C1 Enhancing capacities for a country-owned transition towards CSA

Overview

Climate-smart transformation of food and agricultural systems is a knowledge-intensive and innovative process. It is also a multi-sector, multi-actor and multi-level process that addresses complexities across biophysical, technical and socio-economic levels. How will this gradual and complex transformation be achieved? Who will own and drive this transition process at country level?

How can the transformation become country-owned, sustainable, scaled up and scaled out? What are the national and subnational capacities across people, organizations, institutions, networks and policies that need to be enhanced and how will countries be supported in this process?

This module sets the frame for Section C on “Enabling Environments” calling for a paradigm shift in the “business as usual” practice of capacity development applied to climate-smart agriculture (CSA) to address these questions. The module proposes a system-wide, integrated and inclusive capacity development approach rooted in national empowerment that interdependently enables people, strengthens organizations, institutions and networks while fostering conducive policy and regulatory frameworks.

Highly interactive, inclusive and gender-sensitive, the proposed process aligns with country development priorities and deepens country ownership, commitment and mutual accountability. All critical ingredients to achieve the desired transformation towards CSA sustainably and at scale.

Moreover, practical capacity development methodologies, tools and practices as well as catalytic factors for CSA are explored. These include multi-stakeholder processes and networks, agricultural innovation systems, local institutions at the landscape level, farmer and climate field schools, indigenous knowledge and knowledge sharing, and Information and Communication Technologies and Communication for Development.

Finally, the module provides practical “how to” guidance for countries to apply a facilitated capacity development approach. Illustrated with case studies, methods and tools, the module recommends a three-step, interactive and inclusive process. The process addresses all three interdepended capacity development dimensions (individual, organizational and enabling environment). The steps to be conducted jointly with stakeholders are: 1) assess system-wide capacities; 2) design contextualized and targeted capacity development interventions; and 3) identify, monitor and document progress and results.

The module suggests to apply a system-wide capacity development approach to CSA that will enable countries to sustainably scale up their endogenous climate action in the agricultural sectors. Thus, planning, implementation, monitoring and reporting on CSA interventions will be most transformational, sustainable and reach scale when conducted through the proposed inclusive and interactive capacity development process. Such a process addresses all the three capacity development dimensions interdependently, while fostering country ownership, commitment and mutual accountability.

Key messages

- CSA is highly knowledge-intensive, innovative, multi-sector, multi-actor and multi-dimensional by nature. Countries are encouraged to enhance system-wide capacities to achieve a sustainable and transformational transition towards CSA at scale. This is achieved through an integrated and inclusive capacity development approach that interdependently empowers people, strengthens organizations and institutions and nurtures a conducive and enabling policy environment while fostering country ownership, commitment and mutual accountability.
- A new “paradigm shift” for system-wide capacity development practice is proposed to achieve more transformative and sustainable change at scale. Going beyond “business as usual” individual capacity building, system-wide capacity development enhances capacities across three interdependent capacity development dimensions based on assessed needs: *Individuals* (knowledge, skills, competencies); *organizations, institutions and networks* (performance, mandates and procedures, cross-sectoral, horizontal, vertical and multi-stakeholder coordination and networks); and the *enabling environment* (regulatory and policy frameworks, institutional linkages and political commitment and will).
- Practical “how to” steps to guide country stakeholders on implementing a system-wide capacity development approach include: Jointly with stakeholders *(a) assessing system-wide capacities; (b) designing contextualized and targeted capacity development interventions; and (c) monitoring and documenting progress*. The process needs to be participatory, inclusive and interactive to enable countries to fully understand the benefits of adopting climate-smart approaches, to reduce rights inequalities and to create a space for dialogue, negotiation and consensus-building.
- *Capacities of the enabling environment for CSA* are strengthened by addressing policy coherence and mainstreaming CSA approaches into national policies and programmes, linking scientific assessment to more effective decision-making, and conducting participatory governance assessments to promote more responsible governance of natural resources.
- *Strengthening organizational, institutional and network capacities for CSA* includes synchronizing mandates, enhancing horizontal and vertical coordination within and among sectors, stakeholders, organizations, institutions while supporting networks. Organizational and institutional enhancement at the landscape level deserves particular attention. Strengthening local institutions at the landscape level is key entry point to foster coordination, collaboration, ownership and commitment for joint CSA action. Strengthening, establishing and facilitating *multi-stakeholder, multi-actor processes and platforms* through a neutral, trusted convenor and partnership broker creates important spaces for inclusive and gender-sensitive dialogue. These are key ingredients for an inclusive CSA strategy development, implementation and monitoring.
- *Ongoing skills development for CSA* through continuous engagement of national and local, formal and informal education, training institutions and tertiary educational institutions will be important due to the

uncertain and dynamic nature of climate change impacts.

- *Farmer Field Schools (FFS)/Climate Field Schools (CFS)* are a particularly relevant capacity enhancement modality for CSA to consider. FFS/CFS present an innovative, participatory and interactive learning approach that emphasizes problem solving and discovery-based learning, as well as empowerment.
- *Strengthening agricultural innovation systems* as integrated networks of stakeholders comprising of research, extension, producers, agribusinesses and others is an essential catalytic factor for adopting CSA approaches. Such systems generate, document, blend, share and apply indigenous and scientific knowledge and practices, while facilitating joint learning and collaboration.
- *Information and Communication Technologies (ICTs) and participatory Communication for Development approaches* are catalytic factors for adopting CSA approaches at scale. They improve access to information, knowledge and practices, facilitate dialogue between stakeholders, enhance the voice in decision-making processes, trigger learning across levels, and provide knowledge networks and platforms where diverse actors can connect, interact, share and act.

System-wide capacity development and climate-smart agriculture

C1-1.1 What are capacity and capacity development?

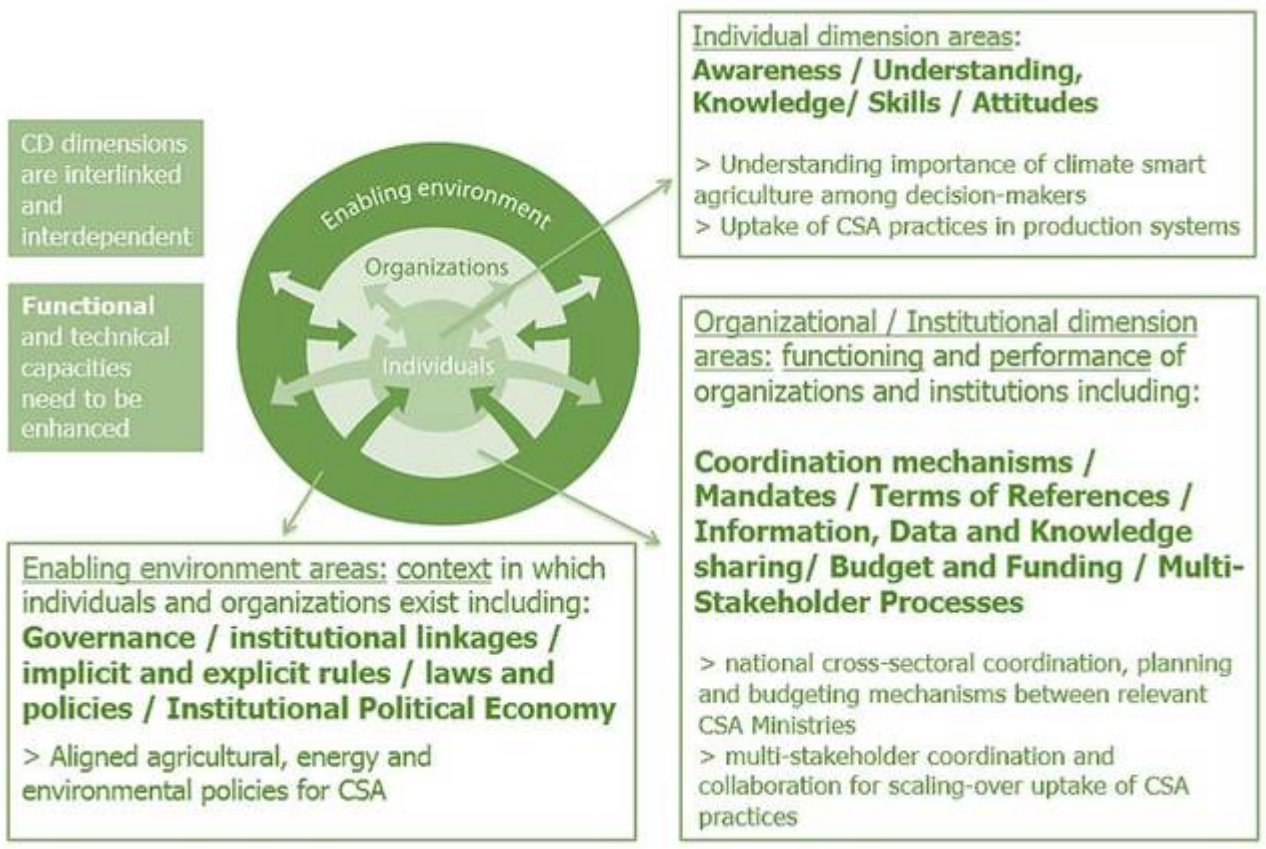
> "*Development is like a tree – it can be nurtured in its growth only by feeding its roots, not by pulling on its branches.*" (I. Serageldin)

Capacity is defined as "the ability of people, organizations and society as a whole to manage their affairs successfully." Capacity development is defined as "the process whereby individuals, organizations and society as a whole unleash, strengthen, create, adapt and maintain capacity [...] to set and achieve their own development objectives over time" (OECD, 2006). Capacity development encapsulates both the overall aim of development (i.e. the "what") as well as the process (i.e. the modality or the "how") by which more sustainable results with higher impacts can be achieved (OECD, 2008).

System-wide and effective capacity development aims to achieve more impactful, transformational andsustainable results at scale by facilitating a sustainable and endogenous development process rooted in national empowerment that enables countries to be in the driving seat of their own destiny. Contributing towards a new development paradigm (Stiglitz, 1998), system-wide capacity development aims to enable countries to own, lead and drive the development process aligned with national priorities, and with external actors (such as FAO) facilitating this

transformation process. Operationally, system-wide capacity development goes beyond isolated training, technical assistance and policy support. Instead, interdependent, participatory approaches need to be applied to jointly assess capacity needs, design contextualized capacity development intervention and monitor capacity development results across the three dimensions of capacity development (see figure C1.1 and more detailed explanation below) to achieve more sustainable, country-owned and impactful results at scale.

Figure C1.1. The three system-wide dimensions of capacity development



Source: Author adapted from FAO, 2015a

To achieve any system-wide change at scale in the way food is produced sustainably in the context of climate change, a CSA and food systems approach needs to be adopted and all three dimensions of capacity development need to be addressed *holistically* and *interdependently*.

C1 - 1.1.1 "Enabling Environment" dimension

The enabling environment dimension of capacity development is defined in this module as "the context in which individuals and organizations put their capabilities into action, where capacity development processes take place. It includes the institutional set-up of a country, its implicit and explicit rules, its power structures and the policy and legal environment in which individuals and organizations function" (FAO, 2015b). It addresses the systemic impediments regarding political commitment and vision, and policy, legal and economic frameworks; national public sector budget allocations and processes; governance, power structures, social norms, incentive-systems and institutional linkages.

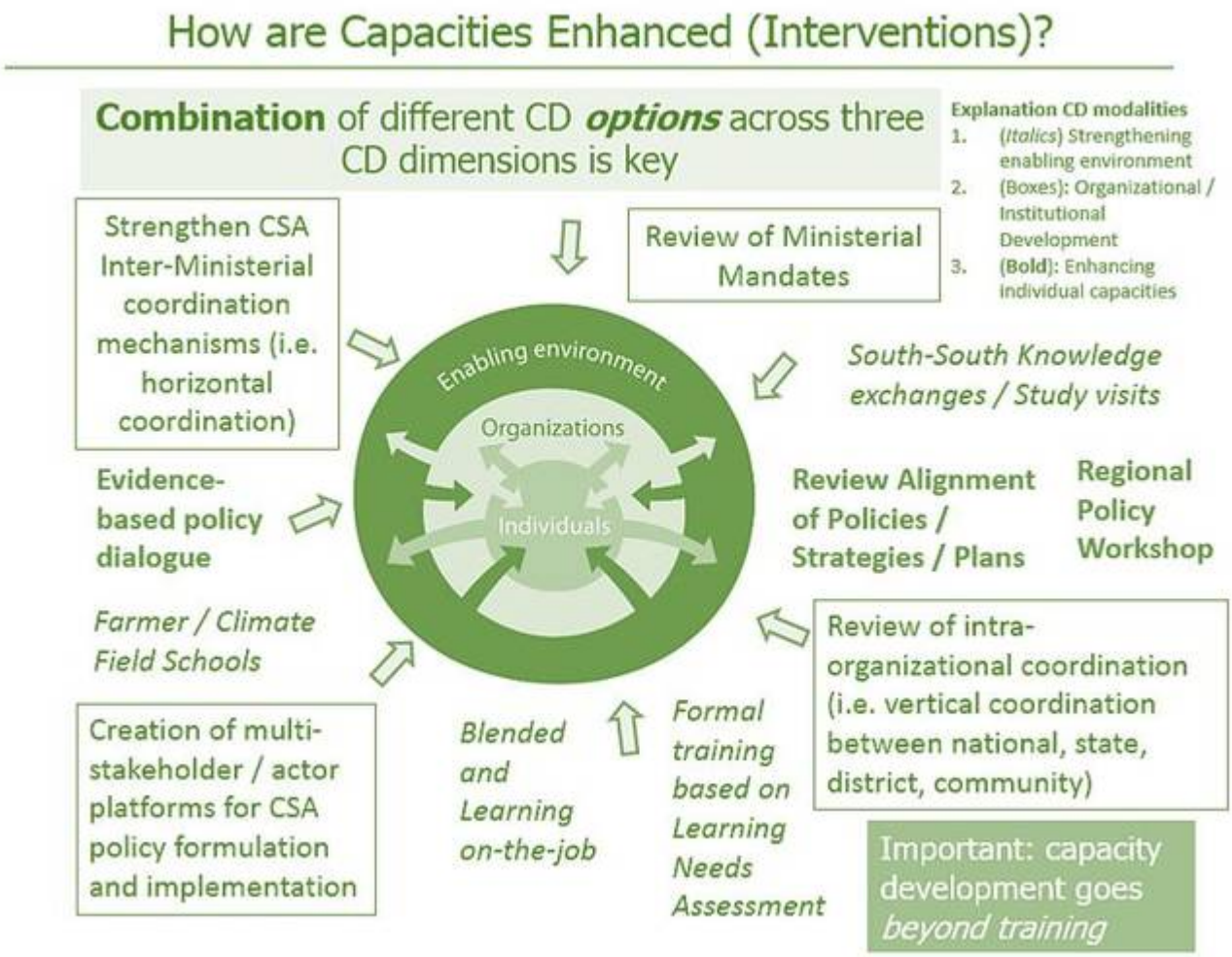
C1 - 1.1.2 “Organizational/Institutional” dimension

The organizational and institutional dimension of capacity development includes public and private organizations, civil society and networks of organizations. It addresses: performance of organizations; cross-sectoral, multi-stakeholder horizontal and vertical coordination and collaboration mechanisms; strategic management functions, structures and relationships; information, knowledge-sharing and decision-making processes; human and financial resources; and infrastructure (FAO, 2015b). Organizational capacity development aims to strengthen performance within (i.e. intra) and between (i.e. inter) organizations. This module will focus on *inter-organizational and institutional strengthening*, such as examining horizontal and vertical coordination between and within organizations and institutions including at the local and landscape levels, thus complementing the original CSA Sourcebook chapter on local institutions. It will also examine multi-stakeholder and multi-actor platforms, processes and networks. Strengthening *intra-organizational performance* will not be examined in detail, as holistic organizational analysis and development is extensively covered elsewhere (Anyonge *et al*., 2013; FAO, 2013a; CSEND 2002; North 1990 and 1994).

C1 - 1.1.3 “Individual” dimension

The individual dimension of capacity development refers to the technical and functional knowledge, skills, competence levels and attitudes of individuals. These can be addressed through facilitation, effective learning activities and competency development (FAO, 2015b, 2012a, 2012b, 2013a). In the realm of CSA, it will be particularly important to develop targeted individual capacity strengthening efforts for different types of individuals, including producers, extension professionals, researchers in national research institutions, local government officials, district government officials, and national government officials across relevant ministries (e.g. environment, agriculture and finance).

Figure C1.2. Interventions across three dimensions of capacity development



Source: Author adapted from FAO, 2015a.

C1-1.2 Methodologies and good-practice factors of system-wide capacity development for climate-smart agriculture

Table C1.1 identifies good practice factors of effective capacity development interventions in the agriculture sector, and provides examples specific to agriculture in the context of climate change.

Good capacity development practice requires addressing all of these success factors to increase the likelihood of greater long-term sustainability, country ownership and scale of capacity development interventions.

Table C1.1. Good practice factors of effective capacity development for climate-smart agriculture

CSA cannot be limited just to production. The food systems themselves need to be climate-smart and resilient. It is crucial to consider all the stages of the supply chain subsequent to food production, since they form an integrated food system including reducing food losses. Gender considerations are particularly important to address exclusion and empowerment (FAO, 2012c).

Capacity Development Success Factor	Explanation	Climate-smart agriculture Examples
Applying a system-wide approach across three capacity development dimensions interdependently	System-wide capacity development for more impactful and country-owned capacity development initiatives at scale involves three dimensions which are interlinked and need to be enhanced interdependently and through inclusive process: - individuals (knowledge, skills, competencies) - organizations, institutions and networks (performance, mandates and procedures, cross-sectoral multi-stakeholder coordination, effective networks) - enabling environment (regulatory and policy frameworks, institutional linkages, enhanced political commitment and will).	Based on a joint stakeholder assessment of capacity needs, capacities can be interdependently enhanced along three dimensions: *Individual*: strengthen the understanding, awareness and practical skills regarding climate change within relevant ministries such as the ministries of agriculture, environment, planning and finance. *Organizational*: enlarge mandates of relevant ministries to reflect climate change responsibilities, improve coordination within and between institutions, strengthen multi-stakeholder networks. *Enabling environment*: align environmental and agricultural policies with harmonized budget allocation to facilitate more effective adaptation and mitigation planning and implementation; Insert mitigation efforts into Nationally Determined Contributions (NDCs) and in alignment with Sustainable Development Goals.
Complementing technical with functional capacity development	Technical capacities refer to aspects such as increasing the competencies of people to intensify production sustainably or manage natural resources more effectively. Functional capacities are increasingly considered a necessary to complement technical capacity enhancement as they enable and empower actors to apply the new knowledge/skills effectively, and scale up the intervention's results. Key functional skills to be enhanced include: - Implementation Capacity: implement and deliver programmes and projects, from planning to monitoring and evaluation including through self-monitoring, experience-based monitoring, self-assessment - Partnering and Networking Capacity: engage in networks, alliances and partnerships - Knowledge Capacity: access, generate, manage and exchange information, knowledge and practices - Policy and Normative Capacity: formulate and implement policies and lead policy reform.	*Technical capacities (individual)*: increasing the competencies of people to intensify production sustainably or manage natural resources more effectively. *Functional capacities (individual)*: planning and policy formulation to integrate technical skills for scaling up or negotiation skills complementing technical skills enhancement for trans-boundary, integrated water resources management.

Capacity Development Success Factor	Explanation	Climate-smart agriculture Examples
Promoting country ownership by aligning programmes with national priorities	National needs and priorities anchored in national ownership should guide capacity development interventions. For example, FAO follows country priorities as laid out in Country Programming Frameworks, which are the result of a joint collaboration effort and extensive dialogue and consultation with the country, National Agriculture Sector Plans, Poverty Reduction Strategy Papers, etc. and as per the Development and Aid Effectiveness Agenda.	Development of national reduced emissions from deforestation and forest degradation (UN REDD) strategies closely aligned with country development strategies. See Case Study C.1.2.
Jointly assessing capacities with stakeholders	Undertaking a careful assessment of needs through a participatory process to diagnose what and whose capacities need to be enhanced is a fundamental pre-condition for all successful and sustainable development projects at scale. Such participatory and inclusive assessments ensure that the context is understood and existing capacities and needs are identified, thus allowing the project or programme to be tailored to the local situation. It also provides spaces for dialogue, negotiation and consensus building (Scherr *et al*., 2012). See also module A3 on integrated landscape management.	See Case Study C1.10 for CSA capacity needs assessments in Kenya and Tanzania.
Achieving sustainability by anchoring programmes to local or national institutions and systems	Successful and sustainable interventions anchor activities in local or national institutions, involving national actors early on when identifying needs and defining methodologies, approaches and desired outcomes. National systems, procedures, organizations, and/or budgets are developed to ensure long-term continuity even after external funding for development projects ends.	Most countries have established climate change organizational units to which CSA interventions should be linked and which foster climate change mainstreaming into development, e.g. National Climate Change Commissions or Offices.
Promoting engagement with local and national actors	Encouraging national/local involvement in project/programme identification, formulation, implementation and monitoring, and the use of participatory communication approaches, ensure the endogenous support essential for sustaining projects in the long term.	The formulation of National Climate Action Programmes/Plans (NAPAs, NAPs, NAMAs) under the UNFCCC emphasizes this factor.
Applying capacity development modalities beyond training	Alongside the delivery of training, other successful capacity development modalities include coaching, on-the-job mentoring, South-South cooperation, policy support, support to organizational development, farmer field schools, creating networks convening for national/ regional events, and strengthening institutional coordination.	See Figure C.2.2. with contextualized climate change learning examples in Case Study C1.4.
Understanding national or regional contexts	Paying attention to national, regional and sub-regional contexts helps identify key drivers of change.	REDD + interventions need to be based on a sound understanding of the drivers of deforestation in a country.

Capacity Development Success Factor	Explanation	Climate-smart agriculture Examples
Using a long-term approach, given the capacity development process time	Capacity development takes considerable time, particularly at organizational and policy levels, and it happens gradually. Ensuring a medium- to long-term horizon, through different forms, scales or funding mechanisms, if necessary, can foster deep-level capacity development.	The shift in CSA interventions from a project to a programmatic approach supports this long-term approach.
Monitoring capacity development	Monitoring of CD is particularly challenging due to the non-linear nature of change. This complexity requires participatory monitoring with stakeholders to track progress across the three dimensions. Such a participatory monitoring process enables spaces joint stakeholder learning, course adjustment if needed while continuously fostering country-ownership and commitment.	Transformation to CSA practice is knowledge-intensive and requires learning and changes in practice. This calls for innovative approaches to track this complex change process across the three dimensions (see section C1-4.3): *Individual*: Are farmers applying climate-smart practices as a result of a Farmer Field School approach? *Organizational:* Are relevant ministries and stakeholders better coordinating for planning and implementation of CSA approaches? *Enabling Environment*: Are relevant CSA policies aligned and being implemented in a participatory way?

What system-wide capacities need to be strengthened to scale-up climate-smart agriculture

The sustainable (FAO, 2017e and 2017f) transformation of food and agriculture systems is extremely complex and challenging as addressing the biophysical, socio-economic, political and institutional dimensions across the three dimensions of CSA (Lipper *et al*, 2014). In addition, the desired scaling-up of CSA includes identifying contextualized practices and technologies within conducive enabling environments and with institutional arrangements and policies. The scaling-up process for CSA occurs horizontally (replicating promising or proven practices and technologies in new geographic areas or target groups), vertically (catalysing institutional and policy change) or diagonally (adaptive management within project implementation to reflect emerging reality), and stakeholder participation is at the core (Neufeldt *et al*., 2015). Applying a system-wide, integrated and inclusive capacity enhancement approach across the following capacity development dimensions directly addresses the desired complexity and supports the scaling-out and up process of CSA.

C1 - 2.1 Enabling environment - Strategies for improving policy coherence and effectiveness

As illustrated previously, the capacity development dimension “enabling environment” addresses the systemic

impediments regarding political commitment and vision, and policy, legal and economic frameworks; national public sector budget allocations and processes; governance and power structures; and incentives and social norms, as well as institutional linkages. Building on module C3 Policies and complementing specific elaborations on the importance of a conducive enabling environment for CSA (CCAFS, 2014), this section highlights the relevance of improving policy coherence and effectiveness, linking scientific assessments and decision-making, as well as participatory governance assessment processes, for a conducive enabling environment to implement CSA approaches.

C1 - 2.1.1 Policy coherence

Planned adaptation and mitigation, including changes in and coordination of policies, institutions and dedicated infrastructure, are needed to facilitate and maximize the long-term benefits of adaptation responses to climate change and effectively reduce and remove emissions. Policy-related constraints that can directly affect resource-poor farmers' ability to benefit from opportunities created by research include: poor infrastructure (particularly roads), limiting access to markets; state control of input and output markets; distorted prices; poor delivery of services; lack of legal frameworks for producer associations; and inadequate (access to) finance. Similarly, fiscal and monetary policies at the macro-economic level have impacts on the agriculture sector, and call for interactions and dialogue with policy-makers. Policy responses to mainstream climate change into all agriculture sectors and food systems are systematically dealt with in module C3, and the specific enabling policies to achieve climate-smart sustainable crop production intensification are addressed in more detail in module B1-4.

C1 - 2.1.2 Linking scientific assessments and decision making

Without adequate information on the future impacts of climate, autonomous adaptation actions will remain reactions to changes that are only informed by past experiences. Without necessarily being designed for potential future changes in climate, autonomous adaptation also carries a risk of evolving into maladaptation (Kahneman, 2011). For example, pressure to cultivate marginal land, or to adopt unsustainable cultivation practices as yields reduce, may increase land degradation and endanger the biodiversity of both wild and domestic species, possibly jeopardizing future ability to respond to increasing climate risks.

There also may be trade-offs regarding mitigation objectives and how to reach them. As an example, one mitigation option for countries is to phase out the spreading of manure onto land in favour of treatment or direct incorporation into the soil. This is to reduce emissions of ammonia, which is considered a secondary greenhouse gas due to its potential contribution to nitrous oxide production when it is deposited in soils and reenters the soil nitrogen cycle. Ammonia is also a source of atmospheric pollution. However, while ammonia emissions are reduced, the side-effect of this measure may be an increase in methane emissions from anaerobic digestion of manure, or in nitrous oxide emissions from denitrification of increased sources of nitrogen incorporated into the soil (Oliver *et al.*, 2004).

One important step towards the transition to climate-smart crop production is to strengthen and develop multidisciplinary scientific and technical capacities at all levels and engender trust in new science, innovative practices and their application. Creating a facilitated interface between science, planning and policy is essential for achieving CSA and an important factor for the enabling environment. Such interfaces enable cross-sector dialogues to overcome silos and foster coordination and collaboration. In addition, integrated research priorities are key. Research is essential to guide and inspire the generation of alternative options and adoption of climate change adaptation and mitigation strategies, and needs to be in the vanguard of innovative agricultural practices. The fragmentation of research efforts is a major constraint for efficient integrated crop, soil, water and nutrient management and the promise that these efforts hold for CSA. In many countries, research institutions for crops, soil and water are separate entities and have different priorities. Attention needs to be given to identifying integrated research priorities and developing strategies to carry out coordinated scientific investigations.

Case Study C1.1 illustrates efforts to develop simple and robust scientific tools that can guide decision making of farmers on a seasonal and long-term basis.

C1 - 2.1.3 Participatory governance assessments

More inclusive, participatory and responsible governance of natural resources, with an equitable and transparent distribution of benefits, is an essential element for better CSA approaches. Taking into consideration internationally agreed principles on Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries, and Forests in the Context of Food Security (FAO, 2012d), participatory governance assessments with elements around the institutional political economy (FAO, 2015a) can shed light into the processes required for improvement. For example, the capacity development activities for REDD+ readiness supported by the UN-REDD Programme apply a participatory governance assessment. They focus on stakeholder consultation and participation, as well as cross-sectoral coordination in REDD+ planning and implementation in developing countries. Case Study C1.2 illustrates one of the many methodologies developed in this context.

C1 - 2.2 Organizational and institutional capacities - Strengthening the performance of organizations, institutions, and multi-stakeholder and multi-actor processes, platforms and networks

As illustrated previously, the capacity development dimension “organizational/ institutional” includes public and private organizations, civil society and networks of organizations across different levels. It addresses: performance of organizations; cross-sectoral and multi-stakeholder horizontal and vertical coordination and collaboration mechanisms; strategic management functions, structures and relationships; information, knowledge-sharing and decision-making processes; human and financial resources; and infrastructure. In this section, strengthening *intra-organizational performance* will not be examined in detail, as holistic organizational analysis and development are extensively covered elsewhere (Anyonge *et al*., 2013; FAO, 2013a; CSEND 2002; North, 1994).

Strengthening organizations and institutions in the context of natural resources management and climate change is closely linked to the importance of social capital and collective action (Ostrom, 1990, 2008, 2009 and 2010; Adger, 2003; German *et al*., 2012, Stockholm Resilience Centre, 2012), including informal institutions (Lipper and Oosterveer, 2011). It is also closely linked to the importance of producer organizations and cooperatives (Saner, Yiu and Filadoro, 2012; Saner and Yiu, 2017; Herbel *et al*., 2012). Moreover, the need to strengthen organizational and institutional capacities has been highlighted as one key priority area for international support to address the agricultural sectors within NDCs (FAO, 2016a) and National Adaptation Planning (FAO, 2017a, 2017b and 2017d).

With specific reference to CSA, an existing knowledge based exists such as the original CSA Sourcebook chapter on local institutions, the CSA Guide by the Consultative Group for International Agricultural Research Program on Climate Change, Agriculture and Food Security (CGIAR-CCAFS) and literature linking organizational and institutional capacity enhancement to scaling-up CSA. The original CSA Sourcebook module C1 suggested key areas where institutions can support smallholders to implement CSA approaches such as providing and sharing technical knowledge, providing financial services credit and access to markets, as well as supporting the coordination of collective action. It also provides a classification of institutions for CSA across different stakeholders and levels as well as an initial quick institutional assessment tool for CSA. The CGIAR-CCAFS CSA Guide (CCAFS, 2014) analyses key institutional arrangements within CSA recommending the need to particularly enhance local institutional frameworks, strengthen the role of meso-level organizations and working to enhance national institutional frameworks to implement policy decisions. Lastly, enhancing organizational and institutional

capacities is recognized as one key factor to scale out and up CSA (Neufeldt *et al*., 2015).

Aiming to complement the existing knowledge base, the focus in this section of the module is on three areas: (i) Horizontal and vertical coordination; (ii) Multi-stakeholder/multi-actor processes and networks; and (iii) Local institutions across landscape levels.

C1 - 2.2.1 Horizontal and vertical coordination

Enhancing horizontal coordination (i.e. inter-organizational, institutional or inter-sectoral), such as between ministries and agencies, and vertical coordination (i.e. intra-organizational and institutional), such as within organizations, institutions or stakeholders (national to district to landscape to local level) is critical to adopt the desired CSA approaches. This applies to governmental as well as non-governmental actors (such as producer organizations, and formal or informal natural resource user groups). At national level, an important barrier to be addressed is the fact that that the institutional mandate for climate change usually resides in the ministry of environment, and that the integration of agricultural sector needs and priorities into ongoing climate-related planning (and, vice versa, the integration of climate-related considerations into agricultural planning) is not a given. This may be further complicated in that many countries have separate ministries addressing agriculture (crops and livestock), fisheries and aquaculture and forestry as well as natural resources management. Fostering efficient, streamlined coordination processes between the multiple entities engaging in planning and budgeting on climate change and the agricultural sectors is a vital step towards achieving a transition towards CSA.

Institutional structures together with agricultural and environmental stakeholders need to recognize that the agriculture sector is part of the “environmental” solution. For instance, strengthening institutional coordination mechanisms has been recognized in efforts to integrate agriculture into the National Adaptation Planning. This includes assessing jointly with relevant ministries the strengths and gaps in institutional coordination mechanisms, mandates, processes and procedures, and designing contextualized solutions to improve and monitor results through a rapid appraisal (FAO, 2017b). As an example, horizontal and vertical institutional coordination mechanisms across national, district and local level were strengthened during the capacity assessment, analysis and diagnostic stages to address climate change in Laos PDR (Case Study C1.3) In addition, module A3 on integrated landscape management discusses “nested scales” and the benefits of integrating agro-ecological and governance dimensions to reduce pressure on the natural resource base and minimize the need for external inputs.

C1 - 2.2.2 Multi-stakeholder/multi-actor processes, platforms and networks

Fostering spaces for multi-stakeholder dialogue is one essential element to achieve the desired scale of development interventions across agriculture, rural development and nutrition (Linn, 2012). As mentioned in module A3 on integrated landscape management, identifying, assessing, strengthening and facilitating participatory multi-stakeholder, multi-actor and/or networks is key to enhancing systemic country capacities for CSA. This encompasses policy formulation, implementation as well enabling the uptake of CSA approaches at scale (see for example the multi-partner programme for scaling up energy-smart food in chapter B9 - 5.3). Given the knowledge-intensive, participatory and innovative nature of CSA approaches, multi-stakeholder and multi-actor processes, platforms, partnerships and/or networks are therefore well placed to enable the co-creation of knowledge, and increased information sharing and collaboration (Hemmati, 2002; Brouwer *et al.*, 2015).

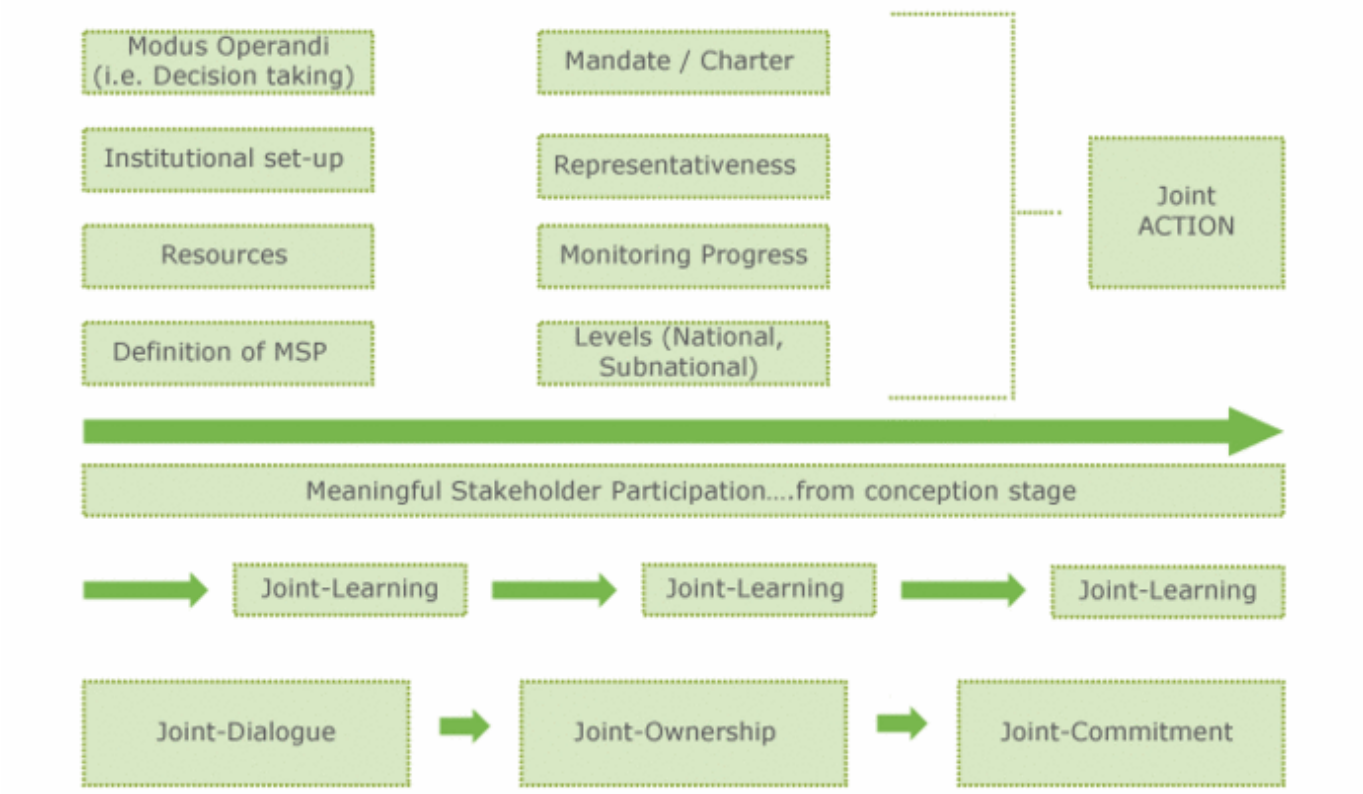
Besides strengthening multi-stakeholder structures, meaningful engagement of all stakeholders requires effective skills development, with a focus on soft skills including multi-stakeholder diplomacy (Kurbalija *et al*., 2006; Kalas, 2007), consideration of power dynamics (Sova *et al*., 2014; Duff *et al*., 2009) as well as measuring progress of multi-stakeholder platforms and processes (FAO, 2013a). Inclusive stakeholder spaces can include cross-

ministerial roundtables, multi-stakeholder/multi-actor platforms for strategy development, implementation or coordination of regional bodies, among others.

Another significant element is to consider which individual or institution can take on the role of a neutral, trusted convener, facilitator or partnership broker (Kalas, 2007; Nederlof *et al.*, 2011 quoting Klerkx *et al.*, 2011; Rioux and Kalas, 2017). For instance, FAO is often ideally placed to take on this bridging function and facilitate dialogue among diverse actors. See Case Study C1.13.

More specifically, multi-stakeholder or multi-actor platforms have been successfully applied around innovation to stimulate learning and catalyse collaboration for natural resources management (Misiko *et al.*, 2013) as well as scale up and out action across community, district and national levels (Tucker *et al.*, 2013). Multi-stakeholder and multi-actor platforms can therefore also be applied to CSA with the guiding principles suggested in Figure C1.3.

Figure C1.3. Operational elements for multi-stakeholder, multi-actors platforms for CSA



Source: Author

As illustrated in Figure C1.3, the key principles for strengthening existing or establishing new multi-stakeholder platforms or multi-actor platforms for CSA are:

- *Promoting an inclusive and participatory process* from the conceptual stage throughout to enable joint learning, joint dialogue, joint ownership and joint commitment for joint action, thus improving the desired sustainability and impact of the platform's results
- *Enabling meaningful participation* of all stakeholders through functional skills and competence development, including negotiation, effective communication and strategic planning to even the playing field, address power dynamics and move towards a common understanding, common objectives and common values for joint action
- *Exploring the role of a trusted and neutral convener, facilitator or broker*

Critical building blocks (see yellow blocks above) of the platform include clarifying and reaching consensus on:

- *modus operandi and operational procedures* (e.g. how the agenda is set up and by whom, how decisions will be taken)
- *institutional set-up* (e.g. will a secretariat be established, will it be a physical or virtual meeting space, who will facilitate the discussion?)
- *resource requirements* (including human and financial resources, and transport allocation to enable remote stakeholder participation and facilitation)
- *monitoring process* (i.e. through self-monitoring by stakeholders to maximize learning and foster continued ownership and commitment)
- *mandate and charter* (i.e. defining and agreeing upon the vision, purpose and entry point)
- *representativeness* (e.g. are stakeholders truly representative and have the authority to take decisions, how coordinated are stakeholder groups within their constituencies?)
- *definition of multi-stakeholder / multi-actor platforms* (i.e. making clear what it is and what it is not)
- *clarifying operational levels* (e.g. national, sub-national and/or linkages between levels).

C1 - 2.2.3 Local institutions across landscape levels

This section underscores the importance of local institutions, particularly across the landscape level, as a key entry point to transformation towards CSA practices. It complements and builds on the CSA Sourcebook module A3 as well as on existing recommendations regarding the importance of local institutions for climate change adaptation (Agrawal, Kononen and Perrin, 2009) and CSA (FAO, 2013b; CCAFS 2014) and particularly across the landscape level (Sayer *et al*., 2012).

Effective climate change adaptation strategies must be location-specific. The strategies need to take into consideration local micro-climates, markets, consumer preferences, availability of inputs, and existing local institutions. Often, lack of adequate attention to this multiplicity of factors undermines the effective scaling-up of CSA interventions. Strengthening local institutions to understand and interpret the multiple factors impacting agriculture is important for informed decision-making and to design feasible adaptation strategies.

Smallholder farmers are particularly vulnerable to climate variability and change, as they lack adequate resources to cope with stressors caused by climate variability. It is important to build their capacity to interpret climate/weather data and make feasible adaptation decisions. Often meteorology is perceived as an abstract science, wherein data collected at the local level is aggregated at the regional or sub-regional level and interpreted to make generalized forecasts for a larger geographic area. This alienates local ownership, undermines deeper understanding of the local micro-climate, and leads to poorer understanding of the stressors/risks, all of which are critical for designing effective adaptation strategies.

Effective management, interpretation and dissemination of climate/weather data at the local level requires building and strengthening local farmer institutions. These institutions can provide farmers with a host of support services to strengthen their resilience and enhance their adaptive capacity to climate change/variability. These could include: (i) establishing and maintaining a database of meteorological data and local indigenous knowledge; (ii) facilitating access to extension services and other support agencies, and providing weather forecasts, market price data, and technical information; (iii) disseminating information and data critical to enable farmers to make informed decisions on crop adaptation; (iv) managing custom hiring of farm machinery; and (v) providing a platform for discussion and engaging various stakeholders to support individual farmers to improve adaptation. The farmer institutions should be inclusive, including members from agriculture and related activities and ensuring adequate representation of economically and socially marginalized groups—as they are often the most vulnerable.

In this realm, the landscape level deserves particular attention. Landscapes are usually not recognized as defined eco-regional entities in the current administrative frameworks. In recent years, there has been increasing

recognition of the importance of adapting a landscape approach for effective natural resources management. The World Wide Fund for Nature (WWF) describes a landscape as “a contiguous area with a specific set of ecological, cultural and socio-economic characteristics distinct from its neighbours” (WWF, 2002). The landscape approach “focuses on large, connected geographic areas to allow for recognition of natural resource conditions and trends, natural and human influences, and opportunities for resource conservation, restoration and development. It seeks to identify important ecological values and patterns of environmental change that may not be evident when managing smaller, local land areas” (Krishnan *et al*., 2012).

Integrated landscape management is the management of production systems and natural resources in an area large enough to produce vital ecosystem services and small enough to be managed by the people who use the land and provide those services (FAO, 2013b; module A3 on integrated landscape management). For sustainable management of the landscape, it is critical to engage the multiple stakeholders to develop a deeper understanding of their landscape and resource availability; explicate their strategies; and prioritize actions for effective management of the resources in the landscape. The strategies should cover issues related to ecosystem services, including those supporting/providing agro-ecological production (pollination, soil fertility, pest control, etc.), water resources, sustainable land and forest management, and biodiversity conservation. The strategies will coordinate production and capacity building. The strategies will describe and prioritize the parameters and objectives of agro-ecological production.

Landscape Management Strategies and Action Plans can build upon FAO’s successful models of natural resources management at the landscape level taking into account the principles of agroecology (FAO). These models have been cost-efficient and effective in numerous countries. Implementation involves working with communities (diverse stakeholders) to define the productivity and sustainable management objectives of their shared landscape, identifying capacity gaps, and working with local extension services and others to generate capacity-building programmes to fill the gaps. The FAO-coordinated Andhra Pradesh Managed Groundwater Systems (APFAMGS) project proved with replicated results that Indian farmers in FFS groups at landscape level could reduce the overuse of groundwater by decreasing water demand once members of their own communities had collected and shared practical data on groundwater recharge and likely supply for dry-season crops. Reducing groundwater extraction while improving crop production showed how Indian farmers could manage critical natural resources at landscape scale. Likewise, the recently completed Strategic Pilot on Adaptation to Climate Change (SPACC) project proved that FFS-style groups could help farmers adapt to climate change at the community level. See Case Study C1.11.

C1 - 2.3 Individual capacity development- Strategies for effective learning across technical and functional capacities

C1 - 2.3.1 Modalities of learning and knowledge sharing for capacity development

An effective learning activity is “any type of structured or semi-structured initiative or intervention with the primary aim of supporting improved work performance and behavioural change of individuals in a way that enables them to better contribute to the development goals of their own organizations and countries” (FAO, 2012e). In addition, “learning must be integrated into a portfolio of interventions that address factors other than knowledge and skills (e.g. management, motivation, incentives, governance) which can support a gradual uptake of changes across the organizational dimension and the enabling environment through a number of different delivery methods to have a better impact on participants” (FAO, 2012e).

Learning and knowledge sharing play a key role in strengthening individual capacities. For CSA, enabling continuous individual and institutional learning is fundamental given the complexity and uncertainty of climate change and its impacts on farming systems and local communities.

In particular, a strategic approach to skills development and learning for adapting a CSA approach, requires (UN

CC:Learn, 2012):

(i) Taking stock of relevant skills development and learning initiatives;

(ii) Assessing existing human capacities to achieve climate change objectives;

(iii) Identifying and prioritizing learning interventions in the short, medium and long terms; and

(iv) Engaging educational and vocational training institutions in order to enhance sustainability.

Figure C1.2 lists the specific to enhance individual capacities for facilitating endogenous (i.e. internally initiated and driven), contextualized change processes led by national actors. It covers a wide range of approaches that trigger learning and knowledge sharing, from classical classroom training to more innovative approaches such as South-South cooperation agreements, coaching, on-the-job mentoring, institutional twinning, applied experimental learning through FFS (see Case Studies C1.4 and C1.5), as well as network creation and facilitation. Beyond face-to-face solutions, many innovative approaches in capacity development foster social learning – for example through e-learning or web/ICT-supported multi-stakeholder platforms and networks (FAO, 2011a).

A note on "trainings/workshops": Trainings/workshops as a capacity development modality are a powerful tool, if used effectively in line with a learning cycle (FAO, 2012b). For instance, effective trainings represent useful opportunities to develop new capacities for climate resilience and climate change mitigation, and to dispel common myths. Trainings on agronomic management would need to be provided to policy-makers, extension agents, agro-dealers and farmers on a consistent basis to refresh their skills and knowledge, and to train new people joining in the agriculture business (e.g. emergent farmers and agro-dealers). For farmers, access to knowledge about changing climatic conditions and the long-term viability of adapted crop production practices is an important element to devise informed strategies to: (i) cope with the limiting factors specifically affecting their crop system; (ii) better allocate the resources they have at their disposal and those they can mobilize; and (iii) make reasoned investments in adaptation and mitigation.

C1 - 2.3.2 Improving technical and functional capacities across the individual, organizational and policy levels to scale up CSA

In numerous countries, sector agencies strengthen individual technical capacities successfully. Technical capacities refer to aspects such as increasing the competencies of staff to intensify production sustainably or manage natural resources more effectively (FAO, 2011b). However, unless such technical capacity- strengthening efforts are adequately integrated into strategic planning, policies and decision-making, it will not be possible to scale them up efficiently or sustainably (Neufeldt *et al*., 2015). Moreover, non-technical (i.e. functional) capacity development is often not prioritized. These soft skills include the ability to manage personnel and organizations, good governance principles such as dialogue and communication with stakeholders, resource allocation within policy frameworks that aim for equity and poverty alleviation, transparency and accountability (UNESCO-IHE and UNW-DPC, 2009). Moreover, the lifelong learning of individuals and organizations is important to keep up with evolving tasks and trigger innovation. This requires financial, personal and managerial support mechanisms to foster knowledge generation and sharing. Functional and soft-skills development can also be generated as incentives for ecosystem services (see module A3 on integrated landscape management). More specifically, FAO's renewed corporate approach to capacity development (FAO, 2010) recommends that to complement technical climate change capacity strengthening (see FAO 2016g), the following functional capacities should be enhanced to enable countries and regions to plan, lead, manage, sustain and scale up initiatives:

- **Implementation Capacity**: implement and deliver programmes and projects, from planning to monitoring and evaluation
- **Partnering Capacity**: engage in networks, alliance and partnerships

- **Knowledge Capacity**: access, generate, manage and exchange information and knowledge (see Information and Knowledge Management Toolkit online course and Africa Adapt)
- **Policy and Normative Capacity**: formulate and implement policies and lead policy reform.

Table C1.2 provides some examples of required capacities at the different levels. Two concrete learning interventions (FFS and e-learning) for boosting individual technical and functional capacities are illustrated in Case Study C1.4.

Table C1.2. Examples of required technical and functional capacities for climate-smart agriculture

Type of capacity	Individual dimension	Organizational dimension	Enabling environment
Technical capacity	Regularly updated knowledge and skills; understanding of broader technical context of CSA.	Appropriate knowledge and skills mix, such as agronomic, environmental, engineering, economic, social, legal, financial and institutional; knowledge of investment procedures.	Policy for critical review of knowledge and information, and allocation of adequate resources for CSA-related capacity development requirements.

Type of capacity		Individual dimension	Organizational dimension	Enabling environment
Functional capacity	**Implementation capacity**	Skills for CSAS project and finance management; personnel/team management/mentoring skills, ability to deliver, leadership, mediation skills.	Ability to set goals/strategy; financial and people management, staff rotation, incentive systems, project management including proper planning and M&E; ability to deliver in a timely manner.	Sound task assignments and clear mandate of sector agencies; cross-sectoral collaboration mechanisms; sound finance and budgeting systems, facilitating proper organizational management.
	Partnering capacity	Ability to engage stakeholders, apply inclusiveness; effective communication, negotiation and advocacy skills; capacity for collective action.	Transparent decision-making processes (including budgets and plans); accountable procedures for stakeholder consultation and empowerment.	Policy to ensure inclusiveness, transparency and accountability; conducive regulations.
	Knowledge capacity	Desire to continue learning and attend trainings, self-reflection of performance; skills for knowledge sharing and management.	Procedures for continuous performance review; mechanisms and rewards to support information/ knowledge exchange and learning; support for communities of practice.	Policy to promote an open work atmosphere and inclusiveness; openness to continuous sector performance review and implementation of adjustments.
	Policy and normative capacity	Ability to meaningfully engage in CSA-related policy and planning processes; ability to understand that agriculture is an integral component of food systems, which have to be climate- and nutrition-smart.	Ability to formulate and implement policies and lead policy reform, including climate change and nutrition mainstreaming in policies.	Capacity to administer legal and institutional frameworks, including those related to UNFCCC.

Source: Adapted by author from UNESCO–IHE and UNW-DPC (2009) for CSA with different functional capacities

C1 - 2.3.2 Farmer Field Schools/Climate Field Schools

Applying a co-learning approach among all stakeholders to foster social learning is an essential component of CSA. One such key capacity development modality to enhance individual as well as organizational capacities are Farmer Field Schools (FFS). The FFS approach is an innovative, participatory and interactive learning approach that emphasizes problem solving and discovery-based learning. FFS aims to build farmers' capacity to analyse their production systems, identify problems, test possible solutions, and eventually encourages the participants to adopt the practices most suitable to their farming systems (FAO, 2011a). The pedagogical and empowering FFS approach has also been evolving into "Climate Field Schools" with the aim to adopt, adapt and grow. Case Studies C1.4 and C1.5 illustrate the practical application of FFS for CSA.

Catalytic factors to enhance capacities for adapting climate-smart agriculture approaches

C1 - 3.1 Agricultural innovations systems

CSA approaches seek to find “smart” solutions to mitigate and adapt to climate change. Innovation, as a process whereby a new idea or way doing something is brought into use, is key to making agriculture more resilient, sustainable, competitive and thus smarter. Innovations – used in plural form – refer to the concrete technological, social or institutional novelties that bring about change. CSA approaches need to be supported by a mix of innovative technological, social and institutional solutions. Such solutions are also key ingredients for “total factor productivity growth”, suggesting that the knowledge intensity within production systems such as research, extension and agricultural innovation systems, policy and institutional reforms represent a key source of future productivity growth, complementing more traditional resource-led growth (Fuglie and Wang, 2012). For example, improved farming practices, collaboration, targeted policies and standards are all important factors in innovations that can address climate change adaptation and mitigation. These innovations require specific technical skills and equipment along with the appropriate mechanisms for knowledge exchange and mutual learning, as well as an environment that enables change.

Innovation in agriculture emerges within agricultural innovation systems – networks of research, extension, producers, agribusinesses and other actors. The interactions of these systems are shaped by policies, mind-sets, attitudes and behaviours (FAO, 2014a; FAO, 2015c; Schut *et al*. 2015; TAP, 2016a). Functioning systems act as catalysts for innovation. They play a critical role in making agriculture more climate-smart by generating, documenting, blending, sharing and applying indigenous, traditional, lay and scientific knowledge and by facilitating learning processes. Knowledge networks can be organized around platforms that provide a venue for the various actors to connect and collaborate (Pali and Swaans, 2013). Global and regional platforms for coordination, knowledge exchange or advocacy are needed alongside local innovation and platforms to strengthen capacities for change in the field (Prolinnova, 2011). Collective action, through farmer organizations, cooperatives or value chains, is a key strategy to minimize transaction costs and scale up agricultural innovations that are climate-smart. Case Study C1.6 illustrates emerging responses to climate change in pastoral systems in Ethiopia and Niger.

Changing over to a new system and ways of doing business carries a perceived and sometimes real risk of failure, particularly for farmers. As a consequence of their risk aversion, farmers are reluctant to change the management practices they are familiar with, unless they can see a clear benefit for their household and business and livelihood priorities. As extensively discussed in module C2, extension services facilitate changes in practice for climate-smart production by providing access to good practices and technologies and enhancing capacity to implement them. However, in many developing countries, the public extension services have deteriorated and been partly replaced by cell phone-, internet-, radio- and TV-based messages from various entities (directly from research institutions, input suppliers, media, ministries, farmer organizations, etc.) and private service providers (e.g. through out-grower schemes). As a result, many farmers, and in particular women farmers, do not have access to any kind of extension. The role of women needs particular consideration in view of their often significant role as food producers in many countries (see module C6 on the role of gender in climate-smart agriculture).

Global attention to agriculture as one of the most climate-vulnerable sectors provides an opportunity to accelerate a much-needed reform of extension and advisory services. Extension has long played an intermediary role between farmers and technology suppliers. However, the challenge of climate change requires collaboration with more actors and more complex interventions than ever before. This calls for a shift in the organization and use of extension systems (FAO, 2013a) from:

1. a focus on introducing new technologies to a focus on institutional change;
2. rural engagement only to include urban areas across the national level, from public service delivery to

multiple agency advisory provision;

3. practice development to strategic policy and practice development;
4. communication for information dissemination to communication for network-based development and innovation, and from core service delivery by experts to facilitation.

Figure C1.4. Theoretical perspectives on agricultural innovation

	Transfer of Technology (ToT)	Farming System Research	Agriculture Knowledge & Information Systems (AKIS)	Agricultural Innovation Systems (AIS)
Periods/Era	Central since 1960's	Starting in 1970s and 1960s	From 1990s	Since 2000s
Purpose	Supply technologies through linear processes	Learn Farmers'constraints through surveys	Collaborate in research (participatory research & extension)	Co-develop innovation involving multi-actor processes and partnerships
Scope	Productivity increase	Efficiency gains (input-output relationships)	Farm-based livelihoods	Value chains, institutional change
Innovators	Scientists	Scientists and extensionists	Farmers, scientists and extensionists together	Multiple actors
Role of Framers	Adopters and laggards	Source of information	Experimenters	Partners, entrepreneurs, innovators, exerting demands
Role of Scientists	Innovators	Experts	Collaborators	Partners, one of the actors responding to demands
Key changes sought	Farmers' behaviour change	Removing farmers'constraints	Empowering farmers	Institutional change, innovation capacity
Market integration	Nil	Nil	Low	High
Capacity development	Technology adoption and uptake through development of technical skills & infrastructure	Technology adoption and uptake through development of technical skills & infrastructure & integration of ecological and farm-economic conditions	Enhancing communication between actors, co-evolved technologies better fit livelihoods systems	Capacity to interact, innovate & learn, creating enabling conditions

Source: Tropical Agricultural Platform, 2016.

Effective adaptation to climate change involves the use of coherent technical and institutional solutions congruent with contemporary thinking on innovation practice. In fact, climate change adaptation and mitigation can be regarded as a process of innovation that requires the successful combination of “hardware” (i.e. new technical devices and practices), “software” (i.e. new knowledge and modes of thinking) and “orgware” (i.e. new social institutions and forms of organization) (Smits, 2002; Leeuwis, 2004; FAO and INRA, 2016).

C1 - 3.2 Indigenous knowledge, knowledge sharing and knowledge networks

Farmers and pastoralists have been dealing with natural climate variability over millennia and have developed a wide range of coping strategies (see also climate-smart livestock production systems in module B2, integrated crop-livestock systems in modules B5 and A3 on Integrated Landscape Management). Such practices remain valid in the expanding climate change context (IFAD, 2016). They include coping strategies by tapping into endogenous innovation processes and applying indigenous knowledge and practices (see Case Study C1.4). One challenge is that to reach scale and address increasingly complex issues to address impacts of climate change in the long term, such indigenous practices need to be complemented with additional knowledge. An additional change is that much of this indigenous knowledge is likely to be lost as the local farming population ages and youth tend to migrate to urban areas or engage in activities other than farming. Therefore, documenting, mobilizing and sharing indigenous knowledge can be vital for safeguarding and further developing local adaptation strategies. Knowledge networks can address both of these challenges while fostering the vital interaction between stakeholders to understand and scale up CSA experiences. Fostering a process and space through knowledge networks and contextualized knowledge management strategies where local, cultural indigenous, scientific, experimental and experiential knowledge are combined encourages collaboration, improves communication and common understanding, promotes innovation and supports equity in participation and decision making (Neufeldt *et al*., 2015 quoting Buck and Bailey, 2014; Freeman *et al*., 2015).

C1 - 3.3 Information and communication technologies and communication for development methods

Bridging the current information and knowledge gap for more inclusive and effective decision making for implementing CSA approaches is a key challenge. Smallholders are usually based in rural areas far from the traditional providers of agricultural information and rural advisory services. In addition, the resources of public extension service providers may be limited. Successful adaptation to climate change by small producers is not merely a question of developing new adaptation technologies, but also depends on ensuring access to them.

C1 - 3.3.1 Information and communication technologies for CSA

Associated with trends such as globalization and the shift towards a network society (Castells, 1996, 1997 and 2005), the term “information and communication technologies (ICTs)” refers to technologies designed to access, process and transmit information and facilitate communication encompassing a full range of technologies. These include traditional, widely used devices such as interactive radios, telephones or TV, to more sophisticated tools like satellites, computers and the Internet (Weigel and Waldburger, 2004). A recent phenomenon is the convergence between ICTs, which enhances interactivity. For instance, community radio become more participatory as people use mobile phones to call in through listener clubs and voice their opinions for a dialogue with decision-makers.

Development practitioners started to explore a technology-centred approach to understand how these tools could be integrated to improve the effectiveness of development projects and programmes captured with the term “ICTs for Development (ICT4D)”. The focus was on the transformative potential of people, organizations and systems (Panos, 2007). However, real risks were also acknowledged, including unsustainable environmental consequences around e-waste (Kiddee, Naidu and Wong, 2013) as well as contributing to a new form of exclusion coined the “digital divide” (Norris, 2011). Regarding the digital divide, the rapid proliferation of ICTs, including the internet, connect many and leave many others out, particularly the most marginalized in rural areas out. To address this risk and move towards a digital “provide”, a people-centred, inclusive and demand-driven application of ICTs was proposed and spearheaded by the Swiss Agency for Development and Cooperation (SDC). Three overlapping areas

were specified around access, voice and networking to: (a) better access critical information, knowledge and communication for practice change; (b) strengthen voice and participation in decision-making processes for inclusive dialogue; and (c) facilitate networking and knowledge sharing (SDC, 2006). Moreover, to capture the full potential of ICTs as a catalyst for transformation, more nuanced assessments identified the need for strategic ICT integration into development programmes (Kalas and Spurk, 2011) as well as applying a "7 Cs approach" beyond a technology-centred, infrastructure- and connectivity ICT4D to include content, capacity, context, convergence, communication, communities and conservation issues (Kalas, 2010).

Thematically, the potential of strategic ICT integration to address various development cooperation areas is well documented. These include sustainable development (Sachs, 2015), agriculture (FAO, 2016b; World Bank, 2017), sustainable agriculture (Conway, 2012; Campanhola and Pandey, 2017) and climate change (Kalas and Finlay, 2009; Heeks and Ospina, 2010). More specifically for CSA, ICTs can play a pivotal role in facilitating the assessment of expected future impacts of climate change on agricultural production systems and landscapes. Moreover, ICTs are powerful tools for improving farmers' access to climate and agricultural information, ranging from technical advice on specific CSA practices to price and market information, and can facilitate the exchange of experiences among peers and between farmers and various stakeholders (Kalas and Finlay, 2009). In addition, ICTs contribute to a change in practices (Farm Radio International, 2011) and empower local stakeholder groups and individuals by enhancing their voice and facilitating increased participation in decision-making processes (Kalas and Spurk, 2011). It is recommended that countries explore the potential of the people-centred, inclusive and demand-driven application of ICTs to catalyse, accelerate and scale up and -out the transition to CSA.

Case Study C1.7 illustrates how the use of ICTs can improve access to research information for researchers, development practitioners and extension workers.

Case Study C1.8 illustrates how an information system helps to connect farmers, extension services, the private sector, research institutes and non-governmental organizations to promote exchanges with a view to improving the adoption of existing technologies, as well as to signal the demand for new ones to technology developers and knowledge providers.

C1 - 3.3.2 Communication for Development for improved participation, coordination and voice

A participatory communication for development approach (C4D) moves beyond information dissemination by the media to a participatory process using a wide variety of media and interpersonal communication techniques and tools that aim to facilitate dialogue among stakeholders and to achieve consensus and action (Bessette, 2004; FAO, 2007; SDC 2006). The C4D approach can therefore improve the effectiveness of local or national climate change and food security initiatives, as well as contribute to empowering stakeholders. It does so by facilitating knowledge exchange and learning among different stakeholders, improving participation and coordination, matching supply and demand for adaptation support services, and contributing to mediation in conflict situations by developing a communication strategy (see Case Study C1.9).

Operational guidance on how to assess, design and monitor capacities for adopting climate-smart agriculture approaches at the country level

How do country stakeholders apply comprehensive capacity development approaches in a practical way to achieve the desired transition towards CSA? What operational steps are needed to make tangible and meaningful progress? Three steps are recommended (see also FAO, 2017g). First, jointly with stakeholders assess capacity development needs and identify concrete recommendations for improvement. Second, jointly with stakeholders design

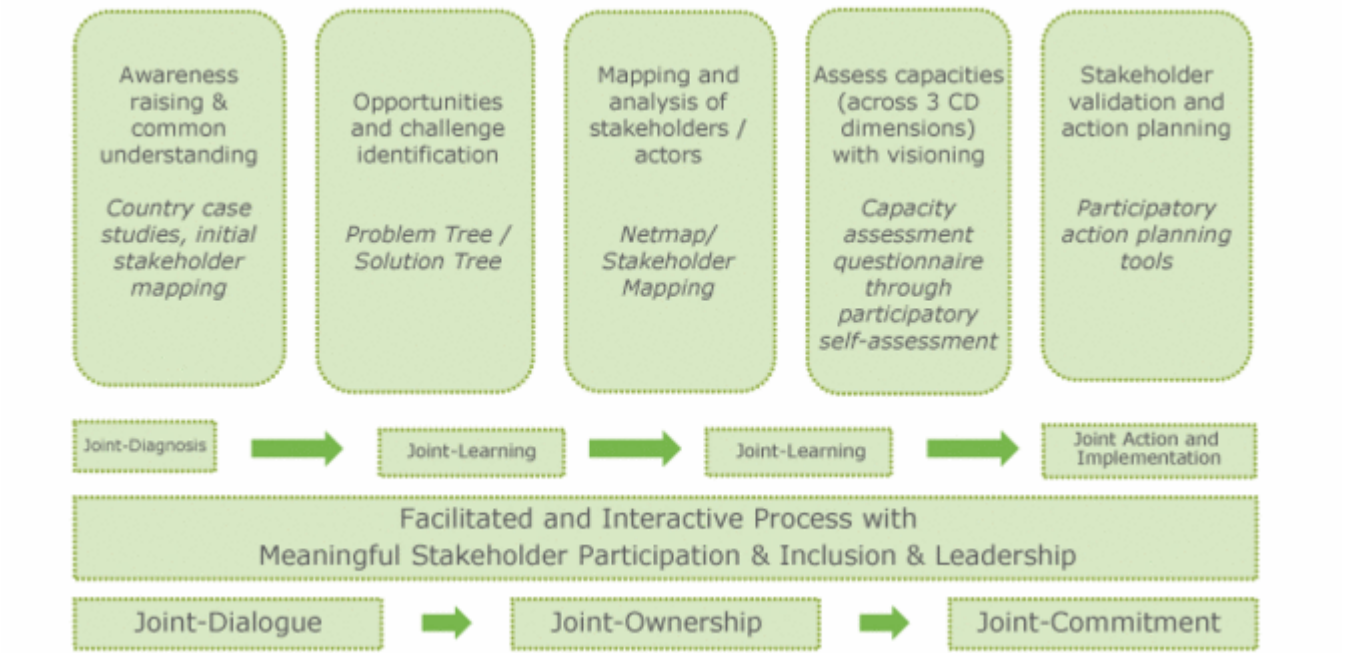
appropriate capacity development interventions. Third, jointly with stakeholders define and track capacity development results. This section explains these three steps to operationalize capacity development for adopting CSA approaches: assessing and analysing capacities; designing capacity development interventions; and monitoring capacities.

C1 - 4.1 Assessing and analysing capacities

To ensure quality at entry while maximizing country ownership from the outset, it is critical to conduct participatory capacity assessments jointly with stakeholders. A capacity assessment is a process that integrated practical tools to help determine what and whose capacities need to be developed, while providing a benchmark to measure progress and identify any adoption constraints, and to ensure that the envisioned capacity development interventions for the CSA project address some of the constraints.

As illustrated below, the capacity assessment process includes several key elements. Above all, it underscores the need for all relevant stakeholders to be included in project planning and in determining priorities (Scherr *et al.*, 2012). The process is furthermore in line with participatory rural appraisal methodologies (Chambers and Conway 1991; Chambers 1994 and 2014), empowerment (Sen, 1999), people-centred community and rural development (Korten, 1980) as well as instrumental and normative participatory typologies (Reed, 2008).

Figure C1.5. Capacity Self-Assessment Process with key elements for CSA transition



Source: Author

Figure C1.5 illustrates the capacity assessment process. Consisting of a series of workshops, the recommended process is participatory, inclusive and interactive by nature. It aims to enhance common understanding, dialogue, consensus and trust among all stakeholders in order to maximize joint-ownership and joint-commitment for joint-action. Covering all administrative levels (i.e. national and sub-national), the process needs to ensure inclusive stakeholder participation. Key elements within the process include:

1. **Awareness raising and common understanding**: Aiming to explore the contextual relevance of CSA for a

country, it starts the dialogue for the joint-diagnostics of opportunities, challenges and actionable recommendations for improvement to follow.

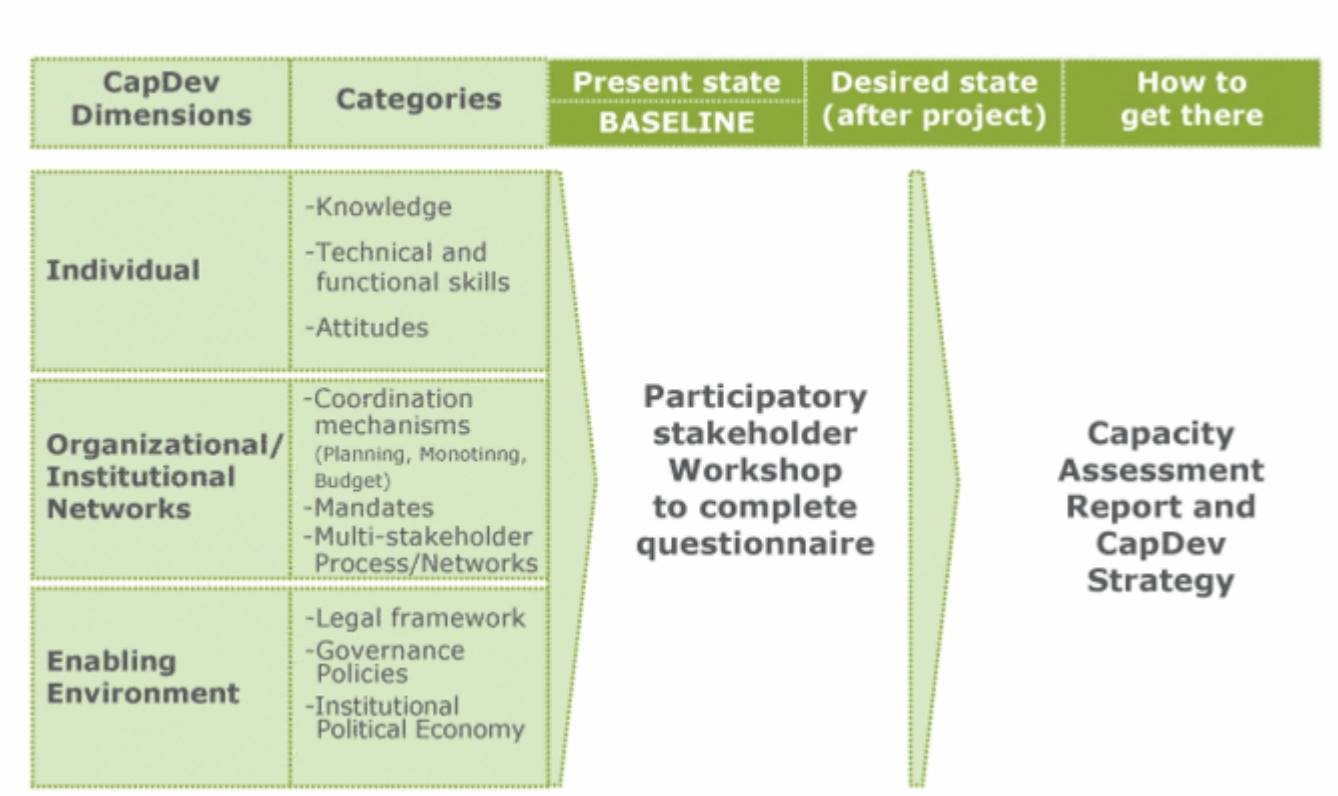
2. **Identifying opportunities and challenges**. Through the facilitated application of problem / solution tree methodologies (see note on tools below), context-specific opportunities and challenges for CSA transition can be identified.
3. **Mapping and Analysis of key stakeholders**. This can be done through a facilitated stakeholder-analysis exercise using various tools such as netmap (see note on tools below).
4. **Assessing capacity needs**. Stakeholders complete a questionnaire (see section below) in a facilitated, "self-assessment" workshop format that compares existing capacities with those are needed to achieve CSA. It helps establish a baseline and is guided by identifying the present state (Where are we now?), the desired/future state (Where do we want to go?) and concrete recommendations (What is the best way to get there?). The questionnaire also addresses the three capacity development dimensions: individuals, organizations and the enabling environment.
5. **Validation and action planning**. This means jointly with stakeholders validating the capacity assessment findings and plan how to enhance the capacities identified. This includes clearly defining a realistic and resourced plan with clearly identified results. Again, participation and consensus are key to ensure that the plans are viable and acceptable to the stakeholders concerned.

A note on tools: The specific facilitated tools proposed for the various steps of the capacity assessment process (problem/solution tree, stakeholder mapping, netmap, participatory action planning, etc.) are not discussed in detail. For a list of tools and practical "how-to" guidance for capacity needs assessment, kindly consult FAO 2015a, TAP 2016b, and CDAIS 2017. In addition, the process and tools can be complemented with additional participatory self-assessment tools particularly applicable to climate change such as Self-Evaluation and Holistic Assessment of Climate Resilience of Famers and Pastoralists (FAO, 2016c).

Case Study C1.7 illustrates the application of the FAO capacity assessment methodology when tailored to CSA projects in Kenya and Tanzania.

One central tool of the capacity assessment process is the **capacity assessment questionnaire** (See Annex C1.1). It identifies qualitatively and quantitatively the existing capacities and identifies the concrete recommendations needed to reach the desired results. It also identifies a *baseline* to measure and monitor progress (FAO, 2017c).

Figure C1.6. Capacity Needs Assessment Questionnaire



To complement and deepen the Case Study C1.7, Annex C1.1 provides the capacity assessment questionnaire used at national level, and Annex C1.2 provides the field/site-level capacity assessment to complement the national-level findings.

Such an approach can help develop initiatives that are tailored to farmers' needs and adapted to local contexts. For example, in the context of the Mitigation of Climate Change in Agriculture (MICCA) pilot project in Tanzania (FAO, 2016d), field visits and interviews with farmers have enabled the trainers to realize that some farmers practicing conservation agriculture were intercropping maize with pumpkin, which is not a nitrogen-fixer legume. As intercropping with leguminous crop is central to improving soil fertility, this showed the need for interdependently strengthening individual capacities on conservation agriculture, strengthening networks and institutional linkages between villages, increasing the number of villages with demonstration plots, expanding the number of demonstration plots in each village, and increasing the number of contact farmers supporting farmers in the implementation of conservation agriculture on their lands. See Annex C1.2. for an overview (in table form) of commonly identified problems, needs and opportunities, as well as suggestions for entry points to improve the situation while undertaking capacity assessment for CSA projects at the field level.

C1 - 4.2 How to design appropriate capacity development interventions across the enabling environment, organizational and individual levels

Following the comprehensive and systemic capacity assessment and analysis, appropriate capacity development modalities need to be defined, designed and appropriately resourced. These modalities may include awareness raising, dialogue, training, technical support, coaching, strengthening and facilitating multi-stakeholder consultations, processes or platforms and strengthening organizational performances, institutional frameworks and linkages. See Figure C1.2. for an overview of different capacity development modalities.

C1 - 4.3 Monitoring capacities - How to identify, monitor and evaluate capacity development interventions for climate-smart agriculture

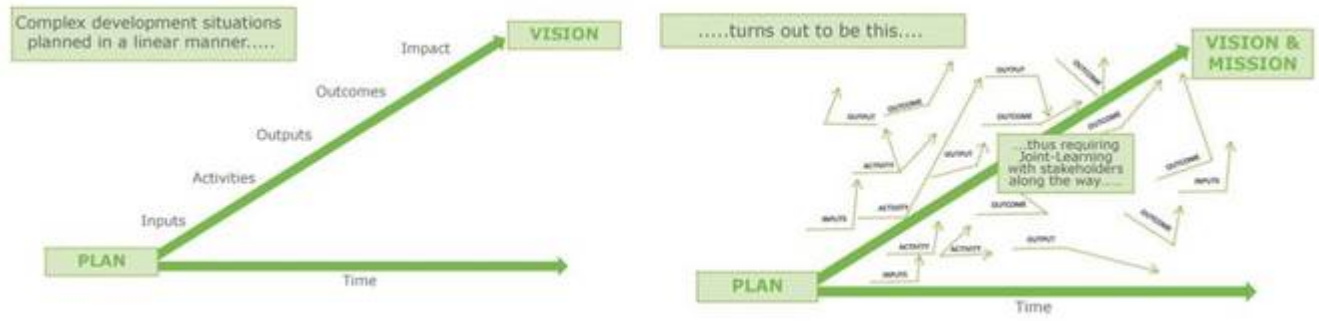
Tracking capacity development means tracing changes in capacities across the three dimensions of capacity development (FAO, 2015a). For instance, and as a result of the capacity development activities:

- Are individuals *applying knowledge* which they were trained in through a workshop?
- Are state and non-state organizations *performing better* to deliver services, or are multi-stakeholder platforms, cross-sectoral coordination mechanisms inclusively and effectively functioning?
- Are policies, regulatory and institutional frameworks aligned with national priorities and with country commitment in place to support the *implementation* of desired change processes?

C1 - 4.3.1 Defining the effects of capacity development

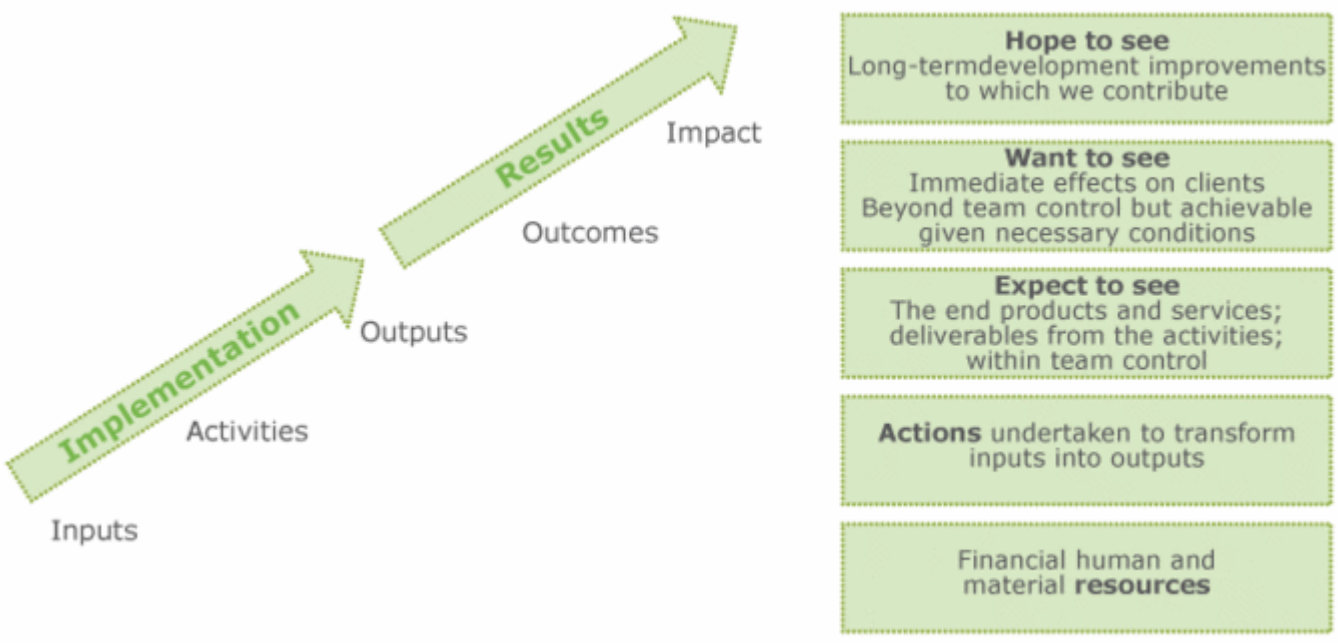
Capacity Development is fundamentally about facilitating change. Defining and monitoring the effects of capacity development interventions is a complex endeavour given the non-linear nature of the process and the difficulty of attributing impacts to particular activities. For instance, originally planned processes with linear activities (Figure C1.7a) turn out to be more complex (Figure C1.7b), requiring space for learning, flexibility and adjustment. This directly applies to CSA, which is similar in complexity and uncertainty.

Figure C1.7 Complexity of a non-linear development process



Notwithstanding this complexity, the majority of development agencies attempt to track capacity development within Results-based Management principles and subsequent Logical Framework approaches (See Figure 1.8), which can be complemented with alternative approaches such as Outcome Mapping (FAO 2015a) and the Theory of Change (Vogel, 2012).

Figure C1.8. Recapping Results-based Management



Source: Author

Particular elements that are important to "stretch" the classical log-frame to monitor capacity development are:

- Addressing all three capacity development dimensions interdependently
- Complementing technical with functional capacities
- Combining the accountability objective with learning to enable continuous adjustment
- Seeking to understand the quality of processes as well as the products
- Creating learning spaces to identify unexpected as well as expected results
- Merging quantitative and qualitative methodologies
- Involving stakeholders through joint monitoring to ensure common understanding, ownership and commitment

Moreover, clearly defining and formulating capacity development results is an important element. This includes whether new practices are *adopted*, *performance* is improved, and *commitment and political* will are fostered.

Table C1.3. Illustration what Constitutes a "Good" Capacity Development Result

What constitutes a good CB result?		
	Output levels	**Outcome level**
INDIVIDUALS	Did producers learn new knowledge/ skills/ behaviours?	Are trained producers actually applying new knowledge/ skills/ behaviours? --> **ADOPTION**
ORGANIZATIONS	Do organizations have improved mandates and systems in place	Are organizations delivering better services? --> **PERFORMANCE**
ENABLING ENVIRONMENT	Are new/ improved policies and frameworks in place?	Do policies and institutional frameworks allow implementation and sustainability of changes? --> **COMMITMENT & POLITICAL WILL**

Source: (FAO, 2015a)

Based on the aforementioned principles, questions for CSA may include:

- Have producers aquired and are applying knowledge, skills and practices on CSA?
- Are agriculture sector ministries involved in decision-making and coordination processes relating to climate change (e.g. NAP planning and implementation)?
- Are local/sub-national weather stations better able to coordinate and collaborate with each other for farmers' groups to disseminate weather data and climate projections to local producers?
- Are policies between the agriculture and climate change sectors harmonzied and budgeted?
- Are incentive structures (e.g. financing to cover initial cost of adoption) with commitment (FAO 2014b) in place to faciliate the uptake of CSA approaches?

In addition to defining clear results across output and outcome levels, a simple monitoring and evaluation (M&E) system with sound capacity-related indicators and tangible means of verification is needed. This includes participatory evaluation techniques (Vernooy *et al*., 2016) to enable learning, help identify the knowledge gaps and demonstrate which CSA approaches work best so that CSA pilot actions can be scaled up effectively (see module C9 on climate-smart programme and project monitoring and evaluation).

Additional operational guidance and examples on how to effectively track enhancement of capacities across the individual, organizational and enabling envirommment dimensions for CSA, including sample outputs, outcomes, indicators, M&E approaches, are available in:

- Annex C1.3 - Example C.1.1 - Tracking capacity development results for integrated landscape management in East Africa
- Annex C1.3 - Example C.1.2 - Tracking Individual and institutional capacities for Climate Change adaptation in Lao PDR
- Module C9 on climate-smart programme and project monitoring and evaluation
- "Measuring Capacity Development. What and How" (FAO 2015a) and "Organizational Analysis and Development" (FAO 2013a).

C1 - 4.3.2 Monitoring the "capacity to innovate"

As outlined in section C1-4.2, innovation to transition towards CSA relies on networks and collective action. Strengthening the capacity to innovate involves interventions that enable stakeholders to work, learn and manage complex situations together, and to collectively engage in strategic processes. This includes the need to balance which of the three CSA dimensions should be pursued in which specific context. Assessing the development of soft skills and the changes in networks they bring about is not always straightforward. However, it is important to determine progress in developing soft as well as hard capacities and to understand the factors that either enable or constrain innovation. Shifting to climate smart production patterns can be achieved more effectively through the aforementioned holistic capacity development approach.

The capacity to innovate can be hard to measure and thus monitor and evaluate. Building on work done to assess the capacities to innovate for more sustainable agricultural innovation systems (FAO, 2017a), key elements include the following:

- Reflection, facilitation, partnership, engagement and other aspects of the capacity to innovate are qualitative in nature. Therefore qualitative tools, such as Most Significant Change or Outcome Harvesting (See FAO 2015a for overview), are mainly used to assess their development.
- A scorecard, as a semi-quantitative tool, can provide a means to capture different elements of the capacity to innovate in a structured manner and complement purely qualitative information (FAO, 2017c). The tool can be organized along indicators, for each of which scores are calculated based on self-assessment questions, interview data or secondary information. Data collection and analysis need to be transparent and

comprehensible. If a scorecard is constructed well, it can be a highly useful instrument for assessing changes in capacities. By quantifying existing capacities, a baseline is established against which performance can later be evaluated using the same set of indicators. In addition, monitoring data on intervention intensity and participation levels can be associated with performance measures to better understand the relationship between capacity development inputs and immediate outcomes. The scorecard can also be used to identify capacity gaps and needs, thus providing essential information for action planning.

- Social network analysis is another approach that is gaining increasing recognition for evaluating capacity development outcomes, especially in the context of innovation processes. Depending on the available data, such analysis can, for example, provide evidence on information exchange, influence or joint planning. Based on the network structure, more and less central actors as well as strong, weak or missing linkages can be identified. Collecting data at different points in time allows the dynamics in a given network to be understood. Connections can move, increase or decrease, while actors might become more or less central. As capacity development interventions aim at strengthening knowledge exchange or collaboration, changes in the connectedness of actors targeted by the intervention are strong indicators of success or failure. If requested, the network data can be used when analysing the uptake of agricultural innovations. Exploring, for example, how exposure to knowledge determine the adoption of climate-smart farm management practices can provide important evidence on how to achieve impact.

Conclusions

Transforming agricultural food systems to become more climate-smart is knowledge-intensive and innovative, as well as a multi-sector, multi-actor and multi-level process by nature. How will this gradual and complex transformation be achieved? Who will own, drive and be accountable for this transition process at country level? How can the transformation become country-owned, sustainable, and scaled up and out? What are the national and subnational capacities across people, organizations, institutions, networks and policies that need to be enhanced and how will countries be supported in this process?

This module encourages country stakeholders to apply a system-wide, inclusive and integrated capacity development approach to achieve a sustainable, country-owned transition towards climate smart agriculture at scale. This methodological capacity development paradigm shift interdependently empowers people, strengthens organizations, institutions and networks, while also fostering conducive policy and regulatory frameworks in a highly inclusive and interactive process that deepens country ownership and commitment. Transitioning towards CSA will also require enhanced technical and functional capacities among agricultural stakeholders to effectively support climate-smart agricultural development.

Operationally, facilitating a capacity development approach includes assessing system-wide capacities, designing contextualized and targeted capacity development interventions, and monitoring and documenting progress and results – activities to be undertaken jointly with stakeholders.

Moreover, practical capacity development methodologies, tools and practices as well as catalytic factors for CSA are explored. These include multi-stakeholder processes, platforms and networks, agricultural innovation systems, local institutions at the landscape level, farmer and climate field schools, indigenous knowledge and knowledge sharing, and Information Communication Technologies (ICTs) and Communication for Development.

The module suggests that applying the proposed system-wide capacity development approach will enable countries to sustainably scale up their endogenous climate action in the agricultural sectors. Thus, planning, implementation, monitoring and reporting on climate-smart agriculture interventions will be most effective, transformational, sustainable and will reach scale when conducted with inclusive, iterative capacity development across the individual, organizational, institutional and enabling environment dimensions fostering country ownership, commitment and mutual accountability in the process.

Acknowledgments

Coordinating lead author: Patrick P. Kalas (FAO)

Contributing authors: Almalinda Abubakar (FAO), Konda Chavva (FAO), Alashiya Gordes (FAO), Christian Grovermann (Research Institute of Organic Agriculture FiBL), Nick Innes-Taylor (FAO), Johannes Ketelaar (FAO), Elizabeth Laval (FAO), Suzanne Phillips (FAO), and Janie Rioux (GCF)*.

Reviewers: Delgermaa Chuluunbaatar (FAO), Allison Loconto (French National Institute for Agricultural Research), Cristina Petracchi (FAO), Monica Petri (FAO), Per Rudebjer (Bioversity International).

Notes: The module is an update of Module 17 *Capacity development for Climate-Smart Agriculture* in the Climate-Smart Agriculture Sourcebook (2013) written by Claudia Hiepe (FAO) and Patrick Kalas (FAO) with contributions by Mario Acunzo (FAO), Federica Matteoli (FAO), Sibyl Nelson (FAO), Karin Nichterlein (FAO), Marzia Pafumi (FAO), Janie Rioux (FAO) and Vanessa Vertiz (FAO).

* Janie Rioux started her contribution to module C.1 while working for FAO and completed it while working at the Green Climate Fund (GCF).

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