farmer connect®

Social Entrepreneurship Solutions

BUILDING TRUST IN A COLLABORATIVE DATA ECOSYSTEM

A white paper by Farmer Connect SA

PUTTING THE DATA-SUBJECT FIRST IS NOT ONLY AN INCREASING REGULATORY REQUIREMENT (WITH HEFTY PENALTIES), IT'S THE FIRST STEP IN A TRUSTED COLLABORATIVE DATA ECOSYSTEM THAT'S GOOD FOR THE FARMER, THE SUPPLY CHAIN, AND YOUR COMPANY.

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Executive Summary

Governmental and consumer demands of transparency within supply chains, especially in areas of climate, responsible consumption, and trusted data are accelerating. With the expected ratification of the EU's Deforestation-Free Products Regulation the requirements are moving from optional to critical, and that means putting transition plans in place *today*.

To meet this need, many certifications and industry programs rely on data collectors in the field asking farmers a multitude of questions regarding their activities past and present. Historically, each company has done this alone, starting from zero each time, resulting in unsustainable costs of acquiring and cleaning data.

By centring information around the data subject (the farmer), we can reduce costs and speed up the journey to compliance and profitability. This approach public and private partners to move from data collection to data analysis and meaningful action.

A collaborative approach to a trusted data ecosystem is the fastest and lowest cost path to supply chain impact and ESG compliance.

WHY IT'S GOOD FOR BUSINESSES

- Reduces the cost of data
- Increases the relevance of data
- More and faster impact from supply chain investments
- Preserves competitive advantage

WHY IT'S GOOD FOR FARMERS

- Allows a stair-step approach to digitization (inclusive)
- Differentiates and valorises the farmer
- Reduces non-farming workload
- Focuses industry/government support

HAVING RELIABLE DATA ABOUT THE ORIGIN, FOOTPRINT, AND IMPACT OF GOODS IS MORE IMPORTANT THAN EVER

Governments, banks, and client compliance departments require it

With the imminent activation of the EU's Deforestation-Free Products Regulation, companies wishing to sell soybeans, beef, palm oil, timber, cocoa, coffee, pork, chicken, lamb, corn, rubber, coal, and printed paper products within the EU will have to prove their supply chains are free from deforestation.

The penalties for noncompliance are set to be significant with violations bringing seizure of products and a potential of fines up to "at least 4% of the operator's or trader's annual turnover in the EU Member State(s)" [1]. Human rights abuses are also part of the scope, which means we could see more direct legal action like that brought by 8 former child slaves from Mali against the companies Hershey, Nestle, Mars, Mondelez and Cargill.[2]

The targets set by European Climate Law will require an estimated €350bn of investment per year, and banks are coming under increasing scrutiny for their financing of "dirty" businesses. What isn't measured can't be managed, and companies without the appropriate, scalable, and cost-effective measures to understand and control their footprint will quickly find their reputation, financing, and legal standing at risk.

Consumers and shareholders demand it

There's strong consumer demand for products that are safe, ethical, authentic, that have been properly processed using appropriate methods, and that have properly compensated the people growing them without taking away their opportunities for development. According to a survey we ran, 82% of consumers are more likely to consider buying coffee that uses technology to prove that it has been picked ethically and sustainably.[3] This phenomenon is extending to the boardroom, as shareholders bring increasing ESG-related resolutions into AGMs[4] and Blackrock's CEO calls ESG standards a company's "license to operate."

WHY IS IT SO HARD TO GET GOOD [FARM/FARMER] DATA?

We keep starting from zero instead of building on the foundation

There are significant challenges to proving claims within the smallholder agriculture space, with the accelerating demands of ESG compliance being front and centre. The Founder & Director of the social and environmental impact focused Farmstrong Foundation, Michiel Hendriksz, states "one of the biggest issues faced on the ground at origin is the cost and quality of data collection & verification. Anecdotal inputs via audit sampling causes huge inconsistencies and imposes obligatory iterations of analysis, rigorous cleansing and revalidation."

Data around smallholder farming systems is typically collected by government, industry, certification and audit bodies using questionnaires and household surveys, all of which have their own purpose, cadence and enumerator. Farmers are often interviewed by multiple bodies, all essentially asking the same questions, which leads to considerable frustration on the part of the farmer, especially when they see slow or little results for the effort. Jerry Glover of the USAID Office of Agriculture, Research, and Policy within the Bureau of Food Security, noted that '**farmer fatigue**' is a key challenge to collecting data from smallholder farmers[5].

Compounding issues include multiple actors on the ground working within parallel "vertical supply chains" that are capturing the same information from the same farmers without coordination. Ruth Maloney who worked for 35 years across soft commodity trading and sustainability before setting up Corridgeree Farms to produce sustainable cocoa and vanilla in Belize says "Survey Fatigue also leads farmers to lie about their data as they are often embarrassed or annoyed to be asked for the same data a 5th time by people earning a lot more money than they do"

It's not profitable for the farmer

The incentives for continually contributing to such data collection activities are not always clear. Hutabarat et al. in 2018[6] indicated that there was a financial restriction due to the cost of audit and compliance for certifications in their current form and even after considering premium payments farmers income is reduced by 8% per hectare in the 1st year of certification. This means that the premiums associated with certifications, which are supposed to improve farmers livelihoods, can require years to yield a return.

> *One of the biggest issues faced on the ground at origin is the cost and quality of data collection & verification. Anecdotal inputs via audit sampling causes huge inconsistencies and imposes obligatory iterations of analysis, rigorous cleansing and revalidation.*
>
> *- Michiel Hendriksz, Founder and Director of the Farmstrong Foundation*

THE FOUR DATA CHALLENGES

Data Disaggregation

Many of the efforts to aggregate farmer data are industry led. One such example is AtSource, where the major food and agri-business company, Olam International, has taken their home-built system and extended it to allow for other actors to collaborate. Cargill did the same thing launching Splinter, imploring the need for industry collaboration to reduce complexity, costs and improve accuracy of farmer data. Collaboration hasn't happened as such initiatives fail to provide enough trust to competitors to share information which is seen as a competitive advantage. Even inside companies, information can be split between multiple legacy systems due to the rapid consolidation of the food and beverage industry.

The Cost of Good Data

According to *The Economist,* data is the new oil[8]. It has vast, untapped potential, trumps opinion or past practices, and the organizations that control it stand to dominate their fields in the decades to come.

Also like oil, finding good sources of data and bringing them into your organization can be highly speculative and costly to execute. In commodities, the usual challenges are compounded by the volatility of the market, the physical and technological distance to the source, the competitive nature of data collection, and the fragmentation of agricultural supply chains.

In their 2017 research paper Gartner concluded, an organisations' "poor data quality to be responsible for an average of $15 million per year in losses."[9]

There's no denying the value, however. From Dominos and Starbucks to Netflix and Amazon, access to data—especially consumer data for B2C companies—is the X-factor when it comes to high valuation multiples.

Data Trustworthiness

The inconsistency of traditional auditing methods set the bar too high for many use cases in developing countries and their analysis suggests that a more efficient and quantitative approach offsets the cost of audit. Moreover, in Sub Saharan Africa using "standard codes across Ministries are not commonplace and the result is a series of agency-specific data silos rather than an effective, federal data architecture" so the data collected cannot be verified and its usage not optimized.[7] Similarly, the African Development Bank highlights that the "poorest of countries, for whom agriculture is a critical source of livelihood, often have the poorest data", which is hugely detrimental in the formulation of national representative policy. [7]

The Opportunity Cost of Unused Data

Governments have also stepped in to support their respective cocoa industries. The Ghanaian Cocoa Board CMS system that is intended support cocoa traceability across the country in a centralized database of all farmers. Michael Ekow Amoah, stated, "systems of private companies have commercial interests at the forefront. Farmers should have the choice who they sell to and should not be tied to one company for the sake of transparency"[10] which is where their CMS steps in. However, a nationalized system also has its challenges with lack of farmer willingness to participate and spiraling costs leading to a very slow roll out.

Major cocoa players Barry Callebaut and Lindt & Sprüngli respectively said of the CMS that they would "build on the solution" if the Ghanaian government prescribed it and Nestle remained standoffish. While the different players try to find an elusive compromise, funds that could be invested in the supply chain are instead spent on rework without creating value. [10]

A FARMER-CENTRIC DATA MODEL FOR COLLABORATIVE DIGITALISATION

TRUBLO CASE STUDY

1. Situation at Start

farmer connect® and Trublo completed an examination around trusted farmer data landscapes to enable collaborative and scalable compliance with existing and upcoming ESG regulations.

The project explored the concept of centralizing information around the data subject (the farmer) and using external data to assign a trust score to both the farmer and the observation (deforestation). The tagged data is then linked to product traceability data, allowing brands and manufacturers to allocate resources to mitigating specific risk instead of taking a broad and potentially ineffectual approach.

Concretely, we proposed an extension to FarmerID, farmer connect's self-sovereign identity-based digital wallet for farmers. FarmerID gives the farmer visibility and control over the information collected about them, including the ability to share it with other actors within the same value chain or geographical landscape. The ability to share lowers the cost of collection, can create a revenue stream for the farmers, and enables multiple actors with differing motivations to assess and act on the data, and if needed, trigger a focused audit at areas of highest risk.

As part of this extension, farmer profiles were examined within the Trublo trust framework.

Data that was captured anecdotally – either by auditors, data collectors or even offered directly by the data subject – was assessed against quantitative data sets to identify a risk or alternatively assign a trust score for the data. This reduces the cost to companies of validating data presumed accurate, or the cost of acting on data that needs further validation.

TRUBLO CASE STUDY
CONTINUED

2. Implementation

Supported by data collectors from the London School of Economics and RWACOF Exports, over 2000 farmers were sampled in the Musasa region of Rwanda. We chose the partner Trade in Space, who is described as "One of the most exciting companies operating at the intersection of Earth Observation and Blockchain technologies" by the European Space Agency with their research targeted at how satellite data and blockchains could combine for positive impact in agricultural value chains. Together we analysed the questionnaires, isolating responses that could be assessed for accuracy by the Trade in Space Geographical Information Systems (GIS) platform. Simply put, by carefully analysing satellite data we could ascertain a level of accuracy for the specific anecdotal responses, which can be extrapolated to a trust score within a content area i.e., deforestation* practices, and weighted back to the overall deforestation Trust Rating of the actor.

The analysis focused on four metrics:

1. Land cover area of the farm
2. Number of plots that exists within each farm area
3. Evidence of crop-cultivation within the last 12 months
4. If over the last 3 years there has been any deforestation either on the farm, adjacent to the farm or within the landscape locality of the farm

*"Deforestation" within this analysis specifically defined by Hansen et al[11] as the loss of forest biomass that can be detected through time-series analysis of satellite tree-canopy using a satellite imaging system calibrated to a 10m Ground Sampling Distance (GSD) (i.e., the Sentinel-2 satellite system).

3. Challenges in the Field

The Trublo exercise and analysis meant that out of the 2000 farmers we could issue two farmers with a "Gold"-standard deforestation Trust Rating credential. This would mean there is no deforestation on the farm, near the farm or within the surrounding 5km. "Silver" was awarded to 1955 farmers as they showed no on or near farm deforestation events. The remaining 43 farmers could be addressed for risk by analysing their anecdotal responses with full correlation being granted a "Bronze" deforestation Trust Rating and partial correlation was flagged to investigate.

Through this process, 34 farm plots were physically visited by and reinterviewed by auditors to investigate and remediate root cause behind the deforestation. When asked if they would cease their deforestation activities, they were provided with additional seedling for replanting. Roughly 60% agreed and the remaining farmers are going through remediation to resolve more complex drivers behind their activities, with potential rejection from the supply chain if deforestation is not completely stopped.

TRUBLO CASE STUDY
CONTINUED

4. Outcomes and Next Steps

Although the analysis is restricted due to the general focus of the LSE questionnaire, it shows that there is a clear opportunity to assess anecdotal information to identify non-compliant or less trustworthy actors with external data sets and incorporate that into existing traceability ecosystems to satisfy current and future regulatory requirements at scale.

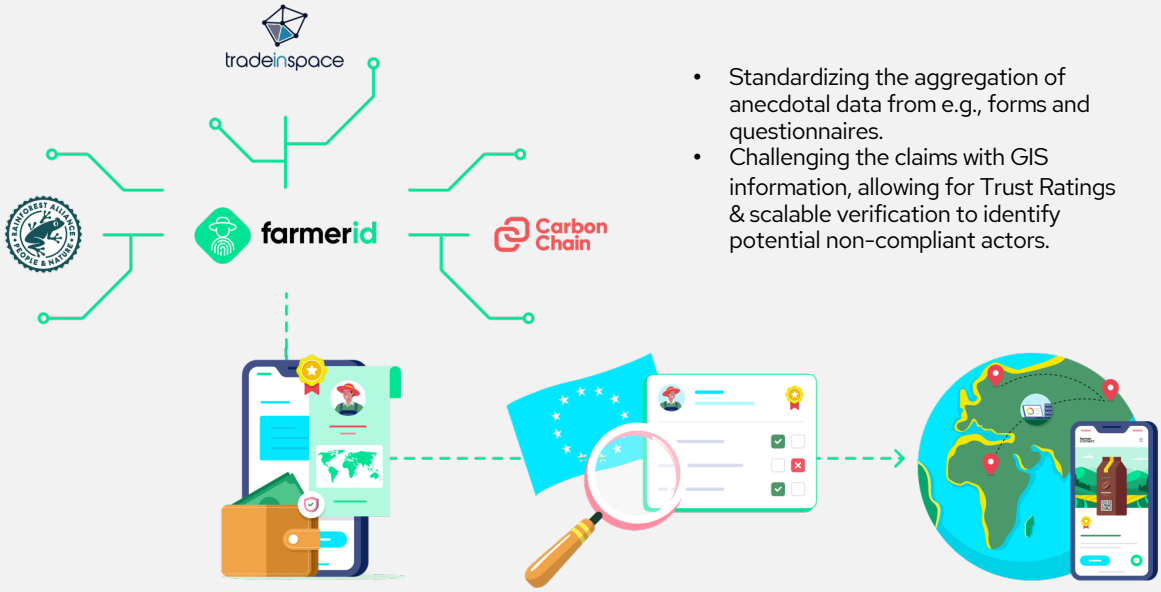
Importantly, by adopting this approach, we can help auditors or local support bodies on the ground to initiate interventions to address irresponsible practices and identify root causes.

This would help avoid future incidents, ultimately enabling the focus on the root cause, moving from stick to carrot and avoiding the acceleration of the digital, financial and opportunity divide.

Crucially, once issued back to the farmer's digital wallet, the deforestation Trust Rating of an actor (farmer) can then be linked directly to the movement of a product and tracked on the blockchain right through the supply chain.

This can be used to prove compliance with the EU's upcoming Deforestation-Free Products Regulation, or provide backing for other compliance or sustainability-based consumer facing claims, ultimately differentiating & valorising the **Digitalised Farmer**.

SOLUTION DESIGN & INFORMATION FLOW



- Standardizing the aggregation of anecdotal data from e.g., forms and questionnaires.
- Challenging the claims with GIS information, allowing for Trust Ratings & scalable verification to identify potential non-compliant actors.

- Issuing a deforestation Trust Rating as a Verifiable Credential to the farmer's digital wallet, allowing for cryptographically secure verification of the data.
- Achieving increased decentralization and reusability by storing information in a farmer-centric way.

- Increasing privacy and ensuring compliant data sharing across the farmer connect ecosystem through easy-to-use opt-in / opt-out mechanisms for the farmer.

- Linking relevant farmer-specific data (e.g., deforestation Trust Rating) to product traceability data on the blockchain, ultimately creating a more trustworthy provenance from the farmer all the way to the consumer.

THE DIGITALISED FARMER

What does a digitalised farmer look like, in terms of yields, financing, good practices, zero child labour, carbon tracking, biodiversity, food security, gender equality, and other important topics?

The most important difference between a digital and an analogue farmer is their ability to be known and participate in the ecosystem. By sharing visibility of the farmer's activities and needs with public and private partners, the farmer is empowered to receive the support they need, offer their goods to new supply chains, prove the farm's ESG claims, and receive added value for their investment in a cleaner, healthier, and more equitable planet.

This isn't just a moral victory; what isn't measured can't be managed, and the digital farmer will inevitably outperform the analogue farmer financially over time.

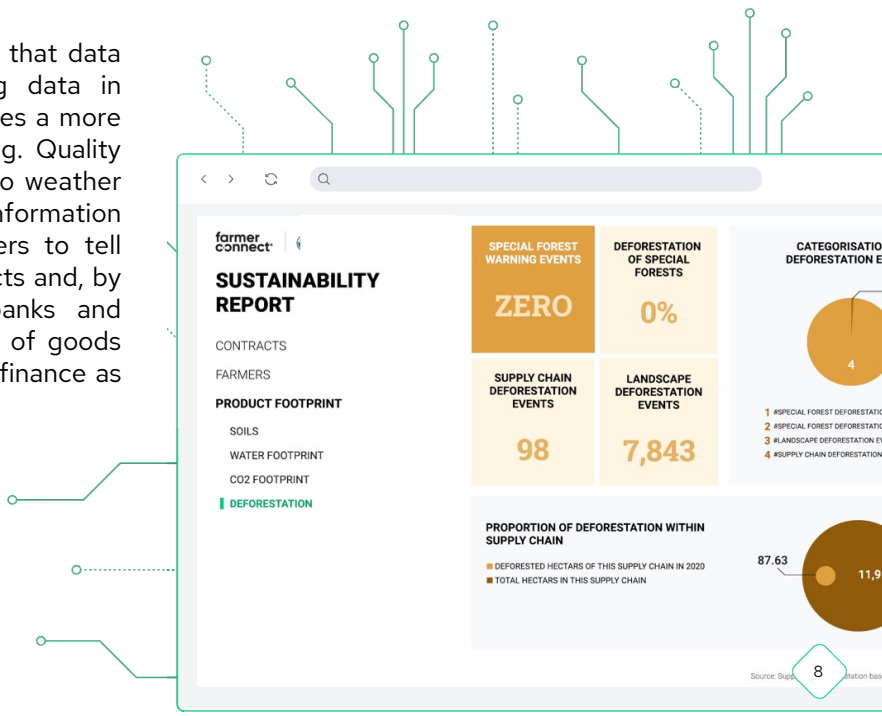
How does a digitalised farmer help the industry by having steady production, increasing supply flexibility, supporting claims and stories about them, and having collaterisable goods?

By digitalising their farm and sharing that data with the ecosystem (and receiving data in return), the digitalised farmer becomes a more knowable part of production planning. Quality metrics allow for rapid adjustments to weather and market conditions, and an information pipeline to the farm allows marketers to tell meaningful stories about their products and, by extension, their consumers. For banks and donors, we see both the traceability of goods and of funds being a requirement to finance as soon as it becomes widely available.

Digitalisation creates what we call "digital proximity" – the feeling that the farm is close and real, as if it were next door. With trusted data, the digitalised farmer is an integral participant in the supply chain, understanding who they sell to and becoming part of the global solution.

Does this only apply to non-European smallholders, or does it also apply to the EU and large-scale farmers globally?

farmer connect's solution starts with the assumption that the farmer is a small business owner –wherever they happen to be located. Our FarmerID solution can operate in areas with low connectivity and is accessible to farmers even with a flip phone or their trading partner's device. Our data model and governance are privacy by design and compatible with the GDPR and other emerging privacy standards. We have also worked with large industrialized farmers or farmer groups, integrating information taken from their established information systems to safely share with the rest of the value chain.



About farmer connect®

farmer connect® is a Swiss-based company delivering end-to-end traceability solutions to global supply chains.

We empower action in the areas of digitalization, sustainability and transparency. We collaborate with companies to help them share value-added data with their clients and trace products, enabling demonstration of the sustainability of their supply chains. We also enable donors and project funders to trace their money to the impact through our cash tracing solutions.

In 2021 we ran a successful Series A funding round, joined the official platform of the UN Global Compact and we are actively contributing towards SDG12 (Responsible Consumption and Production), SDG8 (Decent Work and Economic Growth), SDG9 (Industry, Innovation & Infrastructure) and SDG15 (Life on Land) and SDG17 (Partnerships for the Goals).

LET'S TALK

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