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Week 2 Assignment

Fruit & Vegetable Basket

SFS 5050

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There is a growing movement in Hawai‘i that seeks to address the important considerations of food security in the most geographically remote landmass on the planet (Kent, 2015). “About 85-90% of Hawaii’s food is imported which makes it particularly vulnerable to natural disasters and global event[s] that might disrupt shipping and the food supply” (Office of Planning, 2012). With a resident population of 1.4 million people (Hawaii Population, 2018) and an annual transient population of 8.8 million visitors, (Hawaii Tourism Authority, 2016), supplying enough safe and nutritious food is a challenging task. To do so in a way that promotes food security, self-sufficiency, and resilience will require a redesign of our current food system that includes increasing the amount of locally grown food. A brief look at Hawaii’s agricultural history may provide clues as to which crops should be considered in developing a robust and diversified locally produced food option.

Polynesians settled the Hawaiian Islands, one of the most geographically remote landmasses in the world, around 1,500 years ago in 600 AD (Culliney, 2006; Cuddihy & Stone, 1990) They brought with them a host of plants, such as *kalo* (taro), *‘uala* (sweet potato), and *‘ulu* (breadfruit) as well as many others to ensure their survival through the colonization period and beyond (Handy et al. 1991). By 1100 AD, populations dramatically increased, doubling every century, and around 1650 AD the Hawaiian civilization peaked, with an estimated population of several hundred thousand (Kirch, 1982). By the time of European contact in 1778, much of the land had been altered to support agricultural production and populations had begun to decline, possibly as a result of the restricted amount of land available for agriculture (Dye, 1994).

For several decades, post European contact, the Hawaiians continued their subsistence agricultural practices and primarily traded bananas (*Musa x paradisiacal*), taro (*Colocasia esculenta*), and sweet potatoes (*Ipomoea batatas*) with ship crews. As increasing numbers of Europeans began to arrive and settle, new crops were introduced and cultivated for export from the Hawaiian Islands. The one hundred years between the mid 19th and mid 20th centuries saw the agricultural crops sugar (*Saccharum officinarium*), pineapple (*Ananas comosus*), coffee (*Coffea arabica*), macadamia nuts (*Macadamei ternifolia*), and papaya (*Carica papaya*) greatly expand in plantation-scale production volumes as the ownership of vast tracts of land was transferred from indigenous Polynesians to the wealthy *haoles* (Caucasian immigrants) during the "Great Mahele" of 1848. In the 1860's, rice that was grown in the taro fields replaced the Hawaiian's staple crop and in 1862, more than 800,000 pounds of rice was exported to California (Kent, 2015). Production of sugarcane and pineapple rapidly overtook rice as the dominant crop and held that position until 2016 when the last sugarcane plantation, HC&S, closed its doors on Maui for good. With the passing of the plantation era, macadamia nuts, coffee, papayas, bananas, taro, and avocados have become the most harvested crops in the State (USDA, 2017).

The *Increased Food Security and Food Self-Sufficiency Strategy,* created by the State's Office of Planning (2012), listed three strategic objectives: "(1) Increase demand for and access to locally grown foods; (2) Increase production of locally grown foods (3) Provide policy and organizational support to meet food self-sufficiency needs" (p. ii). In considering the development of a value chain for any potential crops, the State has initiated demand, and it is up to the farmers and retailers to supply products that will meet the anticipated needs of the consumers. This is a relatively new initiative with very short to non-existent (in some cases) supply chains. Therefore, it will be my goal to do a reverse examination on how to make a historically relevant crop into a value chain that has the potential to satisfy the State's objectives. My initial analysis will focus on an

exploration of the culturally significant crops *kalo* (taro), *'uala* (sweet potato), and *'ulu* (breadfruit) through the lenses of culture, and historical agricultural success, and potential for their transformation into value added products.

**Kalo**

The kalo plant (*Colocasia esculenta*), is irrefutably the most culturally important plant to the Hawaiians, both from a spiritual and dietary perspective (Krauss, 1993). Kalo is considered by the Hawaiians as the elder brother and first ancestor of their people and "the important concept of *'ohana*, the extended family, is immediately derived from the word *'oha*, or the cormlets, of the taro that encircle the parent plant" (Nirav, 1992, p. 168). The starchy corm of the plant served the Hawaiians as an important dietary staple. Its dependability due to its drought resistant nature, ease of propagation, ability to thrive on excess moisture, and prosper under a wide variety conditions affected by altitude, soil, and humidity secured its position at the top of the Hawaiian horticultural complex (Handy et al., 1991).

All parts of the plant can be eaten, though preparations vary. However, the most prized part of the plant was the corm, which was used to make *pa'i 'ai* and *poi*. Currently, commercial production is limited to Keanae, on Maui and several areas of Kauai and "demand is greater than local supply and some taro for poi-making has to be imported to the state" (Nirav, 1992, p. 168). Possible value added products include flour and fried chips.

**'Uala**

Culturally considered a secondary crop to kalo, 'uala (*Ipomoea batatas),* or sweet potato, was better adept at growing in marginal soils and minimal rainfall and was an important subsistence crop for the early Hawaiians, as it was easily propagated by slips, matured in less time than kalo, and required less planting labor and care in cultivation (Handy et al., 1991; Krauss, 1993). Post-European contact, 'uala were an especially successful

agricultural crop, and during the Gold Rush of the 1840's, 80,000 barrels of the starchy tuber were exported to Western California (Cuddihy & Stone, 1990).

All parts of 'uala can be eaten, and it was traditionally used in a variety of ways. 'Uala would be steamed in an *imu,* (traditional Hawaiian underground oven), peeled and mashed to make an *'uala poi*, or mixed with coconut milk and served hot. *'Uala 'awa 'awa* was a fermented beer, and the vines could be consumed or used for hog feed. Possible value added products include pudding and beer.

**'Ulu**

Another important staple crop of the Hawaiian horticultural complex, considered wholly secondary to kalo and 'uala, was the 'ulu (*Artocarpus incisa*), or breadfruit (Handy et al., 1991). The original Hawaiian variety was without seeds and was difficult to propagate from root cuttings. However, an acre of 28-30 trees could "entirely support 10-14 people during the 8 months when the fruits [were] ripening" (Nirav, 1992, p. 84).

There are many ways to eat 'ulu including, raw, steamed, baked, stir-fried, and marinated, but the most prized form is *piepiele 'ulu,* cooked with coconut milk and dried in the sun. This delicious treat would stay preserved from the end of one bearing season until the beginning of the next (Krauss, 1993). There are many possibilities for value added products that include flours and the above-mentioned dessert.

**Conclusion**

While current crops, such as macadamia nuts, coffee, and papaya offer greater opportunities for value chain analysis than the traditional subsistence crops listed above, I feel that it is critical that we begin to address our State's deficit in locally produced foods. The Office of Planning (2012) argued, "Replacing just 10% of the food we currently import would amount to approximately $313 million. Assuming a 30% farm share, $94 million would be realized at the farm-gate which would generate an economy-wide

impact of an additional $188 million in sales, $47 million in earnings, $6 million in state tax revenues, and more than 2,300 jobs" (p. ii). If produced and marketed correctly, I believe that the three crops collectively, kalo, ʻuala, and ʻulu could potentially constitute the 10% while adding increased diversity and real food products that contribute to food security in the State.

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