Organic MANIPUR
STRAIGHT FROM THE FARM

MOVCDNER
Farmer Happy, People Healthy

MANIPUR ORGANIC MISSION AGENCY
MOMA







Organic Production Packages for Important Crops

Black Aromatic Rice | HYV Rice | Maize | Turmeric | Ginger
King Chilli | Passionfruit | Kiwifruit | Pineapple

Organic

Black Rice *(Oryza sativa)*

BE ORGANIC BE HEALTHY

Climate

- Kharif season
- Average Temp. range: 21–35°C

Soil Type

- Clay Loam & Rich in Organic Matter
- Opt. pH 5-6.5

Varieties

- Chakhao Poireiton and Chakhao Amubi

Sowing Time

- 2nd week of June to 2nd week of July

Seed rate & Spacing

- Wet nursey: Seed rate- 60-70 kg/ha; Spacing- 20 cm x 15 cm
- SRI: Seed rate- 5 kg/ha; Spacing- 20 cm x 20 cm
- DSR: Seed rate- 80-100 kg/ha (broadcast) 60 kg/ha (line sowing); Spacing- 20 cm (row-row)

Nutrient Management

- Seed treatment of bio-fertilizers: Mix biofertilizer (*Azospirillum*, PSB) @ 200 g in 200 ml of rice gruel for treatment of 10 kg seed and shade dry or Soil application of bio-fertilizers: Broadcast mixture of 2 kg biofertilizer (*Azospirillum*, PSB) + 50 kg of dried FYM before sowing/ transplanting in main field
- Apply 15 tonnes FYM/ha or 10 tonnes FYM/ha + 2.5 tonnes Vermicompost/ha in main field at the time of ploughing and puddling
- Follow Need based Top dressing with vermicompost /conc. OM, foliar application of liquid Organic manure

Water Management

- Rainfed
- Regulate water in case of SRI method from time to time

Weed Management

- Manual or use Cono-weeder in case of SRI Method 2-3 times at 15 days interval
- Thinning & weeding at 20-25 days after sowing (DAS) in case of DSR

Preventive measures for insect and disease management

- Use of healthy and clean seeds
- Clean field bunds
- Remove infested plants and plant parts
- Apply balanced nutrient
- Follow crop rotation

Diseases Management

- Treat seeds with *Trichoderma viride* or *T. harazianum* or *Pseudomonas fluorescence* formulation @ 4 g/kg seed either alone or in combination for seed and soil borne diseases
- Spray neem oil @ 3 ml/litre of water
- Spray 2% turmeric for rice blast

Insect Pests Management

- Soil application of neem cake @ 150 kg/ha
- Spray Karajin/ Derisom @ 2 ml/litre and neem oil @ 3 ml/litre of water
- Apply *Beauveria bassinia* @ 3 g/litre for rice hispa

Harvesting & Yield

- Oct-Nov; 2.5-3 tonnes/ha

Organic

HYV Rice *(Oryza sativa)*

BE ORGANIC BE HEALTHY

Climate

- Kharif season
- Average Temp. range: 21–35°C

Soil Type

- Clay Loam & Rich in Organic Matter;
- Opt. pH 5-6.5

Varieties

- Tamphaphou, Maniphou-12, Maniphou- 13

Sowing Time

- 2nd week of June to 2nd week of July

Seed rate & Spacing

- Wet nursey: Seed rate- 60-70 kg/ha; Spacing- 20 cm x 15 cm
- SRI: Seed rate- 5 kg/ha; Spacing- 20 cm x 20 cm
- DSR: Seed rate- 80-100 kg/ha (broadcast) 60 kg/ha (line sowing); Spacing- 20 cm (row-row)

Nutrient Management

- Seed treatment of bio-fertilizers: Mix biofertilizer (*Azospirillum*, PSB) @ 200 g in 200 ml of rice gruel for treatment of 10 kg seed and shade dry or
- Soil application of bio-fertilizers: Broadcast mixture of 2 kg biofertilizer (*Azospirillum*, PSB) + 50 kg of dried FYM before sowing/ transplanting in main field
- Apply 15 tonnes FYM/ha or 10 tonnes FYM/ha + 2.5 tonnes Vermicompost/ha in main field at the time of ploughing and puddling
- Follow Need based Top dressing with vermicompost /conc. OM, foliar application of liquid Organic manure

Water Management

- Rainfed
- Regulate water in case of SRI method from time to time

Weed Management

- Manual or use Cono-weeder in case of SRI Method 2-3 times at 15 days interval
- Thinning & weeding at 20-25 DAS in case of DSR

Preventive measures for insect and disease management

- Use of healthy and clean seeds
- Clean field bunds
- Remove infested plants and plant parts
- Apply balanced nutrient
- Follow crop rotation

Diseases Management

- Treat seeds with *Trichoderma viride* or *T. harazianum* or *Pseudomonas fluorescence* formulation @ 4 g/kg seed either alone or in combination for seed and soil borne diseases
- Spray neem oil @ 3 ml/litre of water
- Spray 2% turmeric for rice blast

Insect Pests Management

- Soil application of neem cake @ 150 kg/ha
- Spray Karajin/ Derisom @ 2 ml/litre and neem oil @ 3 ml/litre of water
- Apply *Beauveria bassinia* @ 3 g/litre for rice hispa

Harvesting & Yield

- Oct-Nov; 3.5-4 tonnes/ha

Organic

Maize *(Zea mays)*

BE ORGANIC BE HEALTHY

Climate

- Average temp. range: 22-30° C

Soil Type

- Well drained sandy loam to silty loam soils with rich organic matter
- pH: 5.5-7.5

Varieties

- Local variety/ composite variety

Sowing Time

- April –May (Summer maize)
- Sept-Oct 1st fortnight (Winter Maize)

Seed rate & Spacing

- Seed rate: 20-25 kg/ha
- Ridge and Furrow method
- Spacing: 50-60 cm x 20-25 cm, Sowing depth: 5-7 cm;

Nutrient Management

- Seed treatment of bio-fertilizers: Mix biofertilizer (*Azospirillum*, PSB) @ 200 g in 200 ml of rice gruel for treatment of 10 kg seed and shade dry or
- Soil application of bio-fertilizers: Broadcast mixture of 2 kg biofertilizer (*Azospirillum*, PSB) + 50 kg of dried FYM before sowing in main field
- Apply 15 tonnes FYM/ha or 10 tonnes FYM/ha + 2-3 tonnes Vermicompost/ha in main field before 20 DAS
- Follow Need based Top dressing with vermicompost / conc. OM, foliar application of liquid Organic manure

Aftercare

- Earthing up at knee high stage (30-35 DAS)

Water Management

- Avoid water stagnation during its life season
- Rainfed (summer maize)
- Irrigated (winter maize)
- Provide irrigation at least during tasseling and silking stages in winter maize

Weed Management

- Mechanical/ manual weeding at
- 1st weeding: 15-20 DAS
- 2nd weeding: 30-35 DAS
- 3rd weeding: 50-55 DAS

Preventive measures for insect and disease management

- Use of healthy and clean seeds
- Clean field bunds
- Follow summer ploughing to expose larvae of insect pest to sunlight and natural predators
- Burn stubbles of infested crop
- Apply balanced nutrient
- Follow crop rotation/intercropping with legumes like soybean, black gram, cow pea etc.

Diseases Management

- Treat seeds with *Trichoderma viride* or *T. harazianum* or *Pseudomonas fluorescence* formulation @ 4 g/kg seed either alone or in combination for seed and soil borne diseases
- Spray 3-4 times at 15 days interval with neem oil/ derisom @ 3 ml/litre + cow urine 3% + panchagavya 3% to manage most of diseases

Insect Pests Management

- Soil application of neem cake @ 150 kg/ha or Spray Karajin/ Derisom @ 3 ml/litre, 3% cow urine, neem oil @ 3 ml/litre of water at 20-25 days after germination to check Stem borer, Fall army Worm, Cut worms and Army worms
- Apply *Metarhizium anisopliae* talc formulation (1 x 108 cfu/g) @ 5 g/litre (whorl application) at 15-25 days after sowing for Fall army worm
- Application of *Beauveria bassinia* and *Bacillus thuringensis v. kurstaki*@ 2-3 g/litre for Fall army worm can be done

Harvesting & Yield

- Aug-Sept (Summer maize)
- Local: 1.5- 2 tonnes/ha; Composite: 3-3.5 tonnes/ha
- Jan-Feb (Winter maize)
- Local: 2 tonnes/ha; Composite: 3.5 tonnes/ha

Organic

Turmeric *(Curcuma longa)*

BE ORGANIC BE HEALTHY

Climate

- Warm, humid
- Rainfall-1500 mm & temperature of 20-30°C
- Grow well under partial shade

Soil Type

- Sandy or clayey loamy or red loamy, rich in organic matter

Varieties

- Lakadong and Megha Turmeric-1

Sowing Time

- March-April (can be continued up to May)

Seed rate & Spacing

- Mother rhizome or primary finger rhizome (2500 kg/ha); weight seed rhizomes approx. 25-30 g
- Spacing: 30 cm X 25cm (in raised beds) or 45-60 cm X 25 cm (on ridges) & planting depth 12 cm
- 1 kg seed rhizome should treated with 10 g *Trichoderma* + 10 g *Azospirillum* + 10 g *Pseudomonas* + 1 tablespoonful of Acacia gum/Molases per lit of water for 30 minutes

Nutrient Management

- Apply 2 t/ha powdered neem cake and mix well with the soil before planting
- Combined application Vermicompost (5 t/ha) + *Azospirillum* (10 kg /ha) + *Bacillus* (5 kg/ha) + *Pseudomonas* (5 kg/ha) + 1 kg wood ash during planting; followed by *Frateuria* (10 kg/ha) at 45-90 days after planting

Aftercare

- First mulching just after planting @ 10 t paddy straw/ha, next mulching at 45 and 90 days after planting @ 5.0-7.5 t paddy straw/ha
- Daincha or sunhemp can be raised in between two beds immediately after planting and they can be uprooted before second mulching
- Sowing of cluster bean or pigeon pea in the corners of the raised beds just after planting for providing partial shade

Water Management

- 15-25 irrigation in clay soil and 40 irrigation in sandy loam may be necessary at 7-10 days interval
- A light irrigation after planting is must. Irrigation should be withheld 1 month before harvesting
- A light irrigation 2-3 days before harvesting to loosen the soil

Weed Management

- Weeding has to be done thrice at 60, 90 and 120 days after planting

Diseases Management

- Use of disease free rhizome
- Rhizome treatment, rhizome solarisation, clean cultivation, crop rotation with maize
- Disease infected rhizome should be removed from the field
- Application of *Trichoderma harzianum*

Insect Pests Management

- Clean cultivation, pruning of infested shoot and also picking and destroying the caterpillar
- Spraying of *Bacillus thuringiensis* (0.2%) and Neem oil (3 ml/lit) at 15-21 days interval during July-October
- Application of *Beauveria bassiana* or *Metarhizium anisopliae* mixed with vermicompost
- Soil application of neem cake @ 2 t/ha during planting and use of light traps

Harvesting & Yield

- 7-9 months after planting during January- March when plants become dry
- Yield: 20-25 t/ha.

Organic

Ginger *(Zingiber officinale)*

BE ORGANIC BE HEALTHY

Climate

- Warm and humid, cold & dry climate is best for rhizome development
- Grow well under partial shade.

Soil Type

- Sandy or clayey loam, red loam, lateritic loam

Varieties

- Pherzawl Local and Less fibre variety

Sowing Time

- March-April (can be continued up to May)

Seed rate & Spacing

- Mother rhizome or primary finger rhizome (1800-2500 kg/ha); weight seed rhizomes approx. 20-25 g and 4-5 cm length in size
- Spacing: 25 cm X 25 cm (in raised beds) or 40-50 cm X 20 cm (on ridges) & planting depth 12 cm
- 1kg seed rhizome should treated with 10 g *Trichoderma* + 10 g *Azospirillum* + 10 g *Pseudomonas* + 1 tablespoonful of Acacia gum/Molases per lit of water for 30 minutes.

Nutrient Management

- Apply 2 t/ha powdered neem cake or 3.5 t/ha mustard cake and mix well with the soil before planting
- Combined application Vermicompost (6.5 t/ha) + *Azospirillum* (10 kg /ha) + *Bacillus* (5 kg/ha) + *Pseudomonas* (5 kg/ha) + 1 kg wood ash during planting; followed by *Frateuria* (10 kg/ha) at 45-90 days after planting

Aftercare

- First mulching just after planting @ 10 t paddy straw/ha, next mulching at 45 and 90 days after planting @ 5.0-7.5 t paddy straw/ha
- Daincha or sunhemp can be raised in between two beds immediately after planting and they can be uprooted before second mulching
- Sowing of cluster bean or pigeon pea in the corners of the raised beds just after planting for providing partial shade

Water Management

- Irrigation is given at 10 days intervals, total 16-18 irrigation is required
- A light irrigation after planting is must. Irrigation should be withheld 1 month before harvesting
- A light irrigation 2-3 days before harvesting to loosen the soil

Weed Management

- Weeding has to be done thrice at 60, 90 and 120 days after planting

Diseases Management

- Use of disease free rhizome
- Removal and destruction of infected rhizome
- Early planting, proper drainage and crop rotation
- Rhizome treatment with warm water at 51°C for 10 minutes and *Trichoderma* formulation
- Soil application of *Trichoderma* (2.5 kg mixed with 50 kg FYM) at 10-15 days before sowing

Insect Pests Management

- Clean cultivation, pruning of infested shoot and also picking and destroying the caterpillar
- Spraying of *Bacillus thuringiensis* (0.2%) and Neem oil (3 ml/lit) at 15-21 days interval during July-October
- Application of *Beauveria bassiana* or *Metarhizium anisopliae* mixed with vermicompost
- Soil application of neem cake @ 2 t/ha during planting and use of light traps

Harvesting & Yield

- 8-9 months after planting during January- March when plants become dry
- Yield: 18-22 t/ha

Organic

King Chilli *(Capsicum chinense)*

BE ORGANIC BE HEALTHY

Climate

- Warm and humid
- Rainfall 75-100 cm & temperature 20-30°C

Soil Type

- Deep loose sandy loam or clay loam with good drainage

Varieties

- Local variety

Sowing Time

- Sowing (2nd fortnight of January-1st fortnight of March) & Transplanting (April- June)
- The nursery beds should be covered with nylon nets

Seed rate & Spacing

- Seed (350-400 g/ha)
- Spacing 60 cm X 90cm or 75 cm X 90 cm for open field and 90 cm X 90 cm for protected cultivation
- 45-60 days old seedling (5-6 leaf stage) is recommended for transplanting

Nutrient Management

- Vermicompost @ 4-5 t/ha applied 10-15 days before transplanting and *Azospirillum* + *Pseudomonas* @ 7.5-10 kg/ha each along mixed with compost or vermicompost during transplanting

Aftercare

- Mulching with silver polymulch

Water Management

- Seedling should be watered immediately after transplanting and during dry spell
- Light but frequent irrigation should be given during flowering and fruiting stage

Weed Management

- Timely weeding is required

Diseases Management

- Root dipping of saplings in *Trichoderma* sp. solution (10 g *Trichoderma* + 1 tablespoonful of Acacia gum/Molases per lit of water) for 30 minutes.
- Apply *Pseduomonas fluorescens* 15 days after transplanting and 3 months after first application @ 2.5 kg/ha mixed with FYM

Insect Pests Management

- Spray neem oil or neem based insecticide
- Two border rows of maize should be grown to restrict the movement of aphid vectors
- Use of silver poly mulch also helps in repealing aphids and thrips
- Yellow sticky traps should be used

Harvesting & Yield

- Fruit become full red or orange
- Harvesting starts from September-October
- Under good management condition, one healthy king chilli plant can produce more than 1 kg fruits

Organic

Passionfruit *(Passiflora edulis)*

BE ORGANIC BE HEALTHY

Climate

- Tropical to sub- tropical
- Rainfall 1000-2500 mm & temperature range is 20°C to 30°C

Soil Type

- Sandy loam to heavy loam
- p^H 5.5 to 7

Varieties

- Purple and Yellow

Sowing Time

- June- July

Seed rate & Spacing

- Rooted hardwood cutting 30-35 cm long having 3 nodes
- Spacing: 2 m X 3 m

Nutrient Management

- Vermicompost (6.5 t/ha) + *Azospirillum* (20 kg/ha) + PSB (20 kg/ha) + AM (65 kg/ha)

Aftercare

- Training (two-arm kniffin system) & pruning should be done after harvesting to encourage current season growth
- During initial years, pineapple, ginger and short duration vegetables can be intercropping

Water Management

- Irrigation at 10-15 days interval during December to March

Weed Management

- Up to 1m radius around the base of each vine should be kept clean and free from weed

Diseases Management

- Avoid intercropping with legumes
- Combined application of *Trichoderma* + *Pseudomonus* (10 g each/sq.m.)

Insect Pests Management

- Apply Pyrethrum (10 ml/litre) and neem based insecticide.

Harvesting & Yield

- After 16-18 months, passion fruit takes about 85-90 days from flowering to maturity
- Yield: Purple 8- 10 t/ha and Yellow 10- 12 t/ha

Organic

Kiwifruit *(Actinidia deliciosa)*

BE ORGANIC BE HEALTHY

Climate

- Requires 700-800 chilling hours below 7°C to break its rest period
- Rainfall 150 cm/year & frost free weather is desirable

Soil Type

- Sandy loam
- p^H 5.5 to 7.0

Varieties

- Allison (Male) and Hayward (Female)

Sowing Time

- December to February

Seed rate & Spacing

- Grafted plant is the best planting material
- Planting should be done at 1 male : 8 female ratio, every third plant in alternate row should be a male plant
- Spacing: T-bar trellis system = 6 m x 4 m, Pergola system = 6 m x 6 m

Nutrient Management

- 10 kg vermicompost + 5 kg neem cake + 50 g *Azospirillum* + 50 g *Pseudomonas* per plant during planting and after fruit set.

Aftercare

- T-bar trellis system or Pergola system of training
- Pruning should be done to encourage current season growth either in winter after harvesting
- Hand pollination may be adopted to improve fruit set
- Similarly fruit thinning is also required to ensure bigger size fruits

Water Management

- Water regularly at 10-15 days intervals and for newly planted vines, once a week during summer
- Watering is must when the leaves turn brown and fall off

Weed Management

- Weeding during first four years to keep the basin area clean. Weeding is important before manure application and mulching

Diseases Management

- Application of *Trichoderma*

Insect Pests Management

- Application of Annonin extract (2 ml/litre of water), *Beauveria bassiana* (5-10 g/litre of water) and *Verticillum lecanii* (3-5 ml/litre of water)

Harvesting & Yield

- At maturity the hairs present on the fruit skin can be removed easily
- Kiwifruit ripens during September to December depending upon variety and climate
- The berries are harvested when they are still hard and generally ready for harvest in between 125-150 days after fruit set
- Vines on trellis produce about 25 t/ha after seven years

Organic

Pineapple *(Ananas comosus)*

BE ORGANIC BE HEALTHY

Climate

- Tropical to sub- tropical
- Rainfall 1000-2000 mm & temperature range is 20°C to 30°C

Soil Type

- Sandy loam to heavy loam
- p^H 5.5 to 7.0

Varieties

- Kew and Queen

Sowing Time

- April-May, but it can be extended up to June-July

Seed rate & Spacing

- Suckers (450 g) or slips (350 g) are considered as best planting material
- Spacing: single row (30 cm X 75 cm), double row (30 cm X 60 cm x 90 cm) or high density planting (25 cm X 35 cm X 75 cm)

Nutrient Management

- FYM @ 30-40 t/ha or vermicompost @ 15 t/ha during planting + *Pseudomonas* /*Bacillus* @ 10kg/ha + Arbuscular mycorrhiza @ 60-70 kg/ha

Aftercare

- Earthing up and Mulching

Water Management

- 8-12 irrigation in summer and 5-6 irrigations in winter months at an interval of 20- 25 days

Weed Management

- Twice a year; first, August or September, and second, in October to November

Diseases Management

- Use of disease free planting material
- Good drainage and application of *Trichoderma* biopesticides

Insect Pests Management

- Neem oil or neem based insecticide

Harvesting & Yield

- At maturity fruits turns golden yellow
- 15-18 months after planting (May- August)
- Yield: Upto 50 t/ha

POINTS TO REMEMBER

- Organic growers should maintain field history of their land. Buffer zone should be maintained around the organic field to prevent contamination from adjacent land unless it is physically protected.
- Crop Production Plan should be properly maintained including description of the crops in the production cycle, source of planting material, list and source of agri-inputs, practices and procedures, etc.
- The organic growers should proceed with a clear Conversion Plan in consultation with certifying agency.
- Seed and planting material should be from certified organic source. In case certified organic source is not available, non-certified organic and chemically untreated seed or planting material may be used.
- Organic growers should undertake soil and water conservation measures, especially in hilly terrains.
- The irrigation water should be free from all sorts of contamination.
- Soil testing is always recommended for organic nutrient management.
- No products or input which are prohibited as per NPOP guideline should be used.
- Before using any commercial bio-product or product under restricted use as per NPOP guideline, certifying agency must be consulted.
- Organic farms should maintain sufficient bio-diversity.

Organic Production Packages for Important Crops

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