



all about rice

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This is the maiden issue of the educational series titled All About Rice.

We hope this publication will enlighten our leaders in agriculture, education, extension and media, our policymakers and the general public about timely and "hot" issues on rice. We believe that information and knowledge empower people to reason, decide, act and innovate, which make for a dynamic and progressive rice industry.

We welcome comments and views on issues tackled in the articles, suggestions on improving the publication, and ideas for topics to be covered in succeeding issues.



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Organic Fertilizer In Rice: Myths And Facts

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Summary

Much has been written about the benefits of fertilizers and the detrimental effects of chemical fertilizers in agriculture. However, research has shown that organic fertilizers may not altogether be the best option for rice farming.

- Organic materials, after undergoing decomposition especially when applied in large quantities, could cause groundwater pollution.
- Plants do not directly use the nutrients found in organic material.
- The amounts of essential plant nutrients in organic materials, including the commercial organic fertilizers, are very low.
- Organic materials can improve the physical properties of soils only under aerobic soil conditions where upland or dryland crops are grown.
- Soil organic matter will not increase significantly in just one or two years of applying organic materials.
- Organic fertilizer is not the sole factor in improving the quality of the food product.

A strategy that can be used to successfully improve and sustain the productivity of soils is to apply farm wastes (crop residues and farm manure) – which are organic – in combination with proper amounts of chemical fertilizers, taking as added consideration the alleviation of limiting micronutrients.



Organic fertilizers can be a source of essential nutrients for plants as well as for the improvement of soil productivity. On the other hand, use of chemical fertilizers has been blamed relentlessly for the deterioration of soil and water resources and the environment as a whole.

Chemical fertilizers have been generally considered a bane in farming. Pollution of groundwater and of bodies of waters like rivers and lakes has been caused by irresponsible application of fertilizers. Besides the deleterious effect on our waters, fertilizer use has caused the decline in of soil productivity.

The deterioration is not due to the material itself but is due to improper use of chemical fertilizers. The harmful consequences of applying fertilizers can be eliminated or minimized if only we follow this cardinal rule: *application has to be based mainly on the need of the crop and on the capacity of the soils to store and provide the essential nutrients.*

Despite its benefits, organic fertilizers have inherent characteristics that show that it may not be the best option for rice farming.

The Truth About Organic Fertilizers

Despite its benefits, organic fertilizers have inherent characteristics that show that it may not be the best option for rice farming. These characteristics are cited below:

- **Organic materials after undergoing decomposition especially when applied in large quantities could cause groundwater pollution.**

High nitrate levels in groundwater from organic matter have been reported in the US, the Netherlands, and other developed countries where animal populations are large and concentrated in limited areas. Unless in a stable state or humified (resulting from the decomposition), organic fertilizers applied under conditions in which oxygen is at a minimum level (like in flooded rice soils) may produce toxins harmful to the plant.

- **Plants do not directly use the nutrients found in organic material.**

The organic compounds that contain the essential nutrients needed by plants have to be subjected to a process called “mineralization” to be absorbed. For example, plants cannot absorb organic N. The organic N has to

be transformed into its ammonium nitrate forms ($\text{NH}_4\text{-N}$ or $\text{NO}_3\text{-N}$) before it can be absorbed by plants. In a case such as this, the remedy is to apply the micronutrients in organic materials (in inorganic form) through common chemical fertilizers. To do this, one needs to identify which essential nutrients are *limiting* so that they can be applied with the common inorganic fertilizers.

- **The amounts of essential plant nutrients in organic materials including commercial organic fertilizers are very low.**

To supply the amount of nutrients required for high yields, a tremendous volume of organic material is required. To illustrate, there is hardly any organic material that will contain more than three percent nitrogen. Consequently, when one encounters commercial organic fertilizer containing nitrogen higher than three percent, it is likely that such material has been fortified with inorganic fertilizer N.

- **Organic materials are claimed to be important in improving the physical properties of soils such as water-holding capacity, aggregated soil structure, and nutrient-holding capacity. But this could only be true under aerobic soil conditions where upland or dryland crops are grown.**

In humid tropical conditions like in the Philippines, it would take continuous and high rates of organic material application before the benefits may be realized. This is because under humid tropical condition organic matter decomposition is relatively rapid thus organic accumulation in soils is minimal.

- **Soil organic matter will not increase significantly (by as much as one percent or higher) in just one or two years of applying organic materials.**

This is true, given the current recommended rates of organic fertilizers applied. The rates often recommended range from eight to ten 50-kg bags per hectare (400-500 kg) with a moisture content of 35 percent. Since soil organic matter has a role in forming aggregate soil structure, it is unlikely that such a soil parameter could be improved in such a short period especially in rice soils where puddling is a common practice in the preparation of the land for planting.



- **Organic fertilizer is not the sole factor in improving the quality of the food product, such as increased antioxidant content.**

A study in the US showed that it is not the application of organic farming alone that is the reason behind the increase in antioxidants (in this study, the antioxidants studied were polyphenols). Polyphenol content could even be higher in plants applied with inorganic fertilizers for as long as no pesticides were applied.

It cannot be denied, however, that organic materials benefit crop production. Farmers are still encouraged to apply organic materials especially crop residues and farm wastes like animal manure. Proper combination of chemical fertilizers and organic materials remain to be the wiser option.

Conclusion And Recommendation

Despite these disparities, soil organic matter has an important role in increasing the efficiency of nutrient use from chemical fertilizers.

A strategy that can be used to successfully improve and sustain the productivity of soils is to ***apply farm wastes (crop residues and farm manure) – which are organic – in combination with chemical fertilizers, taking as added consideration the alleviation of limiting micronutrients.***

When organic fertilizers are applied with inorganic fertilizers, there is a greater chance for us to sustain fairly high yields and improve soil productivity.

Thus, when organic fertilizers are applied with inorganic fertilizers, there is a greater chance to sustain fairly high yields and improve soil productivity. But we continue to strongly advise farmers to return to the land all farm wastes, i.e., animal manures and crop residues, rather than rely heavily on commercial organic fertilizers. Through this, farmers could be assured of obtaining high yields required to feed the ever-increasing population in the country.

A note to contributors

All About Rice encourages submissions dealing with timely, relevant, and exciting issues and new developments on rice. This paper will come out quarterly. Submissions should provide additional information that will help readers understand specific issues, mobilize public support, and increase appreciation for this staple food and important cultural icon.

Please include a brief statement of the objective/s of the article, a short description of the issue being highlighted, and a discussion of the important points. Limit each submission to approximately three to four pages of double-spaced, typewritten text. Illustrations and photos are encouraged.

Send manuscripts, correspondence, and comments or suggestions by mail or e-mail to:



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