




A guide to technology implementation in agribusinesses

Part 1: Developing Requirements

December 2019



A person wearing a blue checkered shirt with a logo that says 'NR' and a brown jacket is holding a black Samsung smartphone in their right hand and a clipboard with a pen in their left hand. The background is a blurred green field.

Are you collecting your smallholder data on pen and paper? Do your operations feel slow and outdated? Do you wish you had real-time insight into your field and smallholder outreach activities?

AgDevCo has found that technology can be a powerful tool for smallholder outreach and engagement when implemented with a clear strategy and defined goals. This guide is designed to cut through the ambiguity, uncertainty, and frustration that many feel when implementing technology and will help you set your organisation on a path towards a digital future.

WHY TECHNOLOGY MATTERS

Digital technology is a powerful tool we can leverage to improve our businesses. This guide will help you prepare for implementing tech solutions that will improve your company's bottom line and allow you to focus on what matters most: your goals, your vision, and your impact.

Digital technologies provide limitless opportunity for agribusinesses to streamline their operations, create new business models, expand to new markets, and reach more smallholders. There is no doubt that technologies can transform organisations that are able to harness the power of these rapidly changing tools.

Yet from these well-known benefits a frustrating challenge emerges. The pace at which technology advances lets us dream about future possibilities but also creates confusion about what technology can actually do and how it should be used. Unfortunately, most agribusinesses we've met would summarise technology in this way:

We know it should work.

We know it can work.

So why doesn't it work?

The good news is that technology projects can be simplified in ways that allow us to reduce risk by developing clear requirements and proven strategies. This guide provides a simple methodology any agribusiness can use to begin to document its vision and prepare for reaching out to technology providers. By helping to frame technology's purpose in your organisation we hope you can leave the pages of this guide with confidence in using tech for what it truly is: an intriguing and inspiring tool that can transform your company and exponentially increase your impact.

These insights and guidelines were developed through the work of the AgDevCo Smallholder Development Unit (SDU) in the course of implementing projects with agribusinesses across Africa. This guide will focus on preparing you with the knowledge you need to create a technology strategy and will be supplemented by further guides as new insights are developed.



PREPARING FOR THIS GUIDE

In this guide we will walk through two simple steps that will help you develop technology requirements:

1

DOCUMENT YOUR BUSINESS

Most technology solutions are closely tied to business processes and the data your organisations uses and collects. We'll step through a checklist you can use to make sure your business processes are documented and you are ready to describe your operations to new technology partners.

2

CREATING REQUIREMENTS

Just because technology can help with all business challenges does not mean it should. We'll show you how to bring the right team members and goals together to create a common vision and plan.

Who should be involved?



MANAGING DIRECTOR / CEO

Sets a vision and goals



REPRESENTATIVE(S) FOR EACH OPERATIONAL ACTIVITY

(e.g. extension work, warehouse staff)

Ensures that technology will capture requirements most valued by staff and users



REPRESENTATIVE FOR EACH BACK OFFICE TASK

(e.g. finance, human resources)

Ensures that technology will improve the company's administrative work and overall operational efficiency

A project manager for all technology-related activities should also be appointed to organise the activities in this guide.



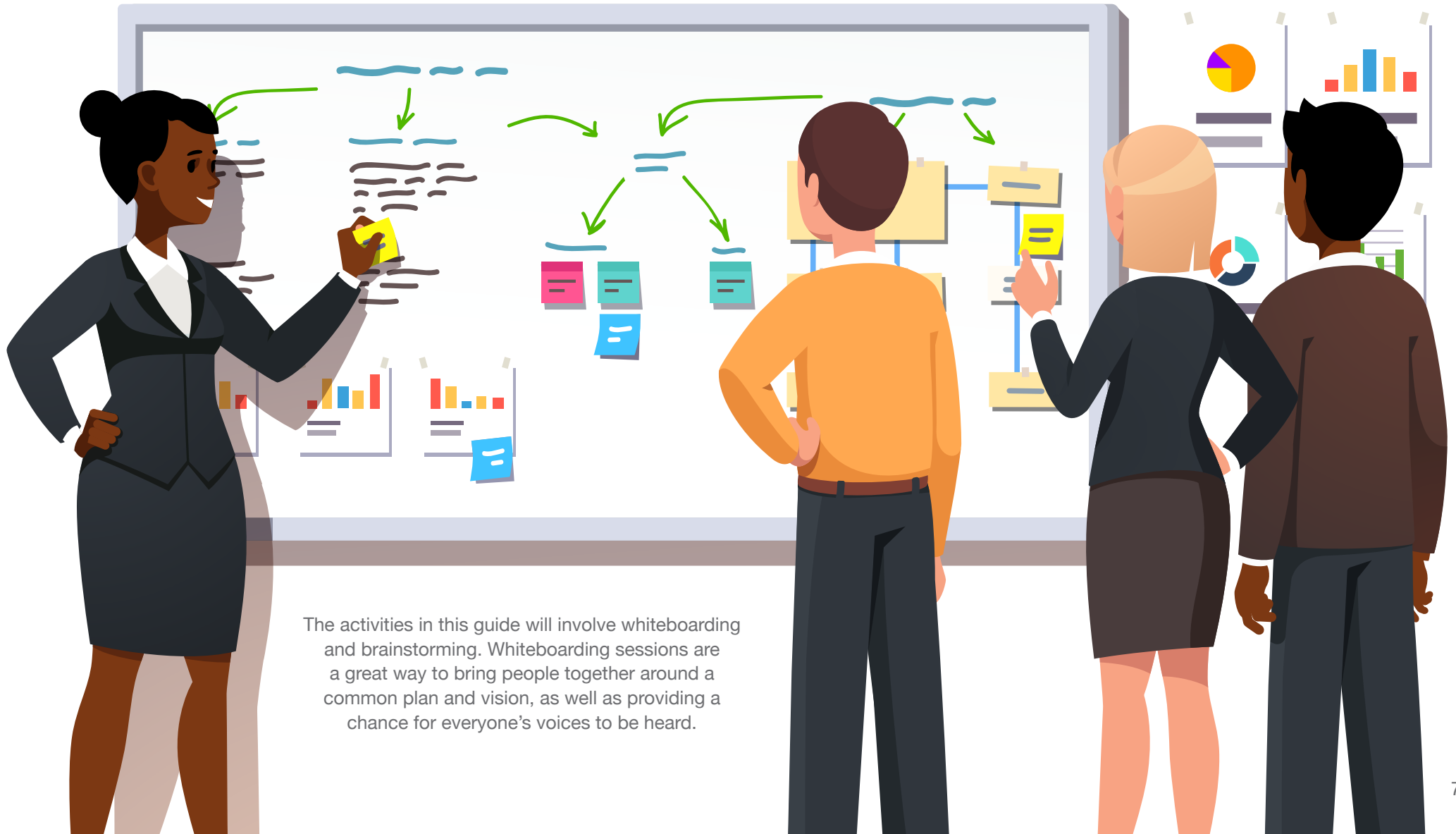
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STEP 1 DOCUMENTING YOUR BUSINESS

Before implementing new technologies, it's critical to take an inventory of your organisation's data and current processes. During this step, we'll prepare the materials you'll need to help technology providers understand your organisation, your goals, and your vision.

Activity 1 | Document your operations and processes

Most organisations have unique and complex business processes, so it might feel difficult and overwhelming to try to record of the nuances of your daily activities. To simplify what needs to be documented, start by writing down the tasks and activities of each job function at your organisation. This step will provide both you and any partner companies with a starting point of areas where technology can help optimise operations and solve key challenges.

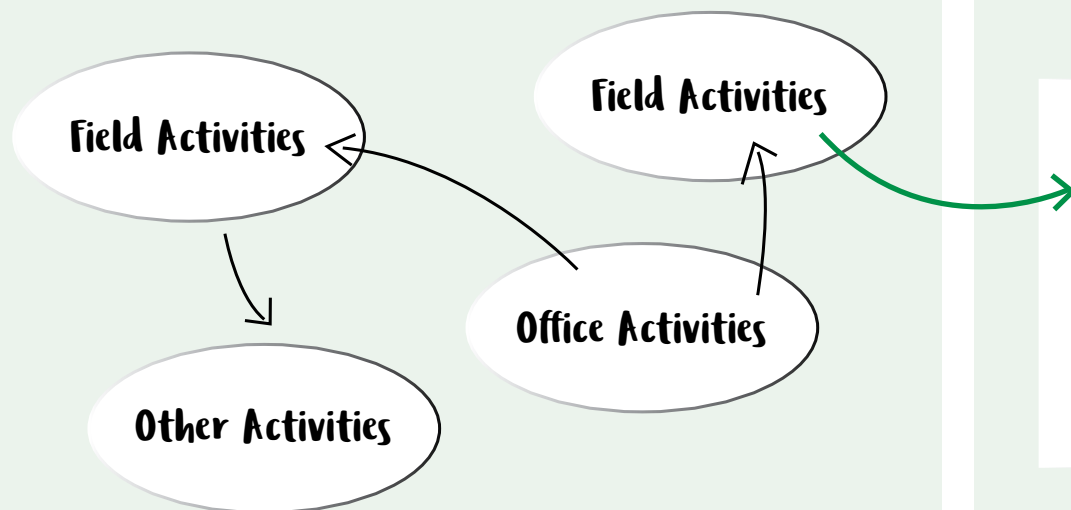


The activities in this guide will involve whiteboarding and brainstorming. Whiteboarding sessions are a great way to bring people together around a common plan and vision, as well as providing a chance for everyone's voices to be heard.

Activity 1 | Document your operations and processes (continued)

Documenting tasks and activities

Create a full list of all tasks and activities that all staff perform. This will be a really long list, but taking note of all tasks and activities will eventually help to identify important features and functionality that technologies should include.



When going through this process, it can be helpful to draw arrows that show the flow of information between roles or different areas of your organisation. As you work through the flow of information, try to identify bottlenecks or areas of your operations that feel inefficient and that might be improved through new technologies.

Documenting roles and responsibilities

Every organisation has a unique hierarchy and structure even for positions common to many agribusinesses (i.e. field officers). For each job function at your organisation, list out primary responsibilities and key metrics (how the position is judged in terms of performance and success). This process will help to identify the impact that technology will have on the users and to make sure that solutions are centered on user's needs.

Job function:

Field Officer

Metrics for success:

- 15 farmer visits per week
- 5 demo plots per season

Responsibilities:

- Training farmers
- Managing demo plots
- Pest and disease evaluations

TIP: If possible, also list external stakeholders and the needs of those who may use or be impacted by the technology you implement. Don't forget that external groups such as customers or smallholders play an important 'role' in your business's success!

Make sure to delegate one person to record all information in a document that can be provided to technology providers.



CASE STUDY

Silverlands Ranching, Zambia

Silverlands Ranching is a key supplier to the Zambian beef market, with a large cattle purchasing and feed lot operation. The company has invested in the development of the Silverlands Livestock Improvement Community Programme (SLIC) to provide extension services that support smallholder farmers in livestock husbandry. Among many other initiatives, SLIC established 28 cattle dipping stations that provide services for up to 200,000 cattle per year across 250,000 hectares.

As SLIC expanded their impact and reach, they looked toward the use of technology to help optimise and streamline operations, increase insights, and improve outreach, marketing, and partnerships. Working through the steps in this guide, SLIC documented their processes and established key metrics for success. A sample of their process documentation is shown to the right and serves as a perfect example for the output of this activity. Even in hand-written form on a whiteboard, the documentation creates a critical first step in defining requirements and setting priorities for technology implementation.



Documenting workflows

Silverlands and SLIC field activities, workflows, and data collection processes were identified through whiteboarding.

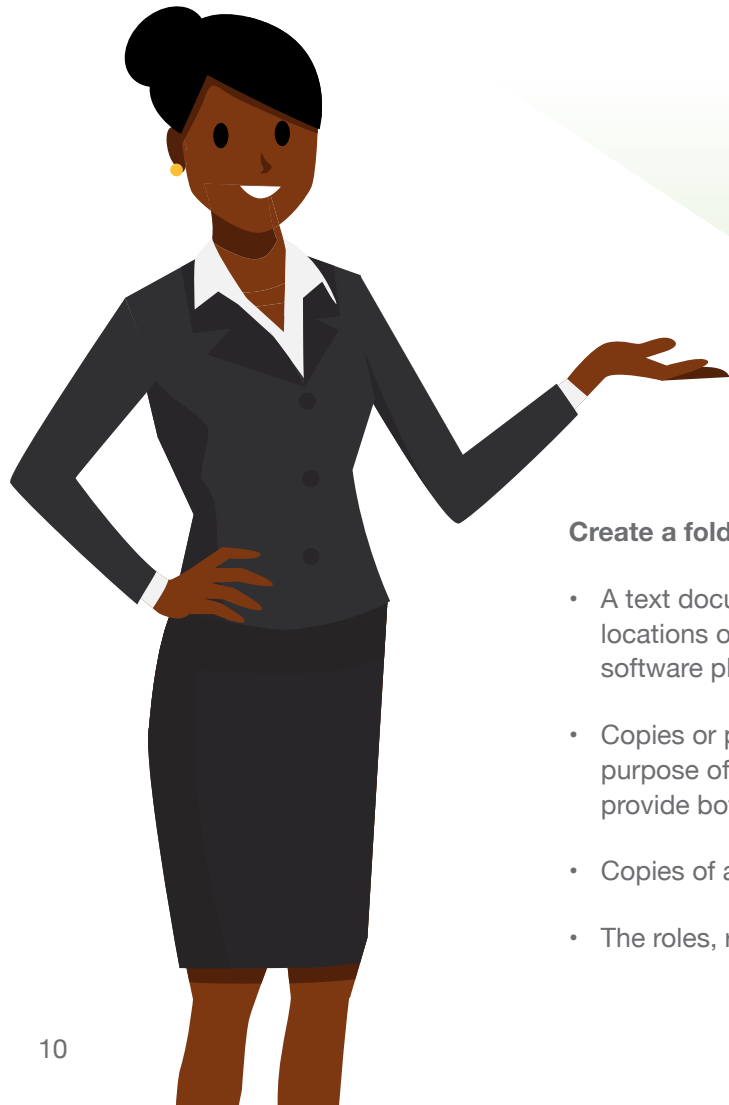


Creating key metrics

Key metrics for the success of each SLIC business unit were documented, based on a larger vision for smallholder outreach.

Activity 2 | Gather up your data

Finding and documenting all of your data is a useful and important preliminary step in thinking through the ways your organisation can leverage technology. This step will also help technology partners learn more about your operations.



Spreadsheets



Text documents



Paper forms



Databases



Current software platforms

Create a folder that contains the following:

- A text document describing where your data is stored, including the locations of all spreadsheets, notebooks, paper forms, databases, and software platforms.
- Copies or pictures of all paper forms used, including a description of the purpose of each form and when and how the form is used. For each form, provide both a blank version and one that is populated with example data.
- Copies of all data files (spreadsheets, text documents, etc.).
- The roles, responsibilities, tasks, and activities documented in Activity 1.

Do's and Dont's



Do make sure all files are organised with filenames that describe the content of the file.

Do translate forms and files (where possible) into a language technology providers will understand, such as English.



Don't add usernames and passwords for your files or data systems in any documents.

Don't provide anyone external with access to your data or systems until legal paperwork that protects you, such as a non-disclosure agreement, has been signed.

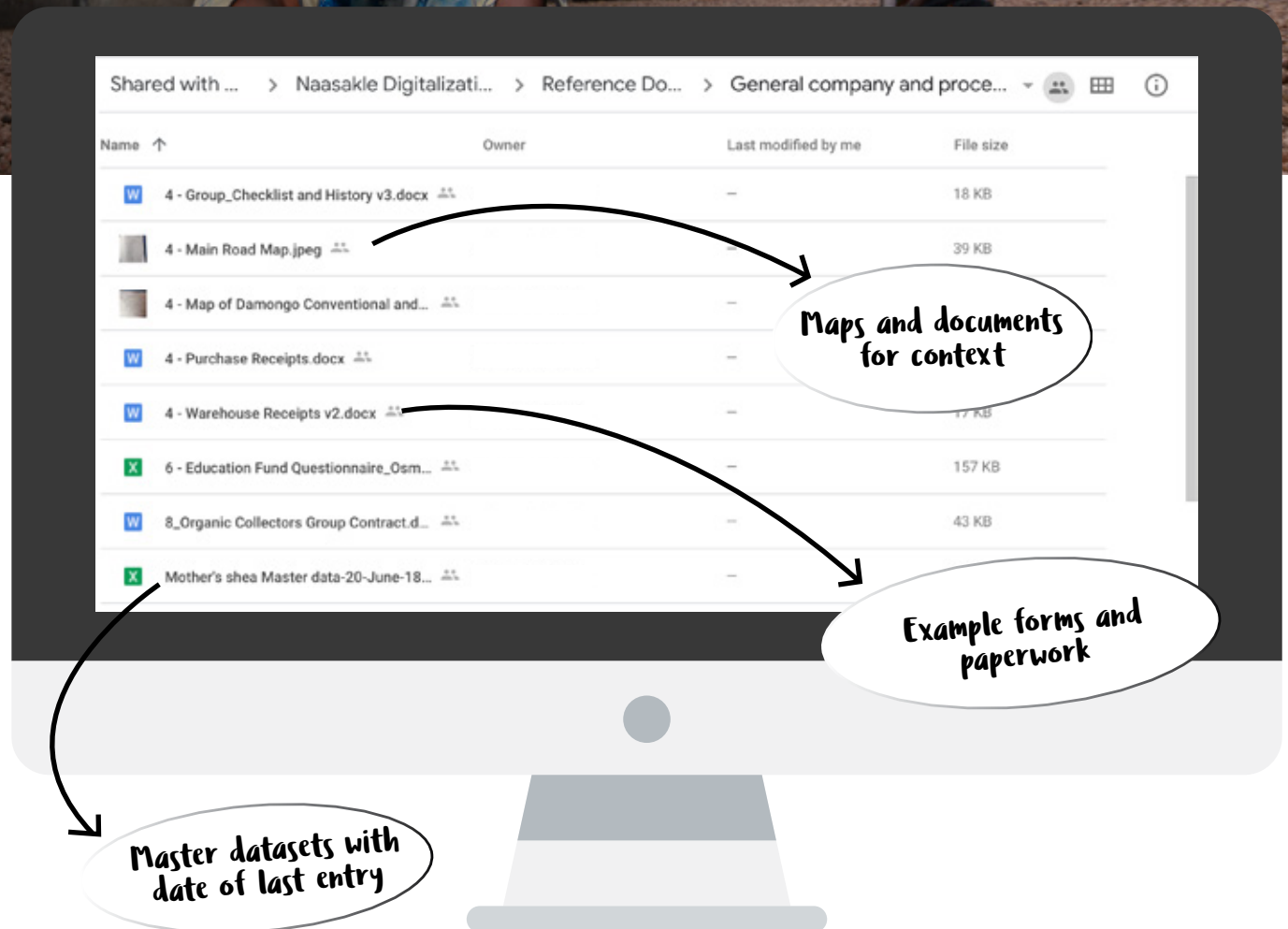


CASE STUDY

Mother's Shea, Ghana

Mother's Shea is a Ghanaian business that processes shea butter for bulk export sales. Mother's Shea sources its shea nuts from nearly 7,500 women 'pickers' who are organised into cooperatives located in villages across the Savannah Region of Ghana.

As Mother's Shea sought to scale its operations and expand its smallholder outreach, the company began to explore technologies that could help with traceability and insights. To the right is an example of the Google Drive folder the management provided to technology consultants and experts as they learned more about technology solutions. Their documentation serves as a perfect example of the type of information technology partners will need to learn more about your organisation, and includes current datasets with the date of last data entry, process documentation, survey forms, and maps.





2

STEP 2 CREATING REQUIREMENTS

Successful tech projects start with the clarity of knowing what you want and why. In this step we'll bring the right team members and goals together to create a common vision for success.

Activity 1 | Brainstorming

Using sticky notes or pieces of paper and tape and a large wall, begin writing down ideas for what technology should be able to do. Work independently or in small groups at this stage to make sure everyone's voice and ideas are heard.

TIP: Allow all suggestions at this stage even if the idea seems impossible. Brainstorming is important not only for the process of requirements generation, but also to help get everyone on your team excited about what technology can do and how it can shape your organisation.

Stuck on what to write? Or having a hard time figuring out what tech should do?

A good starting point is to work through the activities and tasks noted in Step 1. Think through the data you currently collect, data you would like to collect, the reports that you want to use, and pain points in the current business and activity processes.



Activity 2 | Grouping & collaborating

Working together as a team, consolidate ideas by creating groups of sticky notes that are similar. Notes might be grouped according to similar data or functionality, such as harvest data or information needed to manage field activities with smallholders.

Rate each note using the following classifications:

- 1) MUST HAVE:** These are features, functionality, or data you feel are absolutely essential as part of the tech solution, otherwise the solution would not be useful or helpful for your organisation.
- 2) NICE TO HAVE:** These are features, functionality, or types of data that would be really helpful or useful to have (if possible), but not something required to perform daily activities.

TIP: For each MUST HAVE item, be sure to list out the expected benefit to the business. For example, improved field data collection might save time on compiling reports or help to improve extension services. If there is no business benefit to a MUST HAVE it is probably just a NICE TO HAVE.

TIP: If you are unsure whether technology can be used for an idea, assign a rating of NOT SURE and flag these items for discussion with technology providers.

Last season's crop records

MUST HAVE
Improves extension services

HARVEST DATA

Inputs to farmers

MUST HAVE
Improves extension services

Geo-mapped
farmer fields

NOT SURE

Farmer profiles

MUST HAVE
Saves time on
reporting

Monthly income
survey

NICE TO HAVE

Training records

MUST HAVE
Saves time on
reporting

SMALLHOLDERS

Do's and Dont's



Do encourage all to give their ideas and make sure all team members know that all ideas are good ideas at this stage.

Do ask each individual to reflect on tasks in their day-to-day jobs that might be automated or easier with technology.

Do appoint one person to lead the whiteboarding, but allow others to take the lead as they have ideas.



Do not try to solve ideas with specific technologies you are familiar with at this stage (e.g. "we need a mobile app").



CASE STUDY

Faranaya Agri-Business Centre, Ghana

Faranaya is an aggregator of sorghum in northern Ghana. As demand for sorghum has increased in recent years, the company began exploring technology solutions that would increase insights into their operations and help manage a large number of smallholder farmers.

The videos available at the link to the right show an unedited whiteboarding discussion with Faranaya managers, field officers, and other leaders who are working to determine the highest priority data requirements. Lively brainstorming sessions are always a productive activity as long as everyone has the opportunity to speak. These discussions help everyone agree on a common vision for how technology can best serve the company.



See the Dropbox folder below for videos of brainstorming sessions at Faranaya:

<https://rebrand.ly/agritech>

As you are brainstorming, take time to also list out any new business ideas you have (tech related or not) as well as any technologies you are interested in learning more about. Each of these ideas can also be discussed with digital technology partners, in addition to your core requirements.



New business ideas

Add input sales
for smallholders

Purchase
maize from
smallholders

Test new crop
varieties



Interesting tech we want to learn about

Drones and
satellite data

USSD
applications

Machine Learning

Activity 3 | Prioritising and planning

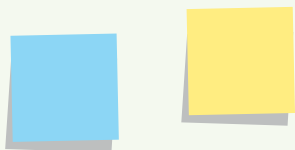
Group your **MUST HAVE** sticky notes into the following boxes shown below.



Field & extension work

Add all notes related to:

- Farmer or farmer group profiles
- Data related to demo plots and training
- Reports related to field or extension activities
- Inputs and/or crop or harvest records
- Field officer activities, tasks, and workplans



Traceability, operations, and supply chain

Add all notes related to:

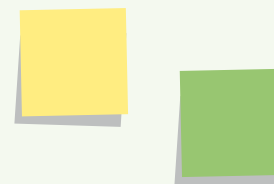
- Purchases from farmers
- Processing records and end-products sales
- Transport records
- Inventory and stock records
- Reports related to any of the items added in this box



Back office operations

Add all notes related to:

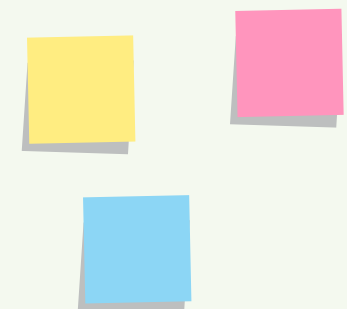
- Employee records
- Payroll
- Payments to farmer and suppliers
- Accounting, finance, and audits
- Automating or improving financial insights or accounting reports
- Company sales and new business development



System integrations

Add all notes related to:

- All integrations connecting different platforms or technologies
- Datasets which need to be merged or consolidated automatically



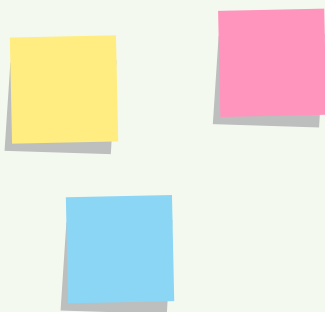
Note: It can sometimes feel difficult to place notes in specific categories. For example, smallholder farmer records are usually important for field work, traceability, and integrating systems together. If you are having a hard time deciding which category to select, feel free to add the sticky notes in multiple places or choose the one box where you think it matters the most.



Geospatial analysis and mapping

Add all notes related to:

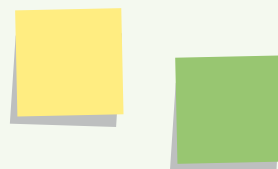
- Creating maps of activities, and farmers
- Cross-referencing different layers of geospatial data (e.g. farmers vs. disease prevalence)



Data analysis

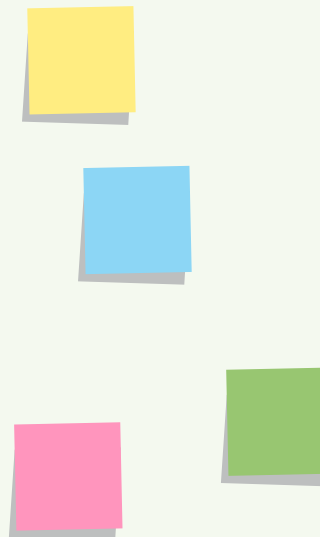
Add all notes related to:

- Data intended for research
- Statistical models and impact evaluation
- Machine learning and algorithm development



If you have a specific idea that doesn't feel like it fits in any of the boxes to the left, you can create a new box:

MARKETING TO
SMALLHOLDERS



Activity 4 | Developing a strategy

Phase 1: Digitising your operations

Start Here: Work through each step below moving from one to the next



1

Field & extension work

\$ \$0 - \$5,000 / year

🕒 1-4 weeks to implement

Your best strategy will be driven by your budget, but no matter what your budget is you can leverage numerous technologies with mature feature sets and great support. All platforms allow you to build forms without code or custom development and many will host your data for you. Some of the common tools we see used are:

ODK

CommCare

SurveyCTO

KoBoToolbox

TaroWorks



2

Traceability, operations, and supply chain

\$ \$15,000 + \$5k per year

🕒 3-6 months to implement

Once your field data is digitised, you can look towards implementing solutions from providers who offer platforms specific to the needs of agribusinesses. These are bespoke solutions that require substantial resources to build and maintain, so you should only implement these if you are hitting the limits of cheaper solutions, such as Excel. Some of the common providers we see are:

SourceTrace

CropIn

Farmforce



3

Back office operations

\$ Varies depending on provider

🕒 Varies depending on functionality

Agribusinesses naturally share commonalities that span all businesses, such as human resources, payroll, or accounting. For common business functions, it is usually best to go with platforms that specialise in these functionalities and have well tested and flexible feature sets. A simple Google search for the business function you need will reveal an almost overwhelming list of software providers who can likely meet your needs. You should select a provider within your preferred price point that can most easily integrate with your existing technologies and operations.



4

System integrations

\$ \$3-5k per integration

🕒 1-4 weeks per integration

Although it is becoming easier to get different platforms to connect with each other, it is not uncommon for two technologies not to be able to sync with each other directly. If an integration between two platforms you are using does not exist from one or both of the technology providers, a custom integration will need to be developed. Custom integrations should ideally be developed by the providers themselves, but can also be developed by an IT specialist or developer you contract.

Phase 2: Growing and scaling operations and impact

Add the below items one at a time as your data improves throughout Phase 1



Geospatial analysis and mapping

\$ \$0 - \$5,000 / year

⌚ Implement gradually over time

Although many platforms from Phase 1 will offer some form of mapping functionality, it is typically advisable to use third-party solutions that are specialised in mapping and that maintain mature and tested feature sets. A few solutions we've seen used are:

Google Maps

MapBox

Leaflet

ArcGIS



Data analysis

\$ Varies based on skills needed

⌚ Ongoing over time

Platforms from Phase 1 will offer basic reporting and dashboard functionality. For more advanced statistical analysis and/or advanced analytics, it is typically advisable to hire a specialist or expert in the field of analytics you need (e.g. impact evaluation or machine learning). Platforms aiding in this line of work will still require careful configuration and insight from experts who can ensure that the results and models developed are aligned to your specific use case. Experts in this line of work will typically bring their own preferences for tools and programming languages.

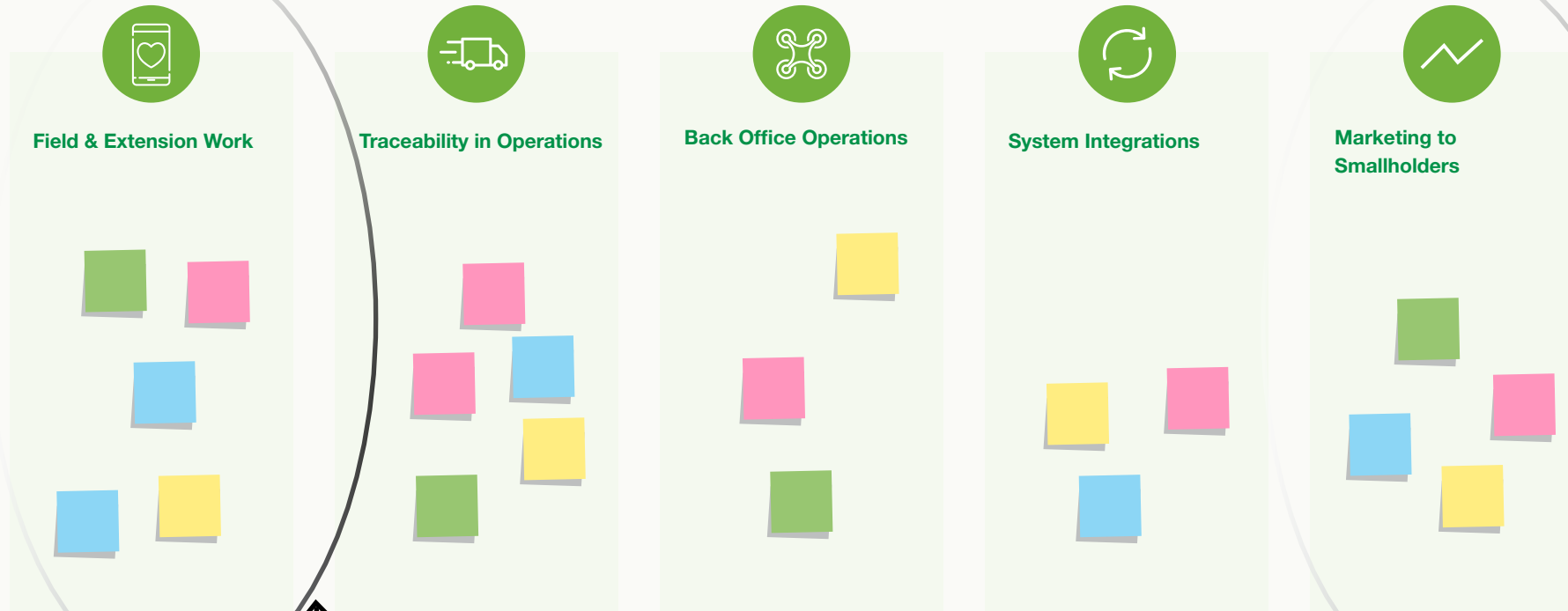
MARKETING TO SMALLHOLDERS

\$ Varies; start with free platforms

⌚ Varies based on functionality

Specific ideas not listed in the boxes to the left may require technologies and experts that are very specific to your use case or goals. When testing out new ideas, try to start small and design pilot tests that are cheap or free. Once your core assumptions are validated and you have a clear understanding of requirements, invest additional resources over time while continually evaluating the return on investment you are seeing from the use of technology in this area.

Activity 5 | Prioritising and planning



Choose no more than two green boxes to focus on and leave the others as pending.

Be realistic about timeframes and timelines. It is typically difficult to complete more than one green box per business quarter (so allow 3-6 months for each).

EXAMPLE

Category	Specific goals	Priority	Timeline	Budget
Field & extension work	Farmer profiles and training records	1	Q2 of 2020	\$1,500/year
Marketing to smallholders	Collecting data to create loyalty programs and vendor connections	2	By Q3 of 2020	\$3,000
Adding traceability to our operations	Tracking inventory and stock	N/A	Sometime next year	No budget at this time
System integrations	Get accounting and input sales platforms to connect	N/A	Not a priority right now	Non-applicable

Work together to identify the boxes that are most critical to the organisation's success and those you feel will add the most value. For each priority, try to identify an ideal timeline that makes sense for the business based on upcoming agricultural seasons, responsibilities and workload, and known opportunities and risks. Don't worry if you are unsure about areas such as the timeline and budget, which may require input from solution providers. The purpose of this activity is just to ensure that at a high level all internal stakeholders agree on an ideal path forward and are comfortable with the resources you plan to devote to technology. Be realistic in your assessment of the available resources - including budgets and your time. Even with little budget and limited time, there may still be easy and free or low-cost solutions you can consider.

Next Steps

Once you complete this step, you are ready to begin contacting technology providers to learn more about their solutions, services, and product offerings. Although the number of available options may feel overwhelming, the priorities, goals and requirements you have developed by following this guide will help set you up for success and keep discussions focused on your goals and vision.



Contact us to learn more about AgDevCo's work and approach

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AgDevCo's Smallholder Development Unit (SDU), with the support of the Mastercard Foundation and UK aid, supports rural agricultural enterprises to develop equitable schemes to boost productivity and incomes for smallholder farmers in Zambia, Mozambique, Malawi, Tanzania, Uganda, Ghana, Senegal and Sierra Leone.

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