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Caribbean Biosafety and Biotechnology

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Report Highlights:

Biotech regulations have been virtually non-existent in the Caribbean. However, that may change in the years ahead as several Caribbean Community (CARICOM) countries continue to work toward implementing National Biosafety Frameworks (NBFs) in order to comply with their obligations under the Cartagena Protocol on Biosafety (CPB), to which they are parties. To date, only one CARICOM country (St. Kitts and Nevis) has enacted biosafety legislation. Thus, much work remains to be done before NBF's are fully operational throughout the region.

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Section I: Executive Summary:

Several institutions within the Caribbean Basin Agricultural Trade Office's (CBATO) region of coverage are conducting biotech research on crops such as sugarcane, cassava, papaya, rice, coconuts, cocoa, coffee, peppers, and spices and to a lesser extent on ornamentals and animals [1]. This research has yielded a number of advances, including developing transgenic papaya varieties resistant to devastating papaya viruses as well as the development of biochemical compounds suitable for use as bio-pesticides. However, the actual commercial production of genetically engineered (GE) products will take many years. The Caribbean region is also not yet at the stage where animal genetic engineering (or cloning of animals) is being developed.

The CBATO is not aware of any specific requirements related to the importation of GE products in its region. Currently, the United States is the region's main supplier of food and agricultural products. Nearly 100 percent of all corn, soybean, cotton and canola products are imported from the United States.

Suppliers may encounter greater regulation of GE products as well as increased consumer awareness in the years ahead. Over the past several years most of the countries within CARICOM have worked at developing their own draft NBF; a combination of policy, legal, administrative and technical instruments geared toward addressing safety for the environment and human health in relation to modern biotechnology [2]. This is being done with the support of the United Nations/Global Environment Facility (UNEP/GEF), which is helping these countries meet their obligations under the CPB [3]. To date, only St. Kitts and Nevis has enacted any biosafety legislation and no country in the region, including St. Kitts and Nevis, has a fully functional biosafety framework in place.

[1] The CBATO islands of coverage are: Anguilla, Antigua & Barbuda, Aruba, The Bahamas, Barbados, Bermuda, British Virgin Islands, Cayman Islands, Cuba, Dominica, Guadeloupe, Martinique, Grenada, Montserrat, the former Netherlands Antilles (Curaçao, Bonaire, Sint Maarten, Saba & St. Eustatius), St. Kitts & Nevis, St. Lucia, Saint Martin, St. Barthélemy, St. Vincent & the Grenadines, Trinidad & Tobago, and Turks & Caicos Islands. For purposes of this report, Cuba is excluded from the CBATO's region of coverage.

[2] CARICOM Member States are: Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Lucia, St. Kitts and Nevis, St. Vincent and the Grenadines, Suriname, and Trinidad and Tobago (CARICOM Associate Members are: Anguilla, Bermuda, British Virgin Islands, Cayman Islands, Turks and Caicos Islands).

[3] CARICOM Member States that are Parties to the CPB are: Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, and Trinidad and Tobago. It should be noted that Jamaica is not part of the UNEP/GEF Regional Project for Implementing NBFs in the Caribbean because it did not ratify the CPB until after the project was initiated. Instead Jamaica is carrying out its own NBF project.

Section II: Plant and Animal Biotechnology

CHAPTER 1: PLANT BIOTECHNOLOGY

PART A: Production and Trade

a) Product Development:

There are no GE plants or crops under development in the CBATO region that are poised to be commercialized in the near future. Overall, agricultural production throughout the region is minimal, and most countries within the region must import the majority of their agricultural product needs. Total land area is 23,783 sq. km. (9,183 sq. miles), roughly the size of New Hampshire. Of this, only about seven percent of the land is arable and an even smaller percentage is actually utilized for farming.

Nonetheless, research institutions throughout the Caribbean have recognized that production of GE plants and crops could lead to an increase in yields and reduced use of water in agriculture. These institutions have identified several local products (sugarcane, cotton, rice, coconuts, cocoa, coffee, peppers, spices, and anthuriums among others) that could be improved using agricultural biotechnology. Some of the institutions leading the way with research on some of these plants and crops are: the University of the West Indies (UWI), the Caribbean Agricultural and Development Institute (CARDI), and the National Agriculture Research Institute (NARI) in Guyana.

b) Commercial Production:

In the absence of a fully-functioning biosafety legal framework in place to oversee the production or release of LMOs, countries in the region are being cautious when it comes to GE crop cultivation. In essence, there are no known field trials or commercial production of GE products taking place in the CBATO region.

c) Exports:

Not applicable.

d) Imports:

Currently, the United States is the region's main supplier of food and agricultural products. In some cases, particularly for imports of the consumer-oriented products category, products from third countries are transshipped through the United States. The following tables show the region's imports of some key GE products, including the consumer-oriented products category, which is made up largely of products derived from or containing GE corn, soybean and/or canola.

Reporting Countries Export Statistics (Partner: CBATO Islands), Corn

Country	Unit	2016	Market Share (%)
United States	Tons	136,149	99.0
Other	Tons	1,346	1.0
Total	Tons	137,495	100.0

Source: Global Trade Atlas

Reporting Countries Export Statistics (Partner: CBATO Islands), Soybeans

Country	Unit	2016	Market Share (%)
United States	Tons	29,909	99.8
Other	Tons	54	0.2
Total	Tons	29,963	100.0

Source: Global Trade Atlas

Reporting Countries Export Statistics (Partner: CBATO Islands), Soybean Meal

Country	Unit	2016	Market Share (%)
United States	Tons	48,387	99.5
Other	Tons	226	0.5
Total	Tons	48,613	100.0

Source: Global Trade Atlas

Reporting Countries Export Statistics (Partner: CBATO Islands), Cotton

Country	Unit	2016	Market Share (%)
United States	Tons	59	100.0
Other	Tons	0	0.0
Total	Tons	59	100.0

Source: Global Trade Atlas

Reporting Countries Export Statistics (Partner: CBATO Islands), Rapeseed, Colza or Mustard Oil and their fractions

Country	Unit	2016	Market Share (%)
United States	Tons	970	69.5
Canada	Tons	388	27.8
Other	Tons	38	2.7
Total	Tons	1,396	100.0

Source: Global Trade Atlas

Reporting Countries Export Statistics (Partner: CBATO Islands), Consumer-Oriented Products

Country	Unit	2016	Market Share (%)
United States	US Dollars	900,100,773	56.1
Netherlands	US Dollars	90,684,537	5.7
Brazil	US Dollars	83,617,919	5.2
U.K.	US Dollars	71,353,052	4.5
New Zealand	US Dollars	65,168,840	4.1
Canada	US Dollars	49,836,910	3.1
Costa Rica	US Dollars	49,782,711	3.1
Other	US Dollars	292,596,654	18.3
Total	US Dollars	1,603,141,396	100.0

Note: Export numbers shown in US dollars to avoid inconsistencies created by different units of measure for quantity.

Source: Global Trade Atlas

e) Food Aid:

The CBATO region is normally not a food aid recipient. However, as a result of the devastating 2017 hurricane season, some islands (e.g. Dominica) may become food aid recipients. It is unknown whether any GE products have been part of any food aid programs in the region.

f) Trade Barriers:

Post is not aware of any specific requirements related to the importation of GE products in its region [1]. Within the Caribbean region, CARICOM is focused on establishing the Caribbean Single Market and Economy (CSME) to facilitate the free movement of CARICOM-origin products between Member States. It remains to be seen whether CARICOM will develop regional rules affecting trade in GE products.

PART B: Policy

a) Regulatory Framework:

Most of the countries within CARICOM are seeking to address their plant biotechnology requirements through a NBF. To date, only St. Kitts and Nevis has enacted any biosafety legislation. While an important first step toward establishing its comprehensive NBF, implementing regulations have yet to be finalized and thus the regulatory and institutional structures are not yet operational. None of the other CARICOM countries have enacted any biosafety legislation.

The Regional Project for Implementing NBFs

The \$13 million UNEP/GEF Regional Project for Implementing NBFs in the Caribbean, which is being executed by UWI, is assisting the 12 CARICOM countries that are parties to the CPB with implementation of their obligations [2]. This project is a continuation of previous UNEP/GEF biosafety capacity building efforts in the region dating back to 2001.

The overall goal of the UNEP/GEF project is to implement effective, operable, transparent and sustainable NBFs, and deliver global benefits that are compliant with the CPB in the Caribbean sub-region countries while also protecting against any potential risks from the introduction of LMOs. The four project aims are to:

- “Establish institutional (policy/legal) frameworks for biosafety at both the national and regional levels that will allow Parties to the CPB to utilize modern biotechnology in compliance with this Protocol;
- Facilitate the establishment, enhancement and operation of institutional capacities as well as technical and technological resources among the participating Caribbean Member States for the detection, assessment and management of potential risks from modern biotechnology (in combination with invasive alien species (IAS) where appropriate) at the national and regional levels;
- Develop and strengthen the human resource base and level of expertise in biosafety on a national and regional scale, in support of biosafety management and national biosafety systems in the Caribbean;
- Improve and consolidate biosafety information management within the Caribbean project countries in a way that can promote transparency, raise public awareness and facilitate biosafety decision making,

and be up scaled to provide broader regional information services as needed, and if possible, establish links to information sources.”

The regional portion of the project aims to support the establishment of a region-wide mechanism for coordinating and supporting countries in biosafety management by providing them with training on biosafety risk assessment and the management of LMOs.

[1] Guadeloupe and Martinique, as overseas departments of France, may be exceptions to this statement.

[2] CBATO Islands participating in the UNEP/GEF project are Antigua and Barbuda, The Bahamas, Barbados, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago. The other CARICOM participants are Belize, Guyana, and Suriname.

According to various sources, this may lead to a Regional Biosafety Clearing House (BCH) to support and coordinate exchange of information. The regional process also aims to strengthen institutional capacities, provide technical guidance on biosafety issues and assist with the implementation of NBFs.

National activities of the project will also support the establishment of the necessary legal and institutional frameworks, public education programs, and training necessary for effective and sustained implementation of the CPB. Projected country-specific outcomes include establishing:

- Functional NBFs in line with the CPB and the national and regional needs of each country;
- Functional national systems able to detect LMOs and perform risk assessments;
- Functional systems to monitor the environment and enforce regulations;
- National systems for biosafety information management while stimulating public awareness, biosafety education, and participation in the decision-making process.

The project, which was started in November 2012, was originally scheduled to be completed by December 2015. However, due to various factors, the project deadline was postponed. According to UWI’s project management, country level activities have concluded and regional level activities are expected to wrap up by late 2017 or early 2018. In addition to the project’s conclusion being pushed back, the realization that the timeline for enacting biosafety legislation in each country could not be fully controlled led to the redefinition of an important project output. Rather than countries being expected to enact biosafety legislation, the current expectation is that the draft legislation will be ready for Parliamentary approval in each country. To date, only St. Kitts and Nevis has passed its Biosafety Act while all others have been working to make their draft legislation “Parliament-ready.” It is important to note that Barbados and The Bahamas never signed the project partnership agreement with UWI, and Suriname signed the agreement quite late into the project. This precluded these countries from drawing on any project funds for national level activities and thus fully participating in the project. These countries opted toward transferring their project country funds to the regional component of the project in order to reap some tangential benefits from the project.

UWI’s project management intends to hire a consultant in January 2018 to develop a proposal to be presented to UNEP/GEF for a follow-up project to help participating countries enact their biosafety legislation. Once the legislative framework is in place, the expectation is that the Caribbean Agricultural Health and Food Safety Agency (CAHFSA), a CARICOM organization, would be charged with regional follow-up, harmonization, and sustainability of biosafety regulatory efforts.

At the regional level, progress is being made toward a “Center of Excellence in Biosafety”, which will serve as a virtual information hub. The Center will encompass three areas:

- A regional roster of experts to provide assistance to countries where expertise does not exist, and to harmonize risk assessment processes in the region by pooling existing resources. The list will include experts proposed by the participating project countries which will constitute the ad hoc Regional Advisory Panel for Risk Assessment.
- A regional network of laboratories to support the national regulatory agencies (Agricultural, Environmental and Food Safety agencies), as it relates to the implementation of those provisions within biosafety legislation being developed by countries to: (i) deal with the surveillance of LMOs and LMOs for Food, Feed and Processing (LMO-FFPs) entering or leaving the country; (ii) monitor the contained use of LMOs or LMO-FFPs, where necessary; and (iii) comply with any other provision relating to biosafety for which laboratory testing is required.
- A Master of Science (MSc) Program in Biosafety as a means of capacity building to support the biosafety efforts of project participants. In 2014, UWI initiated a graduate program in biosafety, offering an MSc and a Postgraduate Diploma in the field. The first cohort of students graduated from the program in 2015 and the second wave of students is currently in the program. This program will help to expand biosafety capacity in the region.

The following table shows the general status of the biosafety legislation of the CBATO countries participating in the UNEP/GEF project.

Country	Status of Legislation (as of October 2017)
Antigua and Barbuda	Draft legislation is not “Parliament-Ready”
The Bahamas	Draft legislation has yet to be developed
Barbados	Draft legislation has yet to be developed
Grenada	Draft legislation is “Parliament-Ready”
Dominica	Draft legislation is not “Parliament-Ready”
St. Kitts and Nevis	Legislation passed.
St. Lucia	Draft legislation is “Parliament-Ready”
St. Vincent and the Grenadines	Draft legislation is not “Parliament-Ready”
Trinidad and Tobago	Draft legislation is not “Parliament-Ready”

Note: Although not part of the CBATO region, Belize and Guyana are also reported to have their draft legislation “Parliament-Ready”, on the other hand Suriname’s draft legislation is not “Parliament-Ready.”

Source: UWI project management.

In addition to the UNEP/GEF project efforts, CARICOM is attempting to harmonize regional biosafety policies within the region. In October 2017 a draft regional biosafety policy was reportedly submitted to CARICOM’s Council for Trade and Economic Development (COTED) for review and approval. It is unknown at this point if and when the harmonized policy will be approved.

b) Approvals:

Without the legal and regulatory frameworks being in place, no GE plants or crops have been approved or registered in the region for cultivation, import, or export.

c) Stacked or pyramided event approvals:

The same holds true for stacked or pyramided events. Moreover, such events are not contemplated in CARICOM's draft regional policy. A scientific risk assessment would need to be conducted before any approval or registration would be considered.

d) Field Testing:

No field testing of GE crops is currently taking place.

e) Innovative Biotechnologies:

The use of innovative biotechnologies (such as genome editing) in plants or plant products has not been fully contemplated in national legislation or regional policy. Thus, even when proposed biosafety regulatory systems become operational, the regulatory status of such biotechnologies will be undetermined and will likely require further assessment.

f) Coexistence:

Although no rules are currently in place for coexistence of GE and non-GE crops, it is worth noting that individual countries in the region have indicated that once biosafety regulatory systems become operational, they will want to retain decision-making on this matter at the national level rather than at the regional level.

g) Labeling:

As a general pragmatic approach to trade (in recognition of the large volume of food imports from the United States), project participants have reportedly agreed to implement voluntary rather than compulsory negative labeling requirements for foods containing GE ingredients. Labeling legislation would need to be approved before implementation could take place by the appropriate labeling enforcement authority in each country.

h) Monitoring and Testing:

As part of the UNEP/GEF project, the region has developed testing capability for LMO events. At the country level, participating countries have acquired lab equipment and trained lab personnel to conduct basic testing. UWI also has three regional labs with more advanced equipment, which national labs can use to conduct more advanced tests or validate their results. As a third option, the region would rely on accredited U.S. reference labs. Despite developing this capability, it is unknown if countries in the region are currently conducting any testing on imported or exported products. Certainly no trade has been affected by any monitoring or testing.

i) Low Level Presence (LLP) Policy:

The draft regional biosafety policy calls for countries to implement a 5 percent LLP.

j) Additional Regulatory Requirements:

Not applicable.

k) Intellectual Property Rights (IPR):

Given the lack of commercial production of GE crops in the region, Post is not aware of any GE-related IPR issues.

l) Cartagena Protocol Ratification:

Nine of the countries in the CBATO region are parties to the CPB, and while they are all in the process of trying to meet their obligations under the protocol, none has fully implemented it to date.

Status of Ratification and Entry Into Force of the CPB

	Date of Signature	Date instrument of ratification or accession was deposited	Accession Mode	Date of entry into force
Antigua and Barbuda	May 24, 2000	Sep 10, 2003	Ratification	Dec 9, 2003
The Bahamas	May 24, 2000	Jan 15, 2004	Ratification	Apr 14, 2004
Barbados		Sep 6, 2002	Accession	Sep 11, 2003
Dominica		Jul 13, 2004	Accession	Oct 11, 2004
Grenada	May 24, 2000	Feb 5, 2004	Ratification	May 5, 2004
St. Kitts and Nevis		May 23, 2001	Accession	Sep 11, 2003
St. Lucia		Jun 16, 2005	Accession	Sep 14, 2005
St. Vincent and the Grenadines		Aug 27, 2003	Accession	Nov 25, 2003
Trinidad and Tobago		Oct 5, 2000	Accession	Sep 11, 2003

Source: Convention on Biological Diversity website (<http://bch.cbd.int/protocol/parties/#tab=0>).

Please refer to the table in PART B, sub-paragraph a, for information on the status of each country's biosafety legislation. As part of the UNEP/GEF regional project for implementing NBFs in the region, UWI is working with a consultant from the International Centre for Genetic Engineering and Biotechnology (ICGEB) in Trieste, Italy, to develop implementing regulations based on each country's draft legislation.

m) International Treaties/Forums:

We are not aware of the region or any individual CBATO islands of coverage taking positions pertaining to agricultural biotechnologies, the use of such technologies, and products thereof in other international treaties/fora.

n) Related issues:

None.

PART C: Marketing

a) Public/private opinions:

As part of the UNEP/GEF project, participating countries engaged in "awareness raising activities" at the national level to educate the public on biosafety, biotechnology, bio-security and invasive species. The project also supported stakeholder consultations as part of the national processes to enact biosafety regulations. Nonetheless, overall awareness of agricultural biotechnology and GE products is quite

limited. There is no public discussion on the matter and there are no NGO's or public campaigns lobbying for or against agricultural biotechnology, albeit for planting GE crops or consuming foods derived from GE crops.

b) Market acceptance/studies:

There are no significant marketing issues that currently affect U.S. agricultural products. However, Dominica, which exports organically grown crops to niche markets in Europe, may have concerns that coexistence with any biotech material introduced into their small island environment could jeopardize their exports to Europe. This concern may be a factor in shaping Dominica's regulatory environment and could possibly have a marketing impact on some U.S. products in the future. On the other hand, Dominica was devastated by hurricane Maria in September, 2017. The effect of the hurricane on Dominica's agriculture and on possible subsequent changes in the biosafety positions of the Dominica government are unknown at this point.

CHAPTER 2. ANIMAL BIOTECHNOLOGY:

PART D: Production and Trade

a) Product Development:

The Caribbean region is not yet developing animal genetic engineering or cloning of animals. Although there has been some biotech research in Barbados on Blackbelly sheep, the region is far from having the capability to engage on specific animal biotechnology projects. However, experts in the region believe that an expansion of animal breeding using conventional and new embryo techniques as well as DNA techniques to characterize regional species would be a positive development. The use of molecular techniques to identify genes for breeding purposes will be high on the research agendas of several countries in coming years.

On a related topic, in 2016 the Government of the Cayman Islands, through its Mosquito Research & Control Unit (MRCU), partnered with the UK based biotechnology firm, Oxitec, to collaborate on a "Friendly *Aedes aegypti* Mosquito Project." *Aedes aegypti* is a vector for Dengue Fever, Chikungunya, Zika (which has been linked to nervous system disorders and birth defects such as microcephaly), and Yellow Fever. The project uses a pioneering technique involving GE male mosquitos to fight *Aedes aegypti*. The GE males, which cannot bite, are released into the wild to mate with female *Aedes aegypti*, producing offspring that die before reaching maturity. The GE males also die within a few days. The end result of the project is a greatly reduced *Aedes aegypti* population. MRCU's collaboration with Oxitec goes back to 2009, when field releases of the GE mosquitos were conducted in Grand Cayman to test the safety and efficiency of the technique. The current project's operational deployment of GE mosquitos began in July 2016, and initial results (as of January 2017) indicate an 88 percent decline in *Aedes aegypti* egg collection in traps located in the treatment area. So far, the Cayman Islands is the only country within the CBATO region of coverage employing biotechnology in its fight against mosquito-borne disease.

b) Commercial Production:

Not applicable.

c) Exports:

Not applicable.

d) Imports:

Not applicable.

e) Trade Barriers:

Although there are no known barriers to trade, it is believed that animal health and food safety authorities would treat requests for imports of GE animals, livestock clones, and offspring of clones or products from these animals, with an abundance of caution prior to granting import approval.

PART E: Policy

a) Regulatory Framework:

The UNEP/GEF Regional Project for Implementing NBFs in the Caribbean pertains to plant biotechnology only. There is no regulatory framework for animal biotechnology.

b) Innovative Biotechnologies:

Not applicable.

c) Labeling and Traceability:

Not applicable.

d) Intellectual Property Rights (IPR):

Not applicable.

e) International Treaties/Forums:

Not applicable.

f) Related Issues:

None.

PART F: Marketing

a) Public/Private Opinions:

As mentioned earlier, overall awareness of agricultural biotechnology and animal biotechnology specifically, is quite limited. There is no public discussion on the matter and there are no NGO's or public campaigns lobbying for or against agricultural biotechnology. However, it is believed that the public is more sensitive to animal biotechnology and would treat issues related with livestock clones, offspring of clones, and GE animals with greater caution.

b) Market Acceptance/Studies:

There are no studies that we are aware of regarding marketing of animal biotechnology products in the region. Overall acceptance of animal biotechnology by government regulators, producers, the trade and

consumers remains unknown, but as mentioned above the subject is likely to be treated with a great deal of caution.