IGIA BREIFING PAPER: UNIVERSITY OF HAWAII PACIFIC BUSINESS CENTER PROGRAM

PACIFIC GLUTEN FREE BREADFRUIT FLOUR REGIONAL INDUSTRY DEVELOPMENT INITIATIVE

This briefing report is submitted by Dr. Tusi Avegalio, Director of the Pacific Business Center Program (PBCP) and Executive Director of the Honolulu Minority Business Enterprise Center (HMBEC) both located at the Shidler College of Business Administration, University of Hawaii- Manoa campus. Both programs serve under UH Vice President John Morton, who is the Principle Investigator. PBCP is supported by the US Department of Commerce Economic Development Administration (EDA), Western Regional Office based in Seattle, Washington. PBCP is the largest EDA University Center program in the nation, serving Hawaii and the US Affiliated Island Governments of the Pacific. The PBCP and HMBEC are winners of six national, three US regional and one State award in the past ten years for their project management, technical assistance and leadership in the Pacific region. The following report briefly encapsulates two years of developing the Pacific Regional Breadfruit Initiative and the feasibility of making it a reality within three years.

Introduction

Commercialization of Ulu at an industrial scale for export has not occurred anywhere in the world, yet. With the discovery that Ulu is gluten free, the opportunity to develop and refine existing practices will provide major economic development, food security and sustainability benefits wherever it can be supported. Breadfruit is gluten-free and has been dehydrated and processed successfully into a flour in Samoa, Philippines and Jamaica. However, efforts to expand the processing to a sufficiently industrialized scale for the introduction of breadfruit flour in the U.S. market as a GF food product have been unsuccessful. Actually, it has not been tried. Another compelling reason is that growing time from planting to harvest conventionally took seven plus years for the tree to mature.

Breadfruit Propagation for Mass Cultivation

Breadfruit has never been commercialized on a significant scale because the breadfruit tree, unlike the coconut tree, has proven difficult to mass-produce. A technique to mass-produce breadfruit plantlets from breadfruit plant tissue from the Ma'afala, a variety of breadfruit that is indigenous to Samoa and is common throughout the Pacific, was developed by research led by Dr. Susan Murch. Thousands of breadfruit plantlets can be produced in the lab and shipped to farmers anywhere in the world where breadfruit can be grown. A compelling aspect of the propagated ulu plantlets that significantly enhances commercialization is the plant to harvest time cycle is cut in half. Propagated trees fruit within two and a half to three years vs. the traditionally cultivated trees that take seven or more. Dr. Susan Murch's research is ongoing and in partnership with Dr. Diane Ragone, Director of the Breadfruit Institute, National Tropical Botanical Garden on Kauai. Dr. Murch's work is virtually unknown to the distributors of gluten free products.

Hawaii: Main Pacific Hub for Breadfruit Flour Manufacturing and Export

Several American Affiliated Pacific Islands are strategically located to serve as sub regional hubs receiving dried breadfruit shipped from Micronesia, Polynesian and Melanesia. Hawaii can become the main Pacific regional manufacturing and export hub with key US Territories as transshipment spokes for ulu grown and dried from Micronesia, Polynesia and Melanesia. Likewise, production and transshipment infrastructure constructed in the Marianas will be the link to Japan and Asian markets. CH Robinson, a leading national and international food distributor estimates that 150 to 200,000 tons of regular (non GF) flour is moved every week. To meet market demand for gluten free flour, a reliable production flow of a minimum of 100,000 tons per week will be essential. Engaging collaboratively with Oceania as a production source assures production supply no single pacific entity can meet on its own.

Hawaii, and other Pacific Islands have land that could be turned into breadfruit food forestry orchards that can support a gluten free breadfruit flour industry. These breadfruit trees could also provide food security in the case of natural disaster. Pacific Islands are aware of the work of Dr. Susan Murch in Canada and the rapidly growing demand for gluten-free products in the U.S., even so far as to include their endorsement of the proposed development at the recent Micronesia Chief Executives Summit on Saipan (December 4-6, 2013).

The two Samoas' Summit which was held on December 5, 2012, brought together all of the pieces that are essential to developing a breadfruit flour industry – market demand; distribution networks; manufacturing expertise; export infrastructure; agricultural technology; agricultural land base – with the realization that a collaborative regional initiative can harness the collective potential and begin to create the partnerships essential for establishing a regional Pacific breadfruit flour industry. The ramifications for employment opportunities for local residents, familiar with the tree and its cultivation are significant. As tuna, a pelagic marine species is impacted by the growing radioactive run off plume that is alarming in its size and drifting towards Hawaii and the west coast from Fukushima, and fish stocks being depleted without meaningful conservation, agriculturally based economic development utilizing the synthesis of modern science and traditional wisdom centered around the breadfruit, is not only a more viable and healthy alternate to the tuna industry, it is safer and more sustainable.

University of Hawaii Pacific Business Center Breadfruit R/D Team of Experts

For this project the PBCP assembled an all-star team of experts: Dr. Diane Ragone, Director of the Breadfruit Institute on Kauai; Dr. Susan Murch from the University of British Columbia; Craig Elevitch of Agroforestry Net and M. Kalani Souza from Olohana Foundation in Hawaii and representing the National Disaster Preparedness Training Center (NDPTC) on matters of food security; Dr. Alvin Huang at the College of Tropical Agriculture at the University of Hawaii; Dr. Fadi Aramouni and Dr. Jeff Gwirtz at the Food Sciences and International Grains Programs at Kansas State University; and Sean Nelsen, Director of Business Management, Food Source/C.H. Robinson, one of the world's largest third party logistics (3PL) providers, with 2012 gross revenues of $11.2 billion. FoodSource is based in Monterey California.

US Market Demand

In the U.S. the demand for gluten-free (GF) food and beverage products has increased astronomically since 2008, going from $1.54 billion to an estimated $3.31 billion in 2012 by Gluten Free Foods and Beverages Market: Trends and Developments in the U.S. 4thed. There is also a more recent (2014) estimate of $10.5 Billion in 2013 to projections for the category of $15 billion in annual sales in 2016 according to Mintel, a market research company. The largest part of this market is baked goods and snacks that substitute GF flour for wheat flour. A gluten free beer has also hit the market and gaining in popularity. Local breweries may want to investigate that potential.

The major distributors of GF products in the U.S. know very little about breadfruit and its' potential as a source of GF flour. Sean Nelsen, representing FoodSource C.H. Robinson, one of the largest logistics and distribution companies for food products in the U.S., featured the GF market and distribution strategies and potential growth demand for the GF products in American Samoa (12/2012), where the first of two regional breadfruit summits were held initiated by PBCP in collaboration with the host governments. Having SubWay and Trader Joe's as two of their clients speaks to the Company's expansive reach and support of the health food movement in the U.S. Breadfruit flour developments in the Pacific have yet to be introduced into the US

Market and strategic marketing plans are being developed concurrently with continued Ulu food research and processing to flour.

Other Commercial Benefits: The sap from the Ulu is very high in organic latex, which the commodities market lists as $1,000.00 per gallon. The organic chemical content of the Ulu flower is nearly 60% more effective than the leading synthetic based insecticide. Studies by scientists at the USDA Agricultural Research Service (ARS) and Canada's University of British Columbia identified three compounds of the plant that repel mosquitoes more effectively than the leading commercial insecticide. The Deployed War-Fighter Protection Research Program, which develops and improves methods to protect our U.S. military personnel against insects that transmit diseases such as malaria, yellow fever and dengue fever are now aware of the breadfruit flower. The anticipated demand for a commercialized product is compelling. The health benefits are equally astonishing. Breadfruit is not only gluten free; its vitamin A is one of the highest among plants or fruits. This is significant in that Vitamin A deficiency (VAD) is one of the most common and devastating micro-nutrient deficiencies in the world and is especially common in tropical developing nations. With obesity epidemic, particularly in the US Affiliated Pacific States, breadfruit consumption replacing imported staples and sugar-laden foods, i.e., rice, confections, bread, etc. can curve the upward spiral of diabetes, heart disease and hypertension endemic in the region. Breadfruit is high in complex carbohydrates, low in fat, and cholesterol and gluten free. It has a moderate glycemic index (blood sugar shock) compared to white potato, white rice, white bread, and taro.

Tapping the Scientific, Research and Technical Expertise of the US University EDA (Economic Development Administration) network

The EDA National University Center program links the top university technical and scientific expertise in the nation providing state of the art technology, research, engineering and scientific know-how to support the growth and strength of American Economic development and initiatives that include the American Affiliated Island Governments of the Pacific. Two examples are the linkage to Kansas State University, that specializes in flour processes and technology for the US Department of Agriculture and major food production manufacturers in the US and the need to design requisite food engineering and technologies for breadfruit and other agricultural products of the Pacific.

There will be a need to design a production facility that is appropriately scaled (and scalable) for the volume of production required that takes advantage of the most economical, efficient technology and production equipment that is currently available and is appropriate for Hawaii. This production model would include applications of recent advances in solar technology that will allow tons of breadfruit to be dried continuously as well as economically at the farm level without the use of conventional sources of electricity. PBCP will work with Professor Jeff Gwirtz of the Advanced Manufacturing Institute (AMI) and the International Grains Program (IGP) at Kansas State University who is a national and internationally known expert in the field.

Partnership for Mutual Benefit: Building on Kinship, Cultural Ties and Existing Strengths

The agricultural land available for increasing the production of breadfruit is insufficient for supporting a new breadfruit industry at the national and international scale. A regional industry strategy will more than support the demand with key sub regional hubs linked to Hawaii. Consequently, partnering with its' Pacific Island neighbor, brings to the table substantial agricultural land capacity in support of the breadfruit initiative.

Sharing the Benefits with Individual Families, Villages, Pacific Island Neighbors and Caribbean Islands.

As a compelling form of Community Based Economic Development, the old copra drying and collection model may be an excellent method for the average family and village to earn a supplemental income from collecting

and drying of Ulu for district collectors to weigh and purchase on the spot. Families can earn as much as they want depending on market value and cost per lb. of dried breadfruit. Considering the spiraling demand for gluten free food products, this income source can be significant. The significance of traditional food forest agro forestry cross cropping and multi tiered planting vs. mono cropping has been validated by agro forestry experts and research. It maximizes land use and environmental balance while minimizing disturbance to traditional island farming and culturally based life. Community based economic development also assures benefits are shared broadly among the village and community residents along coastal and inland areas.

US Territories in the Caribbean. As much of the research, experimentation and applications of breadfruit cultivation and propagation work has been done on islands in the Pacific where the breadfruit originated, the work and results can be transferred easily to the US Territories in the Caribbean and elsewhere where the breadfruit can grow and thieve. The template from the Pacific can benefit human society globally to feed the hungry, improve health, restore environmental stability, generate economic benefit and promote peace. It is more then a fruit; it is a gift of life.

Much of the research testing and design work will have been done by a process no single community entity can afford, yet the benefits from linking to a regional breadfruit development industry would jump start many island communities that can support the developed model. The model addresses transferability and scalability of the manufacturing and processing model for easy community access and use. The broader island community benefit will encourage communities to form clusters to share a community-processing model.

Like spokes on a wheel, this model is linked to the central commercialization processing and manufacturing center for each island for export and shipping that can be consolidated in American Samoa in the south pacific, Phonphei (FSM) in the Central Pacific and the Marianas in the far east Pacific, all linked to the shipping and distribution hub in Hawaii for manufacturing and export to multiple destinations on the west coast. This is just a concept model discussion, but one that is viable given the looming demand for gluten free foods in the US market. As each jurisdiction develops in this systems approach, expertise will facilitate local capacity to move it towards greater self-sufficiency to engage markets at its discretion. For now, all regions and governments need to work together collaboratively to move the regional breadfruit initiative forward. We can sail with the wind or turn into the wind and reach for shores yet untouched.

Feasibility Study/Business Plan

To attract private investment and to demonstrate that breadfruit production is both profitable and is supported by market demand, there needs to be a document that brings together all of the supply, production costs and market demand projections in a business plan with a full set of financials that an investor can analyze and verify.

The PBCP has done numerous successful business plans for products produced and sold from Hawaii and Pacific island states. In 2005-2006, PBCP managed the successful start-up of a candlenut oil factory in East Timor. The project was funded by USAID and was recognized by the University Economic Development Association as a Project of the Year. Further analysis and research is needed to move the initiative forward as current work has focused on aligning the research and commercialization aspects together. Its not there yet, but is feasible to launch with support within three years.

Premature Business Planning Precautions: Breadfruit can be used in so many different ways (gluten free flour for breads, crackers, chips, noodles; as a supplement for high protein drinks; as a source of latex; as a source of insect repellant, etc.). Project partner C.H. Robinson, a $10 billion global food distributor based in California, whose client list includes – SubWay, Carl's Jr., Trader Joe's and Walmart – has encouraged the

project team to identify the most marketable breadfruit products for them to show to their clients (ex: Subway is looking for a gluten free bun for a gluten free sandwich).

Prematurely locking breadfruit into the wrong product form could add years to it successfully entering the market. Coconuts, for instance, were not commercial until they were turned into oil (via copra) and made into high-end premium soap for the European market in the second half of the 19th century. Kukui nuts were not commercially viable as an export product until they were turned into a skin moisturizer that is used throughout the cosmetics industry.

Mahalo:
PBCP has initiated the breadfruit initiative for over two years, often with limited or shared resources to achieve the current level of development. PBCP looks forward to collaborating with Territorial, State, Higher Education and Community organizations interested in the development of Ulu in the Pacific. It is conceivable that a local breadfruit industry in any or all of the territories can be fully operational within three years given the resources to operationalize and support the initiative in the realization of that goal. Mahalo Dr. Tusi

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