



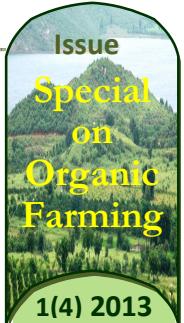
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## Importance of Quality Farm Yard Manure in Improving Soil Health

Dhram Prakash and Pritpal Singh

\*Ph.D. (Scholars), Department of Soil Science, PAU, Ludhiana, Punjab, India

\*Email of corresponding author: [dhramprakashtoia@gmail.com](mailto:dhramprakashtoia@gmail.com)

Only a small portion of animal dung is being used for preparing quality manure. By the adoption of conventional methods, animal dung is not properly decomposed. In open heaps, animal dung remained exposed to sunlight and rain water, and thereby experiences serious nutrient losses via volatilization and leaching processes.

### Introduction

Prior to '*Green Revolution*' in Punjab (India), farm yard manure (FYM) was an exclusive source of plant nutrients for field crops. During this period, many crop varieties were released which were having a higher yielding potential, but at the same time they were having higher nutrient needs. The cultivation of these crop varieties coupled with tremendously escalating human population had compelled the farmer's to make use of chemical fertilizers for nourishing their field crops. Furthermore, the easy accessibility of chemical fertilizers at cheaper and subsidized rates has resulted in decreased interest of farming community towards the use of organic manures in crop production. The cropping intensity in Punjab has increased from 136% during 70's to 189% during 2008-09. Furthermore, the adoption of rice-wheat cropping system for the last few decades has resulted in several micro-nutrient deficiencies and soil health problems in Punjab soils. A long-term experimentation on soil health and fertilizer management accomplished at Punjab Agricultural University, have substantiated that long-term sustainability in maintenance of soil health can only be ensured if chemical fertilizers are used conjointly FYM. Farm yard manure has a great significance in maintaining soil health. But, unfortunately a major part of animal dung produced in Punjab is burned as fuel. Only a small portion which is being used for preparing manure, is also not properly decomposed, which leads to the formation of poor quality of farm yard manure. Most of farmer's in the state used to heap the fresh dung in open fields after collecting from under sheds. Openly heaped dung besides causing pollution particularly during rainy season, also remained exposed to sunlight and rain water, and experiences serious losses of

several essential plant nutrients through evaporation and leaching. Therefore, there is need to adopt proper decomposition procedure in pits, so that quality manure can be prepared and soil health and crop productivity be sustained on long-term basis.

### **Advantages of Applying FYM to Soil**

- It helps in improving soil health through its effect on amending soil physical, chemical and biological properties
- It ensures proper aeration in soil and improves water holding capacity of soil
- It helps in improving soil structure
- It helps in more efficient utilization of chemical fertilizers. For example, it helps in increasing availability of phosphorus to crops by converting insoluble phosphorus forms to soluble forms
- It acts as slow release fertilizers and supplies plant nutrient to the growing crops for longer period of time
- It helps in checking soil erosion occurred through wind and water
- It helps in increasing the population of soil micro-organisms that enhances the availability of plant nutrients in the soil
- It helps in ameliorating salt affected soils and helps in mitigating the harmful effects of sodic irrigation water to crops
- It helps in modifying the soil temperature
- It helps in improving soil organic carbon status (carbon sequestration)

### **Method of Preparing Quality FYM**

**Collection of dung and urine:** It is generally seen that farmer's in villages pay less attention towards preparation of quality FYM. Farmer's generally hesitate to use soaking material (crop residue) under animals. However, under rare cases, if they dress the residue under animals, that again is either in a very small quantity or of very poor quality, that can soak low volume of urine. Due to this reason, a major portion of urine which is a good source of nitrogen and sulphur in particular drains away and actually does not become the part of manure. According to the estimates, about 70% nitrogen, 70% phosphorus and 90% potassium consumed by animals through feed and fodder come out of their body through dung and urine. Approximately 55% nitrogen and 82% of potassium remains in urine and remaining 45% nitrogen and 18% phosphorus remains in their dung. However, almost all phosphorus remains in animal dung. Therefore, our effort should be such that dung, urine and urine soaked crop residue are collected

and used for preparing FYM, so that urine becomes an integral component of FYM. The selection of crop residue should be made in such a way that it should soak urine in volume greater than its own weight. For this purpose, the use of rice straw may be an appealing option, as it can soak 3-4 times more than its own weight.

**Pit formation and filling:** The quality FYM can be prepared by decomposing the material in pits. The size and dimensions of pit generally depends upon the number of animals and the quantity of available dung. Generally, a pit of 6-7 meter length, 1.0-1.5 meter width and 1.0 meter in height is sufficient for handling a dung of 3-5 animals. The filling should be done in three stages. The base of pit should be dressed with a thick (upto 1/3<sup>rd</sup> of pit height) layer of rice straw, so that the urine can be soaked. Thereafter, spread the freshly collected dung, urine and urine soaked residue uniformly inside the pit. As and when the level material inside the pit reaches near or around 1.0-1.5 feet above ground level, the surface should be covered with thin layer of dung. The filling of another portion should be made in this way. The material inside the pit gets converted into a good quality FYM within 3-4 months.

### Need of Pit Formation for Preparing FYM

It has been observed that material can be converted into quality FYM if adequate (60-70%) moisture has been maintained throughout the decomposition process. However, in villages the large sized dung heaps are commonly seen, where the moisture is lost due to evaporation during hot summer season. Additionally, the losses of soluble nutrients also occurred during rainy days, leading to preparation of poor quality FYM. But, if the material is decomposed inside the pits with adequate precautions, the nutrients can be conserved upto 75%. The reproduction of flees also remained checked in this procedure of preparation of FYM.

### Nutrient Composition of FYM

The content of nutrients in FYM depends largely on the extent of decomposition and methods adopted for the decomposition process. Beside, the extent of losses occurred during handling of material (particularly urine) from under the sheds to its filling inside the pits; also govern the quality of FYM. Well decomposed FYM may contain nitrogen from 1.2 to 2.0%, phosphorus from 0.5 to 0.7% and potassium from 1.2 to 2.6% (Table 1). The content range of secondary and micro-nutrients in well decomposed FYM has been given in Table 1.

**Table 1: Content (range) of plant nutrients in farm yard manure**

Nutrient	Content (%)	Nutrient	Content ( $\text{mg kg}^{-1}$ )
Nitrogen	1.2-2.0	Zinc	80-160
Phosphorus	0.5-0.7	Copper	10-110
Potassium	1.2-2.6	Iron	2000-3500
Calcium	0.2-3.8	Manganese	100-340
Magnesium	0.2-0.7	Boron	12-72
Sulphur	0.3-0.5	Molybdenum	1-18

### **Some Important Tips**

- The selection of pits site should be made in such a way that there should not be any risk of entering rain water inside the pits. However, thick bunds can also be constructed alongside the pits, to avoid entering rain water inside the pits
- Care should be taken to select good quality bedding material for soaking urine

### **Conclusion**

Preparation of manure in pits conserves plant essential nutrients, and therefore that leads to the formation of good quality farm yard manure.