Tamil Nadu

Package of Practices for Organic Crop Production

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Suggested cropping systems (based on testing under NPOF)

1. CS_1: Green manure-Cotton-Maize
2. CS_2: Green manure-Chillies-Sunflower
3. CS_3: Green manure-Beetroot-Maize

Details of Cropping Systems

Cropping System 1: Green manure-Cotton-Maize

Particulars	*Kharif*	*Rabi*	Summer
Crop	Cotton	Maize	Sunnhemp
Fortnight of sowing/planting	August 1st fortnight	February 1stfortnight	June 1st fortnight
Fortnight of harvesting	January 2nd fortnight	May 2ndfortnight	July 1st fortnight
Varieties suitable for organic farming	Suraj	CO(H)M6	Local

Crop *(kharif)*: Cotton

Important features of suitable varieties

Parameters	MCU 12	Suraj
Duration (days)	160	165
Average yield under organic condition (kg/ha)	2000 kg/ha	1799 kg/ha
Source (s) of availability	-	CICR, Coimbatore
Suitable regions/districts in the state	Coimbatore, Erode, Madurai, Dindigul, Theni, Dharmapuri, Salem, Namakkal, Erode	Coimbatore

Field preparation:

Prepare the field to get a fine tilth. Chiselling for soils with hard pan: Chisel the soils having hard pan formation at shallow depths with chisel plough at 0.5 metre interval, first in one direction and then in the direction perpendicular to the previous one, once in three years. Form ridges and furrows 10 m long with 60 cm spacing by using ridge plough or bund former.

Cultural practices

<table>
<tr><td>Seed rate (kg/ha)</td><td colspan="4">7.5 kgs of delinted seeds</td></tr>
<tr><td rowspan="5">Pre-sowing/planting treatment of seed/seedlings</td><td>Material</td><td colspan="2">Recommended rate (kg/ha or lit/ha)</td><td>Method of application</td></tr>
<tr><td>Azospirillum</td><td colspan="2">600 g/ha</td><td>Seed treatment</td></tr>
<tr><td>Phosphobacteria</td><td colspan="2">600 g/ha</td><td>Seed treatment</td></tr>
<tr><td>Pseudomonas</td><td colspan="2">10 g/kg of seed</td><td>Seed treatment</td></tr>
<tr><td>Trichoderma</td><td colspan="2">4 g/kg of seed</td><td>Seed treatment</td></tr>
<tr><td>Spacing (Row x plant)</td><td colspan="4">60 x 30 cm</td></tr>
<tr><td rowspan="6">Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc</td><td colspan="3">Source</td><td>Quantity/ha</td></tr>
<tr><td colspan="3">FYM</td><td>7.05 t/ha</td></tr>
<tr><td colspan="3">Vermicompost</td><td>4.49 t/ha</td></tr>
<tr><td colspan="3">Azospirillum</td><td>2kg/ha</td></tr>
<tr><td colspan="3">Phosphobacteria</td><td>2kg/ha</td></tr>
<tr><td colspan="3">Pseudomonas</td><td>2.5 kg/ha</td></tr>
<tr><td rowspan="3">Top dressing of organic manures</td><td colspan="3">Trichoderma</td><td>2.5 kg/ha</td></tr>
<tr><td>Source</td><td colspan="2">Quantity/ha</td><td>Days after sowing/planting or stage of crop</td></tr>
<tr><td>Vermicompost</td><td colspan="2">1 t/ha</td><td>45 DAS</td></tr>
<tr><td>Panchagavya</td><td colspan="2">3% spray</td><td>30, 60 and 90 DAS</td></tr>
<tr><td rowspan="2">Irrigation practices</td><td>Number of irrigations</td><td colspan="2">Most critical stages for irrigation</td><td>Depth of irrigation (cm)</td></tr>
<tr><td>15-18 irrigations depending on the weather and soil type</td><td colspan="2">Germination phase (1-15 days)
Vegetative phase (16-44 days)
Flowering phase (85-90 days)</td><td></td></tr>
<tr><td>Major weeds</td><td colspan="4">Acalypha indica, Cyanodon dactylon, Cyperus rotundus, Digera arvensis,Chloris barbata, Trianthema portulacastrum, Parthenium hysterophorus</td></tr>
<tr><td rowspan="2">Weed management</td><td colspan="2">Critical stage of weeding</td><td colspan="2">Recommended practice for organic condition</td></tr>
<tr><td colspan="2">Vegetative and flowering phase</td><td colspan="2">Manual weeding
Stubble mulching</td></tr>
<tr><td rowspan="2">Organic plant protection practices</td><td>Name of pest/disease</td><td colspan="2">Organic material recommended for control</td><td>Quantity (kg or litres/ ha)</td></tr>
<tr><td>Fruit borer: Helicoverpa armigera</td><td colspan="2">Application of Nuclear Polyhedrosis Virus (NPV) in evening hours at 7th and 12th week after sowing
• Beauveria bassiana</td><td>3 x 10^{12} POB /ha</td></tr>
</table>

		• Release of egg parasitoid, *Trichogramma* spp., •Egg-larval parasitoid, *Chelonus blackburnii* and Predator *Chrysoperla carnea* • ULV spray of NPV, for effective control of *Helicoverpa*	1.15% WP 400 g/ha 6.25 cc/ha at 15 days interval 3 times from 45 DAS 1,00,000/ha at 6^{th}, 13^{th} and 14^{th} week after sowing. 3 x 10^{12} POB /ha with 10% cotton seed kernel extract, with sticking agent
	Pink bollworm: *Pectin ophora gossypiella*	• Use pheromone trap to monitor the adult moth activity • Three weekly releases of egg parasitoid *Trichogramma* sp	@1,00,000/ha per release
	Cotton Stem Weevil: *Pemphere s* **(***Pempherulus)* *affinis* and Shoot weevil: *Alcidodes affaber*	Basal application of neem cake	250 kg/ha
	Tobacco Cutworm: *Spodoptera litura*	• Use of light trap • Growing castor along border and irrigation bunds • Removal and destruction of egg masses • Removal and destruction of early stage larvae • Hand picking and destruction of grown up caterpillars	
	Sucking pests	• Neem oil • Neem seed kernel extract • Fish oil rosin soap • Notchi leaf extract *Catharanthus rosea* extract	3% 5% 2.5 % 5% 5%
	Foliar diseases - Alternaria leaf spot: *Alternaria macrospora*	Neem oil *Bacillus subtilis*	3% 0.04% on 60, 90 and 120 days after sowing

	Wilt : *Fusarium oxysporum* f. sp. *vasinfectum*	• Seed treatment with *Trichoderma viride* formulation • Destroy the infected - plant debris. • Soil application of *Trichoderma viride*	4g/kg seed 2.5kg/ha
	Root Rot: *Rhizoctonia bataticola*	• Seed treatment with *T. viride* • Seed treatment with *Bacillus* • Soil application • Seed treatment with *Pseudomonas* • Soil application of *Pseudomonas*	@ 4 g/kg seed @ 10g/kg seed @ 2.5 kg/ ha at the time of sowing @10g/kg @ 2.5 kg/ha at the time of sowing
Optimum stage of harvesting	Boll bursting stage		

Yield and Economics

Parameters	**1st year***	**2nd year**	**3rd year**	**4th year**	**5th year**	**6th year**	**7th year**
Economic yield (kg/ha)	1323	1460	1175	1493	1515	1053	1165
Price (Rs/kg)	Actual price: 45 25 % premium price: 46.25						
Cost of cultivation*(Rs/ha)	40,110						
Net returns* (Rs/ha)	13,771						

Crop *(Rabi)* : Maize

Important features of suitable varieties

Parameters	**CO1**	**COH(M)6**
Duration (days)	10-110	110
Average yield under organic condition (kg/ha)	5200	7400 kg/ha
Source (s) of availability	TNAU	TNAU
Suitable regions/districts in the state	Coimbatore, Erode, Tirunelveli, Tanjore and Pudukottai	All maize growing areas

Specific resistance / tolerance to disease	Resistant to downy mildewOrange flint grains	Multiple disease resistance to Sorghum downy mildew, *Maydis* leaf blight, *Turcicum* leaf blight, Post flowering stock rot and Banded leaf and sheath blight

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. Form ridges and furrows providing sufficient irrigation channels. The ridges should be 6 m long and 60 cm apart using a bund former or ridge plough.

Cultural practices

Seed rate	20 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	*Material*	*Recommended rate (kg/ha or lit/ha)*	*Method of application*
	Azospirillum	600 g/ha	Seed treatment
	Phosphobacteria	600 g/ha	Seed treatment
Spacing (Row x plant) in cm	60 x 25 cm		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity/ha	
	FYM	11.88 t/ha	
	Vermicompost	7.57t/ha	
	Azospirillum	2kg/ha	
	Phosphobacteria	2kg/ha	
Top dressing of organic manures	*Source*	*Quantity/ha*	*Days after sowing/planting or stage of crop*
	Vermicompost	1 t/ha	30 DAS
Irrigation practices	*Number of irrigations*	*Most critical stages for irrigation*	*Depth of irrigation (cm)*
	9 to 11 irrigations based on the weather and soil type	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	-
Major weeds	*Acalypha indica,* Cyanodon dactylon, Cyperus rotundus, *Digera arvensis,Chloris barbata, Trianthema portulacastrum, Parthenium hysterophorus*		
Weed management	*Critical stage of weeding*	*Recommended practice for organic condition*	
	• Vegetative phase Flowering phase	• Manual weeding • Stubble mulching	
Organic plant protection	*Name of*	*Organic material*	*Quantity (kg or*

practices	*pest/disease*	*recommended for control*	*litres/ ha)*
	Stem borer: *Chilo partellus*	Release egg p[arasitoid *Trichogramma chilonis* are desirable. Third release is to be accompanied with larval parasitoid *Cotesia flavipes* @ 5000/ha	@ 2,50,000 /ha (three releases at weekly interval)
	Corn worm/Earworm: *H elicoverpa armigera*	• Set up of light traps • Set up sex pheromone traps • Two applications of NPV along with crude sugar 2.5 kg + cotton seed kernel powder 250 g on the ear heads	@ 12/ha @ 1.5 x 10^{12} POB at 10 days interval along with crude sugar 2.5 kg + cotton seed kernel powder 250 g on the ear heads
	Sucking pests	Neem oil Neem seed kernel extract Fish oil rosin soap	3%
	Foliar diseases	Neem oil	3%
Optimum stage of harvesting	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.		

Yield and Economics

Parameters	**1st year***	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Economic yield (kg/ha)	3753	4123	4078	3757	4064	4144	5481
Price (Rs/kg) (consider 25 % premium on prevailing market price)	Actual price: Rs.12.5 25 % premium on prevailing market price:Rs.15.62						
Cost of cultivation*(Rs/ha)	Rs.48,678						
Net returns* (Rs/ha)	Rs.36,963						

*based on prices of 2013-14

Crop *(Summer)*: Sunnhemp

Important features of suitable varieties

Parameters	Sunnhemp
Duration (days)	150 days
Average yield under organic condition (kg/ha)	Green biomass: 13-15 t/ha
Source (s) of availability	TNAU
Suitable regions/districts in the state	All districts of Tamil Nadu

Field preparation: Plough the soil to fine tilth, broadcast the seeds and form ridges and furrows 60 cm.

Cultural practices

Seed rate (kg/ha)	25-35 kg/ha for green manure		
Pre-sowing/planting treatment of seed/seedlings	*Material*	*Recommended rate (kg/ha or lit/ha)*	*Method of application*
	Rhizobium	1 kg/ha	Seed treatment
Spacing (Row X plant) in cm	Broadcasted by mixing with 25 kg sand		
Irrigation practices	Once in 30 days		
Major weeds	*Trianthema portulacastrum, Parthenium hysterophorus*		
Weed management	Hand hoeing and removal		
Organic plant protection practices	Neem oil: 3% spraying		
Optimum stage of harvesting	Incorporation during flowering stage or 45 DAS		

Yield and Economics: Incorporated as green biomass at 45 DAS

Cropping System 2: Green manure-Chillies-Sunflower

Particulars	*Kharif*	*Rabi*	Summer
Crop	Chillies	Sunflower	Sunnhemp
Fortnight of sowing/planting	August 1^{rst} fortnight	February 2ndfortnight	June 2nd fortnight
Fortnight of harvesting	February 1^{rst} fortnight	June 1^{rst} fortnight	July 2nd fortnight
Varieties suitable for organic farming	PKM1	COSFV5	Local

Crop *(kharif)*: Chillies

Important features of suitable varieties

Parameters	PKM1	K1
Duration (days)	180	210
Average yield under organic condition (kg/ha)	3.08 tonnes/ha –dry pod	1.8 tonnes/ha- dry pod

Source (s) of availability	TNAU	TNAU
Suitable regions/districts in the state	Rainfed and irrigated conditions	Southern Districts of Tamil Nadu, Coimbatore

Nursery raising practices:
Seed rate
Varieties: 1.0 kg / ha.
Nursery area: 100 sq.m / ha.

Nursery raising: Protray nursery

- Mix sterilized cocopeat @ 300 kg with 5 kg neem cake along with *Azospirillum* and phosphobacteria each @ 1 kg. Approximately 1.2 kg of cocopeat is required for filling one protay. 300 protrays (98 cells) are required for the production of 29,000 seedlings, which are required for one hectare adopting a spacing of 90 x 60 x 45 cm in a paired row system.
- Sow the seeds in protrays @ 1 seed per cell.
- Cover the seed with cocopeat and keep the trays one above the other and cover with a polythene sheet till germination starts.
- After 6 days place the protrays with germinated seedlings individually on the raised beds inside the shade net.
- Water with rosecan everyday upto seed germination.

Field preparation:

Thoroughly prepare the field and form ridges and furrows at a spacing of 60 cm. Irrigate the furrows and transplant 40-45 days old seedlings, with the ball of earth on the ridges.

Cultural practices

Pre-sowing/planting treatment of seed/seedlings	*Material*	*Recommended rate (kg/ha or lit/ha)*	*Method of application*
	Azospirillum	400 g/ha	Seedling root dip
	Phosphobacteria	400 g/ha	Seedling root dip
Spacing (Row x plant) in cm	60 x 45 cm		
Number of seedlings/hill	2		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	*Source*	*Quantity/ha*	
	FYM	7.50 t/ha	
	Vermicompost	3.09 t/ha	
	Azospirillum	2kg/ha	
	Phosphobacteria	2kg/ha	
	Pseudomonas	2.5 kg/ha	
	Trichoderma	2.5 kg/ha	
Top dressing of organic manures	Source	Quantity/ha	Days after sowing/planting or stage of crop
	Vermicompost	1 t/ha	45 DAS

	Panchagavya	3% spray	30, 60, 90 and 120 DAS
Irrigation practices	*Number of irrigations*	*Most critical stages for irrigation*	*Depth of irrigation (cm)*
	18-24 irrigations depending on the weather and soil type	Irrigation is done at weekly intervals	-
Major weeds	*Acalypha indica*, Cyanodon dactylon, Cyperus rotundus, *Digera arvensis,Chloris barbata, Trianthema portulacastrum, Parthenium hysterophorus*		
Weed management	*Critical stage of weeding*	*Recommended practice for organic condition*	
	Vegetative and flowering phase	Hand weeding once in 30 days after planting.	
Organic plant protection practices	*Name of pest/disease*	*Organic material recommended for control*	*Quantity (kg or litres/ ha)*
	Fruit borer	• Set up pheromone traps for *Helicoverpa armigera or Spodoptera litura* • Collection and destruction of damaged fruits and grown up caterpillars. • Spray *Bacillus thuringiensis*	@ 12 Nos./ha. @ 2 g/lit
	Sucking pests	Neem oil Neem seed kernel extract	3% 5%

	Damping off and anthracnose	• Seed treatment with *Trichoderma viride* or *Pseudomonas fluorescens* • Soil application of *Pseudomonas fluorescens* • Neem oil	@ 4 g/kg @ 10 g/kg @ 2.5 kg/ha @ 3%
Optimum stage of harvesting	Fruit maturation stage		

Yield and Economics

Parameters	**1st year***	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Economic yield (kg/ha)	3168	5345	3153	5526	5812	4483	6215
Price (Rs/kg) (consider 25 % premium on prevailing market price)	Actual price: 18 25 % premium price: 22.50						
Cost of cultivation*(Rs/ha)	92,560						
Net returns* (Rs/ha)	47,278						

*based on prices of 2013-14

Crop *(Rabi)* : Sunflower

Important features of suitable varieties

Parameters	**TNAU Sunflower Hybrid CO 2**	**COSFV 5**
Duration (days)	90-95	85-90
Average yield under organic condition (kg/ha)	2250	1700
Source (s) of availability	TNAU	TNAU
Suitable regions/districts in the state	Coimbatore, Erode, Salem, Namakkal, Tirunelveli, Dindigul, Dharmapuri, Tiruchirapalli, Perambalur, Karur, Cuddalore, Villupuram, Virudhunagar, Sivagangai , Ramanathapuram, Madurai, Theni, Thoothukudi,	Coimbatore, Erode, Salem, Namakkal, Tirunelveli, Dindigul, Dharmapuri, Tiruchirapalli, Perambalur, Karur, Cuddalore, Villupuram, Virudhunagar, Sivagangai , Ramanathapuram, Madurai, Theni, Thoothukudi

Field preparation:

Plough once with tractor or twice with iron-plough or three to four times with country-plough till all the clods are broken and a fine tilth is obtained. Spread 12.5 t/ha of FYM or compost or composted coir pith evenly on the field before the last ploughing and incorporate in the soil by working with a country plough. Form ridges and furrows 6 m long. Use bund-former or ridge plough to economise and form irrigation channels across and ridges according to the topography of the field.

Cultural practices

<table>
<tr><td>Seed rate</td><td colspan="4">6 kg/ha</td></tr>
<tr><td rowspan="4">Pre-sowing/planting treatment of seed/seedlings</td><td>Material</td><td colspan="2">Recommended rate (kg/ha or lit/ha)</td><td>Method of application</td></tr>
<tr><td>Azospirillum</td><td colspan="2">600 g/ha</td><td>Seed treatment</td></tr>
<tr><td>Phosphobacteria</td><td colspan="2">600 g/ha</td><td>Seed treatment</td></tr>
<tr><td>Trichoderma</td><td colspan="2">4g/kg</td><td>Seed treatment</td></tr>
<tr><td>Spacing (Row x plant) in cm</td><td colspan="4">45 cm x 30cm</td></tr>
<tr><td rowspan="5">Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc</td><td colspan="2">Source</td><td colspan="2">Quantity/ha</td></tr>
<tr><td colspan="2">FYM</td><td colspan="2">5.30 t/ha</td></tr>
<tr><td colspan="2">Vermicompost</td><td colspan="2">3.37t/ha</td></tr>
<tr><td colspan="2">Azospirillum</td><td colspan="2">2kg/ha</td></tr>
<tr><td colspan="2">Phosphobacteria</td><td colspan="2">2kg/ha</td></tr>
<tr><td rowspan="3">Top dressing of organic manures</td><td>Source</td><td colspan="2">Quantity/ha</td><td>Days after sowing/planting or stage of crop</td></tr>
<tr><td>Vermicompost</td><td colspan="2">500 kg/ha</td><td>30 DAS</td></tr>
<tr><td>Panchagavya</td><td colspan="2">3%</td><td>30, 45 and 60 DAS</td></tr>
<tr><td rowspan="2">Irrigation practices</td><td>Number of irrigations</td><td colspan="2">Most critical stages for irrigation</td><td>Depth of irrigation (cm)</td></tr>
<tr><td>10-12 irrigation depending on</td><td colspan="2">Seeding, flowering and seed development stage</td><td>-</td></tr>
</table>

	the weather and soil type		
Major weeds	*Acalypha indica*, Cyanodon dactylon, Cyperus rotundus, *Digera arvensis,Chloris barbata, Trianthema portulacastrum, Parthenium hysterophorus*		
Weed management	*Critical stage of weeding*	*Recommended practice for organic condition*	
	Vegetative phase Flowering phase	Manual weeding Stubble mulching	
Organic plant protection practices	*Name of pest/disease*	*Organic material recommended for control*	*Quantity (kg or litres/ ha)*
	Capitulum borer (Head borer): *Helicoverpa armigera*	• Sow trap crops like marigold at 50 plants/acre • Use of pheromone traps for pest intensity identification as well as to trap the male moths • Setting of light traps to know the range of pest incidence as well as to kill moth population • Release predators like coccinellids, *Chrysoperla carnea* • Release parasitoides like *Trichogramma* spp, (*Bracon* spp., *Campoletis* spp) • Spraying of 5% Neem oil or 5% Neem Seed Kernal extract before egg laying	4 traps/acre 1 light trap/5 acre @1larva/ head @ 20,000/acre
	Bihar hairy caterpillar: *Spilosoma oblique*	• Deep summer ploughing • Use of well rotten manures • Collection and destruction of larvae	
	Tobacco caterpillar: *Spodoptera litura*	• Hand pick the *Helicoverpa* larvae and destroy • Install bird perches per hectare for predatory birds	
	Leaf hopper (jassids): *Amrasca biguttula biguttula*	• Neem oil • Neem seed kernel extract	3% 5%
	Foliar diseases	Neem oil	3%
	Charcoal Rot: *Macrophomina*	Soil application of *P. fluorescens* or *T. viride*	2.5 kg / ha + 50 Kg of

	phaseolina		well decomposed FYM or sand at 30 days after sowing
Optimum stage of harvesting	Observe the bracts on the backside of the capitula. When they turn lemon yellow, the heads harden and the crop is ready for harvest.		

Yield and Economics

Parameters	**1st year***	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**
Economic yield (kg/ha)	1252	1227	1023	1349	1602	1304	1373
Price (Rs/kg) (consider 25 % premium on prevailing market price)	Actual price: 25 25 % premium on prevailing market price: 31.25						
Cost of cultivation*(Rs/ha)	21,918						
Net returns* (Rs/ha)	20,988						

*based on prices of 2013-14

Crop *(summer)*: Sunhemp

Important features of suitable varieties

Parameters	**Sunnhemp**
Duration (days)	150 days
Average yield under organic condition (kg/ha)	Green biomass – 13-15 t/ha
Source (s) of availability	TNAU
Suitable regions/districts in the state	All districts of Tamil Nadu

Field preparation: Plough the soil to fine tilth, broadcast the seeds and form ridges and furrows 60 cm.

Cultural practices

Seed rate (kg/ha) (Not applicable for nursery crops)	25-35 kg/ha for green manure		
Pre-sowing/planting treatment of seed/seedlings	*Material*	*Recommended rate (kg/ha or lit/ha)*	*Method of application*
	Rhizobium	1 kg/ha	Seed treatment
Spacing (Row x plant) in cm	Broadcasted		

Irrigation practices	Once in 30 days
Organic plant protection practices	Neem oil: 3% spraying
Optimum stage of harvesting	Incorporation during flowering stage or 45 DAS

Yield and Economics: Incorporated as green biomass at 45 DAS

Cropping System 3: Green manure-Beetroot-Maize

Particulars	***Kharif***	***Rabi***	**Summer**
Crop	Beetroot	Maize	Sunnhemp
Fortnight of sowing/planting	July 1st fortnight	Novemebr 1st fortnight	March 1rst fortnight
Fortnight of harvesting	September 2nd fortnight	February 2nd fortnight	April 2nd fortnight
Varieties suitable for organic farming	Ruby queen	CO(H)M6	Local

Crop *(kharif)*: Beetroot

Important features of suitable varieties

Parameters	**Ruby queen**
Duration (days)	60-75 days
Average yield under organic condition (kg/ha)	
Source (s) of availability	Private industry
Suitable regions/districts in the state	Widely adaptable (Preferably cool weather)

Field preparation:

Land is ploughed to a fine tilth by thorough ploughing making it loose and friable. Clods are to be removed completely. Apply well decomposed farmyard manure at the time of final ploughing.

Cultural practices

Seed rate (kg/ha)	6 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	*Material*	*Recommended rate (kg/ha or lit/ha)*	*Method of application*
Spacing (Row x plant) in cm	30 x 10 cm		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	*Source*	*Quantity/ha*	
	FYM	3.75 t/ha	
	Vermicompost	1.55 t/ha	
Top dressing of organic	Source	Quantity/ha	Days after

manures			sowing/planting or stage of crop
	Vermicompost	500 kg/ha	45 DAS
	Panchagavya	3% spray	30, 45 and 60 DAS
Irrigation practices	*Number of irrigations*	*Most critical stages for irrigation*	*Depth of irrigation (cm)*
	8 - 10 irrigations depending on the weather and soil type	Irrigation is done at weekly intervals	
Major weeds	*Acalypha indica*, Cyanodon dactylon, Cyperus rotundus, *Digera arvensis,Chloris barbata, Trianthema portulacastrum, Parthenium hysterophorus*		
Weed management	*Critical stage of weeding*	*Recommended practice for organic condition*	
	Early stage of crop growth	Hand weeding once in 30 days after sowing	
Organic plant protection practices	*Name of pest/disease*	*Organic material recommended for control*	*Quantity (kg or litres/ ha)*
	Leaf miners, web worms, semi loopers	Neem oil	3%
	Cercospora leaf spot	Neem oil	3%

Yield and Economics

Parameters	1st year*
Economic yield (kg/ha)	24.8 t/ha
Price (Rs/kg)	Actual price: Rs.10 25 % premium price: rs.12.5
Cost of cultivation*(Rs/ha)	Rs.86,015
Net returns* (Rs/ha)	Rs.2,23,985

*based on prices of 2013-14

Crop *(Rabi)* : Maize

Important features of suitable varieties

Parameters	COH(M)6
Duration (days)	110
Average yield under organic condition (kg/ha)	7400 kg/ha
Source (s) of availability	TNAU
Suitable regions/districts	All maize growing areas

in the state	
Specific resistance / tolerance to pest	Moderately resistant to stem borer
Specific resistance / tolerance to disease	Multiple disease resistance to Sorghum downy mildew, *Maydis* leaf blight, *Turcicum* leaf blight, Post flowering stock rot and Banded leaf and sheath blight

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. Form ridges and furrows providing sufficient irrigation channels. The ridges should be 6 m long and 60 cm apart using a bund former or ridge plough.

Cultural practices

Seed rate	20 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	*Material*	*Recommended rate (kg/ha or lit/ha)*	*Method of application*
	Azospirillum	600 g/ha	Seed treatment
	Phosphobacteria	600 g/ha	Seed treatment
Spacing (Row x plant) in cm	60 x 25 cm		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity/ha	
	FYM	11.88 t/ha	
	Vermicompost	7.57t/ha	
	Azospirillum	2kg/ha	
	Phosphobacteria	2kg/ha	
Top dressing of organic manures	*Source*	*Quantity/ha*	*Days after sowing/planting or stage of crop*
	Vermicompost	1 t/ha	30 DAS
Irrigation practices	*Number of irrigations*	*Most critical stages for irrigation*	*Depth of irrigation (cm)*
	9 to 11 irrigations based on the weather and soil type	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	
Major weeds	*Acalypha indica,* Cyanodon dactylon, Cyperus rotundus, *Digera arvensis,Chloris barbata, Trianthema portulacastrum, Parthenium hysterophorus*		
Weed management	*Critical stage of weeding*	*Recommended practice for organic*	

		condition	
	• Vegetative phase Flowering phase	• Manual weeding • Stubble mulching	
Organic plant protection practices	*Name of pest/disease*	*Organic material recommended for control*	*Quantity (kg or litres/ ha)*
	Stem borer: *Chilo partellus*	Release egg parasitoid *Trichogramma chilonis* are desirable. Third release is to be accompanied with larval parasitoid *Cotesia flavipes* @ 5000/ha	@ 2,50,000 /ha (three releases at weekly interval)
	Corn worm/Earworm: *H elicoverpa armigera*	• Set up of light traps • Set up sex pheromone traps • Two applications of NPV along with crude sugar 2.5 kg + cotton seed kernel powder 250 g on the ear heads	@ 12/ha @ 1.5 x 10^{12}POB at 10 days interval along with crude sugar 2.5 kg + cotton seed kernel powder 250 g on the ear heads
	Sucking pests	Neem oil Neem seed kernel extract Fish oil rosin soap	3%
	Foliar diseases	Neem oil	3%
Optimum stage of harvesting	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.		

Yield and Economics

Parameters	**1st year***
Economic yield (kg/ha)	4015
Price (Rs/kg) (consider 25 % premium on prevailing market price)	Actual price:Rs. 12.5 25 % premium on prevailing market price: Rs.15.625
Cost of cultivation*(Rs/ha)	Rs.49,209
Net returns* (Rs/ha)	Rs.11,625

*based on prices of 2013-14

Crop *(summer)*: Sunnhemp

Important features of suitable varieties

Parameters	Sunnhemp
Duration (days)	150 days
Average yield under organic condition (kg/ha)	Green biomass – 13-15 t/ha
Source (s) of availability	TNAU
Suitable regions/districts in the state	All districts of Tamil Nadu

Field preparation: Plough the soil to fine tilth, broadcast the seeds and form ridges and furrows 60 cm.

Cultural practices

Seed rate (kg/ha)	30 kg/ha for green manure		
Pre-sowing/planting treatment of seed/seedlings	*Material*	*Recommended rate (kg/ha or lit/ha)*	*Method of application*
	Rhizobium	1 kg/ha	Seed treatment
Spacing (Row X plant) in cm	Broadcasted		
Irrigation practices	Once in 30 days		
Organic plant protection practices	Neem oil: 3% spraying		
Optimum stage of harvesting	Incorporation during flowering stage or 45 DAS		

Yield and Economics: Incorporated as green biomass on 45 DAS