Issues Paper:
Climate Smart Agriculture in South Africa

As Part of Scaling Up Climate Finance Through the Financial Sector:
NDC Component

IFC International Finance Corporation
WORLD BANK GROUP
Creating Markets, Creating Opportunities

In partnership with:
agrifusion unique land use

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IKI INTERNATIONAL CLIMATE INITIATIVE

I. Introduction

Scaling Up Climate Finance through the Financial Sector is an IFC program designed to increase the proportion of green investments in the portfolio of participating banks in four target countries of Egypt, Mexico, the Philippines, and South Africa, while reducing exposure to coal. It is funded by International Climate Initiative (IKI) of Germany's Federal Ministry for Economic Affairs and Climate Action and implemented by IFC together with the World Bank and the Renewables Academy (RENAC). The program expects to raise awareness across the financial sector on the potential risks and opportunities climate change creates, encourage institutions to align their activities with climate goals, and support the development of a pipeline of green projects to facilitate climate finance in each of the target countries.

One component of this multifaceted program seeks to engage with policymakers, regulators, financiers, private sector and other stakeholders to develop market-level solutions in select sectors to improve the business enabling environment to help develop and finance a pipeline of green projects aligned with the countries' Nationally Determined Contribution (NDC) goals under the Paris Agreement.[1] In South Africa, the target sector for engagement is primary agriculture, focusing on supporting the sector's transition to climate-smart agricultural (CSA) practices.

Climate Smart Agriculture (CSA) is an integrated approach to managing landscapes - cropland, livestock, forests and fisheries - that address the interlinked challenges of food security and climate change. CSA aims to achieve the triple win of (i) increased productivity, (ii) enhanced resilience, and (iii) reduced emissions.[2] An overview of CSA practices in South Africa is provided in Annex A 2.

The objective of this component (or project) is to enable increased private sector investment in climate-smart primary agricultural production, with a particular focus on small and emerging farmers. Although agriculture accounted for only 2.5 percent and about 5 percent of South Africa's GDP and employment in 2021, respectively, the sector has a central role to play in poverty eradication and inclusive development. Expected climate change impacts will reduce the amount of land suitable for arable and pastoral agriculture, in addition to reducing the length of the growing season and decreasing crop yields. Changing rain patterns and increased evaporation will increase the likelihood of extreme droughts. Fostering CSA practices among farmers will directly contribute to South Africa's NDC objectives that emphasize climate change adaptation efforts and the overriding priority to eliminate poverty and eradicate inequality as part of a just transition to a low-carbon and climate-resilient society. The project follows a proactive multistakeholder engagement approach to identify solutions to establish business enabling environment conducive to developing more bankable CSA related projects and attracting new private investment to foster CSA.

[1] NDCs are at the heart of the Paris Agreement and the achievement of its long-term goals. The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, on 12 December 2015 and entered into force on 4 November 2016. Its overarching goal is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels." NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change.
[2] World Bank, 2021: Climate-Smart Agriculture

The multistakeholder engagement approach follows the following key steps:

- Development of an issues paper (this document) that summarizes key barriers to private sector CSA projects and touches on potential solutions to create incentives to private sector investment in CSA. The key objective of the issues paper is to inform multistakeholder dialogues to identify and develop solutions to improve the business enabling environment and financing for CSA projects. The findings of this issues paper are based on a literature review and targeted interviews with key stakeholders.
- Multistakeholder dialogues that bring together key stakeholders from the agribusiness sector to help identify policy, technological, financing, and capacity-building interventions to address barriers and create incentives for the uptake of CSA practices and technologies, assist in the development of commercially viable and bankable projects in CSA, and help participating banks develop financial products to support the implementation of CSA practices and technologies.
- Based on discussions in the dialogues, multistakeholder working groups will be established to facilitate dialogue between sectoral and finance policymakers, financial institutions, industry associations, and project developers to agree on priority solutions and how to implement them.
- Development and publication of the sector Roadmap that outlines actionable recommendations for each stakeholder group, drawing on the outcomes of the multistakeholder dialogues and working groups

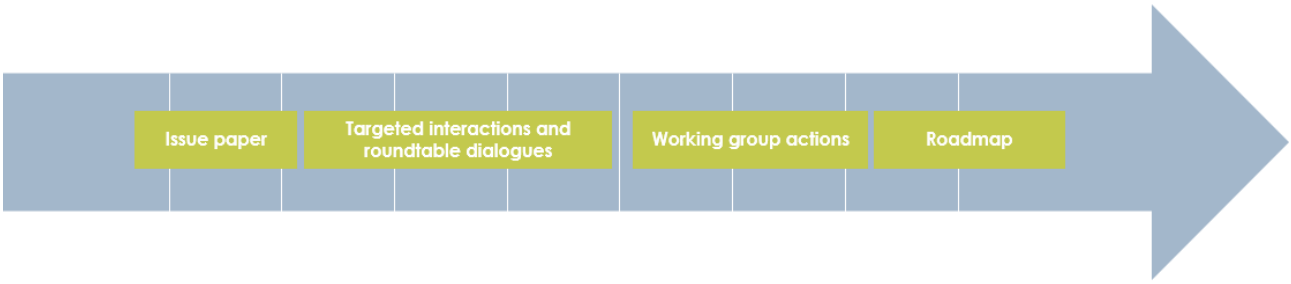

Figure 1 Multi-stakeholder Dialogue Process

II. Sector Context

This chapter summarizes the current status of the agricultural sector in South Africa and some key aspects that should be considered when looking at CSA and opportunities to scale up climate financing in the South African agricultural sector[3].

- **Numerous recent external shocks to the farming system (increases in input costs such as fertilizer, fuel) and the current energy crisis have considerably increased the financial risks for the agricultural sector. The fragile financial state of the sector in turn impacts on the farmers' ability to take up financing for CSA.**

International fertilizer prices have tripled since early 2020 and remain volatile. This development exerts high pressure on farmers as fertilizer can constitute over 50% of some farmers' expenditure on input costs. Moreover, stakeholders have expressed concerns that there is a food security risk from severe load-shedding across South Africa's agricultural sector and the broader food, fiber and beverages value chain. Farmers and food processors have been dealing with up to eight hours a day without electricity, leading to the culling of poultry, the waste of fresh milk and the inability to irrigate crops.

- **South Africa is a water scarce country**.

South Africa is a semi-arid country with poor water resources. With mean annual precipitation of just 450 mm and over 98 percent of its freshwater resources already allocated for different uses, the country faces an acute water scarcity challenge. Agriculture accounts for the largest share of water use (57 percent), followed by industry (around 21 percent) and municipalities (21 percent).

- **The South African agricultural sector is characterized by an extreme dualism of a relatively small number of highly productive and predominantly white commercial farmers on the one hand and a large number of mainly black and much less commercialized smallholder farmers on the other.**

Agricultural growth has mainly been driven by the large-scale commercial sector that can invest in new technology and renewable energy, has access to irrigation, is export oriented and contributes 77% of gross farm income, yet comprises only 7% of farms. It must be recognized that the remaining 93% of small to medium scale commercial businesses and the very large subsistence sector still form a significant part of the agricultural sector. Incremental improvements for these groups can, therefore, have a large positive impact on the sector as a whole.

[3] Various recent and comprehensive overviews can be consulted for more detailed information, such as:
Agriculture and Agro-Processing Master Plan (AAMP) "Social Compact", May 2022
Agriculture in South Africa (2021), Wandile Sihlobo and Johann Kirsten, The Oxford Handbook of the South African Economy *Edited by Arkebe Oqubay, Fiona Tregenna, and Imraan Valodia*
Economic Review of the South African Agriculture 2021/22, Compiled by: Directorate: Statistics & Economic Analysis. Published by: DALRRD.
National Planning Commission, *National Development Plan: Vision for 2030* (Pretoria, 2012)
Draft Climate Smart Agriculture Strategic Framework for Agriculture, Forestry and Fisheries, Government Gazette, 3 August 2018.

Small and subsistence farmers are largely dependent on development finance and grant funding from government for their investments. Private finance is offered to large and medium scale farmers. Based on select indicators, the graphic below visualizes the dualism in the South African farming context and delineates the target group of this program.

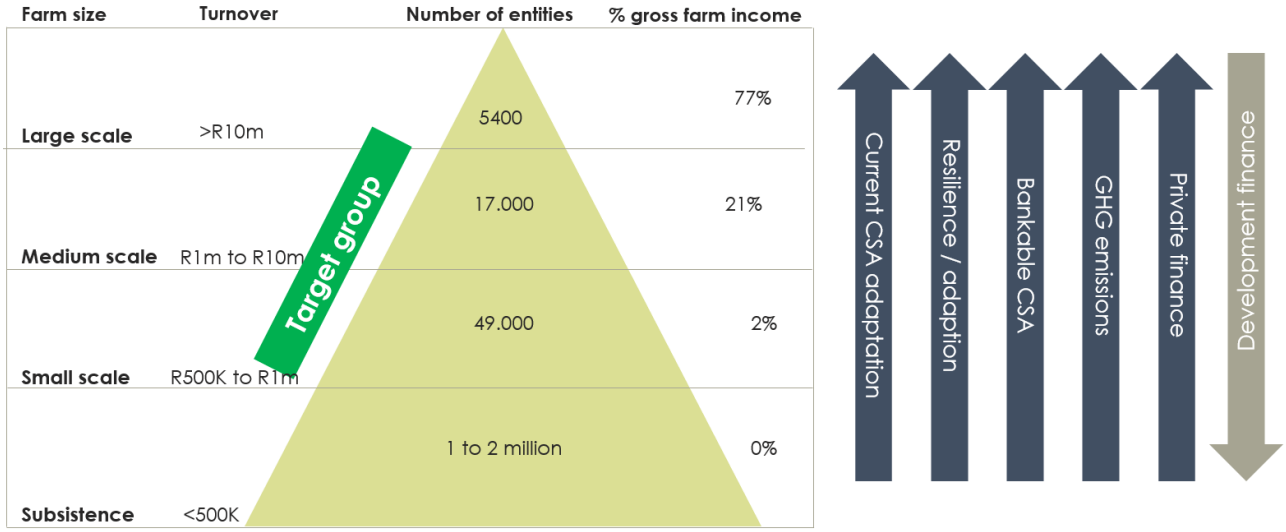

Figure 2 The dualism in the South African farming context and the target group of this project

- **The supply of commercial finance to small farmers is constrained by several structural factors, such as high (actual or perceived) risks and lack of repayment ability, lack of reliable information on the borrower, and lack of collateral and security.**

One requires profitable and sustainable farming operations and agribusinesses to have profitable and sustainable lending institutions. Hence, mainstream lending institutions that have traditionally serviced the commercial market are generally not well positioned to promote financial inclusivity in rural areas in general, and amongst the target farmers in particular.

- **Commercial banks have introduced processes that consider climate change risk and are already servicing demand for CSA lending from larger farms but lack a consistent framework and data systems to monitor their CSA investment.**

In recent years, efforts have been made to stimulate green loans, including the introduction of Voluntary Principles for Environmental and Social Risk by SA's Banking Association in 2014. The five biggest banks—comprising more than 90 percent of banking sector assets—have strategies and processes that consider climate change issues, and they have also signed up to the Equator Principles—a risk management framework for project finance more geared to social issues.

- **South African Government has announced ambitious plans to decarbonize the economy and a Climate Change Bill is currently being developed.**

At COP 26 in November 2021, the governments of South Africa, France, Germany, the United Kingdom and the United States of America, along with the European Union, issued a Political Declaration announcing a new ambitious, long-term Just Energy Transition Partnership (JETP). The Partnership aims to accelerate the decarbonization of South Africa's economy to help it achieve the ambitious goals set out in South Africa's updated Nationally Determined Contribution emissions goals. During the World Leaders Summit at COP27 on 7 November, 2022, President Cyril Ramaphosa of the Republic of South Africa launched the new JET Investment Plan prepared by the South African government as envisaged in the Political Declaration. The Climate Change Bill was tabled in Parliament in February 2022. The Bill will now go through various public participation and law-making processes in order to become South Africa's Climate Change Act. Currently, stakeholders are waiting for this important law to be promulgated. It will have an enormous influence on South Africa's climate change response. It will provide a firm legal basis for further action, including mandatory second and subsequent phases of the carbon budget program, as well as the establishment of sectoral emissions targets (SETs).

The decarbonization potential of the South African economy lies primarily in the energy sector. South Africa's electricity is currently provided by a number of large coal plants. Reaching the climate change mitigation objectives will require allocating large shares of the future energy mix, also within the agriculture sector, to renewable energy technologies.

- **The agriculture, forestry and land use sector are covered in the South Africa's NDC, but no information is provided on mitigation actions or targets in the agriculture and food sector**. Agriculture is included in the key focus sectors in the adaptation component, aiming to "prioritize understanding of impacts, risk and vulnerability for the key sectors, and the development of climate response plans". Adaptation actions in the agricultural sector include the development of early warning systems for small scale farmers, supporting climate-smart agriculture, the development of a multi-hazard early warning system, capacity building for the farming sector on climate change and full implementation of a climate-smart agriculture framework.

Furthermore, South Africa's National Climate Change Response Policy (NCCRP) identifies agriculture as a priority sector for concerted adaptation efforts, and the National Climate Change Adaption Strategy (NCCAS) outlines policy instruments to increase the sector's resilience. The government has anchored its strategy of building a climate-resilient agricultural sector on two key priorities: (i) water management, including irrigation expansion and measures to improve water-holding capacity, such as watershed management and soil and water conservation; and (ii) climate-resilient infrastructure, covering transport and electricity. Beyond investment, additional support through grants and subsidies may be necessary to promote research and development in greener and more resilient agriculture, such as heat- and disease-tolerant varieties and breeds, dryland farming, and other climate-smart agronomic practices.

- **Two established carbon markets are available in South Africa for carbon credits generated by CSA practices: a regulated and a voluntary market.**

In South Africa, the Regulatory Market was created by the Carbon Tax Act, 15 of 2019 (the "Carbon Tax Act"). A carbon tax allowance of up to 10% is given to carbon taxpayers that invest in emission reducing projects (i.e. by

buying carbon offsets) in terms of section 13(1) read with 13(2) of the Carbon Tax Act. The carbon tax rate for the 2022 calendar year was R144 per ton of CO2e. The agriculture sector is not presently required to report on GHG emissions nor pay carbon taxes on direct emissions (only on fuel & electricity) but there is a good chance that this will change in the near future, especially as the OECD have published guidelines on developing consumption-based emissions indicators from AFOLU activities[4].

Voluntary carbon markets allow carbon emitters to offset or reduce their unavoidable emissions by purchasing carbon credits from projects that avoid, reduce or remove greenhouse gases from the atmosphere. While the regulated market has very specific rules and regulations in relation to carbon credit qualification and allowances for offsets, voluntary carbon credits are more flexible and can be accessed by every sector of the economy instead of a limited number of industries (i.e. carbon taxpayers in the Regulatory Market).

- **South Africa recently launched a Green Finance Taxonomy that aims to provide clarity on what qualifies as green investing but excludes a chapter on agriculture.**

In April 2022, the National Treasury launched the South Africa Green Finance Taxonomy, a classification system that defines which assets, projects, activities, and sectors are eligible to be defined as 'green' in line with international best practice and national priorities. It can be used by the financial sector to track, monitor, and demonstrate the credentials of their green activities[5]. Overall, the launch of the taxonomy can be seen as a significant step towards channeling investment into green finance in South Africa. Unfortunately, the taxonomy lacks a chapter on agriculture. Such a chapter would provide guidance and motivation for banks to invest in CSA.

III. Barriers to CSA finance and investment

This chapter identifies barriers and issues impacting on the demand and the supply of CSA finance as well as on the enabling environment preventing further expansion of CSA through private sector investment.

Barriers within the farming sector

Two key specific barriers limit the target group's uptake of CSA practices and, hence, their demand for CSA finance: Lack of knowhow and lack of bankability. (For a description of the target group please see Figure 2.)

[4] Garsous, G. (2021), "Developing consumption-based emissions indicators from Agriculture, Forestry and Land-use (AFOLU) activities", *OECD Food, Agriculture and Fisheries Papers*, No. 171, OECD Publishing, Paris, https://doi.org/10.1787/b2b24307-en.

[5] National Treasury Department of South Africa (2022): South African Green Finance Taxonomy (1st edition)

1. Lack of know-how and awareness of CSA practices

Many farmers still lack the necessary knowhow of CSA practices and are not well informed on the potential impact of climate change and the various CSA technologies that are available. This keeps them from seeking CSA finance. Some fundamental CSA technologies are quite knowledge intensive. For example, rainwater harvesting practices to collect water for irrigation of small vegetable plots require training for proper implementation, constraining their adoption[6].

2. Lack of bankability

Many farmers in the target group are not deemed creditworthy by commercial banks. The history of exclusion in South African agriculture has resulted in most applications for finance by small farmers having the characteristics of a start-up businesses. This includes limited farming experience, lack of track record, weak balance sheets and limited access to security and collateral. In addition, many small farmers operate on land that is under communal tenure where land rights are not secure.[7,8]

Barriers within the public sector

Several issues within the policy and regulatory environment create barriers for CSA projects to take off. They often cut across the agriculture, energy, and water sectors. (A brief summary of major national-level climate change related policies and strategies can be found in Annex 1).

3. Coordination within the energy-water-food nexus

There is a lack of integrated planning within the energy-water-food nexus. In view of the current energy crisis, *integrated* planning is not only essential for understanding future supply and demand, but also for maintaining the existing supply. Transitioning to renewable energy sources is a means of futureproofing, but integrated planning is a critical prerequisite to adequate policy support.[9] Likewise, related to the water crisis that South Africa is facing, there is a lack of *integrated* hydrological modelling which is critical not only to map out the available water resources, but also to determine the potential runoff. The latter is vital input for the design of various types of infrastructure.[10] It is also important to recognize that changes in the availability of water supplies may limit the potential for irrigation expansion in some areas.[11] In the policy space, advancements in the following key areas will define an enabling environment for water efficiency[12]: Integrated planning of water use; water use authorization and groundwater use licensing; water reuse and recycling regulations (including sector specific); and water use tariffs and fees, water discharge and treatment payment review.

[6] WWF, 2018: Investing in soil: emerging climate-smart business opportunities
[7] https://www.dffe.gov.za/sites/default/files/docs/csa_volume1.pdf, p. 168
[8] Ogunyiola et al., 2022: Smallholder farmers' engagement with climate smart agriculture in Africa: role of local knowledge and upscaling
[9] BusinessTech, 11 November 2022: Water crisis in South Africa likely to be worse than the energy mess, warns infrastructure group
[10] BusinessTech, 11 November 2022: Water crisis in South Africa likely to be worse than the energy mess, warns infrastructure group
[11] https://www.tips.org.za/images/WWF_PFU_Policy_brief.pdf
[12] https://www.ifc.org/wps/wcm/connect/d9c48096-a57f-41a7-94f6-6cff88831cd4/202001-South-Africa-agri-processing-resource-efficiency.pdf?MOD=AJPERES&CVID=m-vr2oo

4. Consistent CSA related policies

Some Department of Agriculture, Land Reform, and Rural Development (DALRRD) policies may not properly consider certain tradeoffs with respect to CSA. In particular, the promotion of some aspects of agroecological agriculture conflicts with efforts aimed at increasing productivity and a commercial orientation of smallholder and emerging farmers. One of the aspects of agroecological agriculture is minimum reliance on chemical fertilizers and improved and stress-tolerant crop varieties, which contrasts with the promotion of best management practices. A policy on organic agriculture is also nearing finalization. There is a danger that farmers may be left confused if these programs are not properly targeted or aligned.[13]

5. Transforming research and development into market-ready technologies and products

Some of CSA related policies largely ignore the research and development of technological options for climate change adaptation, e.g. breeding climate-resilient crop and livestock varieties. The policies shy away from addressing the breakdown of transforming research and development into market-ready technologies and products.[14]

6. Implementation on the ground

The existing agriculture policies in South Africa lack the connection between national policies on climate change adaptation and local institutional frameworks. Moving forward, policy efforts should focus on integrating CSA priorities into cross-sectoral mechanisms and should ensure that plans for CSA are filtered down from the national to the provincial and local level and receive sufficient budgets.[15,16]

Barriers within the financial sector

Barriers within the financial sector are related to technology, processes, knowledge and awareness as well as regulatory hurdles.

7. Hurdles of legacy technology in financial institutions and cost of data

Outdated equipment and high cost of data slow down the process of digitalization within the financial sector. Regarding IT equipment in financial institutions, it is essential that the latest available technology is used. There have been exponential improvements in systems available, and this is crucial for both the credit process as well as the management of the loan portfolio. Appropriate systems will assist in reducing transaction costs and vastly improve decision making.

8. Credit assessment methodology favors established commercial farmers

Mainstream credit providers rely almost exclusively on methodologies to assess the bankability and repayment ability of applications that were developed for the financing of established commercial agribusinesses. Here a key requirement is for existing cash flows to be used to service the debt associated with future expansion and

[13] https://www.dffe.gov.za/sites/default/files/docs/csa_volume1.pdf, p. 169
[14] https://www.tips.org.za/images/WWF_PFU_Policy_brief.pdf
[15] Switch Africa Green Programme Policy Brief 4/2020
[16] FANRPAN, CSA in South Africa policy brief, 2017

development. This favors businesses with a track record of profits and strong balance sheets that have often been built up over generations and creates barriers for lending towards the target group of this program.

9. Lack of knowledge and awareness about existing CSA opportunities

While financial institutions in South Africa are generally well-versed in agriculture, officers at local level may not be aware of the risk reducing nature of CSA technologies and practices, necessitating some capacity development in that respect. At the level of FIs, there is often a gap between policy changes and operational implementation. FIs may update policies to provide strategic direction and improve financial inclusivity. In practice there are however considerable perceptual, institutional and even regulatory barriers to overcome. Employees are often set in their ways and need training and reorientation to implement new approaches.

10. Poor monitoring, early warning systems and post investment support

Comprehensive post investment support is vital. Many business failures are a direct result of poor management performance and poor administration of financial activities. It is in the interest of lenders to fill this gap in cases where the state does not provide a sufficient enabling environment and general non-financial support. An effective monitoring and early warning system for each applicant would enable the lender to provide or facilitate appropriate support to prevent a possible default.

Summary of Barriers

The table below provides a summary of the barriers identified in the three previous chapters.

Table 1 Summary of barriers

Farming sector	Public sector	Financial sector
1. Lack of know-how and awareness of profitable CSA investments **2.** Lack of bankability	3. Insufficient coordination within the energy-water-food nexus 4. Inconsistent CSA related policies 5. Transforming research and development into market-ready technologies and products 6. Implementation on the ground	7. Hurdles of legacy technology in financial institutions and cost of data 8. Inadequate mechanisms to process information and assess lending risk 9. Lack of knowledge and awareness about existing opportunities 10. Poor monitoring and early warning system for applicants

IV. Opportunities

Several opportunities exist to break those barriers and increase CSA finance in South Africa. These are set out below.

Digitalization

Digitalization offers a great opportunity to expand CSA finance:

- Digital financial services in retail banking have increased financial inclusion in South Africa. The use of innovative technology and new data sources provides better behavioral analysis and credit profiling techniques that can be used to increase bankability. The digitalization of savings groups and embedded digital agri wallet solutions allow farmers to access formal savings accounts and build a transactional history that banks can use to assess their financial behavior and unlock credit.[17] An opportunity exists that having a transactional history and credit record will assist in unlocking commercial investment for CSA. Digital tools can play an important role to help establish transparent financial track records for the farmers.
- Digital channels and data can be accessed to improve the monitoring and early warning of the agricultural sector. These data have the potential to not only help agricultural actors with immediate decision-making but also to help external actors, including financial service providers, better understand the sector and the risks that it may pose to an investor[18]. While digital connectivity and availability of smart phones may be lower in some of the communal areas in South Africa, this will continually improve and become an integral part of doing business in these areas. There are new types of digital data, from advanced but increasingly available sensors, satellites and other tools, that augment traditional agricultural data from, for example, crop harvests.

Extension and know-how

Access to know-how and awareness of profitable CSA investments among farmers can be increased by agricultural extension and digital information services (see above point)[19] which would drive their demand for CSA finance. Examples of successful agricultural advisory services exist in South Africa; these could be scaled up and expanded to include complementary CSA technologies. Examples include:

- Grain South Africa provides support on CA to its members through their Farmer Innovation Programme[20], which aims to increase the awareness and access to information; and provides education and training; as well as facilitates networking.

[17] GSMA, 2021: Agri DFS - Emerging business models to support the financial inclusion of smallholder farmers
[18] https://www.ifc.org/wps/wcm/connect/3d053636-c589-47ac-865d-731068f0736e/Digital+Financial+Services+for+Agriculture_IFC%2BMCF_2018.pdf?MOD=AJPERES&CVID=moq-VoG

[19] Ubisi et al., 2017: Smallholder farmer's perceived effects of climate change on crop production and household livelihoods in rural Limpopo province, South Africa
[20] https://www.grainsa.co.za/pages/grain-research/conservation-agriculture/farmer-innovation-programme

- The Confronting Climate Change[21] (CCC) Initiative is a carbon foot-printing project, developed to support the South African fruit and wine sectors through identifying and responding to the risks and opportunities associated with carbon emissions.

Irrigation

With respect to irrigation, there is a large potential for financial institutions (FIs) to finance irrigation equipment for use in fruits and vegetables production, ideally in conjunction with solar-powered irrigation pumps. Further business opportunities requiring financing include:

- Machine learning and artificial intelligence, which can analyze data from weather stations, soil moisture sensors, and other sources to optimize irrigation and other farm practices. This can help to reduce water use and increase crop productivity.
- Physical infrastructure - such as water storage facilities, water treatment plants, and water distribution systems - well and borehole drilling, pump hire services, and maintenance of irrigation equipment. All these can support sustainable water management practices and enhance crop productivity.

Renewable energy

The use of renewable energy is a reliable and environmentally sustainable option in a growing number of contexts, contributing to a decoupling of growth from fossil fuel use and unreliable grid-power supply. Solar powered irrigation techniques are promoted in the national climate change action plans as a way to reduce emissions from agriculture. They can be scaled to meet diverse energy demands and are therefore a relevant investment opportunity for those target farmers who are involved in (small-scale) commercial fruit or vegetable production, including farmers who are 'off-grid'. Wind-powered systems can be feasible in remote areas where electric utility power is unavailable, where the transport of fossil fuel is difficult and costly, and where adequate wind is available. Biogas is another option and CSA technology linked to small scale livestock production. Potential options to use blended finance to incentivize own generation within agriculture as part of "greening South Africa's agriculture" are currently considered by the Agriculture, Land Reform and Rural Development Minister.

Carbon credits

Carbon credits can serve as a form of collateral for banks providing funding for CSA practices or be an additional financing mechanism for farmers wanting to implement CSA practices. In the context of the South African agricultural sector there are several CSA practices that can generate carbon credits. These include renewable energy installations, composting, soil carbon sequestration, improved land management, conservation of grassland and fynbos areas, and transitioning to electric vehicles, such as forklifts and tractors.

In the context of agricultural soil carbon sequestration, carbon credits are generated by farmers who use practices that promote the sequestration of carbon in the soil, such as reduced tillage, cover cropping, and the use of organic fertilizers. These practices increase the amount of carbon stored in the soil, which can help to mitigate climate change

[21] https://www.climatefruitandwine.co.za/

by reducing the amount of greenhouse gases in the atmosphere. Carbon credits generated by agricultural soil carbon sequestration are categorized as nature-based carbon removal credits which directly remove carbon emissions from the atmosphere.

The biggest barrier for a farmer implementing qualifiable CSA practices to generate carbon credits and get access to the regulatory or voluntary market are the extremely expensive measurement, reporting and verification costs which are in most cases more than the potential revenue that can be obtained from selling these carbon credits.

Innovative methods to assess project finance

Innovative methods to assess project finance do exist that are more appropriate to lending to the target group:

- Tools could be introduced to also use multi-year projected cash flows based on plausible assumptions, instead of historical performance, to evaluate the viability and repayment ability of applications.
- Expectations around business plans and very high levels of statutory compliance are often not realistic or appropriate with respect to the target farmers. The fact that applicants do not, for example, have formal signed financial records does not necessarily imply that they are not bankable. Many of these processes could be simplified and streamlined without compromising the credit decision.
- Loan repayments should be structured to better match the expected cash flow patterns of the applicant as well as to provide repayment holidays where required.

Mechanisms to mitigate lending risk

There are various institutional mechanisms[22] to mitigate lending risk, at least for small and medium farmers who are to some extent integrated in agricultural value chains. Risk mitigation mechanisms that could be considered in the short term are presented below:

- **Working with intermediaries on leased and / or communal land**: key constraints to lending in communal areas include the lack of scale and institutional challenges. Commercial lenders can however fund intermediaries or joint ventures that have built a relationship with the communities.
- **Support for financial lease markets**: the availability of financial leasing for agricultural equipment – including direct-seeding equipment required for conservation agriculture - can greatly increase mechanization among smallholder farmers. Taking on a lease contract instead of a loan allows farmers to avoid putting up collateral. However, an initial down payment is usually required, and many farmers lack the ability to pay such an amount upfront. Lending institutions can therefore consider supporting entities that provide financial leases as well as providing a loan to farmers for the required down payments.
- **Concept of closed lending cycle**: risk is mitigated by the lender understanding, and to some extent controlling, the full cycle or value chain. A common example is where the client obtains a pre-planting contract and off-take agreement from, for example, a commercial agribusiness or marketer. While this can be similar to contract farming, the key feature is that this off-taker then pays the client through the bank's payment channel. This

[22] These mechanisms are largely based on a report entitled "Bankability of leased and communal land", for IAK Agrar Consulting and the German Federal Ministry of Food and Agriculture (BMEL) in 2021

enables the bank to first settle its loan and then pay the remaining amount to the client. This approach can have multiple benefits in the communal areas in South Africa. Where there is a lack of collateral, it mitigates risk through a safe market outlet and also links producers to commercial agribusinesses in the value chain that provides a support ecosystem for inputs, production advice and access to markets. A caveat is the risk of "side-selling" to someone else than the agreed off-taker in case of market prices being well above the agreed purchase price.

- **Value chain intermediaries and input financing**: value chain financing offers a way for banks to share risks, costs, and essential information with leading value chain actors who are better positioned than banks regarding (i) information gaps: client-facing businesses generally have access to information that is either unavailable to banks or expensive to obtain, such as client profiles; and (ii) transaction costs: these can be lowered substantially by relying on existing networks, infrastructure and transaction platforms of value chain partners that are already in established commercial relationships with potential clients. A variation on the above is to finance an intermediary, such as an input supply company or a cooperative, which then provides the inputs to the target farmers at a price that embeds the cost of financing (interest).
- Innovative examples exist how smallholder farmers' access to finance can be sustainably enhanced with NGO support: for example, the Clinton Development Initiative (CDI) provides input loans to farmer cooperatives to help build credit history, seeking to establish the cooperatives as bankable entities that are eventually able to access credit without CDI's direct support. CDI also provides financial literacy training to farmers and brokers relationships with banks, such as Standard Bank in Malawi.

Index-based weather insurance

In South Africa, available crop insurance mostly has two types of cover, hail and multi-peril. To cover climate hazards, such as droughts and floods, farmers currently require multi-peril insurance. While this cover is quite comprehensive, it is predominantly aimed at the commercial farmer with the capacity and scale to justify the cover and pricing.[23] Weather-index based insurance (WII) has proven both feasible and affordable in several countries such as Kenya and India, but is not available in South Africa.[24] It pays out automatically when a metric, such as rainfall, is above or below a certain level, removing the need for costly visits to sites to assess claims. Index insurance is an approach that ties payments to regional agricultural outcomes rather than direct measurements of production losses.[25] The key advantages of this approach are reduced transaction costs, and reduced risks of moral hazards, adverse selection, and asymmetric information. Because the insurance product is standardized, it can be bundled with other services, such as credit or inputs, and delivered through farmers' associations, commodity associations, input suppliers and other entities. A pilot scheme is currently implemented by South Africa's largest non-life insurer Santam, which aims to cover around 50 smallholders with a product linked to soil moisture, measured via satellite. Premiums would be added onto loans farmers already obtain via agricultural cooperatives or other organizations that provide supplies like seeds. Currently a reform of the regulatory framework in South Africa which does not allow the offering of index-based insurance, is considered by the Prudential Authority and Financial Conduct Authority.

[23] https://www.dffe.gov.za/sites/default/files/docs/csa_volume1.pdf, p. 87ff.
[24] SAIA: Bulletin November 2016
[25] Lybbert and Sumner, 2012: Agricultural technologies for climate change in developing countries: policy options for innovation and technology diffusion. Food Policy 37:114–23

Investments in simple and appropriate-scale machinery (for example for direct-sowing).

There is a potential for FIs to finance local manufacturing of simple and appropriate-scale equipment, which could help mitigate a major barrier to CSA adoption among the target farmers and contribute to job creation in rural areas. While the *purchase* of existing larger-scale equipment is neither economically viable nor financially feasible for smallholder farmers, the technology can be made available via custom-hiring services which, at the same time, offer higher-value job opportunities in rural areas, especially for young men. There is a potential for FIs to finance the establishment of custom-hiring businesses.

Compost production

In many parts of South Africa, organic matter is in short supply and/or faces fierce competition for alternative uses, especially as animal feed. The production of quality compost is quite knowledge intensive, hence requiring respective training (see Section 0 below). Compost could be mass-produced using urban wastes, offering a win-win solution: with rapid urbanization and a dietary shift towards greater animal protein consumption, the challenges of disposing of animal and human waste are likely to become increasingly acute; using this waste for large-scale commercial production of compost offers investment opportunities that could meaningfully help regenerate degrading and increasingly unresponsive soils.[26]

[26] Sitko and Jayne, 2018: Integrating Climate- and Market-Smartness into Strategies for Sustainable Productivity Growth of African Agri-food Systems

V. Conclusions

These conclusions propose four themes that capture the barriers and opportunities described in the previous chapters: Technology, Coordination, Information, and Innovation. All four themes offer solutions for the public sector, the farming sector and the financial sector to increase CSA finance. The figure below summarizes this approach.

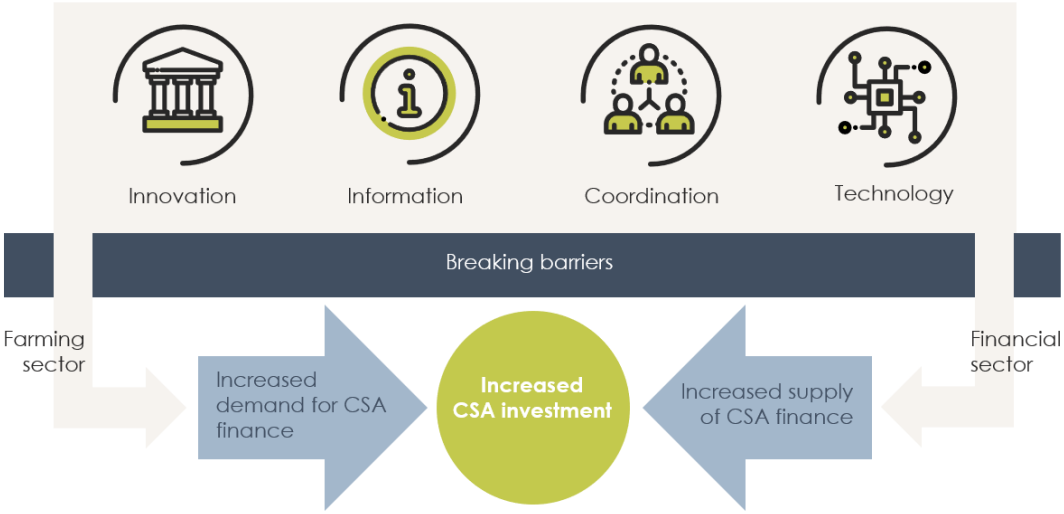

Figure 3 Approach to scale up green finance in agriculture

Innovative green/CSA financing instruments

Innovative financial solutions are being piloted in several areas and could be scaled up: Index-based weather insurance, carbon credits, green finance, new methods to assess project finance and bankability. Sometimes the regulatory frameworks provided by the public authorities and those employed by the financial sector may have to be reformed to facilitate that progress. The public sector could also play a role in reducing the cost of piloting new instruments. The launch of the green taxonomy can be seen as a significant step towards channeling investment into green finance in South Africa. Unfortunately, the taxonomy lacks a chapter on agriculture. Such a chapter would provide guidance and motivation for banks to invest in CSA.

Information and capacity development

Lack of knowledge and awareness about existing opportunities exist at all levels of the public, farming, and financial sectors. Farmers are hesitant to invest in something they don't have sufficient information on. Access to know-how and awareness of profitable CSA investments among farmers can be increased by agricultural extension and digital information services which would drive their demand for CSA finance. Building and strengthening the capacity to

develop business plans would also be important. While financial institutions in South Africa are generally well-versed in agriculture, officers at local level may not be aware of the risk reducing nature of CSA technologies and existing opportunities, necessitating some capacity development in that respect. The public sector can support in raising awareness and developing capacity.

Improved coordination

An enabling environment for CSA investments requires an "informed, systematic and harmonious inclusion of relevant Climate Smart Agriculture concerns, principles and practices and issues in [...] decision-making processes, policies and laws, institutions, technologies, standards, planning frameworks and actions [...]" . Hence, the process is predicated on coordinated efforts by multiple stakeholders in various sectors, including agricultural research and extension, policy, finance, agribusiness, service providers, farmers, and others. Furthermore, coordination is required across administrative levels for successful implementation on the ground. This is currently not always the case within the public sector in South Africa, especially within the energy-water-food nexus. Also, within the private sector more coordination could help scale up CSA investments. Coordination along the value chains can provide a great opportunity for institutional mechanisms to facilitate channeling CSA finance to small farmers. There is also a growing opportunity for financial services organizations to partner with technology players to gather data and develop new funding, credit and insurance solutions better suited to a digitalizing agriculture sector.

Technology access and deployment

The previous chapters have highlighted how legacy technology and the cost of data slow down the process of digitalization within the financial sector. Digitalization offers a great opportunity to expand CSA finance by increasing transparency, improving monitoring, reducing transaction costs, and thereby helping banks, regulators and farmers make informed decisions on risks and bankability. In the farming sector climate change, water scarcity and the severe energy crisis call for the scale up of energy-efficient, water-saving and productivity increasing CSA technologies. Potential options to use blended finance to incentivize own generation of renewable energy within agriculture as part of "greening South Africa's agriculture" are currently considered by the Agriculture, Land Reform and Rural Development Ministry.

Annex 1. Major national-level policies and strategies of relevance for Climate Smart Agriculture

- The National Climate Change Response White Paper (NCCRWP) was adopted in 2011 and presents the South African Government's vision for an effective climate change response to transition to a climate-resilient and lower-carbon economy and society in the long-term.
- The National Development Plan (NDP), adopted in 2013, focuses on eliminating poverty and reducing inequality by 2030, and creating an environmentally sustainable country through climate change mitigation and adaptation efforts.
- South Africa's First Nationally Determined Contribution (NDC) came into effect after the Paris Agreement was signed. South Africa is therefore required to report on mitigation and adaptation efforts. Concerning mitigation, South Africa is to reduce emissions by a range between 398 and 614 million metric tons of carbon equivalent (CO2e) by 2025 and 2030. There are several instruments to ensure reduction in carbon emissions such as car tax, company carbon, and others.
- The Draft Climate Smart Agriculture Strategic Framework for Agriculture, Forestry and Fisheries (AFF), published in 2018, is a broad strategic guideline outlining the climate change adaptation and mitigation strategies for the agriculture, forestry, aquaculture and fisheries sectors. Its stated objectives are (i) to guide actions at all levels of government, investors and development partners on mainstreaming CSA; (ii) to contribute to increasing productivity and growth of AFF related value chains; (iii) to enhance resilience to climatic and weather shocks on the social, environmental, and economic aspects of AFF production and food systems; (iv) to contribute to low carbon development through efficient use of agricultural, agribusiness, forestry and fisheries resources; and (v) to strengthen governance and institutional coordination for effective implementation of the CSA Framework Programme at the national, provincial and local levels.
- The National Climate Change Adaptation Strategy (NCCAS) was published in 2020. It stipulates that climate change is to be incorporated in all policy frameworks, institutional capacity is to be enhanced, vulnerability and adaptation monitoring systems are to be established, vulnerability assessment and adaptation needs frameworks are to be developed, and past investments in adaptation need to be communicated for education and awareness.
- The Agriculture and Agro-processing Master Plan (AAMP), published in 2022, is a social compact co-created by the government, business, labor and civil organizations in the agriculture and agro-processing sectors. The vision of the AAMP is to build a growing, equitable, inclusive, competitive, job-creating, low-carbon and sustainable agriculture and agro-processing sector. Measures to enhance the sector's climate resilience are explicitly addressed.
- The National Water Act of 1998 (NWA) was enacted to provide for fundamental reform of the law relating to water resources in South Africa. The objectives of the NWA include recognizing that South Africa's discriminatory laws and practices of the past prevented equal access to water and that water is an unevenly distributed national resource that belongs to all people of South Africa.
- In South Africa, the Regulatory Carbon Market was created by the Carbon Tax Act, 15 of 2019 (the "Carbon Tax Act"). A carbon tax allowance of up to 10% is given to carbon taxpayers that invest in emission reducing projects (i.e., by buying carbon offsets) in terms of section 13(1) read with 13(2) of the Carbon Tax Act. The carbon tax rate for the 2022 calendar year was R144 per ton of CO2e.

Annex 2. Applicable CSA practices in South Africa

Table 2. CSA practices applicable for large and small farms in South Africa

CSA Technologies	Large Farms	Small Farms
Water management	Efficient irrigation systems and reducing water waste using precision irrigation technologies	Water-saving technologies, such as drip irrigation systems on higher-value crops, and practicing rainwater harvesting
Soil conservation and improvement	Cover cropping, reduced tillage, and intercropping to improve soil health and fertility	Mulching and the use of organic fertilizers, cover cropping and reduced tillage to improve soil health and fertility
Pest and disease management	Integrated pest management strategies that incorporate biological controls, such as the use of beneficial insects	Integrated pest management strategies that incorporate traditional methods, such as companion planting, and the use of natural pesticides
Climate-resilient crop and livestock varieties	Crops and livestock that are better adapted to local climatic conditions, using improved seed varieties and selective breeding programs	Crops and livestock that are better adapted to local climatic conditions
Diversification	Diversifying crops and incorporating agroforestry systems to provide greater resilience against the impacts of climate change	Diversifying crops and incorporating agroforestry systems to provide a more stable and diverse source of food and income
Carbon sequestration	Practices that promote carbon sequestration, such as planting cover crops or trees, to reduce greenhouse gas emissions and mitigate the impacts of climate change.	Practices that promote carbon sequestration, such as planting trees and cover crops, to improve soil fertility and provide additional sources of food and income
Energy management	Energy-efficient practices, such as using renewable energy sources, to reduce greenhouse gas emissions and improve energy security	Energy-saving technologies, such as using energy-efficient lighting and using renewable energy sources, to reduce energy costs and improve energy security
Improved forage management	Practices such as rotational grazing and forage cropping to improve the quality and quantity of feed for livestock	Practices such as rotational grazing and forage cropping to improve the quality and quantity of feed for livestock and reducing the need for supplementary feed
Livestock health management	Proactive measures to prevent and manage diseases in livestock, such as vaccination programs	Basic biosecurity measures, such as separating sick animals, to prevent the spread of diseases
Manure management	Strategies to manage manure, such as composting and anaerobic digestion, to reduce greenhouse gas emissions and improve soil fertility and reduce the risk of water pollution	