



# SRA-LGAREC UPDATES

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## ROCK PHOSPHATE: ALTERNATIVE SOURCE OF PHOSPHORUS FERTILIZER FOR SUGARCANE

Sugarcane crop needs a lot of NPK fertilizer to increase cane tonnage and sugar yield. The estimated national average requirement of fertilizer was at the level of 165-102-168 kg/ha of N,  $P_2O_5$  &  $K_2O$  respectively (SRA Annual Report 2006).

For Negros and Panay area, the average fertilization was 165-85-105 kgs/ha of N,  $P_2O_5$  and  $K_2O$  respectively (Extension Services-Annual Report 2006).

SRA reported that fertilization input for CY 2006-2007 was equivalent to 29% of the total production cost, however with the increasing prices of fertilizers it can go up to 38.42 %.

When the cost of fertilizers becomes prohibitive, application of major plant nutrients especially phosphorus is commonly dispensed with to minimize expenses. Nowadays this practice will become worse because the most expensive among fertilizers is the Di-ammonium Phosphate (18-46-0), which is the source of  $P_2O_5$ .

Sugarcane farmers should not take lightly the role of phosphorus in sugar production. Bombio et al in 1997 reported that a ton of cane takes an average amount of 1.44 kg  $P_2O_5$ .

Soils planted to sugarcane are already depleted with phosphorus as a result of continuous cropping, therefore there is a need to apply P fertilizer based on analysis of SRA soils laboratory.

Phosphorus could be added to the soil in the form of water-soluble phosphate fertilizer,

however these phosphate fertilizers are very costly and get easily fixed upon application.

Other sources of P that could adequately provide the needed P for growth and reproduction is rock phosphate. It contains 12-30% P as  $P_2O_5$ , indigenous and abundant in the country and less expensive than Di-Ammonium (18-46-0) and Mono-Ammonium (16-20-0) phosphates..

Table 1 shows the comparative cost of fertilization at the recommended rate of 165-85-105 NPK based on SRA- Negros and Panay average fertilization for CY 2005-2006.

The cheapest NPK combination was obtained when rock phosphate (18%  $P_2O_5$ ) was applied as 100% source of recommended P with the addition of 25% of the recommended P supplied by 16-20-0. This is followed by rock phosphate (18%  $P_2O_5$ ) + 25% of the recommended P coming from 18-46-0. The most expensive combination was obtained with all chemical fertilizers using Urea, Muriate of potash and Di-Ammonium Phosphate (18-46-0) as 100% source of P.



Fig.1. Sugarcane plants applied with rock phosphate

Sugarcane farmers can save as much as Php 1,744.80/ha by using rock phosphate (18%

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P<sub>2</sub>O<sub>5</sub>) with the addition of 25% of the recommended rate supplied by 16-20-0 as source of P.

The Urea, Muriate of Potash and Rock Phosphate combination was observed in a 5-year study to give the highest average economic benefit with the application of rock phosphate (34% P<sub>2</sub>O<sub>5</sub>) on the first cropping only and followed by 25% of the recommended P from readily available source 18-46-0 every year for 5 years (Gerardino et al 1998).

An on-going study conducted by Bombio et al. since October 2004 showed that yearly application of rock phosphate (12.5% P<sub>2</sub>O<sub>5</sub>) as source of P plus 25 % of the recommended rate from readily available 18-46-0 consistently gave higher LKg/Ha for three croppings compared to treatment where all the P requirements came from 18-46-0.

The computed saving of Php 1,744.80 per hectare obtained when rock phosphate was used to

| Table 1. Cost of different fertilizer combinations to supply 165-85-105 NPK recommendation.<br>(As of February 5, 2008 cost of fertilizers). |             |                     |                                   |      |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------|-----------------------------------|------|
| Fertilizer combination                                                                                                                       | No. of bags | Price per bag (Php) | Cost of required Fertilizer (Php) | Rank |
| 46 -0 -0                                                                                                                                     | 5.73        | 960                 | 5,500.80                          | 4    |
| 18-46-0                                                                                                                                      | 3.69        | 1,800               | 6,642.00                          |      |
| 0-0-60                                                                                                                                       | 3.50        | 1,100               | 3,850.00                          |      |
| Total                                                                                                                                        |             |                     | <b>15,992.80</b>                  |      |
| 46-0-0                                                                                                                                       | 4.22        | 960                 | 4,051.20                          | 3    |
| 16-20-0                                                                                                                                      | 8.50        | 920                 | 7,820.00                          |      |
| 0-0-60                                                                                                                                       | 3.50        | 1,100               | 3,850.00                          |      |
| Total                                                                                                                                        |             |                     | <b>15,721.20</b>                  |      |
| 46-0-0                                                                                                                                       | 7.10        | 960                 | 6,816.00                          | 2    |
| Rock phosphate (RP)<br>18% P <sub>2</sub> O <sub>5</sub>                                                                                     | 9.44        | 240                 | 2,265.60                          |      |
| 18-46-0 *                                                                                                                                    | 0.92        | 1,800               | 1,656.00                          |      |
| 0-0-60                                                                                                                                       | 3.50        | 1,100               | 3,850.00                          |      |
| Total                                                                                                                                        |             |                     | <b>14,587.60</b>                  |      |
| 46-0-0                                                                                                                                       | 6.43        | 960                 | 6,172.80                          | 1    |
| Rock phosphate (RP)<br>18% P <sub>2</sub> O <sub>5</sub>                                                                                     | 9.44        | 240                 | 2,265.60                          |      |
| 16-20-0*                                                                                                                                     | 2.13        | 920                 | 1,959.60                          |      |
| 0-0-60                                                                                                                                       | 3.50        | 1,100               | 3,850.00                          |      |
| Total                                                                                                                                        |             |                     | <b>14,248.00</b>                  |      |

\* - 25% of the recommended rate

supply the P requirement of sugar cane based on soil analysis can give an estimated saving of **Php 389.83 million** for **Negros & Panay farmers** with a total area of **223,423/ha**. (SRA Extension Services Annual Report 2006)

*Note: Soil analysis and percentage P<sub>2</sub>O<sub>5</sub> analysis of rock phosphate (not less than 18%) are the basic information needed by the sugarcane farmer to be able to substitute the recommended P.*

## References:

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