Farmer Field School in the Trifinio Territory; participative learning mechanisms are key elements of Climate Smart Territories. Photo credit: Maicon Barrera

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CHAPTER

6

Climate Smart Territories (CST): An integrated approach to food security, ecosystem services, and climate change in rural areas

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Highlights

- Addressing the challenges of climate change requires integrated, systemic, interdisciplinary and collective responses and achieving results at different geographical and temporal scales, adjusted to the needs for restoration of ecosystems and their services vital for human wellbeing
- The Climate Smart Territories (CST) approach provide such responses, working through multi-stakeholder platforms that facilitate meeting local societal needs while contributing to the implementation of international agreements
- Joint planning, monitoring and continuous learning are essential elements of such collective responses, requiring information and knowledge management systems that connect actors, sources of knowledge and decision-making processes at different levels and from a variety of sectors
- CST builds local response capacity and leadership, and contributes to human sustainable development, outweighing initial transaction costs
- Creating an enabling environment where policy and institutional frameworks and their services are aligned with CST responses could reduce transaction costs
- Tree-based and ecosystem-based responses to climate change are long term, cost effective and resource efficient components of the proposed CST approach

1. Introduction

As global food production rises steadily (FAO, 2006), and more people have access to an adequate food supply than before, the latter is mainly achieved through an increased dependence on trade (Porkka et al., 2013). Many small landholders in the tropics have only limited access to such trade flows and still depend on rain-fed agriculture for selfconsumption (Barrett, 2010) coming from steadily degrading resources (land, water) and sensitive to increasing temperatures and increasing unpredictability of climate variability (Rosenzweig et al., 2001). Thus, climate change is expected to increase the threats to food security, in particular in rural areas in the tropics (Vermeulen et al., 2010; Porter et al., 2014), where many of the landholders have limited access to resources to make adjustments in their livelihoods. Availability of water for agriculture and households, and availability of affordable energy for small industries and households are also factors of concern for rural society and may be aggravated by climate change. The development pathway (Parry et al., 2005), the quality of soil, water and diversity management (Nicholls et al., 2013) and farmer's resilience and capacity to adapt to climate change (Smit et al. 2003; Parry et al., 2005) are mentioned as among the main factors that will determine the relationships between food production, food security (including access to good quality food) and climate change.

Climate-Smart Agriculture (CSA) (FAO, 2010; 2013*a*) has been promoted as an important response to climate change and variability, while the potential contribution of livestock management to emission reduction and compensation has also been highlighted (Gerber et al., 2013). CSA contributes to ensure future food security under a changing climate, and if well designed, may increase water and energy use efficiency. At the same time, forests and their appropriate management are also highly recommended for inclusion in both mitigation and adaptation strategies (Innes et al., 2009; FAO, 2013*b*). Although both approaches (CSA and 'climate-smart forestry') recognize the need for an appropriate institutional setting with supporting policies and finance mechanisms while applying an ecosystem approach at the landscape level, in practice most strategies for CSA and forest management are still oriented towards individual actions by farmers, forest managers, their organizations or sectors, and, in spite of relative successes in improving adaptive capacity of farmers, may not address the complex challenges that climate change poses on the regulation and provision of ecosystem services and food, water and energy security.

Other ecosystem services, such as provision of fresh and clean water, disease and pest regulation, pollination, nutrient cycling and soil formation and conservation, are essential for agricultural production (Power, 2010) and for the general wellbeing of society (MEA, 2005). Access to markets, water and energy, as well as to technical, financial and other supply chain services are essential for food security (e.g., Gregory et al., 2005). All of these services are increasingly threatened by climate change (Porter et al., 2014; Scholes et al., 2014) and new approaches are being developed that build on the foundations of CSA and climate-smart forestry, but seek to optimize synergies between sectors, scales, different ecosystem services and between adaptation and mitigation (e.g., climate-smart landscapes; Scherr et al., 2012; Harvey et al., 2013). Harvey et al. (2013) note that such new approaches require "... transformative changes in current policies, institutional arrangements and funding mechanisms".

In this chapter, we argue that one of those transformational changes lies in the approach itself: rather than looking from the farmer or forest area towards the outside and designing enabling policies and mechanisms to upscale climate-smart practices, we need to upscale our thinking and learning patterns, geographically, thematically and through time to understand the socio-ecological systems in which we live and improve our capacity for integrated and sustainable development planning. We propose to do so through the implementation of what we call Climate Smart Territories (CST): "social and geographic spaces where the actors collaboratively manage ecosystem services to equitably improve human well-being, continuously optimizing land use and mitigation and adaptation to climate change"[1].

2. Climate Smart Territories

The approach of CST as applied by CATIE[2] evolved from more than 25 years of work in agriculture, (agro)forestry and watershed management, applying four basic system approaches to achieve sustainable rural development objectives: sustainable livelihoods (people centred), aligning policies, institutions and incentives (including achieving monetary and other benefits), territorial management (defining and achieving common goals and implementing strategies concerted among multiple stakeholders within a clearly defined space) and the well-known ecosystem approach[3]. CST is an attempt to combine the many lessons learned in the implementation and analysis of numerous research and development projects in Latin America in which CATIE has been involved along with multiple partners and put them in the context of achieving sustainable rural development while accounting for the impacts of climate change. Rather than focussing on adaptation and mitigation, or specific CSA or forestry practices, this chapter focuses on strengthening the local capacity to analyse, learn and incorporate such projects' lessons into local joint planning and implementation, seeking real integration of climate change considerations into their development processes.

This approach shows substantial similarities with CSA and climate-smart forestry, and in particular, is very similar to coupled socio-ecological climate-smart landscapes (see Minang et al., Chapter 1 this book). From these approaches, it differs mainly in the emphasis on strengthening social and human capital within the territory. Our CST approach puts greater emphasis on the functioning of the socio-ecological system, assuming that many local stakeholders, for their production and well-being, depend on locally available ecosystem services which are influenced both by individual and collective actions. Thus, we enter from within, identifying together with an initial group of stakeholder representatives, a common goal or problem. Based on the relations of these stakeholders with their surrounding (agro)ecosystems and their common goal or problem, territorial boundaries are defined. In this approach, territorial learning mechanisms, climate and vulnerability related knowledge management, adaptive management and the need for collaborative efforts for the conservation and provision of ecosystem services are central components in shaping the decision-making processes at multiple scales: family, farm, community and territory. In addition, CST promotes the extension of these components to the more vulnerable groups within the territories. This approach is similar to the integrated landscape management approach as described recently by Scherr et al. (2014), but has a greater emphasis on climate and vulnerability knowledge management, collective decision-making processes, learning mechanisms as well as on the role of ecosystem services (Figure 6.1).

As in the integrated landscape management approach of Scherr et al. (2014), in CST multiple stakeholder platforms are the key for fostering collective action. It is here that stakeholders define the identity and the limits and functions of the territory, usually considering their common interests. Within this platform, stakeholders also define their priorities and discuss the potential opportunities and threats to achieve these priorities

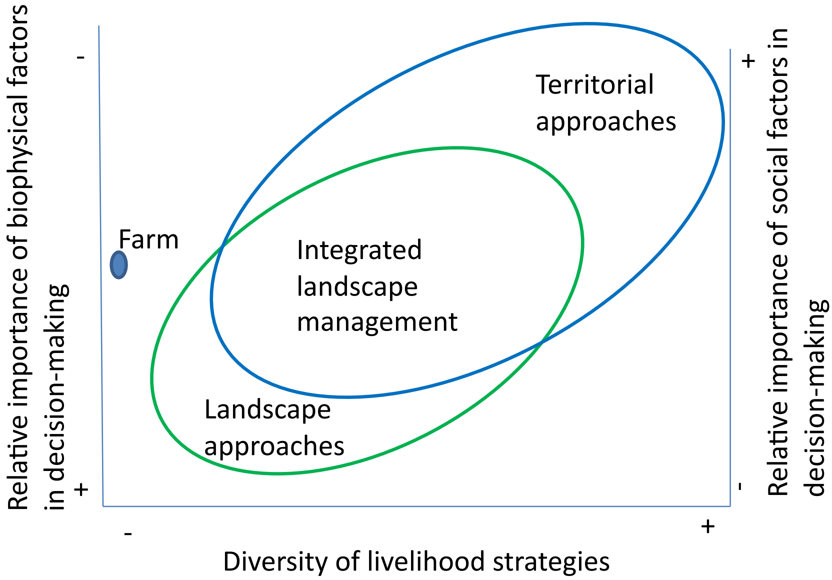

Figure 6.1 Diagram of the relationship between landscapes and territories. The isolated position of the farm along the first vertical axis indicates that working on at the farm level alone is not sufficient to meet landscape or territorial criteria. However, landscape and territorial approaches need to be aware of the needs of farmers to avoid targeting only social or ecological goals while forgetting about individual needs.

and how to respond to them. In successful CST, such platforms will be inclusive of local authorities, participating in strategic planning processes and providing continuity in achieving the long-term goals. Such platforms, which can include farmer organizations, decision-makers, academics and scientists, facilitate intersectoral learning and knowledge management. In addition, they involve national actors and representatives of specific value chains that link the local actors to a variety of stakeholders at different geographical scales. Due to this organization and involvement of the stakeholders, the CST strengthens local to global links and may facilitate the implementation of several international agreements framed within the context of international conventions (e.g., United Nations Framework Convention on Climate Change[4], Agenda 21 and the Sustainable Development Goals currently under discussion[5]). The 'climate-smartness' of CST is achieved when the decision-making processes use the existing collective intelligence for the integration of climatic and development considerations into their deliberations, and explicitly lead to increased well-being, increased resilience to climate and other stresses, and low and/or reduced emissions of greenhouse gases.

2.1 Current experiences

The CST approach builds on local realities and existing experiences; as a result, it may have different entry points, different leaders, and may require different time spans for full implementation. CATIE´s Mesoamerican Agroenvironmental Program (CATIE/MAP), for example, operates in two 'territories': Trifinio and NicaCentral. In each of these territories it uses different entry points for the implementation of a CST approach and strengthening local stakeholder groups' participation in territorial processes. Similarly, in Colombia, CATIE has supported the development of the Huila 2050 plan, the first departmental climate change plan in Colombia, with its own CST approach. Both of the CATIE/MAP and Huila 2050 experiences are described in the following sections.

2.1.1 The CATIE/MAP approach

The two territories supported by CATIE/MAP differ in terms of geography, the existence of a common vision, shared issues and the presence of participative planning processes. The Trifinio territory comprises the upper watershed of the Lempa River that is shared by Guatemala, El Salvador, and Honduras and is jointly managed by the three countries under the Trifinio Plan (passed in 1998). The area is a watershed and its management has applied a territorial approach, strengthening a territorial identity and the participation of different actors and platforms in its territorial planning (Artiga, 2003). The NicaCentral territory, on the other hand, is based within Nicaragua. It partially overlaps with the Bosawas Biosphere Reserve and contains the Peñas Blancas natural reserve, an important provider of ecosystem services. Despite the population sharing common interests around water and the Peñas Blanca natural reserve, a sense of belonging and common vision is still to be realized in this territory. CATIE/MAP considers these different realities. Thus it works in Trifinio with tri-national and local platforms, mainstreaming CST issues in territorial planning frameworks such as the Trifinio Development Plan. In NicaCentral it works mainly with local platforms, strengthening their planning capacity, exploring the common issues and seeking consensus on how to improve climate resilience of farmers by improving both their livelihoods and the environment they live in.

Another entry point used by CATIE/MAP has been CSA, which we see as complementary to CST. However, our experience has shown that, despite the fact that focusing on the individual needs of farmers and their systems is important, the goals of CSA can only be sustainably achieved through collaboration and continuous learning processes. Taking this into account, CATIE/MAP continues working at the farmer level, in both territories, but also works with different local/regional platforms (e.g., value chain, knowledge and innovation, research, planning) to link farmers and other local actors to a variety of regional, national and international stakeholders. Such linkages provide some of the capacity needed to address critical issues at different geographical scales, such as ecosystem services, and to scale up climate-smart practices.

Using this approach, CATIE/MAP is scaling up CSA practices identified from an analysis of climate threats to coffee and cattle farming and other crop alternatives that both strengthen resilience and reduce emissions on these farms. Part of this analysis was participatory using farmer field schools (FFS) to involve local farmers (see Box 6.1). These schools gave the farmers the opportunity to combine scientific knowledge with their own experiences to identify a range of different sustainable farming and land management practices. These also led to a considerable number of farmer families adopting CSA practices, though scaling up turned out to be a slower process than initially anticipated due to a number of critical issues (e.g., conflicting land uses, access to clean and sufficient water) that could not be addressed, hampering full achievement of climate -smart objectives.

During the FFS it became clear that some climate threats, such as a decrease in the water supply for farmers and communities, or crop diseases like coffee rust, need collaborative actions that go beyond the farm (e.g., Imbach et al., 2010; Avelino et al., 2012). In response, CATIE/MAP has strengthened its work with local and regional multi-

Box 6.1

Multi-thematic farmer field schools for CST implementation

Farmer field schools (FFS) are classrooms without walls where participants learn about different agricultural and (agro)forestry topics of common interest through observation, discovery and exchange of experiences. Furthermore, additional topics are dealt with to strengthen capacity for improving livelihoods while also supporting the establishment of a CST. Examples of topics include, gender equity, food and nutritional security, mitigation and adaptation to climate change, restoration of ecosystems and business administration. The concept of FFS was originally developed by the Food and Agriculture Organization of the United Nations (FAO) in the context of integrated pest management in Indonesia. CATIE's FFS application in Central America is an adaptation to the local context considering changes in climate conditions.

An FFS usually is developed at the community level with direct activities on the farm of each of the participating farmer families. It is usually composed of 20 to 30 men and women (adults and youths), representatives of the families who have common interests and similar levels of skills and knowledge. One or more members of each family may participate in FFS activities. After formation of an FFS and informing the community of its structure and operation, a farm and home garden plan is prepared with each family. As a basis for the plan, diagnostics of the farm's resources (biophysical and socio-economic), its constraints and its opportunities are prepared and the dream farm or home garden is defined. Information from the plans is used to design the curriculum of the FFS for each community. These FFS then implement a variety of learning sessions, test plots, individual technical assistance visits, exchanges between families, and induction tours to farms with advanced innovations. In addition, farmers jointly analyse the potential financial instruments that could support farm innovation (e.g., payment for environmental services schemes). In each of these topics, care is taken to integrate cross-cutting topics, such as equity (e.g., gender, ethnic, age), climate change adaptation and mitigation, organization and administration, business plans and marketing, aimed at improving farm production as part of the implementation of the CST approach. In the NicaCentral and Trifinio territories, for example, the FFS have addressed topics such as environmentally conscious cattle farming, cultivation of basic grains, cacao, coffee, home garden planning, healthy habits at home, nutrition education and food preparation, vegetable production, establishment and management of fruit trees in the home garden, water management and agro-ecological management of home gardens and its implications in the context of climate change. In the case of Trifinio and Nicacentral, the FFS has become an important instrument for monitoring and getting feedback, where farmers try out technical assistance recommendations in addition to each other's ideas, and later reconvene to evaluate results of their implementation, discussing the results and recommending adjustments to the original practices. In addition, the FFS evolve over time, addressing the new needs of the farmer families, such as responding to climate change. As one evaluator of an FFS put it "they learned many things, but above all, they strengthened their capacity to innovate, to solve their own problems".

stakeholder platforms and national authorities to create the enabling environment that will allow it to address, in a collaborative way, issues that result in climate-smart outcomes at the territorial level and beyond. This includes development and validation of methods for assessing vulnerability through participatory approaches, looking at the dynamics and potential responses of different cropping systems under climate change stressors and determining the overall impact on ecosystem services resulting from changes within socio-ecological systems. It also includes strengthening capacity for the development of local adaptation strategies, the integration of climate change into existing development strategies and the integration of climate information in short- and medium-term decision-making. These processes will require collaboration between different stakeholder groups to strengthen dissemination and knowledge exchange mechanisms, such as the FFS, either by joining resources, providing new discussion materials or examples of good practices that can be tried, discussed and implemented.

2.1.2 The Huila 2050 approach

In Colombia, the "Huila 2050: preparing for climate change plan"[6], presented by the Government of Huila and the Regional Autonomous Corporation of the upper Magdalena (CAM), developed an innovative model that aims to create a CST in the medium- to long-term. Huila´s location, at the foot of the Colombian Mountain range (Macizo Colombiano), makes it biologically highly diverse, rich in hydrocarbons (petroleum) and an important water catchment area for the Magdalena River, forming the major watershed of Colombia. At the same time, the Department is highly exposed to increases in temperature and reduced precipitation in the long-run, and the effects of extreme rainfall events in the short-term. The threats to the provision of water and other ecosystem services, together with limited success of previous efforts to protect the natural resources, made the Department look for a different approach to effectively manage its natural resources. With the financial support of the Forest, Carbon, Markets and Communities (FCMC) Program of the United States Agency for International Development (USAID) and the general coordination of E3 (Ecologia, Economia y Etica), it formed a multi-sectoral departmental council for climate change as the main mechanism for defining priority actions to reduce the threats to its natural resources, reduce emissions, and at the same time facilitate achievement of departmental development goals. With technical assistance and financial support, they endeavoured into a two-year planning exercise, during which they analysed the Department's general vulnerability to climate change, its emissions profile, options for internal financing and a detailed current and future water balance of the upper watershed. In addition, multi-stakeholder dialogues were held to define and identify pathways for integrating climate change considerations into the departmental development planning processes. This resulted in an integrated climate change action plan, prioritizing five sectors, as well as the establishment of a climate change observatory, supporting decision-making processes through knowledge generation and management.

Simultaneously, local capacity was strengthened using a data and knowledge management system designed to allow departmental authorities to make evidence-based policy decisions to increase resilience and reduce vulnerability in its municipalities. The next steps will be oriented towards strengthening farmer capacity to increase climate resilience of coffee and cattle production, reduce pressures on the forest, and improve the efficiency of water and energy use in the agricultural and urban sectors. In particular, in the livestock sector this will be done using FFS, based on the experiences with FFS in CATIE/MAP (see Box 6.1). Such FFS or similar participative learning mechanisms, are an essential element of the action research and learning cycle of CST, linking knowledge management platforms, scientists, extension agents and farmers within a process of continuous action, reflection, and adjustments.

The CST approach of the Huila 2050 plan has led to the identification of a number of interesting issues. First, there is a need to have more detailed information from the territory to make informed decisions. Many decisions are based on assumptions in relation to climate, water availability and soil quality, as in most areas this information is not readily available. The importance for such locally available information was shown when downscaled climate change projections indicated that the lands suitable for Granadilla (*Passiflora* sp.), one of the major non-traditional crops, will be reduced to a small strip of land in the north of the Department. This may require a shift in current extension efforts, currently geared towards the introduction of this (and other) crop(s) as a complement to coffee in order to reduce vulnerability of the region to changes in the coffee market.

Second, there is a great scope for exploiting the synergies between adaptation and mitigation within the territory. For example, establishing biological corridors that link protected areas at two different altitudes may have, as an additional benefit, the sequestration of carbon dioxide through the establishment of new trees and/or restoration of original vegetation. In Huila this will require collaboration between the State (who owns the land in the protected areas) and local landowners, in particular cattle farmers, who own the land between the forest patches. Similarly, incorporation of trees on farms and in cattle lands will improve growing conditions under extreme weather conditions, providing shade during hot sun, improving infiltration rates (e.g., Benegas et al., 2014) and contributing to carbon sequestration. Performing this analysis within the participatory stakeholder platforms led to the realization of the stakeholders that they could actually contribute to conservation (connectivity) while at the same time benefitting from their actions. Since there is some concern among some of the stakeholders that such practices might negatively affect the availability of water for people downstream, it is envisaged that more detailed studies will determine the effect on the water table.

Third, through a joint-vision oriented approach, the Huila 2050 plan was able to reach out to a larger number of stakeholder groups. This resulted in unexpected financial support for implementation from private sector stakeholders.

3. Key steps towards implementation of CST

Analyzing these cases along with the results of the 2013 Wallace Conference, organized by CATIE with partner institutions to discuss the CST approach with researchers and decision-makers at different levels[7], we can identify a number of characteristics that describe the general pathway territories are taking to integrate climate change in their development strategies.

We argue that the main characteristics that distinguish the CST approach from other climate-smart approaches lie in the social-political dimension; our main premise is that any territory is a social construct, therefore we need to work first on the social, political and institutional arrangements that shape a given territory, before we start implementing technological solutions. Therefore, we are building on a conceptual framework that combines the spiralling-up theory proposed by Emery and Flora (2006) with our experiences in adaptive co-management of watersheds (e.g., Prins & Kammerbauer, 2009). Strengthening human and social resources facilitates the construction of a joint-vision, planning of appropriate pathways, and the design of norms, rules, arrangements and practices needed to work towards that vision. It considers all the resources people have available to build their livelihoods and recognizes the relations they have with those resources as well as with other people and institutions. It allows limiting the territories to areas of influence of groups of people that feel affinity between them and with the area. From our experience, this is key in building a common vision and facilitates collaborative action. Depending on the functions of the territories, it may also result in a 'nested territorial' approach. For some functions, such as ecosystem conservation, the territory may be large (e.g., Trifinio, the Department of Huila), while for other functions, such as strengthening resilience to specific climatic changes and its consequences, the area may be smaller (e.g., a watershed, municipality, productive landscape).

As promoting a climate-smart agenda requires decisions about management of both private and common (public) goods, no one stakeholder is well positioned to push forward this agenda alone. In Central America, multi-stakeholder platforms have shown that they can be an effective mechanism to support the planning and implementation of regional sustainable forest management strategies (e.g., Galloway, 2001) and watershed management (Prins & Kammerbauer, 2009). They provide the space to identify potentially problematic issues raised by some of the stakeholders involved, and try to reconcile potentially differing interests. While managing potential conflicts can be arduous, consuming both time and money, to the degree that it prevents future conflicts and damages, it may be a very rewarding exercise in the medium- and long-term. Also in the CATIE/MAP and Huila cases involving stakeholders still is a major time-consuming issue, but already some promising results have been obtained through the dialogues: consensus among participating stakeholder groups on the long-term goals and commitment of both existing and new human and financial resources to meet those goals.

In each of the cases, actor mapping, resilience and vulnerability assessments, mapping of ecosystem services, and territorial planning are considered to be fundamental for effective and efficient application of interventions that combine adaptation, mitigation and development goals. In a similar manner, access to remote sensing images, GIS skills, good internet connection and well-organized FFS are considered essential elements for successful knowledge management. The exact methods and tools to get there vary according to the needs of the local stakeholders, highlighting the need for extensive climate change toolkits.

While the social-policy dimension may be the entry point for the CST, it is also clear that the success of the CST approach in the end lies in successful application of mitigation and adaptation practices and their contribution to development goals at the territory and farm/household level. Pilot experiences with the implementation of tree- and ecosystem-based farming systems in each of the territories show promising results for such systems under climate change conditions, where trees contribute to compensating for the emission of greenhouse gases through the sequestration of carbon dioxide, while at the same time contributing to the provision of shade and reducing the flow of wind, reducing thus also the spread of important crop pests and diseases (e.g., Avelino et al., 2012). The benefits of trees in agricultural systems in terms of the hydrological cycle are less clear, with evidence suggesting they can both reduce and increase water availability for the production system, depending on the type of system, soil conditions, management practices and specific climate conditions (e.g., Benegas et al., 2014). Scaling up these pilot experiences requires appropriate institutional arrangements, FFS, and incentives for innovation.

4. Challenges ahead

Looking at the advances in implementation of the CST approach we have identified a number of challenges, of which we want to emphasize the following three major ones:

Sustainability of co-management and multi-stakeholder platforms

Setting up such platforms is a large investment, in particular in terms of time required of the stakeholders involved. Once established, however, their continuity will depend above all on the motivation of the members. For example, if in the first few years there are no clearly achieved benefits or there is a lack of clear rules and transparency to guide decision-making processes, many stakeholders may become discouraged with the whole process. In addition, due to the high turnover rates of personnel in many governmental organizations in Latin America, there is the risk of loosing key stakeholders during the process, potentially resulting in the loss of political will and continuity of initiatives promoted by previous administrations.

In addition, strong local leadership, building of trust, a sense of belonging to the CST, sharing of its long-term goals, capacity to generate funds and clear, frequent benefits will help to increase sustainability of these platforms. The costs of co-management structures, however, need to be weighed against the potential benefits. These benefits will usually accrue at mid- and long-term intervals and will contribute to achieving development goals under a changing climate including: water security, control of plant and animal pests and diseases, reducing the risk of malaria and dengue, protection of infrastructure, and risk and disaster management, among others.

Making decisions under uncertain climate scenarios

Projecting future impacts is still a very complex matter with its specific impacts on effect on people, production systems, flora, fauna and ecosystem functions, uncertain. This makes it important to reduce uncertainty by improving information, to explicitly consider this uncertainty in decision-making, and to reduce risk of negative outcomes.

It is necessary that local stakeholders have access to useful agro-meteorological information in order to strengthen their knowledge on natural variability and future climates: when are conditions right to sow, when to monitor for specific pests and diseases, what weather conditions to expect during the next two to three months or during harvest time, etc. Through, for example, a climate observatory, the information of different networks can be shared and used by universities for research into specific climate-related questions relevant for decision-making within the territory.

Achieving short-, medium- and long-term benefits for the local population

One of the strengths of CSA is that it has been able to address immediate needs of local farmers. CST goes beyond this and also focuses on future benefits, strengthening local capacities to plan for, and react to, future constraints on production, conservation and ecosystem service provision to a wide range of local stakeholders. CSA and CST are complementary in that respect and should be applied jointly to mutually strengthen their implementation. To be successful, however, benefits need to be real and perceived. With this in mind, we implement and validate participative local adaptation strategies that seek to match bottom-up planning with short-term goals with top-down national and regional development medium- and long-term goals. Although promising results are being obtained, it is too early to tell whether these will have the desired outcomes.

Thus, while there have already been promising applications of the CST approach, it is still evolving. The clearest advances have been achieved in 1) joining efforts through the different stakeholder platforms, reaching agreements on common, long-term goals that allow for more climate-resilient and low-carbon development that address key issues of the people in the territories, and 2) the sharing of existing resources and assets to meet these goals. Knowledge (including local), stakeholder learning (e.g., FFS) and dialogue platforms are essential components of the CST and have contributed to the application of CSA practices within the territories. However, a number of challenges have also been identified in the application of the CST approach. These need to be met for the CST approach to become successful.

Endnotes

1 Definition contained in the Declaration of Turrialba, drafted at the Wallace Conference held at CATIE in 2013: http://catie.ac.cr/index.php/es/noticias-catie/entry/territorios-climaticamente-inteligentes.
2 Spanish acronym for Tropical Agricultural Research and Higher Education Center. CATIE is a not for profit, regional research organization based in Costa Rica.
3 See: http://www.cbd.int/ecosystem/
4 http://unfccc.int/2860.php
5 http://sustainabledevelopment.un.org/
6 For the plan and related documents see: http://www.e3asesorias.com/#!publicaciones/csvj
7 http://web.catie.ac.cr/wallace2013/home_ing.htm

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