

Kianna Hackett
Kingsley-Pierson CSD
Kingsley, Iowa
Nauru, Sustainable Agriculture

Nauru: Proactive Recovery to Create Sustainable Agriculture and Improved Dietary Needs

Humans have had a history of destroying much of the Earth's resources by stripping away trees, plants, and topsoil, leaving behind a barren unusable landscape. Nauru is one such location that has a long history of negative human impact on the entire ecological system of the country. There is still time for its inhabitants to restore a balance which will allow them to utilize both renewable energy and resources to create a sustainable future for all aspects of the ecological system. By proactively managing the mined area and developing sustainable agriculture, the people of Nauru can establish an environment that meets their societal need for healthy food in a way that safeguards the land for future generations.

Nauru is a very small country (8.1 square miles), (Geography of Nauru) in the Pacific Ocean which is completely surrounded by a coral reef, eliminating the formation of natural harbors. The geography of Nauru is very interesting because the island was formed by a submarine volcano. The volcano formed a seamount which in turned made conditions for a coral atoll to develop. The majority of the island is dominated by a large raised phosphate plateau. Migratory birds used Nauru as a stopover point on their journeys which created an enormous phosphate deposit as their droppings accumulated over many centuries (Foster). Surrounding the plateau is a very fertile strip which leads down to sandy beaches. The climate of Nauru is considered to be tropical with daytime temperatures in the low 80s. The rainy season occurs from November to February with an average rainfall of 80 inches annually. Rainfall is sporadic which limits farming to the coastal belt.

The government of Nauru is a republic. It has a parliamentary democracy that elects a president from its members. The position of president is the highest office in their government with his excellency Baron Divavesi Waqa being the current president. Head of State, Chairman of the Cabinet, and Minister responsible for the Public Service, Police and Emergency Services, Home Affairs, and Climate Change are all positions led by the president (Nauru Government).

The original inhabitants of Nauru were from Micronesia and Polynesia. They stayed isolated from any form of western contact until it was annexed and declared a colony of Germany in the late 19th century (Kaushik). Currently, 11,280 people make up Nauru (Nauru Population). Most of its population lives in an urban setting, in traditional houses made of wood. They have supportive beams that are covered with thatched roofs made of leaves. As wealth from the phosphate mining became more common; the materials used for housing changed and they began to build concrete brick buildings, which now make up many houses on the island today (Architecture of Nauru). Marriage in Nauru must be between two people from different clan groups who have gained approval from their district counselors. Marriage by law is uncommon. If a marriage doesn't work out, separation is the popular choice, but divorce is uncommon. If a Nauran child is born, it must be registered, even if the birth happens outside of Nauru. This is so that the child may have access to Nauran rights. A family unit may consist of relatives on both sides of the family. The average household is most likely made up of an older couple with one or more of their married children along with grandchildren. This makes the average household size of about eight people per household. Adoption is common, especially if the parents cannot or do not have any biological children. These adopted children receive the same rights as a biological child would as long as they are accepted within the community. Children inherit land and other possessions from their parents. Education is important for Nauran children to receive. Many parents may make financial sacrifices in order to provide

their children with a quality education. Students may attend secondary school in Australia or New Zealand if it is affordable for the family (Nauru- Marriage and Family).

Although Nauru has Moqua Well, an underground lake, and Buada Lagoon, a surface lake, the island still struggles to provide safe, clean drinking water to its inhabitants. Groundwater use is extremely limited due to contamination from wastewater and salinity from the ocean. The only reliable, local available water is rainwater collected through roof catchment systems. Water is also brought to the island in ballast on the ships returning to collect more phosphate (Ledesma). The people of Nauru also struggle to provide proper nutrition for their families. It is necessary to import the majority of the food because of their limited agricultural options. Importing the food is very expensive and as a result, they import cheaper processed food. The average diet consists of fish, french fries, hamburgers, pizza and Chinese food. A common drink is iced coffee containing excessive amounts of sugar and milk (Martin). This has caused many health issues. Obesity is currently affecting over 70 percent of the people. Nauru also has 40 percent of the population diagnosed with type 2 diabetes. This has led to problems with heart disease and kidney disease. Many people have conditions such as blindness and amputation of limbs which arose from complications linked to diabetes (Wood).

Employment opportunities are few. The island relies primarily on phosphate mining for their source of income. There is little commercial agriculture because of mining. The main crop grown on Nauru is coconuts. There is no organized form of animal production as the pigs and chickens are allowed to roam uncontrolled on the island. There is also no organized fishing industry even though it is an island and surrounded by an abundance of fish and other seafood. Most people drive motorbikes or take buses to get around the island (How looks life in Nauru).

Nauru is plagued by multiple problems such as a decimated environment, limited agriculture, and poor health. All of these problems are directly related to one another. The first and most noticeable issue is the need for sustainable agriculture which is difficult because of the lack of topsoil left behind from the phosphate mining. The island was mined in such a way that it left large, irregular peaks of limestone protruding from the ground. This has left four-fifths of the island unfit for any form of agriculture and uninhabitable. (Foster). To repair the soil, there are several easy and effective amendments that can be added to enrich the soil. Compost is one of the best and easiest soil amendments because it is made from organic material that helps plants grow and can be created from food scraps and yard waste (Campbell). In order to obtain the amount of compost that would make a significant difference to the soil in Nauru, a reliable source must be located. It is estimated that between 30 to 40 percent of the food supply in the United States is wasted. This is equivalent to 133 billion pounds of food that is thrown out (Frequently Asked Questions). Making compost out of this waste would be beneficial to United States as well as Nauru. It would keep these materials out of U.S. landfills. It would reduce the size and space needed for landfills and it would reduce the carbon footprint made by Americans because it would reduce the amount of methane released into the atmosphere (Composting at Home).

There are several courses of action that would need to be taken to enable composting on that enormous level to occur. Citizens of the United States would have to separate the compostable materials from the rest of their garbage. Current solid waste pick up for Sioux City, Iowa is \$16.30 a month (Garbage Fees). This fee includes the pickup of all waste, whether compostable or not. If communities could develop a separate pickup of compostable materials, the monthly fee in this community could be divided accordingly (compostable vs. non-compostable) as the amount of waste in the regular pickup would be reduced. According to the Compost Council, about 200 U.S. communities have curbside food waste collection and that number is growing. In some of these communities, a company collects the compostable organic waste for a fee of \$32 per month which would be paid by the American consumer (Josephson).

Another problem that would have to be resolved is transportation. Moving that large amount of compost to an island would be expensive and Nauru is an extremely poor country. Nauru does have an important commodity that companies in the U.S. want and that is phosphate rock. Agriculture is very important in the United States and phosphate is used in the production of phosphate fertilizers. Perhaps the two countries could negotiate a trade. Ships could bring compost materials to Nauru and return filled with phosphate to the U.S. The United States would win because it received the phosphate, reduced its carbon footprint, and reduced the amount of food being placed in landfills. Barges would need to be used to ensure the safety of the ship from the sharp, jagged coral that surrounds the island. The barges would take the compost to the island and return with the phosphate. For Nauru, it would improve the soil because as the food and grass clippings decompose, it turns into nutrient-rich compost. The speed that the materials decompose depends on the size of the pile of materials being composted. Microbes break down these materials and need oxygen to work. The smaller the pile, the faster the materials break down from the heat produced by the microbes. Turning the piles over adds the needed air. Another key ingredient is carbon-rich materials like straw, lawn clippings or shredded paper. Another source that might be more readily accessible in Nauru is seaweed since the island is surrounded by ocean. The compost should be kept moist to assist with the decomposition. By becoming a composting “dumping ground”, Nauru would accelerate the natural process of repairing the soil which left to nature, would take a very long period of time (Jumpstart Your Compost). As the phosphate deposits on the island continue to be depleted, the improved soil conditions will allow increased agricultural opportunities. This transition will ensure the people have healthy, sustainable food sources.

Another way to enrich the Nauruan diet while they wait for the soil to be repaired is to farm using hydroponics. Hydroponics is a farming practice that is becoming more and more popular in areas where soil is not conducive to growing crops. This technique works well in areas with limited space. Poor soil and limited space are exactly the problems Nauru faces when providing nutritious food for its inhabitants and the reason hydroponics is a perfect fit. It uses water, nutrients, and a growing medium and has many benefits to traditional farming practices. It is common when using hydroponic farming for the plant to grow at least 20 per cent faster than when using soil. The plants typically yield at least 25% more produce than plants grown in soil (Espiritu). Other advantages to hydroponic farming for Nauru is that it does not require soil which means they aren't limited to the crops they grow because their topsoil has been destroyed. The water used for hydroponics can be recycled so even though Nauru has limited water sources, water is not wasted. There is less disease that occurs in the plants because of there is no soil for the bacteria to grow. The Nauruans have ready access since the crops are grown locally. The hydroponic technique does not require intensive education before use. This technique has also been implemented and tested in countries around the world so is a reliable farming option (Hydroponics).

Nauru has recently established a solar-powered water purification system which enables them to have water for hydroponic farming. It also is working on developing a solar farm on the plateau so the island would not have to rely on diesel as its energy source (Ali). These two improvements make hydroponics a viable option. There are several types of hydroponic systems that range from an advanced system which can be intensive and expensive to a simplified hydroponic growing system that is simpler, cheaper, has low operational costs and low maintenance costs. As the hydroponic system becomes established, it becomes self-sustainable as profits obtained by increased yields are applied to enlarging or improving the system. The initial costs for hydroponic farming can be a slight hindrance although sources of funding could include microloans from the government or other organizations (Hydroponics). The United Nations Development Programme is another organization that might provide funding. UNDP works with countries to eradicate poverty and make the nation sustainable and self sufficient. The Food and Agriculture Organization of the United Nations is an additional source whose goal is to defeat

hunger(FAO). Hydroponics have been funded by UNDP and UN FAO in many parts of the world since the early 1980s.

Once a sustainable, healthy food source can be secured, the diets of the people of Nauru can once again contain healthy options that don't include processed foods. Educating the population about proper nutrition and the importance of exercise is vital to improving their health. This education is also extremely important in hopefully changing one of Nauruan cultural beliefs. "Nauruans see obesity as a sign of wealth, an indication that you don't need to work physically to get by. In a society that, until fairly recently, relied heavily on the physical labour of its inhabitants, a sedentary lifestyle is something admirable, something to which one should aspire (Wood)." This education can be supported by organizations like Jamie's Food Revolution, OzHarvest, Slow Food International, and The American Association of Diabetes Educators.

Jamie's Food Revolution provides food and nutrition education programs, healthy cooking classes and gardens to schools across the world. Its goal is to improve poor eating habits and eliminate obesity. Jamie's Food Revolution focuses on six major issues: food education, nutrition, food waste, our planet, cooking, and ethical buying. The key to this program's success is active participation by the family as they shop for food and learn the value of local sustainable produce (Chulack). OzHarvest is another source that focuses on nutrition education. This program has two educational programs. NEST focuses on teaching people about "nutritious healthy eating choices, low cost meal planning, budgeting, reading food labels, correct food storage, shopping and cooking tips, and minimising food waste." (OzHarvest). The Nourish Program is targeted to reach at-risk people. It provides training and mentoring so that students have skills that will enable them to be more employable. Although located in Australia, it might offer assistance because of the close relationship between the two countries. A third option for providing nutrition education is Slow Food International. This organization works in many countries to ensure everyone has access to good, clean, and fair food (35 Food Education Organizations). It does this by creating a network of resources focusing on school gardens, improved animal welfare, and promoting sustainable agriculture (Slow Foods USA). The American Association of Diabetes Educators also works towards this education goal by providing knowledge and skill-training in order to help individuals identify negative dietary choices. It's education focuses on teaching people to "count carbohydrates, read food labels, measure each serving, develop an eating plan, prevent high or low blood sugar, and set goals for healthy eating." (American Association of Diabetes Educators). The ideas from these programs can be incorporated into a program that works for the population of Nauru.

The welfare of Nauru and its inhabitants will be determined by the actions taken over the next few decades. Restoring topsoil, conservation and careful management of resources, and the development of sustainable agriculture are necessary steps in the island's recovery. Aggressive, proactive management of the mining area can create an area for sustainable agriculture in the future. Adopting sustainable farming techniques like hydroponics will have immediate benefits to the diet and health of the Nauruan people. It also provides economic opportunities and sustainability for the farmer. Educating the population on proper nutrition and exercise as well as changing a cultural belief will lengthen the average lifespan of a resident of Nauru. Many of these steps need to be implemented today for the health and wellbeing of the Nauruan people and to safeguard the island for future generations.

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