

# Data driven services in smallholder farming

Demonstrated benefits of data sharing and addressing data rights management



Ministry of Agriculture, Nature and Food Quality of the Netherlands



## Introduction

Digitalisation of agriculture is driving an exponential growth in the amount of data on agriculture being collected. This calls for new tools and approaches to gather, manage, analyse and use this data. CTA's project, Data4Ag: Agricultural data systems to transform smallholder farming, focuses on transforming smallholder agriculture through the use of data management by agri-enterprises and examines the issues that affect upscaling the associated applications.

## Approach

This Project aims to facilitate better data management in farmer-owned cooperatives, associations and farmer's organisations, and upscale through policy engagement, capacity development and communication. It focuses on transforming agriculture for smallholder farmers through joint ventures to reach new markets and by using aggregated data to provide better services for their members and to inform policy-making.<sup>1</sup>

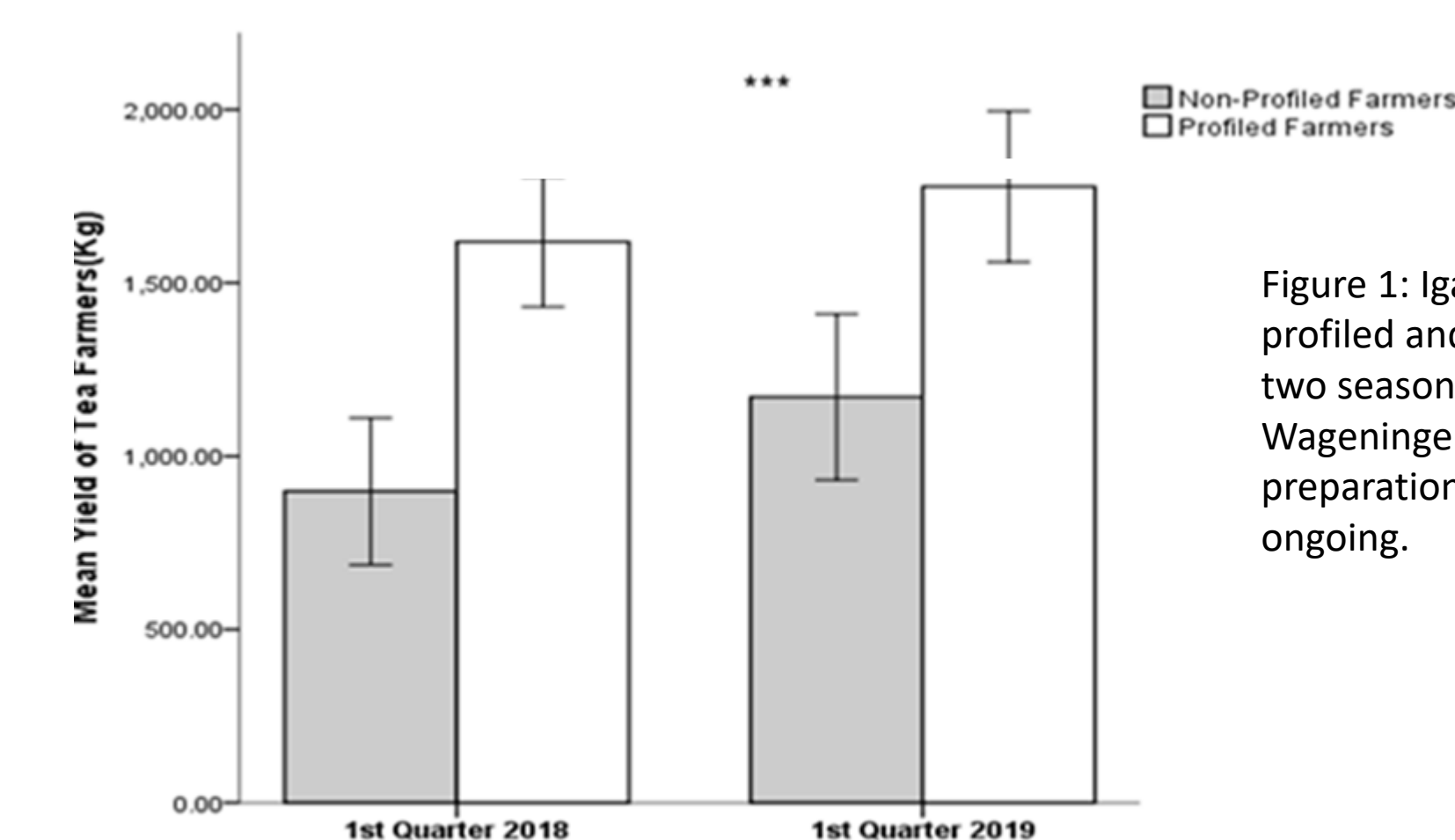
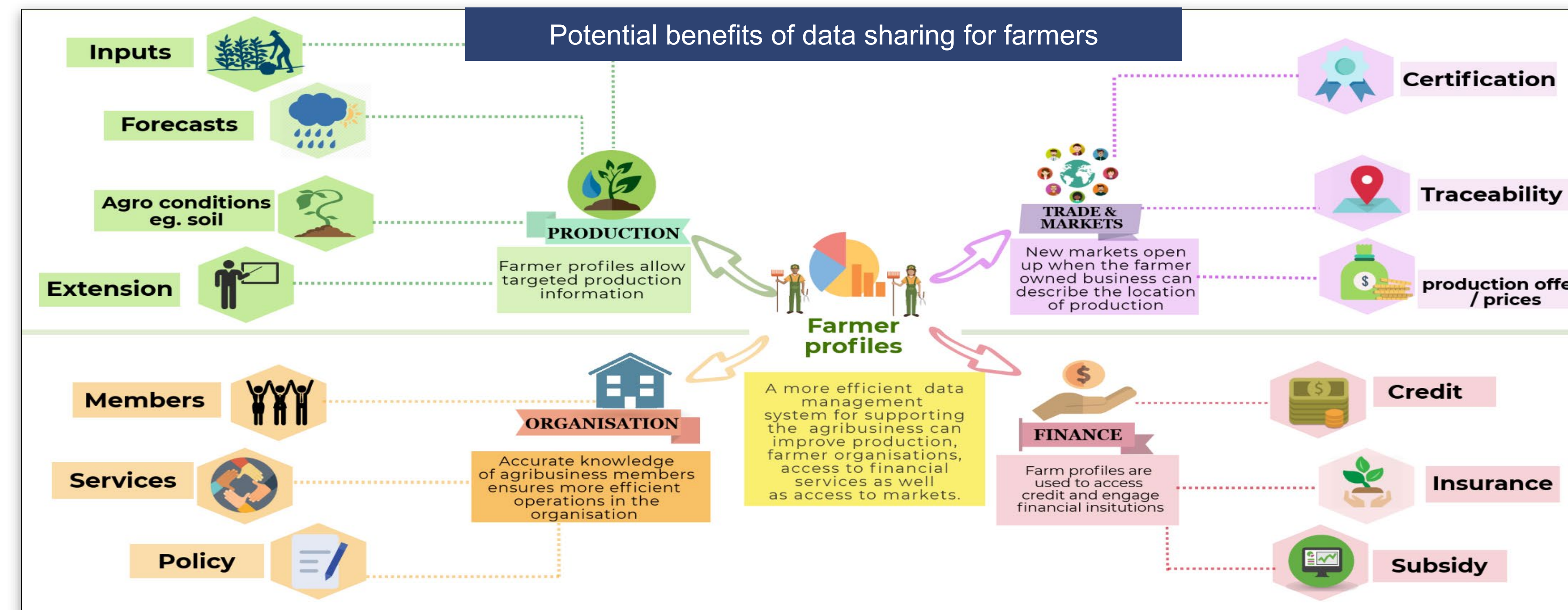


Figure 1: Igara tea returns comparing profiled and non-profiled farmers across two seasons. Wageningen UR C. Ayim, paper in preparation. Machine learning analysis ongoing.

\*\*\* significant difference between profiled and non-profiled farmers at p<0.001



## Results from farm to policy

Farmers' organisations in eSwatini, Lesotho, Burkina Faso, Burundi, Kenya and Uganda have received support for digitalisation, including data enumeration and farmer profiling, data management, analysis and visualisation and potential applications such as collective marketing and credit management. Some have seen 30% increase in yields & profitability. Improved extension has improved resilience. This experience is shared with government through national policy (eg IGTF) and overseen by the regional farmers organisations who raise the issues through international fora.

Most recently raising farmer data rights issues in the AU EU rural task force report and at the FAO digital council discussions. Together with GODAN we have supported Ministerial conferences on data sharing in particular focused on opening government data, both in East and West Africa<sup>2</sup>

## Farmer profiling

This is one of the key elements of the project. A crucial aspect of this work is farmer sensitisation. We have developed with partners an approach based on enumerators using tablets with using ODK to collect data ensuring agreement from farmers. This includes awareness sessions through public campaigns and radio to farmers explain the purpose of data collection. Using qGIS locally for the spatial information and an ONA database running in the cloud we have worked with farmers' organisations to support training of enumerators to capture profile information of smallholder farmers. Having secured their consent, these enumerators gather a range of information regarding location, crop, production, finance and business information, which has been transferred to electronic membership data systems established by the farmers' organisations with CTA support<sup>3</sup>. Capacity building includes data analysis and visualisation. The farmers' organisation can profile and map their members' locations, which brings better management and provision of services to members, including weather forecasts, extension, finance, insurance and market information.

## Impact

The project has had a direct impact in the field with the farmers organisations selected by the Pan African Farmers Organisations regional members, but these sub-projects served to give direct experience to the PAFO members of the issues around data driven applications. This demonstrated the need for farmer profiles as a foundation for any digital services and shows the role Farmers organisations can play as aggregators for these services<sup>4</sup>

To ensure that findings from the project were taken up by the community supporting farmers organisations in transforming smallholder agriculture, we fed the results into a Massive Open Online course that we ran in conjunction with the FAO on farm data. This proved to be very popular with around 2500 registered for each of the two courses run so far.

<p><b>LENAFU, mixed farming, Lesotho</b></p> <p>WFP entering partnership with the farmers union on basis of new digital registration systems. New insurance systems developing</p>	<p><b>EAFF, maize &amp; mixed, Kenya</b></p> <p>By having more collective information on yields Farmers are influencing policy with local &amp; national government.</p>
<p><b>CAPAD family farming, Burundi</b></p> <p>4312 farmers improved income as a result of benefits from collective purchase of inputs. 100,000 Euros of credit was secured for 2896 farmers</p>	<p><b>SNAU, Mixed farming, Swaziland</b></p> <p>Members now to benefit from national input subsidy program as result of new membership management system</p>
<p><b>NUCAFE coffee, Uganda</b></p> <p>Bufumbo – Organic Fairtrade and UTZ certification as a result of farmer profiles brings 60% increase in price from Italian buyer. 60MT sold to South Korea brings added income of 30% to participating growers. 21,000 farmers now have EU Geographical indications</p>	<p><b>Igara Growers Tea Factory, Uganda</b></p> <p>30% increase in tea leaf after profiling as result of better fertiliser inputs resulting from mapping. Better access to credit through new SACCO and investigating use of profiles and transactions for better bank credit.</p>
<p><b>FEBAP</b></p> <p>The FEBA/B project used drones to collect agro-weather data (ground cover, soil, contour lines, water stress, surface area, etc.) to help make fertilisation-related decisions. Profiling was successful but associated services were not well linked.</p>	<p><b>Overall</b></p> <p>Nearly 220,000 farmers have now been profiled by the Data4Ag project. 16,430 have now been trained in data management and a further 3,716 specifically on farm registration and farm data systems.</p>

## Key issue: Data sharing

To reach a wider audience of those working with farmers organisations on agricultural transformation with some of the lessons from the project we have engaged with the international community and in particular with expertise from research and law. Whilst making more government data open in most cases we are concerned with the licences around sharing data in these new systems, and the need to ensure equitable value sharing. Farmers priorities are:

- 1) Need for prior consent & good communication;
- 2) Data ownership to control data sharing;
- 3) Clearer data agreements through a clear briefing;
- 4) Farmer consent of data collection and use;
- 5) Access control Protection of IP rights;
- 6) Sharing value;
- 7) Enforcement-certification.

## References

1. Project page <https://www.cta.int/en/data4ag>
2. Nairobi Declaration site: [cta.int](http://cta.int)
3. ICT update Issue 89 Dec 2018 - Data4Ag: New opportunities for organised smallholder farmers
4. Building the next generation of farmers video <https://www.youtube.com/watch?v=8du0UCFHmao>
5. Review of codes of conduct voluntary guidelines and principles relevant for farm data sharing Working Paper 19/01 CTA, Dec 2019
6. Digital and Data-Driven Agriculture: Harnessing the Power of Data for Smallholders, GFAR, March 2018



## Partners

Agricorn; Confédération des Associations des Producteurs Agricoles pour le Développement (CAPAD), Burundi; East Africa Farmers Federation (EAFF); Fédération des Professionnels agricoles du Burkina (FEBAP); Food and Agriculture Organisation of the United Nations (FAO); Global Forum for Agricultural Research and innovation (GFAR); Global Open Data for Agriculture and Nutrition (GODAN); IGARA Tea Growers Factory (IGTF), Uganda; National Union of Coffee Agribusiness and Farm Enterprises (NUCAFE), Uganda; Open Data Institute (ODI), UK; Pan African Farmers Organisation (PAFO); Southern African Confederation of Agricultural Unions (SACAU); Ministry of Agriculture, Netherlands (LNV); Wageningen UR, Netherlands.

