# From John Deere to TecnoCientifica: Plowing New Paths in Precision Agriculture

*For the last 30+ years, a quiet agricultural revolution has been taking place that largely evaded mass attention until the 2024 solar storms made headlines.*

GRAIN-Q - TecnoCientifica

BUENOS AIRES, ARGENTINA, October 7, 2024 /EINPresswire.com/ -- A quiet agricultural revolution that began over 30 years ago has entered a new phase of advancement, transforming the way farmers grow and manage their crops. With the recent 2024 solar storms bringing precision agriculture into the headlines, the importance of inch-perfect GPS systems and real-time data optimization has become clearer than ever. However, the benefits of precision agriculture go far beyond what the headlines suggest.

The precision agriculture movement, which quietly emerged alongside the Green Revolution of the 1940s, has now become a cornerstone of modern farming. Today, innovations such as TecnoCientifica's GRAIN-Q system are setting new standards by allowing farmers to analyze critical data like moisture, protein, and starch content in real-time as crops are harvested. This data revolutionizes crop management, enabling farmers to improve quality, storage decisions, and profitability.

JOHN DEERE'S LEGACY IN PRECISION AGRICULTURE

Precision agriculture first began making waves in the 1990s when technologies like variable-rate applicators and yield maps combined with GPS guidance systems. John Deere's RTK system, widely regarded as a leader in GPS-based precision farming, exemplifies the growing reliance on these tools to optimize crop yields and management across varying field conditions. The 2024 solar storm, which disrupted GPS signals, underscored just how reliant modern agriculture has

become on these high-tech innovations.


Gustavo Caneda - TecnoCientifica

TECNOCIENTIFICA: THE FUTURE OF PRECISION AGRICULTURE

Of course, as technology has advanced, so too have the benefits of precision agriculture. And these benefits haven't been confined to the inch-perfect GPS systems like John Deere's RTK which we saw degraded in the 2024 solar storms. Today, all manner of geo-referenced real-time and historical data is combined to continuously optimize crops not only for crude measurements like gross yields but also for crop quality.

At the forefront of the next wave of precision farming is TecnoCientifica, whose GRAIN-Q system utilizes Near-Infrared Spectroscopy (NIRS) to assess the quality of crops in real-time. By analyzing moisture and protein content at the point of harvest, farmers can make better decisions about sorting, storage, and market timing, allowing them to fetch premium prices for their highest quality grains. Moreover, the ability to store crops safely and accurately predict spoilage risks dramatically increases farm profitability and sustainability.

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> *Gustavo Caneda*

A BROADER IMPACT BEYOND THE FIELD

The implications of precision agriculture extend beyond the farm itself. TecnoCientifica's T-SCANNER, for example, has been designed to optimize grain processing facilities by allowing real-time, non-invasive sampling of grain quality in inbound trucks. Such technologies can revolutionize how grain elevators, exporters, and manufacturers manage their operations, increasing efficiency and reducing waste.

One of the more notable benefits — something that early precision agriculture researchers could only have dreamed of — is the ability to actively sort grains according to quality as they are harvested. And the benefits that come with this flow well beyond the field right up the entire supply chain.

Immediately for the farmer, actively sorting grains delivers two distinct advantages. The first of which is the ability to sort higher quality grains from lower quality grains. This allows them to fetch premium prices on what is sometimes a significant percentage of their total harvest — premium prices that would not have been possible to realize had lower-quality grains been mixed in.

The second immediate advantage systems like the GRAIN-Q deliver is the ability to make real-time decisions about crop storage. Some of these decisions can be relatively simple. For example, a farmer may choose to dry their grains themselves rather than incur moisture content penalties at a grain elevator. Other decisions, however, can be much more complex, and take into account factors like protein and fat content which can all impact a crop's susceptibility to mold growth, mircobial activity, oxidation, and rancidity. As such, real-time knowledge of any given grain's properties can help guide decisions about drying times, temperature controls, aeration and ventilation, etc.

Immediately, these sorts of decisions contribute to multiple incremental value adds to the overall profitability of a farm operation. Having the confidence to safely store grains on site, for example, can allow a farmer to wait for the right moment to sell their crop and fetch the best price. As can the ability to know whether it's okay to turn down the cooling by a degree or two without impacting crop safety. However, at the more dramatic end of the scale, getting any of these storage decisions wrong can be make-or-break — incorrect storage decisions have the potential to, quite literally, result in the destruction of a crop post-harvest.

The importance of this latter consideration cannot be overstated enough — the UN World Food Program estimates that as much as 40% of grain is lost post-harvest due to inadequate storage. Naturally, this has serious consequences for broad sustainability goals and the global food supply. However, the impacts spread all the way down to the farmer, with many forced into a race to sell grains before decay sets in, which usually results in selling their crop right at the moment while supply is highest and prices are lowest.

## THE ROAD AHEAD

As precision agriculture continues to evolve, smaller, specialized companies like TecnoCientifica are playing a key role in driving innovation. With cutting-edge systems that can be retrofitted to existing equipment, the adoption of precision agriculture technologies is more accessible and cost-effective than ever before. This development promises to increase the adoption rate of these systems, ensuring that farmers, processors, and suppliers alike can benefit from the advancements in data-driven agriculture.

A lot of early precision agriculture innovations tended to focus on large, machine-scale systems like variable-rate applicators (VARs). But, as with any technology, each advance has seen the emergence of increasingly sophisticated and tailored systems.

The consequence of this is that many of the advances we're seeing are no longer coming from large, instantly recognizable names like the John Deeres of the world. Rather, we're seeing smaller companies with niche specializations in obscure fields like Near-infrared Spectroscopy — as is the case with TecnoCientifica — coming to the forefront of precision agriculture.

Curiously enough, the flow on effects of this should be largely beneficial to the overall rate of adoption of precision agriculture techniques going forward. For example, previous advances like VARs often necessitated the purchase of entirely new equipment, often with a minimum of a six-figure price tag. Innovations like TecnoCientifica's GRAIN-Q and T-SCANNER, on the other hand, are often relatively simple retro-fits to existing equipment. This usually means the price of adoption is significantly smaller — often by a factor of 10 — despite the fact the tangible benefits are just as great, if not greater.

This dynamic will also, more than likely, have some broader impacts on the broader agricultural equipment market. After all, if technology like the GRAIN-Q and T-SCANNER not only require niche specialization to develop, but are also designed to be retrofitted to existing equipment, it would seem to make more sense for large OEMs like Gamet Manufacturing and John Deere to increasingly turn to licensing deals to stay relevant. For instance, there is little reason why Gamet couldn't offer the T-SCANNER as an option across its existing range of truck probes. Presumably, all it would take is a bit of paperwork and a relatively small number of hours spent on systems integration work.

In any case, there is one thing that's for sure. What may have started as a quiet, under-the-radar movement based on little more than a handful of theories some forty years ago has quickly developed into one of the most important movements since the Green Revolution. For many of us, the 2024 solar storms were the first real wake-up call to just how far precision agriculture has advanced. But, if companies like TecnoCientifica have shown us anything, it's that tractors guided by GPS down to the nearest inch are just the beginning.

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