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Feeding Itself: Sustainable Food Systems on Santa Catalina Island

Introduction

Imagine nearly seven thousand years ago, you inhabit an island ecosystem only twenty-two miles long and eight miles wide. You dwell its rocky, mountainous landscape that has heaved upward from volcanic tectonic plates unlike its seven sister islands along the California coast that broke off from the mainland (Otte & Pederson). Twenty miles from the mainland, you bask in the twenty two varieties of endemic plant and animal species and subspecies (Catalina Island Conservancy, 2001). The ocean-enveloped ecosystem is a biologically-diverse hotspot, home to over four hundred native plants on land and copious in marine resources such as abalone, varieties of mollusks, small and large fish, and marine mammals like sea lions.

Santa Catalina Island is one of the greatest ecological treasures in Southern California, America, and the world. Home to some of the most rare biological species in the globe, the island has been, and still is, a mystery to science, research, and humanity. As Charles Darwin proclaimed, he felt close to "that great fact – that mystery of mysteries – the first appearance of new beings on this Earth" when he first set foot on the Galapagos Islands (Darwin, 1845).

Santa Catalina Island is part of an innumerable group of islands in the world that play a fundamental role in our simple comprehension of ecology and evolution. In the past two centuries, island research has brought insight to such concepts as speciation

(Wallace, 1881), competition and character displacement (Lack, 1947; Brown and Wilson, 1956), and island biogeography theory (MacArthur and Wilson, 1967).

Beyond that, islands now render a more integral role to sustainable development. Island populations, communities, and ecosystems are self-maintaining entities with well-defined geographical limits that contain the fundamental processes, properties, and interactions of ecological systems compared to the more complex continental taxonomies. Certain "factors that control ecological phenomena" often can be understood against a relatively simple background in island systems (Vitousek et al., 1995). As such, islands can be the ideal microcosm to understanding not only sustainable development, but more directly, human interactions with biological diversity in contained areas. This isn't to say that all island applications should be directly used in continental systems. However, they serve as a catalyst to apprehending sustainable growth under natural constraints.

Sustainable Food Systems: An Introduction

Early References to Sustainable Food Systems and Agriculture

In the past two decades, a resurgence of sustainable and ecological agriculture methods have taken hold since the Green Revolution. The word "sustain," from the Latin sustinere (sus-, from below and tenere, to hold), to keep in existence or maintain, implies long-term support or permanence. As it pertains to agriculture, sustainable describes farming systems that are "capable of maintaining their productivity and usefulness to

society indefinitely. Such systems... must be resource-conserving, socially supportive, commercially competitive, and environmentally sound." (Ikerd, 1990).

Varying Perspectives

Sustainable agriculture has been defined in various ways. On definition is on the basis that sustainable agriculture includes "relatively small, profitable farms that use fewer off-farm inputs, integrate animal and plant production where appropriate, maintain a higher biotic diversity, emphasize technologies that are appropriate to the scale of production, and make the transition to renewable forms of energy". They are less dependent on chemical inputs and economic efficiencies seen in industrial agriculture. In addition, it would involve closer connections between producer and consumer, in which food is directly marketed to locavores, or individuals who eat locally (Horrigan et al., 2002).

Sustainable agriculture integrates three main goals - environmental health, economic profitability, and social and economic equity. Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs (University of California Sustainable Agriculture Research and Education Program. What is Sustainable Agriculture?)

Sustainable agriculture is a model of social and economic organization based on an equitable and participatory vision of development that recognizes the environment and natural resources as the foundation of economic activity. Agriculture is sustainable when it is ecologically sound, economically viable, socially just, culturally appropriate, and based on a holistic scientific approach (Madden et al. 1997).

The very nature of ecological methods of agriculture does not refer to a prescribed set of practices. Instead it challenges producers to think about the long-term implications and dynamics of agricultural systems. It also invites consumers to get more involved in agriculture by learning more about and becoming active participants in their food systems. A key goal is to understand agriculture from an ecological perspective - in terms of nutrient and energy dynamics, and interactions among plants, animals, insects, and other organisms in agroecosystems - then balance it with profit, community and consumer needs (SARE, 1997).

Sustainable Food Systems and the Physical Environment

Rosenzweig and Hillel (1995) have described a variety of impacts of climate change on food production and supply in Potential Impacts of Climate Change on Agriculture and Food Supply. These include a shift in climate and agricultural zones towards the poles, changes in production patterns due to higher temperatures, a boost in agricultural productivity due to increased carbon dioxide in the atmosphere, changing precipitation patterns, and Increased vulnerability of the landless and the poor (Rosenzweig and Hillel, 1995).

An early 1990's global assessment from 18 different countries in over 100 sites suggested that "a doubling of the atmosphere carbon dioxide concentration will lead to only a small decrease in the global crop production...however, developing countries in lower latitudes will bear the brunt of these problems" (Rosenzweig and Parry, 1994). In addition, it has been found in the work, "Climate Change and Extreme Weather Events; Implications for Food Production, Plant Diseases, and Pests", that "global food supply

may be affected by an increase in extreme weather events and climate variability associated with global warming (Rosenzweig et al., 2001).

A sustainable food system is the holistic process from food production to consumer at which can be sustained for future generations. The varied definitions to sustainable agriculture are evidence that the concept is highly interdisciplinary and multifaceted. On one hand, there is a panoply of agricultural "inputs" required to the ecologically-sound production of food: seed, irrigation, sun, crop rotation, integrated pest management, etc. On the other hand, there are other more indirect and complex inputs too often overlooked in the sustainability of food and the elements affected by food. These other sets of inputs are more societal: economic markets, political will towards sustainable agribusiness, property rights, and social statuses. Without effective and critical consideration of these two types of inputs, the most effectively sustainable food system is simply not achievable.

Historical and Current Gastronomy: Discussion of Santa Catalina Island's Food Sustainability

Historical References to Catalina Food Systems

In the earliest known days, food resources on Santa Catalina Island were highly exploited, particularly from the sea. Great levels of abalone, mollusks, small and large fish, and sea mammals were overeaten by the native Pimugans. Once the island was colonized first by Spaniards in the mid 1500's and otter hunters in the 1700's and given

to California by the Mexico in 1846 through the Treaty of Guadalupe Hidalgo, the ability for the island to sustain itself, especially its food systems, began to diminish (Moore).

Through mid-twentieth century, the island was an abode to an influx of cattle, sheep, and bison ranchers, all of which are non-native and brought significant food system changes to the island's ecosystems. For example, the three imported bison that first stepped onto Catalina Island in 1942 were never exported. In a matter of four decades, the bison population exploded, reaching nearly seven hundred by the early 1990's. Bison love foxes. The increase in bison correlated to a dramatic decrease in the endemic island fox, now an officially endangered species (Gutilla, 2008).

Food beginning in the early twentieth century soon became an imported commodity. As Jeannine Pederson of the Catalina Island Museum accounts during World War II:

> "The grocery store (Heinz Grocery) [during World War II] was the central receipt area of ration points required for butter, coffee, dairy products, sugar and meat products. Each item was assigned a certain number of ration points in addition to the actual price" (Pederson, 2007).

Ranchers began to settle and the Catalina Conservancy soon became an instrumental part of the island. Santa Catalina soon grew to what it is today: a conservation and vacation metropolis, retrieving its food either through global imports or recreational fishing.

Food Importation

Since the mid-1900's, humans and food dining establishments on the island have been solely dependent on globally imported food. Originally, smaller, independent stores such as "Heinz Grocery" mentioned above and "Fred and Sally" have supplied residents

and tourists with their daily food necessities. For the past decade, one Vons grocery store and one Vons Express have the main food grocers to the nearly 4,000 full-time residents and 1,000,000 yearly visitors (Krasnowski, 2006). However, grocery stores are not the only suppliers of food and drink on the island. To date, there are thirty-two restaurants, seventeen take out establishments, a dozen clubs and bars, four caterers, and three bakeries (Catalina Island Information Guide).

The importation of all of the island's food has dire ecological consequences. "Food miles", coined by Professor Tim Lang from City University in London, Engliand, denotes that there are "hidden ecological, social and economic consequences of food production to consumers in a simple way, one which had objective reality but also connotations" (Lang, 2006). Produce in the U.S. travels, on average, 1300 - 2000 miles from farm to consumer (NSAIS, 2008). The longer food travels from farm to plate, the larger these consequences may be. Ecological niches may be distributed on the island, the economic prices fixated through one food provider may not situate well with a socio-economically stratified population, and there is great nutritional loss by transporting food thousands of miles away.

Fishing on the Island

Although maritime fishing has occurred on the island for thousands of years, there has been a rapid decline of fish stocks through commercial and recreational fishing only in the past century "…due to lack of laws, lack of protection and over-fishing..." Towards the mid-1950's, sport fishing began declining because of rapid population growth in Southern California and ocean climate change from the Pacific Decadal

Oscillation, "…causing [even] sport fishermen great concern". In response, the island began making marine reserves, limiting and restricting the harvest of some marine species. However, to date, the rules, regulations, and governance of island fishing is overly complex, complicated to understand, and overlapping between different agencies (Parnell et al., 2006).

Rusack Vineyards, of All Things

Out of all things grown on the island, it is seventeen acres of the finest grapes that has been established since March 2007. Known as Rusack's Vineyards, the plot, according to owners Geoff and Allison Rusack, is a small demonstration of "how [a] successful, organically correct, sustainable agricultural operation on private land can be pursued, when surrounded by a land preserve" (Catalina Islander, 2007).

However, one must define what an "organically correct, sustainable agricultural operation" is. While the grape seeds and vineyard operations may be organic, how is the plot offering sustainability to the island? Humans living on and visiting the island cant live off grapes and fermented drinks alone. As such, what else does the vineyard provide? Others may argue that the vineyard offers economic vitality to the owners and the people it serves. But is that the sole incentive – economics? Sustainability requires the best interests in economics, equity, and ecology. Unfortunately, the vineyard does not provide all three.

A Fresh "Old" Design

Keeping in mind Santa Catalina Island's ecological structure requires fresh applications to the sustainability of its food systems. However, because it is a sensitive and self-contained bio-diverse hotspot, the site and its inhabitants must consider the renew-ability of its native and endemic food resources. In order to truly sustain the island's resources, food, and future human generations, one must consider a fresh "old" design – utilizing "old" traditions of only eating food available on the island, but now applying new concepts of food sustainability. This doesn't mean trekking back to "hunger-gatherer" times. Nor does it mean humans have the write to chop down everything on-site and grow anything and everything in an industrial manner. To achieve a sustainable foods design on Catalina Island requires looking at three core elements: food production, fisheries management, and food reproduction.

Food Production

The first design element is production, in which the concept of community-supported endemism (CSE) is proposed. Community-supported agriculture (CSA) is a relatively new idea, first starting in Japan and Europe in the 1960's, and has been booming in the United States in just the past decade. CSA consists of "a community of individuals who pledge [mutual and financial] support to a farm operation so that the farmland becomes…the community's farm" (DeMuth, 1993). Endemism, referring to the "nativity or restriction [of a plant or animal] in a certain area", was coined by biologist Norman Myers only a decade ago. The more isolated and naturally-occurring an

environment is, the greater the probability of finding endemic and native biological species (Myers et al., 1998). Islands are a prime example of endemism.

Thus, in order for an island to be truly sustainable and self-sufficient, a combination of CSA and endemism would be a good middle-ground between a sustainable mechanism for people to eat and the conservation of seed and animal. CSE would implement individual community farms harvesting endemic plants and preserving native animals. While there would be a few managing the operation, there would be incentive for cohesive community development to grow self-sufficient means to food.

Fisheries Management

Secondly, for sustainable fisheries management, the idea of marine protected areas (MPA's), or the "use of protected areas where fishing is limited or prohibited", is proposed. The implementation of MPA's consist of two parts. First, it conserves a "set of habitats that contain high priority target species that are potentially benefited by local protected areas via spillover". Species in this conservation method include lobsters, sheephead, kelp bass and many species of rockfish whose habitats off Catalina include kelp forests, rocky reefs, rock walls, and sand/rock edge habitats. Secondly, MPA's implement preservation of more migratory marine species on the island such as yellowtail, white sea bass, barracuda, bonito and many species of tuna, billfish, mackerel, and sharks. This requires greater governance in the maritime community, potentially with Los Angeles County or the State of California. For both parts, community members may choose various mechanisms to implement such measures such as limiting amounts

of fish taken, citing fishermen, or imposing intellectual property rights to these species. (Parnell et al., 2006).

Food Reproduction

Finally, the essence to food sustainability is the ability to reproduce nutritious, fair, and clean food for future generations. Creating a sustainable food system on the island, then, does not stop with CSE food production and MRA fisheries management. The underlying proposed concept in the reproduction of food is the "cradle-to-cradle" method, which makes the case that an "industrial system that takes, makes and wastes can become a creator of goods and services that generate ecological, social and economic value" (McDonough and Braungart, 2002). There is zero waste, and all materials used during production and consumption are then organically reintroduced for future production and consumption.

Implementing such a design element onto the island requires three components. First, all excess food scraps from the individual CSE farms and natural dwelling establishments will be recycled back in farms as compost to fertilize future food production. A second component involves the careful saving and usage of native seeds. CSE farms could be centralized seed banks and nurseries for such a mechanism. Finally, human excretions, through proper waste management techniques integrated with the community's waste water treatment, will be recycled back to the CSE farms as biosolids. Biosolids are "nutrient-rich organic materials resulting from the treatment of sewage sludge" that may be applied as fertilizer to stimulate plant growth and maintain productive soils (USEPA, 2008).

Conclusion

The evolution and continual survival of plants and animals on Santa Catalina Island is purported through the importance of the sun, water, and food. These three basic elements have and are at the core of humanity's need to live every day. The island basks in sun ninety percent of the year and surrounds itself with water every moment of its existence.

However, the concept of food plays a more dynamic role to the island, simply because it is a more self-contained entity than its continental counterparts. The sensitivity of Santa Catalina Island to invasive plants and animals can greatly disrupt the biological balance of food webs and chains already established. This self-containment and sensitivity brings an entirely new perspective to island sustainability and self-sufficient food systems, for it has never been studied or researched until now.

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