Climate-Smart Agriculture

Guidance Note

World Vision

UTS Institute for Sustainable Futures

Acknowledgements

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ACRONYMS

AFOLU	Agriculture, forestry, and other land use
AP	Area programme
BSL	Building Secure Livelihoods
CGIAR	Consultative Group on International Agricultural Research
CPM	Core project model
CSA	Climate-smart agriculture
CSO	Civil society organisation
DFAT	Department of Foreign Affairs and Trade
DRR	Disaster risk reduction
ESCA	Environmental Sustainability and Climate Action
FAO	Food and Agriculture Organization
FGD	Focus group discussions
FMNR	Farmer Managed Natural Regeneration
GEDSI	Gender equality, disability, and social inclusion
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NGO	Non-governmental organisation
NRM	Natural resource management
RGC	Regreening Communities
UNFCCC	United Nations Framework Convention on Climate Change

INTRODUCTION

Agricultural activities take place on 38% of the planet's terrestrial surface, use approximately 70% of global freshwater resources, and when combined with the distribution and processing of products in the food system, contribute up to one third of anthropogenic greenhouse gas (GHG) emissions.[i,ii] Global food demand is projected to increase, from 2009 levels, by 102% by 2050,[iii] underscoring the need for urgent acceleration and transformation in agriculture under rapidly changing climate and socio-political contexts.[iv] Growing food demand will continue to shape agricultural practices and will increase the contributions of agriculture to global emissions,[v] intensifying future risks and vulnerability in food systems.[vi] In addition, climate change impacts are increasingly compromising the ability to grow food, both in terms of quality and quantity. Increasing temperatures, unpredictable rainfall, and changes in humidity and soil moisture are just some of the direct climate impacts faced by farmers. Agriculture and the broader food and agri-food systems are embedded in the Nationally Determined Contributions (NDCs) under the United Nations Framework Convention on Climate Change's (UNFCCC's) Paris Agreement and must contribute to emissions reductions to ensure food security.[vii]

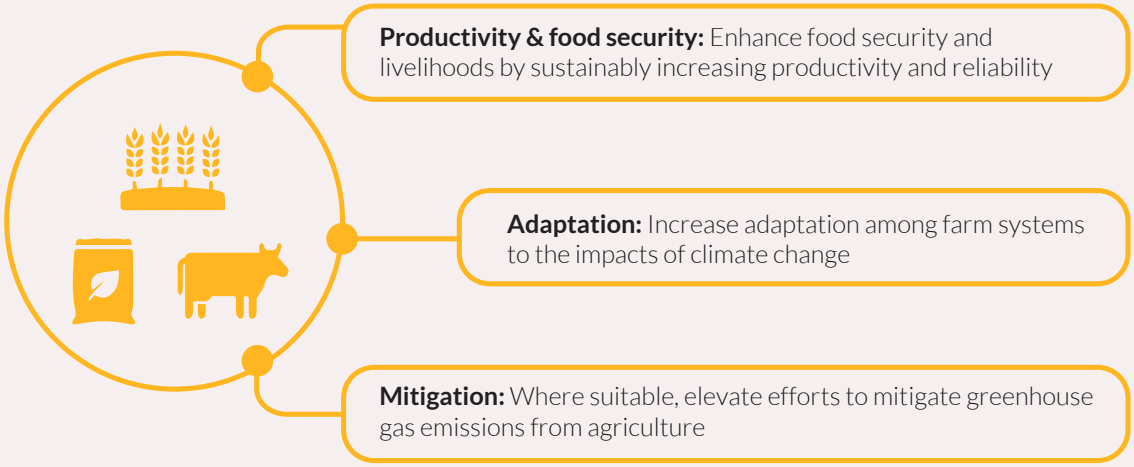
The links between food system activities and climate change are now well established in scientific and development communities. The landmark Intergovernmental Panel on Climate Change (IPCC) Climate Change and Land report[viii] asserted that land is both a source and sink of greenhouse gases, and that sustainable land management contributes to both reducing the impacts of climate changes and supporting ecosystems and people. Agriculture, forestry and other land use (AFOLU) activities account for 13% of carbon dioxide emissions, 44% of methane, and 81% of nitrous oxide emissions from human activities globally from 2007 to 2016, accounting for 23% of total net anthropogenic GHG emissions. Pre- and post-food production activities add further emissions, which when included are estimated to make the food system responsible for 21–37% of total net anthropogenic GHG emissions.

In parallel, climate change is accelerating stress on land and amplifying risks to livelihoods, biodiversity, and infrastructure associated with food systems. While impacts will be heterogenous, increasing and cascading risks from increased warming and frequency, intensity, and unpredictable severe weather events (such as heavy rainfalls and droughts) will impact food production. Given the food and agriculture-related activities directly support the livelihoods of 2.5 billion people, it is critical to develop strategies for supporting sustainable production, adaptation, and mitigation in agricultural practices.

Box 1: What is climate-smart agriculture?

Climate-smart agriculture (CSA) is an approach to help people who manage food systems to respond effectively to climate change. CSA's overall goal is to see agricultural systems transformed to improve productivity and improve food and nutrition security for all people at all times. According to the Food and Agriculture Organization (FAO), CSA is an approach for transforming and reorienting agricultural production systems and food value chains so that they support sustainable development and can ensure food security under climate change. The main objectives of CSA are to (1) sustainably increase agricultural productivity to support equitable increases in incomes, food security, and development; (2) adapt and build resilience to climate change; and (3) develop opportunities to mitigate GHG emissions from agriculture, where possible.[ix] These three objectives are known as the 'three CSA pillars'. Climate-smart agriculture is not a set of practices that can be universally applied, but rather an approach that involves different elements embedded in specific contexts and tailored to meet local needs.[x]

Figure 1: The three pillars of climate-smart agriculture



Climate-smart agriculture options include water-smart, energy-smart, nutrient-smart, carbon-smart and knowledge-smart practices.[xi] For instance:

- Water-smart technologies (such as rainwater harvesting, drip irrigation, watershed management, laser land levelling, drainage management) aim to improve water use efficiency.
- Energy-smart interventions (such as zero till/minimum till that minimise soil disturbance) target improvements in energy use efficiency.
- Nutrient-smart practices (such as intercropping and integrated nutrient management) have the potential to improve nutrient use efficiency.
- Carbon-smart interventions (including agro-forestry, fodder management, and integrated pest management) aim to reduce GHG emissions.
- Knowledge-smart practices (such as drought-tolerant crop varieties and crop planning), and climate-resilient services (such as crop insurance and climate information-based agro-advisories) assist climate risk management by combining science and local knowledge.[xii]

The growth in practices associated with CSA has led to an evolution towards 'broad' CSA practices, which relate to on-farm and value chain activities, and 'narrow' CSA practices, which relate to specific production capacity enhancement on-farm activities.[xiii] A summary of the types of general on-farm CSA practices are provided in Annex 1 as an example.

Policy contexts matter

There are important policy contexts that will determine the extent to which CSA is formally used as a term and practices are used to support national agricultural policy. For example, some countries in sub-Saharan Africa have detailed policy contexts which call for CSA to be the guiding approach to agriculture in food security. Ethiopia, for example, has a 2020–2030 CSA Roadmap focused on the different pillars of CSA in the context of climate variability in the country. The Roadmap integrates the sub-sector policies for the country (such as watershed plans) and global monitoring systems (such as NDCs). Non-governmental organisations (NGOs) can play an important role in supporting the government's visions of CSA policy frameworks, and doing so can help generate traction in CSA projects. When there is no clear type of agriculture practice defined in a country policy or pathway, the broad pillars of CSA offer NGOs such as World Vision sufficient areas of focus to support one of the many development priorities of a country.

The development challenges and opportunities of specific contexts will determine the nature of CSA and what gets prioritised. For example, fragile and conflict-ridden countries will likely need a unique set of strategies that focus on the most immediate needs (likely to be forced migration, food insecurity, and hunger). Yet a broader question arises as to the extent to which some conflict is driven by underlying climate impacts (such as drought), and whether CSA can be a strategy for contributing towards addressing some of the root environmental sources of conflict.

The food insecurity context will likely influence the overall goal of implementing a CSA intervention. For example, Pacific Island countries are undergoing rapid food systems transformation, causing a deterioration in diet quality and making the triple burden of malnutrition – where undernutrition, overnutrition and micronutrient deficiencies coexist within the same population – a major issue.[xiv] Food production systems of smallholder farming families are increasingly threatened by the accelerating impacts of climate change, making food security more precarious. This means that the agricultural practice selected will be guided by this development context, and may generate trade-offs in achieving the different pillars of CSA.

Purpose and intended users of these guidelines

The purpose of these guidelines is to assist in the design and implementation of CSA programming.

These guidelines provide principles, practices, and approaches that can help adapt the CSA focus, depending on the country context, government policy priority, and donor and funding priority. Principles draw from insights generated across nine focus group discussions (FGDs) with World Vision livelihoods staff from multiple regions (see Annex 2 for details).

The intended users of this guide are World Vision technical managers and technical advisors with focus on agricultural, livelihoods, or natural resource management (NRM) programming based in field, regional, and support offices. These staff are at the interface of working with in-country field staff, and the government counterparts and funding agencies that development agencies work with.

The participants applying these guidelines are ultimately the many smallholder farming families that development agencies work with through their various agricultural development, health, and climate change projects and programmes. Farmers' agricultural practices are at the interface of adaptation to climate change impacts and mitigating agriculture-based GHG emissions. Improvements in the effectiveness and efficiency of the CSA activities can also support the adaptive capacity and resilience of farming households – beyond farming practices. These guidelines therefore aim to support holistic efforts to build resilience of the communities that development agencies work with.

This principles-led approach provides broad and practical programming guidance, rather than a technical guide detailing CSA actions. A second step towards CSA programming would be for field offices to then develop their own context-specific CSA strategy and technical guide, using these principles to devise practical CSA options relevant to their sub-national agroecological contexts and in line with national priorities. A CSA online workshop is under construction to support these steps.

A number of existing online modules on the technical aspect of CSA already exist, led by international agencies such as FAO and the Consultative Group on International Agricultural Research (CGIAR). These are listed in Annex 3 for further reading, and are intended to complement these guidelines, which focus on principles for a child well-being oriented organisation.

Box 2: World Vision and CSA

World Vision has made substantial contributions to different aspects of CSA through the agricultural practices embedded in projects. Between 2021 and 2022, 3.3 million farmers across 33 countries received training in World Vision programmes that supported at least one of the CSA pillars (see Figure 1).[xv] Examples of CSA activities for World Vision include:

- the use of agroforestry practices
- community-based fire and forest management
- nutrient-dense crop production
- water efficient production
- compost and biochar management
- farmer managed natural regeneration (FMNR)
- permaculture practices.

A review of six World Vision investments across Africa, Middle East, and Southeast Asia found that CSA for World Vision is very diverse, and there is no 'one size fits all' approach to CSA. Rather, as an international NGO, World Vision can support locally relevant agricultural CSA practices with entry points targeting livelihoods, market access, scientific knowledge, and traditional knowledge integration.

World Vision recognises that environmental degradation and climate change are key accelerators of extreme child vulnerability. World Vision believes that integrating environmental stewardship and climate action into all its work is critical to achieving its strategy. Consequently, these guidelines align with the child well-being outcomes as identified in World Vision's ***Regreening Communities Handbook***, which emphasise:

- children's valuing of the environment
- generating hopeful visions of the future
- supporting adequate nourishment
- creating enabling environments for parents and carers to care for their children.

World Vision International's Environmental Stewardship Management Policy, being enacted through the Global Centre's Environmental Sustainability & Climate Action (ESCA), aims to ensure that World Vision programmes, operations and facilities, advocacy, communications, and marketing activities contribute to improved natural environments, while minimising impacts that may affect the well-being of children, their families, and the communities being served. CSA is the set of technical practices through which environmental stewardship is incorporated into agri-food development programming. CSA practices also provide a means to respond proactively to environmental safeguarding assessments, thereby ensuring positive environmental impacts and minimising the impacts from degraded environments and climate change on vulnerable children.

Box 3: Project models: Building Secure Livelihoods (BSL) and Regreening Communities (RGC)

World Vision is a complex institution with a combination of core project models (CPMs), approaches, and technical practices used to design and implement projects and programmes. Project models are conducted within area programmes funded by the child sponsorship project and finance stream. Some regions, such as the Middle East and the Pacific, and several fragile context countries, only implement grant-funded projects (public and private donors) and do not solely rely on CPMs. This complex institutional environment makes situating CSA within a specific model challenging, as CSA is a cross-cutting way of managing agriculture and climate knowledge which can support different models.

These CSA guidelines present two CPMs as relevant to CSA – Building Secure Livelihoods (BSL) and Regreening Communities (RGC). These two CPMs are selected given they are major contributors to World Vision investments. World Vision estimated in 2023 that 158,000 smallholder farmers have been trained in improved and sustainable agricultural and natural resource management (NRM) techniques, which BSL promotes to support increases to sustainable agricultural production.[xvi] RGC is a newer model (2023); however, World Vision has supported over 1,000 environment and climate action projects which have direct links to the processes and practices of RGC, including 100 projects in agroforestry and FMNR and 630 projects in CSA.[xvii] This scale of investment makes the models relevant for embedding CSA approaches and practices in future World Vision agriculture activities.

The goal of BSL is to contribute to improved child well-being through improved household food security and livelihoods generation. To achieve this goal, BSL targets the marginal poor (households outside extreme poverty but slightly below or above the international poverty line) through an ordered process of sequenced and layered activities, which allow for gradual progression along a continuum of interventions.

BSL links to CSA through its link on the improved livelihoods and food security lens – a direct link to the 'Food Security and Productivity' pillar of CSA. BSL has a strong focus on productivity, linking to markets and supporting incomes for farmers. Such productivity increases to support livelihoods may be accompanied by CSA practices (and adequate support systems from government, private sector actors and financial institution) to enable communities to boost their production and meet market demands. BSL also has a 'Green Growth' pillar, which builds in environmental sustainability and resilience building in the context of climate change. As such, CSA fits within this Green Growth pillar of BSL. The BSL stages begin with the integration of environmental and climate assessments. This involves assessing climate risks, potential negative impacts to environment, followed by identifying potential interventions and practices, this includes mapping CSA practices and green opportunities as potential solutions complete with benefits and trade-offs. Additionally, potential market partners are identified to collaborate with in advancing these initiatives.

RGC has an explicit environmental angle, and builds from World Vision's experiences in FMNR. RGC is a community-led environmental restoration approach that seeks to be both socially inclusive and support environmental management and landscape restoration through participatory processes. In terms of connections to CSA, the focus on improving environmental performance of agricultural systems can align well with both mitigation and adaptation pillars. Several agricultural activities in both these pillars have the potential of aligning with RGC. The RGC process involves identifying and implementing regreening approaches, with communities able to implement their own local practices or select from a toolbox of approaches, which includes many CSA practices.

See Annex 4 for details on how to measure CSA from a World Vision perspective.

Table 1: Examples of links between project models and three pillars of CSA

	Productivity & food security	Adaptation	Mitigation
Regreening Communities	Both CPMs have clear contributions to livelihoods and food security. The focus on empowerment, market access, and productivity from agricultural systems directly contribute to this pillar.	Biodiversity and ecosystem conservation are demonstrated to provide buffers to future climate shocks in agriculture landscapes. Regreening includes a range of adaptive agricultural and environmental strategies.	Agroforestry, FMNR, silvi-pasture, mangrove restoration and other regreening practices have large potential for contributing to carbon sinks and stocks. Practices that reduce rates of land clearing (e.g. Indigenous Community Conserved Areas) may also support mitigation efforts.
Building Secure Livelihoods		BSL focuses on incentives and benefit systems that lead to behaviour change towards adaptation, mitigation, and environmental practice in production systems. By focusing on a specific issue (e.g., drought), BSL can then work with the right actors to enable adaptation to the issue identified.	BSL has a focus on working with both household and market systems as pathways for change. This enables a focus on practices that may offer long-term emissions reduction, for example the use of bio-fertilisers or the increased use of seedlings towards reforestation.

PRACTICES AND PROCESSES FOR CONTEXT-SPECIFIC CLIMATE-SMART AGRICULTURE

CSA is needed when an agricultural landscape, commodity value chain, farming facility, community, or national government are facing a need to manage their food production and practices with the growing impacts of climate change and food insecurity. This is, generally, *any* community given the evolving and non-permanent nature of farming and markets. Conflating the climate and agricultural market system are the political and cultural contexts in which farming takes place, which can include conflict, post-conflict, and changing or fragile political environments.

CSA is likely to be a practice and process used to support national climate change objectives for national governments. Most notably, it may relate to contributions to voluntary NDCs and National Adaptation Plans (NAPs) under the UNFCCC. Some national governments may have specific national agriculture sector development plans and/or strategies that explicitly call for CSA as the focus. Previous work by World Vision on CSA, and regional engagements for these guidelines, points towards a diversity of ways in which CSA is done (Table 2). This means CSA can be guided by the pillars, key techniques, and principles, but these need to be revised and situated within local socio-ecological contexts. For example, one country may have a national CSA policy, but specific programmes and projects will need to consider the different agro-climatic zones and social conditions of an upland agricultural system versus a lowland or semi-arid agricultural system – both of which may exist within the same country.

Table 2: Examples of CSA development and implementation

Country	CSA approach and context
Vanuatu	• Climate change is expected to increase storm frequency and intensity, bringing tidal surges and inundation to low-lying areas; rises in ocean temperatures; and acidification. In Vanuatu, production and adaptation are the major objectives for CSA, and there are little incentives to do mitigation. • World Vision Vanuatu seeks to use innovative CSA practices, including agroforestry, intercropping, rotations, and new varieties, that build more climate-resilient nutrient-dense agricultural systems. Productivity gains improve the income generated through cash crops and improve access to sufficient, diverse, and healthy foods. • Further training is needed on a 'CSA minimum standard' that helps farmers better understand CSA concepts and terminology. • A supportive policy environment is yet to be generated, requiring the testing of CSA approaches alongside government to scale up promising practices.

Viet Nam	• Coastal communities will experience more frequent storm events while highland areas will experience both more intense rainy seasons and drought periods. In Viet Nam, production, adaptation, and mitigation are all important objectives for CSA. • World Vision Viet Nam has developed CSA guidelines for area programme managers to cascade CSA actions to target farmers. CSA options vary according to agro-climatic zones. Farm-based CSA practices are selected from the following categories: (1) soil fertility and plant management, (2) irrigation management, (3) access to market, and (4) access to weather information. Landscape-based CSA practices are also available, such as farmland preservation, biodiversity conservation, water management, and afforestation/forest protection. • A well-developed strategy and supportive policy environment in the country help promote CSA practices tailored to each agro-climatic zone.
Kenya	• Arid and semi-arid parts of East Africa, including Kenya, are expected to become drier with more intense rainfall in the future. In Kenya, production and adaptation are major objectives for CSA, while ensuring the uptake process deepens social cohesion; mitigation is growing in prominence with recent government initiatives sharpening carbon finance opportunity. • World Vision Kenya has a well-developed set of CSA actions guided by the government's CSA Implementation Framework (2018–2027). These focus mainly on improving adaptation to water scarcity, e.g., rainwater harvesting, FMNR/agroforestry, use of climate-resilient varieties, climate forecasting or early warning systems, conservation agriculture, mulching, drip irrigation, and others. • A supportive policy environment (CSA Strategy 2017–2026) and scaling by FAO, World Agroforestry, United Nations Development Programme and others seeks to address barriers to uptake and cross-cutting issues such as finance, equity, inclusion of women, youth and vulnerable groups, research, and human resource development. However, barriers continue to hamper widespread dissemination.
Colombia	• Colombia is expected to be severely impacted by climate change: faster glacial melt in the Andes will exacerbate water level fluctuations, increasing both wet-season flooding and dry-season water scarcity. Shifting rainfall patterns, rising temperatures and weather extremes will increase frequency of droughts, floods, and landslides. Sea level rise also poses a danger to coastal communities. Production and adaptation are major objectives for CSA; carbon-financed mitigation solutions remain elusive for small-scale farmers. • World Vision Colombia seeks to grow adaptation (to water scarcity) and production through regenerative or climate-smart practices, improving market access to support livelihoods, but also needs to find ways to do this while managing emissions. A restorative CSA approach, rather than extractive, and focus on agro-biodiversity are being prioritised. • Government strategies and investments have tended to focus on productivity, particularly on use of agroforestry and organic systems, primarily for shaded coffee. Opportunity exists to foster adaptation and mitigation options for smallholders.

Productivity and food security

Food and nutrition security, as defined by FAO, is a situation that exists when all people at all times have access to safe and nutritious food. Increasingly, there is a recognition that achieving this objective requires explicit integration of climate change and sustainability actions. With over 700 million people facing hunger and malnutrition,[xviii] it is critical that future agricultural interventions continue to support food and nutrition security. Not doing so can perpetuate inequalities associated with poor health outcomes, including reduced brain development, workforce participation, and long-term pressures on health systems.

World Vision's mandate on child well-being has allowed for a strong focus on this pillar of CSA through multiple projects and programmes.

Both project models selected here have direct links to livelihoods and food security. BSL has a strong emphasis on markets, production, and incomes – all factors that can improve food security, notably when associated with exposure to healthy food environments and accessible healthy food choices. RGC has a strong focus in supporting environmental management both on-farm and at a landscape scale. This can support increased agro-biodiversity on community land, farms, and home gardens in many developing country contexts, providing opportunities for increased income and diet diversification. The increased pressure of climate impacts on traditional farm systems and the agriculture practices associated with World Vision projects will need to be explicitly factored in to determine their impact on food and nutrition security for beneficiaries. Further considerations are provided in Table 3 below.

Table 3 : Some considerations, actions, and resources for the productivity and food security pillar

Considerations	Actions
• What is the nutrition and food production context of the communities where CSA is going to be implemented? • What farming practices can be implemented that address the nutrition context and livelihood needs of the population? • What are the relevant private sector inputs needed to enable any productivity gains on farm? • What is the market demand for the potential gains in productivity? • What are the landscape conditions influencing increases in productivity? • What are the historical trade, policy conditions, and social structures that have inhibited and/or enabled productivity?	• Review Ministry of Agriculture relevant agriculture and livestock census data • Review relevant child and adult population health surveys • Answer production trend questions through the FAOSTAT databases • Workshop with communities, local NGOs and businesses on the state of the food system and how to strengthen climate resilience • Determine the debt, loan, and financial conditions of communities associated with agriculture • Monitor commodity prices and market fluctuations **Resources** Global Nutrition Report[xix] FAOSTAT[xx] Food Systems Country Indicators Dashboard[xxi]

Adaptation

Adaptation in agri-food systems requires changes in practices that respond to the variability, intensity, and uncertainty associated with the impacts of climate change. These climate impacts may manifest themselves not only in biophysical changes in the system, such as temperature extremes, new pests and diseases, precipitation, and winds, but also in changes in infrastructure – for example destruction of shelter and roads or damage to soil quality, nursery, greenhouse, and irrigation systems. Climate impacts also affect social systems, for example in the reduction of time available to plant, sow, and harvest due to extreme temperatures, or changes in food consumption patterns or household income due to reduced physical market access from road disruptions.

The complex nature of climate impacts means adaptation strategies in agriculture systems need to be embedded in CSA interventions. To do this, it is important to consider the context of the commodity and/or production system in which adaptation will need to take place. The agro-climatic diversity in which World Vision works points towards the need for CSA to support adaptation across commodities and food assets (such as seeds, livestock, trees) and farm infrastructure (such as irrigation systems, food storage facilities, livestock shelter, etc).

Adaptation also needs to take place in the social systems that interact and are impacted by changes in the farm system. This includes changes within households and/or communities that can support the management of new farming techniques and seed and livestock varieties introduced in an adaptation strategy. It also relates to knowledge services that can support understanding of climate adaptation, notably early warning systems and their associated impacts on farms and livelihoods. Adaptation strategies can also be embedded within the institutional and legislative systems that may exist in some countries. Notably, this may relate to building adaptation strategies into in agricultural insurance schemes.

On-farm production, infrastructure adaptation, and social systems adaptation are highly nuanced, with well-established bodies of knowledge with a large body of evidence behind them. Developing adaptation strategies for a CSA activity thus needs to consider the questions presented in Table 4, with suggested actions provided to support progressing CSA.

While the impacts of climate change will be diverse and uncertain, the reality is that some element of adaptation will need to take place in all communities globally. The nature of this adaptation will vary widely. CSA practices will need to consider the current and future contexts of climate change to determine the extent to which they will be able to support adaptation in the long run.

Table 4: Some considerations, actions, and resources for the adaptation pillar

Considerations	Actions
• What are the observed and projected changes in climate that are and will continue to affect agriculture in the selected location? • What needs to adapt and at what scale, from individuals to households and government policies? • What is the extent and nature of the adaptation? Is it rapid (are the adaptation measures catching up with the rate of increasing climate impacts)? Is it transformative? Over what timeframe? • Who is responsible for both adapting and facilitating the adaptation? What are the roles and responsibilities in the adaptation process? • What are the possible risks of maladaptation, that is, the risk of perpetuating existing inequalities or creating unintended negative impacts from an intervention?	• Identify and apply existing climate impact models and projections for the country and/or commodity • Existing reports and documentation from aid programmes and projects in agriculture • Climate vulnerability and capacity assessment • Political economy analysis • Stakeholder and power analysis • Conflict analysis **Some resources** Resilience, Adaptation Pathways and Transformation Approach[xxii] Strengths based and systems resilience approach (Gero et al., 2024).[xxiii] Inter-sectoral impact model database[xxiv] Asia-Pacific Water Security Risk Index[xxv] Political economy toolkit (Harris, 2013)[xxvi] EU's Climate Data Store[xxvii] World Bank's Climate Change Knowledge Portal[xxviii] Climatelinks global knowledge portal[xxix]

Mitigation

There is a potentially large contribution World Vision can make towards mitigating the negative climate effects of agriculture through improved farm practices and agroforestry techniques. Emissions within farm gate and land expansion for food production account for 16–27% of total anthropogenic emissions. These emissions are largely caused by land clearing and intensive farming systems, while smallholder farmers of 2 hectares or less are estimated to make up 31% of the total emissions for land expansion and agriculture. Smallholder farming is estimated to contribute 5% of total global emissions.[xxx] The combination of biochar production, landscape conservation practices, and crop rotation are all important aspects of World Vision projects.[xxxi] With a sound business case, adequate agronomic extension, and leveraging traditional mixed farm systems knowledge can support the building of carbon stocks in trees and soils. The increased focus on carbon markets as an avenue for income offers an additional opportunity for linking farm systems management with livelihood generation and can also contribute to countries' NDCs. The increased focus on rapidly reducing emissions to stay within a 2.5 degrees emissions scenario makes mitigation an important pillar with co-benefits to the smallholder communities World Vision works with.

CSA is often associated with farm practices, yet there are also wider emissions beyond the farm including transport and waste which account for 5–10% of total anthropogenic emissions.[xxxii] As World Vision project models, such as BSL, deal with market access and distribution of food, there is a potential to expand mitigation activities to include post-

farm gate emissions reduction. For example, this could include a focus on energy efficient cooling and transport, or paying attention to the types of machinery (such as solar powered pumps) and infrastructure used for food processing and value adding, and their associated energy sources. Mitigation considerations are indicated in Table 5.

Table 5: Some consideration, actions, and resources for the mitigation pillar

Considerations	Actions
• What is the emissions profile of the agriculture system being targeted? • Are there 'beyond farm' emissions that need to be considered? • What is the extent of chemical use as farm inputs, and what are the emission implications of this? • How will mitigation efforts be measured and over what time frame? • What are the social equity implications of engaging in carbon markets associated with agriculture? • How does the CSA practice contribute to the country's NDCs and other international climate agreement targets? • Are there CSA-related carbon markets relevant to the country, and what are the costs or benefits to farmers? • Can mitigation outcomes be readily achieved by working with farmers and private sector to reduce waste and loss?	• Engage with country climate and agriculture experts • Relevant synthesis report prepared for UNFCCC annual conferences • Climate Transformation Pathway workshops • Nationally Determined Contribution activities **Some resources** Food Systems Dashboard – Emissions profile[xxxiii] Resource Watch Food System Emissions Database[xxxiv] FAOSTAT Emissions Portal[xxxv] GHG emissions from food systems, by gas World Bank database[xxxvi] Community-based adaptation processes, such as through the use of Climate pathways workshops[xxxvii]

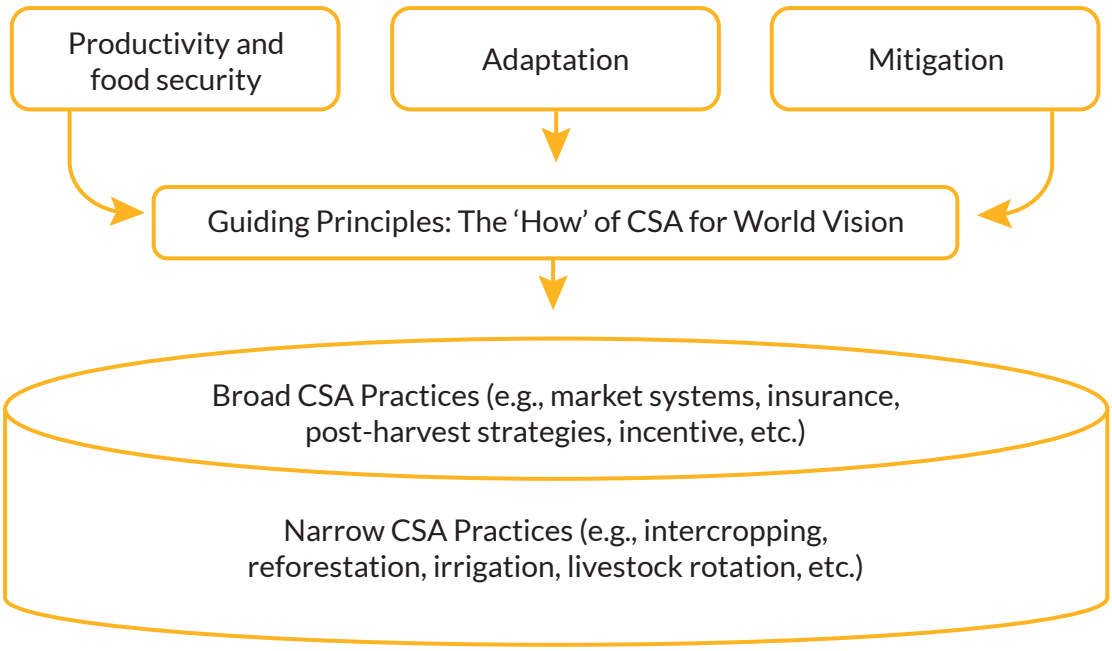
PRINCIPLES FOR CLIMATE-SMART AGRICULTURE PROGRAMMING

Developing CSA activities requires a combination of social and policy knowledge, scientific understanding of climate science and agriculture linkages, and ability to work across scales. It also requires a thorough knowledge of locally appropriate agricultural approaches. This section provides principles for managing the policy, science, and scale interactions associated with CSA. The principles point towards the process for developing and implementing locally appropriate CSA, and are informed by a combination of systems thinking, participatory development, and strengths-based approaches that can support salient, credible, and legitimate knowledge for CSA. Guidance is also provided on how to enact the principles, to provide an action-oriented approach to CSA implementation.

This set of guiding principles inform the selection of 'smart' activities within the extensive lists of broad and narrow CSA practices (with some further reading provided in Annex 3). The focus on principles is to help inform the *how* of *CSA* behind the implementation of practices (the *what* of CSA) in a project for World Vision. Figure 2 shows a representation of how the CSA pillars, the guiding principles, and the 'basket' of narrow and broad options come together.

There are abundant 'checklists' for the types of practices associated with CSA. In a synthesis, Li et al. (2024)[xxxviii] organised the CSA practices to fit across broad and narrow categories based on existing evidence. Broad practices include more systems-oriented factors, such as engaging with insurance systems, marketing processes, livelihood adjustments, and commercialisation. The 'narrow' definitions of CSA focus specifically on on-farm activities associated with crop management, farm systems, irrigation, pest and weed management, and livestock management.

Figure 2: Guiding principles and their role in supporting CSA implementation



Principle 1: Diverse actors in the food system need to be involved in CSA design and implementation

As previously noted in this document, the main participants of CSA interventions are often the smallholder farmers who are at the interface of adaptation, mitigation, and livelihoods development. While many projects are developed in response to 'top down' direction (such as donor funding calls or government priorities), these directions intersect with the contextual realities of countries (for example, hunger or landscape degradation). For this reason, including a diverse set of stakeholders is important to support effective CSA implementation.

In developing a CSA project or programme, it is critical to involve groups described in Table 6 as examples of stakeholders relevant to the food system of interest. These stakeholders can be involved in different stages of the CSA project cycle and may have different questions asked of them throughout the process. Table 6 presents core stakeholders relevant to CSA. However, others may be included depending on the context. See also the Regreening Communities Handbook[xxxix] for complementary stakeholders to involve. As can be seen in Table 6, emphasis is placed on local and national actors being involved in CSA from design phase to enable and enhance locally led development.

Table 6: Stakeholders and their role in CSA implementation through World Vision

Who	Why	How to engage	When to engage	What to ask?
Climate and agricultural science advisors	These may not be World Vision staff, rather they may be from universities or government scientific agencies and may need to be contracted to support the inclusion of climate and agriculture science into the project design.	Build relationships with these actors such that there is mutual value of engagement, and a growing understanding of each side of the relationship. Aim to maintain relationships over time for ongoing exchange of information and to continue to build trust and understanding.	Early on in the CSA design to ensure the science is embedded in the CSA project from the beginning.	Seek summarised, usable information on the impacts of climate change on major agriculture sectors. Ask: how will these crop/livestock/water systems change in the future? What is the level of uncertainty? What is the risk to food security? What usable information is available to smallholder farmers?
Representative groups within communities, including farmers, women, people with disabilities, faith leaders, and youth groups impacted by the CSA intervention	Farmers are the main participants of intervention, but also greatly feel the impacts of climate change and economic shocks. While it may be unfeasible to include all farmers, there are likely to be farmer organisations and groups that understand the context of where projects will be rolled out. In some countries, women's groups play an important role in understanding the pressures and contributions women make to household food security and farming. Explicitly including them is important to help improve the gender and social inclusion dimensions of the project, as well as the ongoing sustainability of project activities beyond the life of the project.	Draw on World Vision's existing relationships with communities and leverage existing connections with community and faith leaders.	In the design phase of the CSA intervention. It is critical that CSA interventions have community and farmer ownership and buy-in. Early discussions with the community will enable the design to align with community priorities. Ongoing community involvement in implementation as well as monitoring and evaluation will help to enable ownership of activities, with the aim to build sustainable approaches that the community can embed in their practices.	These groups will be at the core of farming and climate change. Ask them: How are your group members being affected by climate impacts? What strategies are they using to adapt/mitigate? How are they managing the changes in markets and climate?

Who	Why	How to engage	When to engage	What to ask?
Relevant government policy bodies	Government representatives are important to provide linkages to the government policy context, and to ensure alignment with existing government programmes.	Build on existing relationships World Vision holds with government. If these relationships do not exist, discussions can begin by considering how the CSA intervention can support government's agricultural or development priorities.	In the design of CSA activities, after consultation at the community level has taken place and the local priorities have been mapped to government priorities. Ongoing engagement throughout implementation will enable the sharing of findings, results, and outputs and provide opportunity for government to take on lessons learned into their own policy and practice.	What are the relevant agricultural programmes and policies at the moment? How is CSA being implemented? What are the priority sectors and how are they being affected by climate change? How is climate change integrated into your agricultural policy?
Agricultural extension services	Extension services are often at the interface of government policy and farmer engagement. While extension services may be limited in some parts of the world, they are important in influencing the types of farm practices used by farmers.	Actively engage them in the defining and engagement of farming interventions. Work with them to determine how farmers will be involved in the planned interventions.	At the design stages, when engaging with government stakeholders. They also need to be involved throughout the project.	What the current strategies used to support farmers' learning about climate impacts on their crops/livestock/ livelihoods? What ongoing support mechanisms exist to support farmers as they adapt their practices? What anticipatory measures are in place to prepare for potential climate impacts? How much is the changing market and consumer behaviour influencing extension activities?

Who	Why	How to engage	When to engage	What to ask?
Private and finance sectors (e.g., formal and informal financial institutions)	The private sector can be catalysts in supporting CSA activities, ranging from providing inputs and resources to linking farmers with consumers. Private sector engagement is key to the sustainability of the intervention.	Explore the range of private sector actors relevant to the intervention at local and regional levels (drawing on farmer and community insights), and aim to build relationships with key actors. Engagement will vary by commodity system and purchasing power of farming communities.	Early in the CSA design process, to ensure appropriate linkages between farmers and private sector are embedded in the design. These actors should also be involved throughout the implementation process, including monitoring and evaluation to assess the outcomes and impact from their perspective.	What are the private sector incentives supporting climate-smart techniques in farming, logistics, and food storage? How is climate change impacting the viability of different private sector industries? What strategies can be developed to support increased demand for climate-smart technologies?
Donors	Donors play a critical role in grant funded programmes. They set budgets and priorities that align with the country focus on agriculture and climate change.	Tactfully and strategically through ongoing projects and communities of practice. Donors will have multiple priorities so having targeted focus points will be important.	It depends how donors work. Some are very distant from investments, others like to be involved and on the ground. Technical advisors who maintain relationships with donors can engage them continuously and deliberate CSA and how it fits into current and future funding opportunities.	How is climate mitigation and adaptation embedded in existing livelihood and agriculture programmes? What is the current food security strategy in the context of climate change for your government? How are you working with local actors to support climate action in aid activities?
Local civil society organisations (CSOs) or NGOs	Collaborating with other CSOs and NGOs working at the community level is beneficial for many reasons. Sharing insights, combining resources, reducing the burden of community participation and avoiding duplication are just some of the reasons why working collaboratively is good practice at the local level.	Regular meetings with other organisations working in communities can build awareness of ongoing activities and also build relationships and trust for the benefit of all.	Early on in the CSA design process to ensure World Vision investments are building on existing activities, leveraging strengths, and avoiding duplication. Ongoing collaboration can provide the means to continue to share information, insights, and resources where possible.	What are the aims of your organisation, how do you seek to create change in the community, and what is the focus of your investments? Who are you working with and what has been successful in the ways you have worked with the community so far?

Principle 2: Allow contextual factors and local priorities to guide the design of CSA activities

Contextualising the CSA intervention was a dominant point of discussion throughout all FGDs undertaken for the development of these guidelines. There are three factors associated with working within the local biophysical and socio-political context in which CSA is done.

The first factor relates to **policy and political context**. Countries vary widely in the extent to which they have explicit national policy prioritisation related to CSA. For example, in Colombia, the national agriculture ministry has articulated a focus on energy transition in intensive agricultural systems, and improving agroforestry and organic farm systems. These all align with a prioritisation of CSA. Contrastingly, other countries may not have a CSA-specific policy direction or may focus on one pillar over others. Fragile contexts will have circumstances that require CSA to be considered in sensitive ways that take trade-offs of different choices into account for different stakeholders. Contextual differences will be likely influenced by the development context of the country, a country's international commitments (e.g., under the Paris Agreement), and the political economy of development, climate, and agriculture. The development context of a country can also shape the value chain and commodity context as well, which also connect to the second factor described below. For example, in Solomon Islands, there is a very strong focus on livelihoods, productivity, and food security objectives.

The second factor in working contextually relates to the **landscape and agro-climatic context** of the country and its sub-regions. Some countries have hugely diverse agro-climatic zones, for example Uganda with 10 different agro-climatic zones with altitudes ranging from 351 to 3,962 meters above sea level and 8 to 33 degrees Celsius.[xl] This means that planning for CSA interventions in a country will need to consider this diversity and determine adaptation, mitigation, and food security strategies that are relevant. An additional factor is understanding the future climate projections associated with the agricultural activity that will be supported – to minimise the risk of unintended maladaptive outcomes for a crop/livestock system that may be vulnerable to future climate shocks.

The third factor is to **understand the dominant sustainable agriculture narrative** most prevalent where CSA is being implemented. This is because there are multiple agricultural narratives, such as agroecology or regenerative agriculture, that try to balance environmental management with greater equity and food security outcomes. Addressing climate change is increasingly core to many sustainable agriculture strategies. CSA can include a suite of complementary practices, such as integrating conservation agriculture with FMNR, providing an opportunity to build adaptive capacity, manage mitigation efforts, and improve livelihoods and food security. CSA's three pillars are already embedded in other sustainable agricultural narratives – for example regenerative agriculture's soil carbon focus, conservation agriculture's focus on low-tillage, agroecology's focus on social justice and well-being, and sustainable intensification's focus on productivity increases within biophysical limits.[xli] CSA, as implemented by World Vision, can be fluid and uses the three pillars as a guidance for working with more dominant agricultural narratives in the places where activities are to be implemented. (Further details may be found in World Vision International ESCA's Discussion Paper on Sustainable Agriculture Terminologies Report.[xlii])

There is increasing evidence of the role of traditional and indigenous knowledge and the

role this knowledge can play in revitalising ecosystems. Traditional practices are also more likely to align with value systems and decision-making processes that are relevant to indigenous communities. Agroecological practices in Latin America, for example, have deeply rooted links to traditional knowledge and practices that have managed environmental change. While this knowledge can be crucial in CSA, the uncertain and urgent realities of climate change impacts, and the associated science, will need to be embedded in activities to ensure genuine action is taken towards climate mitigation and adaptation. Table 7 below provides some contextual and local considerations.

Table 7: Some considerations, actions, and resources for local contextualisation

Considerations	Actions
• What are the current agriculture and climate change national policies, strategic plans, and political statements for the country? • Where are we in the political election cycles and the potential implications for policy shift during CSA design? • What are the UNFCCC commitments the country has made related to adaptation and mitigation (e.g., NAPs and NDCs)? • How can we find and use existing agro-climatic zone maps or databases to help support selection of sites for CSA? • What is the food and nutrition security status of the country? • How can principles of locally led development be applied in the country? • What are the dominant agricultural narratives in the context you are working in? • What are the major civil society and business groups working in agriculture? • What existing agriculture practices are being supported and how do they align with CSA?	• Climate projections scoping study on target agricultural sites • Check vulnerabilities to natural hazards or anticipated impacts from climate change • Use principles of locally led development to leverage local capacities and experiences in the sector • Political economy analysis • Workshops and interviews with community leaders, lead farmers, and farmer groups in agriculture projects
	Some resources World Vision/Institute for Economics and Peace Multidimensional Child Vulnerability Tool[xliii] Natural hazards and climate risks online tool[xliv] Narratives of agriculture review (Bless et al., 2023)[xlv] Principles for locally led adaptation (World Resources Institute,[xlvi] International Institute for Environment and Development[xlvii]) Political economy toolkit (Harris, 2013)[xlviii] Global Nutrition Report[xlix] Food Systems Country Indicators Dashboard[l] The Actor and Policy Mapping Tool (Hans et al., 2020)[li] Climate Risk Country Profiles (World Bank)[lii]

Principle 3: Embed gender equality, disability, and social inclusion throughout CSA activities

Agricultural development has a long history of engaging with concepts of gender equality, disability, and social inclusion (GEDSI) as crucial contributors to food security outcomes. Men, women, and children are all influenced by the food-related decisions made – from what to produce, when to harvest, what to eat, and how to cook and consume food. These choices are often influenced by the broader systemic structures that determine gender and disability outcomes – such as land titles and rights, eligibility for grants and social protection systems, legislative systems, and formal and informal workforce participation.

While further work is still needed, there has been substantial progress in the development sector on recognising the role of GEDSI approaches as crucial for equitable adaptation outcomes. There is extensive evidence of how men and women are affected by, and respond to, climate shocks depending on specific socio-economic and cultural contexts.[liii] There are also different ways in which men and women get access to climate information to implement on farms, generating divides in climate knowledge use.[liv]

The livelihoods and food security pillar is significantly affected by the extent to which women's capacity and agency are embedded into CSA design, and broader gender factors are considered. For example, with the increased pressure for households to diversify their income sources, it is traditionally men who engage in off-farm jobs. This amplifies the role of women in farming, harvesting, and food-related activities, contributing to the global feminisation of agriculture trend.[lv] Due to commonly prevailing gender roles, supporting child-well-being is often linked to the ability of women and carers to balance household duties, income activities, and the increased role they play in agricultural production and marketing. Critical reviews of the gendered nature of technology-driven CSA programmes and projects point towards the risk of such interventions perpetuating, rather than transforming, the underlying structures that maintain gender roles in agriculture.[lvi] This calls for processes and actions that explicitly draw from gender studies and practice into CSA design.

Disability-inclusive climate change adaptation, and indeed CSA, is a relatively new and emerging area of focus in the development sector. People with disabilities are affected disproportionately by the impacts of climate change, and yet they are routinely excluded from national to local planning of solutions to the climate crisis.[lvii] World Vision can support progress in disability-inclusive CSA by enabling participation of people with disabilities in initial CSA design and ongoing community consultation, as well as monitoring and evaluating progress and outcomes.

Inclusion of indigenous and other marginalised or minority groups in CSA is also an area where World Vision can aim to progress. By working with communities, and recognising the diversity within communities, World Vision can progressively improve the participation of different groups that exist at the local level for inclusive CSA activities that leave no one behind. Table 8 highlights considerations and actions for gender equality, disability and social inclusion throughout the implementation of CSA.

Table 8: Some considerations, actions, and resources for GEDSI

Considerations	Actions
• How can the important and diverse roles women play in agriculture be better reflected in CSA activities? • What is needed to shift the women's vulnerability assessment bias in development towards an assets, strengths, and capacities focus? • Can more be done to proactively seek out the views of people with disabilities when consulting communities about CSA? • Have considerations been made to include people with disabilities in CSA implementation? • Have other aspects of social inclusion been considered when working with communities, and have indigenous, marginalised and other minority groups been engaged in all CSA activities? • Is there a role for a gender and development expert consultant or staff member, with experience in agriculture projects, to support the design of activities?	• Explore and document the differentiated roles of men and women in agri-food systems where CSA initiatives are to be developed, such as by conducting a GEDSI assessment. • Determine how adaptative capacity will be supported among different members of society. • Assess the progress of World Vision's GESI continuum (i.e., Integrating, applying, strengthening, and promoting) to achieve GESI transformative programming in managing climate impacts as individuals and as groups. **Resources** Framework for Gender and Socially-Inclusive Climate Resilient Agriculture (Huyer et al., 2021)[lviii] Gender at work framework (Rao and Kelleher, 2005)[lix] 'Tinker-Tailor-Transform' gender assessment typology (Lawless et al., 2022)[lx] Techniques and tools for monitoring, evaluation and learning, with strong GEDSI focus (UTS-ISF, 2019)[lxi] Gender Equality and Social Inclusion (GESI) Approach and Theory of Change (World Vision, 2023)[lxii] GESI in Design, Monitoring, and Evaluation Training Manual (World Vision, 2023)[lxiii] GESI-Responsive Food Security and Livelihoods (FSL) Programming Reference Guide (World Vision, 2022)[lxiv]

Principle 4: Integrate anticipatory risk management in CSA

Risk management has been an ongoing approach to mitigating the impacts of natural disasters for decades. With the accelerated and uncertain impacts of climate change, disaster risk reduction (DRR) increasingly focuses on the use of climate projections to determine potential risks to assets, communities, and social structures. Integrating climate risk in food systems relates to consideration of the possible or anticipated impacts of climate shocks and stresses on the inputs supply chain, production, harvesting, storage, and marketing of food. Impacts on these parts of the food system can affect livelihoods, ecosystem integrity, and consumption habits. Building awareness of anticipated climate risks builds resilience in agricultural systems. Underscoring all discussions of risk management should be a recognition of the need for communities and farmers to be at the centre of identifying and describing risk, given the outcomes of risks are context specific. Furthermore, risks may be perceived differently across the community, therefore it is important to consider diverse GEDSI perspectives when identifying risks at the local level.

Given CSA deals, at its core, with agriculture and marketing outcomes, embedding climate risk thinking and practices is important. One way of doing this is drawing from the established field of seasonal forecasting to determine the potential impacts of future climate on the CSA intervention being developed. An evolution of seasonal forecasting has been the use of early warning systems (EWS) and linking them to scenarios and impact profiles for agricultural commodities. Much of this work is often technical and fails to communicate the messages in an accessible manner to farmers and field officers in development agencies, reducing the potential positive benefits of having early warning systems in the first place. In developing CSA programmes, notably multi-year interventions where seasonality impacts cropping and livestock herding approaches, the use of early warning systems would be beneficial. In situations where climate models have high uncertainty (e.g., rainfall may increase, stay the same, or decrease), diversification of livelihood options and commodities may be an appropriate risk management approach to build foundational adaptive capacity.

Risk is not only environmental and climatological. Social risks also exist when individuals, communities, and institutions are exposed to external shocks and stresses. A clear example of this was the mobilisation of social protection measures for food systems and food security during the initial COVID-19 lock-down responses. Without such social responses, the food insecurity (and potential conflict) risks could have been severe. Household risk is also continuously managed by farmers, who often have limited liquid assets that can be used to respond to a shock. Furthermore, the limited uptake of agricultural insurance continues to create risks for assets and crop failures in many countries.[lxv] Climate change-driven scarcity of resources or other factors may result in conflicts that can hinder CSA implementation. Monitoring such developments and nurturing peace among communities is key for the success of CSA. Undertaking risk analysis (environmental and social) is thus an important component of implementing CSA by using some questions and resources presented in Table 9.

Table 9: Some considerations, actions, and resources for risk management

Considerations	Actions
• What are the potential environmental and social risks that may eventuate if a climate (or unexpected) shock affects the programme? • Can opportunities be created to discuss what 'risk' means with diverse community members, given the GEDSI component of risk perception? • What options are possible to diversify community livelihood options and commodities as a risk management approach? • Can agricultural and climate experts be identified, who can advise on short and long-term impacts from climate forecasts? • How do different hazards and risks interact with each other (and potentially amplify the initial risk)? • Are there ways to address the issue of compounding risks? • Where do farmers access information about weather forecasting? Does this differ for men and women? • What role do national meteorological services (NMS) play in disseminating early warning systems to agricultural workers? • What role can development agencies play in facilitating dialogue between NMS, market actors and farmers to improve dissemination of early warning systems?	• Ensure the approach to identifying risks involves consultation with diverse community members and groups, including self-help groups who are recognised as a helpful way for farmers to manage risks, along with private sector actors and relevant government players (including meteorological services). • Embed early warning systems and seasonal forecasting systems as critical data sources in CSA interventions and make it a core learning and communication activity with farmers. • Undertake climate co-benefits mapping activities, and if budgets allow, build in co-benefits measuring and monitoring activities. **Resources** Early warning systems help small-scale farmers prepare for climate change (IFAD, 2024)[lxvi] CRiSTAL – Community based Risk Screening Tool – Adaptation & Livelihoods (IISD, 2015)[lxvii] Inclusive and accessible multi-hazard early-warning systems: learning from women-led early-warning systems in the Pacific (UNDRR, 2022)[lxviii] Inclusive early warning early action - Checklist and implementation guide (UNDRR, 2023)[lxix] Compounding Climate and Social Hazards Result in Different Migration Patterns around the World (Reynolds, 2022)[lxx] The economics of acting early: Evidence of climate and disaster actions in the Pacific (Australia Pacific Climate Partnership, 2024)[lxxi] Risk-informed development: from crisis to resilience (ODI, 2019)[lxxii]

Principle 5: Take a holistic systems perspective to CSA

CSA is acknowledged to be a concept that is almost two decades in development, and with accelerated climate impacts and socio-economic complexity, the focus has now turned towards 'climate-smart food systems'. This shift stems from the recognition that it is not only agriculture that contributes to GHG emissions and requires adaptative practice, but the wider links in value chains, governance, and consumption habits all require shifts to de-carbonise and support more equitable systems.[lxxiii]

A 'food systems approach' can help guide activities that target one or multiple parts of the system, and help understand the feedback and influence of changes in practices and behaviours. A food systems approach is a way of understanding the achievement of food security and nutrition security through looking at connections between production, consumption, distribution, and waste management within the climate and political environments that food activities take place. A food systems approach recognises that all the elements, their relationships and related effects need to be understood in such a way that synergies, trade-offs and interactions between elements in the system are also managed.[lxxiv] A clear example of a systems behaviour is the implications of global shortages of a commodity. If supplies are reduced (for example, of wheat) due to global conflict or environmental issue, then the market prices are likely to increase. This may exacerbate food insecurity among the cash poor who depend on wheat for their daily meals.

To work in 'systems' under CSA, programmes should consider the major variable in a food system that are interacted as follows:

1. biophysical drivers and variables: these include changes in the biophysical environment, such as anthropogenic emissions, soil quality, water availability, state of biodiversity, salinity, phosphorus availability, etc.
2. socio-economic drivers and variables: these include the political structures and policies that influence food, as well as the cultural contexts, gender dynamics, and social relations that influence who eats what and how food is distributed
3. food system activities and food system environments: these include production, harvesting, distributing, packaging, processes, distributing, marketing, consuming, and waste disposal and management
4. food system outcomes: food and nutrition security, social well-being, economic prosperity, environmental sustainability.

Building from recent World Vision analysis of CSA within projects, the practice of systems thinking – which recognises the interactions and feedback at play within a system (Box 4) – can support the design of CSA pillars within the specific implementing contexts, providing an avenue for specifying:

- what CSA is (process)
- for whom and by whom (actors and beneficiaries)
- within which climate context.

These questions on process and benefits can ultimately reduce the risk of perpetuating the inequalities and politics that may lead to maladaptive outcomes from specific interventions.

Box 4: What is systems thinking?

Systems thinking has a long history, and there are a number of ways of doing it. Broadly, systems thinking refers to the practice of thinking about the relationships between different parts of a situation, real world, or conceptual context, and the feedbacks, outcomes, and emerging behaviours that occur as the system changes through time. Complicated systems thinking relates to managing more hardware and infrastructure-based problems – for example, fixing a clock, an irrigation system, or a car. While very complicated, these systems of 'things' are bounded physically and have a limited number of parts that make the system work.

Contrastingly, complex systems thinking relates to social and environmental situations where there are multiple beliefs and attitudes, perceptions of problems, technical expertise, political contexts, and socio-economic and environmental conditions. This means that complexity is part of everyday decisions, and stakeholders trying to work in the system need to acknowledge the boundaries and limitations of their ability to influence the system. In complex systems, trade-offs and compromises are always inevitable when trying to shape the future behaviour of the system.

Food systems approaches can also support broader actions towards sustainability. One is achieving climate co-benefits. The three pillars of CSA automatically create an opportunity to support various types of benefits – such as emissions reduction, engagement with carbon markets, adaptive capacity building, and agro-biodiversity. Co-benefit mapping in the design of a CSA activity can be a useful strategy for working through the trade-offs that may eventuate from the CSA intervention. Additionally, there is an increasing focus on circular food economies and how they can deliver improved waste management, emissions reduction, and chemical-free fertilisers for smallholders. Considerations of circular economy – and the life cycle of different components of the food system – are an emerging new area for CSA. Table 10 presents considerations and actions for taking a holistic systems perspective to CSA during the design, implementation, and evaluation of World Vision programming.

Table 10: Some considerations, actions and resources for holistic systems perspective

Considerations	Actions
• What are the historical and current environmental and socio-political pressures on agricultural producers, markets, private sector actors, and consumers? • What are the landscape and biological factors (such as droughts or pest outbreaks) and also urban and infrastructure factors (such as road networks, waste management systems, and consumer purchasing habits)? • What are the boundaries around the intervention? Consider the number of technologies that will be introduced or used, the number of farmers involved, types of natural and social resources needed for the activity, and the location in which the CSA activity will be implemented. • Who are the various stakeholders involved in the 'system' at different scales (household, community, district, national, and regional)? How could or should they be involved in CSA activities? • What are the long-term emerging implications of past agricultural interventions? What have been some unintended or even negative outcome from previous work?	• Conduct a participatory mapping activity to document and visualise the various benefits/co-benefits of CSA across the food system of interest. • Identify the boundary of your system – what is within the programme's sphere of control, influence, and long-term interest. • Undertake a 'beyond the farm' visual exercise where farmers, field officers, and technical staff consider the systemic linkages to inputs and service providers, markets, consumers, policies, and environmental factors. This helps generate an initial 'food systems' diagram for where CSA fits. • Work together on a stakeholder mapping activity to identify the diverse stakeholders involved across the food system. **Resources** Causal loop construction: the basics (Lannon, 2018)[lxxv] Systems Thinking: stakeholder analysis (Castillo, 2020)[lxxvi] Food Systems Decision Support Toolbox (Posthumus, Bosselaar, Brouwer, 2021)[lxxvii]

ANNEX 1: LIST OF CSA EXAMPLES OF NARROW AND BROAD PRACTICES

Table 1-1: CSA practices under a narrow definition

Category	Practices
Crop planting	Agroforestry
	Changing cropping calendar
	Cover cropping
	Crop diversification / multiple cropping
	Crop rotation
	Crop-livestock integration
	Improved crop varieties
	Intercropping
	Mulching
	Planting trees
	Relocated crops
Farmland management	Crop residual turnover
	Formula of fertilizer and soil testing
	Green manure
	Laser land levelling
	Micro-dosing fertilizer
	Organic composting
	Organic fertilizer / farmyard manure
	Plot resizing
	Reforestation
	Ridge planting
	Soil restoration
	Zero / minimum tillage
Irrigation management	Bunding
	Contour farming
	Drip irrigation / sprinkler / small-scale irrigation
	Infrastructure development (e.g. communal pooling)
	Irrigation time changes
	Ploughing
	Terracing
	Water harvesting
Pest and weed management	Biological control of insects and diseases
	Changing timing and amount of chemical inputs
	Integrated pest management
	Non-chemical weed control
Livestock management	Improved forages
	Livestock diversity

Reference: Li, J., Ma, W. & Zhu, H. 2023, 'A systematic literature review of factors influencing the adoption of climate-smart agricultural practices', Mitigation and Adaptation Strategies for Global Change, vol. 29, no. 1, p. 2, https://doi.org/10.1007/s11027-023-10098-x.

Table 1-2: CSA practices under a broad definition

Category	Practices
Output commercialization	Branding
	Marketing
Livelihood adjustments	Livelihood diversification / diversification of income sources
	Migration
	Off-farm work participation
	Reducing consumption
	Using savings or borrowing money
Others	Reducing livestock holdings
	Agricultural insurance purchase
	Grain storage and/or destocking
	Reducing the land under cultivation (e.g. rent out cropland)
	Take assistance from the government or NGOs

Reference: Li, J., Ma, W. & Zhu, H. 2023, 'A systematic literature review of factors influencing the adoption of climate-smart agricultural practices', Mitigation and Adaptation Strategies for Global Change, vol. 29, no. 1, p. 2, https://doi.org/10.1007/s11027-023-10098-x.

Table 1-3: Matrix of good adaptation and mitigation practices in the agricultural sectors

Agricultural sector or subsector practices and concepts	Adaptation	Mitigation	Climate-smart agriculture
Crops			
Improving cropland management	X	X	X
- Integrated nutrient/soil fertility management	X	X	X
- Reduced/zero tillage	X	X	X
- Residue management	X	X	
- Adjusted planting dates and crop varieties	X		
- Crop relocations	X		
- Improved land management (erosion control & soil protection through tree planting)	X	X	X
- Improved rice cultivation	X	X	X
Using perennials and agroforestry	X	X	
Managing organic soils	X	X	X
Restoring degraded land	X	X	X
Improving varieties and strengthening seed systems	X	X	X
Breeding adaptive varieties/developing new varieties	X	X	X
Integrated pest management	X	X	X
Energy crops		X	

Agricultural sector or subsector practices and concepts	Adaptation	Mitigation	Climate-smart agriculture
Livestock			
Improving pasture management	X	X	X
Improving grazing management	X	X	X
Practising manure management	X	X	X
Addressing land conversion (land management)	X	X	X
Improving feed use		X	
Controlling enteric fermentation		X	
Increasing productivity		X	
Breeding adaptive species	X		
Practising effective disease control	X		
Forestry			
Agroforestry	X	X	X
Afforestation, reforestation and forest restoration	X	X	X
Sustainable forest management and use practices	X	X	X
Integrated fire management		X	
Reduction of deforestation and forest degradation		X	
Managing forest biodiversity	X	X	
Enhancing forest health and vitality to reduce vulnerability	X	X	
Intensifying fire management systems	X		
Adaptive management practices	X		
Managing harvested wood product		X	
Improving tree species to increase biomass productivity and carbon sequestration		X	
Fisheries			
Improving energy efficiency		X	
Decreasing use of fish meal and fish oil feeds		X	
Lowering post-harvest losses		X	
Increasing waste recycling		X	
Reducing excessive fishing capacity		X	
Increasing feeding efficiency		X	
Practising carbon capture and storage (sea beds, phytoplankton and blue carbon)		X	
Assessing renewable energy potential		X	
Integrated coastal zone management (ICZM)	X		
Breeding adaptive species	X		
Diversifying species	X		
Better managing water quantity and quality	X		
Natural resource (i.e. land and water) management			
Practising sustainable land management	X	X	X
Rehabilitating degraded lands	X	X	X
Conserving peat lands and wetlands for reducing emissions and increasing soil carbon sequestration	X	X	X
Integrated water resources management	X	X	X
Improving water management for paddy fields for reducing CH4 emission	X	X	X
Improving irrigation performance and water productivity	X	X	X
Improving drainage and flood control	X		
Harvesting rainwater	X		

Agricultural sector or subsector practices and concepts	Adaptation	Mitigation	Climate-smart agriculture
Using water storage and conservation techniques	X		
Practising water reuse	X	X	X
Using desalination	X		
Cross subsector			
Integrated crop-livestock management	X	X	X
Fish-crop systems (e.g. fish and rice systems)		X	
Integrated food-energy systems	X	X	X
Using early warning and information systems for tsunami, drought and food risks	X		
Developing monitor and control systems for animal and human disease risks	X		
Conducting DRM	X		
Advisory services/extension			
Developing supporting technology	X	X	X
Improving access to climate information	X		
Improving communication for extension	X	X	
Developing participative research to respond to needs of producers in the context of climate change	X	X	
Post-harvest			
Building capacity of farmers, traders and other stakeholders in post-harvest handling practices	X	X	
Providing advice and training on the design and proper management of post-harvest-specific infrastructure	X	X	X
Developing effective waste/ by-product management strategies (e.g. composting, feed)	X	X	
Using sustainable biomass residue for bioenergy generation	X	X	
Using local and renewable raw material to build storage infrastructure	X	X	
Supporting farmers in developing commercial strategies (e.g. avoid selling stocks at a low price and buying later at high prices)	X		
Value chain development			
Efficiently using resources (e.g. water and nutrients) (i.e. reuse, reduce, recycle) with closed loop systems, especially for processing/transformation	X	X	
Improving storage facilities for harvest	X	X	X
Risk management through, for example, insurance	X	X	
Improving energy efficiency	X	X	
Valuing and using by-products originating during the processing (for energy/fertilizers use)	X	X	
Producing renewable packaging	X	X	

Reference: FAO 2012, Incorporating climate change considerations into agricultural investment programmes: A guidance document. Rome, Italy.

ANNEX 2: PROCESS FOR GUIDELINE DEVELOPMENT

These guidelines were developed in collaboration between World Vision Livelihood Technical Advisors and researchers in food systems and climate change at the Institute for Sustainable Futures, University of Technology Sydney. The research and writing required combining existing World Vision materials on CSA, expert insights from the research team, and technical input from World Vision's extensive work across countries, project models, and monitoring and evaluation. To make the material salient to World Vision, and legitimately include perspectives and expertise from World Vision, the team conducted focus groups discussions across multiple regions.

The methods for these guidelines included:

- 9 Focus Group Discussions in English, French, and Spanish
- 8 regions engaged (Pacific, Southeast Asia, South and Southeast Asia, East Africa, South and Central Africa, West Africa, Latin America, Middle East)
- 25 countries
- 42 total participants (29 male, 13 female)

ANNEX 3 SUMMARY OF EXISTING CSA GUIDELINES

Guidelines for CSA tend to be country specific (typically in the Global South, mainly South Asia and sub-Saharan Africa) with case studies to provide examples of successful application of CSA technologies and practices. The documents were typically designed for agriculture extension officers and often the result of a partnership between a national government and an international organisation.

The set of guidelines from the FAO, which were an online resource (found at https://www.fao.org/climate-smart-agriculture-sourcebook/en/) had a broader context and target audience.

Title	Year	Organisation	Organisation type	Purpose	Focus	Link
Climate Smart Agriculture 101	2022	CGIAR	Research	• Provide overarching guidance on designing, implementing, and monitoring CSA	All 3 pillars	https://csaguide.cgiar.org/
Climate-Smart Agriculture Guideline for the United Republic of Tanzania: A Country–Driven Response to Climate Change, Food and Nutrition Insecurity	2017	FAO	Intergovernmental organisation	• Highlights key climate agriculture risks in Tanzania • Instructive tool for mainstreaming adaptation and mitigation objectives via CSA in rural development • Information on implementation of the CSA framework and CSA practices and technologies suited to different regions and agro-climatic zones	Adaptation, mitigation	https://www.fao.org/policy-support/tools-and-publications/resources-details/en/c/885378/
Climate-smart agriculture and the Sustainable Development Goals: Mapping interlinkages, synergies and trade-offs and guidelines for integrated implementation	2019	FAO	Intergovernmental organisation	• Assessment and mapping of CSA-SDG interlinkages and trade-offs • Guidelines for the integration of the CSA implementation steps with the 2030 agenda	Productivity, adaptation, mitigation	https://sdgs.un.org/publications/climate-smart-agriculture-and-sustainable-development-goals-33034
ASEAN Regional Guidelines for Promoting Climate-Smart Agriculture (CSA) Practices Volume III	2021	ASEAN	Intergovernmental organisation	• Provide guidance on how ASEAN member states can promote the adoption and upscaling of CSA practices • Provides assessment guidelines for prioritising the CSA approaches • Includes case studies of successful CSA implementation	Productivity, adaptation, mitigation	https://asean-crn.org/asean-regional-guidelines-for-promoting-climate-smart-agriculture-csa-practices-volume-3/
National Guidelines for Climate Smart Agricultural Technologies and Practices: For the Dry and Intermediate Zones of Sri Lanka & UNDP	2019	Ministry of Mahaweli, Agriculture, Irrigation and Rural Development	National government, intergovernmental organisation	• Summarises current challenges and existing practices in Sri Lanka's agriculture sector • Provides case studies of successful CSA application in Sri Lanka and in other countries • Provides recommended technologies and practices for CSA interventions	Productivity, adaptation	https://erc.undp.org/api/download?filePath=/documents/9654/mgmtresponse/keyaction/doc_8844372782265974165NATIONALGUIDELINESFORCLIMATESMARTAGRICULTURALTECHNOLOGIESANDPRACTICES.pdf
Actionable Guidelines for the Implementation of Climate Smart Agriculture in South Africa Vol I & II	2020	Department of Environment, Forestry, and Fisheries; UNEP	National government, intergovernmental organisation	• Literature review of the status of CSA practices in South Africa • Actionable guidelines for use in the rollout of CSA in South Africa	Adaptation	https://www.dffe.gov.za/sites/default/files/docs/csa_volume1.pdf https://www.dffe.gov.za/sites/default/files/docs/csa_volume2.pdf

Title	Year	Organisation	Organisation type	Purpose	Focus	Link
Climate-Smart Agriculture in action: from concepts to investments (Dedicated training for Staff of the Islamic Development Bank)	2019	FAO, Islamic Development Bank	Intergovernmental organisation, multilateral finance institution	• Technical assistance to increase capacity of project managers in CSA • Training on CSA, its implementation, key practices and technologies, and guidance on how to integrate climate change into agricultural investment/projects	Productivity, adaptation, mitigation	https://www.isdb.org/sites/default/files/media/documents/2022-02/Climate-Smart%20Agriculture%20in%20Action%20-%20Final.pdf
Guidelines For Mainstreaming Climate Change Adaptation and Mitigation in Agricultural Sector Policies and Plans	2018	Ministry of Agriculture, Animal Industry and Fisheries, Uganda	National government	• Provide practical, step-by-step guidance for agriculture sector stakeholders on how to mainstream mitigation and adaptation in planning and decision-making processes • Identify key climate risks for the agriculture sector • Provide a framework for monitoring and evaluation	Adaptation, mitigation	https://www.agriculture.go.ug/wp-content/uploads/2019/09/Guidelines-for-Mainstreaming-Climate-Change-Adaptation-and-Mitigation-in-the-Agricultural-Sector-Policies-Plans-1.pdf
Methodological Guide to Co-Design Climate-Smart Options with Family Farmers	2018	CGIAR	Research institution	• A manual to provide a seven-step methodology to allow family farmers to co-build and adopt CSA options to tackle climate change in an open innovation platform	Adaptation, mitigation	https://agritrop.cirad.fr/591808/1/TRAD_Manual_September.pdf
Handbook on Climate Smart Agriculture in Myanmar	2019	FAO	Intergovernmental organisation	• Handbook designed to help researchers, extension agents, teachers and farmers learn and promote CSA in Myanmar	Productivity, mitigation	https://www.fao.org/3/ca3662en/ca3662en.pdf
Malawi Climate Smart Agriculture Handbook for Frontline Agricultural Extension Staff	2018	Ministry of Agriculture, Irrigation and Water Development, Malawi	National government	• Presents climate change risks for Malawi and adaptation and mitigation measures which farmers can adopt to tackle climate change • Information on suitable farming practices for different agroecosystems and on the benefits of adopting different CSA technologies	Adaptation, mitigation	https://genesis.imgix.net/uploads/Malawi-CSA-manual.pdf
Climate-Smart Agriculture Sourcebook	2013	FAO	Intergovernmental organisation	• To further elaborate the concept of CSA and demonstrate its potential and limitations • Help decisionmakers to understand the necessary ingredients to achieve a climate-smart approach, including existing options and barriers • Includes a summary of improved technologies and approaches for sustainable farm management and enabling frameworks	Productivity, adaptation, mitigation	https://www.fao.org/3/i3325e/i3325e.pdf
Climate-smart agriculture handbook for Mozambique	2019	Ministério de Agricultura e Segurança Alimentar, Mozambique	National government	• Highlights the contribution of agriculture to climate change and the risks it poses for agriculture in Mozambique • Describes adaptation strategies and their mitigation co-benefits, including CSA practices and technologies • Outlines implementation approaches for CSA and their challenges, and how to create an enabling environment through CSA institutions	Adaptation, mitigation	https://genesis.imgix.net/uploads/files/Mozambique-CSA-manual-1.pdf

Title	Year	Organisation	Organisation type	Purpose	Focus	Link
A Guide to Climate-Smart Agriculture: Volume 1: For Extension Workers	2016	Pact	Non-government organisation	• Provides extension workers with a broad reference tool for topics related to CSA and its application in Malawi • Indicates some of the necessary ingredients required to achieve a climate-smart approach, including options and barriers	Productivity, adaptation, mitigation	https://www.pactworld.org/sites/default/files/Final_Draft_A%20Guide%20to%20CSA_Volume%201_09-16-2016.pdf
Climate-Smart Agriculture in Lesotho	2018	World Bank, CGIAR	Multilateral finance institution, research institution	• Provides a baseline for discussions on entry points for investing in CSA at scale in Lesotho • Includes a summary of CSA technologies and practices for production systems key for food security in Lesotho and an assessment of their 'climate smartness' • Provides local case studies and institutions, policies, and finance for CSA	Productivity, adaptation, mitigation	https://cgspace.cgiar.org/items/86f09d65-eca8-484e-bf78-9254aa71781d
The Kenya Cereals Enhancement Programme – Climate Resilient Agricultural Livelihoods (KCEP – CRAL): Climate Smart Extension Manual	2021	Kenya Agricultural and Livestock Research Organisation	Research institution	• Guide for extension officers, service providers, and lead farmers on successfully producing cereals and pulses in Kenya • Includes guidance on climate-smart agriculture, conservation agriculture, soil and water conservation, integrated soil fertility management, agroforestry, agricultural insurance, renewable energy, gender in CSA, and constraints on the uptake of CSA	Productivity, mitigation	https://www.kalro.org/download/csa-extension-manual/?wpdmdl=2051&refresh=67085c7993e8e1728601209
Making Agriculture Climate-Smart: A Business Perspective from South Asia	2017	International Finance Corporation (World Bank Group)	Multilateral finance institution	• Case studies of projects focused on smallholder productivity, smart land and water use, and climate resilience.	Productivity	https://thedocs.worldbank.org/en/doc/667111565805334124-0060022019/render/CSA.pdf
Climate Investment Plan for the Agriculture Sector: A Decision Support Tool for Scaling up Climate-Smart Agriculture Technologies and Practices in Gandaki Province, Nepal	2021	Government of Nepal	National government	• A decision-making tool for investment to support adoption of climate smart agricultural technologies	Productivity, adaptation	https://libird.org/wp-content/uploads/2022/04/CIP_Gandaki.pdf
Translating climate-smart agriculture policies into action: A guidebook for operationalising climate-smart agriculture into local action planning	2021	CGIAR, Government of Kenya	Research institution, national government	• Outlines for lessons and activities for capacity building workshops for subnational agricultural officers in Kenya • Templates for a CSA action plan and project concept	Adaptation, mitigation	https://cgspace.cgiar.org/server/api/core/bitstreams/df4c620c-6e15-433d-afa3-f92f71861087/content
Climate-smart agriculture: A synthesis of experiences and lessons from the NEN region	2022	IFAD	Multilateral finance institution	• Case studies from Near East, North Africa, Europe, and Central Asia (NEN) • An overview of the patterns and drivers for CSA interventions in several agroecological contexts in the NEN region	Productivity, adaptation	https://www.ifad.org/documents/38714170/47008046/csa-studies-nen.pdf/45cb516c-9aac-ffb9-28cb-d0cc0bfd9230?t=1671023226557

Title	Year	Organisation	Organisation type	Purpose	Focus	Link
Climate-Smart Agriculture Sourcebook	2013	FAO	Intergovernmental organisation	• Digital platform that draws together a range of knowledge and expertise on the concept of CSA to guide policymakers, programme managers, sectoral experts, academics, extensionists, and practitioners • Includes case studies and enabling frameworks	Productivity, adaptation	https://www.fao.org/climate-smart-agriculture-sourcebook/en/
Climate Smart Disaster Risk Reduction Interventions in Agriculture Sector – Flood Hazard: A Practitioner's Guidebook	2019	Asian Disaster Preparedness Center	International organisation	• Guidebook for local government employees engaged in mainstreaming climate smart disaster risk reduction and climate change adaptation practices for development planning at the local scale • Specific focus on flood hazards in the agriculture sector	Adaptation	https://www.adpc.net/igo/category/ID1581/doc/2020-i41Pht-ADPC-Practitioners_Guidebook.pdf
IRA Activation Guide: Climate-Smart Agriculture	2023	Environmental Defense Fund	Non-governmental organisation	• Information on how companies can use Inflation Reduction Act-funded agriculture programmes to support their climate goals	Mitigation	https://business.edf.org/wp-content/blogs.dir/90/files/EDF-IRA-Climate-Smart-Agriculture-Activation-Guide.pdf
Climate-Smart Agriculture training manual: A reference manual for agricultural extension agents	2018	FAO	Intergovernmental organisation	• A manual for a four-day training course on climate-smart agriculture for extension agents • Linking climate change and food security	Productivity, adaption	https://www.fao.org/agrifood-economics/publications/detail/en/c/1162181/
Training Manual on Climate Smart Agriculture	2019	Government of Sri Lanka, UNDP	National government, intergovernmental organisation	• Manual for agriculture extension officers providing training for farmers, landowners, civil society organisations, and service provider institutions on CSA	Productivity, adaptation, mitigation	https://erc.undp.org/api/download?filePath=/documents/9654/mgmtresponse/keyaction/doc_21453933229535933OOTRAININGMANUALONCLIMATESMARTAGRICULTUREJun2.pdf
Training Manual for Climate Smart Agriculture	2019	Government of Uganda	National government	• Guidelines on training for farmers by the Northern Uganda Resilience Initiative programme • Support farmers in diversifying their cropping enterprises and to enhance farm resilience while boosting output	Productivity, adaptation	https://nuri.ag/wp-content/uploads/2021/08/CSA-Training-Manual-2019-Final.pdf
Climate-Smart Agriculture (CSA) Training Manual: Users' Manual for Development Practitioners and Extension Workers	2020	Government of Nepal, CGIAR	National government, research institution	• Training programme for farmers on climate change, its impacts, and different climate-smart agriculture technologies and practices	Adaptation	https://ccafs.cgiar.org/resources/publications/climate-smart-agriculture-csa-training-manual
Climate smart agriculture training module: A reference manual for agricultural officers	2022	Pakistan Agricultural Research Council	Research institution	• Manual for students, extension officers, research officers, policymakers, and farmers to understand climate change and its impacts on agriculture, and CSA practices which are relevant to different agro-ecological contexts and conditions	Adaptation	https://www.apn-gcr.org/publication/climate-smart-agriculture-training-module-a-reference-manual-for-agricultural-officers/

Title	Year	Organisation	Organisation type	Purpose	Focus	Link
Climate-smart Agriculture Manual for Agriculture Education in Zimbabwe	2017	UNEP	Intergovernmental organisation	• Technical Manual for professional and university level agricultural education in Zimbabwe to enhance student and professional participation in promoting climate-smart agriculture • Help small-holder farmers to enhance production, resilience to climate change, and climate mitigation • Explores the enabling environments, system approaches, and practices of CSA	Productivity, adaptation, mitigation	https://unepccc.org/project/climate-smart-agriculture-manual-for-agriculture-education-in-zimbabwe/
Climate-Smart Agriculture Adaptation Strategies for Farmers in the Transition Zone of Ghana: Lessons from the Savannah Zone	2018	The Association of Commonwealth Universities, UKAID	Research institution, government aid organisation	• Manual to introduce crop farmers in the transition zone of Ghana to some climate change adaptation strategies being used in the savannah zone and to circulate more widely those being already used in the transition zone • For use by extension agents, non-governmental organisations, and other climate change education organisations	Adaptation	https://www.acu.ac.uk/media/2731/climate-change-manual_derkyi-circle-uptake-1.pdf
Climate Smart Agriculture: Community of Practice Guide	2021	Government of Uganda, Oxfam, CRS, World Vision, CARE International	National government, non-governmental organisation	• Designed to advance the scaling up of CSA in Uganda • Describes agriculture and climate change in Uganda with stakeholder mapping for scaling up CSA • Includes case studies of climate smart agriculture in practice and lessons on the implementation of CSA	Adaptation, mitigation	https://careclimatechange.org/wp-content/uploads/2021/06/The-Climate-Smart-Agriculture-book-2021.pdf
Climate-Smart Agriculture in Cocoa: A Training Manual for Field Officers	2018	World Cocoa Foundation, The Rainforest Alliance	International organisation, non-governmental organisation	• Training manual to raise awareness among cocoa farmers in Ghana on climate change and the tools available to build resilience • Designed for field/extension officers	Adaptation	https://cgspace.cgiar.org/server/api/core/bitstreams/327262fd-ef8a-4808-a731-4a59d8144dd8/content
Module 13: Climate Smart Agriculture (CSA) in Extension and Advisory Services (EAS) in Rwanda	2021	Global Forum for Rural Advisory Services	International organisation	• Training workbook for extension officers working in Rwanda • Explores climate change impacts in Rwanda and adaptation and CSA in the Rwandan context with a specific focus on gender	Adaptation	https://uploads.cnfa.org/2021/07/16104158/Climate-Smart-Agriculture-in-Extension-and-Advisory-Services-Mod-13-WB.pdf

ANNEX 4: DESIGN, MONITORING AND EVALUATION (DME): HOW DO WE MEASURE CSA – AND HOW DO WE KNOW IT WORKS?

Importance of applying DME to our CSA approach

CSA is a central or foundational technical approach for World Vision's BSL and RGC models. DME tracks how CSA is performing, ensuring CSA is contributing towards the model's overall objectives.

Understanding the uptake, impact and sustainability of CSA actions will strengthen the evidence base for World Vision's CSA programming. Sharing lessons and insights about CSA and its application in diverse contexts will provide a critical feedback loop to address gaps or adapt to changing circumstances.

Aligning CSA to Core Project Model objectives

The design phase of a new project provides opportunity to consider how CSA actions will be monitored, measured and/or evaluated. When developing DME for CSA, there are two perspectives to keep in mind (Figure 4-1).

Firstly, the CSA actions should contribute to the overarching goals of World Vision's BSL and RGC models, such as reduced poverty and hunger, and enhanced child well-being. The diverse nature of CSA means there can be multiple pathways by which CSA actions contribute towards the goal – hence the importance, as emphasized in this guidance note, of the process by which CSA options are selected. DME identifies how the selected CSA actions contribute towards the overall objectives of World Vision's programme models.

Secondly, CSA has its own three pillars (see Figure 1). Although CSA aims to contribute to all pillars, not every CSA action applied in every location will necessarily achieve 'triple wins', generating trade-offs between pillars.

As this guidance note presents, the local context in which CSA is developed is critical to understand these trade-offs. This contextual approach helps determine the contributions to the different pillars at different scales and in different timeframes. As such, this trade-off identification should be identified prior to the establishment of DME. Once CSA options and approaches are identified, DME measures can be created for each of the results in the Results Chain.

Selecting indicators to examine the contribution of CSA actions to WV programming goals

World Vision uses indicator handbooks that describe priority indicators to promote the measurement direction in a consistent manner across our multi-sectoral programming across multiple countries. Priority indicators are grouped into goal, outcome, and output levels. These should be aligned with World Vision Global Indicators, SDGs, FAO, and donor frameworks (such as DFAT's ANCP MELF). Many of these priority indicators are consistently used across different project models because the common objective of World Vision's project models is to fulfil child well-being aspirations, and thereby contribute to the SDGs. Using priority indicators allows World Vision to compare and contrast the progress of our development programming across different regions, and to report on our impact at scale.

Figure 4-1 provides a list of indicators that a WV CSA programme can select. For example, priority indicators include the proportion of households living below the national poverty line by poverty probability index (PPI), used because World Vision's programming aims to support families to phase out from poverty. This aligns with SDGs 1, contributing to the condition towards 'No Poverty.'

CSA is able to support achievement of SDG 2: Zero Hunger (FAO, 2019)[lxxviii], and World Vision aims to monitor the proportion of HHs experiencing moderate or severe food insecurity according to the Food Insecurity Experience Scale Global Standard Scale (FIES-GSS).

Figure 4-1: DME approach to link CPM and CSA perspectives

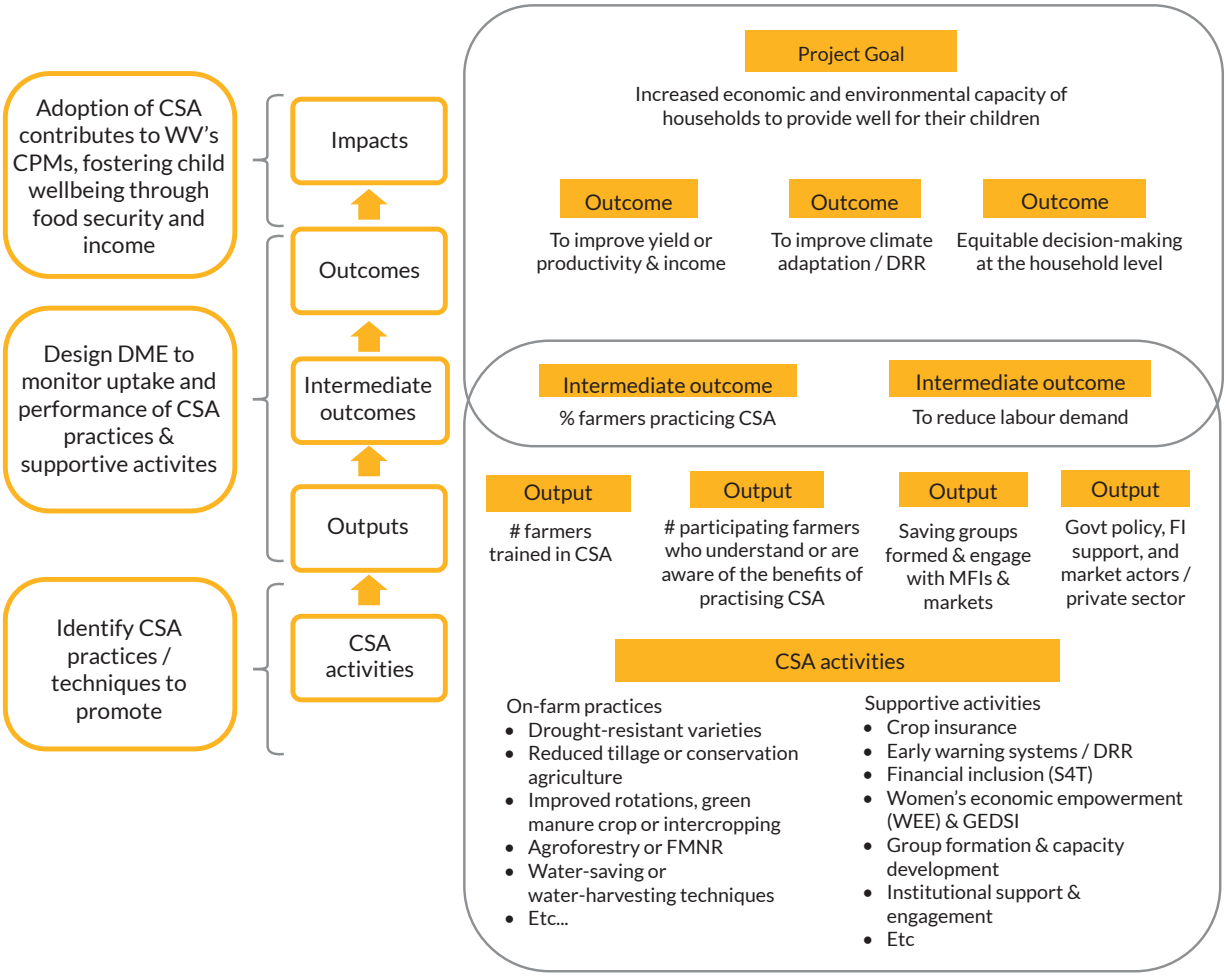


Table 4-1: Recommended and essential indicators for World Vision's CSA programming, according to goal and outcome levels[lxxix]

CSA's Contribution to Child Well-Being
CSA's Contribution to Child Well-Being
• Proportion of households (HHs) able to provide well for their children (OIOS 80 / C4B.0044)
• Proportion of HHs facing moderate or severe food insecurity, according to FIES (OIOS 81 / C4B.25258)
• Proportion of HHs access to sufficient year round food (C4B.21261)
• Proportion of HHs sufficient dietary diversity (C4B.0060)
• Proportion of children 6-23 months receiving minimum dietary diversity (C1A.0022)
• Prevalence of wasting in children under five years of age (C1A.0018)
• Prevalence of stunting in children under five years of age (C1A.0008)
• Proportion of HHs in multi-dimensional poverty (OIOS 79 / C4B.25456)
• Proportion of HHs with gender equality decision making in productive sphere
• Proportion of HHs with gender equality decision making in domestic sphere (C4B.25442)
• Number of people reached by community programming on environment and climate action (OIOS 103)
• Number of children who participated in environmental and climate awareness sessions

CSA Pillar 1: Productivity and Food Security

- Proportion of HHs growing target nutritious crops/products (C4D.034419)
- Average yield of target crops (C4B.14001)
- Proportion of HHs who observe that their main staple crop production is increasing (C4D.034426)
- Proportion of HHs with increased income (C2C.25149)
- Proportion of households with sustained or increased agricultural yields due to climate-resilient agricultural practices (including CSA, Agroforestry, Agro-ecology, NRM, FMNR, etc.)

CSA Pillar 2: Adaptation

- Proportion of HHs who are food insecure according to the Coping Strategies Index (OIOS 69)
- Proportion of households using improved natural resource management (NRM) or sustainable agriculture practices (C4D.034423)
- Proportion of HHs applying Farmer Managed Natural Regeneration (FMNR) (OIOS 105)
- Regreening Index Score
- Number of individuals trained in improved sustainable agricultural practices (including Climate Smart Agriculture (CSA), natural resource management (NRM), Farmer Managed Natural Regeneration (FMNR), sustainable fisheries, ecosystem restoration etc.) (OIOS 66)

CSA Pillar 3: Mitigation

- Number of hectares protected, and/or restored (OIOS 104 / C1D.034455)
- Percentage of households with primary reliance on clean and efficient fuels and technologies (OIOS 67 / C4A.13941/C5A.16397)
- Average tree density change in target area (C4B.25211)

Selection of priority indicators is critical for examining the effectiveness of CSA implementation; to what extent is CSA contributing towards the overall objectives for a project, what progress has been made, and if any adjustments should be made. We try to understand effectiveness and impact through using mixed methods and triangulation of the data, but often it is too costly to identify the underlying causes by which CSA actions build into project impacts. However, DME should be able to examine if, or to what extent, key CSA interventions are contributing to the expected outcomes and goal of a project.

For example, RGC and BSL can identify the interrelated social, economic and environment aspects by answering evaluation questions such as:

- To what extent are food security and dietary diversity goals being changed through implementation of the CSA selected practices?
- What is the role of CSA-driven gender equality actions to enhance food security and participants' behaviour change towards child well-being?

Monitoring methods

DME teams and consultancy firms hired for external evaluations should include members with experience in CSA so they can be conversant with issues specific to the approach. They will also be able to identify appropriate and feasible practices.

For measuring quantitative indicators, project should draw on the relevant existing WV resources like the WVA Evidence Building Framework (EBF) indicators handbook for Climate Action and Regenerative Environment, the WVI 'Our Impact Our Story' framework for the ESCA sector. For qualitative measures, the Regreening Communities CPM Handbook provides useful guidance.

Monitoring methods used will include focus group discussions, interviews with key stakeholders, household surveys, field visits and observation approaches. These will focus on understanding the following results:

- the extent to which CSA has been adopted: number of farmers trained on and or practicing CSA options, # hectares of farmland under CSA, etc

- the level of benefit of CSA: change in productivity or yield, change in water use efficiency, # carbon units sequestered, # trees in target landscapes, etc
- the extent of support provided by input suppliers or private sector players to assist in adoption and scale-up: number of private sector partnerships activated, amount of funds resourced, # technologies deployed, etc
- the degree of inclusion and participation in adoption, such as by women or other vulnerable groups: number of women participating or leading farmer or saving groups,
- how the community dealt with any barriers or problems facing CSA, including access to finance, access to technology or input suppliers, and cultural or religious matters

It is important to note some programmes may require an **advocacy component** to ensure that existing government support mechanisms for CSA be rolled out at the local level. Ultimately, this is to establish a more favourable policy environment, ensuring any barriers to adoption are reduced especially for women and more vulnerable groups.

Sustainability

CSA practices can be sustainable where the following issues are addressed:

- CSA will be replicated readily when a practice is easily taught and passed on with little (or no) requirement for external materials or specialist support.
- CSA will spread when the benefits are found to be tangible and apparent, particularly when food and incomes are improved in more lean years, such as in drought conditions.
- CSA promotes environmental sustainability. By enhancing their environment, farmers and communities can, in time, derive a benefit from ecosystem services, thereby enhancing their ability to adapt to climate change. Biodiversity also tends to increase when the environment is prioritised, offsetting the pest and disease problems associated with monocropping.
- CSA results in positive outcomes for diverse members of the community, and people value CSA efforts and activities.

Project management: How does staffing support CSA?

CSA as a technical approach will be incorporated within the BSL and RCG project models. As such, staffing needs will align with requirements of these core project models.

In practice, this means:

At the Field Office level:

- Ensure the presence and support of Livelihood technical leads who have a deep understanding of the local agroecological zones and contexts, of the national CSA strategy and policy environment, and familiarity with these guiding principles to select and scale-up CSA practices. Working with the technical leads, DM&E lead should guide the contribution of CSA lessons learned to global WV campaigns and/or country strategy development.
- These staff, while experienced at implementing RGC and BSL models, should also be familiar with other WV development priorities including faith and development, GEDSI and fragile programming. They should also be familiar with WV guidelines for mainstreaming ESCA into programming, including the CEDRIG tools, which provide great entry point for including CSA opportunities at project designs and reviews.

At the Area Programme (AP) level:

- Hire a staff member to oversee CSA implementation who is passionate about climate-resilient practices, with a technical background in agronomy, NRM or livestock, and who can articulate CSA guidance for field staff, district government, and partners / community leaders.
- Support from a DM&E staff is needed to help design and measure biophysical responses and community adoption rates of CSA practices, and to report on these impacts.
- Support of AP Manager and finance staff is also required.

At the field level:

- Development facilitators (DFs) are the key staff who will facilitate the community-based implementation of CSA. DFs should at least have a diploma in environment or NRM, agronomy or livestock, or related field.
- The number of DFs should be carefully considered: this will depend on the number and types of interventions being considered, the distribution of the target communities, and the degree of support available from local extension agents and market actors.

A full set of competencies for management staff, finance, DM&E, and DFs is provided in the RGC Handbook. The AP or Project Manager should have attended a RGC or BSL training before implementing these CSA guidelines. DFs should have prior experience at facilitating community consultation and planning, and should be able to use this guidance before starting to contact communities. Attending a WV orientation on CSA design and implementation, whether through WVI or in consultation with Livelihoods technical leads at the Field Office, is critical, even for those with prior experience.

It is recommended to establish a cross-county and -regional learning opportunity, encouraging Field Office leads to participate and share lessons from their country CSA experiences. Together with WV Global Centre's ESCA, WV CSA programming should be evidence based by improving both environmental and human health with a focus on well-being of children.

ENDNOTES

[i] Crippa, M., Solazzo, E., Guizzardi, D., Monforti-Ferrario, F., Tubiello, F.N. & Leip, A. 2021, 'Food systems are responsible for a third of global anthropogenic GHG emissions', Nature Food, vol. 2, no. 3, pp. 198–209.

[ii] FAO 2022, Greenhouse gas emissions from agrifood systems: Global, regional and country trends, 2000–2020. FAOSTAT Analytical Brief 50.

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[iv] Hellin, J., Fisher, E., Taylor, M., Bhasme, S. & Loboguerrero, A.M. 2023, 'Transformative adaptation: from climate-smart to climate-resilient agriculture', CABI Agriculture and Bioscience, vol. 4, no. 1, p. 30.

[v] Crippa et al. 2021.

[vi] The food system refers to all the elements (environment, people, inputs, processes, infrastructures, institutions, etc.) and activities that relate to the production, processing, distribution, preparation, consumption, and waste management of food, and the output of these activities, including socio-economic and environmental outcomes; the agri-food system is broader, referring to any actors and their activities involved in both food and non-food agricultural products. For definitions used in these CSA guidelines, refer to World Vision International's Discussion Paper: Understanding sustainable agri-food system concepts and terminologies (2024). https://www.ipcc.ch/site/assets/uploads/2019/11/SRCCL-Full-Report-Compiled-191128.pdf

[vii] IPCC 2019, IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems, Intergovernmental Panel on Climate Change.

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