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Fiji, Factor 11: Malnutrition

### **Fiji: Improvement of diet to solve issue of dietary diseases.**

It has been reported that the world “will need 70 percent more food, as measured by calories, to feed a global population of 9.6 billion in 2050 and must achieve this through improvements in the ways people produce and consume” (UN News Centre). According to Andrew Steer, President of the World Resources Institute (WRI), we must meet this human need “in a way that creates opportunities for the rural poor, limits clearing of forests, and reduces greenhouse gas emissions from agriculture” (UN News Centre). The islands of Fiji offer a small-scale example of this problem. Fiji is a land of variety; it offers beautiful lagoons, rain and pine forests, mountains, and miles of white sand beaches. Although Fiji comprises some 330 pieces of land big enough to be called islands scattered across 200,000 square miles of ocean, as well as several thousand others too small for human habitation, two of the islands make up 85% of the total land mass. Only just over 100 of the islands are actually inhabited. The larger islands are mainly of volcanic origin with high rugged terrain. The smaller islands are coral, limestone, or sand cays with small pockets of tropical vegetation. Many islands have surrounding coral reefs and lagoons. With this much variety in landscape and seeming availability of easy access to fishing as a food source, it may surprise the casual visitor to this vacation paradise that a high percentage of the population suffers from malnutrition. This includes anemia at rates of 79% in children aged 6-11 months, 68% in children aged 12-23 months, 52% in children aged 24 -35 months, and 30% in children aged 48 -59 months,<sup>1</sup> while women suffer anemia at rate of 40%. Given this level of malnutrition, it is not surprising that as recently as 2012 the infant mortality rate for children less than 5 years of age was 22.4 per 1000 live births, more than 3 times that found in the United States.<sup>2</sup> In the case of Fiji however, simply consuming more calories is not the answer to adequately feeding its population. Rather, better nutrition and a change in dietary staples are needed to address Fiji’s micronutrient deficiency-related health problems.

Indigenous Fijians (or ‘iTaukei’, as they are now officially known) are the largest ethnic group in Fiji and also the most numerous group of rural household dwellers.<sup>3</sup> “The official 2007 census found that of Fiji’s total population of 827,900, indigenous Fijians made up 57%, Fiji Indians 38%, and other Pacific islanders, Chinese, Europeans, and persons of mixed race the other 5%” (Frommer’s). Just fewer than half the households are rural as opposed to urban; however, because the average rural household is larger, slightly more than half of the people live in rural households. Ethnic Fijians generally have larger household sizes compared to Indo-Fijians and other ethnic groups.<sup>4</sup> The average Fijian family consists of about six people<sup>5</sup>: “the senior couple,

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<sup>1</sup> Ministry of Health (Ministry of Health, 2010).

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<sup>1</sup> Ministry of Health (Ministry of Health, 2010).

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<sup>1</sup> Household Income and Expenditure (Fiji Bureau of Statistics, 2012).

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<sup>1</sup> Household Income and Expenditure (Fiji Bureau of Statistics, 2012).

their unmarried children, and a married son with his wife and children, and may extend to include an aged widowed parent, a sister of the head of the household, and grandchildren” (Countries and Their Cultures). Fijian society is largely separated by gender. The men are generally the breadwinners and the women the homemakers, though some women are employed as cheap labor in the garment industry. Within the family, the patriarch of the house “controls the economic activity of the other males, and his wife supervises the other women” (Countries and Their Cultures). Although usually girls do better than boys do in school, fewer women than men get a higher education. Fiji is, however, a relatively well-educated nation<sup>6</sup> with roughly 88% of the people completing high school, though only 40% go to college.<sup>7</sup> Everyone has “access to eight years of [free] primary and seven years [of] secondary education” with government aid (Countries and Their Cultures). Their public schools are “influenced by western prototypes” (Countries and Their Cultures).

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<sup>1</sup> Global Alliance for Clean Cookstones (United Nations Foundations, 2014).

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<sup>1</sup> FAO-Nutrition Country Profiles (FAO, 2003).

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<sup>1</sup> Epeli Waquavonovono, The 2010-11 Employment and Unemployment Survey Preliminary Findings (2012).

Despite the emphasis on and support of education, 35.2% of people live at or below the poverty line,<sup>8</sup> and 43% of Fiji's rural population (37% of rural households) lives in poverty. Nearly a third of the native Fijians live in poverty. Adding to the burden of rural households, the total dependency ratio (child and elderly dependency) is higher in rural populations than in urban populations because the rural population tends to have a significantly higher number of people over the age of 64. Thus, the typical rural-dwelling iTaukei family is more likely to live below the poverty line with a larger family and more dependents.

Like most people in Fiji, the typical rural iTaukei family would depend on the public health system, which is heavily subsidized by the government. Unfortunately, though they have easy access to what care there is, availability of care is a concern as the density of physicians is approximately 0.43 physicians per 1,000 Fijians (vs. 2.42/1,000 in the US), and the hospital bed density is 2.1 beds per 1,000 Fijians (2/3 that of the US).<sup>9</sup> In addition, while Fijians do treat some diseases with medicines, they believe that some ailments are caused by sorcery and are therefore treated by healers (diviners, herbalists, masseuses, etc.).<sup>10</sup> Native Fijians are actually more likely to use these traditional cures than modern medicines, usually delaying going to the hospital for so long that their rates of morbidity and mortality are needlessly increased.<sup>11</sup>

The typical rural Fijian family would work a farm of approximately 10-12 acres. The majority of Fijian farming is for commercial purposes. Sugar is the main cash crop grown, along with coconuts, cassava, tobacco, coffee, rice, tropical fruits, vegetables, ginger, taro, poultry, pigs, and cattle for both milk and meat. There is also a fishing industry. Of the average ten to twelve acres that make up a subsistence farm, approximately 70% would be used for sugarcane, which would be sold to provide income.<sup>12</sup> Generally, these small tracts of land are farmed using methods that do not allow for long-term sustainability. Slash-and-burn field clearing and failing to let fields lie fallow are common practices in Fiji. The poor farming methods add to the problem of food insecurity in Fiji because the methods used decrease soil fertility. Cassava is a main culprit in the lack of crop rotation because it can grow in very poor soil. Therefore, instead of letting a field rest and regain its nutrients, Fijian farmers will continuously plant cassava, further draining the fields, and eventually rendering them useless.<sup>13</sup> The sale of sugarcane does not provide

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<sup>1</sup> The World Bank (The World Bank Group, 2014).

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<sup>1</sup> Central Intelligence Agency (CIA, 2013).

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<sup>1</sup> Countries and Their Cultures (Advameg, Inc, 2014).

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<sup>1</sup> Michael Lowe, "Health and Disease in Fiji" (2001).

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<sup>1</sup> New Agriculturalist, "Country profile-Fiji" (2002).

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<sup>1</sup> Countries and Their Cultures (Advameg, Inc, 2014).

sufficient income to meet all needs of a typical rural family.<sup>14</sup> Thus, the rural iTaukei family will rely on the crops grown on land not devoted to raising sugarcane for additional food, and family members will also seek employment off the farm to supplement the family income.<sup>15</sup> Along with the self-made problem of poor soil, Fijians face external factors such as: “shortage of labor, poor quality and availability of planting material, lack of efficient pest control and monitoring programs, high post-harvest losses, poor animal health [and] high cost of purchased food...” (Agriculture Fiji). Furthermore, Fiji is a tropical island and therefore subject to tropical storms such as hurricanes or cyclones, in addition to floods.<sup>16</sup> Such natural disasters happen on a yearly basis.<sup>17</sup> Flooding in particular is projected to increase, according to current climate change models.<sup>18</sup> These disasters affect the ability to address the micronutrient malnutrition problem in Fiji’s population.<sup>19</sup> “Access to food and the maintenance of adequate nutritional status are critical determinants of people’s survival in a disaster. Micronutrient deficiencies can easily develop during an emergency or be made worse if they are already present. This happens because livelihoods and food crops may be lost; food supplies might be interrupted; there is an increased risk of diarrheal diseases, resulting in malabsorption and nutrient losses, and of infectious diseases, which suppress the appetite whilst increasing the need for micronutrients to help fight illness” (The UN Refugee Agency).

One of the main causes of long-term micronutrient deficiency, besides difficulty accessing food due to economical shortages<sup>20</sup> and natural disasters, is that the staples of the typical Fijian’s diet simply are not nutritious. Most of the food they eat is high in carbohydrates and fat (good energy) but does not have enough vitamins and minerals; this micronutrient-deficient diet causes Fijians to become ill. The traditional farm family’s meal consists of a base of starch (cassava, rice, yams, sweet potatoes), a relish (similar to a small appetizer in the USA but served during the meal - for Fijians the relish usually consists of a meat, fish/seafood, or vegetables boiled in coconut milk), and a drink.<sup>21</sup> The men are served first and get the most and best food.<sup>22</sup> Their

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<sup>1</sup> New Agriculturalist, “Country profile-Fiji” (2002).

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<sup>1</sup> New Agriculturalist, “Country profile-Fiji” (2002).

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<sup>1</sup> Nourishing Fiji Children Project.

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<sup>1</sup> National Disaster Management Office (2013).

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<sup>1</sup> Climate Change in the Pacific: Scientific Assessment and New Research.

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<sup>1</sup> National Disaster Management Office (2013).

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<sup>1</sup> Nutrition and Consumer Protection (FAO, 2010)

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<sup>1</sup> Countries and Their Cultures (Advameg, Inc, 2014).

three staples are cassava, rice, and coconut milk. Cassava (also known as manioc or tapioca) has little nutritional value. It is almost purely carbohydrates with negligible fat and little protein, and, while it is high in vitamin C, it has little if any other nutrients.<sup>23</sup> Rice, too, is mostly carbohydrates with one or two vitamins and meager protein.<sup>24</sup> The majority of the rice they eat (along with slightly over half of all the other food they eat) is imported (usually from New Zealand and Australia) because rice farming is not common amongst rural iTaukei subsistence farmers, although there has been a push from the government to grow more rice so that they can be more self-sufficient. Based on the USDA guidelines, coconut milk has 87% of a person's daily allowance of fat in a single cup, about six grams of protein and five of fiber, and a few vitamins and minerals, including a healthy amount of iron.<sup>25</sup> However, the saturated fat content is so high (255% of a person's daily allotment according to USDA), it is most certainly not the best source of the nutrients it does provide. Thus, the typical rural iTaukei family has a diet "high in energy but low in fiber, vitamins, and minerals..." (Nutrition and Consumer Protection). This type of diet sets the stage for the development of micronutrient deficiencies and malnutrition.

Malnutrition from a micronutrient deficient diet causes a spectrum of problems ranging from impaired night vision ('night blindness' caused by vitamin A deficiency) to serious mental stunting. Malnutrition is tracked by monitoring child growth, using four indicators: 'stunted', 'wasted', 'underweight', and 'overweight'.<sup>26</sup> The major nutritional problems in Fiji are Iron Deficiency Anemia, malnutrition in young children, Iodine Deficiency, "and rapidly increasing diet-related non-communicable diseases" (Khan, 5).

Iron Deficiency Anemia, to which potential mothers and children younger than five are more prone, affects "the poor and underprivileged [who are] not able to eat iron rich food regularly" (FAO-Nutrition Country Profiles). Anemic women are less productive in their jobs, making it harder to earn money, and it is very dangerous for them to give birth. Iron Deficiency Anemia causes low birth weight in infants. "Surviving low birth weight infants have a high morbidity rate, impaired postnatal growth, and high risk of suboptimal mental development" (Pacific Health Dialog Vol. 2). When the women are under-nourished, the children's development is impaired and the next generation has a harder time doing the things they need to do. In other words, "the nutritional status of women influences the development of the fetus and the survival

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<sup>1</sup> Countries and Their Cultures (Advameg, Inc, 2014).

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<sup>1</sup> Google "Cassava Nutrition Facts".

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<sup>1</sup> Google "Rice Nutrition Facts".

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<sup>1</sup> Google "Coconut Milk Nutrition Facts".

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<sup>1</sup> WHO Library (World Health Organization, 2013).

of the infant. These, in turn, [determine] the health status and productivity of adults” (Pacific Health Dialog Vol. 2).

Iodine Deficiency is still a problem in Fiji despite efforts to alleviate it because some areas do not have easy access to imported iodized salt, and it is more of a problem in places where the Fijians do not eat as much seafood.<sup>27</sup> “There are also reportedly high rates of endemic goiter [(enlargement of thyroid gland)] related to dietary iodine deficiency, in the interior of Fiji, ... this seems to be related to iodine-deficient soils, and is possibly made worse, in Fiji, due to high consumption of cassava, which has been found to have goitrogenic [(causing goiter)] properties...” (Pacific Health Dialog Vol. 10). Iodine Deficiency in mothers causes severe mental stunting in their children, who in turn will have a harder time as adults working and earning money to get nutritious food.

Another problem is eating too many carbohydrates with not enough protein, fiber, or vitamins. “In the case of protein deficiency, a complicating factor may be the shift from traditional root crop diets...to almost exclusive consumption of cassava, in some areas, such as Fiji” (Pacific Health Dialog Vol. 10). According to the Fiji Non-Communicable Diseases (NCD) STEPS Survey 2002<sup>28</sup>, there is a rapidly increasing rate of non-communicable diet-related diseases such as hypertension, diabetes, and obesity in the Fiji population as well as risk factors such as low consumption of fruits and vegetables with 66% of survey participants eating less than one serving of fruit per day and less than 26% eating less than one serving of vegetables per day.<sup>29</sup> The survey revealed that with the increased rates of diseases such as diabetes, there has been a corresponding increase in the need for medical intervention for complications arising from these diseases, and such interventions come at an escalating cost that is not “countered simply by accessing greater internal or external funding to spend within the system” (Chung, Decourten, Laqeretabua, Pryor, Saketa, Waqanivalu, 9).

Fijians are aware of these problems and try to fix them, mostly through government aid and legislation, such as restrictions placed on the importation of non-iodized salt for human consumption. “There is nutrition counseling for mothers in antenatal and postnatal clinics, as well as maternal and child health clinics, and iron supplementation is provided to anemic mothers” (Khan, 5). The Milk Supplementation Program (milk fortified with B vitamins<sup>30</sup>) restarted in 2002 for undernourished pre-school children.<sup>31</sup> Iron and micronutrient enrichment of

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<sup>1</sup> FAO-Nutrition Country Profiles (FAO, 2003).

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<sup>1</sup> Ms. Elian Chung, Dr. Maxamillan Decourten, Ms. Ana Laqeretabua, Dr. Jan Pryor, Dr Salanieta Saketa, Dr Temo K. Waqanivalu (Ministry of Health, 2002).

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<sup>1</sup> Chung, Decourten, Laqeretabua, Pryor, Saketa, Waqanivalu, 8.

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<sup>1</sup> Lamers, Yvonne; Quay, Teo, “Food Fortification With Vitamin B12” 29 (Sight and Life, 2012).

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<sup>1</sup> Mrs. Azizan Nisha Khan, “Fiji” 6 (2003).

flour began in 2004.<sup>32</sup> The National Micronutrient Supplementation Program, which began in 2010, is aimed at addressing the problem of anemia in children. During the program, the government supplies iron supplementation coupled with Albendazole, a deworming agent, and also micronutrient supplementation in the form of multivitamins for school-age children (6 to 15 years old).<sup>33</sup> In 2013, a multi-micronutrient powder (MNP) was added to the National Micronutrient Supplementation Program's roster.<sup>34</sup> The powder is meant to be added to food to increase micronutrient content while not affecting taste and is available to Fijians at all health centers. "MNP decreased anemia prevalence significantly in children from 40 to 70 per cent and was a cost effective intervention" (Swami). Though these are all helpful initiatives, they will not get to the root of the problem – Fijians' micronutrient-deficient diet.

Improving the quality of the typical rural iTaukei family diet would start with improving the diet of the mother in the household. As noted above, the women are typically given less food and poorer quality food in a typical rural iTaukei household. However, where women in their reproductive years are given a nutrient deficient diet, the consequences are felt not only by the women herself but also by the children of that woman and by the society of which that child is a member. When a child receives poor nutrition prenatally and continues to suffer poor nutrition after birth, it affects the ability of that child to grow, to learn, and to become a strong contributor to the society. As the child achieves adulthood, the consequences of poor nutrition become apparent in his inability to support his family and understand an increasingly complex world. A poor diet in childhood can form a pattern of poor nutrition that the child then passes along to his/her own children, creating and perpetuating a cycle of impoverishment through lowered intelligence, decreased productivity, and higher health care costs.<sup>35</sup>

As Fiji continues on its path towards achieving the Millennium Goals of improving maternal health and reducing child mortality, it will need to continue its nutritional supplementation programs, which were set to end in 2014. These supplementation programs, coupled with continued efforts to educate the public on proper nutrition to meet dietary needs, will help to reduce child mortality and improve maternal health in Fiji while Fiji works to find a more sustainable solution; because, while supplementation with multivitamins is an adequate short-term strategy in achieving these Millennium Goals – and also a good back-up system to have in place to supply people with the micronutrients they need in the aftermath of tropical storms – long-term strategies should also be pursued. "While short-term interventions have a role in providing specific target groups with vitamin and mineral supplements at certain times, only

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<sup>1</sup> Mrs. Azizan Nisha Khan, "Fiji" 6 (2003).

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<sup>1</sup> The Fijian Government (Ministry of Information, 2012).

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<sup>1</sup> Nasik Swami, "MNP to Reduce Anemia" (Fiji Times Limited, 2013).

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<sup>1</sup> Bapen, "Introduction to Malnutrition" (BAPEN, 2014).

food-based approaches can prevent micronutrient deficiencies in a sustainable manner for most of the population” (SURE Rapid Response).

Food-based approaches would include increased production and consumption of micronutrient rich foods, and food fortification. A way in which Fiji could encourage increased production of micronutrient rich foods would be through hydroponic farming, which allows farmers to grow off-season vegetables and earn more money, which in turn would allow them to buy a better variety of foods. Hydroponic farming is a system in which plants are grown in mineral enriched water in special buildings. There are several benefits to hydroponic farming. First, because plants are grown in an extremely adaptable setting, the type of food that is grown is not dependent on climate or soil fertility and therefore does not necessarily have to be native to Fiji. Second, because hydroponic farms are able to be built anywhere – unlike normal farms which are dependent on dirt – they can be built on high ground to avoid destruction by hurricanes. Last, this type of farming might allow soil, which had formerly been depleted by over planting of cassava, to lie fallow and recover. Currently the ministry, the Fiji Development Bank, and the Secretariat of the Pacific Community have joined with the private sector to establish hydroponic farms.<sup>36</sup> One way the government is tempting farmers to use hydroponic farming is through tax deductions and tax holidays.<sup>37</sup> The return on investment for the farmers is immense because they have more reliable yields and are able to grow whatever the market demands.

A good way to ensure the consumption of micronutrient rich food would be through the supplementation or genetic modification of the cassava. Some researchers in Columbus, Ohio, are beginning to look into this. The “scientists have determined how to fortify the cassava plant... with enough vitamins, minerals, and protein to provide the poor and malnourished with a day’s worth of nutrition in a single meal” (Caldwel). The Gates Foundation is also funding research into cassava crops through the BioCassava Plus project (currently this project is focused on sub-Saharan Africa). “BioCassava Plus is an innovative research project that aims to reduce micronutrient malnutrition by increasing the nutritional value of cassava, a staple crop consumed by more 700 million people worldwide” (BioCassava Plus). The BioCassava Plus is bred to provide Beta-carotene and iron, which are otherwise lacking in the diets of frequent cassava-consumers.<sup>38</sup> It is also made to be less susceptible to diseases in the targeted areas and to contain fewer cyanogenic glycosides, which release cyanide.<sup>39</sup> It will be attractive to the farmers in the targeted areas because it is sold at a much lower price as well as being resistant to disease and solving many dietary issues. Given the hardiness of Cassava, it would be a reasonable experiment to try planting the already-developed BioCassava Plus in Fiji. It could either replace the current strains of cassava in Fiji or be crossbred to make a more nutrient-rich Fijian cassava

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<sup>1</sup> Elenoa Baselala (Fiji Times Limited, 2004-2007).

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<sup>1</sup> “Fiji Islands Investment Opportunities Hydroponics Profile” (Fiji Island Trade & Investment Bureau, 2009).

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<sup>1</sup> Donald Danforth Plant Science Center, “BioCassava Plus” (Donald Danforth Plant Science Center, 2014).

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<sup>1</sup> Richard T Sayre, “The BioCassava Plus Program: Biofortification of Cassava for Sub-Saharan Africa” (Research.net, 2014).



plant. With the new fortified cassava plants, Fijians would be able to keep the diet they are accustomed to while still implementing a very necessary change.

The Fijians have already recognized the need to address dietary micronutrient deficiencies, and recognition is always the first step in solving a problem. If they continue with the government programs already in place as well as incorporate various innovations in farming and food, Fiji can look forward to a happy, healthy, prosperous future.

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