

Adapting precision agriculture techniques for climate smart cocoa production

- 1. What is the problem (in what country)?** Cocoa production is an important economic activity in Latin America. Production in Colombia, Ecuador and Peru accounts for 50% of production in the region and annual growth within the three countries is approximately 11%. About 180,000 producers and 800,000 ha are directly involved in cocoa production. Additionally, the Amazon region is known for the large amount of biodiversity of cocoa, contributing to the high participation of the three countries in the fine flavor cocoa market. Latin America as a region has an estimated 81% of market share in the fine flavor market that is growing at 6% a year.

Upwards of 80% of the cocoa produced in Colombia, Ecuador and Peru is produced by family based agriculture. In many cases, this implies low yields and limited economic sustainability. Furthermore, low yielding farms are not well prepared to adapt to climate change, placing in jeopardy future production in the region at the same time global demand for Latin American cocoa is increasing. Long term changes in temperature and precipitation are expected to shift cocoa production curves as well as disease and pest patterns. Projected average temperature increases of 1 to 2 degrees Celsius are expected to increase inter annual and seasonal climate variability making it difficult to make agricultural management decisions with so much uncertainty. Increases in temperature are also projected to cause water shortages, reducing available water by 10% to 30%. Small producers that do not have access to inputs or technology that regulate the nutrition of the soil, distribution of water or ability to control the humidity within their plantations will be the most affected. Solutions to manage variability exist but are not readily available or adapted appropriately for the use of small farmers.

- 2. Is the potential executing agency and are partners strong / strategic?** ECOM Agroindustrial Corp. Ltd is among the world's leading suppliers of cocoa operating in over 40 major producing countries worldwide and integrating 380,000 farmers into its supply chain. ECOM's South America based cocoa operations are in Colombia, Peru and Ecuador, where it sources at origin and focuses on improving farmer productivity and quality to develop its core business. As a member of the SAFE platform, ECOM is a strategic partner for the MIF in piloting approaches that improve farmer productivity, resilience, and adaptation to climate change. Netafim, an Israeli technology provider, will also participate by providing drip irrigation systems for farmers.

The project will be executed by Sourcetrust, an UK based nonprofit organization, that has extensive experience implementing technical assistance programs in cocoa. Established in 1999 to help chocolate makers source traceable cocoa, it has grown into a global service provider with the aim of transforming cocoa farmer livelihoods for a more transparent, responsible and sustainable cocoa sector. Sourcetrust will work closely with ECOM's technical assistance services to implement the project in Ecuador, Colombia and Peru. The SAFE platform is also a strategic partner for this project. It will contribute with support for monitoring and evaluation, and knowledge dissemination.

- 3. What is the solution proposed?** Despite the threats and challenges posed by increased climate variability, experience from large farms in Ecuador demonstrates

that cocoa farming can be resilient and economically sustainable with the introduction of new precision agriculture techniques. If this technology is adapted to small producers, it could be the key to increasing yields on small farms, improving economic sustainability and making it a more lucrative and sustainable economic activity for future generations.

The strategy is to pilot new credit guarantee structures with established financial institutions (such as Banco Guayaquil) to finance the implementation of climate smart technology in Ecom's supply chain. In the case of Banco Guayaquil, which has limited exposure in lending to small scale cocoa producers, this type of lending has risks and constraints and is therefore not widely available in the sector. The project will explore the implementation of risk sharing mechanisms such as credit guarantees that allow climate smart cocoa to be interesting for banks or other financial institutions as well as favorable for producers.

At the same time, small-scale producers are also not exposed to precision agriculture techniques that are successfully implemented on large farms. Precision agriculture is moving towards addressing specific issues at the farm level based on measuring variability within a farm or region rather than applying generic solutions, which greatly improves the effectiveness and efficiency of input use. The technology package includes:

- Specially created fertilizer blends based on soil and leaf analysis of farms in the target areas. The specially created blends are more effective than generic blends due to the nature of directly targeting nutritional deficiencies rather than applying chemicals that will not be absorbed.
- Drone surveillance as a tool to more quickly observing variance in farms from above (changes in leaf color, areas of high mortality, presence of disease, etc.)
- Drip irrigation to reduce vulnerability to changes in rainfall and to ensure more efficient and effective use of water resources.
- Integral pest and disease management packages.
- Certified plant material for renovation or new planting based on regional recommendations.

Ecom has developed relationships with various input providers and companies offering technical solutions that can be adapted for small producers. Through the program it seeks to replicate this experience with financial institutions such as Banco Guayaquil, linking potential credit with proven solutions. Parallel to its role as a link between small holders and input providers and financial institutions, Ecom provides the commercial link, triangulating financing as a permanent off taker.

4. **What is the wow factor/ the innovation?** This program seeks to be innovative by creating access to technology packages that adapt precision agriculture techniques to small producers as well as new credit enhancement mechanisms to access this technology. Precision agriculture is a farm management system that is employed by large technically advanced farms that works to measure the variability within farms in order to identify and address issues in a site-specific manner. While the level of variability on a small farm (under 10ha) is much less than a large farm (over 100ha), moving towards addressing specific issues at the farm level rather than applying generic solutions will greatly improve the effectiveness and efficiency of input use.

Inputs can be expensive for small producers and many believe that the solution to improving yields is applying more. This is not always the case as the relationship with quantity and effectiveness is not linear. Even with more cost-efficient solutions, the initial investment is beyond the capacity of the small producers. The yield improvements over time, however, make the investment worthwhile.

5. What is the path to scale and who are the potential scalers?

The project will be scaled with other financial institutions that have exposure to the agricultural sector and have demonstrated capacity to lend to small-scale producers. There are an estimated 180,000 producers directly involved in cocoa production within the three countries. While Ecom is interested in piloting the new technology and financial mechanisms to make that technology available to small producers within its own network of producers, the idea is to create interest and capacity within financial institutions and input providers to replicate the program and make climate smart financing available to all cocoa producers in the region. With appropriate de-risking, the project can incentivize financial institutions to create new credit opportunities benefitting small farmers and benefiting the cocoa industry as a whole.

6. How does it align to the IDBG strategies (including country strategy)? The project is aligned with the IDB institutional strategy by supporting the insertion of SMEs into value chains and by addressing cross cutting issues such as climate change and environmental sustainability. It is aligned with the country strategies for Ecuador, Peru, and Colombia by improving agricultural productivity and competitiveness and expanding access to financial services for agricultural producers. The project aligns with IICs priority business areas of improving access to finance and TA for MSMEs, supporting innovation, and green growth. It also focuses on improving market links with agricultural value chains, a key IIC business sector.

7. Which of the 3 main thematic areas of the new MIF does it align to and why? The project is aligned with the strategic pillar of Climate-Smart Agriculture, as it seeks to promote precision agriculture techniques and access to finance to improve productivity and reduce vulnerability to climatic changes.

8. What are the key indicators you can use to feed the aspirational indicator of the thematic area? (i) Number of producers with access to new technology packages; (ii) Number of hectares under improved farm management; (iii) Increase in yields over 3 years due to the implementation of new technologies; (iv) \$ volume of credit deployed for adaptive technologies; (v) number of producers implementing improved specific climate smart agriculture techniques; (vi) volume cacao produced by beneficiaries that is purchased through Ecom.

9. What instruments will you use? How much you think the project will cost to the MIF and how much you think it can leverage from other partners? The instruments to be used are technical cooperation grant for an estimated total of \$1.0 million and reimbursable loan from MIF or another partner for an estimated amount of \$2.0 million. Leveraged funds from Ecom and its partners are estimated at \$1.8 million.

10. Who is in your team (teams should preferably be led a COF staff)? Yolanda Strachan (MIF/CSA), Lissy Velez (MIF/CSA), Alejandro Escobar (MIF/CSA), Gabriela Mera Pacheco (IIC).