PRECISION FROM THE GROUND UP IN BRAZIL

By Bruce Erickson

Brazil has become a major player in the production and export of grains, producing nearly as many soybeans in recent years as the United States. Like the U.S. it hasn't been as quick to adopt precision farming technologies as many would have predicted. But that's probably where many of the similarities end. Lower overall production costs, especially for land and labor, and a greater percentage of input costs devoted to lime and fertilizers create a different dynamic.

"We often have a different approach to precision farming," says Fernando Martins, agronomist engineer and co-owner of AgroExata, one of several precision sampling and consultation services in Brazil. "In the United States you are adopting precision farming technologies to fit along with existing, established practices. In Brazil, in many cases the technology accompanies the first adoption of the practice."

One-third of Brazil crops are no-tilled.

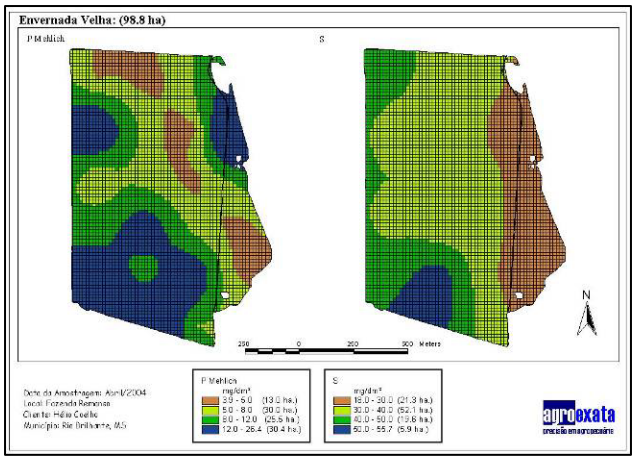
ATM-mounted automated soil sampling equipment used by AgroExata.

Consider the soil testing and recommendation practices that Martins employs with his customers in Brazil. In many cases Martins' testing is the first that is done for a particular piece of ground. Soybean production costs in Brazil are about half of what they are in the U.S. The cost of land, labor, seed, and herbicides are much lower than in the U.S. But fertilizer expenses are significantly higher. This puts additional emphasis on getting the soil nutrient situation right.

Martins' company provides precision soil sampling and recommendation services in some of Brazil's prime agricultural areas. Their business is well established in the state of Mato Grosso Do Sul, and is expanding to the north in Mato Grosso, where farms and fields are larger. 100 ha (250 acre) fields are common.

AgroExata's sampling process is well defined. "Workers, many of them seasonal, run all-terrain vehicles with mounted, automated sampling equipment. Sampling points are predetermined before they head to the field. Once in the field, they collect ten sub-samples in a Z pattern for each 5 hectare (12 acre) grid cell," said Martins. "These are then combined with soil or other information used to create management zones."

While the 5 hectare grid size may seem large compared to Midwest practices, precision is relative. If a huge field has not been soil tested



Nutrient maps are created from interpolating grid sampling data on this 250-acre farm

before, sampling in 5 ha grids imparts a level of detail never before seen in that field. To put in perspective, the 5 ha grid is similar to the 10 acre maximum sample areas recommended by agronomists in the U.S. in the 1960s and 70s for routine soil sampling—before grid sampling using GPS became common.

In the United States, the path into precision agriculture for many producers began with a combine yield monitor and the fascination of the inherent yield variability in fields. Grid soil sampling was a natural continuation, to try to understand and correct some of the variability in soil fertility. It is estimated in Brazil that there are about 130 grain yield monitors, a relatively small number compared to the 30,000 or so in the United States.

AgroExata approaches soil fertility needs from a nutrient balance approach as well as toward nutrient sufficiency levels. Specifically, they try to provide for a balance of certain critical nutrients on soil exchange sites, a philosophy that seems to work with the soils and climate in Brazil. Tissue testing, or leaf sampling is also commonly used to fine-tune recommendations and to tie soil fertility to plant responses.

When labor is relatively inexpensive, there isn't the incentive to replace it with technology as quickly. Variable rate technology is used to amend and fertilize soils according to test results, but much of the variable rate applications are done manually, where conventional equipment is doubled back in areas to increase rates, or the operator stops and starts to change rates. Large fields might seem attractive for the adoption of guidance systems, but with low input costs farm operators so far have been hesitant to invest. It is estimated there were about 1500 light bars in use in Brazil in 2004, and the use of auto-guidance systems is growing.

Along with soybeans, corn is a significant crop in Brazil. But just as many U.S. farmers favor corn and view soybeans as their rotational crop, many Brazilian farmers consider corn second to soybeans. And whether it is corn, soybeans, or another crop, Brazil will be a formidable competitor long into the future. Brazil currently plants about 150 million acres of annual crops, but an additional 250 million acres of cropland are yet to be opened and farmed.

Photos courtesy Fernando Martins

Brazil corn field in December.