

The Role of Fertilizers in Sustainable Agriculture in Mexico

R. NUNEZ-ESCOBAR

Centro de Edafologia, Colegio de Postgraduados, Chapingo (Mexico)

Generalized use of mineral fertilizers for basic crops in Mexico started in the 1950 decade. The increasing food requirements for a continuously growing population were met by means of an increasing fertilizer consumption, which reached 1.555 million tons NPK in 1990, with a production of about 80 million tons of agricultural products for a population of 82 million people. During this period, national mean wheat yields rose from 911 to 4,017 kg/ha; maize yields from 721 to 1629 kg/ha and bean yields from 258 to 440 kg/ha.

These yield increments were the result of better plant varieties and management practices, of which fertilizer use played an outstanding role. The pressure for higher agricultural production has led to some management practices which have resulted in soil degradation. The most important of these deleterious practices are: deforestation, overgrazing, tillage practices in steep slopes and over-irrigation. The rational use of fertilizers in soils suitable for intensive agriculture can increase crop yields in such a way to compensate for the ephemeral harvests obtained in fragile soils open to cultivation on felled forests. Pasture fertilization is not a common practice in Mexico; however, high pasture yield increments have been observed experimentally with adequate fertilizer use, showing a means for sustained animal feeding without overgrazing.

Proper phosphate fertilization enhances biological dinitrogen fixation by legumes, thus improving pasture quality and forage yields.

Soil regeneration on eroded indurated volcanic subsoils takes place more rapidly with the use of fertilizers and organic manures. The fallow period in shifting, slash-and-burn agriculture has been shortened due to demographic pressures. Fertilizer use in these systems has been essential for soil fertility restoration and maintenance.

In conclusion, increased crop production requires higher availability of plant nutrients; in this task fertilizers play an important role in complement with dinitrogen fixation and recycling of organic residues, in order to achieve agricultural sustainability.