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Guam: Small Island—Big Potential

Welcome to Guam, home of the Cruz family. The Cruz family consists of five members, Rosa and Leon, along their three children Tony, Rosita, and Nick. The Cruz family, like most of the population, is of Chamorro ancestry which makes up one third of the population even today. The Chamorro people were the first inhabitants of Guam. The Cruz family lives in a modest concrete home with a concrete roof and a bath. Rosa works for a tourist resort where she does housekeeping to earn money for her family; living just above the poverty line. Leon is like most other farmers in the village of Inarajan, in the farming areas of southern Guam. He grows fruits and vegetables, as well as raising chickens on the one acre of land the family owns. Once the produce from the gardens is ready to be picked, Leon sets up his roadside food stand where he will sell the goods to local families as well as the many passing tourists in the area.

Guam was colonized by Spain during the 17th century and became an important mission of the Catholic Church. In the late 1800s Guam became part of the United States after the Spanish American War. Japan took over the country in 1941, just before World War II. Then in 1944 the United States gained control over Guam. In 1950 Guam became an unincorporated territory of the United States under the Organic Act, and is now home to several U.S. military bases that infuse more than 14,000 residents into the tiny country. Guam's economy depends upon tourism and spending by the U.S. military. In fact, the government employs one-fourth of the workforce at high wages. Unemployment is high, however, and many inhabitants leave Guam for work elsewhere and so records show a slow 1.5% annual population growth.

This small island, in the middle of the Pacific Ocean, just east of the Philippines, is the largest of the Marianas Islands with a 2008 population of nearly 176,000 people. It only covers 538 square kilometers or 212 square miles, three times the size of Washington, D.C. It is long and narrow measuring only 30 miles long and 4 to 10 miles wide. The northeast trade winds on the island allow for generally warm and humid temperatures averaging 87 °F. Guam has two seasons-a dry season and a rainy season both lasting about six months; with the dry season starting in January and ending around June, and its rainy season from July to December. During the rainy season the rivers in Guam wind through and waterfall in the terrains of volcanic hills and limestone cliffs. Although Guam is small, it is a major tourist attraction year around due to its tropical marine climate and azure blue waters. It is the home to many luxurious resorts catering to Asian tourist from Japan and China.

Because of its political ties to the U.S., the population is relatively well educated using the U.S. system model with K-12. Children must attend until age 16. As a result, the country boasts a 99% literacy rate. Guam Community College offers trade and technical programs and 2-year associate degrees while the University of Guam offers a variety of degree programs to those who can afford it.

The majority of Guam's population is located in the northern part of the island that is on limestone plateaus and is also near Guam's major Air Force base. However, the southern part of the island is where most of Guam's agriculture can be found. In the valleys, the soil becomes deeper and can hold the roots of the crops. Guam's major crop production is vegetables and fruits such as cabbages, eggplants, cucumbers, long beans, tomatoes, hot peppers, avocados, yams, squash, maize, breadfruit, coconuts, bananas, watermelon, cantaloupe, mangoes, pineapples, taro, papayas, lime, and pumpkins. The livestock in Guam consists of some cattle, hogs, and lots of chicken. The market value of agriculture production is more than $5 million with 80% of that in fresh produce including fruits and vegetables. However, more than 90% of Guam's food supply is imported from the United States, Australia, and

Japan. Locally grown food cannot support the population. Although these imports provide a reliable and consistent product it is an expensive one considering shipping costs.

Traditionally, Guam's agricultural production has been limited to small-scale and subsistence farming. There is very low demand for products raised partly of because of weak efforts to market. Although Guam's weather is ideal for a variety of crops, unfortunately, exporting raw products is almost impossible because of tropical insects and disease and the inspection problems that may cause. As a result, most fruit and vegetable products would need to be sold locally as fresh produce or value-added with light processing and packaged first. Small farmers such as Leon Cruz could benefit greatly from the production and sale of high quality locally grown produce especially if he could work with other farmers like himself to market larger quantities cooperatively.

Even as food prices have increased, the demand for high quality of food continues to grow. This means that the amount of land devoted to food and its productivity needs to increase. However, It needs to increase sustainably without damaging valuable land, polluting rivers and aquifers, and still providing higher paying jobs for local citizens. The average farm size of one to two acres has increased drastically in the last ten years. As has been the trend in the U.S., the number of small farms has decreased 50% as industrialized farming has increased due to large corporate farms. With this has come increased use of intensive agricultural practices such as pesticide use, commercial fertilizer consumption, and irrigation. In northern Guam, there has been deforestation and land clearing in places where the soil is very thin and often disturbed by storms.

With what has been seen by some as a more progressive industrialized approach to agriculture in Guam has come some problems. Some of these include water quality and quantity. There is competition between drinking water and water used for agricultural purposes. Most irrigation practices used by intensive fruit and vegetable production use drinking water coming from the public water mains connected a single aquifer. Unfortunately, many small local farmers do not have the knowledge and proper equipment to use sustainable irrigation practices. There is also is growing public concern about groundwater contamination from these intensive practices.

Another issue is the maintenance of soil and soil erosion. Intensive agricultural practices often cause the tropical soils common to underdeveloped agricultural areas to lose their fertility quickly requiring the use of more and more commercial fertilizer. Soil erosion and chemical leaching is a threat to the coral reed surrounding the island. The third issue is the toxic pesticides used on crops. Both the farmers and the public want better alternatives to the use of pesticides.

Organic waste management is another issue in Guam due to the fact that the island environment is isolated which limits the choices of waste disposal and creates problems surrounding the way that they dispose of their waste. As the population increases, tourism expands, and current commercialism flourishes, waste disposal is a valid concern.

Bio-diversity is another major issue. With the introduction of exotic species, the extinction of indigenous species and habitat loss are current major issues on Guam. The public policies of Guam don't seem to address environmental protection. There seems to be a general lack of knowledge dealing with tropical environmental issues within the United States regulatory framework. The technology and educational materials that have been developed and used in mainland United States are not adequate.

Recently a conference was held in Agana, the capital of Guam, called Sustaining Tropical Pacific Island Agriculture: Counting Our Success, Charting Our Future. The conference moderator was a familiar name to Iowa, Jerry DeWitt, the director the Leopold Center for Sustainable Agriculture at Iowa State. The group was made up of agricultural leaders and other government leaders from other Pacific island

areas with similar issues and concerns as Guam. Participants came up with the following conclusions for Guam's agricultural future which address many of the problems outlined:

1) Guam needs to do a better job of local agricultural marketing to create stronger farmers' markets, get active support from the government, and promote more diversity in what is grown in Guam. This includes more protein sources such as livestock, more value in processed goods, and the sale of locally grown products to local residents. Nearly 10% of Guam's population is U.S. military personnel. Most of the food for them is imported.

2) Farmers need to address problems of insect species, disease pathogens, and non-native invasive organisms that are damaging agricultural production. Aggressive research at the local and university level is needed to tackle these problems that seem to be blocking progress towards sustainable production.

3) Another problem that needs to be addressed is the small number of young people entering farming because they view it as hard, dirty work.

One goal of the agricultural industry is self-sufficiency that will require education starting with youth. Introducing them to programs such as agricultural education in the schools and encouraging them to integrate animal and plant production into profitable businesses. Another important part of this is good marketing including farm cooperatives, community supported agriculture, and government support programs. All of these could increase agricultural output to satisfy demands locally instead of importing.

The extension program has been a successful model for the United States and can be in Guam. These programs are available because of its political ties to the U.S. Programs such as 4-H have already been started in rural areas to provide youth with learning experiences and relationships that will meet the needs of Guam youth. Businesses and education need to become active partners to be successful. The main goal of the extension service is to educate the youth and its adult volunteers on how to best manage its local resources and participate in all aspects of their local area. By doing this youth will be able to equally be involved in the improvement and development of other educational programs for the betterment of the people of Guam. Other programs that the extension program can provide besides agriculture are those in nutrition, wellness, food security (canning, preserving), food safety, and family finance. These programs are there to help educate Guam's families through hands-on educational workshops teaching food and nutrition safety issues such as meal preparation and handling, and also the processing and storage of food. With more education on food and nutrition and also agriculture more families are likely to grow and consume their own produce, improving their quality of life, a trend that is taking place here in the United States.

Another quality program already in place in the U.S. that could be a tool to change the future of agriculture in Guam is the FFA organization (formerly called the Future Farmers of America). It is operated through the middle schools and high schools and emphasizes leadership, personal growth, and career success. Classes in the high school could include animal production, agronomy, horticulture, food science, business management, forestry, and natural resource management. Members participate in hands-on instruction based on sound science and transferred in fun and innovative ways. Along the way, members learn organizational and leadership skills that could develop them into leaders and innovators in the industry's future.

If Guam were to adopt and follow through with these programs to stabilize their agricultural production, families like the Cruz family will be better off both financially and health-wise. The more the people of Guam are educated about agriculture production, food safety, and environmental issues, the better off the country will be in the years to come. With extension services, Leon will have the knowledge to produce bigger yields from his crops and will not only have enough food to feed his family, but also enough to sell for a profit at his road side food stand and to vendors servicing the tourist and military industries. By networking with other participating farmers, the farmers can support each other and form

beneficial alliances in production and marketing. Goals will need to be set on reducing the amount of food that is imported which should result in lower food prices.

The Cruz children will also benefit from youth programs like the 4-H and FFA. These organizations will help them to become more knowledgeable leaders in Guam's agricultural economy and production. Financial resources dedicated to free extension service programs and research for better crop management practices including irrigation, responsible pesticide use, organic practices, and marketing will be resources well spent. Research and education for not only Guam's farmers, but especially its youth, will provide the country with the sustainable ability to produce larger yields so that their dependence on imports will be less, and the issues concerning water and soil will no longer be an issue between farmers and the public.

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