### **Organic Package of Practices for Maharashtra State**

Organic is defined and regulated by the National Organic Production Program (NPOP) or PGS-India Organic program, to get organic certification/ An organic grower must maintain an Organic System Plan and be certified by an Accredited Certifying Bodies that has been approved and audited by the NAB or PGS-India Regional Council.Organic farming explicitly prohibits the use of synthetic or chemical fertilizers, herbicides and pesticides, genetically-modified organisms, sewage sludge, and irradiation.

Organic Farming starts with the Soil: organic agricultural practices to maintain, replenish and balance soil fertility to produce healthy and better tasting crops. Organic farmers use an array of cultural and biological practices to build soil health, manage weeds and pests, and increase biodiversity. Some examples of organic farming practices include:

- I. Crop rotations to suppress disease and support beneficial insect communities
- II. Cover cropping to fix nitrogen and checking soil erosion
- III. Use of biofertilisers; green manuring; vermi compost, EM etc. to enhance soil microbes and deliver plant nutrients
- IV. Use of FYM; Compost and vermicompost to build organic matter and manage weeds manually.
- V. Use of Bio-pesticides and mechanical controls to manage pests and disease.

In Maharashtra the agricultural area is 18 million ha., which is about 59% of the total area of the state, and 13% of the national agricultural area. About 15% of the area is irrigated and even if all the irrigation projects planned are completed, the irrigated area cannot exceed 25%. Average annual rainfall varies from 250 mm in the semi-desert zone of central Maharashtra to 5,000 mm in the Western Ghats hill ranges along the western coastal border. About 50% of the area is drought- prone. Only 22% of the state income is derived from agriculture, but it supports 67% of the population, mainly in the rural areas. The total number of farmers is nine million, with mean land holdings about twohectares. Small farmers – with land holdings less than this – comprise 64% of the rural population. The livestock population is 36million, which includes 17 million (46%) cattle, and 10 million (28%) goats. The state produces about 15 million tonnes of food grains and accounts for 8% of national production.

Amongst the popular organic cropping systems tested under NPOF in Maharashtra areRice-Groundnut based system; Rice-*Dolichos*beanbased system; Rice-Cucumberbased system and Rice-Redpumpkinbased system fetching good remuneration to growers. The following package of practices recommended for these systems:

Particulars	Kharif	Rabi
Сгор	Rice	Groundnut
Fortnight of sowing/	Nursery Sowing -Second fortnight of	Sowing - Second fortnight of
planting	June Transplanting-Secondfortnight	December
	of July	
Fortnight of harvesting	Second fortnight of October	Second fortnight of April
Varieties suitable for	Karjat-3, Karjat-4, Karjat-7 and	SB-XI, Konkan Guarav and
organic farming	Palghar-1	Konkan Trombay Tapora

### 1: Rice - Groundnut System :

# A. Crop (Kharif) : Rice

Important features of suitable varieties
--

Parameters	Karjat-3	Karjat-4	Karjat-7	Palghar-1
Duration (days)	115-120	110-115	115-120	125-130
Average yield under organic condition (kg/ha)	3500 to 3700	3300 to 3500	3400 to 3600	3900 to 4100
Source (s) of availability	RARS, Karjat	RARS, Karjat	RARS, Karjat	RARS, Karjat
Suitable	Suitable for	Suitable for rainfed	Suitable for	Konkan
regions/districts in the state	as well as irrigated areas	uplands as well as irrigated areas for <i>Kharif</i> and <i>Rabi</i> seasons	rainfed uplands and irrigated transplanted	region and Maharashtr a state
		in <i>Konkan</i> region of Maharashtra.	conditions in Maharashtra State.	
Specificresistance/tole rance to pest	Tolerant to stemborer	Moderately resistant to leaf folder	Resistant to leaf folder, BPH,WBPH and moderately resistant to stem borer	Moderately resistant to stem borer
Specific resistance/tolerance to disease	Resistant to blast and moderately resistant to BLB &brown spots.		Moderately resistant to blast and BLB	Moderatel y resistant to blast
Specific tolerance to drought/water logging	Suitable for high rainfall zone	Suitable for high rainfall +zone	Suitable for high rainfallzone	Suitable for high rainfall zone

# Nursery raising practices

Area of nursery required for 1	0.10 ha (1000m	2)			
ha					
Nursery raising method	Wet nurse	ery / Mat nursery/ Rais	ed bed method etc.		
Bed size (length x breadth			y land less length, plain		
in m)	land more leng	gth) - Breadth- 1 m			
Seed sowing rate/m <sup>2</sup>	45 to 50 g/m <sup>2</sup>				
Pre-sowing seed/soil	Materials Quantity/kg of seed Method of application				
treatment	or per m <sup>2</sup> area				
	Trichoderma	5g/kg of seed	Seed treatment		
Source and optimum	Materials Quantity/m <sup>2</sup> area Method of application				
quantity of organic	FYM Soil incorporation before				
manures/other nutrient		3 kg/m <sup>2</sup> area nursery sowing			
source/m <sup>2</sup> of nursery					
Irrigation practices	Rainfed				

Weed management	Mulching of <i>Glyricidia</i> green leaves and manual hand weeding			
Organic plant protection practices	Name of pest/diseaseRecommended organic material used for controlQuantity/m² are			
	Different insect pests	Application of neem formulation	1500 ppm@5 ml/lit of water for two times	
Optimum age of nursery(days)	22 to 26 days	·		

#### **Field preparation:**

Field is ploughed for solar heating in the month of May. Second ploughing and clod crushing is done before monsoon with wooden plough or tractor or power tiller drawn cultivator.Puddling is done by wooden plough or tractor or power tiller drawn puddler.

The field should be manured with FYM and Neem cake @ 5 and 0.5 tonnes/ha, respectively before puddling. Similarly, 4.5 tonnes/ ha of *Glyricidia* green leaf and 4.2 tonnes/ha of rice straw be incorporated into puddled field prior to transplanting.

Pre-sowing/planting treatment of seed/seedlings	Material Recommended rate (kg/ha or lit./ha)		(kg/ha or	Method of application	
	Phosphate solubilizing bacteria (PSB) and <i>Azospirillum</i>	<i>Azosp</i> 2.5 kg	.5 kg + <i>irillum</i> g + 100 lit ter/ha	Seedling root dip for 20 to 30 minutes in the slurry	
Spacing (Row x Plant) in cm		2.4	20x15cm	•11	
Number of seedlings/hill	Carrier	3-4 9	seedlings/h		
Basal application of	Source			Quantity/ha	
organic manures including soil application	FYM		5000 kg /ł	na before puddling	
of bio-fertilizers, bio-	Neem cake		500 kg /ha	a before puddling	
control agents etc.	<i>Glyricidia</i> Green 1	eaves		ha soil incorporation nsplanting	
	Rice straw		4200 kg /ł before trar	na soil incorporation Isplanting	
Top dressing of	Source	Qu	antity/ha	Days after	
organic manures				sowing/planting	
_	-			or stage of crop	
	Cow urine	50 lit/		Spraying at 30 and 60	
	Vermi-wash	50 lit/ha		days after	
Irrigation practices	Rain-fed during Kharif and canal irrigation during Rab				
Major weeds	<i>Echinochloa crusgalli</i> (Phakhad), <i>Echinochloa colonum</i> (Phakhad), <i>Cyperus iria</i> (Lavala), <i>Cyperus rotundus</i> (Lavala) and <i>Ischane globossa</i> (Dhur)				

Weed management	Critical stage of weeding	Recommended practice for organic condition
	20 Days after transplanting	Cono- weeder hoeing
	30 Days after transplanting (Tillering)	Cono- weeder hoeing and manual hand weeding
	60 Days after transplanting (Panicle initiation )	Manual hand weeding

Organic plant protection practices	Name of the pest/disease	Organic material recommended for control
Insect pests	Stem borer	<ul> <li>Ploughing and collection of stubbles and their composting after harvesting ofrice.</li> <li>Use of tolerant and resistantvarieties. Crop rotation with ground nut, <i>Dolichosbean</i>, cucumber and red pumpkin.</li> <li>Harvesting of rice close to the ground with <i>Vibhav</i> sickle developed by DBSKKV; Dapoli to kill the hibernatinglarvae.</li> <li>Use of pheromone traps @20Nos./ha</li> <li>Release of <i>Trichogramma</i> @ 50000/ha for 4 times.</li> <li>Collection of egg masses and their destruction.</li> <li>Conservation and preservation of frogs in the field</li> </ul>

	Case worm	Timelytransplanting
		Intermittent draining out water from
		thefield
		• Flooding the field followed by
		dragging a rope across the field and
		draining out the water from thefield
	Brown Plant	• Use of tolerant and resistant varieties.
	Hoppers (BPH),	Intermittent draining out water from
	White Backed	thefield
	Plant Hoppers	<ul> <li>Adoption of proper spacing(20x15cm)</li> </ul>
	(WBPH) and	• Formation of alley ways for every three
	Blue beetle	meters for penetration of sunlight and
		proper aeration
	Army worm	Deep ploughing after harvesting of
		crop to expose the hibernating stages
		ofpest.
		Everyday inspection of the field
		during dry spell and atmaturity.
		• Keeping the bunds clean and free of
		weed in the beginning of theseason.
		• Digging the trench and flooding it with
		water for preventing migration of larvae
		from one field to anotherfield.
		• Erection of birdperches.
		Harvesting the crop immediately
		after it attains thematurity.
		Conservation and preservation of frogs
		in the field.
	Leaf eating	Erection of birdperches.
	caterpillars	
Diseases		• Use of tolerant and resistantvarieties.
	Blast and	• Spraying of <i>Pseudomonas fluroscence</i> @
	sheath rot	10 g / lit of water [for 2-3 times]starting
		from maximum tillering to flowering
		stage.
		• Use of tolerant and resistant varieties.
	Bacterial leaf	<ul> <li>Intermittent draining out water</li> </ul>
	blight	from the field.
	5	Adoption of proper spacing(20x15cm)

### 14 Crop (Rabi):

#### Groundnut

Important features of suitable varieties: **SB XI, Konkan Guarav and Konkan Trombay Tapora** 

Parameters	SB-XI Konkan Guarav		Konkan Trombay Tapora
Duration (days)	110-115	120-125	120-125
Average yield under	1200 to 1500	1800 to 2000	1900 to 2100
organic condition (kg/ha)			
Source (s) of availability	RARS, Karjat	RARS, Karjat	RARS, Karjat
Suitable	Maharashtra	Konkan region of	Konkan region of
regions/districts in the	state	Maharashtra	Maharashtra
state			
Specific	Tolerantto	Tolerant to tikka	Tolerant to <i>tikka</i>
resistance/tolerance to	<i>tikka</i> (leaf spot)	(leaf spot) and rust	(leaf spot) and rust
disease	and rust	/	· · · /

### Field preparation :

Plough the field after harvest of *Kharif* rice. Criss-cross cultivation and clod crushing with peg tooth cultivator to bring the soil into good tilth.

Seed rate (kg/ha)	SB XI- 95 kg kernels/ha, Konkan Guarav- 110 kg				
	kernels /ha, Konkan Trombay Tapora- 125 kg				
	kernels/ha				
Pre-sowing/planting	Material Recommended rate Method of				
treatment of		(	kg/ha or lit./ha)	application	
seed/seedlings	Trichoderma	- 5g	g/kg of seed	Seed treatment	
	<i>Rhizobium</i> Biofertiliser	20g	g/ kg of seed	Seed treatment	
	PSB	20g	g/ kg of seed	Seed treatment	
Spacing (Row x Plant)			30x15cm		
Basal application of organic	Sour	ce	Quantity/ha		
manures including soil	FYN	1	1500 kg/ha		
application of bio-fertilizers,	Neem ca	ke	160 kg/ha		
bio-control agents etc.	Vermicom t	pos	560 kg/ha		
Top dressing of organic manures	Source		Quantity/ha	Stage of application	
	Cow urin	e	50 lit/ha	Spraying at 30	

	Vermiwash	50 lit/ha	and 60 days after
			sowing
Irrigation practices	Number of	Most critical stage	Depth of
	irrigation	of irrigation	irrigation (cm)
	10 irrigations at an	Branching,	6 cm/ irrigation)
	interval of 10-12	Flowering,	
	days	Pegging, Pod	
		formation and	
		Pod filling	
Major weeds	Physalis minima (R	anpopati), Portulaca olera	icea (Motha ghol),
	Alternanthera sessil	lis (Reshimkata), Blumea l	lacera (Bhamrud)
	and Amaranthus vi	ridis(Ranti math)	
Weed management	Critical Stage	<b>Recommended</b> Organ	ic Weed
	_	management practices	;
	20 Days after	Dry land weeder	
	sowing		
	Flowering	Manual weeding at the	time of earthing
		up.	

Organic plant protection practices	Name of the pest/disease	Organic material Doses (k recommended for control	-
Insect pests	Aphids	Application of 3ml/lit neem oil	
	<i>Tikka</i> (leaf spot)	• Use of tolerant and resistant varieties.	
	Rust	• Use of tolerant and resistant varieties.	
		<ul><li> Judicious use of irrigation.</li><li> Timelyharvestin</li></ul>	
Optimum stage of harvesting	General yellowing of crop.		
	<ul> <li>Blackening of inside portion ofshell.</li> <li>Development of ridges onpod Colour development of kernel as per varietal character.</li> </ul>		

# Cropping System 2: Rice-Dolichus bean Details of Cropping Systems

Particulars	Kharif	Rab
		i
Crop	Rice	Dolichos bean
Fortnight of	Nursery Sowing -Second	Sowing - Second
sowing/planti	fortnight of June	fortnight of December
ng	Transplanting- Second	_
	fortnight of July	
Fortnight of harvesting	Second fortnight of October	First fortnight of February
		to
		second fortnight of March
Varieties suitable for	Karjat-3, Karjat-4, Karjat-7	Konkan Bhushan
organic farming	and	Konkan bhushan
	Palghar-1	

# Crop (Kharif): Rice

Important features of suitable varieties

Parameters	Karjat-3	Karjat-4	Karjat-7	Palghar1
Duration (days)	115-120	110-115	115-120	125-130
Average yield under organic condition (kg/ha)	3500 to 3700	3300 to 3500	3400 to 3600	3900 to 4100
Source (s) of availability	RARS, Karjat	RARS, Karjat	RARS, Karjat	RARS, Karjat
Suitable regions/distric ts in the state	rainfed uplands as well as irrigated areas	Suitable for rainfed uplands as well as irrigated areas for <i>Kharif</i> and <i>Rabi</i> seasons in <i>Konkan</i> region of Maharashtra.	Suitable for rainfed uplands and irrigated transplanted conditions in Maharashtra State.	<i>Konkan</i> region and Maharashtra state
Specific resistance/toler an ce to pest	Tolerant to stem borer	Moderately resistant to leaf folder	Resistant to leaf folder, BPH,WBPH and moderately resistant to stem borer	Moderat ely resistant to stem borer
Specific resistance/toler an ce to disease Specific	Resistant to blast and moderately resistant to BLB and brown spots. Suitable for	Suitable for	Moderately resistant to blast and BLB Suitable	Moderat ely resistant to blast Suitable
tolerance to drought/water logging	high rainfall zone	high rainfall zone	for high rainfall zone	for high rainfall zone

Nursery raising practices

Area of nursery required	0.10 ha (1000r	$\mathbf{n}^2$ )		
for 1 ha	0.10 Ha (1000H )			
Nursery raising method	Wet nursery / Mat nursery/Raised bed method etc.			
Bed size (length x breadthin m)	Length as per slope of the land (sloppy land less length, plane land more length) - Breadth- 1 m			
Seed sowing rate/m <sup>2</sup>	45 to 50 g/m <sup>2</sup>			
Pre-sowing seed/soil treatment	Materials	Quantity/kg of seed or per m <sup>2</sup> area		ethod of plication
	Trichoderma	8g/kg of seed	Seed	treatment
Source and optimum quantity of organic	Materials	MaterialsQuantity/mMethod of2 areaapplication		
manures/other nutrient source/m <sup>2</sup> of nursery	FYM	3 kg/m <sup>2</sup> area	Soil inco	rporation re nursery
Irrigation practices			Rainfe	
Weed management	Mulching of ( weeding	<i>Glyricidia</i> green lea	ives and m	annual hand
Plant protection practices	Name of pest/disease	~ ,,		
	Different insect pests	Application of n formulation	eem based	1500 ppm@5 ml/lit of water for two times
Optimum age of nursery (days)	22 to 26 days			

### **Field preparation:**

Field is ploughed for solar heating in the month of May. Second ploughing and clod crushing is done before monsoon with wooden plough or tractor or power tiller drawn cultivator.Puddling is done by wooden plough or tractor or power tiller drawn puddler. Bullock drawn *Pankaj* puddler developed by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli should be used for better puddling.

The field should be mannured with FYM and Neem cake @ 5 and 0.5 tonnes/ha, respectively before puddling. Similarly, 4.5 tonnes/ ha of *Glyricidia* green leaf and 4.2 tonnes/ha of rice straw be incorporated into puddled field prior to transplanting.

Practices	Material	Recomme (kg/ha o			Method of application
Pre-sowing/planting	Phosphate	PSB 2.5 k			Seedling root
treatment of	solubilizing	Azospirill		5 kg	dip for 20 to 30
seed/seedlings	bacteria (PSB)	+ 100 lit o			minutes in the
	andAzospirillum	and <i>Azospirillum</i> water/ha slurry			slurry
Spacing (Row x Plant)		20x1	5cm		
Number of		3	-4		
seedlings/hill (in transplanted crop only)		seedlin	ngs/ł	nill	
Basal application of	Source			(	Quantity/ha
organic manures including soil	FYM		500	0 kg /	ha before puddling
application of bio-	Neem cake		500	kg /ł	na before puddling
fertilizers, bio- control	Glyricidia Green lea	ves	4500 kg / ha soil		
agents etc.			incorporation		
	Rice straw		before transplanting 4200 kg / ha soil		
	Rec straw		incorporation		
		1			ansplanting
Top dressing of	_			5	after
organic manures	Source	Quan			
		ha			ige of crop
	Cow urine	50 lit/ha		_	ving at 30 and 60
	Vermiwash	50 lit/ha		5	after transplanting
Irrigation practices	Rainfed during Kha				
Major weeds	Echinochloa crusgalli				
	(Phakhad), Cyperus		a), C	Syperus	s rotundus (Lavala)
TAT 1	and Ischane globossa (Dhur)				
Weed management	Critical stage of weeding Recommended practice fo organic condition			<b>-</b>	
	20 Days after transp	olanting	Cono- weeder hoeing		
	30 Days after transp	olanting			eeder hoeing and
	(Tillering)		manual hand weeding		
	60 Days after transp	olanting	Ma	nual ł	nand weeding
	(Panicle initiation)				

Organic plant protection practices	Name of the pest/disease	Organic material recommended for control
Insect pests	Stem borer	<ul> <li>Ploughing and collection of stubbles and their composting after harvesting ofrice.</li> <li>Use of tolerant and resistantvarieties.</li> <li>Crop rotation with ground nut, Dolichos bean, cucumber and redpumpkin.</li> <li>Harvesting of rice close to the ground with Vibhav sickle developed by DBSKKV; Dapoli to kill the hibernatinglarvae.</li> <li>Use of pheromone traps @20Nos./ha</li> <li>Release of <i>Trichogramma</i> @ 50000/ha for 4times.</li> <li>Collection of egg masses and theirdestruction.</li> <li>Conservation and preservation of frogs in thefield</li> </ul>
	Case worm Brown Plant Hoppers (BPH), White Backed Plant Hoppers (WBPH) and Blue beetle	<ul> <li>Timelytransplanting</li> <li>Intermittent draining out water from thefield</li> <li>Flooding the field followed by dragging a rope across the field and draining out the waterfrom the field</li> <li>Use of tolerant and resistantvarieties.</li> <li>Intermittent draining out water from thefield</li> <li>Adoption of proper spacing(20x15cm)</li> <li>Formation of alley ways for every three metersfor penetration of sunlight and properaeration</li> </ul>

Army worm	• Deep ploughing after harvesting of crop to expose the hibernating stages ofpest.
-----------	--

	Leaf eating	<ul> <li>Everyday inspection of the field during dry spell and atmaturity.</li> <li>Keeping the bunds clean and free of weed in the beginning of theseason.</li> <li>Digging the trench and flooding it with water for preventing migration of larvae from one field to another field.</li> <li>Erection of birdperches.</li> <li>Harvesting the crop immediately after it attains thematurity.</li> <li>Conservation and preservation of frogs in thefield.</li> <li>Erection of birdperches.</li> </ul>
	caterpillars	• Election of birupcicites.
Diseases	Blast and sheath rot	<ul> <li>Use of tolerant and resistantvarieties.</li> <li>Spraying of <i>Pseudomonas fluroscence</i> @ 8-10 g / lit of water [for 2-3 times]starting from maximum tillering to flowering stage.</li> </ul>
	Bacterial leaf blight	<ul> <li>Use of tolerant and resistantvarieties.</li> <li>Intermittent draining out water from the field.</li> <li>Properirrigation.</li> <li>Adoption of proper spacing(20x15cm)</li> </ul>

### Crop (*Rabi*): *Dolichos* bean

Important features of suitable varieties: Konkan Bhushan

Parameters	Variety : Konkan Bhushan
Duration (days)	100 days
Average yield under organic condition (kg/ha)	5000-5200 green pods kg/ha
Source (s) of availability	RARS, Karjat
Suitable regions/districts in the state	Maharashtra state
Specific resistance/tolerance to disease	Resistant to yellow mosaic virus
Special character	Dwarf, Does not require support

### Field preparation:

Plough the field after harvest of *Kharif* rice. Criss-cross cultivation and clod crushing with peg tooth cultivator to bring the soil into good tilth.

Seed rate (kg/ha)	25kg/ha			
Pre-sowing/planting	Material	Recomm	ended	Method
treatment of seed/seedlings		rate (kg/ha or		of
, 0		lit./h		applicatio
		-	•	n
	Trichoderma	8g/kg of	seed	Seed treatment
	Rhizobium	25g/kg of		Seed treatment
	strain	0. 0		
	PSB	25g/ kg of		Seed treatment
Spacing (Row x Plant) in cm		45 x 15	5 cm	
Basal application of organic	Sour			Quantity/ha
manures including soil	FYN			4000 kg/ha
application of bio-fertilizers,	Neem			390 kg/ha
bio-control agents etc.	Vermico	ompost		1330 kg/ha
Top dressing of organic manures	Source	Quantil	y/ha	Days after
			-	sowing/planting
				or stage of crop
1.	Cow urine	50 lit/ha S		Spraying at 30
2.	Vermiwash	50 lit/	'ha	and 60 days
				after sowing
Irrigation practices	Number of			Depth of
	irrigation	stage o		irrigation (cm)
	0 invite a li a ra a	irrigatio		54 cm
	9 irrigations	Branching,		
		Flowering		(6 cm/irrigation)
		Podformation		
Major weeds	Physalis minim	· · ·	,	
	(Motha ghol), Alternanthera sessilis (Reshimkata),			
	Blumea lacera (Bhamrud) and Amaranthus			aranthus
	viridis(Ranti m	/		
Weed management	Critical stage			nmended practice
	weeding			ganic condition
	25-40 DAS			nd weeder, One
			nand	weeding

Organic plant protection practices	Name of the pest/disease	Organic material recommended for control	Quantity (kg or liters/ha)
Insect pest	Aphids	Applicationof neem based pesticide	5ml/lit
	Pod borer	Neem based pesticide; Bt pesticide	5ml/lit; as per recommended dose
Diseases	Powdery mildew	Use of resistant varieties	
Optimum stage of harvesting	Picking for gree	n pods from 60 to100 days af	tersowing

## **Cropping Systems: 3: Rice – Cucumber**

Particulars	Kharif	Rabi
Crop	Rice	Cucumber
Fortnight of	Nursery Sowing -	Sowing – First fortnight
sowing/planti	Second fortnight of	of January
ng	June Transplanting-	
	Second	
	fortnight of July	
Fortnight of harvesting	Second fortnight of October	First fortnight of March to first fortnight of April
Varieties suitable for organic farming	Karjat-3, Karjat-4, Karjat-7 and	Hemangi and Sheetal
	Palghar-1	

# Crop (Kharif): Rice

Parameters	Karjat-3	Karjat-4	Karjat-7	Palghar-1
Duration (days)	115-120	110-115	115-120	125-130
Average yield under organic condition(kg/ha)	3500 to 3700	3300 to 3500	3400 to 3600	3900 to 4100
Source (s) of availability	RARS, Karjat	RARS, Karjat	RARS, Karjat	RARS, Karjat
Suitable regions/districts in the state	Suitable for rainfed uplands as well as irrigated areas for <i>Kharif</i> and <i>Rabi</i> seasons in Maharashtra.	Suitable for rainfed uplands as well as irrigated areas for <i>Kharif</i> and <i>Rabi</i> seasons in <i>Konkan</i> region of Maharashtra.	Suitable for rainfed uplands and irrigated transplanted conditions in Maharashtra State.	Konkan region and Maharashtra state
Specific resistance/toleran ce to pest	Tolerant to stem borer	Moderately resistant to leaf folder	Resistant to leaf folder, BPH,WBPH and moderately resistant to stem borer	Moderately resistant to stem borer

Specific	Resistant to		Moderately	Moderatel
resistance/toleran	blast and		resistant to	y resistant
ce to disease	moderately		blast and	to blast
	resistant to		BLB	
	BLB and			
	brown spots.			
Specific tolerance	Suitable for	Suitable for	Suitable for	Suitable for
to drought/water	high rainfall	high rainfall	high	high
logging	zone	zone	rainfall	rainfall
			zone	zone

# Nursery raising practices

Area of nursery required for 1 ha	0.10 ha (1000m <sup>2</sup> )			
Nursery raising method	Wet nursery / Mat nursery/Raised bed method etc.			
Bed size (length x breadth in m)				
Seed sowing rate/m <sup>2</sup>	45 to 50	$g/m^2$		
Pre-sowing seed/soil treatment	Mater i als	Quantity/kg of seed or per m <sup>2</sup> area	Method of application	
	Trichod erma	5g/kg of seed	Seed treatment	
Source and optimum quantity of organic	Materi als	Quantity/m <sup>2</sup> area	Method of application	
manures/other nutrient source/m <sup>2</sup> of nursery	FYM	3 kg/m <sup>2</sup> area	Soil incorporation before nursery sowing	
Irrigation practices	0			

Weed management	Mulching of <i>Glyricidia</i> green leaves and manual handweeding		
Organic plant protection practices	Name of pest/d i	Recommende d organic material used for control	Quantity/m <sup>2</sup> area
	sease		
	Differ	Application	1500 ppm@5 ml/lit
	e nt	of neem	of water for two
	insect	formulation	times
	pests		
Optimum age of nursery (days)	) 22 to 26 days		

#### Field preparation:

Field is ploughed for solar heating in the month of May. Second ploughing and clod crushing is done before monsoon with wooden plough or tractor or power tiller drawn cultivator.Puddling is done by wooden plough or tractor or power tiller drawn puddler. Bullock drawn *Pankaj* puddler developed by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli should be used for better puddling. The field should be mannured with FYM and Neem cake @ 5 and 0.5 tonnes/ha, respectively before puddling. Similarly, 4.5 tonnes/ ha of *Glyricidia* green leaf and 4.2 tonnes/ha of rice straw be incorporated into puddled field prior to transplanting.

Pre-sowing/planting treatment of seed/seedlings	Material	rate (k	mended g/ha or /ha)	Method of application
	Phosphate solubilizing bacteria (PSB) and <i>Azospirillum</i>	PSB 2.5 kg Azospirillu + 100 lit of	<i>m</i> 2.5 kg	Seedling root dip for 20 to 30 minutes in the slurry
Spacing (Row x Plant) in cm	20		0x15cm	
Number of seedlings/hill Basal application of organic	Source 3-4 see		edlings/hill Quantity/ha	
manures including soil application of bio-fertilizers,	FYM		6670 kg /ha before puddling	
bio- control agents etc.	Glyricidia Green leaves		1220 kg /ha before puddling	
	Rice straw		5470 kg /ha soil incorporation before transplanting	
Irrigation practices	Rainfed during Kharif and car			
Major weeds	Echinochloa crusgalli (Phakhac			
	(Phakhad), Cyperus iria (Lava Ischane globossa (Dhur)		la), Cyperus	rotundus (Lavala) and
Weed management	Critical stage of weeding		Recommended practice for organic condition	
	20 Days after tran	splanting	Cono- weeder hoeing	
	30 Days after transplanting (Tillering)		Cono- weeder hoeing and manual hand weeding	
	60 Days after tran (Panicle initiation		Manual ha	nd weeding

Organic	Name of the	Organic material
plant	pest/disease	recommended for control
protection		
practices		

Insect pests	Stem borer	<ul> <li>Ploughing and collection of stubbles and their composting after harvesting ofrice.</li> <li>Use of tolerant and resistantvarieties.</li> <li>Crop rotation with ground nut,<i>Dolichos</i> bean, cucumber and red pumpkin.</li> <li>Harvesting of rice close to the ground with <i>Vibhav</i> sickle developed by DBSKKV; Dapoli to kill the hibernatinglarvae.</li> <li>Use of pheromone traps @20Nos./ha</li> <li>Release of <i>Trichogramma</i> @ 50000/ha for 4 times.</li> <li>Collection of egg masses and their destruction.</li> <li>Conservation and preservation of frogs in thefield</li> </ul>
	Case worm	<ul> <li>Timelytransplanting</li> <li>Intermittent draining out water from the field</li> <li>Flooding the field followed by dragging a rope across the field and draining outthe water from the field</li> </ul>
	Brown Plant Hoppers (BPH), White Backed Plant Hoppers (WBPH) and Blue beetle	<ul> <li>Use of tolerant and resistantvarieties.</li> <li>Intermittent draining out water from the field</li> <li>Adoption of proper spacing(20x15cm)</li> <li>Formation of alley ways for everythree meters for penetration of sunlightand proper aeration</li> </ul>

Army worm	<ul> <li>Deep ploughing after harvesting of crop to expose the hibernating stages ofpest.</li> <li>Everyday inspection of the field during dry spell and atmaturity.</li> </ul>
	<ul> <li>Keeping the bunds clean and free of weed in the beginning of theseason.</li> <li>Digging the trench and flooding it with water for preventing migration oflarvae from one field to another field.</li> </ul>

•	Erection of birdperches. Harvesting the crop immediately after it attains thematurity. Conservation and preservation of frogs in thefield.
---	---

	Leaf eating caterpillars	Erection of birdperches.
Diseases	Blast and sheath rot	<ul> <li>Use of tolerant and resistantvarieties.</li> <li>Spraying of <i>Pseudomonas fluroscence</i> @ 8-10 g / lit of water [for 2-3 times] starting from maximum tillering to floweringstage.</li> </ul>
	Bacterial leaf blight	<ul> <li>Use of tolerant and resistantvarieties.</li> <li>Intermittent draining out water from the field.</li> <li>Adoption of proper spacing(20x15cm)</li> </ul>

#### CROP (Rabi)- Cucumber:

Important features of suitable varieties: Hemangi and Sheetal

	Variety		
Parameters	Hemangi	Sheetal	
Duration (days)	100-110	95-105	
Average yield under organic condition (kg/ha)	11500-12000	12000-12500	
Source (s) of availability	Government/private agencies	DBSKKV, Dapoli	
Suitable regions/districts in the state	Maharashtra state	Maharashtra state	
Specific resistance/tolerance to disease	Tolerant to powdery mildew and downy mildew		

#### Field preparation:

Ploughing the field after harvest of *Kharif* rice. Criss-cross cultivation and clod crushing with peg tooth cultivator to bring the soil into good tilth.

Seed rate (kg/ha)	2.75 kg/ha			
Pre-	Input	Recommen		Method of
sowing/plantin		rate (kg/h		application
g treatment of		lit./ha)		
seed/seedlings	Trichoderma	5g/kg of s	seed	Seed
0				treatment
	PSB	25g/ kg of :	seed	Seed
				treatment
Spacing (Row x	1.5 x 0.9 m			
Plant) in cm			n	
Basal application	Source			Quantity/ha
of organic manures	F	Y		9000 kg/ha
including soil	N	1		
application of bio-	Nee	m cake		870 kg/ha
fertilizers, bio-	Vermi	icompost		3000 kg/ha
		_		-
control agents etc.				
Irrigation practices	Number of	Most cri		Depth of
	irrigation	stage of irri	gatior	U
				(cm)

	12	12 ir	rigations at	72 cm
	irrigations	an in	iterval of 7-8	(6
			days	cm/irrigatio
				n)
Major weeds	Physalis minima (Ranpopati), Portulaca			
	oleracea (Motha ghol), Alternanthera sessilis			
	(Reshimkata), Blumea lacera (Bhamrud) and			
	Amaranthus	viridis(	(Ranti math)	
Weed management	Critical stag	e of	Recommend	ed practice
	weeding		for organic c	ondition
	30-60 days a	fter	Hand weeding	ng
	sowing			

Organic plant protection practices	Name of the pest/disease	U U	Quantity (kg or liters/ha)
Insect pests	Red pumpkin beetle	Application of neem based pesticide.	5ml/lit
	Fruit fly	Erection of <i>Rakshak</i> <i>pheromone</i> trap designed byDr. BSKKV,Dapoli	4 Nos. /ha
Diseases	Powdery and Downey mildew	<ol> <li>Growing tolerant an varieties.</li> <li>Croprotation.</li> </ol>	d resistant
Optimum stage of harvesting (in case of vegetables and green cob)	• 60-100days a	fter sowing	

# Cropping Systems 4: Rice-Red pumpkin

Particulars	Kharif	Rabi
Crop	Rice	Red
-		pumpkin

Fortnight of	Nursery Sowing -	Sowing -
sowing/planting	Second fortnight of	First
	June Transplanting-	fortnight
	Secondfortnight of	of January
	July	
Fortnight of harvesting	Second fortnight of October	First fortnight of April
Varieties suitable for organic farming	Karjat-3, Karjat-4, Karjat-7 and Palghar-1	MPH-1

# Crop (Kharif): Rice

Important features of suitable varieties

Parameters	Karjat-3	Karjat-4	Karjat- 7	Palghar-1
Duration (days)	115-120	110-115	115- 120	125-130
Average yield under organic condition (kg/ha)	3500 to 3700	3300 to 3500	3400 to 3600	3900 to 4100
Source (s) of availability Suitable	RARS, Karjat Suitable for	RARS, Karjat Suitable	RARS, Karjat Suitable	RARS, Karjat Konkanregio
regions/distri cts in the state	rainfed uplands as well as irrigated areas for <i>Kharif</i> and <i>Rabi</i> seasons in Maharash tra.	for rainfed uplands as well as irrigated areas for <i>Kharif</i> and <i>Rabi</i> seasons in <i>Konkan</i> region of Maharasht ra.	for rainfed uplands and irrigated transplant ed conditions in Maharasht ra State.	n Maharash tra state

Specific	Tolerant to	Moderatel	Resistant	Moderat
resistance/toler	stem borer	y resistant		ely
ance to pest		to leaf		resistant
1		folder	BPH,WB	to stem
			PH	borer
			and	
			moderate	
			ly	
			resistant	
			to stem	
			borer	
Specific	Resistant to		Moderate	Moderat
resistance/tolera	blast and		ly	ely
nce to disease	moderately		resistant	resistant
	resistant to		to blast	to blast
	BLB		and BLB	
	& brown			
	spots.			
Specific	Suitable for	Suitable	Suitable	Suitable for
tolerance to	high rainfall	0	for high	high
drought/water	zone	rainfall	rainfall	rainfall
logging		zone	zone	zone

## Nursery raising practices

Area of nursery required for1 ha	0.10 ha (1000m <sup>2</sup> )		
Nursery raising method	Wet nursery / Mat nursery/Raised bed method etc.		
Bed size (length x breadth in m) Seed sowing rate/m <sup>2</sup>	Length as per slope of the land (sloppy land less length, plane land more length) - Breadth- 1 m 45 to 50 g/m <sup>2</sup>		
Pre-sowing seed/soil treatment	Materials	Quantity/kg of seed or per m <sup>2</sup> area	Method of application
	Trichoderma	8g/kg of seed	Seed treatment
Source and optimum quantity	Materials	Quantity/m²area	Method of application
of organic manures/other nutrient	FYM	3 kg/m <sup>2</sup> area	Soil incorporation

source/m <sup>2</sup> of			before nursery
nursery			sowing
Irrigation practices	Rain-fed		
Weed management	Mulching of <i>Glyricidia</i> green leaves and mannual hand weeding		
Organic plant	Name of	Recommended	Quantity/m <sup>2</sup>
protection	pest/disease	0 1	area
practices		usedfor control	
	Different	Application of	1500 ppm@5
	insect	neemformulation	ml/lit of
	pests		water for two
			times
Optimum age of	22 to 26 day	s after sowing	
nursery		0	
(days)			

#### Field preparation:

Field is ploughed for solar heating in the month of May. Second ploughing and clod crushing is done before monsoon with wooden plough or tractor or power tiller drawn cultivator.Puddling is done by wooden plough or tractor or power tiller drawn puddler. Bullock drawn *Pankaj* puddler developed by Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli should be used for better puddling.

The field should be mannured with FYM and Neem cake @ 5 and 0.5 tonnes/ha, respectively before puddling. Similarly, 4.5 tonnes/ ha of *Glyricidia* green leaf and 4.2 tonnes/ha of rice straw be incorporated into puddled field prior to transplanting.

Pre- sowing/plant ing treatment	Input	Recommended rate (kg/ha or lit./ha)	Method of application
of seed/seedling s	Phosphate solubilizing bacteria (PSB) And <i>Azospirillum</i>	PSB 2.5 kg + Azospirillum 2.5 kg + 100 lit of water/ha	Seedling root dip for 1 5 to 20
			minutes in the slurry

Spacing (Row x Plant) incm20 x1 5cNumber of seedlings/hill3-4 seedlings/hillBasal application of organic manures including soil application ofSourceQuantity/I 6670 kg /ha before puddlingGlyricidia Green1220 kg /ha before	
x1         5c         m         Number of       3-4 seedlings/hill         seedlings/hill         Basal application       Source         of organic       FYM         manures including       Glyricidia Green         soil application of       Glyricidia Green	
Number of seedlings/hill     3-4 seedlings/hill       Basal application of organic manures including soil application of     Source     Quantity/l       Glyricidia Green     1220 kg / ha before	
Number of seedlings/hill3-4 seedlings/hillBasal application of organic manures including soil application ofSourceQuantity/lFYM6670 kg / ha before puddling6670 kg / ha before puddling	
Number of seedlings/hill3-4 seedlings/hillBasal application of organic manures including soil application ofSourceQuantity/lFYM6670 kg / ha before puddlingGlyricidia Green1220 kg / ha before	
seedlings/hillSourceQuantity/lBasal application of organic manures including soil application ofFYM6670 kg / ha before puddlingGlyricidia Green1220 kg / ha before	
Basal application of organic manures including soil application ofSourceQuantity/IGlyricidia Green6670 kg / ha before puddling	
manures includingI Truoor o kg / ha beforesoil application ofGlyricidia Green1220 kg / ha before	
manures includingpuddlingsoil application ofGlyricidia Green1220 kg / ha before	
soil application of <i>Glyricidia</i> Green 1220 kg / ha before	
bio-fertilizers, bio- leaves puddling	
,	
incorporation	~
before transplantin	g
Irrigation practices Rainfed during <i>Kharif</i> and canal irrigation during <i>Rabi</i>	
Major weeds Echinochloa crusgalli (Phakhad), Echinochloa	
colonum	
(Phakhad), Cyperus iria (Lavala), Cyperus	
rotundus (Lavala) and Ischane globossa (Dhu	r)
Weed management Critical stage of weeding Recommended	
d practice for	
organic	
condition	
	L
AnotherAnother30 Days after transplantingCono- weeder	
	L
(Tillering) hoeing and	
manual hand	
weeding	
60 Days after transplanting Manual hand	
(Panicle initiation) weeding	

Organic plant	Name ofthe pest/disease	Organic Input recommended for control
protection		control
practices		

Insect	Stem borer	Ploughing and
pests		<ul> <li>Ploughing and collection of stubbles</li> </ul>
pests		
		and their composting
		after harvesting ofrice.
		• Use of tolerant and
		resistantvarieties.
		Crop rotation with
		ground nut, Dolichos
		bean, cucumber and
		redpumpkin.
		<ul> <li>Harvesting of rice close to</li> </ul>
		the ground with <i>Vibhav</i>
		sickle developed by
		DBSKKV; Dapoli to kill the
		hibernatinglarvae.
		• Use of pheromone traps
		@20Nos./ha
		• Release of <i>Trichogramma</i> @
		50000/ha for 4times.
		Collection of egg masses and
		theirdestruction.
		Conservation and
		preservation of frogs in
		thefield
	Case worm	Timelytransplanting
		• Intermittent draining out
		water from thefield
		• Flooding the field followed
		by dragging a rope across
		the field and draining out
		the water from the
		field
	Brown Plant	Use of tolerant and
	Hoppers (BPH),	resistantvarieties.
	White Backed	Intermittent draining out
	Plant Hoppers	water from thefield
	(WBPH) and	Adoption of proper
	Blue beetle	spacing(20x15cm)
	Side seedle	<ul> <li>Formation of alley ways for</li> </ul>
		every three metersfor
		penetration of sunlight and
		properaeration
		properaciation

	Army worm	<ul> <li>Deep ploughing after harvesting of crop to expose the hibernating stages of pest.</li> <li>Everyday inspection of the field during dry spell and atmaturity.</li> <li>Keeping the bunds clean and free of weed in the beginning of theseason.</li> <li>Digging the trench and flooding it with water for preventing migration of larvae from one field to anotherfield.</li> <li>Erection of birdperches.</li> <li>Harvesting the crop immediately after it attains the maturity.</li> <li>Conservation and preservation of frogs in thefield.</li> </ul>
	Leaf eating caterpillars	Erection of birdperches.
Diseases	Blast and sheath rot	<ul> <li>Use of tolerant and resistantvarieties.</li> <li>Spraying of <i>Pseudomonas</i> <i>fluroscence</i> @ 8-10 g / lit of water [for 2-3 times] starting from maximum tillering to floweringstage.</li> </ul>
	Bacterial leaf blight	<ul> <li>Use of tolerant and resistantvarieties.</li> <li>Intermittent draining out water from thefield.</li> <li>Adoption of proper spacing(20x15cm)</li> </ul>

*Crop (Rabi): Red pumpkin* Important features of suitable varieties: **MPH-1** 

Parameters	Variety :MPH-1
Duration (days)	95-100

Average yield under organic condition (kg/ha)	12500-13000 kg/ha
Source (s) of availability	RARS,Karjat
Suitable regions/districts in the state	Maharashtra state
Specific resistance/tolerance to disease	Tolerant to powdery and downymildew

### Field preparation:

Ploughing the field after harvest of *Kharif* rice. Criss-cross cultivation and clod crushing with peg tooth cultivator to bring the soil into good tilth.

Seed rate (kg/ha)			6.5 kg/	/ha	
Pre- sowing/planting treatment of	Input	Recommended rate (kg/ha orlit./ha)			Method of application
seed/seedlings	Trichoderma		kg of seed	[	Seed treatment
	PSB	25g/	kg of seed	ł	Seed treatment
Spacing (Row x Plant) in cm			1.5 x 0.9	) m	
Basal application	Sc	ource			Quantity/ha
of organic		YΜ			6670 kg/ha
manures	Neem cake			650 kg/ha	
including soil	Vermicompost			2230 kg/ha	
application of					
bio-fertilizers,					
bio-control					
agents etc.					
Irrigation practices			Most		Depth of
	irrigation		critical		irrigation
			stage o		(cm)
	10 irrigation	ne	<b>irrigatic</b> 10 irrigat		60 cm
	10 migatio	115	ataninter	val	(6
			of 10days		cm/irrigation)
Major weeds	Physalis minima (Ranpopati), Portulaca oleracea				
,	(Motha ghol), Alternanthera sessilis (Reshimkata), Blumea lacera (Bhamrud) and Amaranthus viridis (Ranti math)				

Weed manager			al stage of ing	Recommended practice for organic condition	
		30-60	DAS	Hand wee	eding
Organic plant protection practices	Name of pest/dise		Organic recommended control	material for	Quantity (kg or liters/ha)
Insect pests	Red pum beetle	pkin	• Spraying of neemicide		3ml/lit
	Fruit fly		<ul> <li>Erection of <i>I</i> pheromone tr designed by B.S.K.K.V. Dapoli.</li> </ul>	ap	4 Nos. / ha
Diseases	owdery m nd downy iildew		<ul><li>Follow crop</li><li>Maintain fie</li></ul>		ı.
Optimum stage of harvesting	90 – 100E	Days aft	er sowing		

### **Cotton with Legumes :**

**Suitable Varieties :-** Varieties like G. hirsutum – LRA-5166, LRK-516 (Anjali), Rajat (PKV- 84635), PKV-081, DHY-286, Dhaval (JLH-168); G. arboreum – AKH-4, AKA-8401, Y-1, PA-183, Namdeo PA- 141, Savta PA-181; PKV Hy2, 3,4 hybrids developed by Dr. P. D. Krishi Vidyapeeth Akola, H6, 8 and 10, Ankur 651, MECH-1,4 and NHH-44 have also been found suitable for organic management in Maharashtra State.

### Field preparation:

Deep ploughing once in three years, and two shallow ploughings every year, are essential during the summer. One to two deep ploughings once in three years are necessary to control deep-rooted weeds and to destroy pest larvae or cocoons. Some farmers graze animals in the cotton fields in summer.

After one or two showers, the soil should be worked with a harrow 2–3 times before the seeds are sown. Crop residues are one of the major sources of nutrients. The entire crop residue from the previous cotton-legume intercrop should be incorporated into the soil at the time of ploughing. Hard, woody twigs of cotton can be used as fuel or should be recycled after composting.

Each organic farm should have sufficient infrastructure to produce compost and vermicompost. About 20–30 quintals of well-decomposed FYM/compost or 15-20 quintals of on-farm produced vermicompost with 2 kg PSB, 100 kg rock phosphate and 200 kg neem leaf/seed manure can provide sufficient nutrition.

About 500 kg bone meal can also be used along with the composito improve the phosphorus content of the soil. Treatment of the crop residue with *Trichoderma* hasten in situ decomposition. Legumes need to be intercropped with cotton with a minimum coverage of 30%. Mixing their entire vegetative biomass as mulch maintains high soil fertility.

Seed Selection	Seeds from the	prominent	balls of vigor	ous plants must be
	selected. Choosing early maturing varieties helps in escaping			
0 1 (	late bollworm at			
Seed rate	Variety	Seed rate		Plant
(kg/ha)	<u> </u>	(kg/ ha.)	(Cm)	population/ha.
	G. hirsutum	18-20	60 x 30	55,600
	G. arboretum	10-12	60 x 30	55,600
	G. herbaceum	12-15	45 x 30	74,074
	Hybrids	3.0 -3.5	120 x60	13,888
	_		120 x 40	20,833
Pre-	Input		nended rate 1 or lit./ha)	Method of
sowing/planting	5	(Kg/II	i or myna)	application
treatment of	Trichoderma	8g/kg of	f seed	Seed treatment
seed/seedlings	Azotobacter	20g/ kg o	f seed	Seed treatment
_	PSB	20g/ kg o	f seed	Seed treatment
Spacing (Row x	1.0 x 1.0 m or 1.0x0.5 m			
Plant) in m				
Intercropping	Red gram or bl			
		. 0		d gram, 4 rows of
	cotton <b>or</b> 2 rows of cowpea/soybean, 4 rows of cotton or 2			
	rows of red gran			
				ybean <b>or</b> 4 rows of
	sorghum can be		i plants of red	gram, maize and
Cultural			condary show	ot tips encourages
Operations				elopment of many
operations	tertiary branche	es with m	ore flowers	and bolls. Proper
	pruning can increase productivity by 25–30%.			
Irrigation	Although cotton is commonly flood-irrigated, irrigation by			
practices	furrow or by alternate furrow method is more effective and			
•	conserves water.	conserves water.		
				he first 60–70 days,
	and highest duri			
	The crop needs to be irrigated when there is 50-7			n there is 50–70%
	depletion of avai	ilable soil m	oisture.	

	In the sandy loam soils (of north India), the crop is irrigated 3–5 times. Inred sandy loam soils, with low water retention capacity, 4– 10 light irrigations may be needed. In black cotton soils 'protective irrigation' is provided every 20 days, if rains fail, especially during the boll development stage. Mulching of the soil surface with intercropbiomass 60 days after sowing reduces irrigation requirements by40–60%. Mulching is very effective under purely rain-fedconditions.		
Weed	Critical stage of	Recommended practice for organic	
management	weeding	condition	
	20-25 DAS	first weeding	
	55-60 DAS Second weeding		
	Mulching of the field with a thick layer of crop residue immediately after sowing reduces weed growth.		

Crop	Pest/disease	Organic methods recommended for
Protection		control
Insect pests	Aphids (Aphis sp.)	a. Two to three releases of egg parasitoid Trichogramma chilonis @1.5 lakh / ha during
	Pink bollworm (Pectiniphora gossypiella ) American bollworm (Helicoverpa armigera )	peak egg laying of Helicoverpa and other bollworms will help to reduce the bollworms infestation significantly. b. Spraying of H-NPV @ 500 LE / ha c. Pheromone traps @ 5 / ha d. NSKE 5% and neem oil 0.5% can be used to prevent the egg laying of Helicoverpa
	spiny bollworm, (E. insulana)	e. Bt biopesticide formulations@ 1.51 / ha f. In case of a severe attack of bollworm, use alternate sprays of dashaparni. g. Flour spray (2 cups of fine white flour and half
	Cut worm (Agrotis sp.) White fly (Bemisia sp.)	a cup of soap in water) and soft soap spray (15 g soft soap powder in 15 litres of water) have been found to beeffective in control of aphids, jassids, spider mites, thrips and white fly. h. Release of Chrysoperla sp.@ 500-1000 / ha
	Jassids (Amrasca devastans, A. biguttula)	according to the intensity of jassid damage between 20 – 25 days of crop growth. i.Fermented buttermilk spray: ferment buttermilk
	Jassids (Amrasca devastans, A. biguttula)	in a bottle/can for 3-4 weeks; 300 ml fermented buttermilk is diluted in 15 lit. of water) and is
	Thrips (Thripidae sp.)	effective in control ofbollworms, caterpillars and spider mites.
Diseases	Root rot, wilt and browning of leaves	<ul> <li>a) Deep ploughing during summer prevents the occurrence of soil borne pathogens causing root rot and wilt.</li> <li>b) Use of Trichoderma as seed treatment can</li> </ul>

1	
	effectively control the incidence of root rot and
	Fusarium wilt.
	c) Use of neem leaf/seed manure (10 q/ha) has
	also been found to be effective in the control of
	soil borne pathogens.
	d) For the control of rust and root rot, fermented
	(sour) buttermilk (5 lit.) in lime water (100 litres)
	per ha may besprayed.
	e) Foliar spray of Trichoderma viride powder (25
	g), milk (50 ml) and water (10 litres) can reduce
	the incidence of brown leaf patches.
	f. Crush 5 kg lantana leaves in 5 lit. of water and
	10 lit. of cow urine and ferment for 4 days. Dilute
	thereafter with 60 lit. of water and spray on 1 ha
	tocontrol fungal and viral diseases. The solution
	also repels white flies.
Harvesting	In organic farming, the yield of cotton varies from 8-10 q/ha in rain-fed
& Yield	areas to 20–25 q/ha under irrigated conditions. Besides, the farmer obtains
	about 50 to 250 kg of intercrop legume crop.

#### \*\*\*\*

#### **Reference :-**

1. Scientific Package of Practices (PoPs) for organic production of crops in cropping systems.2015. ICAR-Network Project Organic Farming ICAR-Indian Institute of Farming Systems Research, Modipuram, Meerut - 250 110 (UP). 227pp

2. Package of Organic Practices from Maharashtra for Cotton, Rice, Red gram, Sugarcane and Wheat.2006. Maharashtra Organic Farming Federation (MOFF).www.fao.org.in. 32 Pp.