

Package of Practices for Organic Production of Crops and Cropping Systems

ICAR-Network Project Organic Farming



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KERALA

Suggested cropping systems (based on testing under ICAR-CTCRI)

1. Elephant foot yam + green manure cowpea
2. Green manure cowpea-yams + green manure cowpea
3. Taro + green manure cowpea

Details of crops in cropping systems

Elephant foot yam

Particulars	<i>Kharif</i>	<i>Rabi</i>	Summer
Crop	Elephant foot yam and green manure cowpea taken during summer continues	Elephant foot yam taken during summer continues	Elephant foot yam + green manure cowpea
Fortnight of sowing/planting			I fortnight of March planting elephant foot yam and sowing cowpea
Fortnight of harvesting	First fortnight of May harvesting and incorporating green manure cowpea	First fortnight of January harvesting elephant foot yam	
Varieties suitable for organic farming			Elephant foot yam: Gajendra, Sree Padma, Sree Athira, Peerumade local, Vegetable and Fruit Promotion Council Kerala (VFPC) local Green manure cowpea: C-152

Important features of suitable varieties

Parameters	Gajendra	Sree Padma	Sree Athira	Peerumade local	VFPC local
Duration (days)	240-270	240-270	240-270	240-270	240



Average yield under organic condition (t/ha)	33.69	28.85	23.26	26.71	26.09
Source (s) of availability	ICAR-CTCRI	ICAR-CTCRI	ICAR-CTCRI	Locally from Peerumade Development Society (PDS), Pothupara, Idukki dt., Kerala	Vegetable and Fruit Promotion Council Keralam (VFPCK)
Suitable regions/districts in the state	Throughout the state	Throughout the state	Throughout the state	Throughout the state	Throughout the state

Field preparation: The land is ploughed to a depth of 15-20 cm and levelled. Pits of 60 cm x 60 cm x 45 cm size may be dug 90 cm apart. The topsoil is to be collected up to a depth of 15-20 cm separately and filled in the pits. FYM : neem cake mixture (10:1) incubated with *Trichoderma* is applied @ 3 kg pit⁻¹ (36 t/ha) and mixed with topsoil. Neem cake is applied @ 1.0 t/ha (80 g/pit) at the time of planting. Corm pieces of 500 g with a portion of terminal bud treated with slurry containing cowdung, neem cake and *Trichoderma harzianum* (5g/kg seed) are planted in the pits. Immediately after planting elephant foot yam, green manure cowpea is sown @ 20 kg ha⁻¹.

Cultural practices

Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application
	Bio-control agent Cowdung slurry mixed with neem cake and <i>Trichoderma harzianum</i>	<i>Trichoderma</i> 5 g/kg seed	Seed treatment
Spacing (Row X plant) in cm	90 cm x 90 cm		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source FYM + neem cake mixture (10:1) inoculated with <i>Trichoderma harzianum</i> (2.5 kg/ tonne of FYM: neem cake mixture) Neem cake	Quantity/ha 36 t/ha	1 t/ha





Top dressing of organic manures	Source	Quantity/ha	Days after sowing/ planting or stage of crop
	Green manuring with cowpea	20 – 25 t /ha	45-60 DAP
	Ash	3 t/ha	45-60 DAP (at the time of incorporation of green manure cowpea)
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	Rainfed. Life saving irrigation at twice per week until sprouting, if prolonged dry spell occurs.		
Major weeds	<i>Muthanga</i> - Purplenutsedge- <i>Cyperus rotundus</i> Thazhuthama-Spreading hog weed- <i>Boerhaavia diffusa</i> Kattukaduku-Wild mustard- <i>Cleome viscosa</i> Wild Indigo- Kozhinjil- <i>Tephrosia purpurea</i> Muyal chevian-Red tassel flower- <i>Emilia sonchifolia</i> Poovamkurunnu-Purple fleabane- <i>Vernonia cinerea</i> Kurumthotti-Common wire weed- <i>Sida acuta</i> Kurumthotti- <i>Sida hemp</i> - <i>Sida rhombifolia</i>		
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	45 DAP and 75 DAP	Mulching immediately after planting and two hand weedings at 45 days and one month later	
Organic plant protection practices	Name of pest/ disease	Organic material recommended for control	Quantity (kg or litres/ ha)
	Collar rot	FYM: Neem cake mixture (10:1) inoculated with <i>Trichoderma harzianum</i> Seed treatment with cowdung slurry mixed with neem cake and <i>Trichoderma harzianum</i>	<i>Trichoderma</i> (@ 2.5 kg/tonne of FYM: neem cake mixture) @ 90 kg/ha <i>Trichoderma</i> (@ 5 g/kg seed) @ 31.25 kg/ha
Optimum stage of harvesting	8-9 months		

Yield

Parameters	1 st year	2 nd year	3 rd year	4 th year	5 th year	6 th year	7 th year	Mean
Economic yield (t/ha)	65.87	70.63	56.95	57.23	34.81			57.10



Glimpses



Cowdung: neem cake mixture inoculated with *Trichoderma harzianum*



Cost-effective practice of green manuring



Elephant foot yam + green manure cowpea



View of the experiment on organic farming of elephant foot yam



Organic elephant foot yam corms



Yams

Particulars	<i>Kharif</i>	<i>Rabi</i>
Crop	Yams and green manure cowpea	Yams continue
Fortnight of sowing/planting	I fortnight of May planting yams and sowing green manure cowpea	
Fortnight of harvesting	II fortnight of June harvesting and incorporation of green manure cowpea	First fortnight of January harvesting yams

Important features of suitable varieties

Parameters	White yam	Greater yam	Lesser yam	Dwarf white yam
	Var. Sree Priya	Var. Sree Keerthi	Var. Sree Latha	Var. Sree Dhanya
Duration (days)	270 – 300	270 – 300	210-240	210-240
Average yield under organic condition (t/ha)	22.21	21.96	16.83	13.23
Source (s) of availability	ICAR-CTCRI	ICAR-CTCRI	ICAR-CTCRI	ICAR-CTCRI
Suitable regions/districts in the state	Throughout the state	Throughout the state	Throughout the state	Throughout the state

Field preparation: The land is ploughed to a depth of 15-20 cm. Pits of 45 x 45 x45 cm size is opened for planting greater yam and white yam at a spacing of 90 x 90 cm. Three-fourths of the pit is filled with top soil and FYM and reformed into mound. For raising lesser yam, mounds may be formed at a spacing of 75 x 75 cm after broadcasting FYM. In the case of greater yam and white yam, tuber pieces of 250-300 g size can be used as planting material. For planting lesser yam, medium sized tuber of 100-150 g is sufficient.





Cultural practices

Seed rate (kg/ha)																	
Spacing (Row X plant) in cm	White yam and greater yam : 90 x 90 cm Lesser yam: 75 x 75 cm Dwarf white yam: 60 x 60 cm																
Number of seedlings/hill	Not applicable																
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Optimum stage of harvesting	White yam and greater yam: 9-10 months Lesser yam and dwarf white yam: 7-8 months																





Yield

Parameters	1 st year*	2 nd	3 rd	4 th	5 th	6 th	7 th	Mean
Economic yield (kg/ha)								
White yam	17.81	27.16	28.34	18.56	19.22			22.22
Greater yam	19.47	26.30	17.29	21.67	25.07	46.45		26.05
Lesser yam	8.59	24.95	23.57	10.92	16.12	19.28		17.24
Dwarf white yam	12.60	12.28	14.79	10.38				12.51

Taro

Particulars	Kharif	Rabi
Crop	Taro and green manure cowpea	Taro continues
Fortnight of sowing/planting	I fortnight of June planting taro and sowing green manure cowpea	
Fortnight of harvesting	II fortnight of July harvesting and incorporation of green manure cowpea	Second fortnight of November harvesting taro

Important features of suitable varieties

Parameters	Sree Kiran	Sree Rashmi	Local
Duration (days)	190-210	210	210
Average yield under organic condition (t/ha)	10.36	11.19	10.36
Source (s) of availability	ICAR-CTCRI	ICAR-CTCRI	VFPOK
Suitable regions/districts in the state	All regions of the state	All regions of the state	All regions of the state

Field preparation: The land is ploughed to a depth of 20-25 cm. Ridges and furrows are formed at 60 cm spacing. Cormels are planted at a spacing of 45 cm on the ridges. The cormels may be planted at a depth of 2.5-7.5 cm. About 37,000 cormels are required to plant one hectare. Approximately 800 kg of cormels is required to plant one hectare.

Yield

Parameters	1 st year	2 nd	3 rd	4 th	5 th	6 th	7 th	Mean
Economic yield (t/ha)	10.43	16.51	9.71	6.93	9.49	18.18		11.86



Glimpses



Yams + green manure cowpea



View of the experiment on Organic farming of yams
(trailing genotypes)



View of the experiment on organic farming of dwarf
white yam



Green manure cowpea in between dwarf white
yam mounds



Organic white yam



Organic greater yam



Organic lesser yam



Organic dwarf white yam



View of the experiment on Organic farming of taro



Green manure cowpea in between taro



Organic taro (var. Sree Kiran)



Organic taro (var. Sree Rashmi)



Organic taro (Local var)