

# Organic Farming in Northeast India

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The northeast region (NER) of India consists of eight states viz. Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura have considerable opportunities for organic farming due to the least utilization of chemical inputs in farmlands, which is estimated to be 18 million hectares. The agricultural production system in these regions persists mostly in traditional eco-friendly ways, particularly in hilly regions and sensitizing the farmers to the methods of organic farming does not pose a challenge. Most of the upland areas under shifting cultivation (jhum) are organic by default and the regions utilize limited fertilizers (Table 1), also the usage of pesticides is relatively low. NER has a potential of about 47 million tonnes of organic manure including 37 million tonnes from animal excreta and 10 million tonnes from crop residues. Due to the occurrence of high rainfall (200-1100 cm annum<sup>-1</sup>) and favourable climatic conditions, there is profuse production of biomass including weeds, shrubs and herbs both in cropped and non-cropped areas. Biomass production in weeds roughly ranges from 5-20 tons ha<sup>-1</sup> depending on the weed species, season and growing conditions, which can effectively be utilized for the production of valuable organic manure through vermicomposting. The region, being

a hot spot of bio-diversity due to its warm humid climate with an abundance of forest and hilly areas, is an added advantage that all the households are maintaining livestock (pig, poultry, cattle, goats, etc.) producing sufficient quantity of on-farm manures, which could be efficiently used for organic agriculture.

## Steps to Initiate Organic Farming

1. Conversion requirements- 2 years before sowing of annual crops and 3 years before 1st harvest in case of perennials.
2. Farming practice- IPM and INS procedures excluding chemical fertilizers and chemical pesticides are acceptable. GMOs are excluded. Emphasis on soil and crop management practices that enhance population and efficiency of below-ground soil biodiversity for in-situ recycling/rapid composting of on-farm residues and wastes.

## Soil and crop management in an organic production system

The organic farming system encourages the use of mixed/intercropping, crop rotation and manure to maintain soil fertility. As soil fertility gets depleted by growing one single crop year after year and susceptible to attacks of particular insect pests and diseases, mixed/intercrops are advantageous in many ways viz. when cereals/milletts are mixed/intercropped with legumes, the nodules in the roots of legumes fix the atmospheric nitrogen and enhances the soil fertility. Three-tier cropping, an intensification of crops in time and space dimensions is ideal for sharing sunshine, nutrients and water levels. The intercropping/crop rotation also helps in better utilization of profile moisture, nutrient extraction from various layers of soil and effective utilization of farmland. Although organic manure forms a small part of mineral soil, it plays a vital role in

productivity and conditioning the soil, and serves as food for soil bacteria and fungi, which are responsible for converting complex organic minerals into simple substances readily used by the plant. The number of earthworms known as the farmer's friend, can be increased for making soil rich in organic carbon. Bio-fertilizers are being widely accepted as low-cost supplements to chemical fertilizers, which do not have deleterious effects either on soil health or the environment.

**Bioorganic for ginger, GF1:** Ginger is one of the leading cash crops in NER hilly states. The area under ginger in NER is 30.84 thousand ha which gives a total production of 209.15 thousand tonnes (t) at an average yield of 6.78 t ha<sup>-1</sup> against the national productivity of 3.56 t ha<sup>-1</sup>. However, soft rot or rhizome rot of ginger is one of the major diseases' accounting for an average yield loss of 20-30%. The species multiplies with an increase in soil moisture, especially with the onset of the rainy season wherein young sprouts are most susceptible. The disease spreads very fast especially when the soil temperature reaches 27-32°C and the relative humidity exceeds 90%, taking on an average 10-20 days from the onset to total loss of the affected clumps. Considering the dimension of loss, ICAR Research Complex, Uiam Meghalaya developed a formulation of phytochemicals, GF1, for managing the soft rot of ginger. The formulation is aqueous extract, thermo stable having a shelf-life of one year at room temperature. The procedure is mentioned as follows:

- Mix the formulation at a rate 20 ml per litre of water.
- Treat mother rhizomes for 10-12 hrs in solution before sowing. The same solution can be used for 2nd and 3rd lots. Discard the leftout solution after 30-36 hrs. In one litre of solution, one kg of planting material can be treated.

Table 1. Season-wise consumption of fertilizer (N, P<sub>2</sub>O<sub>5</sub>, K<sub>2</sub>O) in NER zone (kg ha<sup>-1</sup>).

S.N.	State	Nutrient	Consumption ('000 tonnes)					
			2020-21			2021-22		
			Kharif	Rabi	Total	Kharif	Rabi	Total
1	Arunachal Pradesh	N	-	-	-	-	-	-
		P <sub>2</sub> O <sub>5</sub>	-	-	-	-	-	-
		K <sub>2</sub> O	-	-	-	-	-	-
		Total	-	-	-	-	-	-
2	Assam	N	90.54	85.09	175.63	88.50	89.96	178.46
		P <sub>2</sub> O <sub>5</sub>	24.37	30.39	54.76	22.74	25.51	48.25
		K <sub>2</sub> O	21.58	27.65	49.23	21.08	13.83	34.91
		Total	136.49	143.13	279.62	132.32	129.30	261.62
3	Manipur	N	7.49	3.23	10.72	6.38	3.21	9.59
		P <sub>2</sub> O <sub>5</sub>	1.07	1.47	2.54	1.95	0.70	2.65
		K <sub>2</sub> O	0.50	1.11	1.61	0.04	0.10	0.14
		Total	9.06	5.81	14.87	8.37	4.01	12.38
4	Meghalaya	N	-	-	-	-	-	-
		P <sub>2</sub> O <sub>5</sub>	-	-	-	-	-	-
		K <sub>2</sub> O	-	-	-	-	-	-
		Total	-	-	-	-	-	-
5	Mizoram	N	0.54	0.45	0.99	0.09	1.15	1.24
		P <sub>2</sub> O <sub>5</sub>	0.09	0.04	0.13	0.02	-	0.02
		K <sub>2</sub> O	-	-	-	0	-	-
		Total	0.63	0.49	1.12	0.11	1.15	1.26
6	Nagaland	N	0.23	0.07	0.30	0.07	0.17	0.24
		P <sub>2</sub> O <sub>5</sub>	0.04	-	0.04	-	-	-
		K <sub>2</sub> O	-	-	-	-	-	-
		Total	0.27	0.07	0.34	0.07	0.17	0.24
7	Sikkim	N	-	-	-	-	-	-
		P <sub>2</sub> O <sub>5</sub>	-	-	-	-	-	-
		K <sub>2</sub> O	-	-	-	-	-	-
		Total	-	-	-	-	-	-
8	Tripura	N	4.65	2.63	7.28	5.92	5.39	11.31
		P <sub>2</sub> O <sub>5</sub>	3.25	2.93	6.18	2.79	3.44	6.23
		K <sub>2</sub> O	1.33	1.26	2.59	0.83	0.99	1.82
		Total	9.23	6.82	16.05	9.54	9.82	19.39

Source: Department of Agriculture and Farmer's Welfare, Gol.

- If the rhizome is not treated at the time of planting, the formulation can be used by way of soil drenching around the plant base. 60-70 ml of ready solution should be applied to individual plants.
- Avoid rainy days for effective results, at least 10-12 hours of dry spells are needed.

#### Certification

The certification system for organic food is via NPOP, which stands for the National Programme for Organic Production, which is an initiative of

the government of India that verifies organic products, including cotton. NPOP is managed by the Agricultural and Processed Food Products Export Development Authority (APEDA) under the Ministry of Commerce and Industry. APEDA is assisting the exporters of organic products under various components of its export promotion scheme. In NER, an organic certification system is in place at the Regional Office of APEDA, Guwahati providing details of

the organic certification process and system.

#### Challenges

The major challenge in organic farming is the maintenance and enhancement of soil productivity and ensuring that yields do not go down, fetching premium prices for the produce and building a farmer-friendly organic certification system. Inadequate research back-up with inadequate safeguards for small farmers opting for organic agriculture are major hindrances. For bringing

sustainability into the system, organic farming is a very good alternative. Low input intensity in agriculture of the NEER, rich biodiversity of crops, a wide range of weed biomass, etc. make it ideally suited for organic cultivation.

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