

## PINNEAPPLE

(*Ananas comosus* L. Merr.)

Cultivar ; Kew, Queen, Mauritius

### Manure and Fertilizer:

10 to 15 t/ha of FYM may be applied at last ploughing. N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O @ 12g, 2g and 12g, respectively per plant per crop should be applied. Half of N and the whole of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O to be applied as basal dose and rest half of N to be applied as foliar spray.

For foliar applications, 450 g urea is dissolved in 10 lit. of water and sprayed on 200 plants. It will provide 1 g of N per plant. Thus for giving 6 g of N as foliar application 6 such spraying are required after every 2 months. Soil application of 40 % of fertilizer of plant crop i.e. 4.8 g. N, 0.8g, P<sub>2</sub>O<sub>5</sub> and 4.8 g, K<sub>2</sub>O/plant after harvest of main crop increase production of ratoon crop of pineapple.

## BANANA

(*Musa* spp. Colla)

**Cultivar:** Dwarf : "Jahaji" (Dwarf Cavendish)  
Medium Tall: "Chenichampa", "Malbhog", "Bar Jahaji"  
Tall: "Pura Kal" (Kach Kal), "Manohar", "Jati", "Bhimkal"

### Manure and Fertilizer :

12 kg FYM/plant  
110 g N/plant  
33 g P<sub>2</sub>O<sub>5</sub>/plant  
330 g K<sub>2</sub>O/plant

In case of Jahaji K<sub>2</sub>O may be increased up to 550 g/plant. In case of Barjahaji 200 g N/plant in three splits (3<sup>rd</sup> month, 5<sup>th</sup> month and shooting stage) should be applied.

FYM should be applied at the time of planting. The whole of P<sub>2</sub>O<sub>5</sub>, half on N and half of K<sub>2</sub>O should be applied in 3<sup>rd</sup> month of planting. The remaining N and K<sub>2</sub>O should be applied in 5<sup>th</sup> month of planting.

Soil application of different micronutrient mixture of B (6g), Zn (9g), Cu (6g) and Mo (1g) per plant for Borjahaji is beneficial. Micronutrient mixture of B, Zn, Cu & Mo at the same rate for Chenichampa and B & Zn mixture for Jahaji increase the production.

## ASSAM LEMON

(*Citrus limon* L. Burmf)

**Cultivar:** Assam Lemon (Local).

### Manure and Fertilizer:

Year	FYM	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	
<b>A. Plain Zone :</b>					
1 <sup>st</sup> yr.	5kg	150g	100g	145g	Per plant per year
2 <sup>nd</sup> yr.	10 kg	300g	200g	290g	
3 <sup>rd</sup> yr.	15 kg	450g	300g	435g	
4 <sup>th</sup> yr.	20 kg	600g	400g	580g	
<b>B. Hill Zone :</b>					
1 <sup>st</sup> yr.	10 kg	100g	100g	100g	Per plant per year
2 <sup>nd</sup> yr.	10 kg	100g	100g	100g	
3 <sup>rd</sup> yr.	10 kg	100g	100g	100g	
4 <sup>th</sup> yr.	20 kg	100g	100g	100g	

For better quality of fruit apply 170g K<sub>2</sub>O/plant/year. This mixture is to be applied in two split doses, i.e. during February/March and October/November. Fertilizer should

be applied leaving about 15-45cm space around the tree trunk and well beyond the canopy spread. It should be incorporated into the soil by light hoeing.

**KHASI MANDARIN**  
(*Citrus reticulata* Blanco)

**Cultivar:** Khasi Mandarin (Local)

**Manure and Fertilizer:**

Age	FYM	N	P <sub>2</sub> O <sub>5</sub>	K <sub>2</sub> O	Per plant per year
2 <sup>nd</sup> yr.	5kg	150g	120g	100g	
3 <sup>rd</sup> yr.	10kg	300g	240g	200g	
4 <sup>th</sup> yr.	15kg	450g	360g	300g	
5 <sup>th</sup> yr.	20kg	600g	480g	400g	
6 <sup>th</sup> yr. Onward	25kg	600g	300g	600g	

In the first year of planting no fertilizer is applied to the plant. For bearing plant, apply Neem cake @ 7.5 kg per plant per year.

Manures and fertilizers should be applied in two split doses, i.e. February/March and September/October.

Fertilizer should be applied leaving about 15-45 cm space around the tree trunk and well beyond the canopy spread. Immediately after application of fertilizer, it should be incorporated into the soil by light or shallow hoeing.

**Micronutrient :**

Foliar application of micro nutrient viz. Zn, B and Mo is very much effective, @ 0.02%, 0.05% and 0.05% as ZnSO<sub>4</sub>, Borax and Ammonium-molybdate respectively thrice in a year during Feb-March, June-July and Sept-Oct.

**COCONUT**  
(*Cocos nucifera* L)

**Variety:** Assam Tall, T x D hybrid, Bengal Selected, Bangal Hazari, Kamrupa.

**Fertilizer Dose :** (per palm per year for bearing plants)

Fertilizer	Improved varieties	Hybrid varieties
Urea	1.50 kg	1.10 kg
SSP	2.50 kg	1.12 kg
MOP	1.75 kg	3.34 kg
Borax	25 g	25 g

The fertilizer should be applied in two equal split doses, i.e. in April and October. The fertilizer should be applied to a trench of 30 cm width and 10 cm depth at a radius of 1 to 1.75m away from the trunk depending upon the age of plant and covered with green leaves and then by soil. For seedling, the dose should be increased up to 4<sup>th</sup> year at the following rates:

1<sup>st</sup> yr. – 1/5<sup>th</sup> of the full dose.

2<sup>nd</sup> yr. – 2/5<sup>th</sup> of the full dose.

3<sup>rd</sup> yr. – 3/5<sup>th</sup> of the full dose.

4<sup>th</sup> yr. – 4/5<sup>th</sup> of the full dose.

From 5<sup>th</sup> year onwards-full dose of fertilizer for bearing palm.

**JACK FRUIT**  
(*Artocarpus heterophyllus* Lam)

**Cultivar:** Singapore Jack, Rudrakshi, Local types.

**Manure and Fertilizer:** For a bearing tree

FYM	: 20 to 30 kg
N	: 200 g.
P <sub>2</sub> O <sub>5</sub>	: 320 g.
K <sub>2</sub> O	: 960 g.
Ash	: 5 kg.

**MANGO**  
(*Mangifera indica* Linn)

**Cultivar :** Langra, Malda, Gulabkhas, Krishnabhog, Dashehari, Fazli, Mallika and Amrapalli.

**Manure and Fertilizer:**

Non bearing stage (upto 3 <sup>rd</sup> year) per plant/year	Bearing tree per plant/year	Old declined tree per plant/year
10 – 15 kg FYM	20 – 25 kg FYM	50 – 60 kg FYM
73 g N	730 g N	1 kg N
18 g P <sub>2</sub> O <sub>5</sub>	180 g P <sub>2</sub> O <sub>5</sub>	0.5 kg P <sub>2</sub> O <sub>5</sub>
68 g K <sub>2</sub> O	680 g K <sub>2</sub> O	1 kg K <sub>2</sub> O

(In case of old declined tree 3% urea as foliar spray per year after pruning).

**PAPAYA**  
(*Carica papaya* Linn.)

**Cultivar:**

**Dioecious Type:** Co.1, Co.2, Washington, Ranchi, Halflong

**Hermaphrodite type:** Solo papayas, Coorg Honey Dew.

**Manure and Fertilizer:**

NPK @ 500g, 500g and 500g per plant, in two splits : (i) 2 months after planting, (ii) at first fruit set.

**LITCHI**  
*Litchi chinensis* Sonn.

**Cultivar:**

Muzaffarpur, Dehra Dun, Calcutta, Rose Scented, Khatti, Seedless.

**Manure and Fertilizer:**

For bearing Tree:

Urea:	110g.
Super Phosphate:	250g
Sulphate of Potash:	125g.
Oil Cake:	2 kg.
Bone Meal:	2 kg.
Wood ash:	4 kg.

**GUAVA**  
(*Psidium guajava* Linn.)

**Cultivar:** Hafsi, Lucknow-49. Allahabad Safeda, Chittidar, Seedless.

**Manure and Fertilizer :** 20-30kg. FYM, 260g N, 320g P<sub>2</sub>O<sub>5</sub> and 260g K<sub>2</sub>O/plant/year in two split doses in February-March and September-October.

**SAPOTA**  
(*Achras zapota* Linn.)

**Cultivar :** Cricket Ball, Barmasi, Oval, Co.1.

**Manure and Fertilizer :**

For a bearing tree, 40 kg. FYM, 200g. N, 80 g P<sub>2</sub>O<sub>5</sub> and 300 g K<sub>2</sub>O/tree/year

**ARECANUT**  
(*Areca catechu* Linn.)

**Cultivar:** Local type

**Manure and Fertilizer:**

Age	FYM kg/ Plant/yr	N g/plant/ year	P <sub>2</sub> O <sub>5</sub> g/pl/yr	K <sub>2</sub> Og/ pl/ year
1 <sup>st</sup> yr.	5	30	15	50
2 <sup>nd</sup> yr.	10	60	30	100
3 <sup>rd</sup> yr & Onwards	15	100	40	140

Apply 2 splits, one during February and the other during September/ October.

**BETELVINE**  
(*Piper betle* Linn.)

**Cultivar :**

Assamiya pan or Jati pan, Khasi pan, Garo pan, Sanchi pan, Bangla pan, (Kali Bangla, Nua Bangla, Ghanegette and Godi Bangla) Mitha pan and Karbi pan.

**Manure and Fertilizers :**

Age	N : P <sub>2</sub> O <sub>5</sub> : K <sub>2</sub> O (kg/ha)
1 - 5 year	0 : 50 :100
>5 – 10 year	100 : 50 : 150
>10 year	200 : 50 : 100

**CASHEW**  
(*Anacardium occidentale*)

**The Year wise fertilizer is as follows :**

Year(s) after planting	Dose g/plant		
	Urea	Rock phosphate	Muriate of potash
1 <sup>st</sup>	330	125	40
2 <sup>nd</sup>	660	250	80
3 <sup>rd</sup>	990	375	120
4 <sup>th</sup>	1320	500	160
5 <sup>th</sup>	1650	625	200

- The fertilizer is to be applied in two splits. First split is given during pre monsoon (May/June) and second part is applied in post monsoon (August/September).
- Fertilizers are applied in 50cm circular band in flat land at a distance of 50cm, 70cm, 100cm and 150cm away from the trunk of cashew of plant during 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year after planting and onwards respectively and rake the fertilizer into the soil.
- In sloppy areas the fertilizers are applied in circular trenches of 25cm width and 15cm depth at the distance mentioned earlier.

**CAULIFLOWER**  
(*Brassica oleracea* L. var botrytis)

**Variety :**

**Early :** Early Kunwari, Pusa Katki and Pusa Deepali.

**Mid :** Improved Japanese, Pusa Synthetic, Pusa Snowhall and Main Crop Patna.

**Late :** Snowball-16, Pusa Snowball, K-1 and Hissar 1.

**Manures and Fertilizers :**

FYM @ 10 t, N 80 kg., P<sub>2</sub>O<sub>5</sub> 60 kg and K<sub>2</sub>O kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed at 30 days after planting (during earthing up). For Kitchen Garden, half of N and whole of P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O may be applied by ring method around the plant at 15 days after planting and the other half of N at 30 days after planting.

Apply either 8 kg of Borax or 6 kg of Boric acid powder per ha along with basal fertilizers or spray 0.2-0.3% Borax (@ 1.6-2.4 kg/800lit/ha) against browning in boron deficient soils.

To prevent deficiency of molybdenum, apply Na or NH<sub>4</sub>-molybdate @ 1-2 kg per ha along with basal fertilizers or irrigation water. Foliar spray of NH<sub>4</sub>-molybdate (0.01-0.1% - @ 200-300g/h is also recommended. Foliar spray with commercial micronutrients formulation like Molymax (50% Mo), Multiplex etc. may be done.

**For Hill Zone :**

- (i) Apply boron 3000 ppm (3g/lit) as foliar spray solution 30 days after transplanting (650 lit spray solution/ha).
- (ii) Apply Multiplex @ 4 kg/ha as spray solution (10g/3 lit) in two splits at 30 45 and days after transplanting. 600 lit of solution is sufficient for one hectare. Polymax or Anusar, Shaktispray with identical micronutrient composition may be used in place of Multiplex.

## **SPROUTING BROCCOLI OR BROCCOLI**

*(Brassica oleracea var. italica)*

### **Variety :**

**Early :** Early Danish Giant, De Cicco Green Bud, Sparton Early, Coastal and Atlantic.

**Mid :** Green sprouting medium.

**Late :** Waltham 29, Green Mountain, Coastal and Atlantic.

**Hybrid :** Southern Comet, Premium Crop, Clipper, Laser (extra early and early), Corsair, Cruiser, Emerkald, Corona (mid season) and Late corona, Stiff, Kayak and Green surf (late).

### **Manures and Fertilizers :**

FYM @ 20 t, N 100-200 kg, P<sub>2</sub>O<sub>5</sub> 60-80 kg and K<sub>2</sub>O 40-60 kg/ha. Nitrogen can be applied in split doses. Molybdenum and Boron should also be applied as in case of broccoli

## **CABBAGE**

*(Brassica oleracea L. var capitata)*

### **Variety :**

Early maturity : Golden Acre, Pride of India, Pusa Mukta (Sel – 8)

Late maturity : Drum Head and Eclipse Drum Head.

### **Manure and Fertilizer :**

FYM @ 10 t, N 120 kg, P<sub>2</sub>O<sub>5</sub> 60 kg, P<sub>2</sub>O 60 kg per ha and Borax 8 kg/ha. Application method same as in Cauliflower.

## **KNOLKHOL**

*(Brassica caulorapa L var. gongyloides)*

**Variety :** Early maturity : White Vienna.

Late maturity : Purple Vienna.

### **Manure and Fertilizer :**

FYM @ 10 t, N 80 kg, P<sub>2</sub>O<sub>5</sub> 60 kg and K<sub>2</sub>O 60 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top-dressed as 20 days after transplanting.

## **TOMATO**

*(Lycopersicon esculentun Mill )*

### **Variety :**

Punjab Chuhara, S-12, Punjab Kesri, Pusa Early Dwarf, Sioux, Pusa Ruby, VC-48-1, Arka Abha (BWR-1), Arka Alok (BWR-5), and BT-1, Bilahi-1 and Bilahi-2.

### **Manure and Fertilizer**

- i) FYM @ 10 t, N 75 kg, P<sub>2</sub>O<sub>5</sub> 60 kg and K<sub>2</sub>O 60 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed in one or two splits.
- ii) Foliar application of Nitrogen in tomato is very much affective. In that case, 40 kg/ha N should be applied as basal and 20 kg/ha N as foliar spray. The schedule for foliar spray to be followed is given below :
  - i. Spray on the 30<sup>th</sup> days after transplanting by dissolving 9.71 kg.

- Urea in 1000 liters of water.
- ii. Spray on the 40<sup>th</sup> days after transplanting by dissolving 14.1 kg. Urea in 1500 liters of water.
  - iii. Spray on the 50<sup>th</sup> days after transplanting by dissolving 19.3 kg urea in 2000 liters of water.

**BRINJAL**  
(*Solanum melongena* L.)

**Variety :**

Long : Cluster, borbengena, JC-1, Kuchia and BWR-34. Pusa Kranti, Pusa Purple Long, Pusa Purple.

Round : Pusa Purple Round, Pusa Vairab, JC-2, BWR-12. Oblong : BB-7, Pant Samrat.

**Manure and Fertilizer :**

FYM @ 10 t, N 50 kg, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O 50 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed in one or two installments. For second season crop of Kuchia cultivar, NPK @ 80:80:80 kg/ha is recommended.

**PEA**  
(*Pisum sativum* L.)

**Variety :**

1. T-136 : Selection from local pea of Bulandshaire (UP).

**Fertility Management :**

Compost of FYM @ 4-5 t/ha or 6 q/bigha should be applied.

Nutrient requirement (kg/ha)	Name of fertilizer	Fertilizer (kg/ha)	Requirement (kg/bigha)
<b>A. Without Rhizobium Culture :</b>			
N 20	Urea	45	6
P <sub>2</sub> O <sub>5</sub> 45	SSP	285	40
K <sub>2</sub> O 0	MOP	0	0
<b>B With Rhizobium Culture :</b>			
N 10	Urea	22	3
P <sub>2</sub> O <sub>5</sub> 46	SSP	285	40
K <sub>2</sub> O 0	MOP	0	0

For Upper Brahmaputra Valley, Lower Brahmaputra Valley and North Bank Plain Zones, 10 kg K<sub>2</sub>O/ha is recommended in addition to normal dose of NPK. In North Bank Plains Zone 10 kg Borax/ha is also recommended.

Diammonium phosphate (DAP) @ 100 kg/ha or 13 kg/bigha should be applied in lieu of urea and SSP in non inoculated crop. NPK may also be supplied in the form of mixed fertilizers like Amrit and others.

**French bean**  
(*Phaseolus vulgaris* L.)

**Variety :**

Pusa Parvaty, Contender, UPF-203,UPF-191 and Premier.

**Manure and fertilizer :**

FYM @ 20 t, N 30 kg, P<sub>2</sub>O<sub>5</sub> 40 kg and K<sub>2</sub>O 20 kg/ha. Half of n and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be topdressed at flowering.

## **DOLICHOS BEAN**

(*Dolichos lablab* L.)

### **Variety :**

Pusa Early Prolific, HD-18 and local cultivars. Besides these; DC-4 and DC-5 are recommended for Hill Zone.

### **Manure and Fertilizer :**

FYM @ 20 t, N 30 kg, P<sub>2</sub>O<sub>5</sub> 40 kg and K<sub>2</sub>O 20 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed at flowering.

## **SPINACE BEET**

(*Beta vulgaris* Roxb. Var. benghalensis)

### **Variety :**

Jobner Green , All Green, S-23 and Pusa Jyoti

**Manure and Fertilizer :**  
FYM @ 20 t, N 80 kg and P<sub>2</sub>O<sub>5</sub> 60 kg/ha basal application.

## **RADISH**

(*Raphanus sativus* L.)

### **Variety :**

**Early :** Pusa Deshi, Pusa Chetki and Pusa Himani.

**Late :** Japanese White, Jaunpuri and Bombay Red.

### **Manure and Fertilizer :**

FYM @ 20, t, N 50 kg, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O 100 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed at 30 days after sowing.

## **CARROT**

(*Daucus carota* L)

### **Variety :**

Nantes, Pusa Kesar and Chantenay.

### **Manure and Fertilizer :**

FYM @ 10 t, N 60 kg, P<sub>2</sub>O<sub>5</sub> 30 kg and K<sub>2</sub>O 120 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed at 30 days after sowing.

## **CUCUMBER**

(*Cucumis sativus* L **Manure and Fertilizer** )

FYM @ 10t, N 20 kg, P<sub>2</sub>O<sub>5</sub> 30 kg and K<sub>2</sub>O 30 kg/ha. Half of N with full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed at veining.

## **RIDGE GOURD**

(*Luffa acutangula* (Rob.)L.

### **Variety :**

Pusa Nasdar, selected local varieties, Viz.AAUJ-1, AAUJ-2, AAUC-3.

### **Manure and Fertilizer :**

FYM @ 10t, N 20 kg, P<sub>2</sub>O<sub>5</sub> 30 kg and K<sub>2</sub>O 30 kg/ha. Half of N with full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed at veining.



**SPONGE GOURD**  
(*Luffa cylindrica* Reom)

Variety :  
Pusa Chikni and selected local varieties.

**Description :**

Pusa Chikni : Bears 15-20 fruits/vine, fruit smooth, dark green, more or less cylindrical; flowers in about 45 days; maturity 50-60 days; suitable for both spring summer and rainy season.

Other (Agro-techniques are same as in Ridge ground).

**SNAKE GOURD**  
(*Trichosanthes cucumerina* L.)

**Variety :**

Long Green, Long White and Extra Long.

**Manure and Fertilizer :**

FYM @ 25 t, N 45 kg, P<sub>2</sub>O<sub>5</sub> 30 kg and K<sub>2</sub>O 30 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should to be applied as basal and the remaining half of N to be top dressed when the plants start bearing.

**BITTER GOURD**  
(*Momordica charantia* L.)

**Variety :**

For spring season-Earliest of All, Long Green, Extra Long and Pusa Do Mausmi.

For summer season-monsoon Monarch and Long Green Monsoon, Coimbatore

Long.

**Manure and Fertilizer :**

FYM @ 10 t, N 40 kg, P<sub>2</sub>O<sub>5</sub> 30 kg and K<sub>2</sub>O 30 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should to be applied as basal and the remaining half of N to be top dressed during flowering and fruiting stages.

**ASHGOURD**  
(*Benincasa hispida* (Thumb) Cogn.)

**Variety :** Selected local varieties.

**Manure and Fertilizer :**

FYM @ 20-25 t, N 70 kg, P<sub>2</sub>O<sub>5</sub> 80 kg and K<sub>2</sub>O 80 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should to be applied as basal and the remaining half of N to be top dressed during flowering and fruiting stages.

**BOTTLE GOURD**  
(*Lagenaria siseraria* (Mol.) Standl.)

**Variety :**

Pusa Summer Prolific Long, Pusa Summer Prolific Round, Pusa Meghdoot and Pusa Manjiri. "Keyari Lao" is grown well in the hill zone of Assam.

**Manure and Fertilizer :**

FYM @ 20-25 t, N 56 kg, P<sub>2</sub>O<sub>5</sub> 56 kg and K<sub>2</sub>O 112 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed at fruit-set.

### **PUMKIN**

(*Cucurbita moschata* Duch ex poir)

**Variety :**

Arke Suryamukhi, Arka Chandan and selected Local cultivar.

**Manure and Fertilizer :**

FYM @ 20-25 t, N 75 kg, P<sub>2</sub>O<sub>5</sub> 80 kg, K<sub>2</sub>O 80 kg, Cao 30 kg/ha basal application.

### **WATER MELON**

(*Citrullus lanatus* (Thumb.) Matsumura and Nekai)

**Variety :**

New Hampshire Midget, Asahi Yamoto, Pusa Bedana, Sugar Baby and Faizabadi.

**Manure and Fertilizer :**

FYM @ 25 t, N 60 kg, P<sub>2</sub>O<sub>5</sub> 40 kg, K<sub>2</sub>O 60 kg/ha basal application.

### **MUSK MELON**

(*Cucumis melo* L.)

**Variety :**

Pusa Sharbati, Hara Madhu, Punjab Sunehri, Durgapur Madhu, Arka Rajhans and Arka Jeet.

**Manure and Fertilizer :**

FYM @ 25 t, N 68 kg, P<sub>2</sub>O<sub>5</sub> 68 kg, K<sub>2</sub>O 130 kg/ha basal application.

### **CHOW-CHOW/CHAYOTE**

(Popularly know as squash among the people of Assam)

*Sechium edule* (Jack) Swartz.

**Cultivated Types :**

White types – Round White, Long White.

Green types – Pointed Green, Broad Green, Oval Green.

**Manure and Fertilizer :**

FYM @ 10-15 kg, Neem Cake 1.5 kg, N 50 g, P<sub>2</sub>O<sub>5</sub> 20 g, K<sub>2</sub>O 30 g are to be applied to each vine each year. An additional application of 50 g N may be required during rainy season when the vine show poor growth.

### **SPINE GOURD**

(*Momordica dioica* Roxb.)

**Variety :**

Selected local varieties.

**Manure and Fertilizer :**

FYM @ 20-25 t, N 50 kg, P<sub>2</sub>O<sub>5</sub> 40 kg, K<sub>2</sub>O 50 kg/ha. Whole of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied at vining and the remaining half after 30 days of 1<sup>st</sup> application.

### **POINTED GOURD**

(*Trichosanthes dioica* Roxb.)

**Variety :**

Selected local varieties.

**Manure and Fertilizer :**

FYM @ 22-25 t, N 80 kg, P<sub>2</sub>O<sub>5</sub> 50 kg, K<sub>2</sub>O 50 kg/ha as basal application and 2% Urea and 2% MOP at 60 days interval as foliar spray.

### **OKRA**

(*Abelmoschus esculentus* (L.) Moench.)

#### **Variety :**

Pusa Sawani, Arka Anamika, Parbhdani Kranti and Selected local cultivars. Red Wonder (Hills zone) : Panchasira (North Brahmaputra Valley zone).

#### **Manure and Fertilizer :**

FYM @ 10 t, N 50 kg, P<sub>2</sub>O<sub>5</sub> 50 kg and K<sub>2</sub>O 50 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be applied as basal and the remaining half of N to be top dressed at 35-40 days after sowing.

### **COWPEA**

(*Vigna unguiculata* (L) Walp)

**Variety :** Pusa Barsati.

#### **Manure and Fertilizer :**

FYM @ 9 t, N 15 kg, P<sub>2</sub>O<sub>5</sub> 35 kg and K<sub>2</sub>O 10 kg/ha basal application.

### **ONION**

*Allium cepa* L.

#### **Variety :**

Pusa Red, Pusa Ratnar, Pusa white (Round), Pusa white (Flat), N-53, Agrifound Light Red, Punjab Red Round, Pusa Madhuri, Arka Niketan.

#### **Manure and fertilizer:**

FYM @ 20 t, N 60 kg, P<sub>2</sub>O<sub>5</sub> 50 kg and K<sub>2</sub>O 50 kg/ha, 40kg N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O as basal and of the remaining N 10 kg to be top dressed at 30-40 days after planting followed by foliar spraying of remaining 10 kg N at 60-70 days. For hills zone; N @ 120kg, P<sub>2</sub>O<sub>5</sub> 80 kg. and K<sub>2</sub>O 80 kg. and K<sub>2</sub>O 30 kg/ha is recommended,

### **GARLIC**

(*Allium sativum* L)

#### **Variety :**

Selected local varieties, Eknalia, 56-4 and G-1.

#### **Manure & Fertilizer :**

FYM @ 20 t, N 100 kg, P<sub>2</sub>O<sub>5</sub> 80 kg. and K<sub>2</sub>O 60 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O should be supplied as basal and the remaining half of N to be top dress at 30 days after sowing.

### **CHILLI**

(*Capsicum annuum* L. var. acuminatum)

#### **Variety :**

NP 46 A, Pusa Jwala and selected local varieties like Suryamukhi, Krishna and Balijuri.

#### **Manure and Fertilizer :**

FYM @ 10t, N 120 kg, P<sub>2</sub>O<sub>5</sub> 60 kg and K<sub>2</sub>O 60 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O Should be applied as basal and the remaining half of N to be top dressed at 30-35 days after transplanting.

For direct seeded chilli, N : P<sub>2</sub>O<sub>5</sub> : K<sub>2</sub>O @ 150 : 75 : 75 kg/ha should be applied as basal dose.

## **CAPSICUM**

(*Capsicum annuum* L.var. *grossum*)

### **Variety :**

California Wonder, Elephant Trunkm, Arka Mohini, Arka Gaurav and Selection 16.  
(The other cultivation practices are same as that of chilli).

## **GINGER**

(*Zingiber officinale* L.)

### **Variety :**

Rio-de-Geneiro, Nadia, Karkai, Bardwan, Moran, Jorhat and China.

### **Manure and Fertilizer :**

FYM @ 10 t, N 20 kg, P<sub>2</sub>O<sub>5</sub> 60 kg and K<sub>2</sub>O 20 kg/ha. Half of N and full doses of FYM, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O to be applied as basal and the remaining half of N to be top dressed at 60 days after planting.

## **TURMERIC**

(*Curcuma longa* Linn.)

### **Variety :**

Shillong Type, Tall clone, CL-24, PTS-38, PCT-13, and VK-145.

### **Manure and Fertilizer :**

FYM @ 20 t, N 30 kg. P<sub>2</sub>O<sub>5</sub> 50 kg and K<sub>2</sub>O 60 kg/ha. Half of K<sub>2</sub>O and full doses of FYM and P<sub>2</sub>O<sub>5</sub> should be applied as basal. Half of N and the remaining half of K<sub>2</sub>O should be side dressed at first earthing up (3 months after planting) and the remaining half of N to be side dressed at second earthing up (4 months after planting). For hills zone; N @ 90 kg. P<sub>2</sub>O<sub>5</sub> 50 kg and K<sub>2</sub>O 60 kg/ha is recommended.

## **CORIANDER**

(*Coriandrum sativum* L.)

### **Variety :**

Bold seeded : UD 21, GAUI, CSI and CIMPO 33 (Normally cultivated under irrigated condition).

Small seeded : UP 41, Pusa 360 and Local selection (suitable for cultivation under rained condition).

### **Manure and Fertilizer :**

FYM @ 10-15 t, N 50 kg, P<sub>2</sub>O<sub>5</sub> 50 kg and K<sub>2</sub>O 50 kg/ha basal application.

## **BLACK CUMIN**

(*Nigella sativa* L.)

### **Variety :**

Local cultivars.

### **Manure and Fertilizer :**

FYM @ 20 t, N 30 kg P<sub>2</sub>O<sub>5</sub> 40 kg and K<sub>2</sub>O 40 kg/h. Half of N and full doses of FYM P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O to be applied as basal and the remaining half of N should be applied in two equal splits, first at 6-8 weeks after sowing and the second just prior to flowering.

## **CUMIN**

(*Cuminum cyminum* L.)

### **Variety :**

RS- 1, S-404, MC-43, NP (6)-1, NP (J)-140 and NP (J)-126.

**Manure and Fertilizer** : As in Black cumin

**FENNEL**  
(*Foeniculum vulgare* Mill)

**Variety :**

Selected local varieties and PF-35.

**Manure and Fertilizer :**

FYM @ 20 t, N 50 kg and P<sub>2</sub>O<sub>5</sub> 25 kg/ha. Half of N and full doses of FYM and P<sub>2</sub>O<sub>5</sub> should be applied as basal and the remaining half of N to be top dressed at 40 days after sowing. All total 5-6 irrigation are required depending upon soil and climatic conditions.

**FENUGREEK**  
(*Trigonella foenum graceum* L.)

**Variety :**

Pusa Early Bunching, Kasuri and Methi No.47.

**Manure and Fertilizer :**

N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O ; 25, 25, 30 kg/ha.

## BLACK PEPPER

(*Piper nigrum* L.)

### Variety :

Only hermaphrodite varieties should be cultivated.

The following varieties are common.

1. Panniyur-1 (hybrid variety)
2. Kalluvalli
3. Balankotta
4. Karimunda
5. Kottandan.
6. Arkulam Munda.

### Manure and Fertilizer :

Compost @ 9 kg., Urea 225 g SSP 1 kg. MOP 100 g and lime 500-10000 g per plant at the following rates.

1<sup>st</sup> year : ½ th of the full dose.

2<sup>nd</sup> year : ½ of the full dose.

3<sup>rd</sup> year : ¾ rd of the full dose.

4<sup>th</sup> year onward : Full dose.

April is the best time for application.

## POTATO

(*Solanum tuberosum*)

### Varieties :

Name	Duration on(days)	Yield rainfed	Q/ha irrigated	Plant Characters	Tuber Characters	Tolerance to disease
Kufri Chandra Mukhi	80-100	85-100	150-160	Medium tall erect	Oval shaped. Slightly Curved, Skin Colour white eyes flat.	Leaf roll and virus
Kufri Jyoti	100-120	85-100	150-160	Tall Erect	Oval Shaped Flat skin White, Eyes Flat, flesh Dull White	Late blight.
Kufri Sindhuri	110-120	85-100	100-160	Tall erect	Round Shaped skin light red eyes flesh pale yellow sticky	Mode Rately Tolerant

### Fertility Management :

The tones or 5 truck loads or 20 cart loads of well decomposed FYM/ha should be applied in the furrows before planting.

Nutrient Requirement (kg/ha)	From Fertilizer (kg/ha)	Requirement (kg/ha)
<b>A. Rained :</b>		
N 60	Urea 133	19
P <sub>2</sub> O <sub>5</sub> 50	SSP 312	45
K <sub>2</sub> O 50	MOP 83	12
<b>B. Irrigated :</b>		
N 60	Urea 133	19
P <sub>2</sub> O <sub>5</sub> 100	SSP 624	90
K <sub>2</sub> O 100	MOP 168	24

Entire quantity of mixed fertilizers should be applied in furrows as basal application and be covered with a thin layer of soils so that tubers do not come into direct contact with the fertilizers.

### **SWEET POTATO** (*Ipomoea batatas* L.)

**Variety :**

Pusa Red-average yield 24 t/ha.

Kalmegh-average yield 30 t/ha.

Dergaon White-average yield 22 t/ha.

Dergaon Red-average yield 20 t/ha.

**Manure and Fertilizer :**

Sweet Potato is a soil exhausting crop. Therefore, proper manuring should be done for better yield. Cattle manure or compost @ 10t/ha. Or 1.5t/bigha may be applied at the time of preparation of main field. Application of 75 kg N, 50 kg P<sub>2</sub>O<sub>5</sub> and 75 kg K<sub>2</sub>O per ha. Or 10 kg N, 6:5 kg P<sub>2</sub>O<sub>5</sub> and 10 kg K<sub>2</sub>O/bigha may be done in two split doses as tabulated below :

Name of Fertilizer	At the time of planting	Time of application
		3 weeks after planting
1. Urea	80 kg/ha(10.5kg/bigha)	80 kg/ha
2. Super Phosphate	310 kg/ha(40kg/bigha)	
3. Murate of Potash	135 kg/ha (16kg/bigha)	

### **TAPIOCA** *Manihot esculenta* Crantz

**Variety :**

H- 43, H- 97, H- 165, S- 865, H- 2304, Triploid- 2-14.

**Manure and Fertilizer :**

Cattle manure or compost may be applied @ 12.5 t/ha (1.5 t/bigha) during the preparation of the land. Application of organic is better than spreading the manure in the whole area. Tapioca responds well to 75 kg N, 75 kg P<sub>2</sub>O<sub>5</sub> and 100 kg K<sub>2</sub>O per ha. when applied in two split doses as tabulated below :

Name of Fertilizer	Time of application	
	At the time of planting	Two months after planting
1. Urea	85 kg/ha(10kg/bigha)	85kg/ha (10 kg/bigha)
2. Super phosphate	235kg/ha(30kg/bigha)	235kg/ha(30kg/bigha)
3. Muriate of potash	85kg/ha(10kg/bigha)	85kg/ha(10kg/bigha)

### COLOCASIA

*Colocasia esculenta* Schott

**Variety :** Kaka Kachu, White Gaurya, Panchamukhia, Nadia, Ahinia Kachu and Birbhum

**Manure and Fertilizer :**

FYM or compost should be applied @ 12 t/ha. In addition 80 kg N, 60 kg P<sub>2</sub>O<sub>5</sub> and 120 kg K<sub>2</sub>O should be applied per ha.

### GREATER YAM

*Dioscorea alata* L.

**Variety :** Kowari Aloo, DA – 48, DA – 80

**Manure and Fertilizer :**

80 kg N, 60 kg P<sub>2</sub>O<sub>5</sub> and 80 kg K<sub>2</sub>O per ha.

### WHITE YAM

*(Dioscorea rotundata* Poir.)

White yam is an introduction from west Africa and are cultivated for its tuber which are utilized as vegetables.

**Variety :** 1-2-12

Description : Plant medium height, ranges 5-8 meters, the vine twine to the right and roughly circular spines as well as a whitish bloom are present on the stem. The leaves are simple, cordate and usually pointed at the tip. The leaves are opposite in their arrangement. The tubers more or less cylindrical in shape. The skin of the tuber is smooth and light brown, while flesh is usually white, sometimes creamy and firm.

**Manure and Fertilizer :**

Cow dung or compost @ 1-1.5 kg/pit should be incorporated at the time of mound preparation. NPK @ 80:60:80 kg/ha should be incorporated in to the soil at the time of first earthing up of soil (1-1.5 months after their culture).

### ELEPHANT FOOT YAM

*(Amorphophallus campanulatus* Blume.)



Elephant foot yam is cultivated for its under ground stem which is used for making vegetable dishes.

**Variety :**

Kavvur and local selected varieties.

**Manure and Fertilizer :**

A high fertility in the soil is essential as the crop is a heavy feeder. Potash in the form of wood ash, farm refuse etc. is suitable for it.

**Paddy husk, dried leaves, etc. are also applied in the absence of cattle manure**

**ROSE**

(*Rosa spp.*)

**Variety : Hybrid Tea :**

Super Star, Arjun, Lal Makhmal, Happiness, Rakta Gandha, Avil's Spakra, Avon, Blue Moon, Century Two, Christian Dior, Crimson Glory, First Prize, Friendship, Illona, Kiss of fire, Kronenbourg, Swarthmore and Jawahar. *Floribunda* : Queen Elizabeth, Arunima Banjaran, Chandrama, Mohini, Suryakiran, Navsadabahar and Sindoor. *Ployantha* : Anjali, Nartaki, Pink Showers, Echo, Cameo, Baby Fanrach.

**Rambler :** American Pillar, Albertine.

<b>Miniature :</b>	Cri Cri,	Mimi,	Babi Masquerade,
	Bonny,	Cindrella,	Coralin,
	Pixie,	Rosmarin,	Starina,
	Chandrika,	Dark	Beauty,
	Pushkala.		

**Manure and Fertilizer :**

Immediately after pruning, during the months of October-November, The top soil around the base of the plant is dug out up to a depth of 10 to 15 cm and kept exposed for 2-3 days, then filled with half a basket of well decomposed FYM and then covered with the excavated soil. The soil compacted around the base and flooded with water. Urea @ 10 g per plant is to be applied 20 cm away from trunk and mixed carefully before watering. Super phosphate at the same rate may be applied after the flower buds have just begun emerge since it promotes flower production.

A foliar feeding with 2 parts Urea, 1 part Dihydrogen ammonium phosphate, 1 part potassium nitrate and 1 part Potassium phosphate @ 3 g per lit. of water is an excellent supplement to root feeding. This solution is thoroughly sprayed on both sides of the leaves and stems. Periodically, insecticides can also be added to the solution if required. Foliar feeding should start 5 weeks after pruning and given at 10 days interval. Foliar feeding should not be done when the plant is in bloom.

**TUBEROSE**

(*Polyanthes tuberosa L.*)

**Variety :**

Calcutta Single, Mexican Single, Swarna Rakha (S), Rajat Rekhata (S), Prajwal (S), Shrinagar, Suhashini, Baibhav (Hyb.)

**Manure and Fertilizer :**

A complete fertilizer mixture of NPK 80:40:60 g/sq.m is given in 2 split doses for better growth yield and quality flower. The first dose is given at the time of planting and the second dose at 45 days after planting.

### **DAHLIA**

*(Dahlia variabilis Desf.)*

#### **Variety :**

Swami Madhavanadam, Swami Lokeshwarananda, Lord Buddha, Ketu, Avalanche, Blood Red, Black out, Nearest Blue, Bholu Baba, Bhiku's Vivek, Prime Minister, Sri Ramkrishna, Dandapani, Queen Elizabeth, Swami Brahmananda, Bhikku's Mother, Bhikku's Raktajaba, Sarada Devi, Dr. B.P. Pal, Jyotsna, Clarissia, Potgainter.

#### **Manure and Fertilizer :**

When dahlia is grown on rich soils, additional feeding is not required; but in poor soils a top dressing of 35 g to 50 g of any complete chemical fertilizer is beneficial. Care should be taken to see that the chemical does not come into contact with the base of the plant. Liquid feeding should be done.

### **GLADIOLUS**

*(Gladiolus grandiflorus L)*

#### **Variety :**

George Mazure, Mayur, Titonia, Vink's Glory, Jo-Wagenaar Show Princess, Ace of Club, Apple Blossom, Sunny Boy, Lady Killer, Gold Dust, Friendship, Psittacinus Hybrid, Dominic, Happy End, Melody, Bis, Bis Sylvia,, Oscar, Copper King, Tunias Classic, Orange Clime, Rose Spire, Frond ship, Morning Bride, Green Woodpecker, Solmon-Queen, Spic and Span, Spring Song, Sans Souci, Black Prince, Tropic Seas, Agnirekha, Suchitra, Manmohan, Mukta, Manisha, Manhar, Mohini, Apsare, Aariti, Shobha, Sana, Meera Nazrana and Poonam.

#### **Manure and Fertilizer :**

N:P:K should be applied in the ratio 1 :2:2 @ 56 g/sq.m. in two equal split doses. One split dose should be thoroughly mixed with the soil before planting of corms and the other at 4 to 6 leaf stage

## HELICONIA

(*Heliconia psittacorum* L.)

### Variety :

Local Type : Plant height varies from 90 cm to 120cm. Inflorescence colour orange yellow with a boat shaped bract and size is 10-19 cm across. Flower yield is 35 number of inflorescence/m<sup>2</sup> and Rhizome yield is 6145 g/m<sup>2</sup>.

### Manure and Fertilizer :

4 kg of FYM/m<sup>2</sup> and 40:20:20 g NPK/m<sup>2</sup> is given in 2 split doses for better growth yield and quality of flower. The first dose is given at the time of planting and 2<sup>nd</sup> dose at 45 days after planting.

## ANTHURIUM

(*Anthurium andreaeanum* Land.)

### Varieties :

Red : Tropical, Red Dragon, Ozaki, Mickey Mouse, Hawaii Red, Cherry Red, Sweet Heart, Temptation, Fla Red, Sikkim Red, Tina Red.

Pink : Agnihotri, Abe Pink, Paradise Pink, Lady Jane, Passion, Magic Pink.

Obake : Red Dragon (red obake), Madonna (cream obake), President (pink obake), Lambada (white obake), Farao (deep orange obake).

White : Trinidad, Lima White, Manoa Mist, Meringue White, Mauritius White, Hidden Treasure, Fla Exotic.

Cream : Fantasia.

Green : Midori – Green, Pistache.

Orange : IASH-2, Sundet Orange, Nitta, Mauritius Orange, Orangeeth, Fla Orange, Sunburst, Diamond Jubilee.

### Manure and fertilizers :

Fertilizers should be applied in smaller doses at frequent interval rather than larger doses at longer intervals. For pot cultivation, 5 g of complex fertilizer (NPK 17:17:17) in 500 ml of water (1%) is sprayed on the foliage once in a month. Foliar application of 0.1% urea at monthly interval is found to be beneficial. In case of Ca deficiency, lime @ 5 g/month/plant is recommended. Soil drenching of liquid manure consisting of cowdung/urea once in every month is beneficial. A handful of dried sieved cowdung is applied at the base of the plant at monthly interval. It is advisable to reduce the quantity of nitrogen in flowering plants, to increase the post harvest life.

## ANTIRRHINUM

(*Antirrhinum majus* L.)

### Variety :

Candle Light, Sunset, Sky scraper, Magic Carpet.

### Manure and Fertilizer :

In light soils, a top dressing of complete fertilizer or well decayed FYM should be applied when plants are about 2 months old.

## ASTER

(*Callistemphus chinensis* Esenback)

### Variety :

Kirkwell, Sunshine, Triumph (dwarf), Giant Comet, Princes, Early Ginat, Queen of the Market, Ostrichd Plume (tall).

**Manure and Fertilizer :** A light dose of liquid manure or a top dressing of complete fertilizers about 10 g per 330 sq. as area.

## BALSAM

(*Impatiens blasamina* L.)

**Variety :** There are single and double varieties.

**Manure and Fertilizer :**

A light dose of complete fertilizer and little FYM.

**CALENDULA**  
(*Calendula officinalis* L.)

**Variety :**

Ball Chrysantha, Sunshine, Apricot, Orange King, Cream Beauty, Shaggy etc.

**Manure and Fertilizer :**

Liquid manure prepared from fresh cow dung should be applied at flower bud formation until flower opening and then discontinued.

**CARNATION**  
(*Diantus caryophyllus* L.)

**Variety :**

Marguerite, Chhabaud, Riviera Giant, Margaret etc.

**Manure and Fertilizer :**

Complete chemical fertilizer a 38 g per 1.85 sq.m after pinching the tops of shoots and fertilizer should be mixed well at the base of the plants. Alternatively. Liquid manure may be apply just before emergence of flower bud.

**(AFRICAN MARIGOLD )**  
(*Tagetes erecta* L.)

**Variety :**

Pusa Narangi Ganda, Gaint Double African, Orange, hajo local, Golden Glow , Cupid, Pot of Gold, Glitters, Burpee Gold, Guinea Gold, etc.

**Manure and Fertilizer :** A little organic manure is beneficial.

**FRANCH MARIGOLD**  
*Tagetes patula* L.

**Variety :** Harmony, Rusty Red, Sun Old, Red Brocade etc.

**Manure and Fertilizer :** A little organic manure is beneficial.

**PETTUNIA**  
*Petunia hybrida* Hortorum

**Variety :**

There are 2 strains, viz., tall and dwarf under the sp. Hybrids. The species grandiflora and Nana compacta have double flowers in a great variety of colour.

**Manure and Fertilizer :**

A small dose of complete fertilizer and a little well rotten cowdung or compost are beneficial.

**PHLOX**  
(*Phlox drummondii* Hooker)

**Variety :**The species P. drummondii var. grandiflora has alba., coccinea, violacea and nana compacts strains. The sp. Pilza has many strains for star phlox.

**Manure and Fertilizer :** A small dose of any complete fertilizer.

## **PORTULACA**

(*Portulaca grandiflora* Hooker.)

### **Variety :**

Single and double varieties with orange, white, purple red or pink flowers.

**Manure and Fertilizer :** Fertilizers are not necessary.

## **SALVIA**

(*Salvia splendens* John Bellenden Ker)

### **Variety :**

The species splendens includes red, white and purple flowered salvia white the sp. Farinacea and leucanha produce blue and deep violet Purple flowers.

### **Manure and Fertilizer :**

A light dose of organic manure for rich garden soil and a medium dose of complete fertilizer for poorer soils.

## **SWEET PEA**

(*Lathyrus odoratus* L.)

### **Variety :**

The early flowering varieties are Mrs. Herbert Hoover, Princess Blue, Harmony, white Giant, etc.

**Manure and Fertilizer :** About 450 g of complete fertilizer mixture containing a greater proportion of sulphate should be incorporated into the soil to cover an area of 1.11 to 1.48 sq.m.

## **ZINNIA**

(*Zinnia elegans* Nicholar Joseph Jacquin)

### **Variety :**

Primrose, Scarlet, Candy Cane, Yellow, Orange, Crimson, Lilipur Mixed, Giant double strain etc.

**Manure and Fertilizer :** A light dose of complete fertilizer and a fair amount of organic manure are beneficial.

## **BAMBOO**

### **PROPAGATION FROM SEEDS :**

**Manuring :** After transplanting, a liberal application of manure/FYM should be made. In subsequent years 100g urea, 25g SSP and 25g MOP should be applied in a ring around each plant. Such treatments increases the number of tillers/culms and also height of the tillers.

### **PROPAGATION FROM OFFSHOOTS**

**Manuring :** After planting the offshoots, equal amount of soil and FYM should be mixed to fill up the pits. In the first year of planting 300mg urea, 150g SSP and 50g of MOP should be applied per plant. In subsequent years the application of fertilizer should be increased proportionately.

## TEA

(*Camellia sinensis* (L) O' kuntze)

### Some Recommended Planting Material :

a) clone : TV 1, TV 18, TV 20, TV 21, TV 22, TV 23, TV 24, TV 25, TV 26, PL 26A, S3A/I, Tin Ali-17/1/54 etc. and other clones approved by the Tea Board.

b) Seed : TS 450, TS 462, TS 464, Betjan Jat, Tingamira Jat and other seed stock and Jats approved by the Tea Board.

Selection of suitable planting material for a locality however should be made observing the performance of the material in the adjoining tea plantations.

### Nursery :

**Manuring** One YTD\* (10:5:15 NPK mixture) mixed with dry soil and (1:9 ratio) should be applied around the collar (5 cm away from the collar) per 30 running meters of 1-2 m wide nursery bed from June to August at fortnightly interval. In addition, 2% urea solution as foliar application may be sprayed 4 times in that period to ensure health and vigorous growth of nursery plant, where necessary.

### Clonal Nursery :

**Manuring** : Superphosphate @ 1 kg/16 running metre (of the trench) should be applied after thoroughly mixing with the excavated soils along with dry well rotten cow dung @ 65 kg/16 m trench.

### Green Cropping :

#### Manuring :

##### (a) young Tea :

Manuring should be started when plants establish in the field.

0 year – 5 g YTD/plant, 3 times at 8 weeks interval by ring method leaving 10 cm around the collar.

+ 1 year – 10 g YTD/plant as above

+ 2 year – 16 g YTD/plant as above

+ 3, + 4 years – 900 kg YTD/ha in single application in stip method leaving 15 cm from the collar of the plant on either sides.

##### (b) Mature tea :

From fourth year onwards 90-135 kg N, 40 kg P<sub>2</sub>O<sub>5</sub> and 60 kg K<sub>2</sub>O/ha should be broadcast in single dose in clean ground in April when the monsoon rain moistens the soil down to a depth of about 45 cm.

N should be applied in the form of urea for two years followed by ammonium sulphate on every third year.

## MEDICINAL PLANTS

### (a) Ashwagandha (*Withania somnifera*)

**Manures and Fertilizers:** Depending upon the availability, well decomposed FYM or compost up to 20t/ ha may be applied either by broadcast over the beds or in the soil prior to sowing level. No inorganic fertilizers are generally used for this crop.

### (b) Safed Musli (*Chlorophytum borivilliam*)

**Manures and fertilizers:** 10-t FYM/ha or sufficient quantity of well-decomposed (FYM or) cow dung should be applied at the time of final land preparation. Nitrogen fertilizer is to applied in the form of urea @ 100 kg/ha in two equal splits at 15 and 30 days after planting. As a basal dose of DAP @ 120 kg/ha and MOP @ 100 kg/ha are to be broadcasted before final land preparation.

## PLANT FOOD CONTENTS IN MANURES AND FERTILIZERS

Manures/fertilizers		N(%)	P <sub>2</sub> O <sub>5</sub> (%)	K <sub>2</sub> O(%)
1.	Farm Yard Manure	0.4	0.3	0.2
2.	Compost	0.5	0.25	0.5
3.	Cow dung	0.5	0.2	0.4
4.	Poultry	1.6	1.5	0.9
5.	Sheep Manure	0.8	0.6	0.3
6.	Cotton Seed Cake	3.9	1.8	1.6
7.	Groundnut Cake	4-5	2.0	1.5
8.	Castor Cake	4-5	2.0	1.9
9.	Neem Cake	5-6	1.8	2.0
10.	Mustard Cake	4-5	1.8	2.0
11.	Fish Meal	4-10	4-8	0.3-1.5
12.	Bone Meal	3-4	20-22	-
13.	Ammonium sulphate	20	-	-
14.	Ammonium chloride	24-26	-	-
15.	Ammonium Phosphate	32-34	-	-
16.	Urea	16	20	-
17.	Calcium ammonium nitrate	46	-	-
18.	Potassium nitrate	20	-	-
19.	Potassium ammonium nitrate	14	-	444
20.	Super phosphate (single)	16	-	28
21.	Super phosphate (double)	-	16	-
22.	Super phosphate (triple)	-	32	-
23.	Rock Phosphate	-	48	-
24.	Muriate of potash	-	28	-

### CONVERSION TABLE FOR VARIOUS FERTILIZERS (IN RESPECT OF N.P. & K)

Conversion factors:

1 kg. N = 2.2 kg urea = 5 kg Ammo. Sulphate

1 kg. P = 6.25 kg. SSP,

1 kg. K = 1.67 kg MOP,

1 kg. ADP = 2.87 kg. SSP and 0.400 kg Urea

1 kg. N

+

1 kg. P = 6.66 kg. Suphala (15:15:15)

+

1 kg. K

Rate of Application of Nutrients	Urea (46% N) kg/ha	Ammonium sulphate (20%) N (kg/ha)	SSP 16% P <sub>2</sub> O <sub>5</sub> (kg/ha)	MOP (60% K <sub>2</sub> O) (kg/ha)
10	22	20	62.5	17
20	44	40	125.0	34
30	66	60	187.5	51
40	88	80	250.0	68
50	110	100	312.5	85

60	132	120	375.0	102
70	154	140	437.5	119
80	176	160	500.0	136
90	198	180	562.5	153
100	220	200	625.0	170
110	242	220	687.5	187
120	264	240	750.0	204
130	286	260	812.5	221
140	308	280	875.0	238
150	330	300	937.5	255
160	352	320	1000.0	272
170	374	340	1062.5	289
180	396	360	1125.0	306
190	418	380	1187.5	325
200	440	400	1250.0	340

**LIST OF GOVERNMENT/PRIVATE AGENCIES  
SUPPLYING VARIOUS HORTICULTURAL INPUTS**

<b>Agencies</b>	<b>Materials supplied</b>
1. Division of vegetable Indian Institute of Horticultural Research. 255 Upper Palace Orchards Bangalore Pin 560080.	Seeds of vegetable crops  Crops
2. Indo-American Hybrid Seeds Co. P.C. Box 7099 Bana Shakari II stage Bangalore- 560070.	Hybrid seeds/planting materials of Horticultural crops.
3. National Seeds Corporation Ltd. Beej Bhawan, Pusa Complex New Delhi 110012.	Seeds of vegetable Crops.
4. Assam Seeds Corporation Ltd. Guwahati-22.	Seeds/Planting materials of horticulture crops.
5. Indian Agricultural Research Institute, Pusa, New Delhi-110012.	Seeds/planting materials of horticultural crops.
6. Indian Petrochemical Corpn. Ltd. P.O. Petrochemicals.  Vadodara-391 346 Gujrat. Regional Office :	UV-stabilized LDPE glazing Materials for plastic house, Plastic. mulching materials.



A.G. Tower, 7<sup>th</sup> floor  
 125/Park Street  
 Calcutta-700017.

<b>Agencies</b>	<b>Materials supplied</b>
7. Sutton & Sons (India) Pvt. Ltd. 13 D Russell Street, Calcutta-70071.	Seeds/planting materials of vegetables and ornamental plants.
8. Maharashtra Hybrid Seeds Co.Ltd. Jalan-431203.	Hybrid seeds of vegetables (Mahyco seeds)
9. American Spring & Pressing Works Pvt. Ltd. P.O. Box No. 7602 Malad, Bombay – 4000 064.	Sprayers and Dusters since last 38 years.

#### CONVERSION TABLE FOR VARIOUS UNITS

Multiply	By	To get
Hectare	2.4	Acre
	7.5	Bigha
Acre	3.125	Bigha
Bigha	5	Katha
Parts per million (ppm)	1.001	Gram per litre
Parts per million	0.0001	Percent solution
Percent solution	10000	ppm
Kg N	2.17	Kg. Urea
Kg P <sub>2</sub> O <sub>5</sub>	6.25	Kg. SSP (Single)
Kg K <sub>2</sub> O	1.67	Kg. MOP