**Food Security: Caribbean Case Study**

(includes all background materials for unit 4 and AGO activity for unit 5)

**Student Learning Outcomes**

Students will be able to:

1. Describe the unique factors that impact food security in the Caribbean relative to New York and Nebraska.
2. Describe the region's past and present participation in the global food system.
3. Identify what factors influence food security in the region.
4. Identify what aspects of malnutrition impact the region.
5. Create a PowerPoint and utilize AGO to describe food security in the region while creating solutions to address this wicked problem.

**Overview**

Students are part of a special ad hoc committee that has been assigned to create a presentation for the larger CARICOM Community a report on food security in the region. They should incorporate information from the assigned readings and the analyses they do with the following ArcGIS online activity. Additional resources can be included as well. As their final product, students are to create a powerpoint presentation describing the context of the Wicked problem of food insecurity and the potential solutions for the city. The presentation should include one or more maps they create in AGO. This presentation will be given in unit 6.

Ideas: As part of their presentation, students could create an ad campaign that highlights the benefits of local Caribbean foods i.e. mangoes, fish over imported food, etc. Students could explore ways that the tourism industry and local farmers could work together.

**Unit 4:Pre-class Assignment**

**Activities**

Read the following articles:

1. Supplemental information provided below.
2. Damien Cave. 2013. As the Cost of Importing Food Soars, Jamaica turns to Earth. New York Times. August 2013. <http://www.nytimes.com/2013/08/04/world/americas/as-cost-of-importing-food-soars-jamaica-turns-to-the-earth.html>
3. Desmond Brown. 2015. Sea Level Rise: What does it mean for Antigua and Barbuda. http://caribbeannewsservice.com/now/sea-level-rise-what-does-it-mean-for-antigua-and-barbuda/
4. Skim pdf Government of Antigua and Barbuda. 2012. Food and Nutrition Security for Antigua and Barbuda. http://www.zerohungerchallengelac.org/ab/doc/FoodNutritionSecurityPolicyAG.pdf

Watch the first six minutes of Sustainable Barbuda Vimeo by the Barbuda Research Complex

Link to video (password: Barbuda): <https://vimeo.com/121945219>

**Optional:** Students might also want to watch the documentary Life and Debt for a deeper understanding of the demise of agriculture in Jamaica and its relationship to the larger processes of globalization and debt.

After students have read the New York Time article, Caribbean News piece, watched the video on Barbuda, and skimmed Food and Nutrition Security for Antigua and Barbuda they should answer the following questions:

1. What role did the Caribbean play in the global food system of the past?
2. What role does it play today?
3. How will sea level rise, changing rainfall patterns impact agriculture in the Caribbean?
4. What type of malnutrition is impacting food security in the region (refer to Lesson 1)?
5. What factors affecting food security do you see in Jamaica/Antigua and Barbuda? Are there others?

**Supplemental Information**

**Introduction**

This case study will focus on food security amongst the member states of CARICOM (The Caribbean Community and Common Market), an organization designed to promote economic cooperation and integration. CARICOM consists of 15 countries that are incredibly diverse in terms of land area, environment, population, and levels of socio-economic development. Some members are islands connected by the Caribbean Sea while others are mainland states located within “traditional” Latin America. Countries in CARICOM have a common European colonial past (French, British, Dutch, etc.) and monocrop export history that utilized enslaved African labor. Many of the members of CARICOM have experienced a decline in agriculture in the last century and have turned to tourism as a mainstay of economic development. Only three countries within CARICOM rely on agriculture as the cornerstone of their economy: Dominica, Haiti and Guyana. Trinidad and Tobago’s economy depends on energy, while the remaining countries economies center on the service sector (Government of Antigua and Barbuda 2012).

**Agriculture Background**

*With the exception of perhaps Haiti, however, the sensationalized and dramatic incidence of food shortages and hunger seen especially in parts of Asia and sub-Saharan Africa is absent from the Caribbean. This has perhaps led to an underestimation of food insecurity in the region and a complacent attitude. (Beckford and Campbell 2013: 2013).*

Since the onset of European colonialism in 1492, agriculture has played a key role in the economy of the Caribbean. Monocrops such as sugarcane dominated the plantation economy, and Europeansamassed considerable wealth through the use of enslaved labor from the continent of Africa.Sidney Mintz writes that England was the most expansive in its colonial control in the region, imported the most enslaved labor and went the furthest in creating a plantation system that was established around sugar.

The most important product of that system was sugar. Coffee, chocolate (cacao), nutmeg, and coconut were among the other products; but the amount of sugar produced, the numbers of its users, and the range of its uses exceeded the others; and it remained the principal product for centuries. (Mintz 1985: 38)

Sugar was grown in the region for consumption in Europe as food habits began to change on the continent. Sugar went from being an exotic commodity only available to the rich to an everyday item of the poor. “By 1750 the poorest English farm labourer’s wife took sugar in her tea” and the Caribbean islands were the ones to largely meet the demand (Mintz 1985: 45). The English economic historian D.C. Coleman estimated British per capita consumption of sugar increased from 4 pounds between 1700-1709 to 18 pounds a century later (Mintz 1985: 67). Interestingly, while sugar was one of the primary export crops out of the Caribbean, nearly everything else consumed in the region came from England.

In the British Caribbean, emancipation occurred in 1834 (dates vary depending on European colonial power). After emancipation, a local peasantry emerged establishing free villages, however, land access was largely restricted. Former enslaved peoples, now “free,” continued to work for plantations. The use of small-scale agriculture, largely subsistence dominated, in addition to fishing and charcoal burning (Beckford and Campbell 2013). However, sustainable food production was not emphasized because it would ultimately detract from the larger priority of sugarcane production. “Dependence on imported food and an emphasis on export-oriented production was therefore created by the economic and political order of the plantation era” (Beckford and Campbell 2013: 16).

Competition from other world regions in the form of beet sugar led to a decline in sugarcane production in the region. As early as 1896, the Norman Commission recommended British colonies begin to diversify their economies and that only Antigua, Barbados and St. Kitts/Nevis should continue to produce sugar as a primary staple crop. The reorientation of economies to other goods still promoted exports to the colonizer.

Table 1 shows the alternative crops that became important to different island economies in the latter part of the 1800s and early 1900s. While these crops still emphasized the export economy, it was small-scale farmers that grew many of these crops.

|  |  |
| --- | --- |
| **Crop** | **Island(s)** |
| Cotton | Barbados, St. Kitts/Nevis, Antigua/Barbuda, and Montserrat |
| Nutmeg | Grenada |
| Ginger | Jamaica |
| Pimento | Jamaica |
| Arrowroot | St. Vincent, The Grenadines |
| Cocoa | Jamaica, Trinidad and Tobago |
| Rice | Trinidad and Tobago, Guyana |
| Coconut | Jamaica, Trinidad and Tobago |
| Lime | St. Lucia, Dominica |
| Banana | Windward Islands, Jamaica |

**Table 2 Changes in Agricultural land in CARICOM (1961-200) Source: Potter et. al 2004, World Bank 2010 and Beckford and Campbell 2013**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Countries** | **1961 (percent)** | **1981 (percent)** | **2000 (percent)** | **2009 (percent)** |
| Antigua/Barbuda | 23 | 25 | 27 | 29.5 |
| Bahamas | 1 | 1 | 1 | 1.4 |
| Barbados | 44 | 44 | 44 | 44.2 |
| Belize | 3.5 | 4 | 6 | 6.7 |
| Dominica | 23 | 25 | 23 | 32 |
| Grenada | 65 | 47 | 35 | 35.3 |
| Guyana | 7 | 9 | 9 | 8.5 |
| Haiti | 46 | 51 | 51 | 66.8 |
| Jamaica | 49 | 46 | 46 | 41.5 |
| St. Kitts/Nevis | 56 | 45 | 28 | 19.2 |
| St. Lucia | 28 | 33 | 31 | 18 |
| St. Vincent/Grenadines | 26 | 31 | 33 | 25.6 |
| Suriname |  |  | .6 | .5 |
| Trinidad and Tobago | 20 | 25 | 26 | 10.5 |

Over time, these small-scale producers became the backbone of the agricultural sector in the region. They grew food on marginal lands, including hillsides, flood plains, and dry coastal plains. Into the present, these small-scale producers cultivation methods have often not changed from their ancestors of previous centuries, which mean competing on an international scale for food export can be difficult. Domestic food agriculture in the region now outpaces agriculture grown for export (Beckford and Campbell). Overall, employment in agriculture has decreased and in some CARICOM countries, the percentage of GDP contributions from agriculture has diminished over time in lieu of other industries, such as tourism (See Tables 2 and 3). In the 20th century, the decline in agriculture has come as a result of the processes of globalization (loss of preferential treatment in bananas—see for example the Lome Agreement) and the increased emphasis on tourism in the region (*Life and Debt* 2001). According to the World Travel and Tourism Council 2012 statistics, tourism makes up anywhere from 77.4 percent of the overall GDP of Antigua and Barbuda, 27.4 percent of Jamaica and 39.4 percent of Barbados (Edgehill2013).

**Table 3 Comparative contribution to GDP in Caricom Source CIA World Fact book 2012 Source: Beckford and Campbell 2013**

|  |  |  |  |
| --- | --- | --- | --- |
| **Countries** | **Agriculture** | **Industry** | **Services** |
| Antigua/Barbuda | 3.8 | 32.9 | 51.8 |
| Bahamas | 1.6 | 8 | 90.4 |
| Barbados | 3.4 | 13.4 | 83.2 |
| Belize | 9.7 | 19.8 | 58 |
| Dominica | 21.4 | 22.4 | 56.3 |
| Grenada | 10.6 | 28.9 | 60.5 |
| Guyana | 24.2 | 24 | 51.8 |
| Haiti | 25 | 16 | 59 |
| Jamaica | 5.8 | 29.5 | 64.7 |
| St. Kitts/Nevis | 2.4 | 22.7 | 74.8 |
| St. Lucia | 4.1 | 18.4 | 77.5 |
| St. Vincent/Grenadines | 7.6 | 25.3 | 67 |
| Suriname | 10.8 | 24.4 | 64.8 |
| Trinidad and Tobago | .4 | 58.9 | 40.7 |

**Trends in Caribbean Food Security**

The unique history of the region, coupled with local economies, environment and culture have resulted in several common trends as it relates to food security (Beckford 2012). The region has seen an overall decline in land productivity, labor and management. Earnings from traditional export crops have also declined, which has resulted in an inability to purchase food. Caribbean markets have lost their trade preferences for traditional export crops (see for example the Lomé Convention; *Life and Debt*). The region exhibits a high dependence on imported food from North America. This dependence on imported food has also changed local diets and has led to an increase in diet-related diseases. People are moving away from local foodways and adopting North American foods and lifestyles. Poverty in the region is increasing, which also impacts people’s access to food.

**Solution to Caribbean Food Insecurity**

Despite these trends, Clinton Beckford (2012) has proposed several solutions that could address food insecurity in the region. 1) Caribbean countries must reduce their dependency on imported food by advocating trade regulations that serve the interests of local farmers (see for example Jamaica).2) Countries must increase farmer expertise by emphasizing local knowledge, support agricultural extension services, and provide information about farming amidst natural hazards. 3) Caribbean peoples must rediscover traditional foods that have been replaced with North American diets. 4) Countries must increase the participation of women in agriculture. On islands like Jamaica, women primarily market and distribute food. Women can become more involved in agriculture through the implementation of backyard gardens where food can be grow safely for home consumption. 5) With the importance of tourism to Caribbean economies, there needs to be efforts at improved linkages between local agriculture and resort facilities as well as an emphasis for tourist to consume local cuisine.

**Sources:**

Clinton Beckford 2012. *Issues in Caribbean Food Security: Building Capacity in Local Food Production Systems, Food Production - Approaches, Challenges and Tasks,* Prof. Anna Aladjadjiyan (Ed.), ISBN: 978- 953-307-887-8, InTech, Available from: http://www.intechopen.com/books/food-production-approacheschallenges-

and-tasks/issues-in-caribbean-food-security-building-capacity-in-local-food-production-systems

Beckford, C. L. and Campbell, D.R. 2013. *Domestic Food Production and Food Security in the Caribbean: Building Capacity and Strengthening Local Food Production Systems.* Palgrave Macmillan: New York.

Edgehill, Michael W. 2013. Tourism and the Caribbean Economy. *Caribbean Journal.* [http://caribjournal.com/2013/09/30/tourism-and-the-caribbean-economy/#](http://caribjournal.com/2013/09/30/tourism-and-the-caribbean-economy/) Accessed November 30, 2015.

Government of Antigua and Barbuda. 2012. Food and Nutrition Security for Antigua and Barbuda. <http://www.zerohungerchallengelac.org/ab/doc/FoodNutritionSecurityPolicyAG.pdf> Accessed December 9, 2015.

*Life and Debt*. 2001. Dir. Stephanie Black. Tuff Gong Pictures, DVD.

Mintz, Sidney W. 1985. *Sweetness and Power: The Place of Sugar in Modern History.* Penguin: London.

**Additional Resources**

FAO (nd.) Antigua, Barbuda and FAO: Building Sustainable Food and Nutrition Security. www.fao.org/3/a-au739e.pdf

FAO. 2015. Regional Overview of Food Insecurity – Latin America and the Caribbean. FAO.

**Unit 5: Caribbean Case Study ArcGIS Online (AGO) Activity**

1. Go to this link: <https://www.arcgis.com/home/webmap/viewer.html?webmap=8abb190866d741ffb03999fcf60f4cbb&amp;extent=-93.955,-1.7563,-48.4717,29.956>
2. Sign into your AGO account

Here you will see layers for countries in CARICOM. A table with the description of the data layers and associated variables is located on a separate document. These layers provide an exploration of issues around the topic of food insecurity, such as demographics, health (obesity), and changing agriculture over time.

1. Explore the data sets.
	1. Look at the tables for each data set. You can click on a column heading to arrange in descending or ascending values.
	2. Change the color of the style for GDP. Display in a graduated color using natural breaks with 4 classes. You can use a different classification method such as
	3. Change the transparency of the top layer so that you can see what is below to identify possible relationships between layers.
	4. Move the order of the data layers in the table of contents to the left. Also, you can turn layers on or off the check mark next to the layer name.
	5. Use the filter function to find those countries with obesity over 25%
	6. Use the filter function to find those countries with GDP less than $10,000.
2. After you get familiar with the datasets, see if you see any patterns within one dataset, such as GDP or obesity. Then, look at patterns between datasets.
	1. As an example, examine the countries of Guyana, Suriname, and Trinidad and Tobago. How do their GDPs compare? Which has the highest? The lowest?
	2. Next, look at the obesity layer of the same 3 countries. As with GDP, which has the highest rate of obesity? Which has the lowest?
	3. Then, compare the patterns of obesity and GDP between the countries. Is a pattern emerging? If so, look at the other countries to see if it is similar or not. Do you see similar or opposite trends between obesity and GDP?
3. Now you are ready to conduct similar or new types of spatial analyses on your own. Some possibilities include creating choropleth maps of agriculture, industry and service, changes in agriculture land, etc.
4. After conducting your analyses and creating maps, compare your results with your readings (Unit 4). How do your maps support the qualitative data from these materials?
5. For your presentation, you can do screen captures of the maps you create in AGO and bring these into PowerPoint.
6. Discuss how the spatial analysis and the maps provide information on food insecurity in the Caribbean.
7. If you would like to search for additional data sets, go to the dropdown arrow by Add and select Search for Layers. In the new window that appears, type in key words to use in your search in Find and chose My Organization for In. Examine the list of possibilities that appears in the Results Found. Click on Add by the data set you would like. When you have finished selecting your new datasets, click on Done Adding Layers at the bottom.

**Caribbean Food Security Data key**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **File Name** | **Objects** | **Variable name** | **Description** | **Source** |
| CARICOM;Alias Name: Economic and Social Indicators | polygon | ISO | International short country name | http://www.diva-gis.org/gdata |
|  |  | NAME\_ENGLI | English spelling of country name | http://www.diva-gis.org/gdata |
|  |  | POP2000 | Population in 2000 | http://www.diva-gis.org/gdata |
|  |  | SQKM | Area of country in square kilometers | http://www.diva-gis.org/gdata |
|  |  | POP\_2015 | Population in 2015 | https://www.cia.gov/library/publications/resources/the-world-factbook/ |
|  |  | GDP\_2014 | Gross Domestic Product/Purchasing Power Parity in 2014 | https://www.cia.gov/library/publications/resources/the-world-factbook/ |
|  |  | OBESITY | Obesity adult prevalence rate 2014 percentage | https://www.cia.gov/library/publications/resources/the-world-factbook/ |
|  |  | CHILD\_UW | Child under the age of 5 underweight percentage 2009-2014 | https://www.cia.gov/library/publications/resources/the-world-factbook/ |
| Carib GDPAlias: Economic Sectors | polygon | ISO | International short country name | http://www.diva-gis.org/gdata |
|  |  | NAME\_ENGLI | English spelling of country name | http://www.diva-gis.org/gdata |
|  |  | POP2000 | Population in 2000 | http://www.diva-gis.org/gdata |
|  |  | SQKM | Area of country in square kilometers | http://www.diva-gis.org/gdata |
|  |  | Agriculture | Comparative contribution to GDP in CARICOM (percentage) | CIA World Factbook 2012; Beckford and Campbell 2013 |
|  |  | Industry | Comparative contribution to GDP in CARICOM (percentage) | CIA World Factbook 2012; Beckford and Campbell 2013 |
|  |  | Services | Comparative contribution to GDP in CARICOM (percentage) | CIA World Factbook 2012; Beckford and Campbell 2013 |
| Carib AGAlias Name: Change in Agricultural Land | polygon | ISO | International short country name | http://www.diva-gis.org/gdata |
|  |  | NAME\_ENGLI | English spelling of country name | http://www.diva-gis.org/gdata |
|  |  | POP2000 | Population in 2000 | http://www.diva-gis.org/gdata |
|  |  | SQKM | Area of country in square kilometers | http://www.diva-gis.org/gdata |
|  |  | AGRI\_1961 | Agricultural land in production, 1961 | Potter et. al 2004, World Bank 2010 and Beckford and Campbell 2013 |
|  |  | AGRI\_1981 | Agricultural land in production, 1981 | Potter et. al 2004, World Bank 2010 and Beckford and Campbell 2013 |
|  |  | AGRI\_2000 | Agricultural land in production, 2000 | Potter et. al 2004, World Bank 2010 and Beckford and Campbell 2013 |
|  |  | AGRI\_2009 | Agricultural land in production, 2009 | Potter et. al 2004, World Bank 2010 and Beckford and Campbell 2013 |