

Package of Practices for Organic Production of Crops and Cropping Systems

ICAR-Network Project Organic Farming



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PUNJAB

Suggested cropping systems (based on testing under NPOF)

1. Maize-Potato-Summer moong
2. Turmeric-Onion
3. Basmati rice-Wheat-Green manure
4. Maize-Durum wheat-Cowpea (Fodder)
5. Maize-Berseem-Bajra fodder cropping system
6. Maize-Berseem-Maize+cowpea fodder cropping system

Details of crops in cropping systems

Maize

Particulars	<i>Kharif</i>
Crop	Maize
Fortnight of sowing/planting	2 nd fortnight of June
Fortnight of harvesting	1 st fortnight of Oct
Varieties suitable for organic farming	Prabhat

Important features of suitable varieties

Parameters	Prabhat
Duration (days)	95
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab

Field preparation: Four ploughing (Disc harrow/Cultivator) and planking

Cultural practices			
Seed rate (kg/ha)	20		
Spacing (Row X plant) in cm	60 x 20		
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	5	Tasselling	7.5
Major weeds	<i>Commelina benghalensis, Trianthema portulacastrum & Brachiaria reptans</i>		
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	15-30 DAS	Hand weeding	
Organic plant protection practices	Name of pest/disease	Organic material recommended for control	Quantity (kg or litres/ ha)
	Stem borer	Tricho cards	40 cards/acre at 10-15 DAS

Yield

Parameters	1 st *year	2 nd	3 rd	4 th	5 th	6 th	7 th	Mean
Economic yield (kg/ha)	6120	7000	5320	5810	7110	-	-	6272





Potato (*Rabi*)

Important features of suitable varieties

Parameters	Kufri Chandramukhi
Duration (days)	80-90
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab

Field preparation: Ploughing (Mould board/ disc plough) and planking

Cultural practices

Seed rate (kg/ha)	3750		
Spacing (Row X plant) in cm	60 x 20		
Basal application of organic manures including soil	Source	Quantity/ha	
	FYM (1% N)	12.5 t/ha	
application of bio-fertilizers, bio-control agents etc	VC (1.5% N)	4.25 t/ha	
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	7	Tuber formation	7.5
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	30-45 DAS	Hand weeding	

Yield

Parameters	1 st *year	2 nd	3 rd	4 th	5 th	6 th	7 th	Mean
Economic yield (kg/ha)	15600	14850	15280	20440	17200	-	-	16674



Summer moong

Important features of suitable varieties

Parameters	SML 668
Duration (days)	60
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab
Specific resistance / tolerance to pest	Thrips
Specific resistance / tolerance to disease	Moongbean yellow mosaic virus

Field preparation: Two ploughing and planking (Disc harrow/Cultivator)

Cultural practices

Seed rate (kg/ha)	37.5			
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application	
	Rhizobium	0.5	Mixing with seed	
Spacing (Row X plant) in cm	22.5 x 7			
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity/ha	Source	Quantity/ha
	FYM (1% N)	1.25 t/ha	FYM (1% N)	0.75 t/ha
			VC (1.5% N)	0.25 t/ha
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)	
	4	Flowering	7.5	
Weed management	Critical stage of weeding	Recommended practice for organic condition		
	30-40 DAS	Hand weeding		

Yield

Parameters	1 st year	2 nd	3 rd	4 th	5 th	6 th	7 th	Mean
Economic yield (kg/ha)	900	1580	1330	1160	1240	-	-	1242





Turmeric

Particulars	Kharif
Crop	Turmeric
Fortnight of sowing/planting	1 st fortnight of May
Fortnight of harvesting	2 nd fortnight of Dec
Varieties suitable for organic farming	Pb Haldi 1

Important features of suitable varieties

Parameters	Pb Haldi 1
Duration (days)	215
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab

Field preparation: Two ploughing (Disc harrow/cultivator) and planking

Cultural practices

Seed rate (kg/ha)	2000			
Spacing (Row X plant) in cm	30 x 20			
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity/ha	Source	Quantity/ha
	FYM (1% N)	15 t/ha	FYM (1% N)	10 t/ha
			VC (1.5% N)	3.25 t/ha
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)	
	15	Rhizome formation	7.5	
Major weeds	<i>Eleusine indica</i> , <i>Trianthema portulacastrum</i> , <i>cyperus rotundus</i> , <i>Digitaria ciliaris</i> (Takri gha)			
Weed management	Critical stage of weeding	Recommended practice for organic condition		





	30-45 DAS	Apply 10 t/ha rice straw mulch and if needed give one hoeing at 3 months of sowing the crop or give 3 hand weedings at 1, 2 and 3 months of sowing the crop.
Optimum stage of harvesting	Complete yellowing and drying of plant	

Yield

Parameters	1 st year	2 nd	3 rd	4 th	5 th	6 th	7 th	Mean
Economic yield (kg/ha)	62850	19750	25260	28650	27910	-	-	32884

Onion (*Rabi*)

Important features of suitable varieties

Parameters	Pb Naroa
Duration (days)	145
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab
Specific resistance / tolerance to pest	Thrips, Heliothis
Specific resistance / tolerance to disease	Purple Blotch

Nursery raising practices

Area of nursery required for 1 ha	62.5 m ²		
Nursery raising method	raised bed method		
Bed size (length X breadth in m)	2.5m x 1m		
Seed sowing rate/m ²	1 g		
Source and optimum quantity of organic manures/other nutrient source/m ² of nursery	Materials	Quantity/ m ² area	Method of application
	FYM (1% N)	5 kg	Broadcast
Weed management	Hand weeding		
Optimum age of nursery (days)	30 DAS		





Field preparation: One ploughing followed by planking

Cultural practices

Seed rate (kg/ha)	10			
Spacing (Row X plant) in cm	15 x 7.5			
Number of seedlings/hill (in nursery crops only)	1-2			
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity/ha	Source	Quantity/ha
	FYM (1% N)	10 t/ha	FYM (1% N)	6.75 t/ha
			VC (1.5% N)	2.25 t/ha
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)	
	12	Bulb formation	7.5	
Major weeds	<i>Phalaris minor</i> , <i>Medicago denticulate</i> , <i>Anagalis arvensis</i> , <i>Lepidium sativa</i>			
Weed management	Critical stage of weeding	Recommended practice for organic condition		
	30-45 DAT	Hand weeding		
Optimum stage of harvesting	Tops dry up and fall			

Yield

Parameters	1 st year	2 nd	3 rd	4 th	5 th	Mean
Economic yield (kg/ha)	13750	12650	16930	18050	14890	15254



Basmati rice

Particulars	Kharif
Crop	Basmati Rice
Fortnight of sowing/planting	1 st fortnight of July
Fortnight of harvesting	1 st fortnight of Nov
Varieties suitable for organic	Punjab Basmati 2

Important features of suitable varieties

Parameters	Punjab Basmati 2
Duration (days)	140
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab

Nursery raising practices

Area of nursery required for 1 ha	500 m ²		
Nursery raising method	Flat bed sowing		
Bed size (length X breadth in m)	10 m x 2 m plot size		
Seed sowing rate/m ²	40 g		
Pre-sowing seed/soil treatment	Materials	Quantity/kg of seed or per m ² area	Method of application
Source and optimum quantity of organic manures/other nutrient source/m ² of nursery	Materials	Quantity/ m ² area	Method of application
	FYM (1% N)	12 kg	Broadcasting
Organic plant protection practices	Name of pest/disease	Recommended organic material used for control	Quantity/ m ² area
	Stem borer	Tricho cards	40 cards/acre at 5-6 times
Optimum age of nursery (days)	35-40		

Field preparation: Two ploughing (Disc harrow/Cultivator) and planking





Cultural practices

Seed rate (kg/ha)	20		
Spacing (Row X plant) in cm	20 x 15 cm		
Number of seedlings/hill (in nursery crops only)	1-2		
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	5	Panicle initiation	7.5
Major weeds	<i>Cyperus spp</i> , <i>Eleusine indica</i> , <i>Caesulia axillaris</i> , <i>Echinochloa crusgalli</i> , <i>Ischaemum rugosum</i> , <i>Sphenoclea zeylanica</i>		
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	30-40 DAT	Hand weeding	

Yield

Parameters	1 st year	2 nd	3 rd	Mean
Economic yield (kg/ha)	2990	3120	2420	2843

Wheat (*Rabi*)

Important features of suitable varieties

Parameters	PBW 621
Duration (days)	158
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab
Specific resistance / tolerance to disease	Brown rust, Yellow rust

Field preparation: Three ploughing followed by planking

Cultural practices

Seed rate (kg/ha)	100
Spacing (Row X plant) in cm	20 cm row spacing





Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source FYM (1% N)	Quantity/ha 30 t/ha	Source FYM (1% N) VC (1.5% N) NEC (2.5% N)	Quantity/ha 4.25 t/ha 2.75 t/ha 1.65 t/ha
Irrigation practices	Number of irrigations 5	Most critical stages for irrigation CRI	Depth of irrigation (cm) 7.5	
Major weeds	<i>Chenopodium album, Phalaris minor, Convolvulus arvensis, Rumex dentatus, Malva neglecta</i>			
Weed management	Critical stage of weeding 30-45 DAS	Recommended practice for organic condition Hand weeding		

Yield

Parameters	1 st year	2 nd	3 rd	Mean
Economic yield (kg/ha)	3350	4440	4940	4243

Sunhemp (Green manure *summer*)

Important features of suitable varieties

Parameters	PAU 1691
Duration (days)	45-60
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab

Field preparation: Ploughing and planking

Cultural practices

Seed rate (kg/ha)	50		
Spacing (Row X plant) in cm	22.5 cm row spacing		
Irrigation practices	Number of irrigations 3	Most critical stages for irrigation -	Depth of irrigation (cm) 7.5





Maize

Particulars	Kharif
Crop	Maize
Fortnight of sowing/planting	2 nd fortnight of June
Fortnight of harvesting	1 st fortnight of Oct
Varieties suitable for organic farming	Prabhat

Important features of suitable varieties

Parameters	Prabhat
Duration (days)	95
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab
Specific tolerance to drought/waterlogging	Lodging resistance

Field preparation: Four ploughing (Disc harrow/cultivator) and planking

Cultural practices

Seed rate (kg/ha)	20		
Spacing (Row X plant) in cm	60 x 20		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity/ha	
	FYM(1% N)	4.25 t/ha	
	VC(1.5% N)	2.75t/ha	
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	5	Tasselling	7.5
Major weeds	<i>Commelina benghalensis</i> , <i>Trianthema portulacastrum</i> & <i>Brachiaria reptans</i>		
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	20-40 DAS	Hand weeding	





Organic plant protection practices	Name of pest/disease	Organic material recommended for control	Quantity (kg or litres/ ha)
	Stem borer	Tricho cards	40 cards/acre at 10-15 DAS

Yield

Parameters	1 st year	2 nd	3 rd	Mean
Economic yield (kg/ha)	5190	4540	4200	4643

Durum wheat (*Rabi*)

Important features of suitable varieties

Parameters	PDW 291
Duration (days)	155
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab
Specific resistance / tolerance to disease	Yellow rust, Brown rust, Karnal Bunt & Loose smut

Field preparation: Two ploughings followed by planking

Cultural practices

Seed rate (kg/ha)	100		
Spacing (Row X plant) in cm	20 cm row spacing		
Basal application of organic manures including soil	Source	Quantity/ha	
	FYM(1% N)	4.25 t/ha	
application of bio-fertilizers,	VC(1.5% N)	2.75t/ha	
bio-control agents etc	NEC(2.5% N)	1.65 t/ha	
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	5	CRI	7.5





Major weeds	<i>Chenopodium album</i> , <i>Phalaris minor</i> , <i>Convolvulus arvensis</i> , <i>Rumex dentatus</i> , <i>Malva neglecta</i>		
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	30-45 DAS	Hand weeding	

Yield

Parameters	1 st year	2 nd	3 rd	Mean
Economic yield (kg/ha)	3570	5420	4870	4620

Cowpea fodder (Summer)

Field preparation: One ploughing followed by planking

Cultural practices

Seed rate (kg/ha)	50		
Spacing (Row X plant) in cm	30 cm row spacing		
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	4	-	7.5
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	30-40 DAS	Hand weeding	
Organic plant protection practices	Name of pest/disease	Organic material recommended for control	Quantity (kg or litres/ ha)

Yield

Parameters	1 st year	2 nd	3 rd	Mean
Economic yield (kg/ha) (Green fodder)	24360	37270	31750	31127



Maize (Kharif)

Particulars	Kharif
Crop	Maize
Fortnight of sowing/planting	1 st fortnight of Aug
Fortnight of harvesting	2 nd fortnight of Oct
Varieties suitable for organic farming	J 1006

Important features of suitable varieties

Parameters	J 1006
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab
Specific resistance / tolerance to disease	Maydis leaf blight, Brown Stripe downy mildew

Field preparation: Two ploughing (Disc harrow/Cultivator) and planking

Cultural practices

Seed rate (kg/ha)	75	
Spacing (Row X plant) in cm	30 cm row spacing	
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source FYM (1% N)	Quantity/ha 8.75 t/ha
Irrigation practices	Number of irrigations 8	Depth of irrigation (cm) 7.5
Major weeds	<i>Commelina benghalensis</i> , <i>Trianthema portulacastrum</i> & <i>Brachiaria reptans</i>	
Weed management	Critical stage of weeding	Recommended practice for organic condition
Optimum stage of harvesting	50-60 DAS	

Yield

Parameters	1 st *year	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	Mean
Economic yield (kg/ha) (Green fodder)	16700	9620	12040	14760	14610	13330	24520	38900	18060





Berseem (*Rabi*)

Important features of suitable varieties

Parameters	BL 10
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab

Field preparation: Three ploughing and Planking

Cultural practices

Seed rate (kg/ha)	20		
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application
	Rhizobium	0.5	Mixing with seed
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity/ha	
	FYM (1%N)	2.5 t/ha	
Irrigation practices	Number of irrigations	Depth of irrigation (cm)	
	6	7.5	
Major weeds	<i>Poa annua</i> , <i>Trianthema potulacastrum</i>		

Yield

Parameters	1 st year	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	Mean
Economic yield (kg/ha)	78000	57370	67970	62760	62750	76810	61850	61100	66076

Crop (*Summer*): Bajra

Important features of suitable varieties

Parameters	PCB 164
Duration (days)	50-60
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab
Specific resistance / tolerance to disease	Downy mildew



Field preparation: 2-3 ploughing

Cultural practices

Seed rate (kg/ha)	20	
Spacing (Row X plant) in cm	22 cm row spacing	
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity/ha
	FYM (1% N)	5 t/ha
Irrigation practices	Number of irrigations	Depth of irrigation (cm)
	8	7.5
Major weeds	<i>Commelina benghalensis, Trianthema portulacastrum & Brachiaria reptans</i>	
Optimum stage of harvesting	40-55 DAS	

Yield

Parameters	1 st year	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	Mean
Economic yield (kg/ha) (Green fodder)	46500	75140	53470	31990	34130	26810	24270	34600	40864

Maize

Particulars	Kharif
Crop	Maize
Fortnight of sowing/planting	1 st fortnight of Aug
Fortnight of harvesting	2 nd fortnight of Oct
Varieties suitable for organic farming	J 1006

Important features of suitable varieties

Parameters	J 1006
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab
Specific resistance / tolerance to disease	Maydis leaf blight, Brown Stripe downy mildew





Field preparation: Two ploughing (Disc harrow/Cultivator) and planking

Cultural practices

Seed rate (kg/ha)	75	
Spacing (Row X plant) in cm	30 cm row spacing	
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source FYM (1% N)	Quantity/ha 8.75 t/ha
Irrigation practices	Number of irrigations 8	Depth of irrigation (cm) 7.5
Major weeds	<i>Eleusine indica</i> , <i>Trianthema potulacastrum</i>	
Organic plant protection practices	Name of pest/disease	Quantity (kg or litres/ ha)
Optimum stage of harvesting	50-60 DAS	

Yield

Parameters	1 st year	2 nd	3	4 th	5 th	6 th	7 th	8 th	Mean
Economic yield (kg/ha)	19400	8850	10410	16850	12880	12880	26250	38500	18253

Berseem (*Rabi*)

Important features of suitable varieties

Parameters	BL 10
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab

Cultural practices

Major weeds	<i>Poa annua</i>
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Yield

Parameters	1 st year	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	Mean
Economic yield (kg/ha)	78800	56930	65490	71150	64500	79290	63490	61500	67644

Maize + Cowpea (Summer)

Important features of suitable varieties

Parameters	J1006, Cowpea 88
Source (s) of availability	PAU
Suitable regions/districts in the state	Punjab

Field preparation: Two ploughing and planking

Cultural practices

Seed rate (kg/ha) (Not applicable for nursery crops)	37.5+37.5	
Spacing (Row X plant) in cm	30 cm row spacing	
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source FYM (1% N)	Quantity/ha 8.75 t/ha
Irrigation practices	Number of irrigations 8	Depth of irrigation (cm) 7.5
Major weeds	<i>Trianthema potulacastrum</i> , <i>Digitaria sanguinalis</i>	
Optimum stage of harvesting	50-60 DAS	

Yield

Parameters	1 st year	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	Mean
Economic yield (kg/ha)	43200	40610	33020	34740	29330	30000	29470	34600	34371

