

SUSTAINABLE SOIL FERTILITY MANAGEMENT OF CROP SYSTEMS IN THE BRAZILIAN CERRADO

Vinicius de Melo Benites¹

¹Embrapa Solos, Rio de Janeiro, RJ, Rua Jardim Botânico, 1024 - 22460-000, Brazil

E-mail: vinicius@cnps.embrapa.br

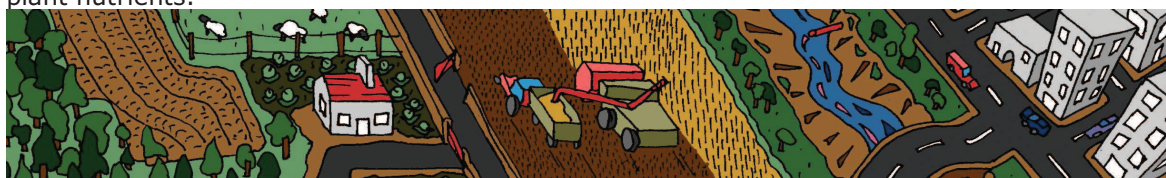
Brazil is the fourth largest global grain and oilseed producer and responsible for approximately 6% of world food production. Most of the areas used to produce grains and fibers are on infertile soils, mainly Oxisols. This requires lime and fertilizer application to reach and maintain an economically production system. Thus, Brazil is also the fourth largest consumer of fertilizer, mostly imported. The high external dependence on fertilizers coupled with the logistical internal problems makes that the fertilizer prices represent the main component in the cost of production. Therefore, actions that increase the efficiency of nutrient use and identify alternative sources of nutrients become strategic to the sustainability of Brazilian agribusiness.

There are significant differences between the agricultural and livestock activity in Brazil concerning the soil fertility management. In soils whose acidity and low fertility have been corrected after several crop seasons, excessive or unbalanced use of fertilizers are very common. Such an inadequate soil management can be reduced best management practices. Practices such as no-tillage combined with integrated crop-livestock systems, in which crop rotations with cover crops are used, promote the accumulation of organic matter and improve nutrient cycling. . Using an efficient management system allows the nutrient losses to be minimized, reducing the application of fertilizer to the maintenance doses, replenishing only the nutrients extracted by crops.

On the other hand, approximately 70 million hectares of agricultural soils are covered by degraded pastures. To recover the fertility of these soils for livestock use is not economically feasible. New ways of management, such as integrated crop-livestock systems are alternatives for the recovery of the fertility of these soils. Since the correction of the fertility of these soils can be made economically possible by integrating agriculture production in the land use system. The recovery of degraded pastures to the agricultural production helps to reduce the pressure for deforestation, especially on the edges of the Amazon region.

Another important issue to be considered is the nutrient cycling from the wastes of livestock and other agro-industrial activities as an alternative to reducing dependence on imported fertilizers. Brazil is one of the largest world animal protein producers, therefore a major producer of organic residues. The total nutrient content present in the livestock wastes represents more than a quarter of whole national nutrient consumption. The reutilization of these nutrients is favored due to the short distance between the animal industries and the areas where grain production is concentrated. Additionally, in the search of alternative sources of nutrients, many rocks are identified as potential suppliers of macro and micro-nutrients to the soil. Some Brazilian rocks, especially sedimentary phosphates and potassium silicate rocks show potential for use in corrective fertilization, considering the nutrient release efficiency in the mid term.

The fertility management practices must be adapted to the tropical agroecosystem, where climatic conditions enable soil cultivation more often than that observed in temperate regions. This situation allows that sources of low solubility fertilizers are used, considering its residual effect on succeeding crops. The combination of good management practices with the use of alternative sources of nutrients arises as a strategy for sustainable soil fertility of tropical agroecosystem, where biological management could be used to increase the availability of plant nutrients.



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