AN ASSESSMENT OF THE PRODUCTION AND TRADE OF GENETICALLY MODIFIED ORGANISMS IN THE CARIBBEAN REGION

Prepared by Noel D. Jacobs

For University of the West Indies, St. Augustine Campus, Trinidad & Tobago/UNEP-GEF Regional Project for Implementing National Biosafety Frameworks in the Caribbean Sub-Region

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This activity was carried out with support from the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF), under project GFL/2328-2716-4C20, “Regional Project For Implementing National Biosafety Frameworks in the Caribbean Sub-region”.
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Background
The Regional Project for Implementing National Biosafety Frameworks in the Caribbean Sub-Region began in November 2012 and is executed by the University of the West Indies (UWI), funded by the Global Environment Facility (GEF), and implemented by the United Nations Environment Programme (UNEP). The project is part of a wider initiative to move countries towards more harmonized biosafety systems that make use of existing national and regional capacities, create new capacities where needed and ensure their financial sustainability, take advantage of economies of scale and regional support mechanisms, ensure that biosafety frameworks fit with the regional objectives of establishing a Caribbean Single Market and Economy (CSME), and be consistent with CARICOM’s initiative of promoting biotechnology and biosafety as a regional strategy.

The primary objectives of the project are to implement effective, operable, transparent and sustainable National Biosafety Frameworks which cater for national and regional needs, deliver global benefits and are compliant with the Cartagena Protocol on Biosafety in the current eligible Caribbean sub-region countries of Antigua & Barbuda, Bahamas, Barbados, Belize, Commonwealth of Dominica, Grenada, Guyana, St. Kitts & Nevis, St. Lucia, St. Vincent & the Grenadines, Suriname, and Trinidad & Tobago.

This assessment is in support of Component 4 of the project “Strengthening biosafety information management in the Caribbean sub-region”, which seeks to address aspects of data collection and public education, a central part of which is a Biosafety Clearing House as a mechanism for information sharing and the generation and compilation of biosafety data. The assessment specifically targets trade data on Living Modified Organisms in the CARICOM Region.

Purpose of the Assessment
To gather information related to the production of Genetically Modified (GM) crops in the Caribbean region, as well as data on the import and export of crops that may be genetically modified such as soybean, cotton, maize, and canola, and prepare a report which can be used
in decision-making and monitoring processes as it relates to: Imports and exports from the region, GMOs available on the Caribbean Market, and Consumption patterns.

Definition and Classification of GMOs
Directive 2001/18/EC of the European Union officially defines GMO as: ‘an organism in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. An organism is any biological entity capable of replication or of transferring genetic material’. Ways or techniques considered generally to give rise to GMOs are, amongst others: recombinant nucleic acid techniques involving new vector formations outside an organism and their subsequent incorporation into a host organism in which they do not occur naturally but in which they are capable of continued propagation; direct introduction into an organism of heritable material prepared outside the organism; cell or protoplast fusion resulting in the formation of live cells with new combinations of heritable genetic material through methods that do not occur naturally\(^1\). There are two categories to which the definition does not apply: (1) The first category includes in vitro fertilisation, natural processes, such as conjugation, transduction or transformation, and polyploidy induction; (ii) the second category includes mutagenesis and cell or protoplast fusion of plant cells of organisms which can exchange genetic material through traditional breeding methods.

A “transgenic organism” is a more specifically defined type of GMO, whose genetic makeup has been altered by the addition of genetic material from an unrelated organism. This, however, should not be confused with the more general way in which “GMO” is used to classify genetically altered organisms, as typically GMOs are organisms whose genetic makeup has been altered without the addition of genetic material from an unrelated organism. For purpose of clarity, it is important to note that a Living Modified Organism (LMO) is a technical legal term, defined in the Cartagena Protocol on Biosafety, which regulates international trade in living GMOs.

Consistent with the above, biosafety describes efforts to reduce or eliminate the potential risks resulting from modern biotechnology and its products, and is thus often defined as “the

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avoidance of risks to human health and safety and to the conservation of the environment, as a result of the use for research and commerce of infectious or genetically modified organisms”

Advantages and Disadvantages of GMOs
There are many questions about Genetically Modified Organisms which may only be answered over time through science, experimentation, and practical applications. To date, many declarations have been made on the pros and cons of GMOs. Some people believe that GMOs can help to address starvation and malnutrition in poor countries, while others believe that GMOs could result in unpredictable health and environmental issues, with serious economic implications for poor countries. The ‘advantages’ and ‘disadvantages’ presented below are primarily based on three easily accessible sources and seek to objectively highlight the current thought in favour and against GMOs, as general informative statements in support of our baseline understanding of the topic at hand.

SUGGESTED ADVANTAGES:

- Crops are more productive and have a larger yield.
- Crops show more resistance to certain pests, diseases, or environmental conditions, reduction of spoilage, or resistance to chemical treatments (e.g. resistance to an herbicide), or improving the nutrient profile of the crop, even though this is debatable.
- A possibility that they could eliminate allergy-causing properties in some foods.
- More capable of thriving in regions with poor soil or adverse climates.
- More environment friendly as they require less herbicides and pesticides.
- Foods are more resistant and stay ripe for longer so they can be shipped long distances or kept on shop shelves for longer periods.

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2 Regional Project for Implementing National Biosafety Frameworks in the Caribbean Sub-Region -University of the West Indies (UWI), funded by the Global Environment Facility (GEF), and implemented by the United Nations Environment Programme (UNEP). Brochure: General Information on Biosafety and Biotechnology.


As more GMO crops can be grown on relatively small parcels of land, they are an answer to feeding growing world populations.

The suggestion that genetically modified foods are safe, since minor changes in genes does not necessarily make a crop toxic or dangerous.

Gene therapy uses genetically modified viruses to deliver genes that can cure disease in humans.

To test and produce human therapeutics.

Production or food quality traits through transgenic plants (desired colour and texture).

Conservation Use (replenishment of plant and animal populations).

Production of biopharmaceuticals in bioreactors.

Production of only known treatment for some diseases; for example Gaucher’s Disease which treated by the drug Elelyso, produced from transgenic plants.

SUGGESTED DISADVANTAGES:

Scientists can choose which genes to manipulate, but they don’t yet know where in the DNA to precisely insert these genes and they have no way of controlling gene expression.

It causes unwanted residual effects. A genetically modified plant can leave unwanted residual substances that can remain in the soil for extended periods of time.

Not labeling is wrong and unfair to the consumers who should have the right to know what they are buying so they can decide for themselves whether they want to buy the food or not. Even if health safety factors are not an issue, some people might have moral or religious objections. They should not have to eat GMOs if they don’t want to.

Genetically modified crops pose a risk to food diversity as the plants are much more dominant.

It can be dangerous to other insects that are important to our ecosystem. GMOs are believed to be dangerous to some insects because new crop genes can be deadly to them.

Herbicide-resistant and pesticide-resistant crops could give rise to super-weeds and super-pests that would need newer, stronger chemicals to destroy them.

GMO crops cross-pollinate with nearby non-GMO plants and could create ecological problems.

The claim of ending world hunger with GMOs is false, since world hunger is more likely cause by a lack of access to food due to social, financial and political causes. Additionally,
GMO technology companies patent their crops and also engineer crops so that harvested grain germs are incapable of developing, creating a dependency on these companies by poor farmers who must purchase the seeds from said companies a very high price. GMOs are not the answer to world hunger and health, and more emphasis should be placed on improving organic agricultural practices which are healthier for humans and less harmful to the environment.

- Vulnerability to large scale frequent encroachments into areas of rich forest biodiversity by commercial agriculture based mainly on the use of external inputs, notably crop species of which LMO-types are commercially available and which could be introduced unintentionally and or accidentally.

In summary, Genetically Modified Organisms may have a lot of advantages such as increased productivity and nutritional value, but still face many ethical issues related to the growing and consumption of genetically engineered crops. The choice of consuming genetically modified foods or not should rest with the consumers, who must be informed and empowered to be able to make that choice. Clearly, there are still many unknowns about the implications of GMOs on human health and the environment, and thus it may be desirable that the use of genetically modified food should be encouraged at a pace that is consistent with the generation of research data into the associated risks. Said differently, GMOs should be carefully regulated until reasonable certainty over their safety and value can be clearly established.

**Regulatory Frameworks Relevant for Production and Trade of GMOs**

Generally, the regulation of GMOs focuses on the control of what, where, how and the circumstances under which GMOs may be used, and is normally based on a properly vetted and evidence-based system of information on the risks associated with GMOs use. At a minimum, regulations should follow sound principles and guidelines of GMO risk analysis\(^6\). However, there are still differences of opinion on whether the GMO process or the GMO product should be the target of regulation, as well as there are differences in opinion about how strict regulation should be, as this is directly affected by costs, perceived risks and benefits of GMO

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release, enforceability and credibility of the regulatory framework. The sections below attempt to summarize the Multi-lateral and National Regulatory Frameworks of relevance to the Caribbean.

Multi-lateral Frameworks
The production and international trade of GMOs and their related products are regulated by several key multi-lateral instruments. These are for the most part rules agreed under the World Trade Organization (WTO), and include the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement), the Agreement on Technical Barriers to Trade (TBT Agreement), the General Agreement on Tariffs and Trade (GATT) 1994, and the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Of particular relevance for Caribbean countries is the SPS Agreement.

The SPS Agreement establishes that countries retain their right to ensure that the food, animal and plant products they import are safe, and at the same time it states that countries should not use unnecessarily stringent measures as disguised barriers to trade. The SPS Agreement concerns in particular: the protection of animal or plant life or health arising from the entry, establishment or spread of pests, diseases, disease-carrying organisms or disease-causing organisms; the protection of human or animal life or health from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs; the protection of human life or health from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests; and the prevention or limitation of other damage from the entry, establishment or spread of pests.

The SPS Agreement additionally states that countries should use internationally agreed standards in establishing their requirements for sanitary and phytosanitary measures, for which three international bodies may be cited as relevant in support of countries’ compliance with this requirement: the Codex Alimentarius Commission for food safety, the International Office of Epizootics (OIE) for animal health and the International Plant Protection Convention (IPPC) for plant health. The twelve (12) countries participating in the UNEP-UWI/GEF Regional Project for Implementing National Biosafety Frameworks in the Caribbean Sub-Region are members to the Codex Alimentarius, the IPPC and the WTO.

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The Cartagena Protocol on Biosafety is a non-WTO instrument that was negotiated outside the strict trade context, and under the auspices of the Convention on Biological Diversity. The Protocol distinguishes LMOs in three categories: LMOs for voluntary introduction into the environment – such as seeds for planting, live fish for release, micro-organisms for bioremediation; LMOs destined for contained use, contained use being defined in Article 3(b) of the Protocol to include activities in which LMOs are controlled by specific measures that effectively limit their contact with, and their impact on, the external environment; and LMOs intended for direct use as food or feed, or for processing (LMO-FFPs)\(^5\). The majority of LMOs are those intended for direct use as food, feed or processing, including genetically modified crops, such as soybean, maize, canola, tomato, cotton, etc.

The Cartagena Protocol on Biosafety does not cover consumer products derived from LMOs, such as corn flakes, flour, starch, seed-oil, tomato paste or ketchup, which are abundant on supermarket shelves throughout the Caribbean.

Articles 1 and 2 of the Cartagena Protocol on Biosafety require Parties to: “ensure an adequate level of protection in the field of the safe transfer, handling and use of these LMOs”, and to ensure that “the development, handling, transport, use, transfer and release of any living modified organisms are undertaken in a manner that prevents or reduces the risks to biological diversity, taking also into account risks to human health”. Each Party is required to “take necessary and appropriate legal, administrative and other measures to implement its obligations under this Protocol”. In addition “Parties shall ensure that the development, handling, transport, use, transfer and release of any living modified organisms are undertaken in a manner that prevents or reduces the risks to biological diversity, taking also into account risks to human health”. Consistent with the above, Parties to the Protocol need to develop comprehensive frameworks for biosafety, and to put in place appropriate legal and regulatory systems.

The European Union is a major player in terms of GMOs rules and regulations, which are clearly relevant for Caribbean-EU Trade relations. The objectives of the EU legal framework are to: Protect human and animal health and the environment by introducing a safety assessment of the highest possible standards at EU level before any GMO is placed on the market; put in place harmonized procedures for risk assessment and authorization of GMOs that are efficient, time-limited and transparent; ensure clear labeling of GMOs placed on the market in order to
enable consumers as well as professionals (e.g. farmers, and food feed chain operators) to make an informed choice; and to ensure the traceability of GMOs placed on the market. There are six (6) primary pieces of regulation, all of which are further supplemented by relevant rules and guidelines: Directive 2001/18/EC on the deliberate release of GMOs into the environment; Regulation (EC) 1829/2003 on genetically modified food and feed; Directive (EU) 2015/412 amending Directive 2001/18/EC as regards the possibility for the Member States to restrict or prohibit the cultivation of GMOs in their territory; Regulation (EC) 1830/2003 concerning the traceability and labeling of genetically modified organisms and the traceability of food and feed products produced from genetically modified organisms; Directive 2009/41/EC on contained use of genetically modified micro-organisms; and Regulation (EC) 1946/2003 on transboundary movements of GMOs.

At the Caribbean level, CARICOM Heads of Governments have endorsed an initiative to promote biotechnology and biosafety as a regional strategy, with the creation of relevant thematic and specialist working groups. Consistent with the above, countries of the Caribbean sub-region have opted for a cooperative biosafety process, primarily through the ‘UNEP-UWI/GEF Regional Project for Implementing National Biosafety Frameworks in the Caribbean Sub-Region’. This is further developed below under National frameworks. The Cartagena Protocol has also sought to strengthen regional mechanisms for GMO regulation through the establishment of a Biosafety Clearing-House (BCH) to facilitate the exchange of information on Living Modified Organisms (LMOs) and assist the Parties to better comply with their obligations under the Protocol. The above-mentioned project has supported the creation, operation and maintenance of the Caribbean Regional Biosafety Centre with active portals across all participating countries, and has additionally sought to move countries towards more harmonized biosafety systems that make use of existing national and regional capacities, create new capacities where needed and ensure their financial sustainability, take advantage of economies of scale and regional support mechanisms, alignment with the regional objectives of establishing a Caribbean Single Market and Economy (CSME), and consistency with CARICOM’s initiative of promoting biotechnology and biosafety as a regional strategy.

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9 Biosafety Clearing House Portal - The Caribbean Regional Biosafety Centre, accessed on the 19th August 2016 at [http://bs.biosafetyclearinghouse.net/baribbeanRegionalCentre.shtml](http://bs.biosafetyclearinghouse.net/baribbeanRegionalCentre.shtml)
National Frameworks
Countries develop their NBF based on acquired and binding obligations such as those under the WTO, the Cartagena Protocol on Biosafety, the EU Directives, etc. However, and more particularly, the specific structure and reach of a country’s NBF is influenced by whether the country is primarily a producer, exporter, or importer of GM products. Many developed countries produce GM crops for export to developing countries, but are very strict on the importation of such products. In this scenario, the NBF of the exporting country may be structured to facilitate production and export, but also is designed to restrict and control importation of GMOs. On the other hand, developing countries that are reliant on the importation of their primary food supplies from developed countries, may be required to offer flexible terms in their NBFs for the importation of GM products, or face WTO sanctions or simply be required to find an alternative food supply, which may be not be available, or excessively expensive and thus inaccessible, with dire consequences on the poor.

The final reach to which a country’s NBF may extend therefore, very much depends on production and trade dynamics (inclusive of food dependency and/or self-sufficiency), level of GMO literacy of the consuming public, capacity to identify and assess GMO risks, and capacity to develop, implement and sustain enforcement efforts in support of the regulatory framework. Tables 1 and 2 illustrate countries whose NBF in 2013 had resulted in different levels of GMO bans and those who have embraced GMO crops, respectively.\(^\text{10}\)

<table>
<thead>
<tr>
<th>Country</th>
<th>Extent of Ban</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America (Mendocino, Trinity and Marin counties in California)</td>
<td>General ban on GM crops</td>
</tr>
<tr>
<td>Australia (South Australia only)</td>
<td>General ban on GM crops</td>
</tr>
<tr>
<td>Japan</td>
<td>No GM seeds are planted in the country (accidental growth near ports from GM canola imported from Canada)</td>
</tr>
<tr>
<td>New Zealand</td>
<td>No GM foods are grown in the country</td>
</tr>
<tr>
<td>Germany</td>
<td>There is a ban on the cultivation or sale of GMO maize</td>
</tr>
<tr>
<td>Ireland</td>
<td>All GM crops were banned for cultivation in 2009, and there is a voluntary labelling system for foods containing GM foods to be identified as such.</td>
</tr>
</tbody>
</table>

\(^{10}\) Examiner. Countries that have banned and Embraced GMOs. Wednesday July 17\(^{\text{th}}\) 2013 and accessed on August 19\(^{\text{th}}\) 2016 at [http://cdn1-b.examiner.com/article/what-countries-have-banned-gmo-crops](http://cdn1-b.examiner.com/article/what-countries-have-banned-gmo-crops)
Austria | There are bans on the cultivation and sale of GMOs.
---|---
Hungary | There are bans on the cultivation and sale of GMOs.
Greece | There are bans on the cultivation and sale of GMOs.
Bulgaria | There are bans on the cultivation and sale of GMOs.
Luxembourg | There are bans on the cultivation and sale of GMOs.
France | There is a ban on GM crops
Madeira (Territory of Portugal) | There is a ban on GM crops
Switzerland | There are bans on the use of genetically modified plants and animals and on the cultivation of GM crops
India | There is a ban on GM eggplant
Thailand | Declared GMO-free zones where only organically produced farming can occur

<table>
<thead>
<tr>
<th>Country</th>
<th>Level/Nature of GMO Acceptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America</td>
<td>Grows mostly GM varieties of corn, canola and soy. Hawaii now grows GM papayas. Approvals have also been given for GM alfalfa, zucchinis, beet sugar and tomato varieties, though not all are currently being grown.</td>
</tr>
<tr>
<td>China</td>
<td>Probably the largest producer of GM crops.</td>
</tr>
<tr>
<td>Germany</td>
<td>Grow GM potatoes</td>
</tr>
<tr>
<td>Sweden</td>
<td>Grow GM potatoes</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Grow GM potatoes and maize</td>
</tr>
<tr>
<td>Finland</td>
<td>Approved GM crops, but none currently grown in country</td>
</tr>
<tr>
<td>Zambia</td>
<td>Embrace GM technology</td>
</tr>
<tr>
<td>Canada</td>
<td>Widespread GM usage; most of the country’s Canola, Soy and Corn are GM</td>
</tr>
<tr>
<td>Spain</td>
<td>Grows GM Maize</td>
</tr>
<tr>
<td>Slovakia</td>
<td>Grows GM Maize</td>
</tr>
<tr>
<td>Portugal</td>
<td>Grows GM Maize</td>
</tr>
<tr>
<td>Romania</td>
<td>Grows GM Maize</td>
</tr>
<tr>
<td>Poland</td>
<td>Grows GM Maize</td>
</tr>
<tr>
<td>Philippines</td>
<td>Grows GM crops</td>
</tr>
<tr>
<td>South Africa</td>
<td>Growing an increasing number of GM crops</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>Supports GM crops, including potatoes</td>
</tr>
<tr>
<td>Brazil</td>
<td>Grows GM crops</td>
</tr>
<tr>
<td>Argentina</td>
<td>Grows GM crops</td>
</tr>
<tr>
<td>Mexico</td>
<td>Grows GM crops</td>
</tr>
<tr>
<td>India</td>
<td>Widespread GM cotton use</td>
</tr>
</tbody>
</table>

As indicated above, countries within the Caribbean Community and Common Market who are eligible countries under the ‘UNEP-UWI/GEF Regional Project for Implementing National...
Biosafety Frameworks in the Caribbean Sub-Region have engaged in producing National Biosafety Frameworks (NBFs) to address national needs and priorities and common sets of concerns, as well as to fulfill their obligations to the Cartagena Protocol on Biosafety. These NBFs seek to address the following common components: a Government policy on biosafety; a regulatory regime for biosafety; a system to handle notifications or requests for authorizations; systems for enforcement and monitoring for environmental effects; and approaches for public information and public participation.

Notwithstanding the above, it is important to note that in all Caribbean countries, it is common to find that permitting responsibilities for the importation of different varieties and expressions of biological and genetic material (food, biopesticides, biological control agents, microbial soil inoculants, seeds and live plants and animals) will spread across multiple agencies. This will require that the NBF of Caribbean countries be broad and all-encompassing to adequately account for the default legislative overlap which currently exists as far as permitting of biological material is concerned. It is important to note at this juncture that, in the absence of domestic legislation in the individual country, the Protocol on Biosafety would govern the trade in LMOs between the members of the Protocol. Countries such as Belize, through the Belize Agricultural Health Authority (BAHA) has made great strides in an effort to consolidate the permitting and other regulatory functions relating to biosafety, and is in fact a model that other countries may wish to emulate. Table 3 attempts to illustrate in very general terms, a summary of the status of GMO regulation in Caribbean countries and as reported at the Extraordinary Regional Steering Committee Meeting of the UNEP-UWI/GEF Regional Project for Implementing National Biosafety Frameworks in the Caribbean Sub-Region held from 7-8 June 2016 in Port of Spain, Trinidad & Tobago.

**Table 3: General Status of GMO Regulation in Caribbean Countries**

<table>
<thead>
<tr>
<th>Country</th>
<th>Summary of Progress in GMO Regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua &amp; Barbuda</td>
<td>• A Policy that embraces Biotechnology &amp; Biosafety</td>
</tr>
<tr>
<td></td>
<td>• Production of a 3rd Draft of the Biosafety &amp; Biotechnology Management Bill</td>
</tr>
<tr>
<td></td>
<td>• <strong>BIOSAFETY REGULATIONS (2nd draft)</strong></td>
</tr>
<tr>
<td></td>
<td>* The Biosafety (Environmental Release) Regulations</td>
</tr>
<tr>
<td></td>
<td>* The Biosafety (Labeling) Regulations</td>
</tr>
<tr>
<td></td>
<td>* The Biosafety (Import, Export and Transit) Regulations</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Country</th>
<th>Information Provided</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bahamas</td>
<td>Draft Bio-security Act and Biosafety Framework</td>
</tr>
<tr>
<td>Barbados</td>
<td>Draft Biosafety Policy, Biosafety Clearing House Mechanism</td>
</tr>
<tr>
<td>Belize</td>
<td>Draft National Biosafety Policy with drafting instructions to inform the legal framework, inclusive of alignment with Cartagena Protocol on Biosafety, clear definition of scope, and the designation of competent authority. BAHA Act Chapter 211 has provisions for regulating import, export and use of genetically modified organisms; No regulations in place</td>
</tr>
<tr>
<td>Grenada</td>
<td>Biosafety Policy, Biosafety Bill, Biosafety Regulations</td>
</tr>
<tr>
<td>St. Lucia</td>
<td>National Biosafety Policy, Enactment of biosafety/biotechnology management legislation (or other key element of the regulatory system) to address safety in the field of transboundary movements of the products of modern Biotechnology is in progress, Establishment and effective operation of National Biosafety Authorities</td>
</tr>
<tr>
<td>St. Vincent &amp; the Grenadines</td>
<td>Draft Biosafety Policy, Draft Biosafety Bill, Draft Administrative Structure/System</td>
</tr>
<tr>
<td>Suriname</td>
<td>Biosafety established in other national policy documents only, Draft Biosafety Law, Administrative System in process</td>
</tr>
<tr>
<td>Trinidad &amp; Tobago</td>
<td>Revised Biosafety Policy, Draft Biosafety Legislation, Draft Administrative System, Biosafety Clearing House</td>
</tr>
</tbody>
</table>

Trends in Global Production and Trade

There has been a steady increase in the global cultivation of GM crops since 1996, with the traditional crops subjected to genetic engineering such as canola, cotton, maize and soybean
now complemented by a large number of alternative GM plants and animals in 2015$^{12}$. While the world’s leading producers of GM crops were originally the United States, Argentina, Brazil, Canada, India and China, this has gradually changed and with quite dramatic increases in the adoption and production of GM crops by developing countries.

Figure 1 below$^5$ illustrates just about eighty (80) million hectares of total GM crop production in 2004, with developed/industrial countries accounting for about sixty (60) million hectares or 75% and developing countries for about 25%. By 2006, however, 38 percent of GM crops were grown in developing countries, as indicated in Table 4 below$^{13}$.

**Figure 1: Distribution of Global GM Crop Production$^5$**

![Distribution of Global GM Crop Production](image)

**Table 4: Genetically Engineered Crops, 1996 to 2006$^{13}$**

<table>
<thead>
<tr>
<th>Country</th>
<th>USA</th>
<th>Argentina</th>
<th>Brazil</th>
<th>Canada</th>
<th>China</th>
<th>Paraguay</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>1.5</td>
<td>0.1</td>
<td>--</td>
<td>0.1</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>


This activity was carried out with support from the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF), under project GFL/2328-2716-4C20, “Regional Project For Implementing National Biosafety Frameworks in the Caribbean Sub-region”.
This activity was carried out with support from the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF), under project GFL/2328-2716-4C20, “Regional Project For Implementing National Biosafety Frameworks in the Caribbean Sub-region”.

<table>
<thead>
<tr>
<th>Year</th>
<th>Area 1</th>
<th>Area 2</th>
<th>Area 3</th>
<th>Area 4</th>
<th>Area 5</th>
<th>Area 6</th>
</tr>
</thead>
<tbody>
<tr>
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<td>1.3</td>
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<tr>
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<td>4.3</td>
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<tr>
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<td>28.7</td>
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<td>4.0</td>
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<tr>
<td>2000</td>
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</tr>
<tr>
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<td>39.0</td>
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<tr>
<td>2003</td>
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<td>2006</td>
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<td>11.5</td>
<td>6.1</td>
<td>3.5</td>
<td>2.0</td>
</tr>
</tbody>
</table>

*illegal cultivation of gmos: calculated area
### Global Area of Genetically Engineered Crops, 1996 to 2006: By Country (Million Hectares)

<table>
<thead>
<tr>
<th>Country</th>
<th>India</th>
<th>South Africa</th>
<th>Uruguay</th>
<th>Australia</th>
<th>Mexico</th>
<th>Romania</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>&lt;0.1</td>
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</tr>
<tr>
<td>1997</td>
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<td>--</td>
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<td>0.1</td>
<td>&lt;0.1</td>
<td>--</td>
</tr>
<tr>
<td>1998</td>
<td>--</td>
<td>&lt;0.1</td>
<td>--</td>
<td>0.1</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1999</td>
<td>--</td>
<td>0.1</td>
<td>--</td>
<td>0.1</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>2000</td>
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<td>0.2</td>
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<td>&lt;0.1</td>
</tr>
<tr>
<td>2001</td>
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<td>&lt;0.1</td>
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<td>&lt;0.1</td>
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<tr>
<td>2002</td>
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<td>&lt;0.1</td>
<td>0.1</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>2003</td>
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<td>&lt;0.1</td>
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<tr>
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<td>0.3</td>
<td>0.2</td>
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<tr>
<td>2005</td>
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<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
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<td>0.1</td>
</tr>
<tr>
<td>2006</td>
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<td>0.4</td>
<td>0.2</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

### Global Area of Genetically Engineered Crops, 1996 to 2006: By Country (Million Hectares)

<table>
<thead>
<tr>
<th>Country</th>
<th>Philippines</th>
<th>Honduras</th>
<th>Colombia</th>
<th>Iran</th>
<th>Spain</th>
<th>Portugal</th>
<th>Germany</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>1997</td>
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<td>--</td>
<td>--</td>
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</tr>
<tr>
<td>1998</td>
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<td>--</td>
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<td>--</td>
</tr>
<tr>
<td>1999</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
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</tr>
<tr>
<td>2000</td>
<td>--</td>
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<td>&lt;0.1</td>
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<td>&lt;0.1</td>
</tr>
<tr>
<td>2001</td>
<td>--</td>
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<td>--</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
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<tr>
<td>2002</td>
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<td>&lt;0.1</td>
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<td>&lt;0.1</td>
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<td>2003</td>
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<td>&lt;0.1</td>
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<tr>
<td>2004</td>
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<td>&lt;0.1</td>
<td>0.5</td>
<td>0.1</td>
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<tr>
<td>2005</td>
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<td>&lt;0.1</td>
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<td>2006</td>
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<td>&lt;0.1</td>
<td>&lt;0.1</td>
<td>0.1</td>
<td>&lt;0.1</td>
<td>&lt;0.1</td>
</tr>
</tbody>
</table>

Data for the period 1996-2012 shows that the increase trend in GM crop production has been sustained, with an involvement of 17.3 million farmers in 28 countries with 170.3 million hectares under cultivation\(^\text{14}\) (Figure 2), with developing countries representing 52% of all countries engaged in GM production\(^\text{14}\) (Figure 3). However, the U.S.A continues to be the international leader in agriculture biotechnology, with 70 million hectares of GM crops under

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cultivation in 2012, followed by Brazil and Argentina with 35 million and 25 million hectares, respectively (Figure 4). By 2014, the U.S. Department of Agriculture (USDA) had approved 19 GM crops, with 10 being produced: corn, soybean, cotton, potato, papaya, squash, canola, alfalfa, apple and sugarbeet\textsuperscript{15}.

Figure 2: Global Production of Biotech Crops with Steady Increase in Production by Developing Countries\textsuperscript{14}

\textit{A record 17.3 million farmers, in 28 countries, planted 170.3 million hectares (420 million acres) in 2012, a sustained increase of 6\% or 10.3 million hectares (25 million acres) over 2011.}

\textsuperscript{15} Time. These Charts Show Every Genetically Modified Food People Already Eat in the U.S.. Accessed on 20\textsuperscript{th} August 2016 at http://time.com/3840073/gmo-food-charts/

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Despite the production data described above, data on imports and exports are difficult to come by. Figure 5 illustrates 2015 data for countries growing biotech crops and granting approvals, those granting import approvals, and those approving research field trials. This data suggests...
29 countries growing GM crops in 2015, as opposed to 28 in 2012, with no clear distinction between industrial and developing countries. However, specific and reliable data on actual varieties approved for import and field trials are not readily accessible. Also, it is important to note the predominant ‘green’ area of the map in Figure 5, clearly illustrating a tendency towards both growing and granting approvals for import, but involving extensive safety and environmental review by regulatory bodies around the world.

Of note is the absence of Caribbean countries from all three categories listed in Figure 5, with the exception of Cuba which has been listed as growing biotech crops and granting approvals, but certainly no English-speaking Caribbean countries and/or countries who have ratified the Cartagena Protocol on Biosafety or participating in the UNEP-UWI/GEF Regional Project for Implementing National Biosafety Frameworks in the Caribbean Sub-Region. While there are may be many reasons for this absence, one such reason may be availability and access to GMO-specific data and statistics in Caribbean countries, which if available, should be at least accessible on one or more national or global databases or clearing houses.
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Figure 5: Global Representation of Where GMOs are Grown, Imported and Approved

As of 2015, GMOs are grown, imported, and/or used in field trials in more than 70 countries.

2015 Participating Countries

Growing Biotech & Granting Import Approvals

Argentina Australia Bolivia Brazil Burkina Faso Canada Chile China Colombia Cuba Czech Republic Ecuador Honduras India Indonesia Japan Mexico Myanmar Pakistan Paraguay Philippines Portugal Romania Slovakia South Africa Spain Sudan United States Uruguay Venezuela

Granting Import Approvals

Austria Belgium Bulgaria Croatia Cyprus Denmark Estonia France Finland Germany Greece Hungary Ireland Italy Japan Latvia Lithuania Luxembourg Malaysia Malta Netherlands New Zealand Norway Papua/New Guinea Poland Russia Singapore Slovenia South Korea Sweden Switzerland Taiwan

Approving Research Field Trials

Cameroon Egypt Ghana Indonesia Kenya Malawi Nigeria Panama Uganda United Kingdom
Trends in Production and Trade in the Caribbean

While there is data to be accessed from primary and secondary sources, after intensive research of public databases and publications, said data may not necessarily provide the level of detail and categorization required to shed light on the true status of GMOs in Caribbean countries, and in particular, for the traditionally produced GMO crops: corn, canola, soybean and cotton. The sections below attempt to provide the best picture possible in terms of production, import, and export, to the extent that available and accessible data allows. In many cases, suggested tendencies and conclusions have to be inferred from aggregated data, in the absence of GMO-specific and country-specific data on crops and processed products.

The primary producers of grains in the Caribbean are Haiti, Belize, Jamaica and Guyana. This is particularly so in the case of corn, in which according to 2008 statistics, Haiti produced 210,000 metric tons, Belize 65,273.9 metric tons, Jamaica producing 1,891 metric tons, and Guyana 1,025.1 metric tons; however, 2015 statistics from Belize Ministry of Agriculture place Yellow Corn Production at 135,043,110 pounds or 67,521 metric tons plus White Corn production at 12,057 metric tons, for a total corn production of 79,578 metric tons for 2015. Soybean production in Belize for 2015 reached 10,436,000 pounds or 5,218 metric tons. Data published by IndexMundi indicates that Trinidad & Tobago produced 5 metric tons of corn in 2015; Guyana 5 metric tons; and Jamaica 2 metric tons. This source also cited Barbados as having started production of soybean meal in 2004 at 20 metric tons, with ups and downs in production, but tapering at 23 metric tons in 2015.

Aggregated data published for soybean suggests that production has grown much faster in Latin America and the Caribbean than in the developed world, with 42.6 million hectares harvested and 112.6 million tons produced from 2008-2010. Clearly, from this statistic, it is impossible to tell what portion of the amounts cited is strictly Caribbean, and much less from which countries did the data originate. Regional crop production data are not easy to come by, but Table 5 below illustrates Tree Crops Production by Caribbean Countries for period 2004-2008, but specific data on varieties produced and GMO status are not reported.

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In terms of the four traditional crops that have been the subject of genetic engineering, i.e., canola, corn, cotton and soybean, Table 6 attempts to illustrate their GMO status in Caribbean countries as reported by Biosafety Scanner, in terms of compulsory labelling, approvals for cultivation, and whether a moratorium exists for either crop. It must be pointed out that according to this website, only Antigua & Barbuda requires compulsory labelling for food and feed containing GM canola, corn and soybean. GM cotton also requires compulsory labelling.
Table 6: GMO Production and Management Status of Canola, Soybean, Cotton and Maize in Caribbean Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>GMO Production and Management Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua &amp; Barbuda</td>
<td><strong>Canola</strong> – compulsory labeling required for food and feed; no approvals granted for production of food, feed, or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Soybean</strong> - compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Cotton</strong> - compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Maize</strong> - compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td>Bahamas</td>
<td><strong>Canola</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed, or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Soybean</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Cotton</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Maize</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td>Barbados</td>
<td><strong>Canola</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed, or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Soybean</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Cotton</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Maize</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td>Belize</td>
<td><strong>Canola</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed, or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Soybean</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Cotton</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td><strong>Maize</strong> – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td>Commonwealth of Dominica</td>
<td>Canola – no compulsory labeling required for food and feed; no approvals granted for production of food, feed, or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Soybean – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td>Cotton – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td>Maize – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Grenada</th>
<th>Canola – no compulsory labeling required for food and feed; no approvals granted for production of food, feed, or seed for cultivation; however, there are no moratoriums on GM for this crop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Soybean – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td>Cotton – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td>Maize – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>St. Kitts &amp; Nevis</th>
<th>Canola – no compulsory labeling required for food and feed; no approvals granted for production of food, feed, or seed for cultivation; however, there are no moratoriums on GM for this crop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Soybean – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td>Cotton – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td>Maize – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>St. Lucia</th>
<th>Canola – no compulsory labeling required for food and feed; no approvals granted for production of food, feed, or seed for cultivation; however, there are no moratoriums on GM for this crop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Soybean – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td>Cotton – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
<tr>
<td></td>
<td>Maize – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>St. Vincent &amp; the Grenadines</th>
<th>Canola – no compulsory labeling required for food and feed; no approvals granted for production of food, feed, or seed for cultivation; however, there are no moratoriums on GM for this crop</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Soybean – no compulsory labeling required for food and feed; no approvals granted for production of food, feed or seed for cultivation; however, there are no moratoriums on GM for this crop</td>
</tr>
</tbody>
</table>
In terms of imports of GMOs to the Caribbean, the challenge is once more the lack of GMO-specific data. Importation statistics may be available from the Customs agencies in all countries, but there is no requirement for data entered on Customs Entries to specify if items being imported contain GMOs or not. Available data published online indicates that in the case of soybean meal, Jamaica imported an average of 107,000 metric tons between 2013 and 2015; Suriname imported 4,000 metric tons in 1986; Trinidad & Tobago imported an average of 55 metric tons between 2013 and 2015; and Guyana 12 metric tons between 2013-2015\(^{18}\). While reported in an aggregated manner, the Caribbean imported 65,000 tons of wheat from Canada in 2012, a country that embraces, produces, and exports a number of GMO crops. Table 7 provides a snap-shot of imports by Caribbean countries from Canada in 2012\(^{20}\), again illustrating the need for Caribbean countries to be able to evaluate, identify and confirm GMO presence on imported stuff, or accept the labeling at face value.

<table>
<thead>
<tr>
<th>Country</th>
<th>Imports from Canada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antigua &amp; Barbuda</td>
<td>6 tons of beans</td>
</tr>
<tr>
<td>Barbados</td>
<td>1 ton beans</td>
</tr>
<tr>
<td></td>
<td>1 ton chick peas</td>
</tr>
<tr>
<td>Dominica</td>
<td>26 tons of corn</td>
</tr>
<tr>
<td></td>
<td>102 tons of beans</td>
</tr>
<tr>
<td>Guyana</td>
<td>1 ton of beans</td>
</tr>
<tr>
<td></td>
<td>15 tons canary seed</td>
</tr>
<tr>
<td>Jamaica</td>
<td>842 tons of beans</td>
</tr>
<tr>
<td></td>
<td>2 tons chick peas</td>
</tr>
<tr>
<td></td>
<td>6 tons corn</td>
</tr>
<tr>
<td>Suriname</td>
<td>61 tons of canary seed</td>
</tr>
<tr>
<td>St. Vincent &amp; the Grenadines</td>
<td>1 ton beans</td>
</tr>
<tr>
<td></td>
<td>7 tons corn</td>
</tr>
<tr>
<td>St. Lucia</td>
<td>12 tons of beans</td>
</tr>
<tr>
<td>Trinidad &amp; Tobago</td>
<td>356 tons of beans</td>
</tr>
<tr>
<td></td>
<td>203 tons of canary seed</td>
</tr>
</tbody>
</table>

\(^{18}\) Canadian Grain Exports. Crop Year 2011-2012. Canadian Grains Export, Canadian Grain Commission, ISSN 1701-9931, 39p

This activity was carried out with support from the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF), under project GFL/2328-2716-4C20, “Regional Project For Implementing National Biosafety Frameworks in the Caribbean Sub-region”.
While the origin of the cotton was not provided, Table 8 illustrates the economic value and portion of global cotton imports by Caribbean countries. Again, details of GMO status are not provided. Data on canola oil imports was available for Trinidad & Tobago only, in which that country imported an average of 106.5 tons of canola oil from Canada between 2013 and June 2016. There is a clear shortage of data for canola oil imports, and is more than likely due to the fact that imports are in the form of canola oil as an ingredient in some other processed product such as cookies, canola meal, cooking spray, multiple grain oils, etc. In addition, ‘canola oil’ may appear as rapeseed oil which is its true original source, with canola oil being a market name or brand for Canada oil. It is crucial that labeling are explicit and consumers are informed and educated about the different expressions of a GM product.

Table 8: Cotton Imports by Caribbean Countries for 2015

<table>
<thead>
<tr>
<th>Country</th>
<th>Value of Imports (US$)</th>
<th>World Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trinidad/Tobago</td>
<td>1.8 million</td>
<td>0.003</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1.6 million</td>
<td>0.003</td>
</tr>
<tr>
<td>Barbados</td>
<td>618,000</td>
<td>0.001</td>
</tr>
<tr>
<td>Dominica</td>
<td>577,000</td>
<td>0.001</td>
</tr>
<tr>
<td>Guyana</td>
<td>490,000</td>
<td>0.001</td>
</tr>
<tr>
<td>Bahamas</td>
<td>193,000</td>
<td>0.0004</td>
</tr>
<tr>
<td>Antigua/Barbuda</td>
<td>148,000</td>
<td>0.0003</td>
</tr>
<tr>
<td>Saint Lucia</td>
<td>119,000</td>
<td>0.0002</td>
</tr>
<tr>
<td>Belize</td>
<td>110,000</td>
<td>0.0002</td>
</tr>
<tr>
<td>Grenada</td>
<td>61,000</td>
<td>0.0001</td>
</tr>
<tr>
<td>St Vincent/Grenadines</td>
<td>43,000</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

Even though data specific to different categories of food may be limited, one thing is clear, the Caribbean is dependent on importations to meet its food bill. For the period 1961 to 2009, the Caribbean spent an average of 2 billion nominal dollars per year on imported food. Staples accounted for the largest expenditure share of food imports by the Caribbean (38.6%), whereas oils accounted for the smallest expenditure share (9.1%) of food imports.

### GMOs Availability and Consumption on the Caribbean Market

While it may be difficult to find an official descriptive list of GM products available in Caribbean countries, there are several things to be inferred and ultimately concluded with respect to indirect or proxy factual data which are available. It is clear that the responsibility lies on the importing countries to confirm the presence or absence of GMOs in imported products, however, even without that confirmation there are powerful indicators and circumstantial evidence which suggest that GMOs may be widespread in the Caribbean.

Annex 1 provides an illustrative list of genetically modified foods that are common in supermarkets, not just in the United States and Canada, but also in all Caribbean countries. Most of those products originate either in the U.S., Canada, Mexico, Brazil, Argentina, or India, all of which are declared producers of GMO crops used as primary ingredients for the products on the illustrative list. Fast food franchises such as KFC, Taco Bell and McDonalds have started to use Canadian GMO canola oil in preparing their food. These franchises exist in many Caribbean Countries, and local operators are not at will to modify or substitute the canola oil for non-GMO oil, since franchise recipes are patented and protected by law. Consistent with the above, a study conducted in Trinidad & Tobago in 2005 confirmed that supermarket shelves were stocked with foods containing GMOs and included baby foods, bakery products, confectionery, meat and meat products, fruit drinks and juices, soups, fruits and vegetables consistent with the types of products in the illustrative list in Annex 1. This same study also

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This activity was carried out with support from the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF), under project GFL/2328-2716-4C20, “Regional Project For Implementing National Biosafety Frameworks in the Caribbean Sub-region”.
found that there were no marked differences in consumption patterns in both urban and rural areas of Trinidad, with common foods consumed in descending order included: meat and dairy products (27 %), baby foods (15 %), soups (15 %), juice and fruit drink (14 %), fruits and vegetables (13 %), confectionery (11 %) and bakery products (5 %).

**Challenges and Limitations for the Caribbean**

The sections above suggest several challenges related to GMO production and management, regulation, information, and risk assessment. In all instances, there seem to be a common factor related to capacity for effective management of GMOs. These findings seem to confirm those of a study conducted in the 2012[^26] which demonstrated that approximately half of the 31 countries represented in a Latin America and the Caribbean study were not carrying out any domestic research and development on genetically modified organisms (GMOs), the majority had not developed GM products beyond the proof-of-concept stage, and only 58% of the study countries appear to have operational biosafety regulatory systems in place. Similar to this report, the mentioned study found scarcity of data on GMOs and serious lack of human and institutional capacity to conduct research and development on crops and to conduct GMO identification and risk assessments. Below is a list of specific challenges identified:

- GMO data not collected; when collected, data are not classified (i.e. is aggregated)
- GMOs integrated in majority of processed foods and products imported into the Caribbean region, and it will be difficult without proper labelling and technical capacity to isolate and identify GMO ingredients
- Processed products imported to the Caribbean may include multiple types of GMOs from different sources and countries, placing additional capacity constraints on Caribbean countries
- National regulations do not require that imported products are labelled to indicate GMO content
- The region’s dependence on imports will make enforcement difficult and/or GMO-free products expensive and probably inaccessible to Caribbean communities.


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• Not enough social and public education and participation in the regulation of GMOs

• The region lacks the technical capacity to carry out domestic rDNA biotechnology R&D on a large scale and to implement operational, cost-/time-effective, and self-sufficient regulatory systems.

Building capacity in biosafety is a huge and time-consuming task. It includes training individuals in the scientific, legal and policy aspects of risk assessment as well as enhancing research capacity. There needs to be capacity-building of existing institutional talent and establishment of sound research, development, and extension, marketing, monitoring and enforcement units. It must be recognized, however, that under the UNEP/UWI – GEF Regional Project for Implementing National Biosafety Frameworks in the Caribbean Sub-Region, participating countries are making significant strides to build human and institutional capacity, administrative systems, public education and awareness, and putting in place National Biosafety Frameworks to address many of the challenges flagged above, even though potential conflicts between WTO rules and the Cartagena Protocol on Biosafety may pose some legal challenges.

The University of the West Indies has launched post-graduate degrees in Biosafety and Biotechnology, and Caribbean countries have started to make use of this opportunity. In terms of formal education and research capacity, the University of the West Indies through its Department of Life Sciences in Trinidad & Tobago and its Biotechnology Centre in Jamaica, is the only institution in the country that is currently involved in Genetic Engineering. The university’s work concentrates on improving disease resistance in plants on economic importance, the DNA fingerprinting of local peppers and increasing the novel features of ornamental plants such as the Anthurium. Additionally, the university is generally tasked with teaching and training in order to encourage biotechnology-based enterprises. There is no ongoing research on the genetic modification of food crops. This capacity building effort is in its incipient stage and will require sustained strengthening if it is to be impactful on building the required biosafety capacity in the Caribbean.

The issue of the scale of the capacity being built against the demand for GMO management and research will continue to be challenging, in addition to issues related to the sustainability of the
systems and capacities being established. The Caribbean’s dependence and reliance on imported food may ultimately limit the scope and reach of the regulatory efforts.

Conclusions & Recommendations

For countries of the Caribbean, agro-biotechnology is particularly challenging. In addition to the need to set up national legislative and regulatory frameworks, compliance with WTO rules and the Cartagena Protocol on Biosafety must be maintained. Despite the progress to date by these countries to establish their NBFs, it is fair to say that some may still be evaluating the risks and benefits that agricultural biotechnology may imply for them, as they strive to develop comprehensive regulatory systems on the issue. The predominantly import-based economies of Caribbean countries put them at a disadvantage, since countries may be forced to flex their NBFs to accommodate the demands of trade partners which may come at a high cost for trade and the environment. In evaluating NBF options, consideration must be given to the potential benefits, the anticipated decrease in the need for chemicals, against the threats posed to biodiversity, livelihoods and cultural systems. Additionally, NBFs should be Caribbean and country-specific, should not mimic the models of industrialized countries, and should seek added value from working solutions closer to home such as South-South cooperation opportunities in GMO regulation, research & development, data exchange, and capacity development.

Data collection, access, and distribution need to be strengthened in order to facilitate data exchange for capacity building, better inform policy formulation processes both nationally and regionally, and better inform and educate the consuming public on GMOs and GM products. Recommendations are provided below to enhance data collection nationally, as the strength of regional data bases is dependent on the quality of national data:

- Require that all technical reports produced by agriculture, plant & animal health, trade and customs agencies adjust their reporting requirements to produce disaggregated statistical data to allow for the identification and classification of specific GM items
- Customs entries in particular, must legally require GM identification of products being imported and items must be disaggregated
- Advocate for the statistical institutes and the Central Banks of the region to publish GMO-specific data in their Annual Reports

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- Standardize reporting formats, templates, metrics and units of measure for GMO items across the region
- Institutionalize that all GMO related reports be posted for public access on national and regional clearing houses and other government information systems
- Advocate for a regional assessment of the status of GMOs in the Caribbean be conducted annually according to a simple template that countries can update.
Annex 1 – Sample List of Genetically Modified Foods Common in Supermarkets

**Source:** Shift Frequency, available at [http://www.whydontyoutrythis.com/2013/06/comprehensive-list-of-gmo-products-and-companies.html](http://www.whydontyoutrythis.com/2013/06/comprehensive-list-of-gmo-products-and-companies.html) and accessed on WEDNESDAY, JUNE 12, 2013.

<table>
<thead>
<tr>
<th>Baby Food ~ Genetically Engineered Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Nabisco (Phillip Morris)</strong></td>
</tr>
<tr>
<td>- Arrowroot Teething Biscuits</td>
</tr>
<tr>
<td>- Infant formula Carnation Infant Formulas (Nestle)</td>
</tr>
<tr>
<td>- AlSoy</td>
</tr>
<tr>
<td>- Good Start</td>
</tr>
<tr>
<td>- Follow-Up</td>
</tr>
<tr>
<td>- Follow-Up Soy</td>
</tr>
<tr>
<td><strong>Enfamil Infant Formulas (Mead Johnson)</strong></td>
</tr>
<tr>
<td>- Enfamil with Iron</td>
</tr>
<tr>
<td>- Enfamil Low Iron</td>
</tr>
<tr>
<td>- Enfamil A.R.</td>
</tr>
<tr>
<td>- Enfamil Nutramigen</td>
</tr>
<tr>
<td>- Enfamil Lacto Free</td>
</tr>
<tr>
<td>- Enfamil 22</td>
</tr>
<tr>
<td>- Enfamil Next step (soy and milk-based varieties)</td>
</tr>
<tr>
<td>- Enfamil Pro-Soybee</td>
</tr>
<tr>
<td><strong>Isomil Infant Formulas (Abbot Labs)</strong></td>
</tr>
<tr>
<td>- Isomil Soy</td>
</tr>
<tr>
<td>- Isomil Soy for Diarrhea</td>
</tr>
<tr>
<td>- Similac (Abbot Labs)</td>
</tr>
<tr>
<td>- Similac Lactose Free</td>
</tr>
<tr>
<td>- Similac with Iron</td>
</tr>
<tr>
<td>- Similac Low Iron</td>
</tr>
<tr>
<td>- Similac Alimentum</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Baking ~ Genetically Engineered Ingredients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aunt Jemima (Quaker)</strong></td>
</tr>
<tr>
<td>- Complete Pancake &amp; Waffle Mix</td>
</tr>
<tr>
<td>- Buttermilk Pancake &amp; Waffle Mix</td>
</tr>
<tr>
<td>- Cornbread Mix</td>
</tr>
<tr>
<td>- Easy Mix Coffee Cake</td>
</tr>
<tr>
<td><strong>Betty Crocker (General Mills)</strong></td>
</tr>
<tr>
<td>- Pie Crust Mix</td>
</tr>
<tr>
<td>- Original Pancake Mix</td>
</tr>
<tr>
<td>- Complete Pancake Mix</td>
</tr>
<tr>
<td>- Buttermilk Complete Pancake Mix</td>
</tr>
<tr>
<td>- Muffin Mixes</td>
</tr>
<tr>
<td>- Banana Nut</td>
</tr>
<tr>
<td>- Lemon Poppy Seed</td>
</tr>
<tr>
<td>- Blueberry</td>
</tr>
<tr>
<td>- Wild Blueberry</td>
</tr>
<tr>
<td>- Chocolate Chip</td>
</tr>
<tr>
<td>- Apple Streusel</td>
</tr>
<tr>
<td>- Quick Bread Mixes Banana</td>
</tr>
<tr>
<td>- Cinnamon Streusel</td>
</tr>
</tbody>
</table>
This activity was carried out with support from the United Nations Environment Programme (UNEP) and the Global Environment Facility (GEF), under project GFL/2328-2716-4C20, “Regional Project For Implementing National Biosafety Frameworks in the Caribbean Sub-region”.

-Lemon Poppy Seed
-Cranberry Orange
-Gingerbread
-Cookie Mixes Chocolate Chip
-Double Chocolate Chunk
-Sugar
-Peanut Butter

Bisquik (Betty Crocker/General Mills)
-Original
-Reduced Fat
-Shake ‘n Pour Pancake Mix
-Shake ‘n Pour Buttermilk Pancake Mix
-Shake ‘n Pour Blueberry Pancake Mix

Duncan Hines (Aurora Foods)
-Muffin Mixes
-Kellogg’s All-Bran Apple Cinnamon
-Kellogg’s All-Bran Blueberry
-Blueberry
-Blueberry Crumb
-Chocolate Chip

Hungry Jack (Pillsbury)
-Buttermilk Pancake Mix
-Extra Light & Fluffy Pancake Mix (all varieties)
-Jiffy
-Corn Muffin Mix
-Blueberry Muffin Mix
-Raspberry Muffin Mix
-Pie Crust Mix

Mrs. Butterworths (Aurora Foods)
-Complete Pancake Mix
-Buttermilk Pancake Mix

Pepperidge Farms (Campbell’s)
-Buttermilk Pancake Mix
-Pillsbury
-Quick Bread & Muffin Mixes
-Blueberry
-Chocolate Chip
-Banana
-Cranberry
-Lemon Poppyseed
-Nut
-Hot Roll Mix
-Gingerbread

Bakers (Kraft/Phillip Morris)
-Unsweetened Chocolate
-Semi-Sweet Chocolate
-German Sweet Chocolate
-White Chocolate
-Hershey’s
-Semi-Sweet Baking Chips
-Milk Chocolate Chips
-Mini Kisses
-Nestle
-Toll House Semi-Sweet Chocolate Chips
- Milk Chocolate Chips
- White Chocolate
- Butterscotch Chips
- Semi-Sweet Chocolate Baking Bars

**Bread ~ Genetically Engineered Ingredients**

**Holsum (Interstate Bakeries)**
- Holsum Thin Sliced
- Roman Meal
- 12 Grain
- Round Top
- Home Pride
- Buttertop White
- Buttertop Wheat

**Pepperidge Farms (Campbell’s)**
- Cinnamon Swirl
- Light Oatmeal
- Light Wheat
- 100% Whole Wheat
- Hearty Slices
- 7 Grain
- 9 Grain
- Crunchy Oat
- Whole Wheat
- Light Side
- Oatmeal
- Wheat
- 7 Grain
- Soft Dinner Rolls
- Club Rolls
- Sandwich Buns
- Hoagie Rolls

**Thomas’ (Bestfoods)**
- English Muffins Original
- Cinnamon Raisin
- Honey Wheat
- Oat Bran
- Blueberry
- Maple French Toast
- Toast-r-Cakes Blueberry
- Toast-r-Cakes Corn Muffins

**Wonder (Interstate Bakeries)**
- White Sandwich Bread
- Country Grain
- Buttermilk
- Thin Sandwich
- Light Wheat
- 100% Stoneground Wheat
- Fat Free Multigrain
- Premium Potato
- Beefsteak Rye
- Wonder Hamburger Buns

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- 100% Natural Granola
- Toasted Oatmeal
- Toasted Oatmeal Honey Nut
- Oat Bran
- Cap’n Crunch
- Cap’n Crunch Peanut Butter Crunch
- Cap’n Crunch Crunchling Berries

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**Chocolate ~ Genetically Engineered Ingredients**

**Cadbury (Cadbury/Hershey’s)**
- Mounds
- Almond Joy
- York Peppermint Patty
- Dairy Milk
- Roast Almond
- Fruit & Nut
- Hershey’s
- Kit-Kat
- Reese’s Peanut Butter Cups
- Mr. Goodbar
- Special Dark
- Milk Chocolate
- Kisses
- Symphony

**Kraft (Kraft/Philip Morris)**
- Toblerone (all varieties)
- Mars
- M&M (all varieties)
- Snickers
- Three Musketeers
- Milky Way
- Twix

**Nestle**
- Crunch
- Milk Chocolate
- Chunky
- Butterfinger
- 100 Grand

**Carnation (Nestle)**

**Hot Cocoa Mixes:**
- Rich Chocolate
- Double Chocolate
- Milk Chocolate
- Marshmallow Madness
- Mini Marshmallow
- No Sugar

**Hershey’s**
- Chocolate Syrup
- Special Dark Chocolate Syrup
- Strawberry Syrup

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Nestle
- Nesquik
- Strawberry Nesquik

Swiss Miss (ConAgra)
- Chocolate Sensation
- Milk Chocolate
- Marshmallow Lovers
- Marshmallow Lovers Fat Free
- No Sugar Added

Swiss Miss (ConAgra)
- Chocolate Sensation
- Milk Chocolate
- Marshmallow Lovers
- Marshmallow Lovers Fat Free
- No Sugar Added

Condiments ~ Genetically Engineered Ingredients

**Del Monte (Nabisco/Phillip Morris)**
- Ketchup
- Heinz
- Ketchup (regular & no salt)
- Chili Sauce
- Cocktail Sauce
- Heinz 57 Steak Sauce

**Hellman’s (Bestfoods)**
- Real Mayonnaise
- Light Mayonnaise
- Low-Fat Mayonnaise

**Hunt’s (ConAgra)**
- Ketchup (regular & no salt)
- KC Masterpiece
- Original BBQ sauce
- Garlic & Herb Marinade
- Honey Teriyaki Marinade

**Kraft (Kraft/Phillip Morris)**
- Miracle Whip (all varieties)
- Kraft Mayonnaise (all)
- Thick & Spicy BBQ sauces (all varieties)
- Char Grill BBQ sauce
- Honey Hickory BBQ sauce

**Nabisco (Nabisco/Phillip Morris)**
- A-1 Steak Sauce
Open Pit (Vlasic/Campbells)
- BBQ sauces (all)
- Chi-Chi’s (Hormel)
- Fiesta Salsa (all varieties)
- Old El Paso (Pillsbury)
- Thick & Chunky Salsa
- Garden Pepper Salsa
- Taco Sauce
- Picante Sauce

**Ortega (Nestle)**
- Taco Sauce
- Salsa Prima Homestyle
- Salsa Prima Roasted Garlic
- Salsa Prima 3 Bell Pepper
- Thick & Chunky Salsa

**Pace (Campbells)**
- Chunky Salsa
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Snack Wells (Nabisco/Phillip Morris)
- Devil’s Food
- Golden Devil’s Food
- Mint Crème
- Coconut Crème
- Chocolate Sandwich
- Chocolate Chip
- Peanut Butter Chip
- Double Chocolate Chip

Keebler (Keebler/Flowers Industries)
- Town House
- Club
- Munch ‘Ems (all varieties)
- Wheatables
- Zesta Saltines
- Toasted (Wheat, Onion, Sesame & Butter Crisps)
- Snax Stix (Wheat, Cheddar & original)
- Harvest Bakery (Multigrain, Butter, Corn Bread)

Nabisco (Nabisco/Phillip Morris)
- Ritz (all varieties)
- Wheat Thins (all)
- Wheatsworth
- Triscuits
- Waverly
- Sociables
- Better Cheddars
- Premium Saltines (all)
- Ritz Snack Mix (all)
- Vegetable Flavor Crisps
- Swiss Cheese Flavor Crisps
- Cheese Nips (all)
- Uneeda Biscuits

Pepperidge Farm (Campbell’s)
- Butter Thins
- Hearty Wheat
- Cracker Trio
- Cracker Quartet
- Three Cheese Snack Stix
- Sesame Snack Stix
- Pumpernickel Snack Stix
- Goldfish (original, cheddar, parmesan, pizza, pretzel)
- Goldfish Snack Mix (all)

Red Oval Farms (Nabisco/Phillip Morris)
- Stoned Wheat Thin (all varieties)
- Crisp ’N Light Sourdough Rye
- Crisp ’N Light Wheat

Sunshine (Flowers Industries)
- Cheeze-It (original & reduced fat)
- Cheeze-It White Cheddar
- Cheeze-It Party Mix
- Krispy Original Saltines

Crackers ~ Genetically Engineered Ingredients

Frozen Dinners ~ Genetically Engineered Ingredients
Banquet (ConAgra)
- Pot Pies (all varieties)
- Fried Chicken
- Salisbury Steak
- Chicken Nugget Meal
- Pepperoni Pizza Meal

Budget Gourmet (Heinz)
- Roast Beef Supreme
- Beef Stroganoff
- Three Cheese Lasagne
- Chicken Oriental & Vegetable
- Fettuccini Primavera

Green Giant (Pillsbury)
- Rice Pilaf with Chicken Flavored Sauce
- Rice Medley with Beef Flavored Sauce
- Primavera Pasta
- Pasta Accents Creamy Cheddar
- Create-a-Meals Parmesan Herb Chicken
- Cheesy Pasta and Vegetable
- Beef Noodle
- Sweet & Sour
- Mushroom Wine Chicken

Healthy Choice (ConAgra)
- Stuffed Pasta Shells
- Chicken Parmagiana
- Country Breaded Chicken
- Roast Chicken Breast
- Beef Pot Roast
- Chicken & Corn Bread
- Cheese & Chicken Tortellini
- Lemon Pepper Fish
- Shrimp & Vegetable
- Macaroni & Cheese

Kid Cuisine (ConAgra)
- Chicken Nugget Meal
- Fried Chicken
- Taco Roll Up
- Corn Dog
- Cheese Pizza
- Fish Stix
- Macaroni & Cheese

Lean Cuisine (Stouffer’s/Nestle)
- Skillet Sensations Chicken & Vegetable
- Broccoli & Beef
- Homestyle Beef
- Teriyaki Chicken
- Chicken Alfredo
- Garlic Chicken
- Roast Turkey
- Hearty Portions Chicken Florentine
- Beef Stroganoff
- Cheese & Spinach Manicotti
- Salisbury Steak
- Café Classics Baked Fish

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-Baked Chicken
-Chicken a L’Orange
-Chicken Parmesan
-Meatloaf with Whipped Potatoes

-Everyday Favorites Chicken Fettuccini
-Chicken Pie
-Angel Hair Pasta
-Three Bean Chili with Rice
-Macaroni & Cheese

Marie Callenders (ConAgra)
-Chicken Pot Pie
-Lasagna & Meat Sauce
-Turkey & Gravy
-Meat Loaf & Gravy
-Country Fried Chicken & Gravy
-Fettuccini with Broccoli & Cheddar
-Roast Beef with Mashed Potatoes
-Country Fried Pork Chop with Gravy
-Chicken Cordon Bleu

Ore-Ida Frozen Potatoes (Heinz)
-Fast Fries
-Steak fries
-Zesties
-Shoestrings
-Hash Browns
-Tater Tots
-Potato Wedges
-Crispy Crunchies

Rosetto Frozen Pasta (Heinz)
-Cheese Ravioli
-Beef Ravioli
-Italian Sausage Ravioli
-Eight Cheese Stuffed Shells
-Eight Cheese Broccoli Stuffed Shells

Stouffer’s (Nestle)
-Family Style Favorites Macaroni & Cheese
-Stuffed Peppers
-Broccoli au Gratin
-Meat Loaf in Gravy
-Green Bean & Mushroom Casserole

-Homestyle Meatloaf
-Salisbury Steak
-Chicken Breast in Gravy

-Hearty Portions Salisbury Steak
-Chicken Fettucini
-Meatloaf with Mashed Potatoes
-Chicken Pot Pie

Swanson (Vlasic/Campbells)
-Meat Loaf
-Fish & Chips
-Salisbury Steak
-Chicken Nuggets
-Hungry Man Fried Chicken
- Roast Chicken
- Fisherman’s Platter
- Pork Rib

**Voila! (Bird’s Eye/Agri-Link Foods)**
- Chicken Voila! Alfredo
- Chicken Voila! Garlic
- Chicken Voila! Pesto
- Chicken Voila! Three Cheese
- Steak Voila! Beef Sirloin
- Shrimp Voila! Garlic

**Weight Watchers (Heinz)**
- Smart Ones Fiesta Chicken
- Basil Chicken
- Ravioli Florentine
- Fajita Chicken
- Roasted Vegetable Primavera

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**Energy Bars & Drinks ~ Genetically Engineered Ingredients**

**Power Bars**

**Power Bar (Nestle)**
- Oatmeal Raisin
- Apple Cinnamon
- Peanut Butter
- Vanilla Crisp
- Chocolate Peanut Butter
- Mocha
- Banana
- Wild Berry
- Harvest Bars Apple Crisp
- Blueberry
- Chocolate Fudge Brownie
- Strawberry
- Peanut Butter Chocolate Chip

**Drink Mixes**

**Carnation Instant Breakfast Mix (Nestle)**
- Creamy Milk Chocolate
- Classic Chocolate
- French Vanilla
- Strawberry
- Café Mocha

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**Heat & Serve Meals ~ Genetically Engineered Ingredients**

**Chef Boyardee (ConAgra)**
- Beefaroni
- Macaroni & Cheese
- Mini Ravioli
- ABC’s & 123’s

**Dinty Moore (Hormel)**
- Beef Stew
- Turkey Stew
- Chicken & Dumplings
- Hormel

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-Macaroni & Cheese
-Pasta Alfredo

**Knorr (Bestfoods)**
-Mushroom Risotto Italian Rice
-Broccoli au Gratin Risotto
-Vegetable Primavera Risotto
-Risotto Milanese
-Original Pilaf
-Rotini with 4 Cheese
-Bow Tie Pasta with Chicken & Vegetable
-Penne with Sun-Dried Tomato
-Fettuccini with Alfredo
-Classic Sauce Packets Hollandaise

**Béarnaise**
-White
-Brown
-Lemon Herb
-Mushroom Brown
-Onion
-Roasted Chicken
-Roasted Pork
-Roasted Turkey

**Pasta Sauce Packets Alfredo**
-Four Cheese
-Carbonara
-Pesto
-Garlic Herb

**Lipton (Unilever)**
-Rice & Sauce Packets Chicken Broccoli
-Cheddar Broccoli
-Beef Flavor
-Spanish
-Chicken Flavor
-Creamy Chicken
-Mushroom
-Sizzle & Stir Skillet Supers Lemon Garlic Chicken & Rice
-Spanish Chicken & Rice
-Herb Chicken & Bowties
-Cheddar Chicken & Shells

**Near East (Quaker)**
-Spicy Tomato Pasta Mix
-Roasted Garlic & Olive Oil Pasta Mix
-Falafel Mix
-Lentil Pilaf
-Couscous
-Tomato Lentil
-Parmesan
-Toasted Pinenut
-Herb Chicken
-Broccoli & Cheese
-Curry

**Pasta Roni (Quaker)**
-Fettuccini Alfredo
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Coca Cola (Coca Cola)
- Sprite
- Cherry Coke
- Barq’s Root Beer
- Minute Maid Orange
- Minute Maid Grape
- Surge
- Ultra
- PepsiCo
- Pepsi
- Slice
- Wild Cherry Pepsi
- Mug Root Beer
- Mountain Dew
- Cadbury/Schweppes
- 7-Up
- Dr. Pepper
- A & W Root Beer
- Sunkist Orange
- Schweppes Ginger Ale

Capri Sun juices (Kraft/Phillip Morris)
- Red Berry
- Surfer Cooler
- Splash Cooler
- Wild Cherry
- Strawberry Kiwi
- Fruit Punch
- Pacific Cooler
- Strawberry
- Orange
- Grape

Fruitopia (Coca Cola)
- Grape Beyond
- Berry Lemonade
- Fruit Integration
- Kiwiberry Ruckus
- Strawberry Passion
- Tremendously Tangerine

Fruit Works (PepsiCo)
- Strawberry Melon
- Peach Papaya
- Pink Lemonade
- Apple Raspberry

Gatorade (Quaker)
- Lemon Lime
- Orange
- Fruitpunch
- Fierce Grape
- Frost Riptide Rush

Hawaiian Punch (Procter & Gamble)
- Tropical Fruit
- Grape Geyser
- Fruit Juicy Red
- Strawberry Surfin

Hi-C (Coca Cola)

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Pink Lemonade
Watermelon Rapids
Boppin' Berry
Tropical Punch
Smashin' Wildberry
Blue Cooler
Blue Moon Berry
Orange
Cherry

Kool Aid (Kraft/Phillip Morris)
Blastin' Berry Cherry
Bluemoon Berry
Kickin' Kiwi Lime
Tropical Punch
Wild Berry Tea
Ocean Spray
Cranberry Juice Cocktail
Cranapple
CranGrape
CranRaspberry
CranStrawberry
CranMango

Squeeze It (Betty Crocker/General Mills)
Rockin' Red Punisher
Chucklin' Cherry
Mystery 2000

Sunny Delight (Procter & Gamble)
Sunny Delight Original
Sunny Delight With Calcium Citrus Punch
Sunny Delight California Style Citrus Punch
Tang juices (Kraft/Phillip Morris)
Orange Uproar
Fruit Frenzy
Berry Panic

Tropicana Twisters (PepsiCo)
Grape Berry
Apple Raspberry Blackberry
Cherry Berry
Cranberry Raspberry Strawberry
Pink Grapefruit
Tropical Strawberry
Orange Cranberry
Orange Strawberry Banana

V-8 (Campbells)
V8 Tomato Juices (all varieties)
Strawberry Kiwi
Strawberry Banana
Fruit Medley
Berry Blend
Citrus Blend
Apple Medley
Tropical Blend
Island Blend

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**Campbell’s**
- Tomato
- Chicken Noodle
- Cream of Chicken
- Cream of Mushroom
- Cream of Celery
- Cream of Broccoli
- Cheddar Cheese
- Green Pea
- Healthy Request Chicken Noodle
- Cream of Chicken
- Cream of Mushroom
- Cream of Celery
- Campbell’s Select Roasted Chicken with Rice

- Grilled Chicken with Sundried Tomatoes
- Chicken Rice
- Vegetable Beef

- Chunky Beef with Rice
- Hearty Chicken & Vegetable
- Pepper Steak
- Baked Potato with Steak & Cheese
- New England Clam Chowder

- Soup to Go Chicken Noodle
- Chicken Rice
- Garden Vegetable
- Vegetable Beef & Rice

Simply Home Chicken Noodle
Chicken Rice
Garden Vegetable
Vegetable Beef with Pasta

**Healthy Choice (ConAgra)**
- Country Vegetable
- Fiesta Chicken
- Bean & Pasta
- Chicken Noodle
- Chicken with Rice
- Minestrone

**Pepperidge Farms (Campbell’s)**
- Corn Chowder
- Lobster Bisque
- Chicken & Wild Rice
- New England Clam Chowder
- Crab Soup

**Progresso (Pillsbury)**
- Tomato Basil
- Chicken Noodle
- Chicken & Wild Rice
- Chicken Barley
- Lentil
- New England Clam Chowder
- Zesty Herb Tomato
- Roasted Chicken with Rotini
- Fat Free Minestrone
- Fat Free Chicken Noodle
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-Fat Free Lentil
-Fat Free Roast Chicken

<table>
<thead>
<tr>
<th>Tomatoes &amp; Sauces ~ Genetically Engineered Ingredients</th>
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**Del Monte (Nabisco/Phillip Morris)**
- Tomato Sauce

**Five Brothers Pasta Sauces (Lipton/Unilever)**
- Summer Vegetable
- Five Cheese
- Roasted Garlic & Onion
- Tomato & Basil

**Healthy Choice Pasta Sauces (ConAgra)**
- Traditional
- Garlic & Herb
- Sun-Dried Tomato & Herb

**Hunts (ConAgra)**
- Traditional Spaghetti Sauce
- Four Cheese Spaghetti Sauce
- Tomato Sauce
- Tomato Paste

**Prego Pasta Sauces (Campbells)**
- Tomato, Basil & Garlic
- Fresh Mushroom
- Ricotta Parmesan
- Meat Flavored
- Roasted Garlic & Herb
- Three Cheese
- Mini-Meatball
- Chicken with Parmesan

**Ragu Sauces (Lipton/Unilever)**
- Old World Traditional
- Old World with Meat
- Old World Marinara
- Old World with Mushrooms
- Ragu Robusto Parmesan & Romano
- Ragu Robusto Roasted Garlic
- Ragu Robusto Sweet Italian Sausage
- Ragu Robusto Six Cheese
- Ragu Robusto Tomato, Olive Oil & Garlic
- Ragu Robusto Classic Italian Meat
- Chunky Garden Style Super Garlic
- Chunky Garden Style Garden Combo
- Chunky Garden Style Tomato, Garlic & Onion
- Chunky Garden Style Tomato, Basil & Italian Cheese
- Pizza Quick Traditional