

## ABSTRACT

There is tremendous unrealised potential in the cocoa industry of the Caribbean, and while the neighbouring regions may have a greater measure of success, there is still significant room for improvement. Slow adoption of innovations, best practices and new technologies in the cocoa industry is in part due to lack of proper channels for information gathering and sharing among stakeholders. Stakeholders are more likely to adopt an innovation when they know that it has been successfully tried and tested by other stakeholders in the industry. CocoaNexT is a Pan Caribbean website developed by Cocoa Research Centre of The University of the West Indies (CRC-UWI) for country-specific data, and information sharing. It is designed to disseminate information from research on propagation, cultivar development and deployment, post-harvest, value addition and IP registration to cocoa farmers, breeders and other stakeholders of the Americas. CocoaNexT will serve as a platform for delivery and promotion of services such as: DNA fingerprinting, flavour consultation, propagation, cultivation, variety improvement, disease management, certification and, importantly, a portal to share information among stakeholders. Regional collaboration has been and continues to be vital for the continued development of this interactive medium to build momentum and pave the way for continuous improvement. Through this platform, stakeholders in each country will have access to a directory of expertise, a practical knowledge base for all aspects of industry and a forum for collaboration to drive innovations forward to the benefit of the industry. The website design has been completed, a domain reserved and content is being input into the framework/structure.

Keywords: cocoa, collaboration, best practice, network, cacao, stakeholders, markets

## **Introduction**

CRC-UWI, a centre for cacao research with a long history of research and collaboration for the benefit of the global industry, continues in the path of collaboration for future sustainability with current projects such as IFCIC<sup>1</sup> and IMPACTT<sup>2</sup>. The CocoaNexT website is the culmination of a regional collaborative project entitled “*Establishing alternative sustainable livelihoods in agriculture through the development of Caribbean Cocoa Industry*” supported by the Perez-Guerrero Trust Fund (PGTF) which began in 2013. Since the project’s inception it has evolved beyond the original goals and objectives for regional collaboration and this evolution will be sustained through the newly created or strengthened stakeholder network connections. These stakeholder connections will be cemented with the advent of CocoaNexT an innovative solution to the problem of weak or absent regional industry support mechanisms, and restricted market access. CocoaNexT will be a unique platform for stakeholders of all regions to consolidate their knowledge, expert services and training opportunities. CocoaNexT will allow all industry stakeholders to learn from the best practices developed by their local and regional neighbours to strengthen each other’s capacity to respond to challenges, innovate and create or solidify the framework for sustainability in the national, and regional industries.

## **Background**

The institution that is CRC-UWI was seeded as the Cacao Research Scheme of the Imperial College of Tropical Agriculture in 1930. It started a collaborative research framework to solve global industry problems, collection of germplasm on which research could be done, and breeding to provide improved material. The scheme had been formed as a result of a need at the time to combat Witches’ Broom (WB)

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<sup>1</sup> International Fine Cocoa Innovation Centre funded by EU/ACP Science and Technology fund

<sup>2</sup> Improving Marketing and Production of Artisanal Cocoa from Trinidad and Tobago funded by the IDB/MF?

disease. So urgent was the problem an entire collection was made from the centre of diversity for cocoa and strategically placed at the MARPER farm in Sangre Grande (Trinidad) the epicentre of the disease to allow for the power of genetics to do battle with nature and allow the survival of plants that could withstand the disease pressure and thus bear fruit to benefit the industry. The name “MARPER” was derived from the organism that caused the WB disease *Marasmius pernicius*<sup>3</sup>. When the scheme became the CRU in 1962, collaborative research continued, the International Cocoa Genebank, Trinidad (ICGT) was born and went on to become the largest and most diverse extant collection of cacao. The entire cocoa industry is linked to the two Universal Collections of cacao, one of which is in the public domain, the ICGT, and curated by the CRU. The ICGT is a focal point for mutually beneficial research and collaboration. Much of the material conserved in Trinidad was shared with the region and around the world: from Grenada, to Africa, to Indonesia, and even back to South America, either hybrids or clones, by accident or by design. It is said the Brazil industry was saved from complete ruin by the WB disease with a hybrid from Trinidad. Given the fact that these hybrids were not officially being distributed outside the region, makes this a source of contention, but it raises the valid question of why the hybrids were not protected under the existing convention (UPOV<sup>4</sup>) and legally shared instead of a hold being placed on all distribution. This is a question many governments must now wrestle with. With the long history of global collaboration and assistance it is no surprise CRC-UWI, a successor organisation of the CRU, formed to create greater global impact continues today with an emphasis on collaboration to increase sustainability. Thus the PGTF project was conceived and executed through associated regional collaborative efforts bearing fruit by way of many workshops with problem solving/troubleshooting for national cocoa programmes and the final deliverable that was earmarked to be a website to support the network of cacao stakeholders.

### **A Regional Industry Perspective**

The problems of regional industry cocoa stakeholders from the Caribbean and countries in Latin America are similar: declining production, low yields, ageing trees, lack of linkage to lucrative high value boutique markets, low value addition and in particular a lack of knowledge of how to deal with and reverse the downward trends. Stakeholders without access to a local support arm such as the CRC-UWI with its 80 plus years of research output in support of the industry are at a disadvantage. Even within Trinidad there may be stakeholders who do not have access to the support available from CRC-UWI to get the information they may need or have an efficient way to share important advances in a digestible format to reach other stakeholders.

Despite the problems common to the region, there have still been stakeholders with success stories and best practices are developed independently in each country but there is no forum to disseminate these as learning tools to expedite improvements across the board. Without such a collaborative framework, efforts will continue to be mostly duplicated with minimal success because of the lack of opportunities to share vital information and a regional approach to solving industry problems. Without such an approach, the cocoa industry will continue to languish and cocoa stakeholders will continue to lack the tools needed to exploit the untapped potential for poverty alleviation that comes with the elite classification as fine/flavour producers. This is a concern for farmers who simply sell beans but also for those stakeholders higher up the value chain (including the farmers who are tree to bar producers) relying on the production output levels to improve and sustain their businesses. As farmers struggle to sustain productivity levels needed to break the income barrier, they are unable to focus on other issues such as access to markets which they could if they were able to solve the basic problems of productivity and quality control.

### **Charting the way forward through the achievements of the project activities**

A snapshot is provided here of the PGTF project achievements in terms of direct collaboration with stakeholders in the region.

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<sup>3</sup> The WB disease causing organism has since been renamed *Moniliophthora perniciosa*

<sup>4</sup> International Union for the Protection of New Plant Varieties

### **Belize collaboration highlights**

Assistance was provided to Belize stakeholders for the development of a cacao agroforestry training manual by Mrs. Annelle Holder-John of CRC-UWI. An invited visit to Belize to speak to stakeholders on regional collaborations and the development of *CocoaNext* was successfully executed and with assistance from BFREE<sup>5</sup> farmers in attendance answered survey questions to contribute to data for the Belize country profile of the website.

### **Jamaica collaboration highlights**

DNA analysis of 576 samples from Jamaica revealed the ancestry of the Jamaica cacao trees with some trees having at least 30% Criollo ancestry. Trees were identified and recommended for propagation and distribution to mitigate the spread of frosty pod disease. Cocoa production decline continues to be the major concern. Improved postharvest processing, management of cocoa quality with creation of higher yielding varieties were identified as the means to improve productivity and reduce risks associated with cocoa production. Training was provided on collection of material for identification, the theory of molecular fingerprinting, breeding, propagation and postharvest processing. Demonstrations and hands on training sessions were done for pollination, rooting of cuttings, as well as different forms of grafting. Training was provided by Professor Path Umaharan, Mr. Lambert Motilal and Mrs. Holder-John of CRC-UWI through a Train-the-Trainer programme at the College of Agriculture and Science Education (CASE) in Portland, Jamaica. Brochures on relevant propagation techniques were also distributed. A training workshop was also led by Dr. Darin Sukha on cocoa quality, cocoa postharvest processing, to improve the quality of cocoa for export which can provide niche-marketing opportunities.

### **Haiti collaboration highlights**

A renewed interest in increasing cocoa cultivation in spite of the severity of the impacts of natural disasters meant that Haiti stakeholders chose the way forward as selecting superior cocoa varieties in their growing locations. Among the achievements for Haiti are DNA fingerprinting of a representative sample of cacao types, identification of superior trees for clonal gardens, a core collection for conservation, gaps in the genetic resources, genotypes for development of a fine/flavour cocoa industry, and for breeding and commercialisation. Dr. Michel Boccara and Mr. Motilal of CRC-UWI trained participants in farm surveying, cacao morphology, passport data collection, cacao sampling, leaf collection, DNA fingerprinting, genetic relationships and cacao breeding. Teams from Haiti were then able to conduct farm surveys to collect passport data and leaf samples for CRC-UWI to fingerprint for further technical support to the stakeholders.

### **Dominican Republic collaboration highlights**

Training of facilitators by Dr. Sukha of CRC-UWI was achieved in capacity building with a pragmatic approach to transfer knowledge of the concepts and instruments of the CALIDENA approach for which a feasibility study was later completed to evaluate applicability for the cocoa value chain. This led to Cocoa Research Centre chairing a Food Advisory Sub Committee to review the current CARICOM Regional Organisation for Standards and Quality set of standards for regional (CARIFORUM region) chocolate and cocoa products.

### **Commonwealth of Dominica collaboration highlights**

Technical assistance and training was provided to Dominica by CRC-UWI staff. Cacao samples provided by the Dominica Ministry of Agriculture Fisheries and Forestry were DNA fingerprinted and characterised using morphological descriptors. A survey of on-farm diversity was led by Dr. David Gopaulchan of CRC-UWI and this information combined with other findings to select superior varieties and develop recommendations for conservation, breeding and supply programmes. Training in crop cultivation, post-harvest processing, and chocolate making as well as support for value addition was also provided. A cottage meeting led by Dr. Sukha addressed the inadequacies in post-harvest processing, cocoa quality management and value addition. Recommendations were subsequently made to the Dominican Ministry of Agriculture, Fisheries and Forestry which will facilitate the ministry's work to increase Dominican standing in the international fine cocoa production arena.

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<sup>5</sup> Belize Foundation for Research & Environmental Education

### **St. Lucia collaboration highlights**

Discussions in St. Lucia with the Ministry of Agriculture concluded there was a need for an upgrade in cocoa quality. Training post-harvest processing and management of cocoa quality was therefore provided by CRC-UWI.

### **St. Vincent collaboration highlights**

The St. Vincent Cocoa Company were committed to revitalisation through the inputs of new varieties with a reputation for fine flavour and steps were taken to have genotypes propagated and delivered to St. Vincent though quarantine problems were a major stumbling block and dictated the pace of progress. Additionally DNA fingerprinting is being carried out to identify indigenous landraces of promise.

### **Grenada collaboration highlights**

GAP analysis for Grenada cocoa industry revealed issues with propagation. A training session on methods of grafting and budding was undertaken at the Maran Nursery in Gouyave in conjunction with the **Cocoa Farming Future Initiative (CFFI)** to promote grafting and participants were given a grafting and budding brochure for further clarification and post workshop review. Subsequently a pruning and rehabilitation workshop was carried out by Mrs. Holder-John and Dr. T. Sreenivasan of CRC-UWI again in partnership with CFFI.

### **Trinidad highlights and conclusions**

Trinidad stakeholders were exposed to training from CRC-UWI in cocoa disease management, all post-harvest practices and issues governing the quality of the end product for farmers. CRC-UWI also regularly now runs Introductory Chocolate Making Training which can be a simple tool for farmers or farmer groups to improve the sustainability of cocoa production as a legitimate source of income.

In conclusion from the activities undertaken regionally, and the achievements of the project action items which are documented, it is clear that collaboration and sharing of knowledge resources is an important tool. It remains to be seen how they can be sustained in the long term which is where a virtual network such as *CocoaNexT* can be the bridge to provide the long term connections for all stakeholders.

CocoaNexT will be user-driven, with customised pages for the type of user e.g. on farmer pages, information on disease screening, tree and orchard design, Geographical Indications (or other IP) support, DNA identification of fine or flavour trees (based on ancestry) for development or enrichment of the fine/flavour segment of the industry.

For conservationists/breeders, a germplasm management toolkit, DNA fingerprinting toolkit, and advice on core collection constitution is provided. General menu options for simply curious visitors will include spotlights of CRC-UWI's current projects with regional partners, or issues that have a global impact such as IFCIC, IMPACTT, and projects related to Cadmium, flavour and quality along the value chain, and also agronomic management.

### **The Website Plan**

A site map was generated for the website, reviewed and revised to create the best platform that would be user-friendly and accessible to stakeholders. The website name CocoaNexT was decided upon as the best representation of what it will be for the future of the industry and the future of collaboration to create positive outcomes for all stakeholders. The domain cocoanext.org was registered and a consultant was contracted to design and develop the website. The web page format has been completed and currently, content (which includes videos and information) is being collated and input into the webpage layout. The website will contain inputs from CRC-UWI, inputs from regional partners (regional cocoa industry stakeholders who have pledged collaborative support to get the content), and will present for its beneficiaries a central location for all best practices, an experts database, and opportunities for collaboration and training where necessary. The benefits will be far-reaching as evidenced by the enthusiasm of the stakeholders who are already contributing content such as the BFREE organisation and other stakeholders in Belize who organised and participated in the forum to discuss potential for future collaboration and gather information for the Belize profile.

## **Website Content**

1. Country pages
  - 1.1. Size of industry, acreages under cultivation, Farmer census
  - 1.2. Problems/GAP analysis (if available)
  - 1.3. Initiatives to address problems
  - 1.4. Cost of production, profitability profile
  - 1.5. Best practices
  - 1.6. Niche producers' profiles, fine chocolate companies, gourmet chocolate, trade shows schedule (e.g. World Cocoa and Chocolate Day for Trinidad and Tobago)
  - 1.7. Industry development plan/Policies governing industry
  - 1.8. Investment support (InvesTT for T&T)
  - 1.9. Tourist Attractions listing
2. Farmer support pages
  - 2.1. Video clips
  - 2.2. "how to" pamphlets
  - 2.3. information bulletins
  - 2.4. Interpretive summaries of research and their developmental impact
    - 2.4.1. research done at CRC-UWI
    - 2.4.2. innovative research from other countries
    - 2.4.3. Review articles: the state-of-the art in various aspects of the cocoa value chain.
    - 2.4.4. Current research projects underway (objectives, results)
3. Breeder/Conservationists pages
  - 3.1. Core collection advice
  - 3.2. DNA fingerprinting toolkit
  - 3.3. Germplasm management toolkit
4. CRC-UWI Services
  - 4.1. Genetic fingerprinting
  - 4.2. Certification
  - 4.3. Flavour testing
  - 4.4. Setting up a certification laboratory
  - 4.5. Postharvest facilities
  - 4.6. Small scale chocolate laboratory
  - 4.7. Disease resistance testing
  - 4.8. Cadmium analysis
  - 4.9. Rehabilitation support
  - 4.10. Training programmes – chocolate making, flavour testing, propagation, pruning and training, disease management, characterisation, genetic profiling, rehabilitation of farms and postharvest management train the trainer workshops to support farmer field school training.
  - 4.11. Agrotourism tour and user experiences

## **Learning Outcomes and Outlook: Expansion/growth**

What worked well: working with NGOs in various regions including island of Grenada in the Caribbean and Belize. In general, collaborators were eager to participate and working with them to get initiatives underway proved to be more efficient. All collaborators in this sphere expressed commitment to submit information for their country profiles for the website. A Google form was created to collect information and a Dropbox folder set up for ease of gathering/sharing of country information for input to the website. There are many online tools available for free that encourage collaboration.

What didn't work well: working with governments proved to be slow starting and slow progress even to date. Working within the current quarantine system and its tendency for slow progress of permit processing/delivery is a concern for countries wishing to share germplasm for the improvement of the industry. Most stakeholders/collaborators were subject to busy schedules and once the direct in-person contact ended it was difficult for them to follow through on the promises made regarding information to

be posted on the website. An option for members to log in and submit draft posts directly at any time will be built into the website to overcome this shortcoming.

### **Conclusion**

A new platform is being developed and refined with input from regional stakeholders to transform the way regional cocoa industry stakeholders collaborate and provide impetus for maximising impact through sharing best practices. As a final output of a project focused on collaboration among regional cocoa stakeholders, CocoaNexT can become the tool that propels the industry to accelerated improvements in all areas through the enabling environment it will provide for stakeholders to communicate and collaborate.

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