DIGITAL CLIMATE SMART AGRICULTURE

Playbook

The AgriFin D-CSA Playbook – What is it?

A sector guide to **Digital Climate Smart Agriculture or D-CSA** including the case for D-CSA, key design principles, high potential opportunities, and examples of D-CSA in action.

D-CSA **leverages digital tools** to help smallholder farmers **increase productivity and resilience in the face of climate change** while contributing to mitigation where possible and appropriate.

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Climate Change is a Current and Urgent Challenge for SHFs

- Because 95% of agriculture in SSA is rainfed, **SHFs are highly vulnerable to changes in weather**.
- **Climate change** is already **causing yield declines for staple crops**, exacerbating food insecurity.
- Future projections indicate an **increasingly variable climate** including changes in rainfall and temperature and more frequent extreme weather.
- This can **shift growing seasons** and **change** which **agricultural activities** are **profitable** on a farm.
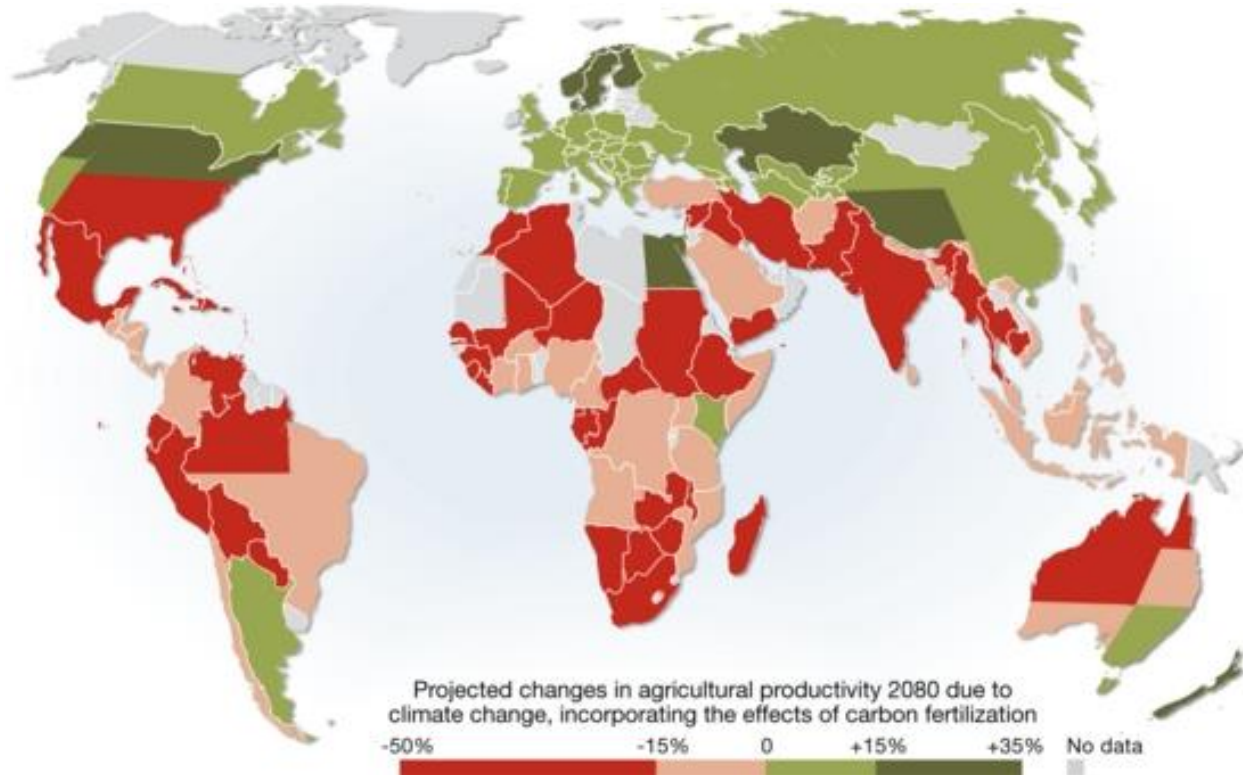- **SHFs are struggling** more-and-more to know **how best to manage their farms**.

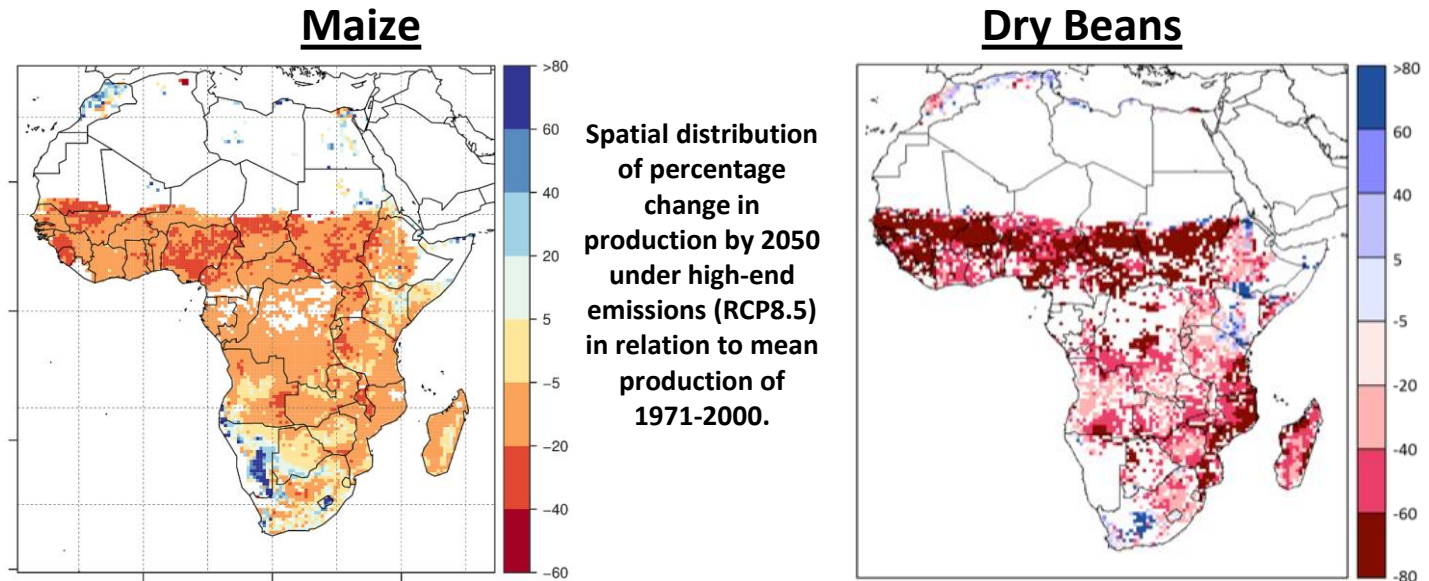**Photo Credit: Mercy Corps**

Photo Credit: World Vision

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Sources: IPCC, August 2019; World Bank, 2015

Climate change impacts on global productivity projected to 2080

Projected changes in agricultural productivity 2080 due to climate change, incorporating the effects of carbon fertilization

-50%   -15%   0   +15%   +35%   No data

- **Climate change impact** on **crop yields** will be **negative from 2030s** onwards according to most modeling studies.
- Half of **projections beyond 2050** indicate **yield decreases** greater than **10%**.

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Without adaptation, staple crop productivity will drop drastically

Climate change impacts on maize-bean system in SSA by 2050

Maize

Dry Beans

Spatial distribution of percentage change in production by 2050 under high-end emissions (RCP8.5) in relation to mean production of 1971-2000.

- Without reductions in GGG emissions and adaptation, productivity of maize and beans, two of the most important crops on the continent, will drop drastically by 2050.
- Adaptation measures need to be implemented immediately to reduce these negative impacts. Planning for the worst-case scenario is important given uncertainty in climate models and global action on mitigation.

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Climate change is already impacting farming conditions

Palmer Drought Severity Index (PDSI) for 1900 to 2002

PDSI measures drought using the cumulative deficit (relative to local mean conditions) in surface land moisture. PDSI is used to determine long-term drought. Lower panel indicates how the global pattern has changed since 1900 with positive red areas indicating drier than average conditions
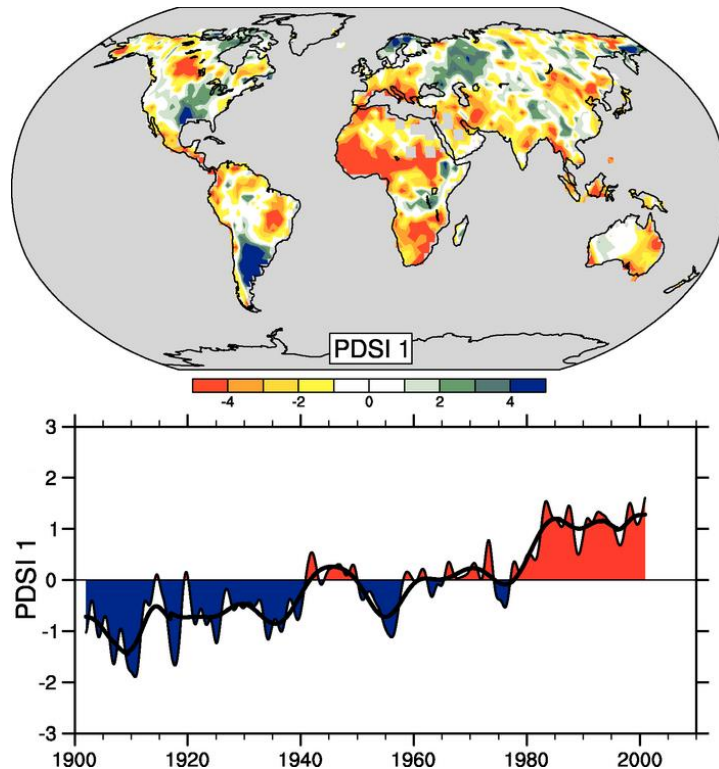
- Many **parts of the world are getting drier** with **less water available for crop production.**

- There is **widespread increasing drought in Africa and parts of Asia** since 1900.

- **Drought** is a key driver of **productivity loss in agriculture** and a **major stress for farmers.**

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SHFs struggle with climate variability, which will increase with climate change

Figure 1 – Historical Timeline of Major Agricultural Production Shocks in Kenya, 1980-2012
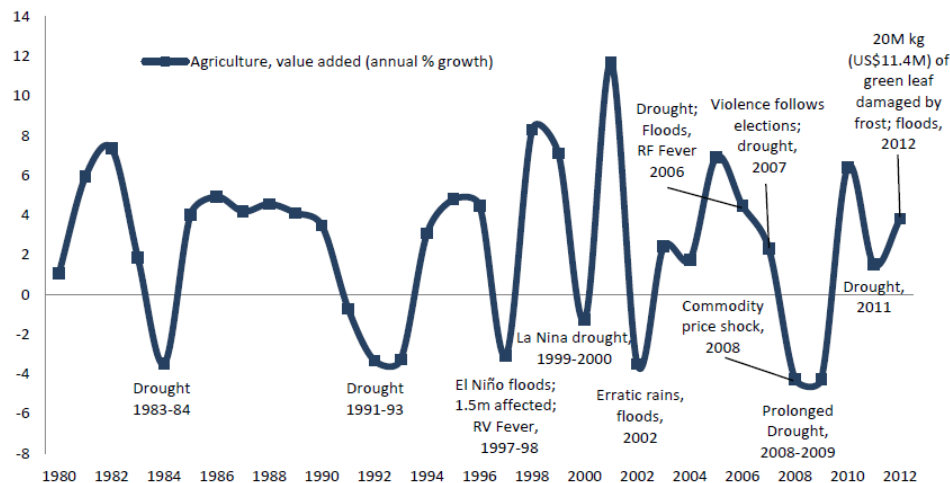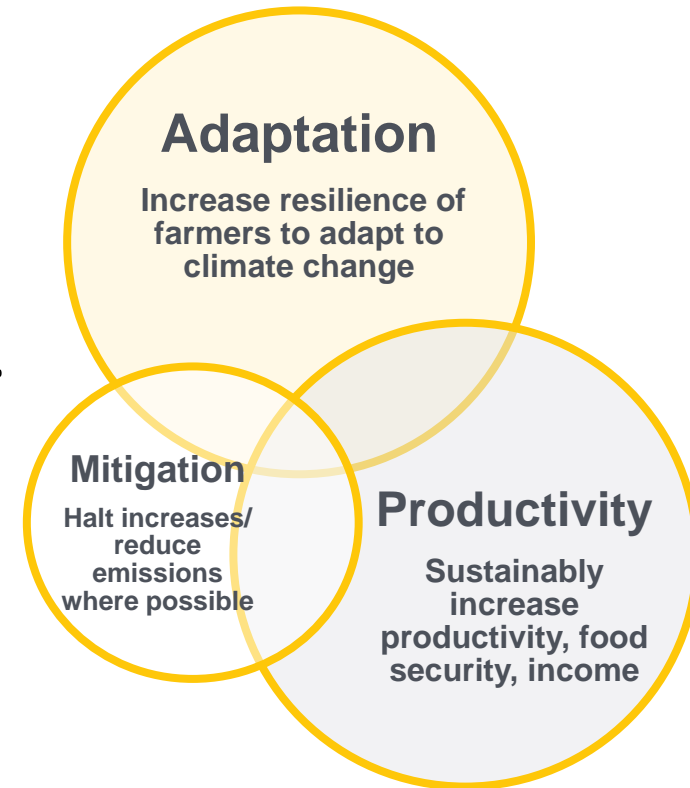

- In Kenya, **widespread drought occurred in 13 of the 31 years between 1981 – 2011** with **negative impacts on SHFs** and the economy.
- **Extreme weather events** such as droughts and floods **will increase** with climate change.
- **Weather is less and less predictable**. Without good information, farmers can't plan.
- Extreme events and increased variability have **major effects on SHFs**, decreasing productivity, food security and income, and preventing them from escaping poverty.

What is Climate Smart Agriculture?

✓ The **CSA Framework** was **developed in 2010 by** the **FAO** to ensure agricultural production systems could contribute to the SDGs in the context of climate change.

✓ Applying CSA means managing trade-offs and capitalizing on synergies between three pillars: **PRODUCTIVITY, ADAPTATION and MITIGATION**. For developing countries and SHFs, mitigation is a focus when and where appropriate.

✓ CSA is "**NOT JUST A SET OF PRACTICES AND TECHNOLOGIES**, but **AN APPROACH** to integrate the urgent challenges of climate change into developing the technical, policy and investment conditions to achieve sustainable agricultural development for food security."

✓ CSA aligns with **sustainable intensification** and looks like **smart agriculture with a climate-lense**.

The Three CSA Pillars

Adaptation
Increase resilience of farmers to adapt to climate change

Mitigation
Halt increases/ reduce emissions where possible

Productivity
Sustainably increase productivity, food security, income

Sources: CSA Guide, 2018; FAO CSA Sourcebook, 2017; Sova et al, 2018
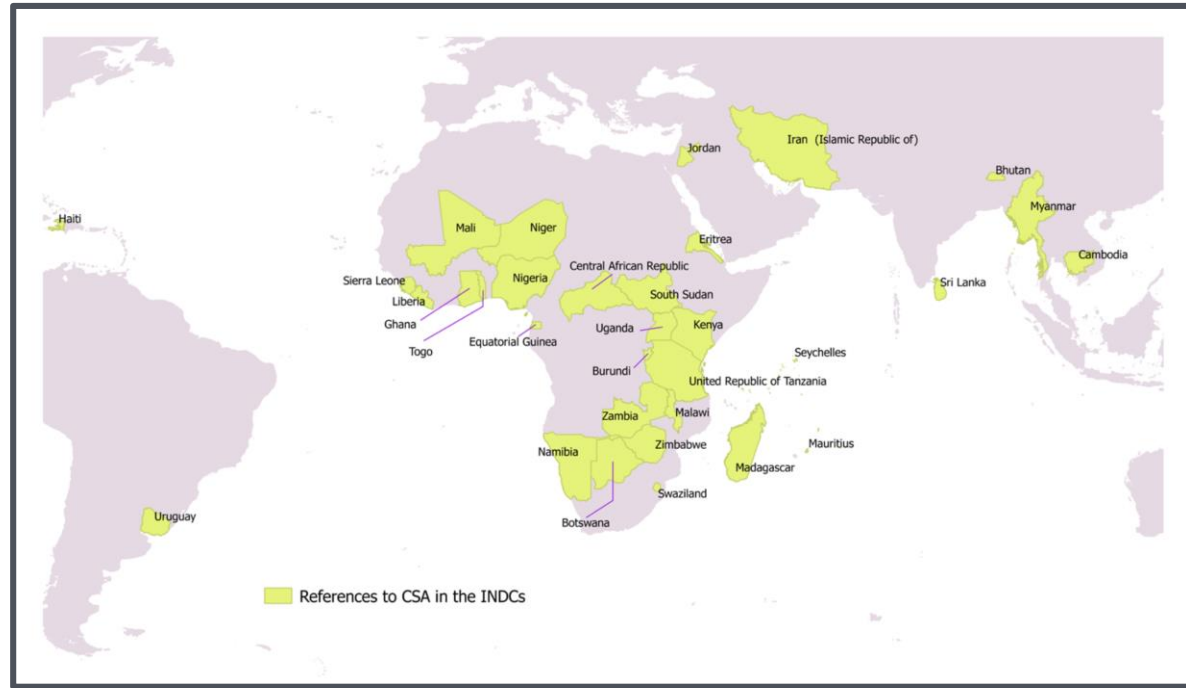
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CSA is a Priority for Governments in SSA

- **Nationally Determined Commitments** (NDCs) are **country-level climate actions** to help meet the goals of the Paris Agreement (UNFCCC COP21).

In the INDCs:

- **84%** of **SSA countries** include **agriculture** as part of their **mitigation** plan.

- **100%** of **SSA countries** include **agriculture** as a key area of **adaptation.**

- **75%** (24) of **countries** that **include CSA** in their NDCs **are in SSA.**

- Countries include CSA to contribute to both adaptation and mitigation goals.

Countries with CSA included in their NDCs

Source: FAO, 2016. "The Agriculture Sectors in the Intended Nationally Determined Contributions. Summary." Environment and Natural Resource Management Working Paper.

CSA is NOT One-Size Fits All

Not CSA **?** CSA

Context & priorities

"What is climate-smart in one-place may not be climate-smart in another, and no interventions are climate-smart everywhere or every time."

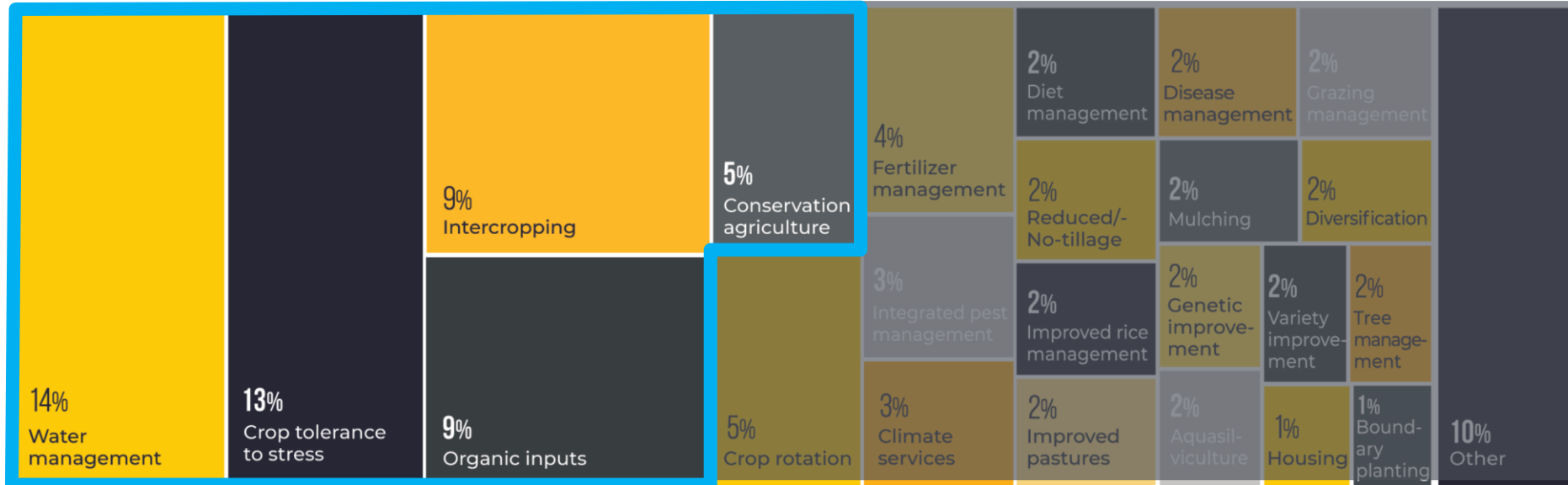*T. Rosenstock, World Agroforestry Center, 2015*

Rosenstock & Lamanna

Globally Experts are Aligning Around Key CSA Technology Clusters

CIAT/CCAFS and the World Bank identified **44 CSA technology clusters** and assessed **more than 1700 combinations** of CSA technologies and cropping systems.

They found that **just <u>5 technology groups</u> account for 50% of all technologies considered climate-smart.** These technologies also align with the FAO CSA Sourcebook.

			2% Diet management
14% Water management	13% Crop tolerance to stress	9% Intercropping	5% Conservation agriculture

14% Water management
13% Crop tolerance to stress
9% Intercropping
9% Organic inputs
5% Conservation agriculture
5% Crop rotation
4% Fertilizer management
3% Integrated pest management
3% Climate services
2% Diet management
2% Reduced-/No-tillage
2% Improved rice management
2% Improved pastures
2% Disease management
2% Mulching
2% Genetic improvement
2% Aquasilviculture
2% Grazing management
2% Diversification
2% Variety improvement
1% Housing
2% Tree management
1% Boundary planting
10% Other

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CSA in Africa

Top 10 Technologies Ranked by "Climate-Smartness" in Africa

1. Silvopasture (integrated system of trees/forage/livestock)
2. Conservation Agriculture
3. Water management
4. Biogas
5. Integrated pest management
6. Aquasilviculture (integrated system of aquaculture and mangroves)
7. Improved Pastures
8. Green manure/Cover crops
9. Intercropping
10. Improved rice management

Top 10 Technologies By Frequency of Expert Mention in Africa

1. Water management
2. Crop tolerance to stress
3. Intercropping
4. Inputs (organic)
5. Crop rotation
6. Inputs (fertilizer)
7. Conservation agriculture
8. Grazing management
9. Disease management
10. Climate services

Risk management technologies, especially climate services, are more commonly identified in Africa than in other regions.

CIAT — International Center for Tropical Agriculture — Since 1967 / Science to cultivate change

CGIAR — RESEARCH PROGRAM ON Climate Change, Agriculture and Food Security — CCAFS

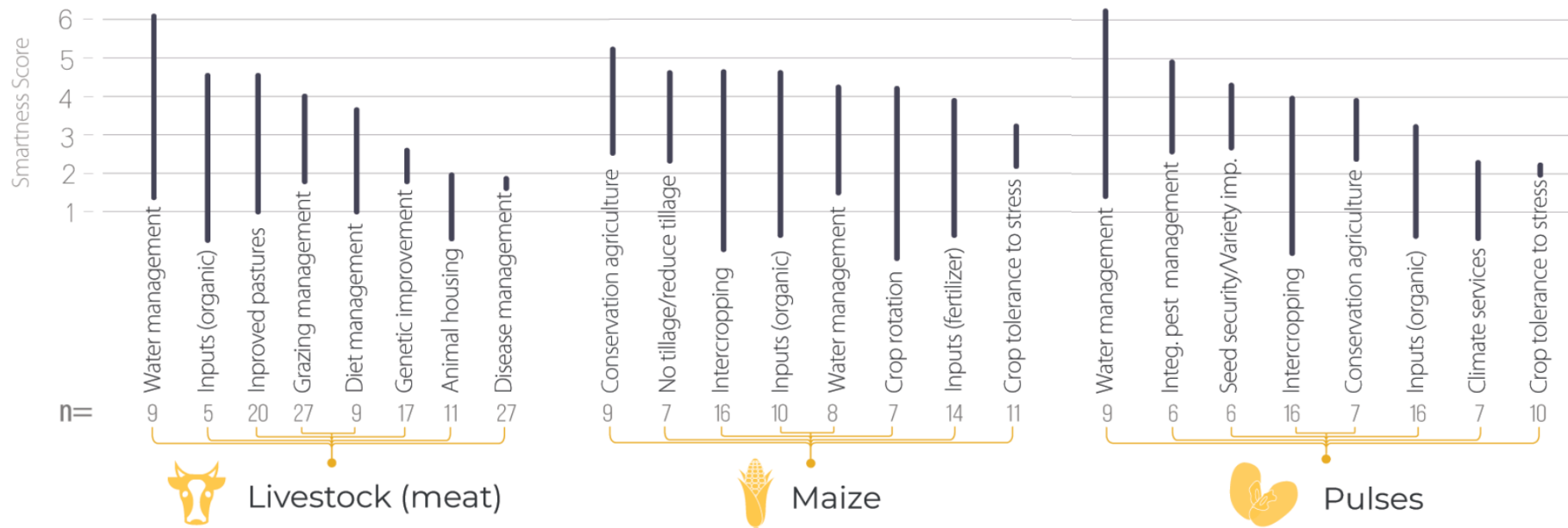THE WORLD BANK — IBRD • IDA | WORLD BANK GROUP

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CSA Approaches are Production System Specific

Highest scored CSA technologies in Africa by production system

CSA requires a full value chain approach

80-86% of greenhouse gas emission from food systems comes from agricultural production. CSA to-date has focused heavily on production technologies.

But, **resilience of the full value chain is essential to supporting farmers** to achieve the productivity and adaptation pillars of CSA. CSA includes **tools, technologies and approaches across the entire value chain**.

1. **Postharvest.** Reducing food loss and waste contributes to mitigation while increasing farmers income and food security.

2. **Credit.** Farmers with access to credit are more likely to adopt CSA.

3. **Insurance.** Farmers with coverage against increasingly variable and extreme weather invest more in their farms. Insurance increases their resilience.

4. **Market access.** Farmers with market access are more likely to adopt CSA. Without market access, farmers will not achieve the productivity pillar.

5. **Supply chain efficiencies**: Reducing waste, improving energy efficiency, improving inventory management and other approaches that increase efficiency, deliver higher profitability to actors across the value chain and generate mitigation co-benefits.

6. **Climate-proofing the value chain**: Value chains need to be made climate resilient which includes climate-proofed infrastructure (roads, storage).

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Taking a Local Value Chain Perspective for CSA

Climate Risk and CSA Options for Irish Potatoes in Elgeyo Marakwet County, Kenya

From: Climate Risk Profile: Elgeyo Marakwet County

Irish Potato

	Provision of inputs	On-farm production	Harvesting storage and processing	Product marketing
Intense rains	Difficult transportation due to wet roads; high transport cost; intense rainfall increases disease incidences; increased cost of pesticides	Wet soils make ploughing difficult; difficulty in planting leading to increased cost; high frequency of spraying and weeding increasing production costs	Delayed harvesting; due to wet conditions high wastage and poor quality; increased cost of transportation; during harvesting wet conditions tubers carry a lot of soil hence poor storage quality	High rainfall could lead to more production hence market glut; low prices due to high supply
Magnitude of impact	Major	Severe	Major	Moderate
Farmers' current strategies to cope with the risks	Using farm saved seeds; early procurement; early acquisition of fertilizers; use of organic manure; some cooperatives help farmers in bulk purchase	Spraying with herbicides; increased labour; early land preparation; dry planting; increased labour; use of meteorological information; earthing up soil; spraying to control pests	Harvested tubers are left to dry before selling/storage; use animal draught/power and human labour to transport the tubers; sale immediately after harvest; delayed harvest	Middlemen play the roles of linking the farmer to the market; selling to middlemen; transporting and selling direct to the market and export to Tanzania and Uganda
Other potential options to increase farmers' adaptive capacity	Having seed multipliers closer to farmers; stocking of seeds; taking the fertilizer to the farmers at ward level/build fertiliser stores at ward level; strengthen cooperatives; introduce disease-resistant varieties	Mechanized farming before the rainy season; mechanized planting at the onset of rains; share information from the relevant departments to many farmers; apply pre-emergence herbicides; introduction of pest- and disease-resistant varieties	Strengthen cooperatives to acquire cleaning and drying machineries; improve feeder roads to make them all-weather; encourage storage to attract better prices; construction of cold storage facilities	Strengthen marketing associations and cooperatives to add value; promote information platforms; contract farming; invest in processing factories

Source: https://ccafs.cgiar.org/publications/kenya-county-climate-risk-profiles

Why Digitize – the case for D-CSA

✓ **Digital learning reaches more people faster and at lower cost than traditional extension.** Farmer training and information is the single largest barrier to CSA adoption globally, affecting almost 90 percent of all interventions.

✓ **Digital financial and insurance services lower the cost of customer acquisition, de-risk financing SHFs, reduce the finance barrier to CSA adoption and protect SHFs from weather shocks.** Uptake of agriculture credit has a positive impact on CSA adoption. Digital allows for new financial products to scale faster and with less risk for providers given new and better data. Digital index and yield insurance protects from weather variability while providing more timely payouts.

✓ **Digital lends itself to customization.** CSA is context specific and can be tailored to SHF needs. Digital allows for products, information and services to be tailored for a specific location or farm. Digital can improve access to the right inputs at the right time.

✓ **Digital provides a platform for multiple providers to reach SHFs with products and services.** Bundling the best available information, services and inputs that farmers need can increase farmer access and use.

✓ **Digital is a rapidly developing field that allows for real-time and better decision making.** The sector will transform over the next decade. More data will be processed through machine learning allowing a better understanding of what's working and what's not and opening- up more opportunities to customize for SHFs

Sources: Rosenstock et al 2015; Sova et al 2018; Ruben et al 2019; Lipper et al 2014

8 Design Principles to Scale D-CSA

1. **Prioritize CSA practices and technologies based on the local context.**

   ✓ **Identify "best fit interventions."** Use existing evidence and/or work with partners who can conduct evidence-based assessments to prioritize CSA across the three pillars for the local context including local culture including gender dynamics.

   ✓ **Deliver information and solutions as relevant to specific farm locations as possible.** Farmers respond best to information for their specific circumstances and the right CSA solutions are farm dependent, including farmer preferences. Geotagging farms is best practice but is not currently done widely or well.

2. **Be gender-transformative in design.** Women SHFs are the most vulnerable to climate change and should be key clients for D-CSA providers. They could be early adopters of CSA, represent a majority of the labor force for implementing CSA, and are more reliable credit and insurance clients. The challenges women face from climate change, barriers to uptake of CSA, and barriers to accessing digital services need to be understood and addressed.

3. **Build and/or engage a dedicated and equipped field force.** Digital alone is not enough to ensure adoption and behaviour change. A farmer trusted and accepted field force is critical. Local farmer-facing organizations such as cooperatives are key partners to engage.
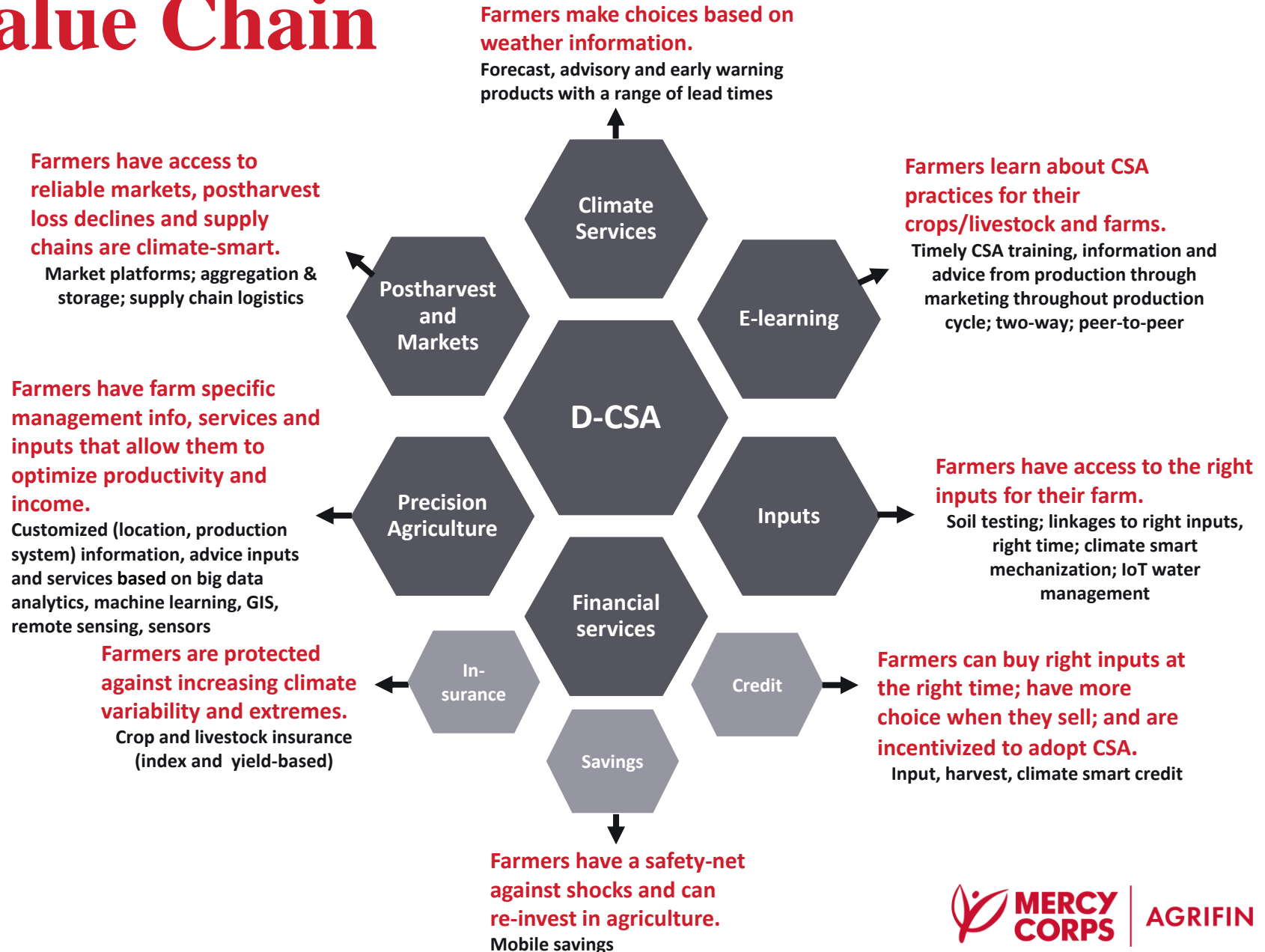
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8 Design Principles to Scale D-CSA

4. **Bundle services to provide more comprehensive support to SHFs and to maximize your bottom line.**

   - ✓ **Incorporate farmer learning**. Lack of training/information is a major barrier to adoption of CSA practices.
   - ✓ **Facilitate market access**. Market access and climate variability are universal drivers of adoption of CSA practices. Other drivers are site-specific.

5. **Develop strong, effective and efficient partnerships.** Form partnerships between technical institutions with expertise in CSA, earth observatory providers with predictive analytics and modeling skills, advisory providers who know how best to communicate with SHFs, local organizations trusted by farmers, public sector institutions, and MNO's and other partners with 1M+ farmer customers.

6. **Start now but take a stepped-approach to providing climate services.** Providing accurate, localized weather-forecasts can be a quick win. Farmers with access to localized weather forecasts have higher marginal gains and are less likely to experience crop loss. Timing planting date with rain onset is particularly critical for some crops; a 10-day planting delay in maize may reduce yields up to 50%. Agro-weather advisories can be added once the right systems, information and models are in place.

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8 Design Principles to Scale D-CSA

7. **Keep messages simple.** Climate change and CSA are complex challenges. Focus on simple, actionable messages. Work with partners who have proven ability to drive behavior change through simple messaging.

8. **Leverage all possible technologies to deliver the best information to farmers.** Deliver messages through technologies and channels accessible to SHFs. Services should be available through multiple media channels and be accessible both offline and online. For mobile-phones, services should run on both feature and smart-phones. At the same time, invest in designing and piloting solutions for SHFs by leveraging rapidly advancing technology such as satellites, sensors, IoT, AI and machine learning.

D-CSA Opportunities Across the Value Chain

Farmers make choices based on weather information.
Forecast, advisory and early warning products with a range of lead times

Farmers have access to reliable markets, postharvest loss declines and supply chains are climate-smart.
Market platforms; aggregation & storage; supply chain logistics

Farmers learn about CSA practices for their crops/livestock and farms.
Timely CSA training, information and advice from production through marketing throughout production cycle; two-way; peer-to-peer

Farmers have farm specific management info, services and inputs that allow them to optimize productivity and income.
Customized (location, production system) information, advice inputs and services based on big data analytics, machine learning, GIS, remote sensing, sensors

Farmers have access to the right inputs for their farm.
Soil testing; linkages to right inputs, right time; climate smart mechanization; IoT water management

Farmers are protected against increasing climate variability and extremes.
Crop and livestock insurance (index and yield-based)

Farmers can buy right inputs at the right time; have more choice when they sell; and are incentivized to adopt CSA.
Input, harvest, climate smart credit

Farmers have a safety-net against shocks and can re-invest in agriculture.
Mobile savings

Climate Services

Postharvest and Markets

E-learning

D-CSA

Precision Agriculture

Inputs

Financial services

In-surance

Credit

Savings

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D-CSA Opportunity: Climate Services

What is it?	Why is it a big opportunity?	Who is doing it? Some examples.
"**Production, translation, transfer and use of climate information for climate-informed decision making.**" **Weather forecasts and agro-weather advisories. Uses big data analytics, multiple data sources, crop modeling.**	• Climate services identified as critical for CSA in Africa. • Marginal gain can increase by 66% with good weather forecasts. • Farmers make better decisions about planting, input use, harvesting.	**Integrated Agro-Meterological Advisory Service in India:** Launched 2007. Agricultural advisories reach ~2.5 million smallholder farmers. Farmers have 10–15% higher yields and 2–5% lower costs. **Ignitia:** 48 hr. "highly accurate," hyper-local weather forecasts delivered via SMS daily. 84% reliable predicted at 3 sq km. 88% of farmers report using forecasts to change farming practices; 79% increased income. West Africa. **aWhere:** Predictive modeling for agriculture based on 1.7 million virtual weather stations globally. Uses blend of observed and satellite data to generate observed and 15-day forecast at 9km x 9km scale. Provides 1) In-time weather data and 2) Advisories that combine crop models with weather data. Data is digitally accessible. Global.

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D-CSA Opportunity: Farmer Learning

What is it?	Why is it a big opportunity?	Who is doing it? Some examples.
Digital training, information and advice for farmers on CSA practices and technologies and climate change impacts.	• Higher scale, lower cost extension with more opportunities for precision.	**Digital Green:** Has reached over 2 million farmers since 2008. Content development driven by local communities so could be tailored for CSA. 68% of users have adopted a new practice. **Mediae:** Multiple digital solutions. TV program Shamba Shape Up reaches 5 M viewers a week Country specific content. CSA approaches such as soil testing included. Reaches 300,000 farmers through iShamba which utilizes SMS to send crop information seasonally based on crop calendar by location and livestock information based on events. Full value chains covered. Distributes county-level forecasts from the Kenya Meteorological Department. Identification of pests and diseases using mobile messaging and images through WhatsApp. **CropIn:** Whole farm management solution linked to geotagged farm location including weather info, crop management advice and pest/disease info.

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D-CSA Opportunity: Water Management

What is it?	Why is it a big opportunity?	Who is doing it? Some examples.
IoT supported (e.g. remote monitoring) low cost pumps and/or drip irrigation to support supplemental or deficit irrigation.	• Increases water use efficiency. • Reduces fuel use thus reducing carbon footprint. • Enhances soil quality by preventing mineral loss. • Saves farmers time and money.	**SunCulture:** RainMaker2, a solar-powered water pump operating with a ClimateSmart Battery and Software for remote monitoring and predictive maintenance. Offers a drip-irrigation add-on. Offers a rent--to-own option.Half of early adopters report increase in farm yields and income. Kenya. **Nano Ganesh:** Mobile based remote-control for turning water pumps on and off. Farmers can save up to $500/yr. A 5-horsepower water pump saves 1000 litres of water, 3-5 units of electricity, 2 hours of person time, 1 litre of fuel and 2 hours of machine time per day. India.

D-CSA Opportunity: Soil Management

What is it?	Why is it a big opportunity?	Who is doing it? Some examples.
Digital soil tests, digital soil quality and management information, and digital linkages to locally available organic and inorganic inputs	• Sustainably increasing yields is dependent on both building soil organic matter through organic inputs and increasing yields often through inorganic fertilizer. • Digital makes testing and precision information more accessible and faster and has the potential to make the info locally relevant.	**SoilCares**: Hand-held testing device provides in-field monitoring of soil nutrients via a smart-phone app and hand-held printer. App delivers assessment and management advice including target yield, soil status, actual nutrient need, soil correction plan and suitable crop types. 20,000+ farmers in Kenya. **Agrics/Geodatics**: Uses farmer data, earth observation data and crop growth model to determine exact N-P-K needed to obtain realistic yields and translates into fertilizer rec. Works with fertilizer companies to develop exact blends. Manages logistics of getting fertilizer to farmers. 20,000+ farmers in Kenya. **Ujuzi Kilimo**: Provides farm specific recommendations (fertilizer, agro-weather advisory) based on data collected with the Ujuzi hand-held soil-testing device, weather forecasts and in-house data analytics. Device captures soil characteristics, topography and environmental data which is analyzed by experts to provide actionable recommendations. 10,000+ farmers in Kenya.

D-CSA Opportunity: Climate Smart Mechanization

What is it?	Why is it a big opportunity?	Who is doing it? Some examples.
Digital links to right equipment (tillage, planting, spraying) at right time.	• Increases uptake of conservation ag practices which are labor intensive.	**Hello Tractor**: IoT tech to connect tractor owners and SHFs through farm equipment sharing app. Reports that tractor use can result in over 60% increase in savings and 3x higher yields for SHFs. Has supplied 250,000 farmers since 2017 in Kenya.

D-CSA Opportunity: Agricultural Credit

What is it?	Why is it a big opportunity?	Who is doing it? Some examples.
Digital credit at each point in the value chain.	• Lowers cost of customer acquisition increasing scale potential. • Increases transparency. • Reduces risks for financial service providers through new and improved data. • Can link to digital payments. • Traditional financial service providers, off-takers and FinTech's can all leverage digital to reach SHFs.	**Kenya Commercial Bank:** MobiGro is a mobile-based digital credit facility allowing farmers to access KES 35 B in agribusiness loans, savings, insurance, market information and training. Farmers sign-up through M-PESA. Kenya and Rwanda. **AgriWallet:** Farmers receive fast payment on sale of agricultural produce into their M-PESA account, can automatically save for inputs, and gain access to input loans. Since AgriWallet pays farmers directly; buyers pay AgriWallet later, improving their working capital, stimulating supply and reducing admin costs. Kenya. **Farm Crowdy:** Mobile app that allows individuals to sponsor and monitor farms in Nigeria. Funds are used to secure land, engage farmer, plant seeds, support full farming cycle and cover logistics of harvest. Sponsors receive original loan plus interest after harvest. 25,000 farmers since 2016 in Nigeria.

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D-CSA Opportunity: Crop and Livestock Insurance

What is it?	Why is it a big opportunity?	Who is doing it? Some examples.
Risk insurance for SHFs. Index or yield based. Index is currently more developed. Weather based index insurance utilizing satellite/ other data	• Protects SHFs from climate variability and extreme weather events. • SHFs who have insurance invest more in their farms. • Timely mobile-based payouts. • Insurers are hesitant to enter the agriculture space; digital de-risks insurance through improved data and monitoring	**Acre Africa:** Sells index insurance products. First ag insurance program to reach SHFs digitally. Has shown rapid scale. Linked to MPESA which allows quick enrollment and payment of claims. Insured farmers had 16% more earnings and invested 19% more compared to their uninsured neighbors. Insured farmers receive more financing partly as a result of being insured. 1.7 M farmers in Kenya, Rwanda and Tanzania as of 2018. **Pula:** Designs products bundling insurance and agricultural inputs (seeds, fertilizer, credit) for SHFs including weather and area and group yield index insurance. Leverages remote sensing, GIS, and ground yield assessments. Offers digital extension to farmers. For clients: prices and structures insurance; end of season data collection, calculation and settlement; business intelligence and farm advisory; and product distribution and marketing. 611,050 farmers in 2017 in 9 countries in SSA.

D-CSA Opportunity: Bundled Platforms

What is it?	Why is it a big opportunity?	Who is doing it? Some examples.
Digital platforms offering bundled services to farmers: • **Market platforms to link to buyers** • **Credit** • **Insurance** • **Access to inputs and services for production and post-harvest** • **E-learning** • **Precision services**	• Increases value to the farmers. • Lowers costs and de-risks delivery for providers. • Market access is one of the critical barriers to CSA adoption. Digital marketplaces linking SHFs to buyers are in very early stages of development but have the potential to increase efficiency of sales and the number of markets SHFs can sell to, increasing their resilience and ultimately income.	**DigiFarm:** Safaricom's integrated mobile platform of digital services for farmers. Brings together multiple input and service providers onto one platform. Accessible on a basic feature phone. Farmers can order inputs, engage in learning, access input credit, harvest cash loans and insurance, connect with buyers, obtain soil testing and aggregate their products. Recently introduced DigiSoko, an open marketplace for agricultural produce. 1.3 M SHFs in Kenya since 2017. **Tulaa:** Leverages mobile and AI to connect farmers, input suppliers and buyers in a digital marketplace. Provides inputs on credit (Tulaa pays input supplier, farmer pays Tulaa back), tailored agronomic advice based on location, crop and inputs purchased using satellite data and AI, and market linkages (Tulaa estimates the expected volume farmers will produce and brokers the sale of the produce with buyers). Operating in Kenya since 2017.

ADF D-CSA Example 1: DigiFarm Precision Advisory

Background

- AFA has worked with Safaricom since 2015 to develop DigiFarm, an integrated mobile-based platform for digital services tailored for SHFs.

- Because SHFs are vulnerable to increasing climate variability and climate shocks, a key part of the DigiFarm product roadmap is to deliver precision agriculture solutions for SHFs to help increase productivity and income and to minimize risks for the digital marketplace and digital credit.

Pilot objectives

- Leverage the wide-reach of the DigiFarm platform with over 1 million registered users, KALRO's deep agronomic expertise including 300+ scientists, aWhere's localized weather data and modeling capabilities and NASA's deep technical expertise with earth observation technologies and data to test and disseminate precision agriculture tools for SHFs during the October 2019 planting season.

- Understand farmers needs and use patterns of precision advice and evaluate the impact on productivity and resilience.

Partner Roles

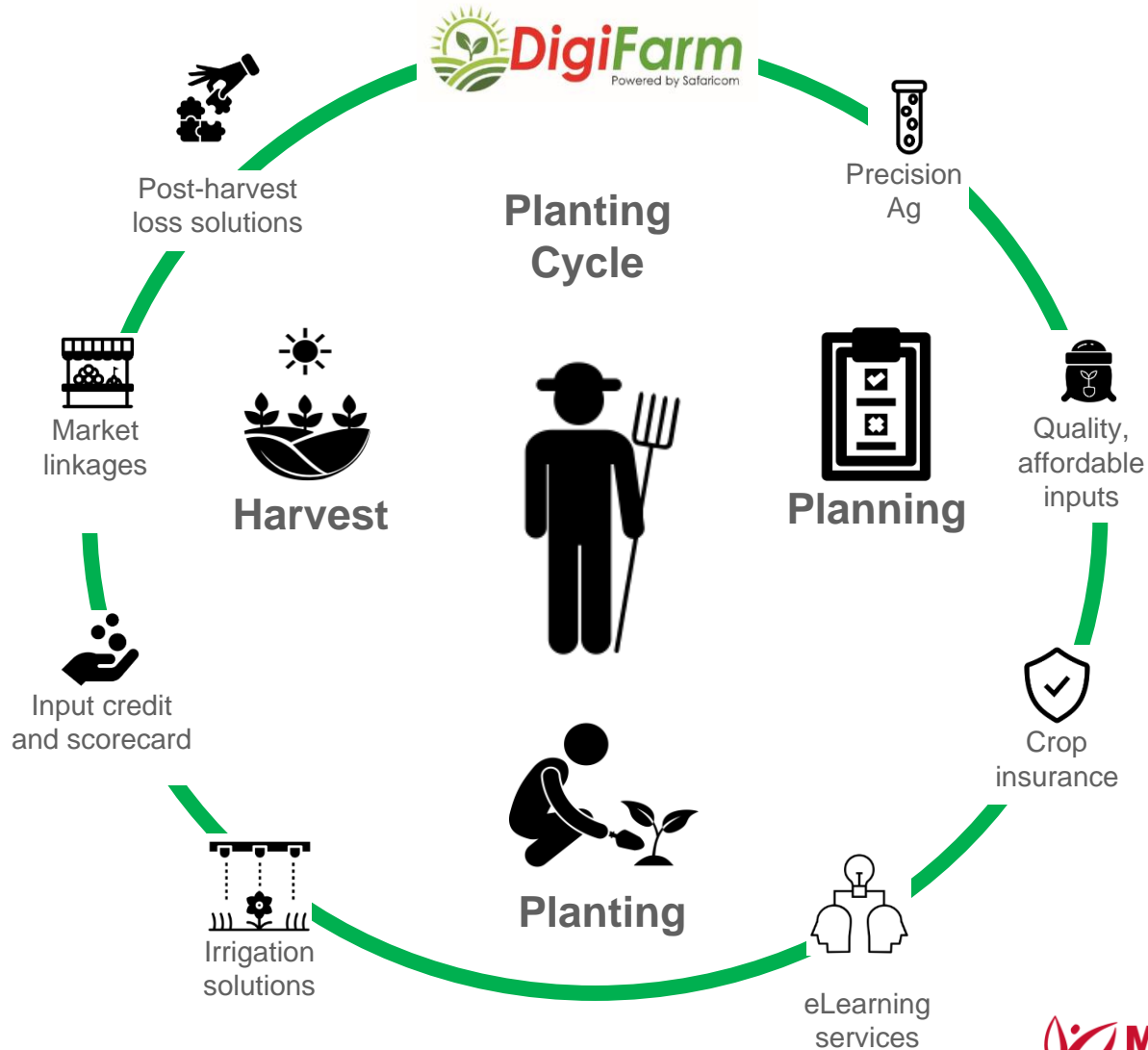| Partner	Role
KALRO	Provide location relevant agronomic management information for selected crops.
aWhere	With agronomic info from KALRO, develop weather-based decision trees for six crops to create SMS messages for farmers and 15-day weather forecasts.
NASA	Engage with KALRO and aWhere to build-out longer-term and more accurate weather forecasting.
DigiFarm	Collect farm location and data as input into aWhere models. Create awareness among customers. Share the messages with farmers (SMS push or pull).
MERCY CORPS	Pilot funding. Partner coordination and relationship management. Implement monitoring, evaluation and learning (MEL).

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DigiFarm is offering D-CSA solutions across the value chain

Planting Cycle

DigiFarm
Powered by Safaricom

Post-harvest loss solutions

Precision Ag

Market linkages

Harvest

Planning

Quality, affordable inputs

Input credit and scorecard

Crop insurance

Irrigation solutions

Planting

eLearning services

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ADF D-CSA Example 2: Imperial College London WINnERS Pilot

Imperial College London Weather Index-based Risk Services (WINnERS) Pilot in Tanzania
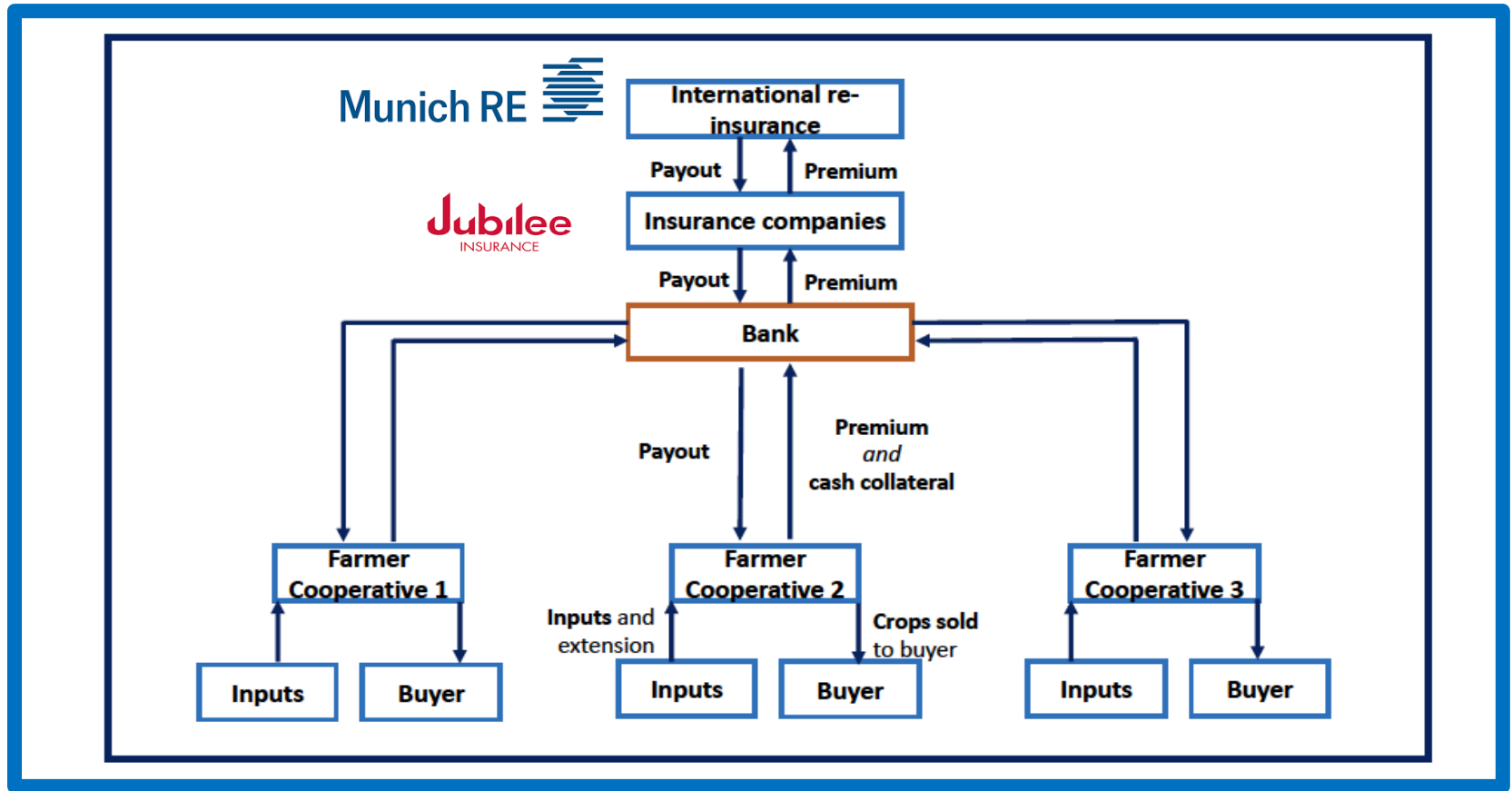
Expert resources to support your D-CSA efforts

CIAT's Program on Climate Smart Agriculture https://ciat.cgiar.org/what-we-do/climate-smart-agriculture/

CSA Country Profiles https://ccafs.cgiar.org/publications/csa-country-profiles

Kenya County Climate Risk Profiles https://ccafs.cgiar.org/publications/kenya-county-climate-risk-profiles

CGIAR Research Program on Climate Change, Agriculture and Food Security

https://ccafs.cgiar.org/climate-smart-agriculture-0#.XcvX5JozY2w

CSA Guide https://csa.guide/

Evidence for Resilient Agriculture https://era.ccafs.cgiar.org/

FAO's Climate Smart Agriculture Sourcebook. Second Edition. 2017.

http://www.fao.org/climate-smart-agriculture-sourcebook/en

Climate Knowledge Portal https://climateknowledgeportal.worldbank.org/

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Call to Action: Equipping SHFs for a More Productive Future

Climate change is making **farming more difficult NOW** and impacts will likely increase.

SHFs are leveraging digital more and more to get what they need and make informed decisions.

We can **tailor CSA approaches** and **use digital channels** to **deliver what SHFs want and need to** adapt to climate change and **achieve increased productivity and resilience**.

The industry can come together:
- ✓ **To make big bet investments in D-CSA**
- ✓ **To test promising approaches with new technology**
- ✓ **To collaborate for impact**
- ✓ **To share data**
- ✓ **To invest in geotagging**
- ✓ **To ensure SHFs have financing through loan guarantees and other mechanisms**

MERCY CORPS | AGRIFIN   **GO D-CSA!**

Thank You!

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