

Technology and Economic Geography¹

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Geography textbooks, papers, and films are commonly overloaded with technological details which have minor relevance to the basic problems of economic geography. From the point of view of general education, it may be desirable to include details on sugar refining, blast furnaces, and flour mills. But such inclusions often are at the expense of more relevant geographic data. Where shall we draw the line?

It is recommended that the test be: *does the technological data significantly explain the way the land is being used?*

This paper will utilize data from the Lesser Antilles to exemplify the proper use of technology in economic geography. Here the value of this kind of data is especially clear because changing technologies have altered the relative value of various islands for producing particular export crops.

A preliminary word on the Lesser Antilles will set the stage. Each island is small: generally smaller than a Hoosier county; Montserrat is slightly smaller than a congressional township. As there is considerable variety of relief, soil, and climate on each island, the size of the land unit adaptable to a particular industry may be a fraction of that island's area. All of these islands were sugar islands until 70 years ago, when the competition of beet sugar forced them to seek other crops. Especially during the first decade of the twentieth century, all tried alternate crops; for example, Grenada shifted to nutmeg and cocoa, St. Vincent to arrowroot and Sea Island cotton, and Montserrat to limes. Some islands, such as Barbados, Antigua, and St. Kitts, were unsuccessful in their search for alternate crops. With the aid of cultural improvements, new cane varieties, large and more efficient factories, and tariff and quota help from mother countries, these islands put their sugar industries on a competitive basis.

The Question of Scale. Some of the changes in the competitive situation involve changes in the idea of what constitutes a large scale operation. Modern technology seems to favor increasingly large scale; most of the islands cannot turn out enough to support a technically efficient unit. For example, sugar factories should produce at least 10 to 20 thousand tons.

St. Kitts is fortunate in having one large sugar factory with a capacity of 65,000 tons. This is possible because the sugar estates are located on the gentle slopes of volcanoes. Although these units are separated from each other by steep ravines, a narrow-gauge railway bridges these ravines and conveys the canes expeditiously to the factory and thence the sugar and molasses to the wharves. Thus St. Kitts has survived in the sugar business because its geographic setting permits production on an efficient scale.

In contrast is St. Lucia, until recently one of the sugar islands. Its alluvial sugar soils are divided among four valleys separated from each other by miles of rugged land. Its total production never exceeded 10,000

¹The examples used in this paper were collected during work under a contract between Indiana University and the Office of Naval Research.

tons divided among four semi-modern factories. During World War II, the southernmost sugar area was converted into a U. S. airbase. In 1958, the area supplying Dennery factory was shifted to bananas. Recently the banana interests bought the other two sugar valleys and expect to continue sugar manufacture in one of the two remaining factories, primarily to supply local markets.

The problem of scale is also exemplified by the poor shipping service which plagues the islands. Ocean-going freighters generally do not find it worth stopping for a small cargo: their minimum requirement may be from 100 to 300 tons. Consequently, freighters from Canada and the United Kingdom only stop on the south-bound trip (usually once a month) and stop on the north-bound trip only when enough produce has accumulated. Small inter-island boats handle some of the trade by trans-shipment at Barbados and Trinidad, but this adds to the price of goods on less populous islands.

Better loading equipment and larger cargo result in lower shipping costs for the more productive islands. Barbados is installing bulk-loading facilities which will load sugar at the rate of 500 tons per hour. With such equipment, the entire annual cotton output of Montserrat could be loaded in three and a half hours, and the sugar crop of Antigua could be loaded in two and a half days.

Accessibility to Market. Sugar, Sea Island cotton, arrowroot, cocoa, and spices can be shipped to the market when convenient, but the marketing of perishable products such as bananas and tomatoes requires rapid, refrigerated shipping. Such ships are not profitable unless the business is on a large-scale basis with a regular cargo.

Until recently, the British Lesser Antilles had good refrigerated service to Canada by boats operated and subsidized by the Canadian government. Tomatoes, carrots, and onions were shipped to Bermuda and Canada until steamship service was discontinued because of labor difficulties. Then the vegetable growers sought markets to the south in Trinidad and British Guiana; available shipping to these points had inadequate refrigerated space for the cargoes offered, and often the produce spoiled and was dumped into the sea.

In contrast is the recent development of the banana industry in the Windward Islands. Here the credit goes to one company, Geest Industries, which has agreed to buy all bananas offered that meet their specifications. As a result, the "Green Gold" boom has spread into Grenada, St. Vincent, St. Lucia, Dominica, and, very recently, into Montserrat.

Take St. Lucia. On Wednesday afternoon the stores close; all busses have their seats and roofs removed and become banana trucks. At collecting points throughout the island, Geest representatives are buying banana stems for 5¢ a pound, provided they are $\frac{7}{8}$ ripe, unbruised and unscratched, and weigh over 18 pounds a stem. The approved bunches are weighed, put into plastic bags, and loaded on busses. Thursday at dawn the white banana boat arrives, women head the stems up the gangplank, and by sunset the boat is off to Dominica.

How different is the banana industry at Montserrat, born August 20, 1959! Here the bananas are the Montserratan hope because their

former crop, Sea Island cotton, is no longer profitable. The Montserrat banana crop is too small to justify a visit from the banana boat. So Montserrat bananas are picked Thursday, $\frac{3}{4}$ (not $\frac{7}{8}$) ripe, and are shipped via a small Montserrat-owned, non-refrigerated steamer which will connect with the banana boat at Dominica Friday morning. Montserratans get 4¢ a pound for their bananas, not 5¢, and there are many more rejected stems than at St. Lucia.

Concluding Remarks. Other illustrations could be given to show the geographic value of technological data. Mention could have been made of the influence of agricultural machinery, new strains of plants and animals, and new techniques of fertilization—all of which have a significant bearing on land use. There is no need to include the *details* of cane cutting, sugar manufacturing, or cotton ginning, which have minor influence. Geographers have enough relevant material to fill all available space in their writing; hence all technological material should be tested and pruned before it is submitted for publication.