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# CASE STUDY

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## Enabling Farmers with a Farmer-centric Transparent Supply Chain and Premiums

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## Enabling Farmers with a Farmer-centric Transparent Supply Chain and Premiums

### Spicing up the market with a Quality and Data Premium

Fairfood and Verstegen Spices & Sauces started a collaboration in 2019 to contribute to a transparent and meaningful nutmeg spice supply chain from farmer to consumer in North Sulawesi, Indonesia. The initiative takes an inclusive, farmer-centric data collaborative approach through digitization and data governance, with the aim to improve the position and livelihoods of smallholders and their communities. The fiduciary data stewardship role played by Fairfood has resulted in increased trust and confidence in data sharing, better communication of data claims and benefits to stakeholders, improved consent and understanding of data ownership, as well as a stronger negotiating position for farmers and ensuring that farmers' voices are heard in the use and collection of their data. The initiative developed a traceability platform called Trace and a Quality and Data Premium product to achieve these goals. This case study provides insights into developing transparent value chains; incentives for data sharing; a first step to human, digital, and financial inclusion; data ownership; and data monetization.

#### Background and main challenges

Indonesia is known for its spices, but the sector faces many obstacles, and its success is not felt by all actors in the value chain. Indonesian nutmeg can be a sustainable product with both a competitive advantage in the export market and an ability to support rural development. Currently, smallholder farmers are the poorest actors in the nutmeg supply chain. They are disadvantaged by poor digital connectivity and limited access to reliable data, inputs, and global markets. In addition, the nutmeg market—through wholesalers who work directly with farmers—is defined by a lack of transparency and uncertainty for future investments.

While the volume of exported nutmeg is increasing, the value and yields tend to fluctuate, resulting in under- or over-supply and big differences in quality. Farmers are left with unstable prices, or they have to stock-dry their nutmeg. Higher demand does not translate into better welfare for farmers. Most nutmeg producers are smallholders who use traditional methods and lack understanding in applying cultivation methods. Constraints related to quality are mainly due to poor harvesting, processing, and distribution management. Inadequate access to finance pressures farmers to sell their nutmeg early before the nuts are properly dried. The wholesalers have access to data on price, demand, and quality, and make connections with the global market. Up until recently, little has been known about the consumer side of the market.

High-quality data is essential to minimize risks and support better and more sustainable decision-making throughout the supply chain. Information on supply and demand should link all actors. Exporters know the quality and volume needed for export at particular times. This data is not shared with farmers or village collectors. Feedback from customers is only reaching wholesalers, at best.

Farmers lack this important data needed to control and improve quality. Moreover, farmers do not have access to global prices. Farmers have limited bargaining power to negotiate. They have to sell based on offered prices, because they do not know the current market situation and prices. This is a threat to the livelihoods of smallholders who do not know the value of quality and of data and receive less than the actual market price.<sup>1</sup> A lack of local government attention—no clear policies and regulations in the nutmeg trading system—has resulted in unilateral market control by traders and lack of market power of farmers.

### Other challenges

- Difficulty in accessing market information, such as price, potential buyers, and global demand.
- The market has become opaque and at times uncontrollable, due to a lack of transparency in transactions, trust and consent, privacy, data sharing and manipulation.
- The hesitancy to share data by and between suppliers is mainly due to a fear of losing producers, a competitive advantage, or their intermediary position. Some claim farmers as “their farmers.”
- The nutmeg price for the farmer is relatively low and not differentiated by quality, resulting in low returns.
- Farmers have little or no control over their data and are oftentimes unaware of how data is used.
- Misuse of farmers’ data is possible and anonymity is not protected. In turn, farmers become more reluctant to participate in surveys and data collection activities. Farmers also noted the fear that data might be used for political or other reasons (fed by examples such as identity fraud in online shopping).
- Farmers are typically not economically rewarded for their data, receiving compensation mainly in the form of “free of charge” services.
- A lack of quality and usable data for all actors. Data gathering processes are inefficient.
- A lack of training or capacity with farmers to explain project and data needs, complexity of different types of data and technologies, as well as collection tools and self-reporting procedures.
- A lack of digital systems for suppliers. Procedures follow a long paper trail before digitization.

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1. Sukarman, L.D., (2021) [The Nutmeg Value Chain in Indonesia](#), *Australasian Agribusiness Perspectives 2021*, Vol. 24, Paper 15.

“As capturing consumers’ trust has become a common challenge among food brands—with sustainable labels and certificates everywhere on supermarket shelves—few structural changes actually hit LMICs’ [low- and middle-income countries] farmers, who continue to live in poverty. In this context, transparency is increasingly translated into data collection and traceability efforts: information about how, by whom, and in which conditions the food on our tables is produced is crucial for companies and consumers looking for responsible sourcing,”

Fairfood

## How are problems solved?

To tackle these challenges, **Verstegen Spices & Sauces**, a herbs and spices company, and **Fairfood**, a nonprofit from the Netherlands, commenced building a suite of digital tools to connect smallholder farmers to supply chains, improve business practices, and enhance incomes of farmers.<sup>2</sup> The initiative aims to create more awareness around responsible data use, the dynamics of power imbalance, and informed consent in the value chain, and to provide farmers with tangible ownership and value for their data.

The absence of a farmer-centric approach led Fairfood and Verstegen to develop their own solutions. Fairfood developed Trace, a blockchain-enabled platform, to make the supply from farmer to consumer transparent and traceable, allowing consumers to track nutmeg back to the individual farmer and verify fair payments.<sup>3</sup> The public consumer-facing platform provides for access to relevant information. This improves the farmers’ negotiating position and increases their and consumers’ involvement.

In early 2023, Verstegen will have enough traced nutmeg to make the transition towards all nutmeg sold by them becoming traceable. For traceability to work, actors need to be willing and able to share accurate, consensual data on transactions. The use of the technology provides for opportunities to overcome challenges and achieve consensus.<sup>4</sup> Trace is fully transparent, regulatory compliant, and provides for secure and reliable data that creates confidence in the market.

The initiative introduced this year (2022) the Fairfood Farmer Cards,<sup>5</sup> which includes near-field communication (NFC), allowing farmers to interact with Trace in areas with low or no internet access. Verstegen can now verify if farmers actually receive a **Quality Premium** price for quality nutmeg. Verstegen is unique in that it pays farmers a **Data Premium**, as an additional income (approximately 4%), to incentivize participation and increase income.<sup>6</sup>

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2. Fairfood offers innovative solutions that enable agri-food businesses to improve their responsible business practices and enhance the economic prosperity of farmers and food workers in their value chain.

3. Fairfood is in the process of making the technology open source (as of September, 2022).

4. Actors can prove to anyone that the information about their supply chain matches an uploaded hash. This gives security and transparency to their data as it would stop one from altering any data in their database at a later time. A limitation is that there is still a centralized database that uploads the hashes to the blockchain. Traceability can also be done by tokenizing assets. A common way is by creating tokens with the use of smart contracts to represent physical goods. One token can correspond with one batch of goods that could be measured in an item’s weight, volume, or size. These tokens are non-fungible, meaning that each token is unique.

5. In an earlier iteration, Verstegen verified that farmers received an agreed-upon price by connecting farmers via SMS. After delivery, the farmer received a text message to verify the quantity and payment. Farmers seemed not very responsive to this approach, hence the switch to NFCs.

6. Fairfood sees that traditional non-governmental organizations (NGOs) seem to be very hesitant to compensate farmers for data at scale, likely because they underestimate the true value of that data (and how it can be used to reduce risks, improve efficiencies, etc.).

This has resulted in a tangible, verifiable increase in the price farmers get and proof that they actually receive the quality premiums. The Data Premium serves as a major incentive to collect better quality nutmeg and data. Prior to the introduction of the Premiums, farmers brought a whole bag of mixed-quality nutmeg. Now farmers know they get a better price if they separate the nutmeg themselves.<sup>7</sup> This gives farmers more control over the quality instead of the exporter making a rough assessment based on a mixed bag. It is an interesting opportunity to assess the effects of data monetization on data quality and the impact on farmers' and their communities' livelihoods. As of yet, it remains to be seen what this means for the livelihoods of farmers; a long-term impact study could give insight on effects on livelihoods—but this will take time, as the cards have been introduced only recently.

**Data ownership and control.** It is Fairfood and Verstegen's vision to enable farmers to own, control, and monetize the use of their farm data, while they can legally and economically handle personal data and exploit new revenue potentials. Farmers give direct consent to their data use. Farmers are willing to participate due to full privacy protection. They cooperatively provide correct and high-quality farm data, enabling easy access to it. Farmers, as the data providers, are in full control as to what data they share. Farmers are able to opt in and out of the platform and can signal issues with data. According to the partners in the initiative, data ownership includes the ability to visualize, analyze, and use data, and flexibility to modify it as required. The partners concluded that: *"Farmer-centric data governance ensures better quality of data, transparency, and informed consent for data use. It helps to provide farmers with clear ownership and tangible value for data, and better understanding of the supply chain."*

The farmer card includes a QR code farmers can scan or an SMS service to see transaction data. So far, this is not widely used, likely because nutmeg farmers are of a higher age and often don't have a smartphone or credit. An important next step is to see how Fairfood can get the data back to the farmers. One option would be to print the data and provide some documentation so that others with smartphone access can assist.

**A trusted data steward.** As a neutral nonprofit acting in farmers' best interest, Fairfood is able to provide ethics guidelines and principles of digital development and responsible data use, advocate for privacy, and steer towards a decentralized governance. Fairfood can help farmers connect with other services, like the credit market. It sees opportunities in promoting open data sharing along value chains, but notes that this requires all actors to agree and time to build trust. Decentralized data exchange provides for trust in the protocol, data traceability, use, and privacy protection. Fairfood can work to protect the sovereignty of individuals and communities that need to be free from interference of others and their interests.

The data steward must have a clear guideline and agreed criteria to collect or process the data. The different stakeholders in the value chain must understand the role and responsibilities of the steward. The steward holds a keen interest for opportunities and risks involved and must address key challenges around data.

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7. For ABCD (Quality and Data Premium for highest-quality nutmeg) and SS (Data Premium for 2nd best, still whole nut quality).



**Actionable Principle:** A data steward must be flexible in the data management process. It must also address key challenges of stakeholders, and this must be easily accessible and communicated. The different actors in the value chain must understand the role and responsibilities of the steward. The steward must act independent from the supply chain.

**Participation and inclusivity.** Farmers must be involved by giving consent and knowing when and why sustainability claims are being made. This can only be accomplished by working on the ground and building lasting relationships. In Trace, this is done by enabling them to participate in verifiable brand promises and knowing how the collected data is going to be used. Traceability can include farmers into the value chain—from farm to fork—and share a narrative of the products being sold.

Meaningful inclusion means more than that—it also means that farmers are equally financially included. Inclusive and representative tools can help balance risks facing smallholders and allow for more fair distribution of value in supply chains. Fairfood notes that training stakeholders and involving them in the data collection and in seeking informed consent, while creating an open dialogue, is essential in data governance and the communication around it. Finally, a note on human connection, which is invaluable, and often neglected in digital realms: Farmers should be given the sense that people far away care about and enjoy their products, and are interested in their lives.



**Actionable Principle:** Open dialogue and building engagements across the supply chain are essential, specifically involving farmers in the collection of data and in seeking informed consent. Capacity building is also required and involvement of them is needed in collecting data.

**Incentives and power dynamics.** Incentives for agri-food companies to act beyond their silo and understand the collective value of data sharing is an important element here. The current power dynamics are centered around buyers or wholesalers. The digital tools hold promise to shift some power to farmers by helping overcome cumbersome procedures and provide access to a legal framework and identity documents needed to gain access to credit. There is still more research needed to better understand the effects of this on the adaptability of actors and the supply chain.

## Facts and figures

**Indonesia accounts for approximately 75% of the world nutmeg production.**

- 99.3% of all the nutmeg plantations in Indonesia are cultivated by smallholder farmers.
- The increasing production of Indonesian nutmeg is due to expanding land areas planted with nutmeg. However, productivity has not shown significant improvement yet, with the average productivity less than 500 kg per hectare of land.







### Important enablers in the local environment

- Due to its potential value as an export product, the Ministry of Agriculture (MoA) has encouraged farmers in other provinces to grow nutmeg in order to respond to the growing demand.
- Local governments have a role in developing regulations and policies in each province. At the national level, the MoA works together with the Ministry of Trade to develop strategic plans for agriculture.
- Policies and regulations conducted and formulated by the MoA cannot be implemented properly at the local level. Nutmeg production is scattered throughout different provinces, each with different unique and specific aspects that need to be taken into consideration.
- Indonesia has national data sovereignty laws and thus requires for the data to be stored and accessible in the country itself. Indonesia also has fairly comprehensive personal data protection laws. These regulations are not strongly enforced, however.
- Indonesia received 46 notifications from the Rapid Alert System Food and Feed regarding “aflatoxin.” The rejection of Indonesian nutmeg by importers has a negative impact on the whole supply chain.
- Improving the infrastructure can support the value chain to perform better and helps lower costs.
- Most nutmeg farmers have limitations in technical knowledge about farming and processing. The public and private sector can support the industry through training and capacity building for farmers.

## The business viability

Verstegen would like to see the development of guidelines or standards for data stewards to increase business viability and consider more investments for the role of the data steward. The partners concluded that identifying together mutual incentives and benefits is an important element. The introduction of a novel traceability solution allows Verstegen to show exactly where the nutmeg they sell comes from (builds trust). While the grant ends in 2022, Fairfood intends to keep the Trace running. The Quality Premiums are specifically set up to try to ensure continuity and quality of supply, while helping to increase farmer income. For reasons of viability and sustainability, the program must have an open and flexible approach to achieve the envisioned change.



**Actionable Principle:** Identify collaborative incentives and benefits that can be ensured for all tiers to scale the project, and continue capacity building and training.

### What was the impact?

- **484 farmers have been onboarded to the Trace platform, with 343 active farmers** (October 2022), and as a result, they have been able to increase their income.
- **Important progress on digital inclusion.** Paper receipts and a log book have been replaced by close to real-time, quality data. The pilot phase of the initiative highlighted the challenges of using SMS text messages to share information and internet connectivity. Parts of those problems have been resolved by using NFC cards that provide the farmer with direct access to the important information.
- **Opportunities for informed decision making.** Ensuring informed consent and communication of data terms across the value chain can be a complex process requiring multiple implementation partners and capacities.
- **Sustainability:** Ensuring relevance and value of data collection for all stakeholders can be a complex and financially onerous process.
- **Continued challenges:** Limited data literacy of farmers combined with the complexity of data needs raises questions about the accuracy of the data collected. Infrastructure constraints such as limited internet, instability of the application, and limited access to smartphones hinder implementation.



### What lessons can be learned?

- Utilize practical technical solutions that lower the barrier to entry (work off-line).
- The Data and Quality Premiums are interesting and innovative features meant to incentivize quality and reliable data sharing. While the project is ongoing, some results can already be demonstrated. The initiative will prove to be an interesting opportunity to learn from these types of incentives.
- Develop and execute an institutional standpoint on data responsibility and fair data sharing, and establish consent norms and data sharing agreements.
- While monetization of data has had some successful experimentation in certain sectors (e.g., health), its impact in agriculture, and especially in relation to vulnerable people, remains to be seen.

