Jharkhand

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Suggested cropping systems (based on testing under NPOF)

1. Rice (basmati type)-wheat
2. Rice (basmati type)-lentil
3. Rice (basmati type)-linseed
4. Rice (basmati type)-potato

Cropping System 1: Rice -Wheat

Particulars	*Kharif*	*Rabi*
Crop	Rice	Wheat
Fortnight of sowing/planting	Transplanting in 1st fortnight of July	2nd fortnight ofNov.
Fortnight of harvesting	1st fortnight of Nov.	1st fortnight of April.
Varieties suitable for organic farming	Birsamati	K-9107

Crop *(kharif)*: Rice

Important features of suitable varieties

Parameters	Birsamati
Duration (days)	125-135 (Medium)
Average yield under organic condition (kg/ha)	3000-3500 kg/ha
Source (s) of availability	AICRP on Rice BAU, Ranchi.
Suitable regions/districts in the state	All district/Jharkhand
Specific resistance / tolerance to pest	Gall midge
Specific resistance / tolerance to disease	Bacterial leaf and sheath blight

Nursery raising practices

Area of nursery required for 1 ha	$1000m^2$		
Nursery raising method	Dry nursery		
Bed size (length X breadth in m)	$1x10m^2$		
Seed sowing rate/m^2	35 kg/ha		
Pre-sowing seed/soil treatment	Materials	Quantity/kg of seed or per m^2area	Method of application
	Pseudomonas fluorescence	5g/kg of seed	For seed dressing metal seed dresser / earthernpots or polythene bags are used

Source and optimum quantity of organic manures/other nutrient source/m^2 of nursery	Materials	Quantity/ m^2area	Method of application
	FYM	1/2 kg	Soil application at the time of nursery preparation 10-15 days prior to sowing.
	Vermicompost	1/4 kg	Applied along with soil after sowing to cover the seeds.
Irrigation practices	As and when needed		
Weed management	1 Hand weeding		
Organic plant protection practices	**Name of pest/disease**	**Recommended organic material used for control**	**Quantity/ m^2area**
	Wilt, Blast, Blight	Nisarga/Monitor/Biosanjeevni (Trichoderma viride)	Seed- 5 g/litter/kg
Optimum age of nursery (days)	25-30 days		

Field preparation: The field was ploughed twice 15 days before transplanting the puddling of the soil was done two days prior to transplanting. The green manure crop dhaincha can be grown at seed rate of 40 kg/ha in May month with application of 250 kg/ha of rock phosphate. The dhaincha crop has to be incorporated at 40-45 DAS at 15 days prior to rice transplanting. This will able to meet out the 25-30 kg/ha of nitrogen requirement of paddy crop.

Cultural practices

Spacing (Row X plant) in cm	20x10 cm		
Number of seedlings/hill	2 seedlings/hill		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)	
	FYM	53.28	
	Karanj cake	6.66	
	Azolla	1 kg/m^2	
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/planting or stage of crop
	Vermicompost	26.66	15 DAT
	Panchagavya	10-12 lit/ha mixed in 500-600 litre of water	
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	Need based	Tiller initiation, flowering and milky stage	3-5 cm standing water
Major weeds			
	Local Name	**English Name**	**Scientific Name**

	Motha	Nut sedge	*Cyperus differmis*
	Dub ghas	Couch grass	*Cynodon dactylon*
	Sawa	Water grass	*Echinochloa colona*
	Kodo	Goose grass	*Eleusine indica*
	Bhangra, Bhangaraiya	False daisy	*Eclipta alba*
	Bara-nagar-motha	Flat sedge	*Cyperus iria*
	Kankaua	Day flower	*Commelina benghalensis*

Weed management	Critical stage of weeding	Recommended practice for organic condition
	20-25 & 40-45 DAT	Hand weeding and summer ploughing

	Name of pest/disease	**Organic material recommended for control**	**Quantity (kg or litres/ ha)**
Organic plant protection practices	White ant, grubs	Kalichakra (metarhizium aniopliae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg jaggery in 200 litter/acer
	Soil born disease	Trichoderma viride	Vermicompost should be treated with Trichoderma to grow its mycelium and treated vermicompost in used
	Sheath blight and sheath rot	Pseudomonas fluorescence	10 gm/litter of water
	Stem borer	Trichocard	8 trichocard/ha (2 times)
	Blight and false smut	Neem or Karanj cake	500 kg/ha at the time of transplanting
	Blast	Bael+Black Tulsi	25 gm each in 1 litre of water
	Most of the insects leaf folder, stem borer, Gandhi bug	Neem seed kernel extract or Neem oil	Foliar 3-5ml/litre

Yield and Economics

Parameters	**1st year***	**2nd year**	**3rd year**	**4th year**	**5th year**	**6th year**	**7th year**	**8th Year**
Economic yield (kg/ha)	1970	1880	3191	3396	3945	3305	Abrupt weather	4050
Price (Rs/kg) (consider 25 % premium on prevailing market price)	15	15	15	15	15	15		15
Cost of cultivation**(Rs/ha)	26718	26718	26718	26718	26718	26718		26718
Net returns** (Rs/ha)	2832	1482	21147	24222	32457	22857		34032

*based on prices of 2013-14

Crop *(Rabi)*: Wheat

Important features of suitable varieties

Parameters	K-9107
Duration (days)	130
Average yield under organic condition (kg/ha)	2000-2500
Source (s) of availability	AICRP on wheat
Suitable regions/districts in the state	All district/Jharkhand
Specific resistance / tolerance to disease	Leaf blight

Field preparation: For field preparation of wheatone deep ploughing followed by 2 -3 harrowing with disc or tines and 2-3 planking should be given to prepare a well pulverised seed bed. Planking should be done after each ploughing.

Cultural practices

Seed rate (kg/ha) (Not applicable for nursery crops)	125 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application
	PSB &Azotobacter	250gm/10 kg seeds each	Warm the water and add 100 gm of jiggery. Mix it well and allow to cool and then add azotobacter culture in it. Finally seed is well mixed with azotobacter culture solution. The treated seed is allowed to dry in shade. Similarly the seed is again treated with PSB and finally sowing is done

Spacing (Row X plant) in cm	Row 20cm		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)	
	FYM	66.66	
	Karanj cake	8.33	
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/planting or stage of crop
	Vermicompost	33.33	25-30 DAS
	Panchagavya	10-12 lit/ha mixed in 500-600 lit of water	
Irrigation practices	**Number of irrigations**	**Most critical stages for irrigation**	**Depth of irrigation (cm)**
	6	Crown root initiation, tillering, jointing, booting, flowering, milk and dough stages	5-6cm
Major weeds	**Local name**	**English name**	**Scientific name**
	Krishananeel	Red pimpernel	*Anagallis arvensis*
	Kateli	Bull thistle	*Cirsium arvense*
	Bathu	Common lambsquarters	*Chenopodium album*
	Motha	Nut sedge	*Cyperus difformis*
	Gehusa (gehu ka mama)	Canary grass	*Phalaris minor*
	Dub ghas	Couch grass	*Cynodon dactylon*
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	20-25 & 40-45	Hand weeding and stale seed bed technique	
Organic plant protection practices	**Name of pest/disease**	**Organic material recommended for control**	**Quantity (kg or litres/ ha)**
	White ant, grubs	Kalichakra (metarhizium aniopliae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg jaggery in 200 litter/acer
	Most of the insects	Neem oil (Multinimore Vanguard)	Foliar 2.5ml/litre
	Soil born disease	Trichoderma viride	Vermicompost should be treated

			with Trichoderma to grow its mycelium and treated vermicompost in used
	Black rust, brown rust, yellow rust and leaf blight	Trichoderma herginum+ Pseudomonas fluorescence	5g/litre of water
	Loose smut	Trichoderma herginum or Trichoderma viride	Seed treatment 5gm/kg seed

Yield and Economics

Parameters	**1st**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
Economic yield (kg/ha)	2048	2366	2528	2587	2000	1875	2240	1950
Price (Rs/kg) (consider 25 % premium on prevailing market price)	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
Cost of cultivation*(Rs/ha)	36643	36643	36643	36643	36643	36643	36643	36643
Net returns* (Rs/ha)	-803	4762	7597	8629.5	-1643	-3830.5	2557	-2518

*based on prices of 2013-14

Details of Specific Practices/products used/recommended

Panchgavya preparation method

Panchgavya can be prepared by mixing 3 litre of cow urine, 5 kg of cow dung, 2 litre of cow milk, curd of 2 litres of cow milk, 1 kg cow ghee, 5 litre water, 500 gm honey, 1 kg jaggery in earthen pot. Then the earthen pot is covered and left for 3 weeks. The prepared Panchgavya should be used only after sieving the material, about 2 litre of Panchgavya should be well mixed in 100 litre of water and sprayed to the crop plants. The prepared Panchgavya would be sufficient 1.5ha of land.

Glimpses

Kharif	***Rabi***

	
Rice 100% Organic	Wheat 100% Organic

Cropping System2: Rice - Lentil

Particulars	*Kharif*	*Rabi*
Crop	Rice	Lentil
Fortnight of sowing/planting	Transplanting in 1st fortnight of July	2nd fortnight ofNov.
Fortnight of harvesting	1st fortnight of Nov.	2nd fortnight of March.
Varieties suitable for organic farming	Birsamati	PL-406

Crop *(kharif)*: Rice

Important features of suitable varieties

Parameters	Birsamati
Duration (days)	125-135 (Medium)
Average yield under organic condition (kg/ha)	3000-3500 kg/ha
Source (s) of availability	AICRP on Rice BAU, Ranchi.
Suitable regions/districts in the state	All district/Jharkhand
Specific resistance / tolerance to pest	Gall midge
Specific resistance / tolerance to disease	Bacterial leaf and sheath blight

Nursery raising practices

Area of nursery required for 1 ha	$1000m^2$		
Nursery raising method	Dry nursery		
Bed size (length X breadth in m)	$1x10m^2$		
Seed sowing rate/m^2	35 kg/ha		
Pre-sowing seed/soil treatment	Materials	Quantity/kg of seed or per m^2area	Method of application

	Pseudomonas fluorescence	5g/kg of seed	For seed dressing metal seed dresser/ earthernpots or polythene bags are used
Source and optimum quantity of organic manures/other nutrient source/m^2 of nursery	Materials	Quantity/ m^2area	Method of application
	FYM	1/2 kg	Soil application at the time of nursery preparation 10-15 days prior to sowing.
	Vermicompost	1/4 kg	Applied along with soil after sowing to cover the seeds.
Irrigation practices	As and when needed		
Weed management	1 Hand weeding		
Organic plant protection practices	**Name of pest/disease**	**Recommended organic material used for control**	**Quantity/ m^2area**
	Wilt, Blast, Blight	Nisarga/Monitor/Biosanjeevni (Trichoderma viride)	Seed- 5 g/litter/kg
Optimum age of nursery (days)	25-30 days		

Field preparation: The field was ploughed twice 15 days before transplanting the puddling of the soil was done two days prior to transplanting. The green manure crop dhaincha can be grown at seed rate of 40 kg/ha in May month with application of 250 kg/ha of rock phosphate. The dhaincha crop has to be incorporated at 40-45 DAS at 15 days prior to rice transplanting. This will able to meet out the 25-30 kg/ha of nitrogen requirement of paddy crop.

Cultural practices

Spacing (Row X plant) in cm	20x10 cm		
Number of seedlings/hill (in nursery crops only)	2 seedlings/hill		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)	
	FYM	53.28	
	Karanj cake	6.66	
	Azolla	1 kg/m^2	
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/planting or stage of crop
	Vermicompost	26.66	15 DAT
	Panchagavya	10-12 lit/ha mixed in 500-600 litre of water	
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	Need based	Tiller initiation,	3-5 cm standing

		flowering and milky stage	water
Major weeds			
	Local Name	**English Name**	**Scientific Name**
	Motha	Nut sedge	*Cyperus difformis*
	Dub ghas	Couch grass	*Cynodon dactylon*
	Sawa	Water grass	*Echinochloa colona*
	Kodo	Goose grass	*Eleusine indica*
	Bhangra, Bhangaraiya	False daisy	*Eclipta alba*
	Bara-nagar-motha	Flat sedge	*Cyperus iria*
	Kankaua	Day flower	*Commelina benghalensis*
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	20-25 & 40-45 DAT	Hand weeding and summer ploughing	

	Name of pest/disease	**Organic material recommended for control**	**Quantity (kg or litres/ ha)**
Organic plant protection practices	White ant, grubs	Kalichakra (metarhizium aniopliae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg jaggery in 200 litter/acer
	Soil born disease	Trichoderma viride	Vermicompost should be treated with Trichoderma to grow its mycelium and treated vermicompost in used
	Sheath blight and sheath rot	Pseudomonas fluorescence	10 gm/litter of water
	Stem borer	Trichocard	8 trichocard/ha (2 times)
	Blight and false smut	Neem or Karanj cake	500 kg/ha at the time of transplanting
	Blast	Bael+Black Tulsi	25 gm each in 1 litre of water
	Most of the insects leaf folder, stem	Neem seed kernel extract or Neem oil	Foliar 3-5ml/litre

	borer, Gandhi bug		

Yield and Economics

Parameters	**1st *year**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
Economic yield (kg/ha)	1970	1880	3191	3396	3945	3305	Abrupt weather	4050
Price (Rs/kg) (consider 25 % premium on prevailing market price)	15	15	15	15	15	15		15
Cost of cultivation*(Rs/ha)	26718	26718	26718	26718	26718	26718		26718
Net returns* (Rs/ha)	2832	1482	21147	24222	32457	22857		34032

*based on prices of 2013-14

Crop *(Rabi)*:Lentil

Important features of suitable varieties

Parameters	PL - 406
Duration (days)	115
Average yield under organic condition (kg/ha)	600-800
Source (s) of availability	Directorate of Seed & Farm, BAU.
Suitable regions/districts in the state	All district /Jharkhand
Specific resistance / tolerance to disease	moderately resistant wilt and rust

Field preparation: For field preparation of lentil one deep ploughing followed by 2-3 cross harrowing should be given. After harrowing, the field should be levelled by giving a gentle slope to ease in irrigation.

Cultural practices

Seed rate (kg/ha) (Not applicable for nursery crops)	25-30 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application
	PSB & Rhizobium culture	250 g/10 kg seeds	Warm the water and add 100 gm of jiggery. Mix it

			well and allow to cool and then add rhizobium culture in it. Finally seed is well mixed with rhizobium culture solution. The treated seed is allowed to dry in shade. Similarly the seed is again treated with PSB and finally sowing is done
Spacing (Row X plant) in cm	25x 8cm		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity(q/ha)	
	FYM	14.0	
	Karanj cake	2.0	
Top dressing of organic manures	Source	Quantity(q/ha)	Days after sowing/planting or stage of crop
	Vermicompost	7.0	25-30 DAS
Irrigation practices	**Number of irrigations**	**Most critical stages for irrigation**	**Depth of irrigation (cm)**
	2	Pre-flowering stage	5-6
Major weeds	**Local name**	**English name**	**Scientific name**
	Krishananeel	Red pimpernel	*Anagallis arvensis*
	Kateli	Bull thistle	*Cirsium arvense*
	Bathu	Common lambsquarters	*Chenopodium album*
	Motha	Nut grass	*Cyperus difformis*
	Dub ghas	Bermuda grass	*Cynodon dactylon*
	Kheshari	Sweet pea	Lathyrus odoratus
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	20-25 & 40-45	Hand weeding and stale seed bed technique	
Organic plant protection	Name of	Organic material	Quantity (kg or

practices	pest/disease	recommended for control	litres/ ha)
	White ant, grubs	Kalichakra (metarhizium aniopliae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg jaggery in 200 litter/acer
	Most of the insects	Neem oil (Multinimore Vanguard)	Foliar 2.5ml/litre
	Soil borne disease	Trichoderma	FYM or Vermicompost treated with trichoderma and applied to the field

Yield and Economics

Parameters	**1st *year**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
Economic yield (kg/ha)	650	735	920	750	562	0	770	649
Price (Rs/kg) (consider 25 % premium on prevailing market price)	35	35	35	35	35	35	35	35
Cost of cultivation*(Rs/ha)	13567	13567	13567	13567	13567	13567	13567	13567
Net returns* (Rs/ha)	9183	12158	18633	12683	6103	-13567	13383	9148

*based on prices of 2013-14

Details of Specific Practices/products used/recommended

Panchgavya can be prepared by mixing 3 litre of cow urine, 5 kg of cow dung, 2 litre of cow milk, curd of 2 litres of cow milk, 1 kg cow ghee, 5 litre water, 500 gm honey, 1 kg jaggery in earthen pot. Then the earthen pot is covered and left for 3 weeks. The prepared Panchgavya should be used only after sieving the material, about 2 litre of Panchgavya should be well mixed in 100 litre of water and sprayed to the crop plants. The prepared Panchgavya would be sufficient 1.5ha of land.

Glimpses

Kharif	*Rabi*
	
Rice 100% Organic	Lentil 100% Organic

Cropping System 3: Rice – Linseed

Particulars	***Kharif***	***Rabi***
Crop	Rice	Linseed
Fortnight of sowing/planting	Transplanting in 1stfortnight of July	2nd fortnight ofNov.
Fortnight of harvesting	1stfortnight of Nov.	1st fortnight of April.
Varieties suitable for organic farming	Birsamati	Shekhar

Crop *(kharif)*: Rice

Important features of suitable varieties

Parameters	**Birsamati**
Duration (days)	125-135 (Medium)
Average yield under organic condition (kg/ha)	3000-3500 kg/ha
Source (s) of availability	AICRP on Rice BAU, Ranchi.
Suitable regions/districts in the state	All district/Jharkhand
Specific resistance / tolerance to pest	Gall midge
Specific resistance / tolerance to disease	Bacterial leaf and sheath blight

Nursery raising practices

Area of nursery required for 1 ha	1000m^2
Nursery raising method	Dry nursery
Bed size (length X breadth in m)	1x10m^2
Seed sowing rate/m^2	35 kg/ha

Pre-sowing seed/soil treatment	Materials	Quantity/kg of seed or per m^2area	Method of application
	Pseudomonas fluorescence	5g/kg of seed	For seed dressing metal seed dresser/ earthernpots or polythene bags are used
Source and optimum quantity of organic manures/other nutrient source/m^2 of nursery	Materials	Quantity/ m^2area	Method of application
	FYM	1/2 kg	Soil application at the time of nursery preparation 10-15 days prior to sowing.
	Vermicompost	1/4 kg	Applied along with soil after sowing to cover the seeds.
Irrigation practices	As and when needed		
Weed management	1 Hand weeding		
Organic plant protection practices	**Name of pest/disease**	**Recommended organic material used for control**	**Quantity/ m^2area**
	Wilt, Blast, Blight	Nisarga/Monitor/Biosanjeevni (Trioderma virde)	Seed- 5 g/litter/kg
Optimum age of nursery (days)	25-30 days		

Field preparation: The field was ploughed twice 15 days before transplanting the puddling of the soil was done two days prior to transplanting. The green manure crop dhaincha can be grown at seed rate of 40 kg/ha in May month with application of 250 kg/ha of rock phosphate. The dhaincha crop has to be incorporated at 40-45 DAS at 15 days prior to rice transplanting. This will able to meet out the 25-30 kg/ha of nitrogen requirement of paddy crop.

Cultural practices

Spacing (Row X plant) in cm	20x10 cm		
Number of seedlings/hill (in nursery crops only)	2 seedlings/hill		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)	
	FYM	53.28	
	Karanj cake	6.66	
	Azolla	1 kg/m^2	
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/planting or stage of crop
	Vermicompost	26.66	15 DAT
	Panchagavya	10-12 lit/ha mixed in 500-600 litre of water	
Irrigation practices	Number of irrigations	Most critical stages for	Depth of irrigation (cm)

		irrigation	
	Need based	Tiller initiation, flowering and milky stage	3-5 cm standing water

Major weeds	**Local Name**	**English Name**	**Scientific Name**
	Motha	Nut sedge	*Cyperus difformis*
	Dub ghas	Couch grass	*Cynodon dactylon*
	Sawa	Water grass	*Echinochloa colona*
	Kodo	Goose grass	*Eleusine indica*
	Bhangra, Bhangaraiya	False daisy	*Eclipta alba*
	Bara-nagar-motha	Flat sedge	*Cyperus iria*
	Kankaua	Day flower	*Commelina benghalensis*

Weed management	Critical stage of weeding	Recommended practice for organic condition
	20-25 & 40-45 DAT	Hand weeding and summer ploughing

Organic plant protection practices	**Name of pest/disease**	**Organic material recommended for control**	**Quantity (kg or litres/ ha)**
	White ant, grubs	Kalichakra (metarhizium aniopliae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg jaggery in 200 litter/acer
	Soil born disease	Trichoderma viride	Vermicompost should be treated with Trichoderma to grow its mycelium and treated vermicompost in used
	Sheath blight and sheath rot	Pseudomonas fluorescence	10 gm/litter of water
	Stem borer	Trichocard	8 trichocard/ha (2 times)
	Blight and false smut	Neem or Karanj cake	500 kg/ha at the time of transplanting
	Blast	Bael+Black Tulsi	25 gm each in 1 litre of water

	Most of the insects leaf folder, stem borer, Gandhi bug	Neem seed kernel extract or Neem oil	Foliar 3-5ml/litre

Yield and Economics

Parameters	**1st*year**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
Economic yield (kg/ha)	1970	1880	3191	3396	3945	3305	Abrupt weather	4050
Price (Rs/kg) (consider 25 % premium on prevailing market price)	15	15	15	15	15	15		15
Cost of cultivation*(Rs/ha)	26718	26718	26718	26718	26718	26718		26718
Net returns* (Rs/ha)	2832	1482	21147	24222	32457	22857		34032

*based on prices of 2013-14

Crop *(Rabi)*: Linseed

Important features of suitable varieties

Parameters	Shekhar
Duration (days)	140
Average yield under organic condition (kg/ha)	500-700
Source (s) of availability	Directorate of seed & farm, BAU.
Suitable regions/districts in the state	All district/Jharkhand
Specific resistance / tolerance to pest	Moderately resistant to bud fly
Specific resistance / tolerance to disease	Resistant to powdery mildew, rust, wilt and moderately resistant to alternaria blight

Field preparation: Field should be prepared by giving 1 ploughing by soil turning plough followed by 2-3 harrowing and finally planking.

Cultural practices

Seed rate (kg/ha)	25-30 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application
	PSB &Azotobacter	250 g/10 kg seeds each	Warm the water and add 100 gm of jiggery. Mix it

			well and allow to cool and then add azotobacter culture in it. Finally seed is well mixed with azotobacter culture solution. The treated seed is allowed to dry in shade. Similarly the seed is again treated with PSB and finally sowing is done
Spacing (Row X plant) in cm	Row 30cm		
Number of seedlings/hill (in nursery crops only)	-		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)	
	FYM	26.66	
	Karanj cake	3.33	
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/planting or stage of crop
	Vermicompost	13.33	25-30 DAS
Irrigation practices	**Number of irrigations**	**Most critical stages for irrigation**	**Depth of irrigation (cm)**
	3	Three irrigation at 35, 55 and 75 days after sowing proved very effective	5-6 cm
Major weeds	**Local name**	**English name**	**Scientific name**
	Krishananeel	Red pimpernel	*Anagallis arvensis*
	Kateli	Bull thistle	*Cirsium arvense*
	Bathu	Common lambsquarters	*Chenopodium album*
	Motha	Nut grass	*Cyperus difformis*
	Dub ghas	Bermuda grass	*Cynodon dactylon*
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	20-25 & 40-45	Hand weeding and stale seed bed technique	
Organic plant protection practices	**Name of pest/disease**	**Organic material recommended for control**	**Quantity (kg or litres/ ha)**
	White ant, grubs	Kalichakra (metarhizium aniopliae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg

			jaggery in 200 litter/acer
	Most of the insects	Neem oil (Multinimore Vanguard)	Foliar 2.5ml/litre
	Soil born disease	Trichoderma	Trichoderma powder mixed with vermicompost of FYM to develop its mycelium and applied to whole field

Yield and Economics

Parameters	**1st***	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**
Economic yield (kg/ha)	492	350	420	400	550	700	790	795
Price (Rs/kg) (consider 25 % premium on prevailing market price)	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25
Cost of cultivation*(Rs/ha)	14065	14065	14065	14065	14065	14065	14065	14065
Net returns* (Rs/ha)	-3610	-6627	-5140	-5565	-2377	810	2722	2829

*based on prices of 2013-14

Details of Specific Practices/products used/recommended

Panchgavya preparation method

Panchgavya can be prepared by mixing 3 litre of cow urine, 5 kg of cow dung, 2 litre of cow milk, curd of 2 litres of cow milk, 1 kg cow ghee, 5 litre water, 500 gm honey, 1 kg jaggery in earthen pot. Then the earthen pot is covered and left for 3 weeks. The prepared Panchgavya should be used only after sieving the material, about 2 litre of Panchgavya should be well mixed in 100 litre of water and sprayed to the crop plants. The prepared Panchgavya would be sufficient 1.5ha of land.

Glimpses

Kharif	***Rabi***

	
Rice 100% Organic	Linseed 100% Organic

Cropping System 4: Rice – Potato

Particulars	*Kharif*	*Rabi*
Crop	Rice	Potato
Fortnight of sowing/planting	Transplanting in 1st fortnight of July	2nd fortnight of Nov.
Fortnight of harvesting	1st fortnight of Nov.	2nd fortnight of Feb.
Varieties suitable for organic farming	Birsamati	Kufri Ashoka

Crop *(kharif)*: Rice

Important features of suitable varieties

Parameters	**Birsamati**
Duration (days)	125-135 (Medium)
Average yield under organic condition (kg/ha)	3000-3500 kg/ha
Source (s) of availability	AICRP on Rice ,BAU, Ranchi.
Suitable regions/districts in the state	All district/Jharkhand
Specific resistance / tolerance to pest	Gall midge
Specific resistance / tolerance to disease	Bacterial leaf and sheath blight

Nursery raising practices

Area of nursery required for 1 ha	$1000m^2$		
Nursery raising method	Dry nursery		
Bed size (length X breadth in m)	$1x10\ m^2$		
Seed sowing rate/m^2	35 kg/ha		
Pre-sowing seed/soil treatment	Materials	Quantity/kg of seed or per m^2area	Method of application
	Pseudomonas fluorescence	5g/kg of seed	For seed dressing metal seed dresser / earthern pots or polythene bags are

			used
Source and optimum quantity of organic manures/other nutrient source/m^2 of nursery	Materials	Quantity/ m^2area	Method of application
	FYM	1/2 kg	Soil application at the time of nursery preparation 10-15 days prior to sowing.
	Vermicompost	1/4 kg	Applied along with soil after sowing to cover the seeds.
Irrigation practices	As and when needed		
Weed management	1 Hand weeding		
Organic plant protection practices	**Name of pest/disease**	**Recommended organic material used for control**	**Quantity/ m^2area**
	Wilt, Blast, Blight	Nisarga/Monitor/Biosanjeevni (Trichoderma viride)	Seed- 5 g/litter/kg
Optimum age of nursery (days)	25-30 days		

Field preparation: The field was ploughed twice 15 days before transplanting the puddling of the soil was done two days prior to transplanting. The green manure crop dhaincha can be grown at seed rate of 40 kg/ha in May month with application of 250 kg/ha of rock phosphate. The dhaincha crop has to be incorporated at 40-45 DAS at 15 days prior to rice transplanting. This will able to meet out the 25-30 kg/ha of nitrogen requirement of paddy crop.

Cultural practices

Spacing (Row X plant) in cm	20x10 cm		
Number of seedlings/hill	2 seedlings/hill		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)	
	FYM	53.28	
	Karanj cake	6.66	
	Azolla	1 kg/m^2	
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/planting or stage of crop
	Vermicompost	26.66	15 DAT
	Panchagavya	10-12 lit/ha mixed in 500-600 litre of water	
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	Need based	Tiller initiation, flowering and milky stage	3-5 cm standing water
Major weeds			

	Local Name	English Name	Scientific Name
	Motha	Nut sedge	*Cyperus difformis*
	Dub ghas	Couch grass	*Cynodon dactylon*
	Sawa	Water grass	*Echinochloa colona*
	Kodo	Goose grass	*Eleusine indica*
	Bhangra, Bhangaraiya	False daisy	*Eclipta alba*
	Bara-nagar-motha	Flat sedge	*Cyperus iria*
	Kankaua	Day flower	*Commelina benghalensis*

Weed management	Critical stage of weeding	Recommended practice for organic condition
	20-25 & 40-45 DAT	Hand weeding and summer ploughing

	Name of pest/disease	Organic material recommended for control	Quantity (kg or litres/ ha)
Organic plant protection practices	White ant, grubs	Kalichakra (metarhizium aniopliae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg jaggery in 200 litter/acre
	Soil born disease	Trichoderma viride	Vermicompost should be treated with Trichoderma to grow its mycelium and treated vermicompost in used
	Sheath blight and sheath rot	Pseudomonas fluorescence	10 gm/litter of water
	Stem borer	Trichocard	8 trichocard/ha (2 times)
	Blight and false smut	Neem or Karanj cake	500 kg/ha at the time of transplanting
	Blast	Bael+Black Tulsi	25 gm each in 1 litre of water
	Most of the insects leaf folder, stem borer, Gandhi bug	Neem seed kernel extract or Neem oil	Foliar 3-5ml/litre

Yield and Economics

Parameters	**1st *year**	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**

Economic yield (kg/ha)	1970	1880	3191	3396	3945	3305	4050	
Price (Rs/kg) (consider 25 % premium on prevailing market price)	15	15	15	15	15	15	15	
Cost of cultivation*(Rs/ha)	26718	26718	26718	26718	26718	26718	26718	
Net returns* (Rs/ha)	2832	1482	21147	24222	32457	22857		34032

*based on prices of 2013-14

Crop *(Rabi)*: Potato

Important features of suitable varieties

Parameters	Kufri Ashoka (Potato)
Duration (days)	95
Average yield under organic condition (kg/ha)	18000-20000
Source (s) of availability	Ram Krishna Mission, Ranchi
Suitable regions/districts in the state	All district/Jharkhand

Field preparation: Land should be well prepared by deep ploughing with mould-bold plough followed by 3-4 cross harrow wings. Each harrowing should be followed by planking so that the soil is well pulverised and levelled.

Cultural practices

Seed rate (kg/ha)	300 kg/ha		
Pre-sowing/planting treatment of seed/seedlings	Material	Recommended rate (kg/ha or lit/ha)	Method of application
	PSB &Azotobacter	250 g/10 kg seeds	Warm the water and add 100 gm of jiggery. Mix it well and allow to cool and then add azotobacter culture in it. Finally seed is well mixed with azotobacter culture solution. The treated seed is allowed to dry in shade. Similarly the seed is again treated with PSB and finally sowing is done

Spacing (Row X plant) in cm	Row to row 50cm, tuber to tuber 20cm		
Basal application of organic manures including soil application of bio-fertilizers, bio-control agents etc	Source	Quantity (q/ha)	
	FYM	80.0	
	Karanj cake	10.0	
Top dressing of organic manures	Source	Quantity (q/ha)	Days after sowing/planting or stage of crop
	Vermicompost	40.0	25-30 DAS
Irrigation practices	Number of irrigations	Most critical stages for irrigation	Depth of irrigation (cm)
	4-5	1st irrigation at 4-5 days after seeding than after 10 days interval	5-6 cm
Major weeds	**Local name**	**English name**	**Scientific name**
	Krishananeel	Red pimpernel	*Anagallis arvensis*
	Kateli	Bull thistle	*Cirsium arvense*
	Bathu	Common lambsquarters	*Chenopodium album*
	Motha	Nut grass	*Cyperus difformis*
	Dub ghas	Bermuda grass	*Cynodon dactylon*
Weed management	Critical stage of weeding	Recommended practice for organic condition	
	20-25 & 40-45	Hand weeding and stale seed bed technique	
Organic plant protection practices	Name of pest/disease	Organic material recommended for control	Quantity (kg or litres/ ha)
	White ant, grubs	Kalichakra (metarhizium aniopliae)	Soil- 1-2kg/40 kg FYM/acre Foliar-1kg/kg jaggery in 200 litter/acer
	Most of the insects	Neem oil (Multinimore Vanguard)	Foliar 2.5ml/litre
	Black Scurf	Trichoderma treated Neem cake	Soil application @ 5 q/ha

Yield and Economics

Parameters	**1st***	**2nd**	**3rd**	**4th**	**5th**	**6th**	**7th**	**8th**

Economic yield (kg/ha)	9110	17283	19500	20500	19166	18750	19000	19300
Price (Rs/kg) (consider 25 % premium on prevailing market price)	12.50	12.50	12.50	12.50	12.50	12.50	12.50	12.50
Cost of cultivation (Rs/ha)	64250	64250	64250	64250	64250	64250	64250	64250
Net returns (Rs/ha)	49625	151787.5	179500	192000	175325	170125	173250	177000

*based on prices of 2013-14

Details of Specific Practices/products used/recommended

Panchgavya preparation method

Panchgavya can be prepared by mixing 3 litre of cow urine, 5 kg of cow dung, 2 litre of cow milk, curd of 2 litres of cow milk, 1 kg cow ghee, 5 litre water, 500 gm honey, 1 kg jaggery in earthen pot. Then the earthen pot is covered and left for 3 weeks. The prepared Panchgavya should be used only after sieving the material, about 2 litre of Panchgavya should be well mixed in 100 litre of water and sprayed to the crop plants. The prepared Panchgavya would be sufficient 1.5ha of land.

Glimpses

Kharif	***Rabi***
	
Rice 100% Organic	Potato 100% Organic