

## Review Article

# Organic Farming in Mizoram – A Prospective Review

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## ABSTRACT

Organic farming is more environment friendly, cost effective and can be practiced easily by locally available resources in Mizoram. When the rules of the market have changed and more and more certified organic foods are fetching good prices in Indian and markets abroad, it is here that a lesson or two learning will lead to uprising among the farmers. Mizoram and Northeast as whole can be the torch bearers in this field of agriculture as farmers here have long realized that tomorrow's ecology is more important than today's economy.

### Keywords

Organic Farming,  
Mizoram

## Introduction

Organic farming is the latest buzzword in the field of Agriculture. Not much time has elapsed, when India met with its tryst of destiny of bumper production in the era of Green Revolution in the early sixties. From the begging bowl status to the lampooning go-downs, India has crossed several milestones in agriculture. But, this was made possible by the pressing demand of the sixties for higher yield, and was more of people centric approach. However, the problem of plenty crept in along with this gigantic achievement and coupled with yield plateauing and widespread reports of soil, water and environment pollution has brought Indian Agriculture again at the crossroads. Times have changed. WTO regime has to be followed and environment has to be cared. In the backdrop of these informations policy makers and researchers

started looking after alternatives. Actually, in the mindless race of meeting the targets, we cared least for our vital natural resources. We, somehow, lost somewhere in between, the vital link of our cropping activity with the fragile natural ecosystem.

Consumers across the countries are becoming wary of products containing pollutants. Recently, there has been spurt in demand for the foods grown organically. With agriculture becoming market savvy, it is high time to generate market driven forces. Several reasons have been emphasized for the need of organic farming like limited land holdings, poor socio-economic conditions of farmers, increasing input cost etc. However, human health hazards and environmental degradations are the two ultimate reasons for the need to

develop Eco-friendly technologies. Organic farming is a management system, which promotes and enhances agro-ecosystem health including bio-diversity, biological cycles and soil biological activities. Soil, “The soul of infinite lives”: is a vital natural resource and is aptly called the lifeline of agriculture. Soil is a dynamic living system which has and which will support innumerable lives only if a little care and affection is shown to it.

National level efforts are now aimed to facilitate the successful adoption of organic farming by the peasants community. India has certain geographical advantages in organic farming such as the northeastern region, whereby the demon of pollutants has not stricken massively and the areas are still virgin for fresh cultivation. The region has plinth already prepared for organic farming. Mizoram is one such state in the North Eastern region, which is situated in the remotest east of India.

Mizoram, a mountainous state is bounded with natural beauty with green and thick forests, rich in flora and fauna. The rich bio-diversity and heavy dense forests decorate beautifully the state. Having sub-tropical and humid climate with an average temperature of 11<sup>0</sup> to 21<sup>0</sup> C in winter and 20<sup>0</sup> to 30<sup>0</sup> C in summer, with an average rainfall of 250 cm. per annum, has bestowed the soils with high organic matter status. However, landscape configuration of Mizoram has given rise to wider variation in slope and topography. Jhumming is rampant and most of the farmers practice this ancient method of slash and burn type of cultivation. Owing to the practices of *Jhum* cultivation in the state soil degradation and soil erosion is widespread. The loss of top soil in some places is so rampant that the bedrock now is exposed. This is the merciless loss of organic matter in the soil.

It has been reported that the soils of the region be in hills, valleys or terraces has more than 1 percent organic matter content which means 20 tones of organic matter/ha. in the plough layer and a soil with 5 % organic matter has 100 tones per hectare in the plough layer. This is very important from crop production point of view, as organic matter is a complex and dynamic soil component that exerts a major influence on soil behavior, properties and functions in the ecosystem. It is actually this large mass which plays host to its ethnic kins which in the form of a few tones of organic manure.

But for a total geographical area of 21.081 m ha. out of which 0.101 m ha. is cultivable, the major groundwork for laying the foundation stone of organic farming is its, low population. The 2001 census says only 8.91 lakh are inhabiting this land. Around the world, millions of farmers are utilizing indigenous technical know-how of crop production which depends upon sustainable use of production resources. With the low population to natural resources that existed in earlier generations, these systems were sustainable.

But with increased population, these ratios increased dramatically and the time of rejuvenation of soil was greatly reduced and the land was thus overused. It is into this backdrop, that the organic farming status, potential, possibilities have been examined in the state of Mizoram.

### **Organic farming describes two major aspects of alternative agriculture**

The substitution of manures and other organic matter for inorganic fertilizers.

It minimizes environmental pollution, conserves vital natural resources and thus it is sustainable.

## **Recyclable Organic Resources in Mizoram**

Plenty of organic waste from agriculture, animals and human being is available which is rich in nutrient. There are several types of material mainly from plant or animal origin directly or indirectly in decomposed form, which can be utilized for sustainable crop production.

### **Livestock wastes**

Animal shed wastes – Dung, Urine, Litter material, food & fodder left-outs

Byproducts of slaughterhouses: Blood and meat wastes, bones, horn and hooves, leather and hair wastes.

### **Crop residues, tree wastes**

Crop wastes of cereals, pulses and oilseeds. Stalks of various plants and trees.

### **Urban and Rural wastes**

Rural and urban solid wastes.  
Urban liquid wastes- sewerage and sludge.

### **Vermi Composting**

#### **Bio-fertilizers**

Rhizobium sps, PSB, Azotobacter, Azolla, BGA.

#### **Green Manures**

#### **Agro- industries byproducts:**

Oil cakes.  
Paddy husks and bran.  
Bagasse and pressmud.  
Sawdust.  
Fruit and vegetable wastes.

Cotton, wool and silk wastes.  
Tea and tobacco leaves.

Crop residues are the remnants of crops left over after harvesting and threshing. Being easily accessible to the farmers for use on their land, crop residues have traditionally played an important role in maintaining soil productivity.

Estimates of the availability of crop residues rural and urban composts, Vermicomposting capacity, bio-fertilizers and agro-industries wastes have largely remained ah-hoc in Mizoram.

The Mizos by tradition are completely non-vegetarian. The Mizos are very fond of keeping animals in the house and it is valued as a treasure of the house. Each and every household may keep a pig, goat, Cattle, poultry birds and so on. Pig figured as one of the main treasures of the households. Such is the custom of Mizos, that Mithun was offered by bridegroom as the price to the parents of the bride when marriage took place without which a traditional marriage could not be settled.

### **Manurial potential of Mizoram**

For centuries, the excreta of animals has been used as manure. From the soil fertility point of view, the excreta of various animals is important for the supply of major nutrients, N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, and organic matter, trace elements etc.

As such, The chemical composition of the excreta of different animals and their total population can give an approximate value of the total nutritional content of these manure. Experiments have clearly shown that these animal manures are not only rich in major nutrients but several micronutrients are also present in these.

**Table.1** Approximate quantity of plant nutrients for some typical organic manures

Organic manures	Primary Nutrients (%)				Micro-nutrients (mg/ kg)				
	N	P	K	Fe	Zn	Mn	Cu	B	Mo
FYM	1.00	0.54	0.9	2600	57	250	2.5	2.1	0.7
Pig manure	1.88	2.13	0.67	1200	50	70	8.9	-	-
Poultry manure	1.89	1.90	1.60	1400	90	210	7.1	5.0	-
Goat / Sheep manure.	0.65	0.50	0.03	-	2570	150	61	4600	-

J.C. Katyal (1992)

**Table.2** Dung / Excreta production per animal per year (dry weight basis)

Livestock	Range (t/ yr.)	Average (t/yr.)
Cattle	0.1 – 1.8	1.10
Buffalo	0.8 – 1.9	1.35
Horse	0.4 – 0.6	0.5
Pig	0.2 – 0.3	0.25
Sheep / goat	0.1 – 0.2	0.15
Poultry	0.14	0.14

**Table.3** Livestock population, excreta produced per head and dung production per animal per year of Mizoram, 2002

Animals	Animal population (in 'ooo)	Dung production per animal per year (Dry weight basis) in tonnes/year	
		Range (t/yr)	Average (t/yr)
Cattle	33	0.4-1.8	1.10
Buffalo	5	0.8-1.9	1.35
Pigs	163	0.2-0.3	0.25
Sheep	1	0.1-0.2	0.15
Goats	16	0.1-0.2	0.15
Horses	2	0.4-0.6	0.5
Total poultry	1307	0.14	0.14

**Table.4** Estimated nutrient potential of major animal manures of Mizoram

Animal manure	Animal population (in 000)	Average dung production/ (dry wet basis kg/yr.)	Primary Nutrients (tonnes)				
			Total (t/ yr.)	N	P	K	Total
Cattle	33	1100	36300	0.363	0.196	0.32	0.88
Buffalo	5	1350	6750	0.06	0.036	0.06	0.15
Pigs	163	250	40750	0.76	0.77	0.65	2.18
Sheep	1	150	150	0.00097	0.00075	0.000045	0.0017
Goats	16	150	2400	0.015	0.012	0.00072	0.027
Total poultry	1307	140	182980	3.29	3.47	2.92	9.68
Total				4.489	4.48	3.95	12.91

On an average cattle produces 15 –18 kg of dung. It has been observed that 70 –80 % of the dung produced by various animals are water and after drying which is the state to be applied into the field it remains only 20 % percent. Table 2 shows the dung and excreta produced per animal on a dry wet basis that after drying the recyclable waste of various manure are 1.10, 1.35, 0.25, 0.15, 0.15, 0.5, 0.14 tonnes for cattle, buffalo, pigs, sheep, goats, horses, total poultry respectively. Experiments have clearly shown that these animal manures are not only rich in major nutrients but several micronutrients are also present in these.

Livestock population of Mizoram of which there is some utilisable manurial potential which is existing at present has been presented in the table 3.

The total cattle population of the state is 33 thousand, buffalo 5 thousand, pigs 163 thousand, sheep 1 thousand, goats 16 thousand, horses 2 thousand and total poultry population existing at present both in the various poultry farms and unorganised sector comes out to be 1307 thousand.

Table 4. Shows the different nutrient composition of various animal manures and if we multiply these manurial composition to the existing population of the state, a birds eye view of these manures for their N P K content can be obtained. The table shows that total N P K nutrient of the combined population of Mizoram is 12.91 tonnes at the level of population which is reported till date.

### **Prospects of different animal manures for its potential uses**

All manures vary in composition of nutrients. All of these quantities are not available to crops in the year of application;

It is assumed that only  $1/3^{\text{rd}}$  of N & P may be effective and most of the potash will be available for the first crop. This is called as direct effect of application. The remaining amount of plant food becomes available to the second, third and to a small extent fourth crop raised on the same piece of land. This is known as the residual effect of organic manures. Thus organic manures have a lasting effect on soil productivity when FYM is applied every year; the crop goes on increasing due to direct plus residual effect on every succeeding crop. This is also known as cumulative effect.

Average quality of FYM contains 12 kg. nutrients / tone and is equivalent to 3 kg. fertilizer nutrients in the first crop.

It is assumed that 87.7 kg. fertilizer N produced one tone paddy. Therefore, 20 t FYM is equivalent to 87.7 kg. fertilizer N (1 t FYM = 4.4 kg. Fertilizer N).

On an average, 104 kg. (N + P<sub>2</sub>O<sub>5</sub> + K<sub>2</sub>O) or 28.8 t FYM are needed to increase paddy yield by one tone. Thus, tentatively each tone FYM can be equated with 3.6 kg. N + P<sub>2</sub>O<sub>5</sub> + K<sub>2</sub>O. of fertilizer nutrients. These computations show that fertilizer application rates can be adjusted @ 3.6 kg. NPK for each tone FYM available.

General recommendations result from experiments on farmers fields while site – specific recommendations can be had on the basis of soil tests. Optimum application rates represent the cutoff point – that is farmers are not advised to exceed these and application beyond the optimum will not bring in any additional net gain. Application rates below the optimum level are of course a common feature of Indian Agriculture and most farmers apply according to their resources or their notion of what is “optimum” for their conditions.

### **Factors influencing manurial composition**

The quality and general character of animal manures are affected by:

- Source of manure.
- Food of the animal.
- Age and the condition of the animal.
- Function of the animal.
- Manner of storage.
- Nature of litter.

### **Possibilities of animal manures in Mizoram**

Mizo farmers need adequate resources for augmenting the crop productivity. The uses of wastes of animal origin is one of the major under utilized resource for them.

These wastes are very important in sustaining subsistent agriculture. These animals excreta are available both at the backyard of rural houses and in the dairies. Part of the total excrement remains in the pasture and range land but large volumes accumulate in feedlots and buildings. However certain constraints are there which are listed below under Mizoram condition.

### **Constraints regarding the use of these manures in Mizoram**

Scattered dropping pose collection problems.

Bulky in nature poses transportation problems.

Larger proportion of the dung is used for dung cakes and burnt as fuel.

There is improper and wasteful preparation of the manure.

Leaching during the rains and drying during

the hot months, storage pits or heaps lead to loss of nutrients.

Non- availability of viable technology for their economic – recycling.

Lack of awareness among the farmers regarding use of these manures

Undulated topography of the state is other reason for it

Higher labour costs for its application

There is no need to emphasize that organic manures influence favorably plant growth and yield directly as well as indirectly.

The indirect effects include augmentation of beneficial microbial population and their activities such as organic matter decomposition, biological nitrogen fixation, solubilization of insoluble phosphates and availability of multi-nutrients.

In addition to N, P, K, a fair amount of micro-nutrient such as Mn, Zn, Cu, Fe, Mo are simultaneously added to soil.

Organic manures improve the soil structure, seed germination, water holding capacity, drainage, base exchange capacity and check soil erosion. The direct effects relate to the uptake of humic substances or its decomposition products affecting favorably the growth and metabolism of plants

### **The important reasons for which Mizoram should adopt organic farming can be**

Most of the soils contain high organic carbon/ organic matter status.

One of the lowest nutrient addition (13kg NPK /ha) by fertilizer sources in India

Widespread jhuming practice uses nil or no fertilizer

Total population of the state is 8.91 lakh (2001 census) and population density is 33/Sq.Km.

Majority of people are non-vegetarian and rearing animal is essential.

Good population of pigs and poultry which yield high nutrient load organic manures

Labour availability is cheap and the locally available Mizo cart can easily lift these bulky manures.

Majorities of the farmers are resource poor and are subsistent in nature.

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