A farmer at work in a maize field in India.

Photo: Michelle DeFreese/CIMMYT

CLIMATE-SMART AGRICULTURE – WHAT IS IT?

CSA – today, any programme addressing the future viability of agriculture that does not contain this acronym for "Climate-Smart Agriculture" would be quite inconceivable. But what exactly does the term refer to, and in what way does the concept differ from that of sustainable agriculture? Showing examples from Colombia, Niger and India, our author demonstrates what CSA means in practice and explains why the term "agriculture" does not do justice to the broader framing of the context.

By Bruce Campbell

Hundreds of local and international organisations have adopted the concept of Climate-Smart Agriculture (CSA). However, as with many newly-proposed concepts, there are different interpretations and contestations. CSA is by no means perfect for what it needs to cover in the urgent and complex area of climate action in agriculture and food systems, but it is a useful shorthand.

Many of us interpret CSA as an approach rather than as a concrete practice or technology. As Leslie Lipper and co-authors write in Nature Climate Change, "CSA is an approach for transforming and reorienting agricultural systems to support food security under the new realities of climate change". There are many other terms related to agricultural development, but CSA is novel in its focus on a range of climate actions. The concept was conceived by the United Nations Food and Agriculture Organization (FAO) in 2010 in response to the need to transform agricultural development to the challenges of climate change.

Realising a food secure world has always been difficult, but it will become even more challenging under a changing climate. According to the Intergovernmental Panel on Climate Change (IPCC), a temperature increase of 2° C could affect agricultural yields by 15 per cent with current farming practices, while the FAO states that 60 per cent more food is needed by 2050 to meet the growing demand. In addition, food systems are responsible for up to a third of greenhouse gas emissions, so these must be mitigated to limit global warming. Climate-Smart Agriculture is an approach to address these challenges in an inclusive manner.

THE THREE PILLARS OF CSA

In essence, CSA interventions seek to achieve three outcomes: (a) sustainably increasing agricultural productivity and incomes; (b) adapting and building resilience to climate change; and (c) reducing and/or removing greenhouse gases emissions, where possible. Many have interpreted these as the components that would need to be found in a particular agricultural practice or technology, such as in conservation agriculture and agroforestry. We have a somewhat different framing. The overall objective of CSA is to support efforts, from local to global levels, for sustainably using agricultural systems to achieve food and nutrition security for all people at all times, integrating necessary adaptation and capturing potential mitigation. The three pillars above are then the goals to achieve that objective.

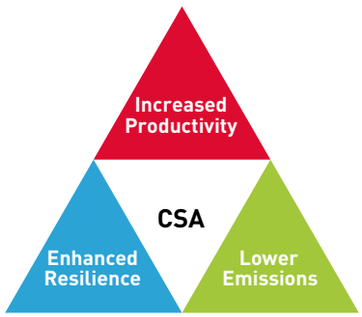
What do we need to do to achieve those three inter-related goals? Action may involve agroforestry in one location, but crop-livestock systems in another. It may involve index-based insurance, better input markets and wheat farming elsewhere. The focus is on the goals, not on any particular practice that needs to be labelled climate-smart. And we need to recognise the trade-offs that may arise amongst the goals.

In focusing on the goals, we would hope to move away from the situation where particular technologies and practices are "sold" and "promoted" – we want to move away from silver bullets. Unfortunately, this is not the case in current practice, as we see multiple forms of climate-smartness being promoted: climate-smart potatoes, climate-smart landscapes, climate-smart villages, climate-smart rice, climate-smart livestock production, etc. We concur with Todd Rosenstock from the World Agroforestry Centre (ICRAF) when he says that a technology can be climate-smart in many places but is unlikely to be climate-smart everywhere. Let's not go to a farm, farmer, landscape or country with a climate-smart solution, but rather start from the farmers and local stakeholders to understand their needs, and work together towards the local and global goals. We should focus on the processes needed to achieve the goals. As Lipper and co-authors suggest, these may include promoting co-ordinated actions by farmers, researchers, private sector, civil society and policy-makers; building evidence of what works in specific contexts with particular types of farmers; increasing local institutional effectiveness to support agriculture; fostering coherence between climate and agricultural policies; and linking climate and agricultural financing. This gets CSA into the real business of development in the era of climate change, rather than pushing particular technologies.

WHAT DISTINGUISHES CSA FROM SUSTAINABLE AGRICULTURE?

We think this is simply answered. CSA is merely sustainable agriculture with a strong focus on the climate dimensions. CSA ideas will make sustainable agriculture even more sustainable! This will occur by, for example, focusing on climate advisories for farmers (where appropriate!), scaling up weather-based index insurance (where appropriate!), and/or mobilising climate finance for the benefits of farmers and farming (where appropriate!). If sustainable agriculture completely embraces the emerging ideas in CSA, there will be no reason for the CSA concept to continue – climate concerns will be completely mainstreamed into sustainable agriculture.

The three pillars of Climate-Smart Agriculture



While CSA pursues similar goals to other approaches – food security and sustainable development – CSA distinguishes itself in three ways. First of all, CSA systematically integrates climate change into the planning and development of agricultural systems. While many approaches to sustainable agriculture consider resilience and reduction of greenhouse gas emission as beneficial side effects, CSA takes them as starting points. Secondly, to achieve the three outcomes of productivity, adaptation and mitigation, CSA emphasises the synergies and trade-offs between interventions at different levels. This is important, because interventions can have beneficial socio-ecological effects at farm level, but detrimental effects at landscape or community level. To identify optimal interventions and assist farmers and decision-makers, CSA projects need to deploy prioritisation tools to identify trade-offs and synergies between options. Thirdly, CSA attracts new funding to agricultural development, as it focuses explicitly on climate change. With the need for climate change adaptation and mitigation, a myriad of climate funds has appeared, such as the Least Developed Countries Fund, the Global Environment Facility Trust Fund and the Green Climate Fund.

CSA IN PRACTICE: EXAMPLES FROM COLOMBIA, NIGER AND INDIA

To illustrate how CSA can be applied to an institution, in women's empowerment and an agronomic technique alike, three examples are shared from Colombia, Niger and India. The first example is the establishment of the Local Technical Agroclimatic Committees (LTACs) in Colombia. The Colombian Ministry of Agriculture and Rural Development set up these committees with support from several research institutes in 2015, to make farmers more resilient to the increasing climate variability. In these committees, representatives from gov-

Members of a Local Technical Agroclimatic Committee in Montería, Colombia.

Photo: José Luis Urrea/CCAFS

ernment, civil society, meteorological services and farmers meet regularly to discuss climate forecasts and formulate practical agronomic recommendations. These recommendations are distributed to farmers through regional and national bulletins, so that they can make informed decisions on what varieties to plant, when to sow and how to manage water and other inputs. With the five LTACs more than 150,000 farmers were already receiving tailored agroclimatic advisory services. The establishment of the LTACs followed a typical CSA approach and contributes to the three CSA outcomes, as it enables farmers and policy-makers to increase productivity, decrease greenhouse gas emissions by optimising fertiliser application, and adapt to changing climates.

The second example comes from Niger. Agriculture in Niger is characterised by its hostile environment, with annual rainfall lower than 600 mm and temperatures surpassing 30° C for months on end. Despite these harsh conditions, 80 per cent of Nigeriens depend on farming for their livelihood, which makes them very vulnerable to climate variability. Particularly women and their children often face malnutrition, as they are assigned marginal lands to cultivate. In response to both problems, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) trained over 10,000 women in Niger to reclaim degraded lands. Women learn restorative cultivation techniques, such as the use of zai-pits, which are dug in hardened soil and filled with manure to concentrate nutrients and water for seeds once the rainy season starts. They were also assisted in negotiating for the long-term right to cultivate common marginal lands. These efforts to empower women to reclaim marginal lands increased productivity and carbon sequestration in soils, and strengthened the resilience of women to face climate variability.

> *A technology can be climate-smart in many places but is unlikely to be climate-smart everywhere.*

The third example from India shows how a technique from conservation agriculture can be deployed as a CSA intervention. The International Maize and Wheat Improvement Centre (CIMMYT) and several research partners tested different combinations of tillage, crop establishment and residue management in a rice-wheat rotation in the Indo-Gangetic Plains of India. The researchers found that the fields without tillage led to a higher productivity of both rice and wheat after four years, and that the soil organic carbon content increased over the years. With a higher organic carbon content, carbon dioxide is sequestered and soils become more resilient to floods and droughts. To demonstrate these benefits, CIMMYT deployed the zero-tillage and accompanying conservation agriculture techniques at one of its test fields in the India state of Bihar. Representatives of the government of Bihar, seeking methods to increase the climate resilience of its farmers, visited the test fields and decided to promote the zero-tillage rice-wheat rotations as an official policy. While this production system was conceived as a conservation agriculture technique, it contributes to CSA outcomes, and was deployed throughout the state of Bihar to increase the resilience of farmers to climate stresses.

Nigerien women sowing okra seeds in the zai-pits.

Photo: ICRISAT

As such, these three examples show that there is a great overlap between the objectives and methods of approaches to sustainable agriculture, but that CSA distinguishes itself with its focus on climate change.

A BROAD FRAMING OF CSA

There are many different interpretations of CSA – this is alluded to above in relation to the focus on technologies and practices as opposed to an approach to agricultural development under climate change. The term "agriculture" in CSA is perhaps unfortunate, as we should be also focusing on broader food system issues, value chains, policy issues and crucial services (such as climate-informed advisories, insurance and credit). Technologies and practices, however, tend to get the most attention in many discussions on CSA. Furthermore, CSA often concentrates on the farm and farmers rather than on some of the higher level landscape issues that need to be considered. We would posit we need a broad framing of what is to be considered under CSA – anything that helps deliver on the three objectives (pillars). CSA can therefore be understood as an approach promoting agricultural development in response to the challenges of climate change adaptation and mitigation, ultimately aiming to improve the livelihoods of people. CSA has gained considerable traction since 2010, with participants ranging from local farmers to global organisations. However, as the interest in CSA practices grows, it becomes increasingly important to monitor and evaluate results and interpret them in their site-specific context. Only in this manner can CSA contribute to the livelihoods of people around the world, in co-operation with the other approaches to sustainable agriculture.

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