird beetle: Spray Malathion at 30ml/15L of water or Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) or Nitofol at 27ml/15L of water.	Harvest 3 months after planting. Yield: 8-10 tonnes/ha. Food Value: (Boiled) Dietary fibre, Potassium, Vitamin C, Vitamin A and Vitamin B2.	Can be a good source of food after disaster as potatoes can be stored for a long period. Can be planted after disaster as it grows fast. Can be stored in soil for some time before harvest. Also a good source of income.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

PUMPKIN

Pumpkin
(Cucurbita maxima)

Recommended varieties:

- Queensland Blue
- Butternut
- Local Selection

Seed Rate:
1.5kg/ha

Planting Time:
All year around

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between row: 2m Within row: 1m Germination: 3 to 6 days after sowing.	Soil analysis should be done before planting. Poultry Manure: Apply 10 tonnes/ha to the soil, 2 weeks before planting. NPK: 13:13:21 200kg/ha basal at planting. Urea: 50kg/ha Side dress 4-8 weeks after planting.	Hand weed or hoe and do not damage stem. Inter-cropping with maize to control weeds and provide additional income	Powdery mildew: Apply Benomyl at 15g/15L of water (Sold as Benlate)	Pumpkin Beetle: Malathion 30ml/15L water or Spray Accephate 75% a.i at 20g/15L of water (Accephate is sold as Orthene & Sunthene).	Harvest 15-17 weeks after sowing. Yield: 15 to 20 tonnes/ha. Food Value: Dietary Fibre, Vitamin C, Potassium and Vitamin A.	Storm surges, floods: Plant pumpkin on raised beds to protect against salt intrusion and uprooting. Tolerant to most soil types including sandy and rocky soils.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

RADISH

Radish
(Raphanus sativus)

Recommended varieties:

- Long Whiteside
- Awa Cross
- Everest
- Cagivou
- Sitara

Seed Rate:
10 kg/ha

Planting Time:
Can be planted all year round

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 50cm Plants within rows: 5cm Broadcast then thin out to 5cm apart 2-3 weeks after germination.	Soil analysis should be done before planting. Poultry Manure: 5 tonnes/ha. Broadcast and mix well with soil before planting. b) NPK: 13:13:21 200kg/ha Basal application at planting c) Urea: 100kg/ha. Side dress 3-4weeks after planting. Soil analysis should be done before fertilizer application.	Pull out weeds or use a hoe. Take care not to damage the plants.	No significant disease pests of concern.	No serious pests.	Harvest 4 to 5 weeks after sowing Yield: 8 to 15 tonnes/ ha. Food Value: Dietary Fibre and Vitamin C	Good source of income after a disaster as it grows fast. Relatively tolerant to seawater infiltration. Their robust rooting system will decrease risk of erosion during flooding and increase resilience under drought condition (deep rooting system)

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

RICE (DRYLAND)

Rice (Dryland)
(Oryza sativa)

Recommended varieties:
Cagivou
Sitara
- Star
- Maleka
- Totoka
- Boldgrain
- Uttam
- Deepak
- Nuinui

Seed Rate:
Drill Method- 100kg/ha

Broadcast Method 60-90kg/ha

Planting Time:
November to Mid February

Dry seeding should be done in case of delayed rains.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 20cm Plants within rows: 15cm Drop/dibbling seeds in furrows or use seed drill @ a depth of 4-6cm. If broadcasting, this should be evenly broadcasted followed by laddering.	Soil analysis should be done before planting. Superphosphate at 100kg/ha at planting Muriate of potash at 150kg/ha at planting in split application 105kg/ha at 20 days after seeding and 45kg/ha before panicle initiation and booting stages. Nitrogen (Urea) at 110kg/ha in split applications, 77kg/ha at 20 days after seeding and 33kg/ha before panicle initiation and booting stages	i) Narrow Leaf weeds a) Apply Propal (10L/ha) at 300-350ml/15L of water at 3-4 leaf stage. ii) Broad Leaf weeds a) MCPA (4L/ha) at 85-110ml/15L of water at 3-4 leaf stage. Care should be taken that there should not be any rainfall up to 4-8 hours after spraying.	1. Brown Spot: Maintain fertility level. 2. Sheath Rot: Avoids closer spacing and high level of Nitrogen. 3. Stem Rot: Plant resistant variety. There are no serious diseases in Fiji. For better control avoid closer spacing and use clean planting materials	1. Plant hopper: Spray with Bifenthrin 15-20ml/16 L of water or Malathion 30ml/15L of water or Diazinon 45-48ml/15L of water. 2. Rice Leaf rollers: Apply Carbacide at 29g/15L of water. 3. Rice Army Worm: Apply Carbacide at 29g/15 L of water or Bifenthrin at 15-20ml/16L of water Use a Mist blower for Spraying. If using Knapsack sprayer, spray under the leaves and around the roots properly	Improved Varities 5-7.5 tonnes/ha for Star, Boldgrain Cagivou and Sitara 4-5 tonnes/ha for Maleka & Totoka, Deepak, Uttam and Nuinui with maturity after 3-4 months Food Value: Source of Thiamin, Riboflavin, Niacin.	Source of income if not affected by the disaster. Paddy rice increase CO_2 emission. First food distributed after disaster (small quantity cover big family and easy to cook, store well and for long time).

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

RICE (WETLAND)

Rice (Wetland)
(Oryza sativa)

Recommended varieties:

- Star
- Maleka
- Totoka
- Boldgrain
- Uttam
- Deepak
- Nuinui

Seed Rate:
80kg/ha for direct seeded.
30 kg/ha for transplanted.

Planting Time:
November to April
(Main Season)

July to August (Offseason)

Improved varieties: Year round under irrigation

Traditional Varieties:
November to February

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 25cm Plants within rows: 25cm Transplanting 1 -2 seedlings per hill at age of 3 weeks. If broadcasting, this should be evenly broadcasted followed by laddering.	Soil analysis should be done before planting Superphosphate at 200kg/ha at planting Muriate of potash at 120kg/ha in split applications 84kg at planting and 36kg before panicle initiation and booting stages. Nitrogen (Urea) at 174kg/ha in split applications, 122kg at 20 days after seeding and 52kg before panicle initiation and booting stages	i) Narrow Leaf weeds a) Apply Pro-pal (10L/ha) at 300-350ml/15L of water at 3-4 leaf stage. ii) Broad Leaf weeds a) MCPA (4L/ha) at 85-110ml/15L of water at 3-4 leaf stage. Care should be taken that there should not be any rainfall up to 4-8 hours after spraying.	1. Brown Spot: Maintain fertility level. 2. Sheath Rot: Avoids closer spacing and high level of Nitrogen. 3. Stem Rot: Plant resistant variety. There are no serious diseases in Fiji. For better control avoid closer spacing and use clean planting materials	1. Plant hopper: Spray with Bifenthrin 15-20ml/16 L of water or Malathion 30ml/15L of water or Diazinon 45-48ml/15L of water. 2. Rice Leaf rollers: Apply Carbacide at 29g/15L of water. 3. Rice Army Worm: Apply Carbacide at 29g/15 L of water or Bifenthrin at 15-20ml/16L of water Use a Mist blower for Spraying. If using Knapsack sprayer, spray under the leaves and around the roots properly	Improved Varieties 5 tonnes/ha for Star, Boldgrain 4-5 tonnes/ha for Maleka & Totoka, Deepak, Uttam and Nuinui with maturity after 3-4 months Traditional Varieties 3-4 tonnes/ha with maturity after 6-8 months Food Value: Source of Thiamin, Riboflavin, Niacin.	Source of income if not affected by the disaster. Paddy rice increase CO_2 emission. First food distributed after disaster (small quantity cover big family and easy to cook, store well and for long time).

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

ROCKMELON

Rockmelon
(Cucumis melon)

Recommended varieties:

- Yates Rock
- Hales PMR 45
- Winstons No 1
- Sweet dream
- Summer dream
- Hales Best

Seed Rate:
1.5kg/ha

Planting Density:
5000 plants/ha

Planting Time:
April to August.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 2m Plants within rows: 1m Germination: 6 to 10 days after sowing	Soil analysis should be done before planting. NPK: 13:13:21 200kg/ ha basal application at planting. Urea: 100kg/ha 50kg at 3 weeks after germination & 50kg at first flowering. Poultry Manure: 10 tonnes/ha Broadcast before sowing and mix well in the soil 2 weeks before planting. Soil planting should be done before fertilizer application.	Hand weed or hoe as necessary.	Downy Mildew Plough diseased crop refuse to depth of 9-10 inches; Spray with Mancozeb every 7-10 days from early appearance. Rotate with non-host cucurbit crops (tomatoes, peanuts, sorghum and maize). Gummy Stem Blight Use of disease free seeds, regular monitoring of transplant seedlings, thorough ploughing of field after harvest, practice of crop rotation with non-cucurbit crops and use of fungicides such as Mancozeb, Manzate and Maneb are recommended. Use Kocide at 15-20g/15L of water to prevent fungal infections	Aphids: Spray Dimethioate at 15ml/15L of water (Sold as Rogor) or Bifenthrin at 15 to 20ml/16L of water.	Harvest: 12 to 16 weeks after sowing Yield: 15 to 20 tonnes/ha. Food Value: Dietary Fibre and Vitamin C.	Best planted after disaster, if weather allows, as a quick source of food and income. Immature fruit can be eaten if needed.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

SORGHUM

Sorghum
(Sorghum vulgare)

Recommended varieties:
- Martin Tall

Cropping Season:
Dry Season

Seed Rate:
7 - 8kg/ha

Planting Time:
Early February - March

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 46cm Plants within rows: 15cm	Soil analysis should be done before planting. NPK: 13:13:21 300kg/ ha basal. Urea: 150kg at apply after 4 weeks of planting Soil analysis should be done before fertilizer application	Inter row cultivation	Bacterial Leaf Streak Destroy all leaves and stems by burning after harvest. Do not plant sorghum on the same field two crops in succession. Use disease-free seeds from the previous crop.	Aphids and Birds damage is negligible.	New crops after 15 weeks, ratoon 12 weeks. Yield: 1.2 tonnes/ha Ratoon 1 tonne/ha. Economic life: one ratoon crop recommended Food Value: Protein, Dietary fibre, Iron, Niacin	Sorghum is more tolerant of wet soils and flooding than most of the grain crops- Drought: plan in narrow rows to increase moisture capture.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

SOURSOP

Soursop
(Annona muricata)

Fruiting Season:
October to April

Recommended varieties:
- Local Selection

Seed Rate:
500 plants/ha

Planting Time:
Can be planted all year round

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 4.5m Plants within rows: 4.5m Germination: Propagated by seeds, cuttings or grafted on same rootstock. Seedlings are grown in nursery and transplanted in to the field at 8 to 10 leaf stage.	Soil analysis should be done before planting. NPK: 13:13:21 90g/plant during planting. 230g/plant at every 3 months up to 3 years after planting. Thereafter 1kg/ plant every 6 months. Soil analysis should be done before fertilizer application.	Ring weed the plants and spray Glyphosate at 75ml /15L of water using spray shield	No significant disease pests of concern.	Birds and Bats eat ripe fruits on the tree. Harvest fruits before full ripeness Mealy Bugs/Scales/ Whiteflies: Spray Malathion at 30ml in 15L of water or Bifenthrin at 15-20ml/16L of water. or Diazinon at 56 ml/15L of water. or Soap solution 5 table spoons of bar soap/4L of water. 2 table spoon of dish washing liquids/4L of water	Fruiting starts in 2 to 4 years after planting. Expected yields: 8 to 10 tonnes/ha/ year after 3 years from planting. Economic life: 10 to 12 years. Food Value: Fair source of Protein, Dietary fibre, Potassium and Calcium.	Good source of income and food after a disaster. Soursop is drought tolerant. Apply windbreaks as soursop is highly susceptible to strong winds (stem and trunk breakage)

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

SPRING ONION

Spring Onion
(Allium cepa)

Recommended varieties:

- White Lisbon
- Yellow Bermuda

Seed Rate:
4kg/ha

Planting Time:
At the start of the cool season.

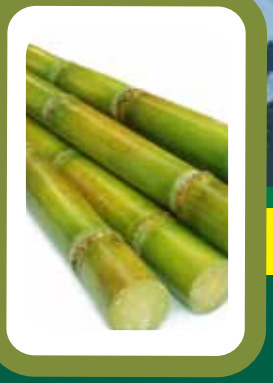
Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 50cm Plants within rows: 8cm Germination: 6 to 10 days after sowing.	Soil analysis should be done before planting. NPK: 13:13:21 200kg/ha basal at planting. Urea: 100kg/ha Side dress 4-6 weeks after planting. Poultry Manure: 5 tonnes/ha Mix well in the soil 2 weeks before planting. Soil analysis should be done before fertilizer application.	Mulch with straw materials. Hand weed or hoe when necessary; spray pre emergence herbicide.	Powdery Mildew: Mancozeb at 50g/15L water or Apply Benomyl at 15g/15L of water. (Sold as Benlate) Use Kocide at 15-20g/15L of water to prevent fungal infections.	Damage caused is negligible.	Harvest 8 to12 weeks after planting Yield: 10 to 12 tonnes/ha Food Value: Source of Iron, Zinc, Vitamin C and Thiamin.	Can be a good source of income after a disaster as it is quick to grow.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

SUGARCANE

Sugarcane
(Saccharum officinarum)



Recommended varieties:

- Nadiri
- Aiwa
- Beqa
- Galoa
- Kaba
- Mali
- Mana
- Ragna
- Vatu
- Waya
- Yasawa
- Kiuva
- LF91-1925
- Viwa
- Qamea

Cropping Season
All year round

Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Varies from 5 to 8 tonnes depending on planting method. Use seed cane from a selected seed cane nursery. Use seed cane of 7-9 months from plant or first ratoon. Preferably from seed cane nursery. Planting Time: Where soil is free draining, as on the hills, can plant during rainy months (December - March). Flats - planting to be completed by May. All replanting to be complete by end of October.	The spacing should be 1.37m (4.5 feet) but it also depends on the variety planted. The bottom trough of the drill should be around 15 - 20cm below the ground level. Germination: Within eleven days of planting and complete germination within 21 days. This depends on the quality of the seed cane, land preparation and prevailing weather conditions.	Blend A: Apply at planting (in drills) at 150kg-200kg/ha Blend B: Apply at 8 weeks after planting at 700-800kg/ha Blend C: Apply on ratoon cane 2 to 4 weeks after harvest at 700-800kg/ha Soil analysis should be done before fertilizer application.	Velpar K4 or Diuron plus E40: Use of herbicide depends on the weed types.	Fiji Disease Do not use any of the stems from a diseased plant for propagation. Remove plants as soon as symptoms are seen, and burn them. When pulling out the plants look to see if insects are present in the young leaves; if they are, hold the leaves together to stop them from escaping and spreading the virus. Burn the plants, and insects. Collect and burn the diseased plants and debris after harvest.	After 12 to 14 months Plant Cane (new crop) - > 65TCH Ratoon Cane > 55 TCH Crop Cycle 5 - 7 ratoons. Food Value: Carbohydrate	Quick energy and water source. Source of income. Drought tolerant crop. Can withstand some flooding and water inundation.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

SWEET CORN

Sweet corn
(Zea mays. saccharata)

Recommended varieties:
Hawaiian Super sweet No. 9

Cropping Season:
All year round

Seed Rate	Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
15 - 18kg/ha Planting Time: December to April	Between rows: 75cm Plants within rows: 30cm	NPK: 13:13:21 300kg/ha before planting as basal application Urea: 200kg/ha at weeks after planting. Poultry Manure: 10 tonnes/ha incorporate into the soil two weeks before planting	Pre-emergence Nutrazine 200ml/15L of water to be applied soon after planting. Inter-row cultivation at 4 weeks after planting.	Maize Smut Remove infected plants before the galls rupture and burn the plant. Rotate crops on the same field; Avoid over-fertilizing with nitrogen as this increases susceptibility. Be careful not to injure plants during cultural operations. Seeds can be treated with fungicides (e.g. Thiram) as done in Australia.	8 to 10 weeks from planting. Yield: Green 3-3.5t/ha Grain (seed) - 2 to 2.5t/ha Food Value: Contain Vitamin A and Protein. Dietary Fibre complex carbohydrates.	Very good source of income after a disaster. Before cyclone or floods, harvest green cobs if possible. Adapt planting time, plant outside cyclone season. Drought: Intercrop or cover the soil with copra residue or other mulch to avoid loss of soil humidity. Use bucket drip irrigation system.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

TOMATO

Tomato
(Solanum lycopersicum)

Cropping Season:
May to October

Recommended varieties:
- Alton
- Redland

Summer taste
- Alafua Large

Seed Rate
300 grams/ha

Planting Time:
Main season in the cool months (May to October) Off season from November to April.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Trellising Between rows: 0.75m to 1.0m Plants within rows 30 to 40cm for staked varieties. Open Field Between rows: 1.5m Plants within rows: 30cm For indeterminate varieties grown in open fields.	Soil analysis should be done before fertilizer application. Poultry Manure: 10 tonnes/ha Broadcast 2 - 3 weeks before planting. NPK: 13:13:21 apply 200kg/ha basal at planting Urea: 100kg/ha Side dress 2 & 4 weeks after transplanting.	Hand weed or hoe for small plots. Inter row cultivation when plants are still small. Practice mulching to control weeds and retain soil moisture.	Anthracnose: Apply Benomyl at 15g/15L of water (Sold as Benlate). Spray at early flowering stage. Use Kocide at 15-20g/15L of water. Spray weekly, before and after harvest Or Manzate 30g/15L of water. Spray every 2 weeks Bacterial Wilt Avoid planting where solanaceous plants (Tomato,Eggplant, chillies and Capsicum) were previously planted. Dig, remove and destroy infected plant. Improve drainage. Use a two-year rotation and use resistant varieties. Stem Rot: Use a two-year rotation. Blossom End Rot: (Lack of Calcium in the soil) Apply Aglime or poultry manure to improve soil pH level Improve soil drainage.	Spider (Tomato) Mite: Apply Malathion at the rate of 30ml/15L of water. Practice proper field sanitation. Fruit worm or Fruit Borer: Steward at 5ml/10L of water. Or Delfin at 14g/15L of water. Green semi looper: Endosulfan at 10ml/15L of water or Suncis at 12ml/15L of water.	10 to 12 weeks after transplanting and picking continues for 5 weeks. Yield: 10 to 15 tonnes/ha Food Value: Source of Potassium, Calcium, Sodium, Dietary fibre and Protein.	Quick source of food after disaster and good source of income.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

TUMERIC

Tumeric
(Curuma longa)

Cropping Season:
August to Novermber

Recommended varieties:
- White
- Red

Seed Rate:
10 to 12 tonnes/ha

Planting time:
September to October

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 60cm Plants within rows: 40cm Germination: Require free drainage	NPK: Apply twice, second and third months after planting at the rate of 625kg/ ha. Urea: Apply twice, second and third months after planting and before hilling at the rate of 312kg/ha) Soil analysis should be done before fertilizer application. Fertilizer should not be applied when it is too dry.	Hand weed or hoe regularly	No significant disease pests of concern.	No serious pest or disease.	10 months after planting Yield: 15 to 25 tonnes Food Value: (Powder) Dietary fibre, Potassium, Iron, (very high), Calcium, Calories, Magnesium, Vitamin C, Thiamin, Riboflavin, Niacin. White tumeric has medicinal value.	Good for control of soil erosion.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

URD

Urd
(Vigna mungo)

Recommended Varieties:
- Kiran
- Raikivi

Seed Rate:
17kg/ha

Treated seeds can be kept up to six (6) months at room temperature.

Planting Time:
Planting season is from February to October.

Avoid planting in the wet season.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Mechanised: Between rows: 65cm Plants within rows: 10-20cm Manual: Between rows: 50cm Plants within rows: 10 - 20cm	Soil analysis should be done before fertilizer application. 200kg mixture of Blend A & B at 100kg/ha of each blend applied as basal. (Lower rates on more fertile soil) and Foliar application of sodium molybdate growth at the rate of 1grm/1L of water at 2 – 6weeks in red soils only.	Hoeing or mechanical inter row cultivation.	Powdery Mildew: Small white powdery spots on the upper leaf surface. Affected leaves turn yellow and later brown. Pods are malformed and leaf defoliation occurs. Spray Benomyl at 15g/15L of water. (Sold as Benlate) twice at 10-14 days interval.	For control of Maruca, Leaf miners and other pests use: Apply Lannate at 30ml/15L of water or spray Phyrethroids at 40ml/15L (Sold as Attack) Spray when eggs of Maruca are noticed on flower buds. Aphids: Apply Dimethioate at 15ml/15L (Sold as Rogor) or Bifenthrin at 15 to 20ml/15L knapsack	Harvest dry pods 65 to 70 days from planting. Yield: 1.0 to 1.5 tonnes/ha Food Value: Good source of B-complex group of vitamins, Vitamin C, Iron, Zinc and Calcium.	Good source of food after a disaster, as it is relatively quick to grow. Good crop to reduce erosion and improve soil fertility (nitrogen).

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

VANILLA

Vanilla
(Vanilla planifolia)

Recommended varieties:

- Bourbon vanilla (Vanilla planifolia)

Seed Rate:
1111 plants/ha

Planting Time:
Can be planted all year round.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between Rows: 3m Plants within Rows: 3m Cutting: 1.5m long sprout in 15-20 days after planting.	Require heavy mulching: 20-30 cm around base. (Coconut husk, dry leaves & rotten decaying timber can be safely used as mulch). Poor Soils: Apply 20-30g of Nitrogen & Phosphorus, 60-100g Potash per Vine per year beside the organic mulch. Soil analysis should be done before fertilizer application.	Suppress weeds with addition of heavy mulch. Hand weed around the plant at least four times a year. - Slash between rows.	No significant disease pests of concern.	Slugs & Snails: control by hand picking and use Metaldehyde Baits. Keep ground clean. Scales: spray the affected vines with a mixture of Diazinon at 60ml/15L of water with white oil.	Harvest 3 years after planting continues to increase in production for 4-5 years when it reaches peak production. With good management production can continue for 10 years. Yield: Improved Varieties: 300-600kg cured beans. Food Value: Food flavor	Could be a good source of income.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

WATERCRESS

Watercress
(Rorripa nasturium aquaticum)

Recommended varieties:
- Local selection

Cropping Season:
February to July

Seed Rate:
66,666 cuttings

Planting Time:
October to April

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value	Disaster Risk and Climate Change tips
Between rows: 50cm Plants within rows: 30cm Germination: 2 weeks after planting.	Urea: Side dress at two weeks after sprouting. Poultry Manure: Mix well in the soil before planting. Soil analysis should be done before fertilizer application.	Remove water weeds by hand.	No significant disease pests of concern.	No major pest of economic importance	5 to 6 weeks after planting Yield: 5 to 8 tonnes Food Value: Dietary fibre, Potassium, Calcium, Iron, Vitamin A and Vitamin C (very high)	Good source of food after a disaster as it grows very fast. Tolerant to flooding.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

WATERMELON

Watermelon
(Citrullus lanatus)

Recommended varieties:

- Charleston Grey
- Sugar Babe
- Farmers Giant

China Dragon
- Emperor Charleston

Seed Rate:
1.5-2kg/ha

Plant density:
3333 plants/ha

Planting Time:
April to September during the cool season but can be grown all year round.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between Rows: 3m Plants within Rows: 1m Germination: 6 - 10 days after sowing	Soil analysis should be done before planting Poultry Manure: 10 tonnes/ha Mix well in the soil before planting. NPK: 13:13:21 apply 200kg/ha Basal at planting Urea: 100kg/ha Side dress at 4 and 8 weeks after planting.	Hand weeding of hoeing as necessary. Practice of mulching to retain moisture and control weeds.	Powdery mildew, Gummy blight, Anthracnose: Spray with Antracol at the rate of 30g/15L of water for disease control. Apply Benomyl at 15g/15L of water (Sold as Benlate). Spray at early flowering stage. Use Kocide at 15-20g/15L of water. Spray weekly, before and after harvest Or Manzate 30g/15L of water. Spray every 2 weeks. Blossom End Rot: (Lack of Calcium in the soil) Apply Aglime or poultry manure to improve soil pH level Improve soil drainage	Aphids: Spray Dimethioate at 15ml/15L of water (Sold as Rogor) or Bifenthrin at 15 to 20ml/15L of water. Thrips: Apply Bifenthrin at 15 to 20ml/16L of water. Pumpkin Beetle: Apply Malathion at 30ml/15L of water.	It takes 70 to 120 days from planting to harvest, depending on varieties. Yield: 30-40 tonnes/ha Food Value: Vitamin C.	If weather allows planting could be a good relatively quick source of food and income after disaster.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

WINGED BEAN

Winged Bean
(Psophocarpus tetragonolobus)

Recommended varieties:
- Local Mumu

Cropping Season:
October to April or hot wet climate

Seed Rate:
15kg/ha

Planting Time:
Best yields from July to December.

Better yields obtained when grown on trellis, stakes or house fence.

Spacing:
Between Rows: 3m

Plants within Rows: 1m

Germination:
10 - 12 days after sowing.

Suitable for planting on trellis

Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
NPK: 13:13:21 200kg/ha Basal at planting. Urea: 100kg/ha Side dress at 2 and 4 weeks after planting. Poultry Manure: 5 tonnes/ha. Mix well in the soil before planting. Soil analysis should be done before fertilizer application.	Hand weed or hoe where necessary.	Sclerotium rolfsii: Dig infected plant, remove and destroy then apply Benomyl at 15g/15L of water (Sold as Benlate) for protection.	Bean Pod borer: Apply Lannate at 30ml/15L of water. Aphids & Red Spider Mite: Dimethioate at 15ml/15L of water or Bifenthrin at 15 to 20ml/16L of water.	10 to 12 weeks after planting, pick pods when still tender. Harvest continues for about 6 weeks. Yields: 7 to 10 tonnes/ha Food Value: (Baked) Protein Dietary fibre, Magnesium, Iron, Thiamin, Riboflavin, Niacin, Vitamin B-complex, Vitamin C, Zinc and Calcium.	Good source of food after a disaster, as it is relatively quick to grow. Good crop to reduce erosion and improve soil fertility (nitrogen).

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

YAM

Yam
(Dioscorea alata)

Recommended varieties:
- Early Varieties for all Zones
  Lokaloka, Vurai Balavu, Vurai Leka, Yasawa

- Late Varieties for all Zones
  Beka, Damuni, Filipai White, Filipai Yellow, Futuna, Kivi, Murapoi, Taniela Vula Leka, Veiwa.

- Late Varieties for Dry & Intermediate Zone Beka, Damuni, Filipai White, Filipai Yellow, Futuna, Kivi, Murapoi, Niudamu, Taniela Vula Balavu, Taniela Vula

Seed Rate
Ridges:
4.2 tonnes/ha
(16,670 setts/ha)

Mounds: 3.1 tonnes/ha (12,500 mounds/ha)

Planting Time:
Early Varieties:
Between June & July

Late Varieties:
Between August to September.

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Ridge: 1m between ridge and 50 cm plants within ridges. Mounds: 1m between mounds and 0.8m within mounds.	Soil analysis should be done before planting. Poultry manure: apply 10-12 tons/ ha 1 week before planting Super phosphate: -200kg/ha and Murate of potash 200kg/ha at planting. Urea: 200kg/ha in 3 split applications at 8, 12, 16 weeks after planting	Apply pre-emergence Altrazine at 120ml/15L water. Hand weeding is highly recommended. Ensure yams are properly trellised and staked for proper weed control. Use spray shield Avoid touching crop plants.	Yam Anthracnose & Dioscorea leaf spot: If need be spray with Mancozeb at 50g/15L of water. Two weeks alternate with Apply Benomyl at 15g/15L of water. (Sold as Benlate) Tuber Rot: Treat wounded ends of seeds with Mancozeb at 50g/15L water. or Benomyl at 15g/15L of water. (Sold as Benlate) or fire ash. Apply powder just to cover the wounded ends.	Tuber Scale: Use clean planting material. -Practice crop rotation. -Dipping of planting material in Diazinon at 60ml/15L of water before planting.	When vine turns brown and dies. Early Varieties: 14 -15 tonnes/ha Late Varieties 16-18 tonnes/ha Food Value: Dietary fibre, Potassium, modest amount of Vitamin B1, Vitamin C and fair amount of Iron.	Could be a good source of food during and after a disaster as it stays edible for a long time. Can be stored 3 months (lesser yam) or 6 months (greater yam) after harvest in dry places. Wild yams can be harvested in time of need. If no fertile lands are available Yams can be grown in sacks. Tsunami: Plant on raised beds.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

YAQONA

Yaqona
(Piper methysticum)

Recommended varieties:

- Loa kasa leka
- Loa kasa balavu
- Vula kasa balavu
- Qila Leka
- Matakaro balavu
- Yonolulu
- Damu
- Vula Kasa Leka
- l. Yalu
- Qila Balavu
- Dokobana Vula
- Matakaro leka
- Dokobana loa

Seed Rate
2,500 mounds/ha (3-5 cuttings/mound)

Planting Time:
All year round.

Spacing	Fertilizer/ Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Traditional System: Between rows: 2m Plants within rows: 2m	Soil analysis should be done before planting. Yaqona is best on new fertile soil with high organic matter.	Hand weeding is recommended.	Kava Die Back Disease: Use traditional growing methods: - remove and destroy infected plants by burning & burying. Grow only on good soils, with adequate shade. Intercrop with crops such as dalo, dalo-ni-tana, coconuts, banana, cassava, yams and sweet potato. Avoid planting host plants such as Cucurbit plants (pumpkin, cucumber, watermelon), solanaceous plants (tomato, capsicum, chillies, eggplant and tabacco), leguminous plants, pineapple,erythrina (drala) and weeds(mileaminute and commelina Use clean and healthy planting materials from non-infected plants.	No major insect pest	Harvesting after 3-4 years from planting can be left longer in the field. Yield (Dry): 2-3 tonnes/ha Food Value: Carbohydrate and as a laxative.	In disaster prone areas, plant Yaqona as part of a multi-crop food garden with coconut, yams, cocoa, coffee. Can be a good source of income after disaster. Mulch to keep soil moisture in severe drought period, prune field-grown plants extensively by removing large leaves to reduce evapotranspiration rates.

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

ZUCCHINI

Zucchini
(Cucurbita pepo)

Recommended varieties:
- Marrow
- Black Jack

Cropping Season:
Cool dry but it can be grown all year round

Seed Rate
3kg/ha

Planting Time:
Cool season
Cool Season
(April – September)

Off season
(October – March)

Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/Food Value	Disaster Risk and Climate Change tips
Between rows: 1m Plants within rows: 30cm Germination: 5 to 10 days after sowing	a) NPK: 13:13:21 200kg/ha Basal at planting. b) Urea: 100kg/ha Side dress 3 to 4 weeks after germination. Poultry Manure: 12 tonnes/ha Broadcast, mix well before planting. Soil analysis should be done before fertilizer application.	Hand weed or hoe when necessary. Practice mulching to control weeds and retain soil moisture.	Mosaic virus Powdery Mildew: Apply Benomyl at 10g/15L of water (Sold as Benlate) or Copper Oxychloride at 60g/15L of water (Sold as KOPI) Downey Mildew: Apply Antracol at 30g/15L water Use Kocide at 15-20g/15L of water to prevent fungal infections	Squash Bug and 28 Spotted Lady Bird beetle: Spray Malathion at 30ml/15L water or Bifenthrin at 15 to 20ml/16L knapsack. or Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene) Aphids: Dimethioate at 15ml/15L of water (Sold as Rogor) or Bifenthrin at 15 to 20ml/16L knapsack Squash Bug: Spray Acephate 75% a.i at 20g/15L of water (Acephate is sold as Orthene & Sunthene)	Harvest 6 to 8 weeks after planting Yield: 8 to 10 tonnes/ha Food Value: Dietary fibre and Vitamin C.	Good food and income alternative after a disaster, as it grows relatively fast. Hardy plant that can withstand some flooding and dry periods

FIELD OBSERVATION

Recommended Varieties Cropping Season	Seed Rate	Spacing	Fertilizer/Manure	Weed Control/ Management	Disease Control/ Management	Insect Control/ Management	Harvest/Yield/ Food Value

PESTS

Source: Plant Protection Koronivia Research Station

Cabbage Aphid

Colonies feed on the leaves and foul them with honeydew. Sucking leads to curling and stunting of leaves.

Weevil in Cowpea

They are the most common and widespread insect pests in storage.
They attack both pods in the field and seeds in storage. Infested stored seeds can be recognised by the round exit holes and the white eggs on the seed surface.

Centre Grub in Cabbage

Leaves may be webbed together or develop large blisters. Older plants appear stunted.

Thrips

They puncture the plant cells with their rasping-sucking mouthparts and withdraw cell sap.

Thrips feeding on fruits causes scarring, irregular discoloration and deformation, which reduce the market value of fruits.

Corn Ear Worm in Okra

They bore holes in the pods. The corn earworm, occasionally feeds upon okra. The head is golden brown and the body has small bumps and spines, giving it a rough texture. There can be two or three generations in a year.

Dalo Beetle

Dalo beetle feeds on dalo corms making large holes which reduce their market value and can result in corm rot and the complete loss of the corm. The size of an adult dalo beetle is 18 to 20mm.

Fruit Borer in Tomatoes

Attacks the developing and mature fruits of tomato.
They usually bore into the fruit from the stem end and feed on the inner parts of the fruits, causing extensive fruit damage and promoting decay caused by secondary infections.

Fruit Fly

They pierce the fruits and lay eggs in fruits.
The fruit fly maggots feed inside the fruit causing sunken, discoloured patches, distortions and open cracks.
These cracks serve as entry points for fungi and bacteria, causing fruit rot.

Large Cabbage Moth

Older caterpillars feed under a web of silk on young leaves, petioles and growing point of the plant, often damaging it entirely.

Leaf Miner

Leaf Miners are basically any insect that lays its eggs in the spongy layer between the upper and lower surfaces of leaves. The vast majority of leaf-mining insects are moths and flies. Larvae develop between the leaf surfaces and tunnel or 'mine' out the spongy middle layer as they grow.

Pod Borer in Pigeon Pea

Source: Legalega Research Station

Young caterpillars may feed on any part of the flowers or foliage.

Older caterpillars are highly mobile, feeding continuously on flowers and newly formed pods, causing severe damage to the crop.

Spider Mite in Tomatoes

Feeds on surfaces of foliage, stems and fruits.

Blossoms are shed, fruits stunted and skin rusty or corky looking.

DISEASES

Source: Plant Protection Koronivia Research Station

Downey Mildew in Lettuce

Light green to yellow spots on upper leaf. Later turns brown, soft & slimy. Undersurface-white fungal growth

Leaf Spot in Lettuce

Round to irregular spots, pale grey centres. When spots merge, can kill large leaf area. Also affects Capsicum.

Soft Rot in Capsicum

The infected fruits shrinks and hang like water-filled bags. Underlying tissue is soften, leaving a sunken, wrinkled, fragile skin that is easily ruptured.

Fruit Rot in Eggplant

The fungus may attack fruit at any growth stage and any part of the fruit. Spots on the fruit are dark brown, water-soaked and may have a light-coloured border. A whitish mould develops on the spots when wet conditions prevail. Infected fruits drop prematurely.

Anthracnose in Papaya

Attacks ripe fruit; sunken brown spots that enlarge and result in rot as fruit ripens.

Bacterial Wilt in Eggplant

Major problem for tomatoes and eggplants especially when there are no proper drains and there is too much water in the field.

Black Sigatoka Disease

Leaves die off before the fruits mature. Control the spread of the disease by cutting and burning the infected leaves.

Damping Off/Basal Rot in English Cabbage

Seedlings attacked at soil level. Older plants- basal rot, leaves develop large white, grey or pale brown areas of delay Fungus web, visible in the morning

Blossom End Rot in Tomatoes

Caused due to lack of calcium in the blossom-end of the fruit. It is also caused by a sharp change from cold to hot weather, extreme soil moisture fluctuations, drought, stress, root damage due to deep cultivation or waterlogged conditions, or excessive growth due to too much nitrogen fertilization.

Powdery Mildew in Tomatoes

Spots under-leaf, yellow then light brown. Affects Chillies, Eggplant and Capsicum.

Sunburn in Tomatoes

Occurs when leaves fall off prematurely.

Fruits become yellow and unevenly ripe.

Injured area become white & blistered, lose water, grey flat paper-like spots.

Nematode

Causes swelling on the roots. Affects Eggplant, Tomatoes, Carrot, Radish, Cucumber, Okra and Bele.

COMMON WEEDS AND ITS CONTROL

Source: Plant Protection Koronivia Research Station

Wedelia
(Sphagneticola trilobata)

Description
Wedelia is a creeping perennial herb that belongs to the Asteraceae family or sunflower. Its stem is rounded and long, rooting at the nodes and its flowering portion similar to sunflower but small in size.

Control:
Wedelia Eradicator 0.3g/1L of water

African tulip
(Spathodea campanulata)

Description
It's a beautiful blooming tree, large upright that can grow more than 25 meters and can be propagated from stems cuttings, seeds and runners.

Control:
Glyphosate 360
1:1 rates (1 part chemical and 1 part water) – large trees

1:2 rates (1 part chemical and 2 part water) - smaller and medium trees

Rain tree
(Samanea saman)

Description
Rain tree (Samanea saman) is a tree that can be easily recognized for its umbrella shaped canopy. The tree can grow to a height of 15 to 25 meters. Very large trees can reach up to 50 meters. At times the canopy width is much longer than that of the trees height.

Control:
Glyphosate 360 and
Tordon Gold
1:1 rates (1 part water and 1 part chemical) -– large trees

1:2 rates (1 part chemical and 2 part water) - smaller and medium trees.

Merremia
(Meremia peltata)

Description
Merremia peltata belongs to the family Convolvulaceae and it's a coarse climbing vine with underground tubers. Its stems are smooth and twine at the tips; they may be up to 20 meters long. Leaves are simple, broad, and alternate with purple veins beneath; leaf margins are waxy. White funnel shaped flowers are borne in clusters on stalks 15-30cm long.

Control:
Slash the vines and spray
Glyphosate at 10ml/1L of water

Commelina
(Commelina diffusa)

Description
Sometimes known as the climbing dayflower or spreading dayflower, is a pan tropical herbaceous plant in the dayflower family. It is most common in wet disturbed soils.

Control:
Wedelia Eradicator 0.3grams/1L of water
Or
Amine 0.5ml/1L of water

Fireworks
(Clerodendrum quadriloculare)

Description
Clerodendrum quadriloculare is a species of flowering plant native to New Guinea and the Philippines. It is one of many species long in included in the verbena family, Verbenaceae but transferred to the Lamiaceae based on molecular studies.

Control:
Glyphosate at 10ml/1L of water

Common sedge

Description
Sedges are a grouping of plants that are suited to grow in wet places

Control:
MCPA 75ml/1L of water

Nut sedge/Nut grass
(Cyperus rotundus)

Description
It's an erect sedge with red-brown, linear spikelet loosely arranged on several rays, 2-3 inflorescence bracts, and underground tubers produced at the tips of wiry, spreading stolons.

Control:
MCPA 75ml/1L of water

Mile a minute
(Mikania micrantha)

Description
A branched, slender-stemmed perennial vine. The leaves are arranged in opposite pairs along the stems and are heart-shaped or triangular with an acute tip and a broad base. Leaves may be 4-13cm long. The flowers, each 3-5mm long, are arranged in dense terminal or auxiliary corymbs. Individual florets are white to greenish-white.

Control:
Rust fungus (Biological control) or chemical control Glyphosate at 10ml/1L of water

COMMON WEEDS AND ITS CONTROL

Source: Plant Protection Koronivia Research Station

Mission grass
(Pennisetum polystachyon)

Description
An annual or perennial; culms simple or branched, the branches often flowering. Spikelet's 3-5 mm; false spike 8-10 mm, rarely 6-15 mm wide, excluding the bristles; longest bristle 15-25 mm long, the others more than twice as long as the spikelet. When mature, the spikelets break off at the central axis together with the bristles.

Control:
Glyphosate at 10ml/1L of water

Tarweed
(Cuphea carthaginensis)

Description
Sticky herb with opposite leaves, purple, six parted flowers, and small, ovoid capsules surrounded by the longitudinally ribbed calyx.

Control:
Glyphosate at 10ml/1L of water

Lantana
(Lantana camara)

Description
Prickly, coarse-leaved shrub with small, multi-colored flowers in head-like spikes

Control:
Glyphosate at 15ml/1L of water
Wedelia Eradicator 0.3g/1L of water

Prickly solanum
(Solanum torvum)

Description
Large, prickly shrub with finely hairy stems and lower leaf surfaces, corymbs of white, sympetalous flowers with yellow stamens, and glabrous, green to yellow, globose berries.

Control:
Glyphosate at 10ml/1L of water

Ellington curse
(Acacia farnesiana)

Description
Acacia farnesiana is a deciduous Shrub growing to 9 m (29ft 6in) at a fast rate. The flowers are hermaphrodite (have both male and female organs).
Suitable for: light (sandy), medium (loamy) and heavy (clay) soils, prefers well-drained soil and can grow in nutritionally poor soil. Suitable pH: acid, neutral and basic (alkaline) soils and can grow in very acid, very alkaline and saline soils. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.

Control:
Cut and spray Glyphosate at 10ml/1L of water

Broom weed
(Sida acuta)

Description
Woody shrub with alternate leaves, pale orange flowers on long stalks, numerous stamens, fused into a column, and a wheel- shaped splitting fruit of 9 – 12 beaked sections.

Control:
Calligrapha pantherina
(Biological control)

Navua Sedge
(Kyllinga polyphylla)
synonyms (Cyperus aromaticus)

Description
Sedge with a knotty creeping rhizome, erect stems, and spikelet in green, subglobose heads with 5-8 leaf –like bracts below.

Control:
Glyphosate at 10ml/1L of water
MCPA 75ml/1L of water

Jungle Rice
(Echinochloa colona.)

Description
Tufted grass with a panicle of short, alternating branches 3-5mm wide, bearing densely packed awnless, acute-tipped spkielets not in distinct rows.

Control:
Glyphosate at 10ml/1L of water

Giant sensitive grass
(Mimosa invisa)

Description
Scrambling, prickly shrub with bipinnate compound leaves of 3-8 pairs of opposite pinnae, and flowers in small, pink globose heads.

Control:
Glyphosate 360 4L/ha
2,4D Dicamba (Butoxone) 2L/ha

COMMON WEEDS AND ITS CONTROL

Source: Plant Protection Koronivia Research Station

Synedrella
(Synedrella nodiflora)

Description
Coarse herb with opposite leaves, and yellow ray and disc flowers in axillary or terminal, sub sessile heads.

Control:
Glyphosate at 10ml/1L of water

Goat Weed
(Ageratum conyzoides)

Description
Hairy herb with coarse, opposite leaves and bell shaped heads of lavender disc flowers arranged in terminal corymbs.

Control:
Glyphosate at 10ml/1L of water

Johnson Grass
(Sorghum halepense)

Description
This perennial grass is about 2½–7' tall and more or less erect.The culms are light green, terete, and glabrous. The alternate leaves occur primarily along the lower half of each culm. The leaf blades are up to 2½' long and 1¼" across; they are widely spreading, arching, or ascending. The upper blade surface is medium to dark green and glabrous, while the lower blade surface is more pale than the upper surface and glabrous. The larger leaf blades have prominent central veins that are pale-colored near their bases. The leaf sheaths are light green to green, glabrous (or nearly so), and open.

Control:
Glyphosate at 10ml/1L of water

Noogoora burr/rough cocklebur
(Xanthium strumarium)

Description
The species is an annual plant and monoecious, belonging to the Asteraceae family. The flowers are borne in separate unisexual heads: staminate (male) heads situated above the pistillate (female) heads in the inflorescence. The pistillate heads consist of two pistillate flowers surrounded by a spiny involucre.

Control:
Glyphosate at 15ml/1L of water
Wedelia Eradicator 0.3g/1L of water

Hibiscus burr
(Urena lobata)

Description
Urena lobata, commonly known as Caesarweed or hibiscus burr is an annual, variable, erect, ascendant under shrub measuring up to 0.5 meters to 2.5 meters tall. The stems are covered with minute star-like hairs and often tinged purple

Control:
Glyphosate at 15ml/1L of water
Escort 0.5g/1L of water

False kava
(Piper auritum)

Description
Piper auritum is an aromatic herb with a heart-shaped, velvety leaf. The leaves can reach up to 30 centimeters (12 in) or more in size. The complex flavor of false kava is not so easily described; it has been compared to eucalyptus, licorice, sassafras, anise, nutmeg, mint, tarragon, and black pepper. The flavor is stronger in the young stems and veins.

Control:
Glyphosate at 15ml/1L of water

Winged false buttonweed
(Spermacoce latifolia)

Description
Spermacoce latifolia is a perennial herb, sometimes erect but other times decumbent. Stems are square in cross-section, with wings along the corners running lengthwise along the stem. Leaves are elliptical to oblong, up to 8 cm long. Flowers are white to very pale purple, formed in axillary clumps.

Control:
Glyphosate at 10ml/1L of water

Simple leaf chaste-tree/beach vites
(Vitex trifolia)

Description
Vitex trifolia is a large coastal shrub or small tree, less than 5 m in height with the stems covered by soft hairs (tomentose). The leaves are oppositely arranged along the stems and are usually compound, composed of 3 linear leaflets which range between 1 –12 cm in length. The upper surface of the leaves is green and the lower surface grayish green.The flowers are born in panicles or clusters up to 18 cm in length.

Control:
Glyphosate at 15ml/1L of water

Arrow head
(Syngonium podophyllum)

Description
Arrowhead vine is an evergreen climbing vine that typically grows to 3-6' long. As a houseplant, it is typically grown for its attractive ornamental foliage which changes shape as the leaves mature. Juvenile leaves (to 5.5" long) are ovate with heart-shaped bases and sometimes with silver variegation. Leaves mature to arrow shape.

Control:
Escort 0.3g- 0.5g/1L of water

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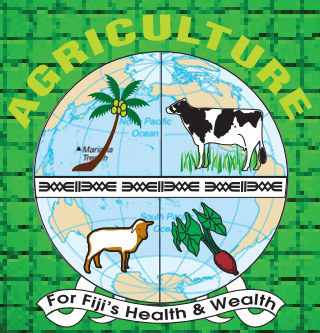
The

Farmer's Guide

A Farmer's Guide to a better harvest



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