Organic Materials and Manures

Rice Science for a Better World

rice fact sheets

What are organic materials and manures?

Organic material and manures are those materials that come from plant or animal waste or by-products such as cattle or poultry manure, composted rice straw or other crop residues, sewage sludge, oil cakes, green manures, and legume clippings.

How to use organic materials and manures?

Organic material or manure is normally applied uniformly across the field, two or more_weeks before being incorporated into the soil during land preparation. Sometimes rice straw is directly composted in the field.

Why use organic materials and manures?

Manures and other organic sources are used to improve soil fertility and soil organic matter content and to provide micronutrients and other growth factors not normally supplied by inorganic fertilizers. Application of these materials may also enhance microbial growth and nutrient turnover in soil.

Organic material	% N	% P_2O_5	% K_2O
Crop residue (rice straw)	0.5-0.8	0.15-0.26	1.2-1.7
FYM (cattle manure)	0.8-1.2	0.44-0.88	0.4-0.8
Compost	0.5-2.0	0.44-0.88	0.4-1.5
Sewage sludge	1.6	1.76	0.2
Pig manure	0.7-1.0	0.44-0.66	0.6-0.9
Sheep & goat manure	2.0-3.0	0.88	2.1
Poultry manure	1.5-3.0	1.15-2.25	1.0-1.4
Oil cakes	2.5-8.0	0.66-2.86	1.2-2.3
Green manures			
Sesbania	1.7-2.8	0.1-0.2	1.4-1.9
Azolla	2.0-5.3	0.16-1.59	0.4-6.0

Examples for the nutrient content of various organic materials.

Addition of rice straw in the field and manure.

How much do I apply?

To apply the equivalent of 100 kg N ha^{-1}, use:

Urea (46% N)	Poultry Manure (2% N)	Cattle Manure (1% N)	Compost (0.5% N)
217 kg	5,000 kg (or 5 t)	10,000 kg (or 10 t)	20,000 kg (20 t)

Nutrient source	N (%)	P_2O_5 (%)	K_2O (%)	Price (US$/kg)	Amount required (kg)	Price (US$) for 100 kg N, 50kg P_2O_5, & 50 kg K_2O per ha
Cattle manure	0.8	0.3	1.0	0.03	12,500	375
Urea	46	--	--	0.14	217	77
SP36	--	36	--	0.21	139	
KCl	--	--	60	0.21	83	

Organic manures are sometimes more expensive than inorganic fertilizers

Applications of organic material can be difficult as it:

1. can be bulky, with high handling and transport costs.
2. may have high costs per unit of nutrient.
3. is not always available.
4. has to be applied at the beginning of the crop (thus early applications may not meet later crop demand for nutrients).
5. can have an unpleasant odor, making it undesirable for farmers and others.

Combining organic manure and fertilizer

It is advisable to combine the use organic manures with the application of inorganic nutrient sources as needed. This allows farmers to use organic materials or manure available on-farm at low cost to supply a portion of the crop's demand for nutrients and improve soil fertility where required. The use of organic manures available on-farm can return high yields and profit when combined with inorganic fertilizer, particularly on upland or poor lowland soils. However, it is often not profitable to buy organic fertilizers even if they are sold as fortified organic fertilizers, which is a ready mix of organic and inorganic fertilizers.

Further information

Keys to diagnose problems in the field, visit http://www.knowledgebank.irri.org/ricedoctor.

For an overall view of crop management practices, visit http://www.knowledgebank.irri.org/tropRice.

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