

Economics Of Organic Manure Use By Food Crop Farmers In Ecologically Vulnerable Areas Of Imo State,Nigeria.

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Abstract: This paper views the cost and returns of organic manure use among food crop farmers in ecologically vulnerable areas of Imo State, Nigeria. Empirical results of experiments conducted to evaluate the benefits or otherwise of organic manure use in different food crop production were reviewed, collated and appraised. Besides, organic manure used in combination with inorganic manure (fertilizer varieties) were also collated and analysed. The result showed that organic manure when used alone or in combination with inorganic fertilizer ensures increment in growth and yield of food crops, weed control, 50% reduction in expenditure on fertilizer, 40% topsoil retention capacity, mitigation of crude oil pollution on soils, control of soil erosion and salinity, and reduction of contamination from pesticide use. Sequel to the obvious numerous benefits of organic manure, its use should be encouraged by government and other relevant non- governmental organizations.

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Introduction

In Nigeria, intensive cropping is gradually replacing the traditional shifting cultivation that is associated with long period of fallow but low crop yield. The steady decline in food crop production due to reduced length of fallow on land prompt farmers to amend the soil with different materials (organic and inorganic) in order to enhance plant growth and increase crop yield (Reijntjes et al., 1992; Adepetu, 1997, Sobulo and Babalola 1992, Ismail et al. 1996, Olayinka 1996 and Olayinka et al. 1998).Types of organic materials used are cow dung, poultry droppings, refuse compost and farmyard manure.

This use of organic manure to meet the nutrient requirement of crops would be an inevitable practice in the years to come for sustainable agriculture since organic manure generally improves the soil physical, chemical and biological properties along with conserving the moisture holding capacity of the soil and thus resulting in enhanced crop productivity, along with maintaining the quality of crops produced (Maheswarappa, et al, 1999). Although organic manure contains plant nutrients in small quantities as compared to the fertilizers, the presence of growth promoting principles like

enzymes and hormones, besides plant nutrients make them essential for improvement of soil fertility and productivity(Bhuma,2001)

From the foregoing, the overwhelming interest in the use of organic manure as against inorganic fertilizers has been observed but a gap still exists about the cost and returns associated with its use among the various food crop farmers. Hence this paper reveals the cost and benefit paradigm of organic manure use by food crop farmers in Imo State.

Organic Manure:

Organic manure covers manures made from cattle dung, excreta of other animals, rural and urban composts, other animal wastes, crop residues and last but not the least green manures. Organic manure is time tested materials for improving the fertility and productivity of soils. Almost any kind of organic matter may be used as manure, but some kinds are better than others. Organic manures vary widely in the amount of plant nutrients that they contain. Some are more concentrated than others. Compost is one of the less concentrated organic manures, but it is extremely valuable in adding extra body to soils

especially the sandy ones. Compost can also help to lighten heavy clay soils

Simple Chemical substances are taken up by plant roots in dilute solution. Organic substances are complex and insoluble and must be broken down or decomposed before they may be taken up by a plant's roots.

Therefore, organic manures which break down or decay quickly are available to the plant faster than those which decay slowly. The rate of decay is a function of temperature. The higher the temperature, the more quickly the nutrients in the manure will become available to the plant. At the same time, the quicker that the nutrients become available to the plant the more rapidly those nutrients will be depleted. In practice, too much organic manure applied at once will decompose before the plant may make use of it. So smaller applications of manure applied frequently are more beneficial to the plant than larger applications applied less frequently.

Types of Organic Manure

Cow, Horse or Sheep Manure -- Are the most common organic manures available. Elephant manure (when the circus is in town) may be used in the same way as Cow, Horse and Sheep Manure. These manures may be used by mixing with soil or by adding them to compost. When fresh, they may be mixed with water and the resulting manure tea applied to the soil around the plants. These manures, when dried, may be also mixed with potting soil. Because these manures do not contain a high proportion of plant food frequent applications are required.

Urine -- Yes, pee. Whether from man or animals it is an extremely valuable manure as it contains a higher proportion of nitrogen than Cow, Horse, Sheep or Elephant Manure. As the valuable chemical substances are already in solution they are immediately available for plant use. Urine should not be used fresh but kept for a few days then diluted at a ratio of 1 to 4 with water. It may then be applied directly to the ground around plants. Urine is also useful as a source of added nitrogen to compost. Be aware that urine should be kept in a closed container out of the house prior to use as it will definitely become stinky.

Poultry Manure -- This is available from Chickens, Duck, Geese, Turkeys, Pigeons, Parrots, and so on. Poultry manure may be used fresh when mixed with soil or as a poultry manure tea after first being rotted for a short time in water. Poultry manure is more concentrated than the cattle manures mentioned above as it is high in nitrogen. Poultry manure should be stored in a closed container as it is foul-smelling.

Bat Guano -- This comes from caves inhabited by bats. It is somewhat of a boutique fertilizer and tends to be rather expensive for small amounts. Bat Guano is usually higher in phosphorus than nitrogen and may be used in the same way as cattle manure.

Bone Meal -- This organic fertilizer is made from the bones of animals which have been used as food. It contains nitrogen but is valued more for its phosphorous and calcium content.

Blood Meal -- This is a concentrated organic manure. It is high in nitrogen and must be kept in an airtight container as it is hygroscopic (attracts water). When this happens, some of its nitrogen value is lost.

Fish Meal or Fish Emulsion -- This is a good fertilizer, but tends to be extremely fishy smelling. However, it is a good source of nitrogen and some phosphorous.

Seaweed -- With beach access available in most of Florida, this is a fairly easy manure to obtain at no cost. Seaweed is an excellent source of calcium and potash. Prior to using seaweed though, be sure to wash it thoroughly to remove the salt. Dig it directly into the soil or compost it.

Sludge (or Milorganite®) -- While it has a slight odor, dried sludge is safe to use and mostly odorless. It may be added to the soil or compost pile.

Green Manure -- Grass and weeds that have been cut from your lawn or pulled from your garden make a good humus. Be sure to allow them to rot well in the compost pile before using as pieces of the roots and seeds may re-grow where you least want them to. Green manure helps to add body to sandy soil.(Nehrling,2008)

Table 1. The Effect of Use of Organic Manure and Inorganic Manure on Sugar cane.

K,P,Ca,Mg,... in	Chlorophyll	Leave Area Index	Total Dry matter	Sugar yield	Cane yield	Plant populn density	Leaves contents
<u>SUGAR CANE IN BANGLADESH</u>							
Organic Manure	slightly increased	rapid growth	higher	-	-	-	higher
Inorganic Manure	-	-	-	-	-	-	lesser
Organic/inorganic (15t/ha)	-	-	-	9.47t/ha	108.4t/ha	163.4x10 ³ /ha	-
Note: 25% reduction of inorganic manure can be possible with the use of organic manure at the rate of 15t/ha in Sugar cane production.							

Source: Adapted from, Bokhtiar and Sakurai (2005).

The Effect of Use of Organic Manure on Rice

Organic manure was also used in two rice cultivars Matangini (improved) and Champaisali (local) in India. There was a significant increase in the yield of rice when organic manure was added at 10t/ha. This yield increment was found to be equivalent to the yield when inorganic manure (N Fertilizer) was applied at the rate of 20 and 40 kg/ha. However, the maximum yield was produced when organic manure application was supplemented with 40 kg N/ha. (Ghosh and Sharma, 1999)

Table 2. Effect of Urea(U) and Goat manure(GM) on Growth and Yield of Celosia Plant.

Treatment	Plant Height (cm)	Number of leaves/plant	Stem girth (cm)	Root length (cm)	Stem weight (g)	Leave weight/plant (g)
No treatment	3.5	4.8	0.66	5.3	5.9	8.3
10t/ha GM	4.5	7.5	1.02	10.7	11.7	11.8
125kg/ha U	5.9	9.1	1.05	11.4	30.0	22.8
125kg/ha U+						
2t/ha GM	7.4	10.1	1.11	13.0	73.2	29.4
125kg/ha U +						
4t/ha GM	8.2	11.1	1.24	17.3	73.2	51.1
125kg/ha U+						
6t/ha GM	9.4	11.7	2.23	17.2	86.1	65.9
125kg/ha U +						
8t/ha GM	7.2	9.5	1.33	14.0	56.4	40.3
LSD (0.05)	0.3	1.5	0.47	1.4	7.6	3.2

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Mean Values for 3 Experiments

Source; Ojeniyi et al, (2003)

Table 3. Effects of Goat Dung Manure(D) and WoodAsh(A) on Growth and Yield of Amaranthus

Treatment weight (g)	Mean plant Height(cm)	Mean Number of Leaves/Plant	Number of Branches	Stem Girth (cm)	Stem weight (g)	Leave
No Treatment	31.3	26	7		2.8	15.4
11.5						
2t/haA	31.2	36	8		3.7	18.7
19.2						
8t/haD	65.7	70	19		6.0	68.3
55.2						
2t/haA +2t/haD	60.7	68	14		5.3	38.8
30.0						
2t/haA+4t/haD	48.1	76	15		5.3	42.8
40.7						
2t/haA+6t/haD	53.4	73	16		4.3	43.3
40.8						
2t/haA+8t/haD	91.0	106	20		6.2	114.7
84.8						
LSD(0.05)	38.0	28.5	7.3	NS	-	-

Source; Ojeniyi et al, (2002)

Effects of Organic Manure on the Performance of Cowpea (*Vigna unguiculata* (L.) WALP) Varieties and on the Chemical Properties of the Soil.

According to Madukwe, et al (2008) soils treated with organic manure(poultry) significantly improved the levels of Nitrogen,Phosphorus, and Potassium by 0.32, 6.80 and 0.04 respectively. It was equally observed that there was a significant increase in the mean yield of cowpea from 571.9kg/ha to 744.7kg/ha on soils treated with poultry manure. Root nodulation of cowpea was all observed to have significantly increased from 10.3 to about 15.9 also on poultry manure treated soils.

In Imo State the most ecologically oriented soil nutrient depleting problems are those associated with erosion menace, crude oil pollution and farming activities. The effort so far on this piece has shown the effects of organic manure use on soils other than those polluted with crude oil. Hence, this part will showcase the effect of organic manure use on crude oil polluted soils.

Effects of Poultry Manure and Cow Dung on the Physical and Chemical Properties of Crude Oil Polluted Soil

It has been observed that crude oil pollution significantly affected the soil physical and chemical properties and also impaired maize plant growth. At increased level of pollution (300 ml), the soil chemical and physical properties were severely degraded. However, the application of poultry and cow dung manures significantly repaired the degraded soil. It was also observed that poultry manure showed superiority over cow dung in amending crude oil degraded soil. Soil pollution also impaired the maize seed germination and growth. At 300 ml crude oil pollution, the lowest germination percentage (58.50 %) was recorded, but with application of poultry manure germination percentage was 100 %. It was recommended that poultry manure be employed in the amendment of crude oil polluted soils.(Onuh,et al 2008)

Conclusion:

Organic manure has been found to be of great economic value in food crop production. This ranges from increment in growth and yield of food crops when used alone or in combination with inorganic fertilizer, weed control, 50% reduction in expenditure on fertilizer, 40% topsoil retention capacity, mitigation of crude oil pollution condition on soils, control of soil erosion and salinity and reduction of contamination from pesticide use among others. Although these benefits accrue from organic manure use, they do not go without myriads of cost to farmers and non farmers alike. These also range from

contamination of food crops, soil fertility imbalance, pollution, weed problem etc.

An indebt analysis of the findings in this paper reveals that organic manure use has numerous advantages as well as disadvantages which tend to cancel one another. Nevertheless farms where organic methods for cropping are experimented will display more profitability than conventional farms. Organic agriculture is definitely more sustainable in the long run, improving soil fertility terrain and drought resistance greatly. The use of organic manure completely waive off external costs incurred due to investment in chemical pesticides and nutrient runoff and a number of health issues that result from agro-chemical residue. Therefore its use is encouraged.

Recommendations:

In view of the overwhelming potentials of organic manure use in the various crop production problems as shown overleaf, it is note worthy therefore to recommend as follows;

1. That every possible encouragement should be given to livestock farmers especially those in poultry production to boost there output which will not only increase food protein source but will also ensure adequate availability of poultry manure.
2. That extension programmes should be geared towards educating farmers on the abundant advantages derivable from the use of organic manure or its use in combination with inorganic fertilizer.
3. That government agricultural policies should be tailored towards massive production of organic manure via the processing and conversion of refuse, sewage and other organic waste materials which are ordinarily allowed to rot away to useable forms.
4. Finally in order to ensure a sustainable use of organic manure bearing in mind its numerous advantages, researches should be encouraged towards determining the nutrient composition of each organic manure source. This helps eschew nutrient imbalance which has the same detrimental effect like the abuse of the use of inorganic fertilizer.

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