

Seed to table: National Foods and tomatoes

In recent years, the sharp depreciation of the rupee has put the end-consumer prices of many import-based products under pressure. National Foods decided to meet this challenge by cultivating tomato varieties locally that are suitable for tomato paste to produce their market-leading tomato ketchup.

Import challenge

National Foods has been a part of the national landscape for the past 52 years, and has also been exporting its products for over 30 years. As a food processing company, National Foods relies heavily on food items that are imported (like tomato paste) or procured locally. During a recent period of significant economic distress, characterized by a negative balance of payments, trade deficits, inflation, and a rapidly depreciating rupee, the company faced escalating import costs. The restrictions on the availability of dollars became a trigger. In response, National Foods launched the Seed to Table project. This initiative aimed to reduce reliance on imported tomato paste by improving the quality of locally sourced tomatoes. By addressing these supply chain challenges from the ground up, starting with the seed, National Foods sought to ensure their products met the required standards, hence the name, "Seed to Table".

Background

National Foods has a diverse portfolio of brands spanning ten major categories, including recipe mixes, basic spices, seasonings, pickles, ketchup, mayonnaise, salt, jams and jellies, desserts, and pastes and chutneys. National Foods is a market leader in six of these ten categories: recipe mixes, basic spices, pickles, ketchup, salt, and jams and jellies. For a food exporter like National Foods, maintaining product quality is a major priority. The company faces significant hurdles in exporting food items due to non-compliance issues within the food industry. With annual procurement encompassing more than forty crops and over seventy percent of its raw materials being agriculture-related, National Foods has encountered substantial challenges in its sourcing in recent years.

The agricultural products procured through middlemen often fail to meet the stringent specifications required for National Foods' end-products intended for both local and international markets. This inconsistency is particularly problematic because stable input supply and pricing are essential for building and maintaining a reliable brand in the local and global markets.

Tomato ketchup, National Foods' second-largest product category after spice mixes, best exemplifies these challenges. Despite holding more than fifty percent of the market share in ketchup, National Foods has been heavily reliant on imported tomato paste. The economic turmoil in the country, marked by trade deficits, depleting foreign reserves, rising prices, and most importantly for National Foods, a rapidly depreciating rupee, exacerbated the situation, making imports increasingly expensive and unreliable. Without a stable supply of tomato paste, National Foods faced a serious challenge to its market leadership, as shutting down production of its second-biggest product would have severely impacted the brand and resulted in a loss of market share, which is extremely difficult to regain.

Price volatility in the procurement of tomato paste and red chillies further complicates National Foods' operations. The prices of tomatoes and chillies fluctuate on average by as much as sixty to eighty percent within a year, creating significant instability. This high variability in input costs prevents National Foods from establishing a foothold in export markets, where other brands are more cost-competitive. Such fluctuations undermine National Foods' ability to maintain a consistent and affordable product line internationally.



In response to these challenges, National Foods launched the Seed to Table project with the vision of “localizing agricultural value chains within Pakistan while ensuring the production of high-quality products.” The initial focus of this initiative is on tomatoes, which are essential for producing tomato paste, a key ingredient in National Foods' second-largest product, ketchup. To meet its requirement of a single ton of tomato paste with a brix content of 28% (concentration of soluble solids), National Foods needs to procure nearly six tons of fresh tomatoes annually. The Seed to Table project aims to ensure that these tomatoes are cultivated to exact specifications, thereby reducing dependence on imports, stabilizing prices, and maintaining the high quality necessary for National Foods' products.

Partnerships and collaborations

National Foods developed a partnership and collaboration model by bringing in expertise across various segments of the tomato value chain for its Seed to Table project. This collaborative approach involved partnerships with farm management companies such as Indus Acres, Kevlaar, Ibtida Ventures, and Vital Green, which played a crucial role in managing the farms and ensuring optimal agricultural practices. Each farm management entity was engaged under a distinct contractual arrangement; some operated under formal contract farming agreements with varying degrees of financial support from National Foods, while others functioned solely as aggregators.

Recognizing the need for suitable paste tomato varieties, National Foods partnered with Syngenta to introduce these varieties into Pakistan. This partnership began around the end of 2022, and focused on studying the value chain and identifying commercially available varieties that could be successfully grown locally. The R&D phase was pivotal in securing a tomato variety with high brix content and near-paste quality. After evaluating various options, a Syngenta tomato variety was selected for its suitable characteristics, particularly its high brix content. National Foods negotiated with Syngenta to supply the seeds and provide free agronomy support to farmers, which was essential as many farmers lacked the expertise to manage tomatoes independently. This agronomic support also included crop protection measures to meet the standards required for international markets.

To ensure proper farm management and optimized yields, National Foods employed advanced technologies, including satellite and drone imagery provided by agri-tech companies like FarmEvo and Farmdar. These technologies enabled precise monitoring of farm activities, facilitating data-driven decision-making. Additionally, crop insurance was provided to mitigate risks and ensure financial stability for farmers.

Despite significant technological advancements, the human element remained vital in the Seed to Table project. Farm managers and aggregators played key roles in interpreting data and managing farm operations effectively. The real game-changer for National Foods was partnering with farm management companies that manage farms professionally. These companies, part of the formal sector, run professional operations and can act as a bridge between processors and farmers. They function either as contract farmers or aggregators, relaying processors' requirements and ensuring growers deliver the needed quality.

Previous experiences of other processors attempting backward integration showed that farmers often reneged on contracts when market prices increased. To mitigate this, National Foods attempted this collaborative approach and provided inputs to farmers (agronomic support, as well as actual inputs) and maintained direct involvement in farm management. This involvement included monitoring and support to achieve better conversion rates and color values of the tomatoes. National Foods, in collaboration with its logistics and processing partner, Al-Rahim Agri Processing, also provided crates for packing and managed logistics.

National Foods' partnerships with farm management companies included various financing models, ranging from partial to full financing by National Foods and farm-level aggregation by the farm management companies. The aim was to provide each farm a return on investment of over twenty percent. The collaboration with Al-Rahim included a toll manufacturing model, where Al-Rahim processed the tomatoes into paste for National Foods. Toll manufacturing refers to an arrangement where one company processes raw materials for another company, in this case allowing National Foods to leverage Al-Rahim's processing capabilities while maintaining control over the quality and supply chain.

Challenges and how they were tackled

One of the primary issues was the inability of local suppliers to meet quality parameters, particularly regarding color and tomato-to-paste conversion rates. The specific tomato varieties suitable for high quality paste production were not available in Pakistan, whereas lower-quality tomato paste, made from substandard tomatoes, was sold to tier 2 and tier 3 companies. National Foods, therefore, had to work with Syngenta for the introduction of new suitable varieties and had to get the processing of the tomatoes done by itself to ensure tomato paste supply.

Farming was also not National Foods' core strength, as the company had not previously pursued agricultural ventures. Key questions included whether to purchase land, engage in corporate farming, how to determine suitable locations, how to manage logistics, and how to oversee farm operations. The diverse agro-ecological zones and varying soil quality across different regions of Pakistan further complicated matters. Managing multiple farms across these regions would be highly challenging, given National Foods' diverse crop requirements. Therefore, it made the most sense to engage with farm management companies (or FarmCos) under varying levels of control as described earlier.

Another significant challenge was dealing with the variability of different farms. Each farm had unique conditions, such as soil type, water access, labor expertise, and farm management practices, leading to varying yields in terms of quality and quantity. National Foods invited bids from FarmCos, asking how much they could produce and at what price. However, the volatile nature of tomato prices made it difficult to establish a stable agreement. If market prices soared, farmers were likely to renege on their contracts, claiming crop losses or wastages while selling their produce in the open market. This year as well, while some farms adhered to their agreements with National Foods, others (especially farmers under aggregators) found it more profitable to sell at higher market prices. This challenge is yet to be resolved in a comprehensive manner as even the companies that did stick to the agreement were reluctant to get into a binding agreement the following year as they could be potentially forgoing four to five times the profits that they could have earned had they not fulfilled their contract.

Logistics also posed a significant challenge. Typically, green tomatoes that are nearing ripening stage are harvested and transported and by the time they hit the shelves, they are ready for consumption. However, National Foods required only red tomatoes that had ripened on the plant, which drastically reduced their shelf life and demanded seamless logistics. However, the processing facility was far away in Khairpur. Transporting ripe tomatoes almost 400 kilometers from Thatta to the processing facility resulted in additional wastages. The complexity of ensuring timely and efficient transportation added to the logistical hurdles. Establishing a processing facility near the tomato production region will bring down the transportation costs significantly.

Technical support was another area where the project faced difficulties. Although companies like Farmdar and FarmEvo were involved in drone and topology mapping, the data provided was not sufficiently actionable. There was a lack of comprehensive reporting, key performance indicators, and

analytical insights necessary for effective farm management. The data was there, in many cases, but without adequate analytics on the data, it served little to no purpose. Primarily, the reason for this seems to be that companies working on farming data have focused on field crops rather than on horticulture crops like tomatoes.

National Foods had also intended to manage inputs like pesticides and fertilizers through partnerships with companies like Syngenta and Engro, but some of these arrangements fell short. The proposed system of reimbursing farmers for inputs proved problematic, as there were no checks to prevent misuse. A more transparent system, involving direct purchase and distribution of inputs, coupled with technology such as sensors to measure soil nutrients (to make sure that the inputs have actually been applied), would be more effective in managing resources and ensuring accountability.

Crop insurance, at eight percent of the total sum insured, was built into the cost of the project, although the parametric insurance did not trigger. The cost of insurance was relatively high and protects mostly against anomalous weather events and is still unable to cover for diseases or other biological reasons for yield losses.

Results

The Seed to Table project achieved significant milestones in its first season. By the end of March 2024, despite facing a 40-day delay in the season due to adverse weather conditions, a hundred percent of the targeted tonnage was achieved for tomato paste, showcasing the success of the project's strategies.

In Pakistan, the average yield for tomatoes is typically around eight to nine tons per acre. However, most FarmCos participating in the project set ambitious targets of achieving yields between fifteen to twenty tons per acre. Remarkably, these expectations were exceeded, with some farms achieving yields of thirty-five to forty tons per acre.

The tomatoes produced through the Seed to Table project were of superior quality, with color and taste of the processed tomato paste significantly better than that of imported paste. Additionally, the cost of tomato paste was twenty percent lower than that of tomato paste imported from China. National Foods' strategic focus on quality and efficiency provided a competitive advantage, as the locally produced paste, although more expensive than local alternatives, offered better quality and a higher AB value. The AB ratio is a color measurement used primarily in the food industry to assess the quality and visual appeal of tomato products, such as tomato paste and ketchup; a higher AB ratio indicates a more intense red color. This quality was achieved while remaining economically competitive against imported products.

Looking ahead, National Foods anticipates further cost reductions with future expansion. The cost of fresh tomatoes could decrease by another 9% with increased yields. The tomato conversion cost can be reduced by 16% by adjusting the quality to meet food safety standards rather than exceeding them. Additionally, locating manufacturing plants closer to farms could result in a 91% reduction in transport costs.

National Foods plans to replicate the model on other crops, starting with red chili cultivation in Kunri, followed by ginger and garlic production. The partnership with Syngenta will continue to be crucial for seed supply and agronomy support.

Conclusion

The Seed to Table project by National Foods has proven to be a ground breaking initiative in localizing agricultural value chains within Pakistan, particularly for the production of tomato paste. Faced with economic instability and the challenges of importing raw materials, National Foods took a strategic leap to ensure self-sufficiency and maintain the high quality of their products. The project not only addressed the immediate threats to their supply chain but also laid a sustainable foundation for future growth and competitiveness.

The success of the project is attributed to the innovative partnership and collaboration model National Foods developed. Engaging with farm management companies, seed suppliers, and agri-tech firms, National Foods was able to harness expertise across the entire tomato value chain. The use of advanced technologies such as drone monitoring and high-quality imaging, combined with hands-on agronomy support, ensured that the tomatoes produced met the stringent quality standards required. The superior yields and quality achieved, significantly better than the national average, underscore the effectiveness of these partnerships and the potential for future cost reductions.

