



## FINAL PROJECT REPORT

### PEREZ-GUERRERO TRUST FUND FOR ECONOMIC AND TECHNICAL COOPERATION AMONG DEVELOPING COUNTRIES, MEMBERS OF THE GROUP OF 77 GOVERNMENT OF THE REPUBLIC OF TRINIDAD AND TOBAGO

<b>Title:</b>	<b>INT/11/K01 - Establishing alternative sustainable livelihoods in agriculture through the development of a vibrant Fine/ Flavour Caribbean Cocoa Industry</b>
<b>Sector:</b>	<b>Agriculture</b>

Outcome	Deliverables	Status	Dissemination method
01. A Caribbean Cocoa Industry Task Force for securing a regional commitment for R&D agenda for revitalizing the cocoa industry	Caribbean Industry Development Workshop	Two Caribbean Conferences were conducted to transfer scientific research on innovations in cocoa production, processing and quality management and regional symposium/workshop to understand the status of the cocoa industries in the region and gaps.	<p><b>International fine cocoa innovation centre conference &amp; symposium1: <i>Seeding Innovations along the Cocoa Value Chain</i></b>. March 23-24, 2015 at Ortinola Estate, Acono, Maracas Valley, St. Joseph, Trinidad.</p> <p><b>International fine cocoa innovation centre conference &amp; symposium2 &amp; chocolate exposition 'Revitalising the Caribbean Cocoa Industry'</b>. February 6-7, 2017 at Spanish Court Hotel, New Kingston Jamaica</p> <p><b>Australia-Caribbean Knowledge Sharing Symposium</b>. 24-28 October, 2018 at Faculty of Education Conference Centre, UWI, St. Augustine was conducted by the Cocoa Research</p>

			Centre with support from the Australian High Commission.
01	Conduct workshop sessions to develop a strategic plan and a Caribbean Cocoa Industry Development Taskforce to execute activities	<p>Other exploratory in-country workshops sessions were conducted in Belize, Dominica, Jamaica, Haiti and St Lucia to further identify the needs or gaps of their cocoa industries and what services Cocoa Research Centre to support the countries. This was further consolidated under the Australia-Caribbean Knowledge Sharing Meeting.</p> <p>There was also a best practice exchange among Eastern Caribbean States (ECS) countries for fine cocoa food safety and quality in production, processing and marketing for export to European Union (EU), international and regional markets on 3<sup>rd</sup> – 5<sup>th</sup> March 2015. Additionally, CRC co-facilitated a three-day information regional workshop in Dominica on cocoa industry self-assessment and gap analysis on 24<sup>th</sup> January 2017</p>	<p>A Whatsapp group was formed in 2018 following the Australia Caribbean knowledge sharing symposium and remains operational to date. This allows for a medium for regional stakeholders to liaise with CRC to overcome problems and facilitate communication within regional partners.</p> <p>Based on the gaps identified projects supported by LWR, EU as well as Compete Caribbean have been completed in Haiti, Jamaica and Dominica. Negotiations are in train to support Belize and Grenada with support from Compete Caribbean and St. Lucia with support from EU-FAO. Additional project in Haiti with support from AVCF is on-going.</p>
02 Training programmes in Post harvest technology, flavour testing and quality management system , value addition	Design and deliver training Programmes	<p><b>Trinidad and Tobago</b></p> <p>Diseases reduce cocoa productivity by 20-40% in Trinidad and Tobago. Innovations developed at the Cocoa Research Centre to reduce the disease problem including resistant planting material, employment of the CRC collar and best practices in biological and chemical control methods were disseminated through train-the-trainer workshops.</p> <p>Microlot marketing provides market access into the microbatch boutique chocolate markets that offer high prices for cocoa. However, cocoa requires consistency in quality over harvests, certification and traceability. CRC provided cocoa post-harvest processing and quality management training on best practices from pre-harvest, harvest, fermentation, drying,</p>	<ul style="list-style-type: none"> <li>• Training workshop in cocoa disease management. May 2014 for 64 stakeholders.</li> <li>• Train-the-trainer training workshop at the Rio Claro Experimental Station Sept, 2017</li> <li>• Post-harvest processing and quality management training course at the Ministry of Agriculture of Trinidad and Tobago La Reunion Estate and cocoa processing facility.</li> </ul>

		<p>sorting and grading, storage and transport. There was also a practical session on cocoa bean physical quality assessments including bean count, bean weight, moisture contents and cut tests. The training concluded with a chocolate tasting session which introduced participants to dark chocolates from the following origins, Ghana, International Cocoa Genebank, Trinidad and La Reunion Estate, Trinidad (dried using the diesel fired artificial dryer).</p> <p><b>St. Lucia</b> St. Lucia identified that training to improve post-harvest and quality management was one of their major needs, therefore training in this field was carried out.</p> <p><b>St. Vincent</b> The Cocoa Research Centre provided budwood from 11 ICS accessions (ICS 6, ICS 60s ICS 45, ICS 8, ICS 95, ICS 1, ICS 49, ICS 85, ICS 45, ICS 16, ICS 98) to St. Vincent to assist in revitalizing their cocoa industry as this was one of their primary needs.</p> <p><b>Haiti</b> Haiti initial requirement was the identification of the genotypes currently on the island to determine the quality of planting material. Dr. Michel Boccara and Mr. Lambert Motilal from Cocoa Research Centre trained thirty participants, including staff of CRS and agronomists, in farm surveying, cacao morphology, passport data collection, cacao sampling, leaf collection, DNA fingerprinting, genetic relationships and cacao breeding.</p> <p><b>Jamaica</b></p>	<ul style="list-style-type: none"> <li>• Development of criteria, and indicators for postharvest quality management and certification were developed and disseminated to farmers interested in microlot marketing.</li> <li>• B2b meeting was held in October 2019 to link local microlot producers with microbatch chocolate processors in Europe, Japan and North America.</li> <li>• This was done in the form of a train-the-trainer workshop.</li> <li>• Training for Mr. Edmund Thomas of St. Lucia in post-harvest processing and quality management in September 2014.</li> <li>• CRC offered DNA fingerprinting services to accurately identify the varieties and provided information on the varieties and their hybrids.</li> <li>• “Caractérisation Morphologique et Moléculaire des Clones de Cacao à Haiti”- a three day workshop at Dame Marie, Haiti” in August 2015.</li> </ul>
--	--	--	--

		<p>The important constraint in Jamaica was the poor quality planting material and deteriorating quality of final beans marketed. The intervention with support from EU-ACP was for CRC to support improvement in planting material and improvement in quality management. DNA fingerprinting services to identify promising varieties as well as to test the fidelity of the clonal and seed gardens were conducted. This was supported by training in propagation and deployment of varieties.</p> <p>To address the quality problem two training workshops were carried in the Eastern and Western Jamaica</p> <p>A training workshop to create an understanding of cocoa quality, how it affects the end products and develop competencies for optimal cocoa postharvest processing was also facilitated.</p> <p><b>Grenada</b></p> <p>During the analysis of the gaps in the Grenadian cocoa industry it was determined that trees with a tap root system would be more suited to the Grenadian environment, where exposure to strong winds may cause uprooting of trees propagated by rooted cutting. Therefore a workshop to provide training in an alternative method of propagation, namely grafting was facilitated.</p>	<ul style="list-style-type: none"> <li>• Training on collection of material for identification, the theory of molecular fingerprinting, breeding and propagation was provided to over 30 participants by CRC through a Train-the-Trainer programme at the College of Agriculture and Science Education (CASE) in Portland, Jamaica.</li> <li>• Training and brochures on propagation (grafting and rooted cuttings) and manuals titled “Guidelines for Collecting and Shipment of Cacao Leaf Samples” and “Surveying On-Farm Diversity of Cacao in Jamaica.”</li> <li>• Training workshop titled “Improving postharvest processing, quality management in cocoa, geographical indications, traceability, quality certification and linkages to the tourism industry” was held from June 8th – 10th 2015 at the Montpellier Agricultural Research Station (MARS), Bickersteth, St. James, Montego Bay, Jamaica.</li> <li>• Three day training session on different methods of grafting and budding was undertaken at the Maran Nursery in Gouyave in conjunction with the Cocoa Farming Future Initiative (CFFI) between the 17th and 19th February 2014 with over 40 participants.</li> </ul>
--	--	---	---

		<p>To address the low yields in Grenada, a pruning and shade management workshop was requested by Grenada.</p> <p><b>Dominica</b> In Dominica a needs assessment indicated that the cocoa industry in Dominica required a three prong technical/training assistance package. The Cocoa Research Centre was able to provide consultancy and training for crop cultivation (propagation, pruning, management and rehabilitation), post-harvest processing and chocolate making.</p> <p>A subsequent gap analysis showed poor quality due to inappropriate postharvest processing and cadmium contamination of beans was identified.</p>	<ul style="list-style-type: none"> <li>• Pruning workshop at St. Marks Grenada, was facilitated between the 21st and 22nd of July, 2015. And a Pruning brochure</li> <li>• Three-day training workshop “The Training in Cocoa Cultivation Workshop” at CRC, Trinidad February 21st -23rd, 2017 for 6 Dominican participants.</li> <li>• Four-day Introductory chocolate course at CRC, Trinidad in February 2017 in which there were two participants from Dominica.</li> <li>• Additional interventions are on-going to improve quality through improvement in infrastructure and improvement in process management. Further a cadmium mapping exercise and mitigation methodology development is in train.</li> </ul>
03 A knowledge base on the Caribbean cocoa industry	<p>Conduct studies and prepare papers:</p> <p>A. Country status, research, innovation, sharing of technology.</p> <p>B. Industry standards and quality control</p>	<p>A. Several brochures were prepared based on the requirements of participating countries and the Cocoa NEXT platform was used to showcase country status.</p> <p>B. It is important to develop quality control standards, monitoring systems and protocols which can be used by Caribbean countries. Dr. Darin Sukha participated in the training of facilitators in CALIDENA</p>	<ul style="list-style-type: none"> <li>• Brochure on cadmium mitigation</li> <li>• Brochure on Quality Management</li> <li>• Brochure on Soil fertility</li> <li>• Brochure on Climate Smart Approach</li> <li>• <b>Sukha DA</b> (2019) Trinidad and Tobago Standard, TTS 646:2019 (ISO 2292:2018, MOD). Cocoa Beans – Sampling. Chairman,</li> </ul>

	<p>C. Market intelligence, quality control.</p> <p>D. Genetic resource management and joint development of projects</p>	<p>Methodology in the Caribbean held in Santo Domingo, Dominican Republic on 9- 11<sup>th</sup> December 2014. The <b>CALIDENA</b> methodology assists in the identification and furthering of activities which will strengthen the quality services for a value chain in order to increase the competitiveness of small and medium enterprises (SMEs). A standard for quality for beans of coca for Trinidad and Tobago was developed and is currently being adapted to the region. CRC worked with Cocoa of Excellence to develop an international standard which is being used to develop sensory laboratories in the Caribbean, namely Grenada, Belize, Dominica and Haiti with the support of Complete Caribbean</p> <p>C. Business to Business meetings were organised to facilitate trade between persons in the industry. There were also a meeting in Dominica on post-harvest management.</p> <p>D. The Cocoa Research Centre facilitated DNA fingerprinting and supported the establishment of clonal gardens and National genebanks in Haiti, Jamaica and Dominca. The training on how to collect leaf samples for finger printing and the morphological/ passport data allowed teams</p>	<p>Specification Committee for Cocoa Quality Standards of the Trinidad and Tobago Bureau of Standards for the formulation of the Trinidad and Tobago Standard, TTS 646:2019 (ISO 2292:2018, MOD). Macoya, Trinidad and Tobago 33 p.</p> <ul style="list-style-type: none"> <li>• <b>Sukha DA</b> (2019) Trinidad and Tobago Standard, TTS 647:2019 (ISO 2451:2017, MOD). Cocoa Beans – Specifications and Quality Requirements. Chairman, Specification Committee for Cocoa Quality Standards of the Trinidad and Tobago Bureau of Standards for the formulation of the Trinidad and Tobago Standard, TTS 647:2019 (ISO 2451:2017, MOD). Macoya, Trinidad and Tobago 45 p.</li> <li>• B2B meetings on the 4<sup>th</sup> and 5<sup>th</sup> October 2019 at the Hyatt hotel in Trinidad</li> <li>• Meeting in Dominica on 24/01/2017 to discuss post-harvest processing, quality management and value addition attended by 64 persons. The outcomes of the cottage meeting were used to provide recommendations for the Dominican Ministry of Agriculture</li> </ul> <p>Technical Reports</p>
--	---	---	---

		<p>from Haiti to carry out farm surveys and collected leaf samples for CRC to fingerprint. In total, though 399 samples were prepped for DNA analysis. This study revealed the genetic architecture of cocoa in South West Haiti and the possible sources of germplasm introductions into Haiti: Identified superior mother plants for the establishment of a clonal garden: Identified a core collection that should be conserved in a genebank and gaps in the genetic resources of cocoa in Haiti: Identified a group of genotypes with Trinitario/Criollo ancestry that can be used to develop a fine/flavour cocoa industry and also Identified highly inbred and highly heterozygous genotypes which can be exploited in breeding and for commercial release.</p>	<ul style="list-style-type: none"> <li>• <b>Motilal L.A et. al., (2016)</b> Morphological and Molecular characterszation of Cacao Clones in South West Haiti.</li> <li>• <b>Motilal LA (2014)</b> Surveying On-Farm Diversity of Cacao in Jamaica.</li> </ul>
<p>04 Develop e-Cacao TECH website and organise for website launch at workshop in Trinidad</p>	<p>A. Develop website and organise for website launch at workshop in Trinidad.</p> <p>B. Provide training to use and maintain website</p>	<p>Two websites were developed the first entitled CocoaNext to share information regarding the regional cocoa industries and to share best practices in each country. Website developed: <a href="http://www.cocoanext.org">www.cocoanext.org</a> by Mr. Dwayne Villiers Cocoa NEXT: Regional Pan-Caribbean website of the Cocoa Research Centre</p> <p>The second website was developed to provide information on CRC innovations, training and services.  <b>Website developed:</b> <a href="http://www.ifcic.center">www.ifcic.center</a></p> <p>IFCIC: International Fine Cocoa Innovation Centre was developed to provide technical knowledge</p> <p>Ms. Antoinete Sankar was trained on how to use and maintain the website.</p>	<ul style="list-style-type: none"> <li>• E-mail</li> <li>• Facebook and Instagram</li> <li>• International Symposium on Cocoa Research 2018 (Poster)</li> <li>• CocoaNEXT website dissemination and data collection at Belize Cacao and Agroforestry Forum July 20th, 2017, Southern Belize (BFREE and Ya'axché Conservation <a href="https://www.bfreebz.org/stakeholders-discuss-future-cacao-industry-belize/">https://www.bfreebz.org/stakeholders-discuss-future-cacao-industry-belize/</a></li> </ul>

