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BEST PRACTICES IN CAPACITY BUILDING FOR AGRICULTURAL INNOVATION SYSTEMS

Good Practice Note COLOMBIA, NICARAGUA, GUATEMALA AND HONDURAS

LOCAL TECHNICAL AGROCLIMATIC COMMITTEES (MTAS)

Information available to Latin American farmers for better decision making in the field.

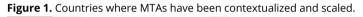


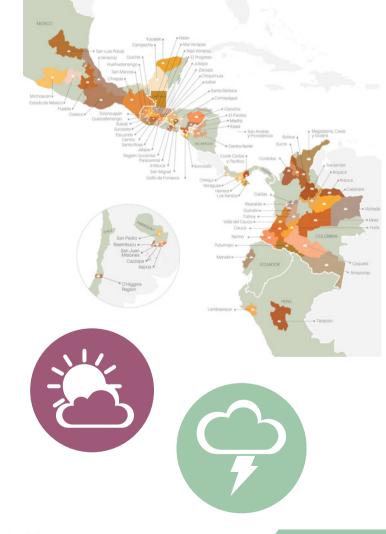
CONTEXT

Local stakeholders and agricultural producers in Latin America have limited access to agroclimatic information and, when they do gain access to it, they have difficulty translating it into processable and actionable knowledge. While climate services are recognized as contributing to bridging the gap between the generation of climate information and its use by stakeholders, their provision and use in Latin America still represents a critical challenge [1].

Effective implementation of climate services implies a process of change in attitude, knowledge and skills of stakeholders (e.g., institutions, extension services and farmers) to inform decision making in production systems given the expected climate variations in their region. The approach of the Local Technical Agroclimatic Committees (MTAs) has proven to be a very effective mechanism for delivering free climate services that seek precisely to contribute to closing this gap.

With the objective of providing timely, open, accessible and useful climate information free of charge at the local scale, this approach emerged in Colombia, as a pilot in Cauca and Córdoba in 2013 [2]. Over the last 10 years, it has been contextualized and scaled up in 11 countries in the region (**Figure 1**), which recognize MTAs as an innovative mechanism to reduce climate risks in the agricultural sector [3].





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through cooperation projects with CIAT [4-9]. Under the agreement signed between the MADR and CIAT during 2013-2015, the MTA approach was initiated in Colombia. Then, in a process of scalability and sustainability, trade association such as FEDEARROZ, FENALCE assumed the leadership of local MTAs with the support of AGROSAVIA, the SMHN-IDEAM and FAO, covering almost the entire national territory. In Honduras, the governance of the MTAs is in charge of SAG under a ministerial law of conformation of the MTAs in 2016, with the support of SMHN-CENAOS/COPECO and CIAT. In Guatemala, the first MTA in Chiquimula in 2017 was led by academia, and subsequently expanded to other departments in collaboration with the public and private sector. To date, MTA coverage encompasses all departments nationwide under the supervision of MAGA in Guatemala, with the support of SMHN-INSIVUMEH and CIAT. In Nicaragua, the governance of the MTAs is under the responsibility of farmer associations and ongoing CIAT projects since 2017. Estimated investment is close to USD 5M (USD 500,000 annually) from public funds (Ministries, meteorological institutes), private initiative, donors such as EU, GCF, USAID and others from CGIAR.

ACRONYMS

- **CIAT** (International Center for Tropical Agriculture)
- MADR (Ministry of Agriculture and Rural Development; Colombia)
- **IDEAM** (Institute of Hydrology, Meteorology and Environmental Studies; Colombia)
- FAO Colombia (Food and Agriculture Organization of the United Nations)
- AGROSAVIA (Colombian Agricultural Research Corporation)
- SMHN (National Meteorological and Hydrological Services)
- NCD (Nationally Determined Contribution of Colombia)
- FEDEARROZ (National Federation of Rice Growers in Colombia)
- **FENALCE** (National Federation of Cereal and Legume Growers in Colombia)
- SAG (Ministry of Agriculture and Livestock; Honduras)
- **CENAOS** (Center for Atmospheric, Oceanographic and Seismic Studies; Honduras)
- COPECO (Permanent Contingencies Commission; Honduras)
- MAGA (Ministry of Agriculture, Livestock and Food; Guatemala)
- **INSIVUMEH** (National Institute of Seismology, Volcanology, Meteorology and Hydrology; Guatemala)
- UE (European Union)
- GFC (Green Climate Fund)



METHODOLOGICAL APPROACH

MTAs represent an innovative approach to co-generate, translate and communicate climate information to support decision-making in agricultural systems. They work as spaces for open and inclusive dialogue in which diverse actors from the public and private sectors, academia and research, international cooperation, farmers' associations and independent producers participate on a voluntary basis. When an institution seeks to implement an MTA in its territory, it must identify possible members of the MTA and their roles, explore human and financial support sources for its sustainability and convene the actors through various media (radio, digital and written); it may be formalized by public administrative act or not, depending on the leadership of the local government. **Figure 2**, on the next page, presents the step-by-step for the development of an MTA [10].

In the MTAs, scientific knowledge is integrated with local knowledge related to climate, creating a space for territorial coordination. This makes it possible to generate recommendations for decision-making in each production system of interest, which are disseminated through the Agroclimatic Technical Bulletin (ATBu). In Colombia, MTA sessions are held on a monthly basis and develop recommendations for crops in their most critical stages, and a local ATBu is generated every month. In Honduras, Guatemala and other countries in the Central American region, MTA meetings are held prior to the start of key planting dates for major crops. In total, three agro-climatic bulletins are created each year to address the three planting periods (primera, postrera and apante plantings).



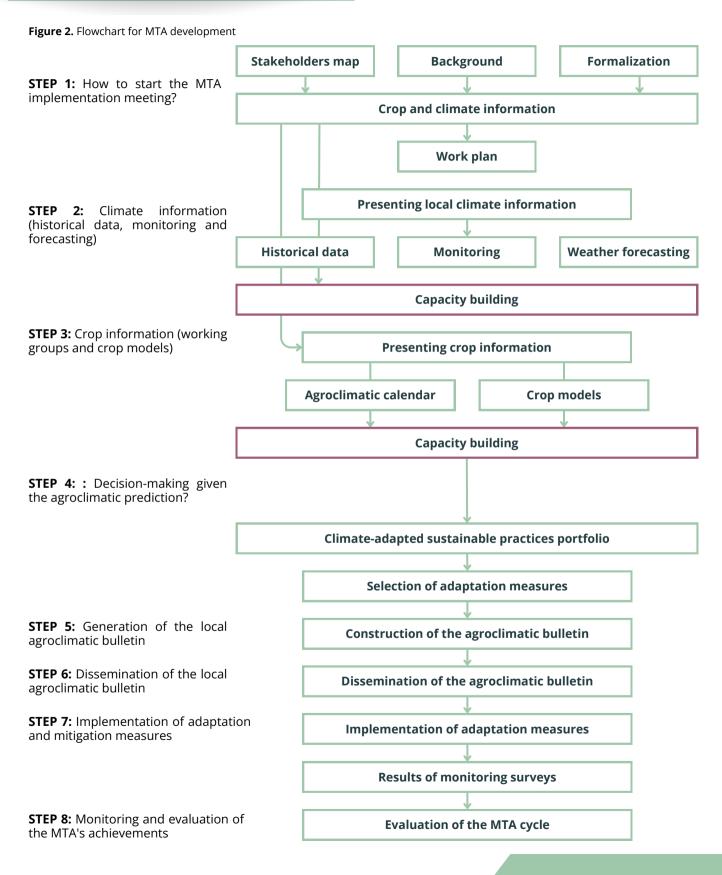




Figure 3. Distribution of stakeholders

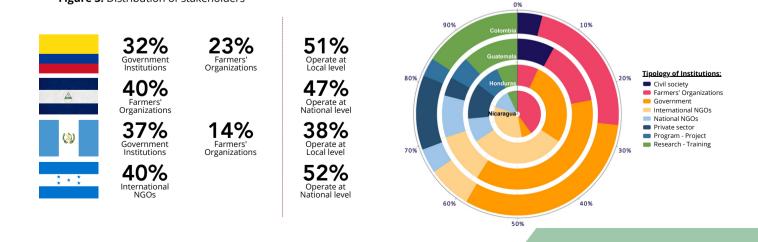
The bulletin contains information on recent weather conditions, climate forecasts, warnings of extreme weather events and their possible impact on production systems. Climate forecasts are generated in consensus with the national meteorological service of each country and the agrometeorological groups of the participating institutions. With the information from the ATBu, stakeholders have the possibility of understanding how climate variations at various time scales can impact their systems, in order to design and implement measures that help to reduce the impact on crop productivity at the local scale or, on the contrary, increase productivity by taking advantage of the climatic supply at the time [2,10].

Several systematic monitoring and evaluation studies have been carried out in the context of MTAs, especially in the four Latin American countries where MTAs has been operating the longest: Guatemala, Honduras, Nicaragua and Colombia. These activities include monitoring surveys [11,12], outcome harvesting through interviews and focus groups [13] and network analysis. These studies measure indicators such as diversity of participation, organization, quantification of users, effectiveness of dissemination channels, MTA connections, governance indicators, as well as the relevance, pertinence and perception of the information presented, among other factors. With the information gathered, the results achieved are synthesized and the effectiveness, sustainability and scalability are evaluated. Ultimately, the objective is to analyze and evaluate the factors that contribute to the success of the MTAs and synthesize them into clear recommendations for the implementation of climate services in the region.



MTAs form a broad network of local, national and international actors that address agroclimatic risk management. Analyzing the actors involved and their roles contributes to understanding the sustainability of MTAs and their ability to reach their diverse audiences. MTAs play a critical role within this network by facilitating the exchange of agroclimatic information, and bridging gaps.

Figure 3 below reveals the ecosystem of actors participating in the four countries analyzed (Giraldo-Mendez et al., 2023, in prep.) - Colombia, Nicaragua, Guatemala and Honduras. In Colombia and Guatemala, MTAs are mainly composed of government institutions (32% and 37%, respectively) followed by farmers' organizations (23% and 14%, respectively). In Honduras, it is composed of international NGOs (32%) and in Nicaragua by farmers' organizations (40%). In Colombia and Guatemala, most institutions operate at the local level (51% and 38% respectively), while in Honduras and Nicaragua, the national level is the best represented (52% and 47% respectively).



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Two groups of alliances have been identified: the first is composed of local organizations that support the translation and dissemination of agroclimatic information; the second is composed of organizations with different roles, including the co-generation of climate information (e.g., NMHS and private sector), coordination in financing and policies (e.g., Ministries of Agriculture, international NGOs, national organizations) and training (e.g., universities and research centers). Translation consists of putting into simple words and short phrases the weather predictions and crop management recommendations, based on the criteria of experts participating in meetings or working groups that are formed by crop category (e.g., basic grains or cereals, cash crops, agroforestry systems, etc.). Sometimes agroclimatic modeling techniques or data analysis are used to help understand the behavior of production systems under specific climatic conditions to support decision-making [21].

RESULTS

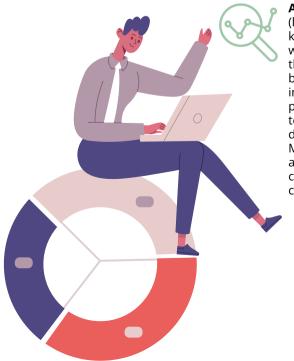
Numerous results have emerged in the implementation of MTAs in the last 10 years, addressing one or more key factors for success, such as sustainability and scalability. These results are grouped in five Areas of Innovation and Transformation (AIT, Giraldo et al., 2020).



AIT1: Access to and confidence in agroclimatic information. There is more access to and trust in the information generated by the MTAs. For example, in Guatemala, Honduras, Peru and Mexico, the MTAs brought the NMHSs closer to the territories by integrating climate information (historical data, monitoring and forecasts) into the decision-making processes of the participating institutions. In Colombia, the MTAs have promoted and strengthened teams of meteorologists working in agricultural institutions (e.g., unions and research institutions). In Nicaragua, the MTAs use the local knowledge of the communities and the meteorological stations installed by various projects. In Guatemala, more than 80% of users perceive that the rainfall forecast is accurate, showing confidence in its use for decision making [14].



AIT2: Communication of agroclimatic information. Agroclimatic information and adaptation strategies have become better known and more accessible to users, thanks to a permanent and repeated process of agroclimatic literacy. In addition to the ATBu, other agroclimatic information products are generated and disseminated, such as reports on web pages, messages on social networks, radio capsules on local radio stations in three of the countries evaluated (Colombia, Guatemala and Honduras). In Honduras, SAG creates a 2-page brochure that summarizes the ATBu and is displayed on panels in SAG regional offices. In Cauca, Colombia, half-page bulletins containing recommendations for different production systems are read in collective spaces such as churches and civil associations. In Guatemala, the use of radio has helped 20,000 farmers to manage their crops based on forecasts [22].



AIT3: Participation and collaboration. An agroclimatic literacy space (learning process) has been established that democratizes agroclimatic knowledge. Participants of MTAs develop and strengthen their knowledge with a deeper understanding of the effects of climate variability, enabling them to provide better guidance to farmers that supports planning and better decision making in the field [11-13]. In addition, some MTAs incorporate farmers' traditional knowledge (e.g., bioindicators, moon phases) through their newsletters. Participation in MTAs varies from session to session (monthly in Colombia and quarterly in most countries) and depends on the modality chosen (either face-to-face or virtual). In Mexico, MTAs emerged during the pandemic and are carried out virtually, taking advantage of connectivity; participation has reached up to 600 people connected online. In the face-to-face modality, due to logistical considerations, attendance at MTAs is limited to a maximum of 60 people.

06 COLOMBIA, NICARAGUA, GUATEMALA AND HONDURAS BEST PRACTICES IN CAPACITY BUILDING FOR AGRICULTURAL INNOVATION SYSTEMS



AIT4: Changes in farmers' decision making. For example: (i) adjustments in planting dates; (ii) adjustments in agricultural credit or insurance applications; (iii) construction of water catchment tanks based on rainfall forecasts; (iv) changes in crop varieties based on forecasts; and others related to the adoption of more resilient farming practices. Practices prioritized by MTAs in line with PICSA implementations, such as changes in planting dates or plant density, permanent pest and disease control, proper soil preparation, weeding and correct fertilization have doubled yields in Colombia for cereals and tripled in Guatemala, even under unfavorable rainfall conditions [19, 20].



AIT5: Changes in policies, governance and institutional leadership. Inter-institutional alliances in the territories that favor the adaptation of producer families to climate risks, with the creation and strengthening of programs, projects and actions at the national and local levels. The development of MTAs has generated a political influence that has led to their institutionalization in Honduras and Guatemala [14,15], which in turn promotes the sustainability of the process technically and financially. In Colombia, the MTAs contribute to the fulfillment of the NDCs and other public policy instruments on Climate Change.

REPLICABILITY, SCALABILITY AND SUSTAINABILITY

MTAs, as a model vehicle for the development of climate services, generally address existing limitations in the implementation of climate services, achieving replicability, scalability, effectiveness of use and sustainability. **Figure 4**, on the next page, identifies the key factors that contribute to the success of MTAs.

Flexibility and adaptability have allowed the MTA approach to be replicable and to fit into a wide range of geographic, socioeconomic and political contexts. These characteristics have also facilitated the involvement of a considerable diversity of stakeholders with diverse but complementary roles. Currently, more than 70 MTAs established in 11 countries in the region are reaching more than 500,000 producers and 30,000 technicians belonging to 420 institutions [5,14].

In Guatemala, for example, climate services are helping to close information access gaps for vulnerable groups, including women (30% of farmers) and indigenous people (30%) [14]. The MTAs inform other key actors such as risk and disaster units, volunteer firefighters and other civil community groups, climate change roundtables for other sectors, health, education or even military entities present in the territories. More than 10 years of action by the MTAs in the region have allowed the strengthening of capacities to generate, translate, communicate and use climate information in order to improve planning and decision making.

The scaling of MTAs is not only limited in terms of geographic scope and number of participants, but also stems from the transformation in roles and responsibilities within a diverse ecosystem of actors. These actors collaborate to provide enhanced capabilities and tangible benefits on the ground. In Colombia, for example, in addition to having a national MTA led by MADR, IDEAM and FAO Colombia play a key role in scaling up in the territories. In Guatemala, the success of the first MTA (Chiquimula in 2017) led to the rapid and systematic expansion of the approach, with 19 MTAs in Guatemala covering 100% of the country with agroclimatic information adapted to each zone [16] with constant strengthening from CIAT to MAGA and INSIVUMEH [17,18].

The continuous provision of resources (both financial and personnel) has been an essential factor in the sustainability of the MTAs. In Colombia, this has been achieved thanks to the commitment of various stakeholders, such as the MADR, production associations, universities, AGROSAVIA, government ministries, among others. These actors have actively participated and have provided financial backing and support to the MTAs. In Honduras, a country that faces significant challenges in terms of sustainability, management and governance of the MTAs, the participation of numerous organizations, especially international cooperation, is conditioned by specific projects. In Nicaragua, the central government's participation in the MTAs has been limited, which has led to international cooperation organizations operating the MTAs. Despite the participation of local farmers' organizations, sustainability challenges are faced in all of Nicaragua's MTAs.

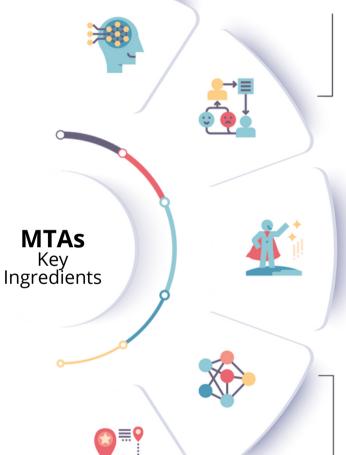
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Figure 4. MTAs Key Ingredients

LEARNING PROCESS

At the **MTAs**, participants promote diverse and complementary perspectives, in a collective learning process (new knowledge and skills)



PARTICIPATORY APPROACH

The **MTAs**, as a participatory process, helps to generate demand-oriented information flows. Participation of different stakeholders helps to discover diverse points of view, which allows debate and a better comprehension of the roles of the institutions.

LEADERSHIP

Each **MTAs** has one leading institutions that creates an environment of trust, where critical reflection helps to identify improvement opportunities. Facilitation involves: efficient meeting management, collaboration processes, planning and mobilization of agreed actions. Leader stability is an important driver for scaling up and sustain an MTA.

COLLABORATION AND NETWORKING

At the **MTAs**, stakeholders from the network can be change agents. Collaboration allows solving problems and it's characterized by voluntary participation, consensus-based decision making, long-term relationships between the parties, exchange, pooling resources, and commitment.

REAL WORLD

The **MTAs** is flexible and adaptable: it constantly reflects upon its results and adapts strategies if needed (e.g., online MTA during Covid pandemic). This helps local communities to improve their livelihoods and promotes change, link science to the territory and understand characteristics of complex agricultural systems.





- Scaling up the MTAs approach and its elements has been facilitated by the existence of an MTA implementation manual. This was complemented by constant capacity building processes at different levels in the 11 intervention countries, through activities such as conferences, exchanges and workshops.
- MTAs are guided by the demands of users and stakeholders, which makes their approach dynamic and participatory. It is adjusted according to local contexts and developed in collaboration with the various actors present in the territory.
- Agricultural extension agents benefited from trainings for understanding and communicating climate data and its impacts on agriculture. This was possible thanks to the inclusion of academia and research centers, as well as partnerships with the private sector.
- The participation of the national meteorological entity in the MTAs and open-access data is decisive for the sustainability of the process, which ultimately leads to the institutionalization or formalization of the MTAs in the countries.
- Achieving true inclusion and ensure sustainability, requires encouraging and enabling open and voluntary participation of all entities, with their specific contributions. In this regard, public-private sector linkages play a crucial role.
- Along with MTAs, additional mechanisms should be established to reach rural communities with agroclimatic information. CIAT has experience in participatory approaches such as Participatory Integrated Climate Services for Agriculture (PICSA), which is being implemented in several countries in the region [19,20].

RECOMENDATIONS



Implement monitoring and evaluation systems to make adjustments to the process, taking into account local contexts with the indicators mentioned in the methodological approach.



Promote the exchange of experiences among MTAs in the region, to learn about specific innovative and operational mechanisms that could be replicated in other contexts.

Promote the strengthening, participation and financing of the national meteorological entity to provide official climate reports and forecasts.



Monthly MTA meetings require considerable resources and time, necessitating efficient and contextspecific strategies. Quarterly meetings may be insufficient at key decision-making moments. To address this, it is suggested to complement with virtual sessions or maintain two-way communication through social media platforms.



Adopt the use of the MTA Implementation Manual, developed by CIAT, in collaboration with various stakeholders, to retain the main elements of the approach and adapt it to the local context needs.

Good Practice Note COLOMBIA, NICARAGUA, GUATEMALA AND HONDURAS





At the MTA, knowledge and experiences of producers, technicians, academia and the public sector are shared. These are spaces where the institutions do not come to expose, but the producers present their experiences, what measures they have taken and all the results are shared.

> Federation of cooperatives for Development (Fecodesa) Technical field team. Somotillo - Nicaragua

Now in December farmers are planting potatoes, corn and peas, we started to identify grains that require less water, we have to look at what time it rains and for that we use the MTA report.

> Promotor PICSA and Farmer Boyacá - Colombia

ColombiaThe MTA has managed to set up a Regional Forecasting Center (RFC) in Corpomojana, which is providing us with data from the territory twice a week. Just imagine what a boast. With the RFC I can decide that tomorrow I can go to fumigate until noon. With the MTA I can decide planting dates, herbicide controls and fertilization.

> Rice grower and small-scale mill owner San Marcos - Colombia

Spots have started to emerge from the MTA, users appropriate the information and turn it into audios that are shared via WhatsApp.

> INSIVUMEH Guatemala



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Alianza



Food and Agriculture Organization of the United Nations

🕤 Agricultura



Good Practice Note Series

The Food and Agriculture Organization (FAO), the Tropical Agriculture Platform (TAP) and the DeSIRA (Smart Innovation for Development through Research in Agriculture) initiative, together with the Inter-American Institute for Cooperation on Agriculture (IICA) and the Latin American Network of Rural Extension Services (RELASER), are committed to contributing to the strengthening of national agricultural innovation systems (AIS) for the transformation towards sustainable food systems in Latin America and the Caribbean.

AGROSAV/A

In 2021, a Joint Rapid Assessment on Strengthening Agricultural Innovation Systems in Africa, Asia and Latin America was conducted to analyze the innovation environment to identify and document initiatives to strengthen AIS, in the context of the TAP-AIS project, funded by the European Union through the DeSIRA initiative.

The report presented challenges and opportunities for innovation, especially through the improvement of functional capacities and the ways in which regional, global and national organizations can support this task from the approaches and tools of the Tropical Agriculture Platform (TAP).

The publication of this series of Good Practice Notes is an attempt by RELASER and IICA to document cases that have tried to address the development of an effective AIS by addressing their challenges in Latin America.

The same effort was made in the Asia Pacific region, whose best practice notes can be found <u>here</u>.



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For more information, see: www.fao.org/in-action/tap-ais www.twitter.com/TAP_G20