

ThreeFold Technology enabler for digitising the Agricultural sector

Introduction

Agriculture is the main part of Tanzania's economy. As of 2016, Tanzania had over 44 million hectares of arable land with only 33 percent of this amount in cultivation. Almost 70 percent of the poor population live in rural areas, and almost all of them are involved in the farming sector. Land is a vital asset in ensuring food security, and among the nine main food crops in Tanzania are maize, sorghum, millet, rice, wheat, beans, cassava, potatoes, and bananas. The agricultural industry makes a large contribution to the country's foreign exchange earnings, with more than US\$1 billion in earnings from cash crop exports.

The current state is still very traditional and does not include (much) modern farming tools and technologies. To increase the return in the agricultural sector DATA is a very important commodity that can enhance the sectors success and get the sector into the 22 century.

Data is a transformative commodity

With the increasing importance of data, a new global supply chain arises. Farmers in the future will not just farm their food products, but will become data farmers as well. In an ecosystem where many stakeholders benefit from the joint use of the data, data owned by well-connected farmers, can help them to increase yields and income. It helps them to grow the right crops, in the right way and with a better connection to markets, information, finance and agri inputs and services.

To make sure the data economy works for farmers, ethical principles and practical solutions are necessary. We feel there should be a global charter for the use of data from smallholder farmers. Fair Farmer Data reflects our vision beyond fair trade, but then for data. So what is fair data?

Fair Data is based on the principles of Fair Participation, Fair Ownership, Fair Value and Fair Voice in the entire value chain.

Fair Data is founded on two key principles: - Farmers remain in control of their own data (Fair Ownership) - The value of the data returns to the farmer on three levels: - Digital Inclusion (Fair Voice) - Access to services (Fair Participation) - Rewards and incentives (Fair Value)

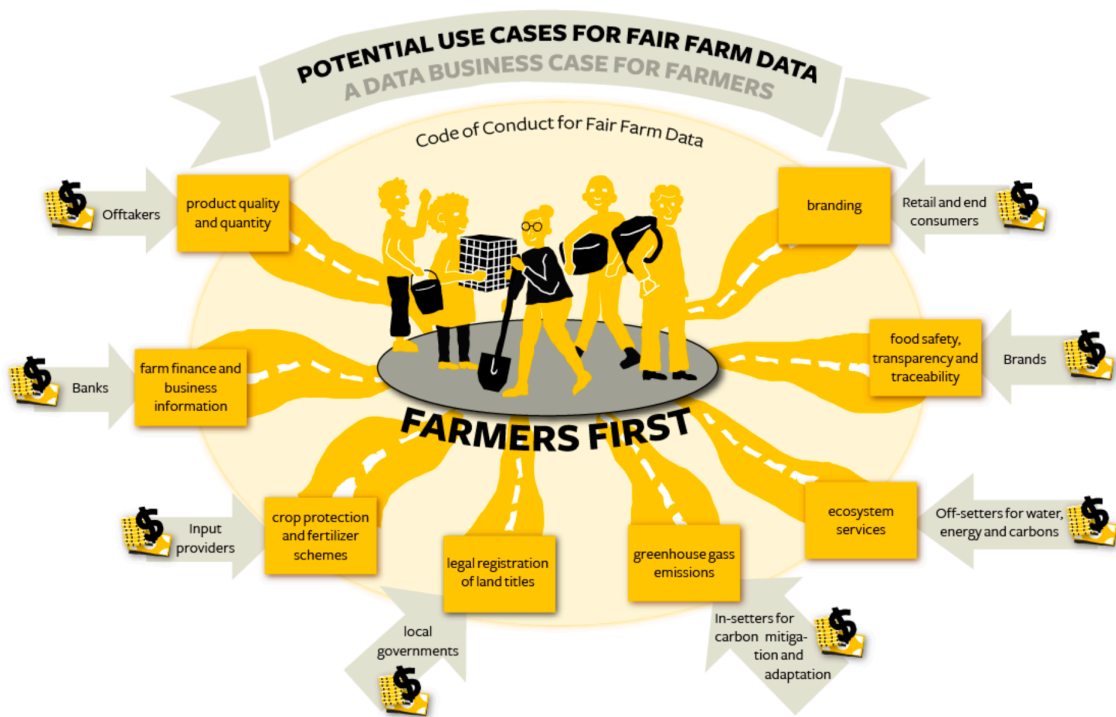
Data directs the pathway for a data economy that works for smallholder farmers. And leverages digital smallholder farmer inclusion and sector wide interoperability frameworks towards seamless exchange of data whilst generating value for the farmer.

Over the past decade, systemic transformations characterized by a new dependency upon data driven insights and access to digital opportunities, have brought radical transformations to (agricultural) production systems and processes worldwide. Technology has become a great enabler in the field of food and agriculture.

The added value of digital technology to support improving livelihoods while contributing to sustainability objectives is clear. The huge potential to increase efficiency in the scalability of interventions is also non-disputable. Further uptake of digital tools will give farmers access to knowledge to improve practices and yields and to financial services and markets. Over the last 10 years the agritech landscape expanded dramatically. Many new entrants and start-ups developed solutions and applications targeting smallholder farming in the global South. The possibilities of the internet of things and precision farming for smallholders are promising. Blockchain technology to secure transparency of data and information exchange and tokenization has the potential to improve supply chain efficiency and contribute to a better share of value, improving farmers' livelihoods.

Farmers First

When farmers start collecting data off their farming activities, and retain ownership of that data, that data can lead to a large number of positive outcomes that help farmers become better at what they do, retain a higher percentage of the final retail sales price of the produce and give them opportunities to attract forms of investment and income that are not available to them without data ownership.



Product quality and quantity

Result: increased payment from offtakers

How: Collecting data during crop growth allows to record and compare data points between farmers in a community and even between farmers of different communities. Quality control of the final produce of all farmers presents information what farming practices yields the largest quantities and best quality of produce.

Both larger quantities and better quality increase the earnings of the farmer. Farmers stays in control and ownership of his data, collective community data sets benefit everyone in the community.

Farm finance and business information

Result: Banks, NGO's and for profit organizations have better information to base investment or funding decisions on. This results in more funding being available to farmers to grow their crop.

How: Data provides insights into farming practices and more importantly how they have improved over time. This can be seems a a track record of the farmers success over the past crops. Collected data, in ownership of the farmers, stored in a local (sovereign) blockchain to the farmer community (country) presents a trustworthy source for an audit trail of farming history.

Crop protection and fertilizer schemes

Result: Farming input providers benefit from having (anonymous?) access to farming data. Product like fertilizer, pest control and others provides them with real time information to improve and optimize their products.

How: The input providers need (are incentivised) to reward the data owners (eg. farmer) for access to this data.

Legal registration of land titles

Result: Land deed information might not be 100% accurate a local and country governments. Farming communities know historically what land belongs to whom. Digital methods of recording what the actual (agreed) land ownership is is valuable information for local governments who in return my allows for perks or payments to the farmers.

How: Very simply having a farmer walk the boundaries of his owner lands and record the GPS footprint of this will allow all neighboring farmers to present the land boundaries with everyones consent. The time saved by the governments sending surveyors and recoding land boundaries can be shared with the farmers.

Greenhouse gas emissions / absorption

Result: Tracking of gas emissions of storage allow in-setters for carbon migration. They have an interest to acquire recorded carbon storage or are able to bring offset methods to make the farming process carbon neutral.

How: creating carbon offset certificates represents value and bringing carbon offseting into the farming process allow for a higher product price to retailers / consumers. Tracking all of this in a local sovereign blockchain where the farmer retains ownership of that data is the starting point for this.

Ecosystem services

Result: Properly recorded water, energy and carbon use (and there``with the control of it) allows off-setters for water, energy and carbons to come into the ecosystem and create a neutral environment.

How: creating offset certificates represents value and bringing offseting into the farming process allow for a higher product price to retailers / consumers. Tracking all of this in a local sovereign blockchain where the farmer retains ownership of that data is the starting point for

this.

Food safety, transparency and traceability

Result: Farmers collecting data on how their crops are grown (and stay in ownership of this data) allow large food enterprises to have precise information on what happened to this crop. For global brands this represents marketing and differentiation capabilities for which they are willing to pay (a higher price for the crop or a direct payment for access to that information)

How: Collect all sorts of data point related to farming and specific crop growth. Stored in a immutable, sovereign data store (eg. blockchain) this represent a data market where (anonymous) data gets sold to for conglomerates and farmers stay owners of that data.

Branding

Result: Precise information of what has gone in, how little ecosystem was used to create this crop, farmers (family) living conditions are all presenting value to conscious retailers and consumers who are willing to pay a higher price for the produce, putting a higher amount per produced items in the farmers pocket. Again, data ownership retains with the farmer.

How: Conscious buyers are willing to pay a higher price for unit for products that are good for the planet, logistical chain and farmers.