Maximising lemon market efficiency

Harnessing the power of AI and data collaboration is a game changer for the CGA lemon focus group.

By Precious Kunota

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In 2024, the Citrus Growers' Association (CGA) of Southern Africa lemon focus group, chaired by Leroux Venter, enhanced their approach to the European lemon market. They collaborated with data specialists from the CGA and SAFRESCO, a leading multi-origin exporter with a significant presence in Europe. SAFRESCO provided an artificial intelligence (AI) model to assist growers in consistently supplying the market with high-quality lemons from SA throughout the year. Leveraging this model, the growers effectively monitored supply and optimised their export strategies, giving them new insights from historical and live data.

The role of AI and data specialists

The goal here is simply to provide growers with a platform for transparent data sharing. And rather than advising on market supply, the article illustrates the impact of high or low supply. In preparation for the season, Precious Kunota collaborated with Anya Jaworski from SAFRESCO to use advanced data analytics and AI models to help growers understand the potential unintended supply/demand imbalance caused by harvesting times in SA. The model uses historical data to learn its purpose of monitoring lemon export volumes from SA and other producing countries, to Europe.

It's important that growers understand the potential unintended supply/demand imbalance caused by harvesting times in SA.

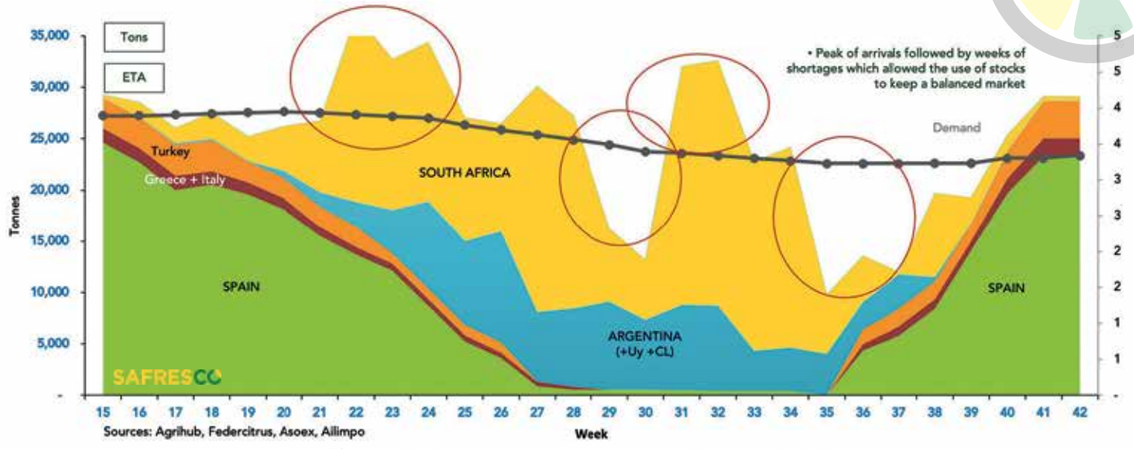

Figure 1: Actual lemon exports to Europe, 2023

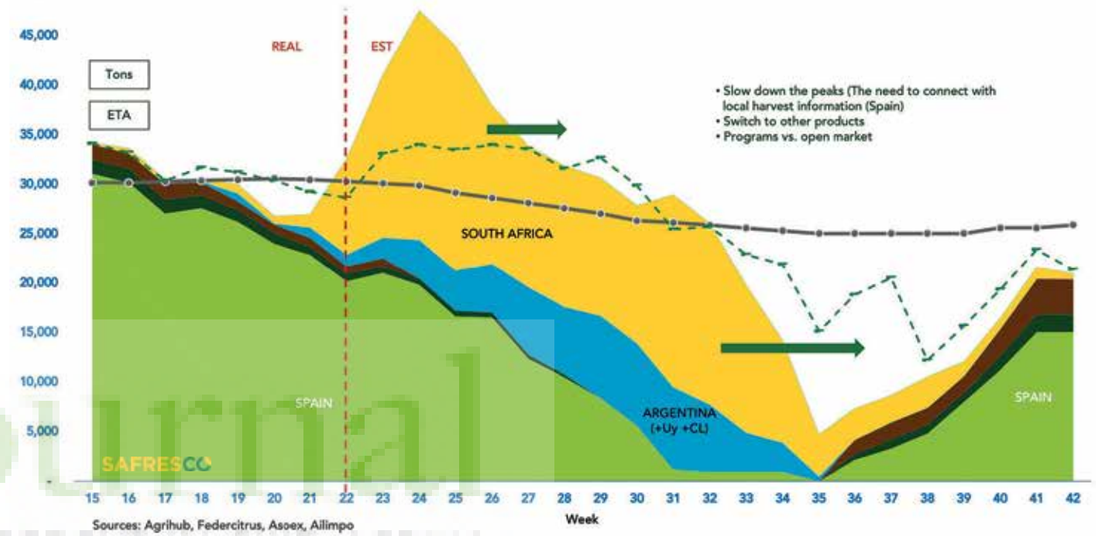

Figure 2: Pre-season forecast of lemon exports to Europe, 2024

It provides growers with a real-time global perspective on market dynamics relative to the demand curve. This collaboration offered lemon growers a strategic advantage in navigating market complexities.

Synergy between macro-level data from the model, and on-the-ground insights from CGA lemon focus group members and the Spanish Ailimpo group has been crucial. These growers have provided real-time information about crop conditions, harvest yields, and market conditions that helps contextualise the data and connect with local harvesting information from Spain. The aim is to highlight the consequences of market over- and undersupply. This integration of focus group expertise with the data model has created a powerful feedback loop, enhancing the accuracy and reliability of the reported information.

By monitoring supply, growers have minimised potential waste that results from oversupplying the market. This mitigation of waste benefits the environment and aligns with global trends regarding sustainability in agriculture.

Analysis

Figure 1 shows 2023 lemon exports to Europe from all major suppliers. Focusing on SA, the supply experienced a few weeks of peaks above the demand curve, followed by dips in supply. These dips allowed the market to absorb the accumulated stock. This wave-like distribution pattern enabled growers to ensure customers have fruit until the end of the season.

In 2024 the scenario changed due to a bumper lemon crop supply from Spain. Using the 2023 season as a baseline for weekly distribution, the initial forecast in **Figure 2** showed that maintaining a similar weekly export rate as in 2023 would likely result in an "iceberg" scenario, with supply far exceeding the usual demand curve for several weeks, followed by a steep decline. At the beginning of the 2024 season it was evident that South African lemons would enter the European market later than usual due to the abundance of Spanish lemons. Spain's Fino crop was estimated to increase by 41% compared to the previous season. This would last longer than usual, followed by an even larger Verna harvest (up by 59%). This abundance of lemons in Europe meant that any additional supply from SA could push the total supply beyond the demand line.

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The "iceberg" scenario, followed by a sharp decline in supply, was projected to create a massive gap at the tail end of the season. This prompted industry discussions on the need to focus on the total season estimate, as well as the distribution of exports throughout the season. Weekly distribution became more critical than total exported volumes, especially given the inelastic demand for lemons. Once prices drop, recovery becomes very difficult.

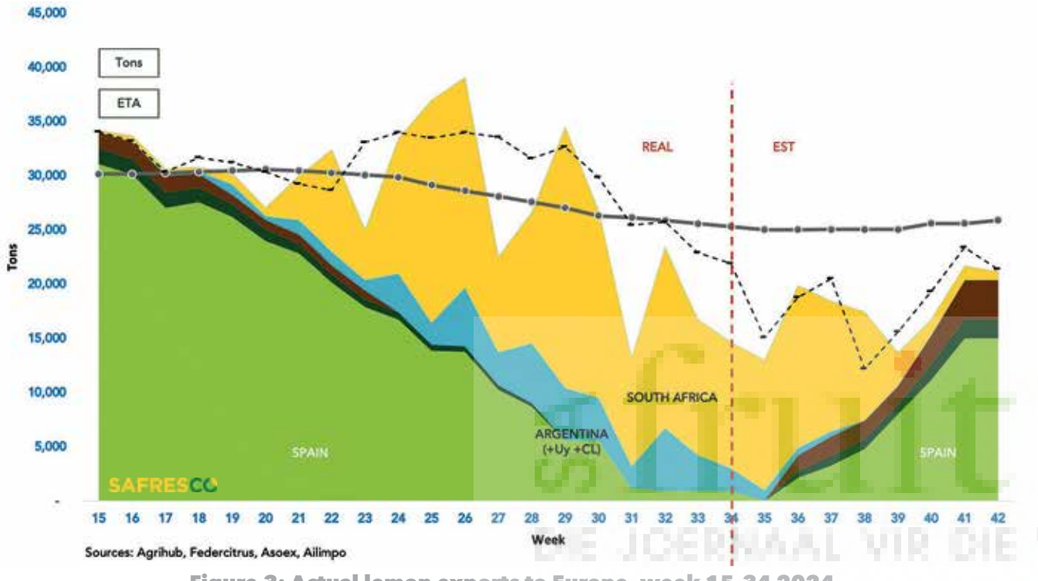

Figure 3: Actual lemon exports to Europe, week 15-34 2024

After discussing the forecast scenario with the lemon focus group and other industry stakeholders, the model was updated with actual numbers as the season unfolded. This led to the scenario depicted in **Figure 3**, showing actual export figures up to week 34 of 2024.

Importantly, in addition to data usage, the persistent unfavourable weather conditions and the precautions around citrus black spot regulations in the lemon-growing regions acted as a variable factor for the packing and export rate to Europe. So far, the 2024 season has shown regular peaks consistently followed by dips, allowing the market to absorb the stock. With this pattern in mind, the best-case scenario would be for the season to finish even stronger before Spain re-enters the market.

Expanding the model

The success of this collaboration for lemon growers in 2024 sets a precedent for other citrus commodities. The main lesson from examining the 2023 and 2024 seasons is that the success of an export season lies in the distribution of weekly exports. One cannot use the previous season as a blueprint for the next, as each season presents unique challenges based on market conditions and weather. However, leveraging data provides the required time for individual businesses to re-strategize in the event of a crisis.

The collaboration between the lemon focus group, the CGA, and SAFRESCO this year exemplifies the transformative power of integrating advanced AI models with on-the-ground expertise. The principles of real-time market monitoring, predictive analytics, and informed decision-making can also be applied to other citrus fruits. By expanding this model, the entire fruit industry can benefit, showcasing a successful blueprint for the future of agriculture.

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Citrus Growers' Association OF SOUTHERN AFRICA
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