TRANSFORMING CROP & LIVESTOCK PRODUCTION SYSTEMS FOR CLIMATE RESILIENCE IN SOUTHERN AFRICA

Project Concept Note for Technical Assistance

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<tr><td>Executive summary</td><td>Climate change is projected to adversely affect smallholder farmers in southern Africa. Transforming current production systems is therefore an imperative. The objective of this project is to make use of 15 years of research evidence and development experience with climate-smart agriculture production systems to adapt to the risks and uncertainties of a changing climate. Projections of climate change and soil fertility decline will have a strong impact on the predominant cereal-legume farming systems as well as livestock and rangeland management.
The project will therefore facilitate the widespread out-scaling of more resilient and adapted farming practices to increase productivity and profitability, adaptation to climate shocks and mitigation.
Based on existing value-chain oriented climate risk analyses, farming communities will be supported to identify their current adaptive capacities, farming targets and climate risks. Capacity building to minimize risk, increase productivity and carbon stocks will target identified gaps, based on existing evidence of successful CSA technologies, mechanisms and strategies. From farmer perspective a needs and gap analysis will be conducted to identify barriers for adoption and market engagement. These will be translated into creating an enabling environment for scaling at local, national and SADC level.
The outcomes of enhancing sustainable climate-smart agriculture and pastoral production systems will be agriculture systems more resilient to climate change and soil fertility decline, leading to higher yields and incomes, healthier populations, ecosystems and economies while creating an enabling policy environment to combat climate change. It will work through three work packages focusing on:
Work Package 1: Out-scaling climate-smart agriculture interventions;
Work Package 2: Generating and packaging knowledge and experiences;
Work Package 3: Creating an enabling environment for scaling.
The project will be coordinated by a group of front runners in the agriculture research and development space (SADC, CCARDESA, CIMMYT, CI, PPF, FANRPAN, RSDA and GIZ) and the National Agricultural Research and Extension Services of Botswana, Lesotho, Malawi, Mozambique, Zambia and Zimbabwe.</td></tr>
<tr><td>Goal / Outcome</td><td>Expanded uptake of climate-smart agriculture and pastoral production (CSA) systems that are more resilient to climate shocks and soil fertility decline; leading to higher yields and incomes, responsible land stewardship, healthier populations, ecosystems and economies while creating an enabling policy environment to combat climate change.</td></tr>
<tr><td>Outputs and targets</td><td><table>
<tr><th>Outputs</th><th>Exemplary Targets (indicators)</th></tr>
<tr><td>a) The area under climate-smart and sustainable pastoralist practices (CSA) in southern Africa is expanded</td><td>Increase in current area under cropping and pastoral land use under CSA practices:
By year 3: Crop land from approximately 1M ha in 2020 by an additional 100,000 ha and pastoral land an increase to 1M ha.
By year 5: Increase in crop land under CSA practices by 300,000 ha with 300,000 new households applying CSA practices (in addition</td></tr>
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		to current cohort) and an additional 500,000 ha of pastoral landscapes (in addition to existing). Approximately 80,000 ha of rangeland will be under improved grazing management.
	b) The resilience of smallholder farmers and pastoralists is increased, expressed by higher productivity and profitability. Farm families acquire increased knowledge and capacity about CSA principles and apply these principles on their land	1,500,000 indirect beneficiaries (farming family members) practicing cereal-legume farming and pastoralist systems by year 5. Increase in maize yields by 50% (from currently 0.5-2.5 t ha^{-1} to 0.8-3.8 t ha^{-1}); increase in sorghum yields by 20% (from 0.3-0.8 t ha^{-1} to 0.4-1.0 t ha^{-1}); increase in legume yields by 30% (from 0.4-1.3 t ha^{-1}- 0.5-1.7 t ha^{-1}) by year 5. Increase in income by 20-50% from baseline and 20% of additional people raised over poverty line. At least 100,000 new farmers trained on improved CSA practices by year 3 and 300,000 farmers by year 5 (of which at least 50 % are females). 400 new eco-rangers (skilled herders) employed by year 5 and market access for livestock improved by 5%. At least 50 new grazing associations/farmer associations formed by year 5.
	c) Increased carbon sequestration and reduced soil erosion	An increase of 20% in soil carbon sequestration compared to conventional farming rates and degraded rangelands and 50% reduced soil erosion after applying the principles of CSA. The methodology and baselines for measuring animal related emissions of greenhouse gases is established by year 3.
	d) The private sector promotes CSA technologies and the number of new enterprises is increased	Increase in amount of heat and drought tolerant seed varieties sold/marketed and number of CSA practices promoted. 20 new heat and drought tolerant seed varieties released by SADC in year 3 and an additional 10 by year 5. Improve livestock breed composition and type in accordance with climate change adaptation and mitigation. 50 new social enterprises / new enterprise service sites established by year 5 that thrive on CSA practices.
	e) Farmers, media, the private sector and civil society organizations of	At least 5 SADC member states have established national ICKM sub-portals connected to CCARDESA ICKM system and expanded their

	SADC member states pro-actively access, develop and disseminate news and knowledge products on sustainable and climate-smart agriculture through existing ICKM systems	networks to state- and non-state extension services and research & development organization by year 3 and another 4 member states by year 5. By year 3 the CCARDESA website (as key element of its ICKM system) has increased its visitors by 20,000 and in year 5 by 50,000. At least 4 agricultural extension services utilize new and innovative CSA knowledge products and tools in their extension strategy by year 3 and an additional 5 by year 5. At least 4 media agencies across SADC disseminate news on CSA on a regular basis to farmers by year 3 and an additional 6 by year 5. At least 5 training providers targeting extension services have integrated CSA technologies into their programs by year 3 and 10 additional by year 5.	
	f) Agriculture policy makers utilize relevant data from the CSA systems to monitor and report on agriculture related achievements in their regional and global commitments	Agriculture related baseline and monitoring data provided by relevant national agriculture stakeholders for reporting, reviewing and enhancing at least 4 NDCs.	
	g) Policy priorities to support CSA are aligned with the goals and objectives of regional and international agreements and trade standards	Recommendations made on integrating relevant climate change and agriculture related content from SDGs, CAADP/Malabo, RAP and NDCs for at least 2 national development plans, 2 climate change policy and 4 agricultural policy/strategy or investment plan reviews. A SADC regional CSA implementation plan is presented to Ministers of Agriculture. At least 2 annual national SDG Voluntary National Reviews (VNR), 2 NDCs and 2 NAP reports informed by program outputs. New international trade standards for beef produced in foot-and-mouth control zones adopted and embedded in national strategies.	
Rationale	The southern African region is heavily affected by increasing climate variability and change expressed by erratic rainfalls, delayed onset of the cropping season, heat and drought stress amongst others. Together with these climate hazards, declining soil fertility and a reduced carrying capacity to raise livestock jeopardize the sustainable development goals (SDGs). **More than 70% of the region's population depend on agriculture for food, nutrition, income and employment**. Smallholder farming systems in southern Africa are directly linked to the performance of cereal-legume cropping systems which occupy between 50-80% of the overall		

	farmland. Rangeland habitats cover over 90% of the region, providing critical ecosystem services, such as water storage and habitat for biodiversity, and maintain livelihoods and cultural values related to livestock. Yet up to 95% of the regions natural rangelands are at some level of degradation rendering vital ecosystem services vulnerable to climate change. For the last 15 years, many programs in SADC and partners have piloted, identified, and implemented best practices for climate-smart agriculture and pastoralism (CSA), including new technologies, strategies and policies to accelerate the **transformation of Africa's agriculture into a more prosperous and sustainable future**. Climate-smart agriculture refers to practices and technologies that adapt to a changing climate, mitigate its negative effects by reducing greenhouse gas emissions and increase productivity and profitability (Lipper et al. 2012). Preceding projects on **"Outscaling climate-smart agriculture technologies"** (maize-legume-based systems in Malawi, Zambia and Zimbabwe and sorghum-based systems in Botswana and Lesotho) analyzed the vulnerability of farming and pastoral communities, piloted and prioritized promising technologies and summarized their performance in feasibility studies. A third project on cattle/rangeland-based systems in the same countries plus Mozambique is being implemented and empowers communities to choose more sustainable rangeland and livestock management practices using a unique and tested value chain approach. This is the foundation of a **credible business case** for scaling. Successful interventions for field crops in cereal-legume based farming systems, piloted from 2004-2019 in Malawi, Zambia and Zimbabwe and documented with a solid evidence base include innovations such as conservation agriculture, improved maize-legume diversification strategies, agro-forestry components, use of drought-tolerant crop species and green manure cover crops, combined with appropriate scale mechanization amongst others. For dryer areas, sorghum and millet remain the most important food security crops, accounting for 25% of production volumes of other major crops in Botswana and Lesotho, for example. Although a large share of production is consumed at subsistence level or stored, there is revenue-generating potential for the local sale of sorghum. The economic viability of up scaling sorghum production is significantly dependent on the operating costs, yields and market prices. The potential profit per hectare of sorghum production in Botswana and Lesotho is estimated to be approx. $1,082 USD (cost-benefit ratio 3.4) and $818 USD (cost-benefit ratio 3.1) respectively, making the scale-up of sorghum a viable revenue-generating activity for smallholder farmers even in dryer areas. A number of key entry points are identified to leverage targeted interventions to sustainably increase sorghum production and increase the climate resilience of smallholder farmers not only in Lesotho and Botswana, but beyond. While many view livestock as a threat to conservation and especially rangeland health, it is in fact through the correct management of livestock and unlocking their value in underserved communities that significant benefits for sustainable land use and biodiversity conservation can be achieved. Herding for Health (H4H) follows a holistic, community-driven approach to address challenges faced by farmers living in communal African rangelands, especially within and adjacent to protected areas. The concept is based on the premise that with proper livestock management, land degradation can be reversed and the desired impacts, including the recharge of water resources and an increase in biodiversity, will be realized. The concept is based on: a) healthy rangelands; b) healthy animals; c) thriving livelihoods and d) the development of an enabling policy environment for sustainable livestock management. This entails, for example, training of eco-

	rangers (skilled herders) who are capacitated in sustainable grazing management, livestock production and health and wildlife friendly practices. The H4H approach uses a formal conservation agreement model to ensure, through appropriate incentives, voluntary adoption and compliance of land stewardship and sustainable best practices. Innovative mobile enterprise development opportunities, such as mobile abattoirs and mobile auctions forms part of the incentive package. **All three projects develop knowledge products identified best practices in CSA based on scientific evidence**[1]. These along with knowledge products collected and curated across the region, are made available through the Information, Communication and Knowledge Management (ICKM)-system of the Centre for the Coordination of Agricultural Research and Development in Southern Africa (CCARDESA), including its webpage (www.ccardesa.org, 14,000 visitors in 2019 with increasing trend), D-Groups and a Facebook page, providing regular newsletters and maintaining a network of 24 ICKM focal points within Ministries of Agriculture across 14 SADC member states. CCARDESA has made significant advances in providing information, communication and knowledge on agriculture and food security to agricultural research for development stakeholders for evidence-based decision making in southern Africa, including CSA. A mobile application on climate-smart agriculture has just been released. However, increased resources are required to reach the 'last mile' to local-level extension officers and farmers across SADC more effectively and to connect to and strengthen SADC member state ICKM systems. SADC has made considerable progress in its harmonized seed regulatory system und uplifting its seed sector – an important opportunity to register and distribute more heat and drought tolerant seed varieties now. Making the transition to resilient agriculture production systems **demands for transformational change at the field and farm level and at enabling supply chains**, but also strong political commitments, greater coherence, co-ordination and integration among the various sectors and government departments dealing with climate change, agricultural development and food security. Global, SADC and national policies need to be aligned and backed-up with coherent cross-sectoral planning. This project offers the opportunity to develop a regional SADC CSA implementation plan. While SADC has got the governance systems with Ministries of Agriculture and national Climate Change focal points in place and NDCs prioritize agriculture in their adaptation efforts, for the region and its member states, a major challenge to scaling up climate resilient agriculture practices is the **failure to secure adequate resources**, thus undermining regional and national efforts at achieving sustainable economic growth and development and regional integration. Business as usual approaches to policy engagement, uncoordinated action and further piloting will not suffice in the face of accelerating climate change. Large-scale investments are needed now, to secure a future worthwhile living for southern Africa's smallholder farmers and pastoralists while maintaining and increasing carbon stocks and reducing greenhouse gas emissions from the agriculture sector.
Background/Context analysis	Cereal-legume cropping systems are critical for over 12M smallholder farm families' food and nutrition security and a total population of approximately 86M

[1] https://hdl.handle.net/10883/20128; https://hdl.handle.net/10883/20129; https://hdl.handle.net/10883/20130; https://hdl.handle.net/10883/20131

	people in the SADC region, excluding South Africa (FAOSTAT, 2018)—yet their maize and legume yields are only a fraction of their potential due to declining soil fertility, increased heat and moisture stress as well as inappropriate management practices (e.g. maize yields are currently 0.5-2.5 t ha^{-1} against a potential yield of 10-15 t ha^{-1}; sorghum yield are 0.3-0.8 t ha^{-1} against a potential yield of 5 t $ha^{-1}$and legume yields are 0.4-1.3 t ha-against a yield potential of 3-5 t ha^{-1}). The majority of smallholder farmers (<5ha) in southern Africa use traditional and outdated agriculture practices based on conventional tillage, mono-cropping and burning or grazing of crop residues. They apply low mineral fertilizer rates, have limited access to new and stress-tolerant seed varieties and lack appropriate scale mechanization options resulting in low yields (and profits), poor water- and labor-use-efficiency, and depleted soils. The negative impacts of climate change are already being felt in the SADC region. In the last major El Niño year 2015/2016, a regional drought disaster was declared with a cereal deficit of 9.3 million tons and 643,000 cattle perished. The food insecure population increased by 31% to 40 million people in the 2017-2018 season. In 2019 alone, four cyclones killed over 1,000 people, leaving 3,000 injured. Over 800,000 hectares of land were destroyed (SADC, 2019). Projections show that southern Africa will continue to be significantly impacted by climate change. It has been predicted that by 2050, temperatures are expected to increase by 2.5-2.7°C (Cairns et al., 2013), rainfalls to become more erratic and crop productivity of maize to decline between 15-30%, whereas sorghum and millet system are projected to show greater resilience to climate change (Lobell et al., 2008). Increasing drought and heat stress has negative effect on both domesticated livestock and wildlife. Drought affects the productivity and carrying capacity of rangeland leading to weaker animals, overgrazing and soil degradation if grazing is not carefully managed. The increased demand for meat by emerging populations exacerbate the situation as biomass production for feed is limited by the agro-ecological systems. Climate change is likely to further exacerbate the degradation of rangelands via the "CO_2 fertilization effect" as well as wetter, warmer climates and decreased fires and herbivore numbers (Venter et al., 2019), with a concomitant decrease in grazing capacity. The rehabilitation and maintenance of these systems will contribute to global climate resilience through habitat maintenance and carbon sequestration potential, which may equal that of Amazon forests (Brandt et al., 2018). If people and nature are to continue to thrive, new models of economic development that regenerate and protect nature are required, not only in isolated parks, but at a scale that accommodates natural movements of animals, sequesters significant CO_2 from the atmosphere, and promotes real rural development for people most likely to suffer from inevitable impacts of climate change. Within Southern Africa's rangeland, restoration of a healthy rangeland system can sequester 10 m^3 CO_2 per hectare per annum and that grazing is necessary for the maintenance of tropical rangelands, rather than being inherently destructive (Oba et al., 2001). Agriculture across Africa must undergo a significant transformation to adapt to the multiple challenges of climate change and accompanying food insecurity, poverty and malnutrition. Fundamental to tackling climate change is the need to make agriculture more "climate-smart". At the same time, the agricultural sector also provides opportunities for climate change mitigation through initiatives such as climate smart agriculture and sustainable pastoralist systems, sustainable agro-forestry and rangeland-management based adaptation and management practices. This contributes to the

	Nationally Determined Contributions (NDCs). The sector thus requires a holistic approach, ensuring that the region reduces greenhouse gas (GHG) emissions and maintaining carbon stocks (confirmed by the 4 pour 1000 initiative https://www.4p1000.org/), whilst improving agricultural productivity and enhancing national food and nutrition security. Achieving climate smart agriculture is an important theme in global policy frameworks and strategies such as the Agenda 2063 Sustainable Development Goals (SDGs), the NDCs under the Paris Agreement and with regional commitments, such as those emanating from the Comprehensive Africa Agriculture Development Programme (CAADP) and the Malabo Declaration on Accelerated Agricultural Growth and Transformation for Shared Prosperity and Improved Livelihoods of the African Union as well as the Regional Agriculture Policy and Investment Plan of the Southern African Development Community (SADC). However, there is a lack of sustained coordination between government departments and disjointed approaches and efforts to sustainable production and upscaling of CSA in SADC which needs to be changed to achieve impact at national and regional scale. With the knowledge gained in previous project **we are confident that technologies are now available** to address these challenges and funds are needed to kick-start transformational change. With increasing numbers of farmers adopting improved CSA and sustainable pastoral system, we expect to improve the livelihood of millions of farmers who otherwise will see no future and hope to remain in this region. The SADC/GIZ ACCRA program has pulled together a team of front-running institutions (CIMMYT, FANRPAN, PPF; CI, RSDA amongst others) and the national research and extension services of SADC countries in supporting the development and dissemination of this concept note to assist CCARDESA and SADC member states in their efforts to attract additional financial resources to increase investments in climate smart agriculture, on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).
Methodological Approach	The program objectives and outputs will be achieved through the following three work packages: **Work package 1: Scaling out CSA practices to smallholder farmers & pastoralists/herders (outputs a, b, c, d)** Current efforts to expand awareness and increase step-by-step adoption of CSA practices will be out-scaled directly with target farming communities and extension services. Relevant for NDCs will be the quantification of CSA benefits (specifically adaptation and mitigation benefits) to improve monitoring as a basis to enhance ambition. This is one of the most pertinent knowledge gaps and needs. The work package will additionally cover further co-development and adaptation of current farming systems to climate change. The stream of effort is centered around bottom-up community-based adaptation approaches, on-farm and rangeland demonstrations, training of ecorangers to be community-based change agents, and participatory trials, extension support coupled with ongoing data collection of farm (crops + soils) and rangeland/cattle performance and supporting farmer decision-making. CSA awareness-raising and capacity building activities will include mega-demos; learning exchanges, field days; farmer-to-farmer extension approaches; mother and baby trials; innovation systems; participatory evaluations

	of plots and rangelands with farmers; amongst others. For farmer and pastoralist decision-making, participatory and science-led assessments of current adoption rates (both spatial and in numbers) together with socio-economic contexts and dynamics will be conducted to identify the drivers and barriers to CSA adoption at the farmer level. Farmers, especially female and youth, will be supported and linked to markets to encourage the change from subsistence farming to commercial farmers. Farmers will be supported to create the required level of organization to support conservation agreement development and implementation as a sustainable, benefit-sharing land stewardship model. Critical in this respect is to engage not only with farmers but also relevant value chain actors from the supply side to create incentives and buy in to achieve transformational change. Expected outputs from this work package will be: a) Bottlenecks to successful CSA out-scaling identified and male and female farmer and pastoralist decision-making understood (demand side); b) Assessment and map of barriers, incentives and capacities related to CSA uptake in national cereal, legume and livestock supply value chains and policies (supply side); c) Gender-sensitive CSA practices, co-developed, adapted and extended with private, civil-society and public-sector partners, and out-scaled to smallholder farmers and pastoralists in target countries; d) Traditional and new heat and drought tolerant seed varieties are registered in SADCs harmonized seed regulatory system; e) Benefits of CSA technologies quantified at different scales; f) Increased knowledge and technical capacity to successfully implement and out-scale CSA by last-mile providers in target countries; and g) Development of applications and tools to assist the effective and accurate tracking of CSA scaling, impacts, and best practice compliance monitoring. **Work package 2: Local, national and regional knowledge generation and dissemination and capacity building (mainly target e, also a, b, c, d)** This work package builds on previous achievements in selecting and developing knowledge products on CSA technologies, strategies and practices and disseminating these through CCARDESA and other consortia partner ICKM systems, including the new mobile application on CSA, and targeted trainings for stakeholders of the national agricultural research and extension systems. To reach the “last mile” – farmers and pastoralists of both genders – further investments are needed to expand existing ICKM systems and out-scale existing knowledge products through innovative forms of communication and new partnerships. Following a needs assessment, node-based replicable national agriculture and research document management and website infrastructure will be developed (synced with CCARDESAs ICKM system as well as the H4H Online Partnership Portal) and networks to state- and non-state extension services (including media, private sector and civil society) and farmers strengthened. Innovative communication tools and products for CSA will be developed translating scientific texts into attractive and user-oriented infographics, pictures, animations, videos, audio/podcast/radio streams and fact sheets in multiple languages. The development and exchange of local field stories will be facilitated, done by journalists and male and female as well as youth farming champions themselves. New partnerships with news and media agencies as well as training providers will

	be formed to broadcast knowledge and experiences and build capacities of extension services and farmers on the medium and long term. Targeted trainings will be provided especially at local, but also at national and regional levels. This will lead to following outputs: a) Country-based sub-portals on information, communication and knowledge management (ICKM) established through 'Node-Bundle' and linked to CARDESAs ICKM system; b) Selected training providers in SADC reviewed curricula to include relevant climate change and CSA content in training programs; c) Innovative platforms for market information and connectivity established d) Farmers and pastoralists, private sector and media, national and regional stakeholder trained on CSA technologies, practices and policy elements; e) Packages of innovative picture-, animation- & infographic-based communication products on CSA in English and Portuguese used at extension level and disseminated through media; and f) Mechanism for continuously gathering and exchanging on local stories from farmer-to-farmer and through CARDESAs ICKM system established and operational. **Work package 3: Strengthening the enabling environment: aligning CSA related policies, strategies and targets (targets f & g)** This work package seeks to enable the broader policy environment in which resilient, CSA production can be taken to scale. This work package will bridge the gap between science and policy and advocate for the alignment of SDGs, National Adaptation Programmes of Action (NAPAs), National Adaptation Plans (NAPs) and Nationally Appropriate Mitigation Actions (NAMAs) to national development planning processes to ensure SADC member states reap the co-benefits of adaptation and mitigation. A range of appropriate methods and tools including case study syntheses, multi-stakeholder policy engagement platforms, monitoring and evaluation of different policy processes, and economic evaluation of different policy alternatives will be used to facilitate the alignment and integration of agriculture-related policies, strategies and investment plans to relevant priorities and targets formulated in NDCs, Comprehensive Africa Agriculture Development Programme (CAADP)-Malabo, SADC Regional Agricultural Policy (RAP) and SDGs. The Measurement, Reporting and Verification (MRV) system will be strengthened within the agriculture sector for NDC reporting and enhancement. Expected outputs from this work package will include: a) Agriculture-related policies, strategies and investment plans incorporate proven CSA technologies and practices and relevant NDC, SADC RAP, CAADP/Malabo Declaration and SDGs targets; b) Policy barriers removed and incentives created for CSA outscaling; c) SADC CSA implementation presented for Minister of Agriculture endorsement; d) Agriculture-related baseline-data and timely updates provided and capacities enhanced for MRV and potential increase in ambition of NDCs (mitigation and adaptation) and other relevant targets;

	e) Agriculture actors engaged in climate change-related advisory and decision-making processes at local, national and regional level (including in NDC investment planning and GCF programming among others).
Target group / beneficiaries	Primary beneficiaries will be smallholder farmers and pastoralists with access only to communal land tenure of variable herd sizes and livestock types, many of them living below the $2 poverty line. Female and youth farmers and pastoralists will be deliberately targeted to increase equity in farming between different gender groups. Most of the smallholder farmers will be subsistence farmers, with a minority selling maize, sorghum and other cash crops or beef and dairy products. Intermediaries and indirect beneficiaries will be researchers and extension agents from both private and public sectors who will pick up new knowledge and extension methods; private sector entrepreneurs (seed, fertilizer, machinery, veterinary pharmaceuticals, fodder producers, meat abattoirs, processors and distributors, and beef producers) who will gain from increased business opportunities; and local governments and policy makers who will benefit from new knowledge to formulate policies for sustainable agriculture transformation.
SADC Member States	The program is going to be implemented in the SADC region with out-scaling activities, primarily focusing on: Botswana, Lesotho, Malawi, Mozambique, Zambia and Zimbabwe and with spill-overs to Tanzania, Namibia, Eswatini and South Africa. Source or spill-over countries may interchange based on the target farming system and its feasible implementation. Focal Points in local Governments are nominated by the respective Ministries of Agriculture within Research, Development and Extension as well as Communication Departments.
Implementing Partners	This program will be implemented by a consortium consisting of the Centre for Coordination of Agricultural Research and Development (CCARDESA), the International Maize and Wheat Improvement Centre (CIMMYT), Conservation International (CI), the Food, Agriculture and National Resources Policy Advocacy Network (FANRPAN), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Peace Parks Foundation (PPF) and the Rural Self-Help Development Association (RSDA) in close collaboration with SADCs Directorate on Food, Agriculture and Natural Resources and the Ministries of Agriculture in each country. This consortium of well-established national, regional, continental and global organizations is suggested with lead responsibilities for individual players while contributing across all working packages. CIMMYT, CI and PPF, and RSDA will lead the implementation of **Work Package 1** on out-scaling CSA practices to smallholder farmers and pastoralists/ herders. CIMMYT, the global leader in research on maize and wheat-based farming systems will provide expertise on sustainable and resilient farming practices in maize-legume based systems, CI and PPF will foster 'Herding for Health' (https://www.peaceparks.org/h4h/) in southern Africa's rangelands, and RSDA in sorghum-based systems. Each institution will deliver on all aspects of CSA across different farming systems and will complement each other. As part of Work Package 1, CIMMYT and RSDI, CI and PPF, will identify barriers to scaling-out and also provide training and capacity building to farmers. CCARDESA will lead the implementation of **Work package 2** on local, national and regional knowledge-generation and dissemination and capacity building. All

	other consortium partners will contribute through knowledge products, training, networks, the identification of farmer champions and their own ICKM systems. FANRPAN with its country nodes will lead the implementation of **Work Package 3** on strengthening the enabling environment through its networks and well-established policy dialogues. GIZ will contribute through sharing expertise in mainstreaming climate change considerations, climate-proofing of policies and strategies, NDC enhancement and setting up MRV systems. GIZ will channel funding to the consortium partners and ensure compliance. Joint action plans are developed in close collaboration with key stakeholders at regional, national and local levels, including Ministries of Agriculture, private sector and civil-society organizations. GIZ will also develop an M&E system and coordinate the overall reporting. At least 50 % of the operational funding will be allocated to working package 1 and the remaining 50 % shared across working packages 2 and 3. Sub-granting and further implementing partners will be identified during the appraisal phase and may include line ministries, regional organizations and Consultative Group on International Agricultural Research (CGIAR) Centers such as the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the International Livestock Research Institute (ILRI), Academia, NGOs (Total LandCare, Catholic Relief Service etc.) and Social Enterprises (such as Meat Naturally) as well as the private sector companies (seed companies, machinery manufacturers, agro-dealers amongst others). The intervention outlined in this proposal was developed in full collaboration with a range of partners, including Ministries of Agriculture and country working groups, who have been involved in directing, providing technical input and validating all phases of the analysis and proposal development. The ownership of this intervention concept resides with the counterparts in each government, aligning to their needs and supporting their strategic aspirations.
Governance	Existing SADC governance arrangements among its Member States will be utilized to steer the program, to ensure alignment and promote enhancement of the regional CSA agenda. This consists of three Technical Committees: 1. on Crops, 2. on Livestock and 3. on Climate Change (each at Director Level) and annual Ministerial Meetings on Agriculture. In addition to this, at operational level a regional technical steering committee will be established, consisting of representatives of SADC FANR, Ministries of Agriculture, civil society and private sector and the consortium partners. Opportunities to utilize and strengthen SADCs non-state actor engagement mechanism and recently established Business Council will be elaborated.
Alignment to SDGs, UNFCCC Paris Agreement	This initiative contributes to achieving the following Sustainable Development Goals (SDGs): SDGs 1 (end poverty), 2 (end hunger and achieve food and nutrition security), 5 (gender equality and empower women and girls), 13 (combat climate change and its impacts), and 15 (sustainable use of terrestrial ecosystems).
Alignment to continental and SADCs Policy Frameworks	This initiative is aligned to and contributes to the key SADC framework documents, including the revised Regional Indicative Strategic Development Plan (RISDP), the SADC Regional Agricultural Policy (RAP) and its investment plan, the SADC Food and Nutrition Strategy (2015-2025), the Climate Change Strategy and Action Plan (2015), and the revised SADC Protocol on Gender and Development,

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<tr><td></td><td>the Phakalane Declaration for Commodity-Based Trade in Beef in SADC, among others.
At continental level this initiative is informed by the Comprehensive Africa Agriculture Development Programme (CAADP), the Malabo Declaration, and the Science Agenda for Agriculture in Africa (S3A), the Africa Climate-Smart Agriculture Alliance (ACSAA), and the Gaborone Declaration for Sustainability in Africa</td></tr>
<tr><td>Contribution to achieving NDCs and other relevant national policies/strategies</td><td>All 16 Nationally Determined Contributions (NDCs) of SADC member states prioritize agriculture as an adaptation area and 8 also as a mitigation strategy. The generation and dissemination of technologies for successful sustainable and climate-smart agriculture from local and regional level will support the adoption of best practices and lead to increased climate resilience of farming household and help in maintaining carbon stocks and reducing emissions in agricultural production systems.
<table>
<tr><td>Adaptation focus
yes</td><td>Mitigation focus
no</td><td>Mitigation as co-benefit
yes</td></tr>
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<tr><td>Timeline</td><td>From 2020 to 2025 (in two phases)</td></tr>
<tr><td>Estimated budget</td><td>The total estimated budget including requested funding amounts to 40 Mio USD (value for money: 27 USD/beneficiary).</td></tr>
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<tr><td>Reference documents / Baseline data</td><td>Cairns, J.E., J. Hellin, K. Sonder, J.L. Araus, J.F. MacRobert, C. Thierfelder, et al. 2013. Adapting maize production to climate change in sub-Saharan Africa. Food Security 5: 345-360. doi:10.1007/s12571-013-0256-x.

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