



# Climate-Smart, Resilient Agriculture

Improving smallholders' resilience, mitigation and profitability in all we do

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**syngenta** foundation  
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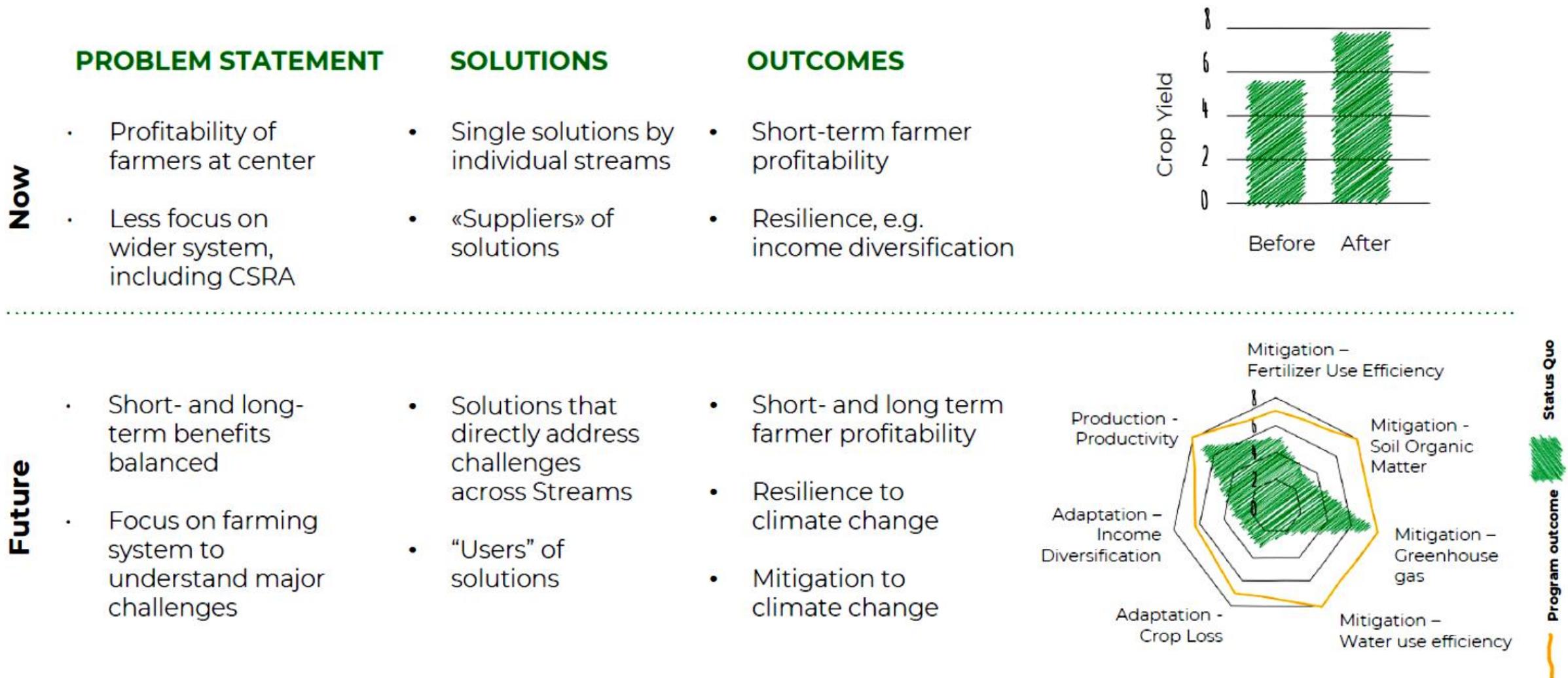
# Why does SFSA need to become more climate-smart?

Climate change is humanity's biggest challenge; agriculture is particularly affected, given its dependency on weather and functioning ecosystems. In addition, while agriculture is greatly impacted by a changing climate, it is also one of the biggest drivers of climate change. Agriculture and land-use change account for roughly 25% of global greenhouse gas (GHG) emissions. There is hence an immediate need both to mitigate the effect of agriculture on global warming and for farming systems to adapt to non-mitigatable climate change. Smallholders in low- and middle-income countries are particularly exposed. Already producing low and erratic yields, and often disconnected from major input and output value chains, financial safety nets and extension services, they are uniquely vulnerable to the risks associated with climate change and the degradation of agricultural ecosystems.

In response to this urgent challenge, SFSA is including Climate-Smart, Resilient Agriculture (CSRA) as a core component of its renewed strategy. This decision highlights the need – and our determination – to help smallholders to deal better with the consequences of climate change.

SFSA is already “climate-smart” in many ways: For instance, we engage in developing and delivering climate-smart genetics, index-based weather insurance products, tools for precision input use, water-efficient irrigation and energy-efficient mechanization. However, tackling the systemic challenge of climate change requires us to go beyond isolated interventions. We will now build solutions that improve the capacity of farming systems to mitigate and adapt to climate change in more systemic and sustainable ways. Figure 1 indicates how the focus on CSRA could change our program design and delivery.





**Figure 1:** Impact of a focus on climate-smart, resilient agriculture on future SFSA program development and delivery. Differences between the “Now” and the “Future” are highlighted in the areas of problem statement, solution design, and anticipated outcomes.

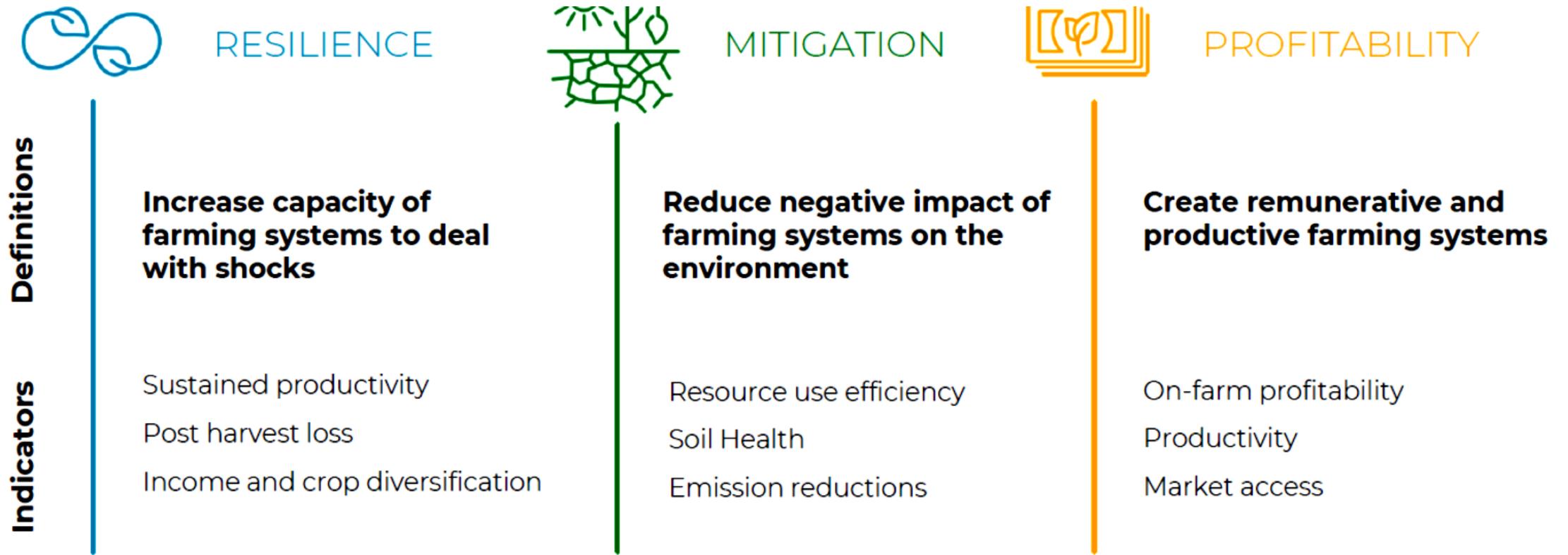


## What is CSRA and why is context so important?

The FAO coined the term climate-smart agriculture (CSA) in 2010. CSA incorporates the three pillars of productivity, resilience and mitigation. It bridges several Sustainable Development Goals, most notably SDG 13 ('Climate Action') but also SDGs 2 ('Zero Hunger'), 4 ('Decent Work & Economic Growth'), 12 ('Responsible Consumption & Production') and 14/15 ('Life Below Water and on Land').

The original FAO definition of 'Climate-Smart Agriculture' largely matches our own intention of delivering value-creating solutions, practices and technologies to smallholders. But while we broadly agree with the definition, we propose a slight adaptation for our work. This is highlighted in Figure 2. The revised definition can help us to deliver even better on our refreshed mission to 'strengthen smallholder farming and food systems, by catalyzing market development and delivering innovations while building capacity across the public and private sector'. We will develop models and initiatives that combine long-term resilience and mitigation benefits with more rapid economic gains for adopters, creating value at farm and value-chain level. Soil health will play an important role.

Context clearly matters in this quest, as does farmer segmentation. The impact of climate change on agriculture (and vice versa) differs between regions, crop types, farming systems, levels of farmers' natural, knowledge and financial capital, infrastructure and other (dis-)enabling factors that influence their capacity to adapt to a changing climate. Figure 2 describes in more detail the three CSRA pillars and what they mean to us.



**Figure 3:** Potential interventions to improve the value proposition of a potential solution (e.g. crop rotations) and incentivize farmer adoption.

# Adaptation and Resilience

Although resilience has been defined in many different ways, it generally refers to ‘the capacity [e.g. of people or a system] to absorb a shock’. Improving resilience typically requires addressing three interwoven goals: increasing agricultural viability (agronomic, economic and environmental) despite climate shifts, mitigating the harm caused by climate variability or volatility, and reducing smallholder vulnerability to adverse events. SFSA focuses most on the proactive strategy of increasing agricultural viability despite climatic challenges. For example, we seek to improve soil health not only to maintain yields and incomes, but also to sustainably improve these and ensure that resources are available for future generations. This matches the increasing emphasis on taking regenerative approaches to agricultural systems, encouraging farming principles and practices that increase biodiversity, enrich soils, improve watersheds and enhance ecosystems.

To increase farmers’ resilience and capability to adapt to climate shocks, appropriate risk mitigation strategies and tools need to be developed and deployed. Adaptation can include measures that reduce the risk of crop failures (e.g. appropriate climate-smart genetics, inputs, farming practices and infrastructure) as well as interventions to reduce the financial consequences of crop failures (such as insurance or savings schemes). In some cases, benefits from increased resilience of farming systems may only become apparent during an extreme event. Resilience benefits must therefore be combined with other economic incentives arising from increased productivity, decreased costs of production, access to more remunerative value chains (for example through certification) or other incentive schemes (subsidies). It is also essential to promote these benefits and thus increase farmers’ willingness to adopt such interventions.



# Mitigation

Mitigation in the context of climate change refers very narrowly to the reduction and/or removal of GHG emissions. However, agricultural activities do not only affect the environment through emissions. They also compete with their environments for resources. Extracting water for irrigation, for example, reduces its availability for downstream communities and ecosystems.

Furthermore, unsustainable farming can degrade land and leak harmful substances into the environment. Avoiding land-use change is also critical to preserve ecosystems and biodiversity. The mitigation pillar of CSRA will therefore go beyond climate-change relevant emissions and take a more holistic approach. The specific context clearly matters. For example: improved water use efficiency and reduced water extraction are likely to have a bigger impact in drought-prone areas. A reduction in use of crop protection chemicals will be particularly important for farming systems adjacent to vulnerable habitats, such as river deltas.



# Productivity and Profitability

Ensuring productivity and profitability gains for low-income smallholders is crucial. Rapid economic benefits greatly facilitate farmer adoption of practices that improve resilience or mitigation. Smallholders need immediate and reliable returns on their investments. SFSA-led programs will deliver outcomes with a robust value proposition for farmers and the value chain. One way to achieve this is through products and practices that already incorporate such economic benefits under existing conditions. Alternatively, our work can change the enabling environment (e.g. subsidies, policies, innovation) to create new value propositions for not-yet economically viable technologies and practices with high potential for mitigation and/or adaptation.



# Creating a value proposition for CSRA

We believe that smallholders will only adopt CSRA practices at scale if these deliver both near-term and continuing return on investment (ROI) at the farm level. This in turn fundamentally depends on farmers' empowered participation in remunerative value chains that send 'climate-smart' signals.

SFSA will therefore focus on interventions that (i) align with climate mitigation objectives, and (ii) actively increase climate resilience / adaptation, if and only if (iii) they have a clear potential to robustly contribute to farm-level profitability. For example, making mitigation strategies mandatory for smallholders has limited viability in the absence of substantial policy and/or financial support. Shifting to new practices may create disproportionately higher financial risks and costs for smallholders, who are poor, at risk from food insecurity and often most vulnerable to climate change.





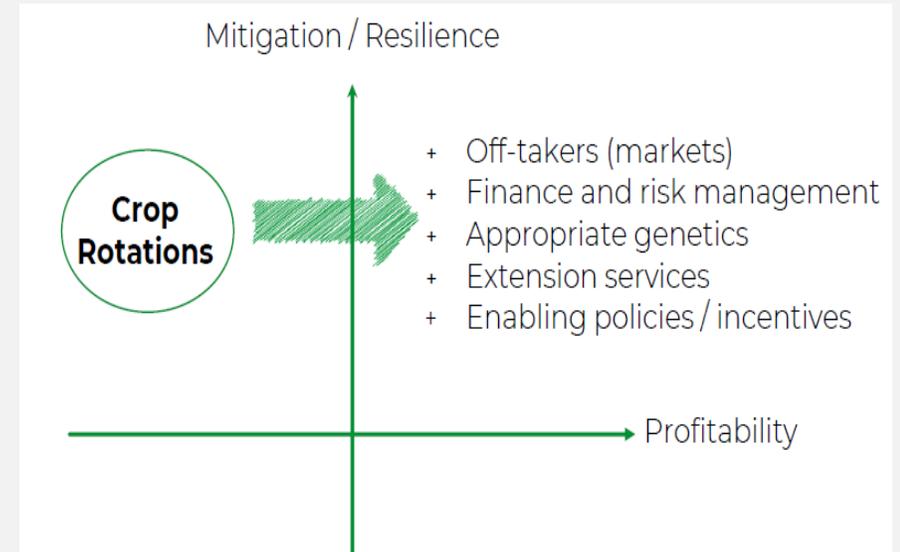
## Identifying and scaling winners

Assessing solutions according to the three dimensions of CSRA will help us identify “winners” – technologies and practices that both score highly in terms of their mitigation/adaptation potential and provide a viable economic value proposition to farmers, ideally under existing market and policy environments. Such winners will then be delivered through our existing internal networks and through strategic partners. Again, context matters: what constitutes a winner depends heavily on the farming system in question. We anticipate developing such assessments locally rather than globally.



## Levers for building the value proposition

The same approach will also help identify solutions that score highly in terms of mitigation and adaptation benefits but do not (yet) represent a viable value proposition. The barriers may include adverse policy frameworks, lack of value chain linkages or a need for innovation and/or bundling of services to create more attractive solutions. Such barriers provide an opportunity for SFSA to catalyze systemic change. This could, for instance, include more conducive agricultural policies, value chain linkages or climate-smart finance (such as carbon finance or other payment schemes for ecosystems services). Figure 3 provides an example of how SFSA interventions could increase the value proposition of a climate-smart solution.



**Figure 3:** Potential interventions to improve the value proposition of a potential solution (e.g. crop rotations) and incentivize farmer adoption.

## CSRA benefits for SFSA

An organization-wide focus on climate-smart objectives throughout our entire portfolio will create a number of benefits and opportunities to improve the ways we work and how we are perceived by stakeholders and partners.

First and foremost, focusing on a common, unifying theme will create a stronger sense of purpose and understanding of “what good looks like”. This will help us to better understand and shape the contribution of each project/PI, team, function and individual employee to achieving overall, Foundation-wide goals. It will also enable a more consistent and transparent narrative for the prioritization of investments and help us more proactively define and communicate our agenda, engaging in initiatives and partnerships as appropriate.

Focusing on more systemic challenges will also encourage internal alignment and collaboration. For instance, the creation of solution packages to diversify production systems (as highlighted in Figure 3) could include access to seed, market linkages and financial products. There will also be more opportunities for internal collaboration with the Policy and R&D functions. The need to understand local context and develop appropriate CSRA solutions will also enhance country teams’ role in ensuring smallholders’ success.

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