(i) MAIZE (*Zea mays* L.)

CLIMATE REQUIREMENT

T_Max°C	T_Min°C	Optimum °C	Rainfall mm	Altitude m MSL
40 - 44	6 - 7	21 - 32	500 - 750	up to 3000

Tropical and sub tropical. Minimum temperature for germination is 6 - 7°C, suitable temperature for germination and growth is 21 - 23 and 30 - 32°C, respectively. Day neutral plant.

CROP IMPROVEMENT
SEASON AND VARIETIES

Sl. No.	Agro ecological zones	Districts	Season	Hybrids
1	North Eastern Zone	Vellore, Thiruvannamalai, Cuddalore, Villupuram, Thiruvallur, Kancheepuram	Jan-Feb (Thaipattam) April - May Chithiraipattam) June-July (Adipattam) Sep-Oct (Puratassipattam)	Hybrid CO 6 and COH (M) 8
2	North Western Zone	Salem, Namakkal, Dharmapuri, Krishnagiri		
3	Western Zone	Coimbatore, Erode, Karur, Tiruppur, Theni and Dindigul		
4	Cauvery Delta Zone	Trichy, Thanjavur, Thiruvarur, Nagapattinam, Pudukkottai Perambalur and Ariyalur	Jan-Feb (Thaipattam) April - May Chithiraipattam) June-July (Adipattam)	
5	Southern Zone	Madurai and Virudhunagar	Jan-Feb (Thaipattam) June-July (Adipattam) Sep-Oct(Puratassipattam)	
		Sivagangai, Ramanathapuram, Tirunelveli and Thoothukudi	Sep-Oct(Puratassipattam)	

6	High rainfall zone	Kanyakumari	Jan-Feb (Thaipattam) June-July (Adipattam) Sep-Oct(Puratassipattam)	
7	Hilly and High Altitude Zone	Ooty	Jan-Feb (Thaipattam) June-July (Adipattam) Sep-Oct(Puratassipattam)	

II. PARTICULARS OF MAIZE HYBRIDS

PARTICULARS	CO 6	COH(M) 8
Year of Release	2012	2014
Year of Notification	SO.1708(E)/26.07.2012	SO.1919(E)/30.07.2014
Parentage	UMI 1200 x UMI 1230	UMI 1201 x UMI1230
Duration (days)	110	85 – 95
Area of adaption	All maize growing areas	All maize growing areas
Rainfed/Irrigated	Both	Both
Grain yield (kg/ha)		
Irrigated	7500	7600
Rainfed	5500	5500

Special features	High shelling (81%) with high test weight (40 g /100 seeds). Multiple disease resistance to sorghum downy mildew, *Maydis* leaf blight, *Turcicum* leaf blight, Post flowering stock rot and Banded leaf and sheath blight. Moderately resistant to stem borer.	Medium maturity hybrid, grains are bold, orange yellow in colour and semi dent type. Single cross normal corn. Multiple disease resistance *viz*. MLB, TLB, RDM, DM and moderately resistant to PFSR and *polysora* rust under artificial Conditions. Moderately resistant to stem borer *(chilo partellus*) and resistant to cyst nematode *(Heterodera zeae).*
Stem Colour	Green	Green
Leaf: Anthocyanin Colouration of sheath	Present	Present
Ear: Anthocyanin Colouration of silk	Present	Present
Cob size	Big	Big
Ear: Husk Coverage	Fully covered	Fully covered
Colour of top of Grains	Orange Yellow	Orange yellow
Type of kernels	Semi dent	Semi dent

CROP MANAGEMENT

i. IRRIGATED MAIZE

1. APPLICATION OF FYM OR COMPOST

Spread 12.5 t/ha of FYM or compost or composted coir pith evenly on the unploughed field along with 10 packets of Azospirillum (2000 g/ha) and incorporate in the soil.

2. FIELD PREPARATION

Plough the field with disc plough once followed by cultivator ploughing twice, after spreading FYM or compost till a fine tilth is obtained.

3. FORMING RIDGES AND FURROWS OR BEDS

Form ridges and furrows providing sufficient irrigation channels. The ridges should be 6 m long and 60 cm apart.

If ridges and furrows are not made, form beds of size 10 m^2 or 20 m^2 depending on the availability of water.

Use a bund former or ridge plough to economise cost of production.

4. APPLICATION OF FERTILIZERS

i. Soil test crop response based integrated plant nutrition system (STCR- IPNS) I If soil test recommendation is not available adopt a blanket recommendation of 135:62.5:50 Kg/NPK ha^{-1} for varieties and 250:75:75 kg NPK ha^{-1} for hybrid maize

ii. Apply quarter of the dose of N; full dose of P_2O_5 and K_2O basally before sowing.

iii. In the case of ridge planted crop, open a furrow 6 cm deep on the side of the ridge, at two thirds the distance from the top of the ridge.

iv. Apply the fertilizer mixture along the furrows evenly and cover to a depth of 4 cm with soil.

v. If bed system of planting is followed, open furrows 6 cm deep at a distance of 60 cm apart.

vi. Place the fertilizer mixture along the furrows evenly and cover to a depth of 4 cm with soil.

Soil test crop response based integrated plant nutrition system (STCR- IPNS) recommendation may be adopted for prescribing fertilizer doses for specified yield targets. (ready reckoners are furnished)

Maize - Hybrid (1)

Soil : Red sandy loam (Palaviduthi series)

Target : 9 – 10 t ha^{-1}

$FN = 3.96\ T – 0.62\ SN – 0.69\ ON$

$FP_2O_5 = 1.56\ T – 1.93\ SP – 0.60\ OP$

$FK_2O = 1.66\ T – 0.27\ SK – 0.49\ OK$

Initial soil test values (kg ha^{-1})			Yield target – 9 t ha^{-1}			Yield target – 10 t ha^{-1}		
			NPK (kg ha^{-1}) + FYM @ 12.5 t ha^{-1} + *Azospirillum* @ 2 kg ha^{-1} + PSB @ 2 kg ha^{-1}			NPK (kg ha^{-1}) + FYM @ 12.5 t ha^{-1} + *Azospirillum* @ 2 kg ha^{-1} + PSB @ 2 kg ha^{-1}		
SN	**SP**	**SK**	**FN**	**FP_2O_5**	**FK_2O**	**FN**	**FP_2O_5**	**FK_2O**
200	14	200	177	83	65	217	99	82
220	16	220	165	80	60	205	95	77
240	18	240	153	76	55	192	91	71
260	20	260	140	72	49	180	87	66
280	22	280	128	68	44	167	84	60

Maize - Hybrid (2)

Soil : Mixed black calcareous (Perianaickenpalayam series)

Target : 9 – 10 t ha^{-1}

F N = 4.01 T – 0.76 SN – 0.83 ON

FP_2O_5= 1.57 T – 2.71 SP – 0.61 OP

FK_2O = 2.09 T – 0.26 SK – 0.65 OK

Initial soil test values (kg ha^{-1})			Yield target – 9 t ha^{-1}			Yield target – 10 t ha^{-1}		
			NPK (kg ha^{-1}) + FYM @ 12.5 t ha^{-1} + *Azospirillum* @ 2 kg ha^{-1} + PSB @ 2 kg ha^{-1}			NPK (kg ha^{-1}) + FYM @ 12.5 t ha^{-1} + *Azospirillum* @ 2 kg ha^{-1} + PSB @ 2 kg ha^{-1}		
SN	**SP**	**SK**	**FN**	**FP_2O_5**	**FK_2O**	**FN**	**FP_2O_5**	**FK_2O**
200	14	300	154	73	80	194	89	101
220	16	350	139	68	67	179	84	88
240	18	400	125*	63	54	164	78	75
260	20	450	125*	57	41	148	73	62
280	22	500	125*	52	38*	133	67	49

* Maintenance dose

Maize- Hybrid (3)

Soil : Black calcareous (Pilamedu series)

Target : 10 – 11t ha^{-1}

F N = 3.78 T – 0.78 SN – 0.89 ON

FP_2O_5= 1.47 T – 2.02 SP – 0.91 OP

FK_2O = 1.79 T – 0.14 SK – 0.62 OK

Initial soil test values (kg ha^{-1})			Yield target – 10 t ha^{-1} NPK (kg ha^{-1}) + FYM @ 12.5 t ha^{-1} + *Azospirillum* @ 2 kg ha^{-1} + PSB @ 2 kg ha^{-1}			Yield target – 11 t ha^{-1} NPK (kg ha^{-1}) + FYM @ 12.5 t ha^{-1} + *Azospirillum* @ 2 kg ha^{-1} + PSB @ 2 kg ha^{-1}		
SN	**SP**	**SK**	**FN**	**FP_2O_5**	**FK_2O**	**FN**	**FP_2O_5**	**FK_2O**
180	12	400	178	91	91	215	105	109
200	14	450	162	87	84	200	101	102
220	16	500	146	83	77	184	97	95
240	18	550	131	79	70	169	93	88
260	20	600	125*	75	63	153	89	81

*maintenance dose

Note: FN, FP_2O_5 and K_2O are fertilizer N, P_2O_5 and K_2O in kg ha^{-1}, respectively; T is the yield target in q ha^{-1}; SN, SP and SK respectively are available N,P and K in kg ha^{-1} and ON, OP and OK are the quantities of N, P and K supplied through organic manure in kg ha^{-1}.

When Azospirillum is used as seed and soil application, apply 100 kg of N/ha (25% reduction on the total N recommended by soil test).

Deficiency symptoms

Nitrogen deficiency	:	Leaves become yellow, older leaves show drying at the tips which progress along mid veins, stalks become slender.
Phosphorus deficiency	:	Leaves are purplish green during early growth. Growth spindly, slow maturity, irregular ear formation.
Potassium deficiency	:	Leaves show yellow or yellowish green streaks, become corrugated. Tips and marginal scorch. Tips end in ears are poorly filled. Stalks have short internode. Plants become weak and may fall down.
Magnesium deficiency	:	Older leaves are the first to become chlorotic at margins and between veins. Streaked appearance of leaves. Necrotic or chlorotic spots seen in leaves.
Zinc deficiency	:	Older leaves have yellow streaks or chlorotic striping between veins. In several cases, unfolding of young leaves, which may be white or yellow.
Iron deficiency	:	Interveinal chlorosis. The entire crop may exhibit bleached appearance.

5. APPLICATION OF MICRONUTRIENT

i. 12.5 kg of micronutrient mixture formulated by the Department of Agriculture, Tamil Nadu, mixed with sand to make a total quantity of 50 kg/ha is to be applied. (or)

ii. Apply TNAU MN mixture @ 30 kg/ha as enriched FYM (Prepare enriched FYM at 1:10 ratio MN mixture and FYM; mix at friable moisture and incubate for one month in shade.

iii. Apply Zinc sulphate @ 37.5 kg ha^{-1} for hybrid Maize and 25 kg ha^{-1} for varieties can be followed in Zn deficient soils.

iv. Apply 50 kg $FeSO_4$ + 12.5 t FYM ha^{-1} along with 40 kg S as elemental Sulphur for calcareous soils. Apply the mixture over the furrows and two thirds in the top of ridges, if ridge planting is followed. If bed system of sowing is followed, apply the micronutrient mixture over the beds.

v. Apply 40 kg S, 10 kg Borax and 50 kg $FeSO_4$ + 12.5 t FYM for specific respective nutrient deficiency in soils.

vi. For zinc and iron deficiencies in plants foliar spraying 0.5% $ZnSO_4$, 1% $FeSO_4$ + 0.1% citric acid thrice on 30, 40 and 50 days after sowing can be followed.

6. SEED RATE

Select good quality seeds and adopt the seed rate of 20 kg/ha for CO 1 and TNAU Maize Hybrid CO 6 and 25 kg /ha for COBC 1.

7. SPACING

Adopt a spacing of 25 cm between plants in the rows which are 60 cm apart.
Population : For varieties and hybrids 6 – 7 plants / sq. m. and

For baby corn, 8 – 9 plants / sq. m.

8. SEED TREATMENT

Step 1: Use pelleted seeds with insecticides (treat one kg of seeds with Chlorpyriphos 20EC or Monocrotophos 36 WSC or Phosalone 35 EC @ 4 ml + 0.5 gram gum in 20 ml of water) for the control of stem borer or seed treatment with Imidacloprid 70 WS 10 g/kg of seeds.

Step 2: Seed treatment with Metalaxyl or Thiram @ 2 g/kg of seed for the control of downy mildew and crazy top

Step 3: Seeds treated with fungicides may be treated with three packets (600 g/ha) of Azospirillum before sowing.

9. SOWING

i. Dibble the seeds at a depth of 4 cm along the furrow in which fertilizers are placed and cover with soil.

ii. Put one seed per hole if the germination is assured otherwise put two seeds per hole

10. WEED MANAGEMENT

i. Apply Atrazine @ 0.50 – 0.75 kg/ha as pre-emergence on 3-5 DAS using Backpack/ Knapsack/ Rocker sprayer fitted with a flat fan nozzle using 500 litres of water/ha followed by one hand weeding on 30-35 DAS. (or)

ii. Apply Atrazine @ 0.50 kg/ha as pre-emergence on 3-5 DAS followed by 2,4-D @ 1 kg/ha on 20-25 DAS, using Backpack/Knapsack/Rocker sprayer fitted with a flat fan nozzle using 500 litres of water/ha.

iii. In line sown crop, apply PE Atrazine @ 0.50 kg/ha on 3-5 DAS followed by Twin Wheel hoe weeder weeding on 30-35 DAS.

iv. Apply herbicide when there is sufficient moisture in the soil.

v. Do not disturb the soil after herbicide application.

vi. If pulse crop is to be raised as intercrop, do not use Atrazine. Spray Pendimethalin @0.75 kg/ha as pre emergence on 3-5 DAS.

11. THINNING AND GAP FILLING

i. If two seeds were sown, leave only one healthy and vigorous seedling per hole and remove the other on the 12-15 days after sowing.

ii. Where seedlings have not germinated, dibble presoaked seeds at the rate of 2 seeds per hole and immediately irrigate.

12. HOEING, HAND-WEEDING AND EARTHING UP

i. Hoe and hand-weed on the 30th day of sowing.

ii. Earth up and form new ridges so that the plants come directly on the top of the ridges. This will provide additional anchorage to the plants.

13. TOP DRESSING WITH NITROGEN

i. Place half of the dose of N on the 25th day of sowing along the furrows evenly and cover it with soil.

ii. Place the remaining quarter of N on the 45th day of sowing

14. WATER MANAGEMENT

Maize crop is sensitive to both moisture stress and excessive moisture, hence regulate irrigation according to the requirement. Ensure optimum moisture availability during the most critical phase (45 to 65 days after sowing); otherwise yield will be reduced by a considerable extent.

Regulate irrigation according to the following growth phase of the crop.

Germination & establishment phase	1 to 14 days
Vegetative phase	15 to 39 days
Flowering phase	40 to 65 days
Maturity phase	66 to 95 days

Heavy soils		
Stage	**No. of irrigation**	**Days after sowing**
Germination & establishment	3	After sowing, Life irrigation -4th,12th day
Vegetative	2	25th, 36th day
Flowering(Irrigate copiously)	2	48th, 60th day
Maturity phase (Control irrigation)	2	72nd, 85th day
Light soils		
Germination & establishment	3	After sowing, Life irrigation -4th ,12thday
Vegetative Phase	3	22nd ,32nd & 40th day
Flowering phase (Irrigate copiously)	3	50th ,60th & 72nd day
Maturity phase (Controlled irrigation)	2	85th , 95th day

DRIP IRRIGATION TO MAIZE

Irrigation once in 2 days

Irrigation based on climatological approach Irrigation volume:

= (Pe x Kp x Kc x A x Wp) – Re

Pe – Pan evaporation rate (mm/day) Kp – Pan co-efficient (0.75 to 0.80)

Kc – Crop co-efficient (0.4 – Vegetative stage; 0.75 – Flowering stage; 1.05 – Grain formation stage) A – Area (75 x 30 cm)
Wp – Wetted percentage (80% for maize) Re – Effective rainfall (mm)

$$\text{Irrigation duration} = \frac{\text{Water requirement per plant once in 2 days}}{\text{No. of dripper per plant x Discharge rate (lph)}}$$

DRIP FERTIGATION TECHNOLOGY

- Method of planting : paired row planting **(60/90 × 30 cm)**
- Fertilizer dose = 150:75:75 kg NPK per ha
- Drip fertigation with Water soluble fertilizer (WSF)
  - N Polyfeed 19-19-19
  - P MAP 12-61-00
  - K KNO_3 13-00-45

Fertigation Device : Ventury assembly (3/4”) with injector pump (0.5 HP)

Fertigation schedule for Hybrid maize with Water Soluble Fertilizers at (75 % RDF)

Stage (days)	Duration (days)	Fertilizer form	Fertilizer grade			Dose/ ha/ day	Total Qty (Kg/ha)	Nutrients kg/ha		
			N	P	K			N	P	K
6 to 25	20	MAP	12	61	0	2.813	56.25	6.75	34.31	0.00
	20	Urea	46	0	0	0.938	18.75	8.63	0.00	0.00
26-60	35	PolyFeed	19	19	19	2.143	75.00	14.25	14.25	14.25
	35	Multi-K	13	0	45	1.500	52.50	6.83	0.00	23.63
	35	Urea	46	0	0	2.143	75.00	34.50	0.00	0.00
61-75	15	PolyFeed	19	19	19	2.750	41.25	7.84	7.84	7.84
	15	Multi-K	13	0	45	1.600	24.00	3.12	0.00	10.80
	15	Urea	46	0	0	4.500	67.50	31.05	0.00	0.00
								112.96	56.40	56.51

Fertigation schedule for Hybrid maize with Normal Fertilizers (100% RDF)

Stage (days)	Duration (days)	Fertilizer form	Fertilizer grade			Dose/ ha/ day	Total Qty (Kg/ha)	Nutrients kg/ha		
			N	P	K			N	P	K
6 to 25	20	DAP	18	46	0	5.00	100	18.0	46.0	0.0
	20	Urea	46	0	0	2.50	50	23.0	0.0	0.0
26-60	35	DAP	18	46	0	1.86	65	11.7	29.9	0.0
	35	Urea	46	0	0	4.29	150	69.0	0.0	0.0
	35	MOP	0	0	60	2.14	75	0.0	0.0	45.0
61-75	15	Urea	46	0	0	4.13	62	28.5	0.0	0.0
	15	MOP	0	0	60	3.33	50	0.0	0.0	30.0
								150.2	75.9	75.0

HARVESTING STAGE OF CROP

Observe the following symptoms, taking into consideration the average duration of the crop.

i. The sheath covering the cob will turn yellow and dry at maturity.

ii. The seeds become fairly hard and dry. At this stage the crop is ready for harvest.

HARVESTING THE CROP

i. Tear off the cob sheath by using the gunny needle and remove the cobs from the plant.

ii. Carry out harvest operations at a single stage for easy transportation.

THRESHING THE COBS

i. Dry the cobs under the sun till the grains are dry.

ii. Use mechanical threshers or by running the tractor over dried cobs to separate the grains from the shank.

iii. Clean the seeds by winnowing

iv. Collect and store the dry grains in gunnies.

STACKING THE STRAW FOR FEEDING CATTLE

i. Maize straw can also be used as a good cattle feed when it is green.

ii. Harvest the crop and cut the green straw into bits with a chaff cutter or chopping knife and feed the cattle.

I. RAINFED MAIZE

1. FIELD PREPARATION

Chisel the soil having hard pan formation at shallow depths with chisel plough at 0.5 m interval first in one direction and then in the direction perpendicular to the previous one once in three years. Apply 12.5 t/ha of FYM or compost or composted coir pith besides chiselling, to get an additional yield of about 30% over control.

2. APPLICATION OF FYM OR COMPOST

Spread 12.5 t/ha of FYM or compost or composted coir pith evenly on the unploughed field along with 10 packets of Azospirillum (2000 g/ha) and incorporate in the soil.

3. APPLICATION OF FERTILIZER

i. Apply NPK as per soil test recommendation as far as possible. If soil test recommendation is not available, adopt a blanket recommendation of 60 : 30 : 30 NPK kg/ha for Alfisols and 40 : 20 : 0 NPK kg/ha for Vertisols.

ii. Apply half of N and full dose of P_2O_5 and K_2O with enriched FYM as basal along with Azospirillum (10 packets/ha).

iii. Top dress remaining half of N at tasseling.

Soil test crop response based integrated plant nutrition system (STCR-IPNS) recommendation may be adopted for prescribing fertilizer doses for specified yieldtargets. (ready reckoners are furnished)

Rainfed Maize

Soil	:	Red sandy loam (Irugur series)	FN = 3.23 T - 0.42 SN - 0.52 ON
Target	:	4 - 5 t ha^{-1}	FP_2O_5 = 1.51T - 1.98 SP - 0.94 OP
			FK_2O = 1.73T - 0.21 SK - 0.48 OK

Initial soil test values (kg ha^{-1})			Yield target – 4 t ha^{-1}			Yield target – 5 t ha^{-1}		
			NPK (kg ha^{-1}) + FYM @ 12.5 t ha^{-1} + *Azospirillum* @ 2 kg ha^{-1} + PSB @ 2 kg ha^{-1}			NPK (kg ha^{-1}) + FYM @ 12.5 t ha^{-1} + *Azospirillum* @ 2 kg ha^{-1} + PSB @ 2 kg ha^{-1}		
SN	**SP**	**SK**	**FN**	**FP_2O_5**	**FK_2O**	**FN**	**FP_2O_5**	**FK_2O**
160	10	200	30*	16	15*	62	31	20
180	12	220	30*	15*	15*	54	27	15*
200	14	240	30*	15*	15*	46	23	15*
220	16	260	30*	15*	15*	37	19	15*
240	18	280	30*	15*	15*	30*	15*	15*

* Maintenance dose ** Maximum dose

Note: FN, FP_2O_5 and K_2O are fertilizer N, P_2O_5 and K_2O in kg ha^{-1}, respectively; T is the yield target in q ha^{-1}; SN, SP and SK respectively are available N,P and K in kg ha^{-1} and ON, OP and OK are the quantities of N, P and K supplied through organic manure inkg ha^{-1}.

Apply TNAU MN mixture @ 7.5 kg /ha as Enriched FYM (Prepare enriched FYM at 1:10 ratio of MN mixture & FYM ; mix at friable moisture &incubate for one month in shade).

4. SEED RATE

Select good quality seeds. Adopt the seed rate @ 20 kg/ha for hybrids and 25 kg/ha for varieties

5. SPACING

Adopt a spacing of 45 cm between rows and 20 cm between plants in the row. Population : 10 - 11plants/m^2

6. PRE-TREATMENT OF SEEDS WITH BIOFERTILIZER

Seeds treated with fungicides may be treated with three packets (600 g/ha) of Azospirillum

7. SOWING

Dibble or drill the seeds at a depth of 4 cm.

8. CROPPING SYSTEMS

i. Intercropping system of maize + cowpea or maize + blackgram is recommended for higher net returns in the red lateritic soils of Southern districts.

ii. For Vertisols of Southern district, maize + redgram intercropping systems is ideal.

CROP PHYSIOLOGY

Foliar spray of TNAU Maize Maxim @ 3 kg/acre in 200 litres of water at tassel initiation and at grain filling stages improves grain filling, grain yield and drought tolerance.

CROP PROTECTION

A. PEST MANAGEMENT

Shoot fly, *Atherigona orientalis*	• Set up TNAU low cost fish meal trap 12 nos./ha till the crop is 30 days old • **Apply any one of the following insecticides/ ha** Carbofuran 3CG 33.3 kg Dimethoate 30EC 1.2 lit Methyl demeton 25EC 1.0 lit Monocrotophos 36SL 625 ml
Stem borer, *Chilo partellus*	• Release egg parasitoid, *Trichogramma chilonis* @ 12 cc/ha coinciding with egg laying period thrice at weekly interval. • Conserve larval parasitoid, *Cotesia flavipes* • Apply Carbofuran 3CG 33.3 kg/ha • If granular insecticides are not used, spray Dimethoate 30EC 660 ml/ha
Aphids *Rhopalosiphum maidis*	• Spray Dimethoate 30EC 1.2 lit/ha
Cob borer *Helicoverpa armigera*	Spray azadirachtin 1% (10000 ppm) 1500 ml/ha
Thrips	Apply Carbofuran 3CG 33.3 kg/ha
Fall armyworm (FAW), *Spodoptera frugiperda* (invasive pest)	• Apply neem cake @ 250 kg/ha during last ploughing and treat seeds with thiamethoxam 30 FS or *Beauveria bassiana* @ 10 g/ kg • Adopt spacing of 60 x 25 cm for irrigated and 45 x 20 cm for rainfed maize and rogue spacing of 75 cm for every 10 rows • Raise border crop of cowpea, sunflower or gingelly, and intercrop with black gram or green gram to attract and conserve natural enemies • Raise border crop of Bajra Napier for irrigated maize or grain sorghum variety for rainfed maize to attract FAW

	adults on border crops • Use solar light trap @ one /ha and sex pheromone traps @ 50/ha for mass trapping of adults from 10-15 DAS **Apply any one of the following/ ha** 1. Early whorl stage (15 – 20 DAS) • Azadirachtin 1% EC 20 ml/10 l • Thiodicarb 75 WP 20 g/10 l • Emamectin benzoate 5 SG 4g/10 l 2. Late whorl stages (40-45 DAS) • *Metarhizium anisopliae* 80 g/10 l with 1 x 10^8 cfu/g • Spinetoram 12 SC 5 ml/10 l • Novaluron 10 EC 15 ml/10 l • Tasseling and cob formation stage (60 – 65 DAS) • Flubendiamide 480 SC 4 ml/10 l • Chlorantraniliprole 18.5 SC 4 ml/10 l

B. Disease Management

Seed treatment: Treat the seeds with Carbendazim @ 2 g/kg or Thiram @ 4 g/kg or Metalaxyl @ 3 g/kg of seed

Name of the Disease	Recommendations
Rust: *Puccinia sorghi*	**CIB recommendation** • Spray Kresoxim-methyl 44.3% SC @ 1 ml/l of water
Downy mildew or Crazy top: *Peronosclerospora sorghi*	• Sow resistant hybrid TNAU maize hybrid CO-6 and COH (M) 8 • Rogue out downy mildew infected plants • Spray Metalaxyl + Mancozeb @ 1000 g or Mancozeb 1000 g/ha at 20 days after sowing **CIB recommendation** • Treat the seeds with Metalaxyl -M 31.8% ES @ 2.4 ml/kg seed or with Metalaxyl 35% WS @ 700gms with a dilution of 0.75 to 1ltr / 100 kg seeds.
Turcicum leaf blight: *Exserohilum turcicum* **and *Maydis* leaf blight:** *Helminthosporium maydis*	• Spray Mancozeb or zineb @ 2-4 g/lr. on appearance of the disease and repeat at 10 days interval, if necessary • Seed treatment with *Pseudomonas fluorescens* @ 10g/ kg and spray Propiconazole 25% EC @ 0.1% on 35 and 50 DAS **CIB recommendation** • Spray Kresoxim-methyl 44.3% SC @ 1 ml/lr. of water

Post Flowering Stalk rot: *Macrophomina phaseolina*	• Follow crop rotation • Avoid water stress at flowering time to reduce the disease incidence • Avoid nutrient stress and apply Potash @ 80 kg/ha in endemic areas • Apply *P. Fluorescens* or *T. asperellum* @ 2.5 kg / ha with 50 kg of well decomposed FYM / sand in soil at 30 days after sowing
	CIB recommendation for combined infections • Spray Azoxystrobin 18.2% w/w + Cyproconazole 7.3% w/w SC @ 1l/ha to control downy mildew, leaf blights and rust diseases • Spray Azoxystrobin 18.2% w/w + Difenoconazole 11.4% w/w SC @ 0.1% to control leaf blights and downy mildew diseases

MAIZE - VARIETAL SEED PRODUCTION

Land requirement

- Land should be free from volunteer plants. The previous crop should not be the same variety or other varieties of the same crop. It can be the same variety if it is certified as per the procedures of certification agency.

Isolation

- For certified seed production, leave a distance of 200 m all around the field from the same and other varieties of maize.

Pre-sowing seed management

- Soak the seed in 4 % *Pseudomonas fluorescens* for 8 hrs. at 1 : 1 ratio and dry back the seeds to original seed moisture content under shade.

Season

- June - September and November - February.

Spacing

- 45 x 10 cm.

Fertilizer requirement

- The crop requires NPK @ 150:75:75 kg / ha. Apply NPK @ 40:75:40 kg / ha as basal, 50 kg N at 20 days after sowing and 60:0:35 kg NPK at 40 days after sowing.

Harvest

- Harvest the cobs as once over Harvest.
- Verify true to type cobs based on kernel and shank colour (cob sorting) variations.
- Remove the diseased cobs.

Shelling

- Shell the cobs either by beating with pliable bamboo stick or using maize sheller with required Rpm at a seed moisture content of 15 - 18 %.
- Improper shelling leads to pericarp injury up to 48 % and will promote saprophytic fungal growth.
- Estimate mechanical / pericarp injury through 20 % $FeCl_3$ test or using 0.25 % Tetrazolium chloride solution.

Size grading

- Grade the seeds using 18 / 64" round perforated sieves.

Pre-storage seed treatment

- Treat the seeds with Carbendazim @ 2 g / kg of seed.
- Dry dress the seeds with Halogen mixture @ 3 g / kg of seed ($CaOCl_2$ + $CaCO_3$ + *arappu* (*Albizzia amara*) leaf powder mixed in the ratio of 5:4:1 for grain cum seed storage.

Storage

- Store the seeds in gunny or cloth bags for short term storage (8 - 9 months) with a seed moisture content of 10 to 12 %.
- Store the seeds in polylined gunny bag for medium term storage (12 - 15 months) with a seed moisture content of 8 - 9 %.
- Store the seeds in 700 gauge polythene bag for long term storage (more than 15 months) with a seed moisture content less than 8 %.

MAIZE - HYBRID SEED PRODUCTION

Land requirement

- Select fertile land with good drainage and irrigation.
- Field should not have volunteer plants. Hence, the previous crop should not be the same or different variety / hybrid of maize.

Isolation

- All around the field leave 200 m distance from same and other varieties / hybrids of maize.

Pre-sowing seed treatment

- Coat the seed with polymer @ 6 g / kg + Carbendazim @ 2 g / kg + Imidachloprid @ 1 ml / kg + micronutrient mixture @ 3 ml / kg of seed.

Spacing

- 60 x 25 cm.

Planting ratio

- Sow the female and male parents in the ratio of 6 : 2.

Border rows

- Sow four rows of male parent all around the field for effective pollination.

Fertilizer requirement

- Apply NPK @ 150: 75: 75 kg / ha in split applications. Three split application 25 kg of N at vegetative,at 5% flowering and 10 days after second application. Apply 18.75 kg of K in two split application at 5% flowering and maturity stages.

Foliar spray

- Spray $ZnSO_4$ 0.5 % + Boric acid 0.2 % at 50 % flowering stage to enhance the seed set.