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Rising Oceans, Climate Change, Food Aid, and Human Rights in the Marshall Islands

INGRID AHLGREN, SEIJI YAMADA, AND ALLEN WONG

Abstract

Climate change impacts are expected to produce more frequent, longer and unpredictable drought periods with further saltwater intrusion in the Marshall Islands. As a result, a significant return to traditional food cropping is unlikely. This will lead to an increased dependence on food aid, especially in the outer atoll populations. An examination of the nutritional content of food aid suggests it is likely to lead to poor health outcomes. Dependence on food aid has gradually increased over the past 70 years in the Marshall Islands, starting with population relocation because of war and nuclear testing and most recently because of climate change. The authors argue that the health impacts of the supplemental imported diet, combined with migration to population centers, may result in an even greater prevalence of chronic diseases, and exert pressures that lead to more communicable disease, further exacerbating the syndemics in the Marshall Islands. The authors conclude that food aid donors and the Republic of the Marshall Islands (RMI) government have human rights obligations to ensure that the people in the Marshall Islands have access to adequate nutrition. Accordingly, donors and the government should re-examine the content of food aid and ensure it is of sufficient quality to meet the right to health obligations.

Ingrid Ahlgreen, MS, is a PhD candidate at Australian National University, Canberra, Australia.

Seiji Yamada, MD, MPH, is Associate Professor in the Department of Family Medicine and Community Health, John A. Burns School of Medicine, University of Hawai'i, Mililani, Hawaii, USA.

Allen Wong, MD, is resident physician at Banner Good Samaritan Family Medicine Residency, Phoenix, Arizona, USA.

Please address correspondence to the authors c/o Ingrid Ahlgren. Email: ingrid.ahlgren@anu.edu.au.

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Introduction

In this paper, we discuss the right of Marshallese to good nutrition; the effects of climate change on nutrition; and possible solutions for improving nutrition in the islands.

History and geography of the Marshall Islands

The historical experience of the Marshall Islands is one of colonization by successive Spanish, German, Japanese, and American administrations. In the post-WWII period, the US tested most of its high megatonnage nuclear weapons in the Marshall Islands, resulting in population relocation and ensuing dependence on imported foods. Over time, cultural food preferences came to favor imported items such as white rice and canned meat products. The large-scale consumption of these foods has led to an epidemic in non-communicable diseases. In the face of climate change, which is expected to produce more frequent, longer, and unpredictable drought periods, as well as sea level rise and inundations, a return to traditional food crops is probably not viable, and dependence on food aid will likely increase. The Republic of the Marshall Islands (RMI) government has an obligation to protect, respect, and fulfill its people's rights to adequate nutrition. The international community will need to assist the Marshall Islands to adapt to climate change and improve its people's nutrition.

The Marshall Islands, with a population of 69,747, are an archipelago of 29 low-lying coral atolls and five single islands in the central Pacific Ocean.[1] Its atolls and islands stretch between 4° and 15° north latitude and 160° and 173° east longitude, straddle the Intertropical Convergence Zone (ITCZ) line, and cover an area of 700 miles north to south and approximately 800 miles east to west. Because of this geographic expanse, various disasters can affect different atolls. With a mean elevation of two meters, the Marshall Islands are particularly vulnerable to sea level rise, rogue waves, severe weather, and droughts.[2] Annual rainfall varies considerably from north to south; the southern atolls receive 300-400 centimeters and the northern 100-175 centimeters.[3] Dependent on thin aquifers and catchment for water, the Marshallese people face chronic water challenges. Drought is more common in the drier northern atolls, and there is a persistent risk of water scarcity during extended dry periods, resulting in difficulties with sanitation and risk of water-borne diseases. The soils of the Marshall Islands are generally thin, sandy, alkaline, and lacking in minerals and micronutrients essential for plant growth. Combined with poor water-retaining properties of the soil, the quantities and range of crops that can be cultivated are limited.

Long-term climate change predictions for the Marshall Islands

In December 2012, the National Oceanic and Atmospheric Administration released *Global Sea Level Rise Scenarios for the United States National Climate Assessment*, which predicts with 90% confidence that the global mean sea level will rise between 0.2m (8 inches) and 2.0m (6.6 feet) by 2100.[4] The median global estimate is therefore approximately one meter. Reginald White, of the Republic of the Marshall Islands National Weather Service, notes that for Northern Marshall Islands the projected sea level rise by 2090 will be 15-47cm (7.1-18.5 inches) for a low emissions scenario and 22-62cm (8.7-24.4 inches) for a high emissions scenario. However, because of yearly variations, with La Niña years producing more rainfall, White suggests that in a La Niña year, the sea levels could rise to the same level as the projected sea level rise by the year 2030.[5]

> Recently, however, it has become more evident that climate change will not express itself primarily through slow shifts in average conditions over a long period. . . . [There is] mounting evidence that it is extreme events, such as droughts, floods and heatwaves, that we must prepare for. More extreme weather events are due to increased en-

ergy within the climate system.[6]

The draft National Climate Assessment, released January 2013, notes a trend of less rainfall in the Marshall Islands over the period of 1950-2010 (0.3 inches less of monthly rainfall per decade in Kwajalein and 0.4 inches less of monthly rainfall per decade in Majuro).[7] The report notes that freshwater supplies obtained from aquifers and catchment, while already constrained, will decline even further as a consequence of warmer, drier weather and saltwater intrusion from rising sea levels.

Climate change and health effects in the Marshall Islands and surrounding region

Increasingly, climate researchers attribute the rise in the incidence of weather-related disasters to greater amounts of energy in the climate system secondary to the greenhouse effect.[8] They have proposed that there is no such thing as a purely natural disaster and that hazard exposure, vulnerability, disaster risk, and adaptation are dependent on social forces and processes.[6, 9] Floods, storms, droughts, cold and heat waves, fires, landslides, and increases in pests and disease vectors have been identified as being influenced by climate change.[9]

The vulnerability of a country to climate change is based not only on the likelihood of exposure to natural phenomena, but also on development, availability of natural resources, agricultural dependency and conflicts, and the adaptive capacity of a country's infrastructure. Not incidentally, poorer and more underdeveloped societies are inherently more vulnerable to natural disasters. Disasters hinder the development of societies; development is needed to prepare for natural disasters. From this viewpoint, one can see that the globalized market economic system, with its attendant levels of unequal development, has a role in making marginalized populations more prone to disasters. In its latest assessment, the Climate Change Vulnerability Index—which did not index the small island nations of the Pacific—lists Bangladesh, India, Madagascar, Nepal, and Mozambique as the nations most vulnerable to climate change.[10]

Woodward and colleagues (1998) examined vulnerability to climate change in the Asia-Pacific region, based on a scale giving equal weight to altitude, island numbers, total land area, and island type. This ranking also took into account the country's ability to adapt, using five causes of vulnerability to assess climate change and human health in the Asia-Pacific region: destructive growth, poverty, political rigidity, dependency, and isolation. The Marshall Islands is listed as second only to Tokelau among Pacific Island states in terms of susceptibility to sea level rise.[11]

The US National Climate Assessment acknowledges the particular risks faced by the low islands of the US-associated Pacific Islands:

> Mounting threats to food and water security, infrastructure, and public health and safety are expected to lead to increasing human migration from low to high elevation islands and continental sites. Under these circumstances, it will become increasingly difficult for Pacific Islanders to sustain the region's many unique customs, beliefs, and languages.[7]

Since 1998, the RMI's two urban centers and its northern atolls have suffered a number of climate-related incidents. Following a national drought emergency declared in 1997-1998 during a strong El Niño period, a cholera epidemic associated with lingering La Niña effects ensued in Ebeye in December 2000, causing more than 400 cases and six deaths.[12,13] Serious droughts occurred in the northern outer atolls in 2001 and 2007. In Majuro, high waves flooded the capital in December 2008, June 2013, and March 2014. A dengue outbreak (part of the worldwide increase in the number of countries reporting dengue), with over 1600 cases, occurred in the Marshall Islands starting in October 2011. In the region, two atoll islands in the Mortlocks of the Federated States of Micronesia (FSM) were inundated in March 2007.[14] Typhoons and tropical storms have caused major damage and loss of life in Chuuk (Tropical Storm Chata'an, July 2002, 47 deaths) and Yap (Typhoon Sudal, April 2004, 90% of homes damaged, major damage to hospital) in the FSM. In Novem-

ber 2013, Typhoon Haiyan caused major damage to Kayangel Island in the Republic of Palau on its way to the Philippines.

Selected Marshall Islands post-war history and sovereignty

As part of the US island-hopping campaign of World War II, the Marshall Islands were wrested from the Japanese in early 1944. Under a UN agreement, much of Micronesia was designated as a Trust Territory under US control, and the Marshall Islands became a key testing ground for nuclear weapons.[15]

In order to turn the northern Marshall Islands into military testing grounds, the US appealed to the Marshallese through their Christian faith, and compared the islanders to the children of Israel who were saved and brought to the Promised Land. They proclaimed that the US was going to learn to harvest the power of the atomic bomb for the good of mankind.[16,17] Between 1946 and 1958, 67 nuclear devices were detonated in Enewetak and Bikini Atolls, devastating islands that have been home to the Marshallese for centuries. Numerous health issues arose directly from the radioactive fallout of the atomic weapons testing, including birth defects, infertility/miscarriages, and elevated cancer rates.[18,19] Cesium and strontium isotopes (which act, biologically, like potassium and calcium, respectively) from fallout contaminated the plants, topsoil, fish, and other marine organisms of Bikini and Enewetak Atolls. Areas of these northern atolls continue to be off-limits for agriculture and harvesting of reef resources.[20] Residents of Bikini and Enewetak were evacuated because of the nuclear testing on those atolls. In 1954, in the aftermath of the Bravo test, residents of the nearby Rongelap and Utrok atolls (including some former residents of Bikini and Enewetak) were also relocated.

The Marshall Islands separated from the Trust Territory in 1978. In 1986, the US Congress approved the Compact of Free Association (COFA), an agreement that gave citizens of the RMI and the FSM (and later, the Republic of Palau) free entry, employment and educational opportunities, and access to some social services in the US and affiliated territories. In exchange, the US received sole military access to the land, airspace, and waters surrounding the Compact Nations. For the health consequences, the loss of the homeland, and transformation of the Marshallese way of life caused by nuclear testing, the US government provided an espousal provision that gave $150 million to an RMI compensation trust fund, under the condition that the Marshallese would be prohibited from seeking future legal actions against the US.[21] In 2003, the Compacts were amended and renewed by the RMI and the Federated States of Micronesia. Under this agreement, $3.5 billion are provided over 20 years for the two nations. In return, the US maintains the Ronald Reagan Ballistic Missile Test Site on Kwajalein Island in Kwajalein Atoll.

Dietary changes and health consequences

Traditional food production and gathering had been gradually eroding since before World War II, with the Marshallese people increasingly dependent on imported food. Between World War I and World War II, greater Micronesia was under the *Nan'yo* (South Seas) Japanese Imperial control, and white rice (not grown in Micronesia) became a dietary staple. The traditional sources of starch for the Marshallese—taro, pandanus, and breadfruit—have been largely replaced by rice. Coconuts remain a main source of hydration and nutrition, as well as the primary means in the outer islands of income generation (in the form of copra, dried coconut meat, from which coconut oil is derived). Subsequent to World War II and the period of nuclear testing, when American troops and other personnel brought canned rations with them, Marshall Islanders also began to rely on imported processed foods and canned goods. Recent estimates suggest that 90 percent of all Marshallese food is imported.[22]

Carucci documents the historical experience of the people of Enewetak. Relocated in 1947 because of nuclear testing, they did not return to Enwetak until 1980. During 33 years of exile to the remote and much smaller atoll of Ujelang, the population experienced periods of famine. Upon their return to Enewetak, with portions of the atoll off-limits

Day	Meal 1	Meals 2 and 3 (1 serving each)
1	Pancakes (eggless)	Rice* + canned tuna**
2	Fried doughnuts	Rice + Spam** + pandanus
3	Ichiban ramen	Rice + 1/2 a local lobster or crab
4	Pancakes (eggless)	Rice + local fish + pandanus
5	Coffeebread (eggless)	Rice + canned tuna
6	Coffeebread (eggless)	Salted fish + 1/3 breadfruit
7	Rice + Spam	Coffeebread + local fish

* Serving of rice observed per person (per meal) is 3-4 scoops of cooked rice
** Servings of tuna or spam (and occasionally corned beef) is one 8 oz. can (in oil) shared between 4-6 people, equaling 1.5 to 2 oz. per person

TABLE 1 Observed dietary practices in the Marshall Islands - per meal, per person

because of radiation, the residents were dependent of food supplied by the US Department of Agriculture and an agricultural support fund.[23]

Based on ethnographic observations by Ingrid Ahlgren between 2007 and 2013 in nine different atolls, the typical contemporary three meals for a Marshallese in the outer islands (prior to food aid response to the 2013 drought) are as outlined in Table 1.

In addition to these regular meals, Marshallese commonly snack on uncooked ramen noodles throughout the day, and drink tea and coffee throughout the day and night. A typical serving of coffee (one 16-20 ounce cup) includes one to two tablespoons of instant coffee, one to three tablespoons of instant creamer, and four to six tablespoons of sugar. Other protein sources are eaten semi-regularly. Fresh reef or oceanic fish (boiled or pan fried in oil) and salt-dried fish are eaten an estimated three to four times a week, and small free-range chickens (boiled) are eaten once or twice a month. Pig, dog, and turtle are typically reserved for special events, once every two or three months. Canned tuna and sardines (in oil or tomato sauce) are often preferred to their abundant fresh counterparts because of both convenience and prestige. It is not uncommon for fishermen in both the capital and outer atolls to trade in their fresh catches to local stores for canned goods.

When canned food is available, people are less likely to fish or prepare breadfruit and other local foods. Additionally, many communities have abandoned their outrigger canoes in favor of motorboats. However, because of delays in government ship visits, gasoline has become a scarce commodity, leading to a further reduction in fish in the diet. Traditional staples—taro, breadfruit, coconut, and pandanus—have become supplemental foods. At times, outer atoll governments have reported to the national government that they were suffering from lack of food. However, surveys performed in response revealed that breadfruit or other more labor-intensive crops, such as taro, were available—this implies that the term "food" has come to mean imported foodstuffs. Healthier imported foods, however, are unavailable for local purchase, because businesses are unwilling to import and stock foods that will not be purchased—particularly if costs (for example, for refrigeration) are higher.

This diet change has contributed to poor nutrition in children and diabetes in adults.[24] Epidemics of child malnutrition, diabetes, obesity, and attendant chronic diseases are major health issues. Gittelsohn et al found that 35.5% of 1- to 5-year-old children and 36.3% of 5 to 10-year-old children were stunted. Stunting was associated with lower economic status, urban residence, and consumption of imported foods.[25] A study in Ebeye found (adjusted to a standard world population) an age-adjusted prevalence of diabetes in adults 30 or more years of age of 27%, and an age-adjusted prevalence in adults 20 or more years of age of 20%.[26] The most recent study conducted in the capital of Majuro found that the body mass indices (BMI) were in the obese range for 53% of men and 70% of women. Twenty-nine percent of men's and 37% of women's blood

glucoses were found to be high, and 80-90% of hospital admissions are for NCDs.[27]

Similar nutritional problems have arisen in other Pacific Island nations. Changes in diet from traditional to imported foods have contributed to obesity, diabetes, and hypertension in adults in the FSM, as well as to malnutrition in children in Tonga.[28,29]

While contemporary cultural food preferences of the Marshallese are for imported items, the populace has inadequate health literacy to understand the role that food choices have on the genesis of disease. Yet under the International Covenant on Economic, Social and Cultural Rights, the RMI government is obligated to provide health information to its citizens as a human right. Among the obligations of states are "the dissemination of appropriate information relating to healthy lifestyles and nutrition."[30]

Climate change, migration pressures, NCDs, and communicable diseases

The prevalent, non-drought situation diet outlined above is not a healthy diet. Ecological and social forces are thus leading to obesity, diabetes, and other NCDs in the RMI.[31] Further, diabetes itself predisposes to a variety of conditions exacerbated by poor immunity, suppurative infections commonly, but also tuberculosis.[32,33]

With rising sea levels, human habitation in the remote atolls will become unsustainable.[34] Initially, more Marshallese people will migrate to Majuro and Ebeye (the 66-acre island in Kwajalein Atoll with a population of 15,000, where the workers who service the Ronald Reagan Ballistic Missile Test Site live). Indoor crowding in these population centers facilitates TB transmission. The World Health Organization reports that in 2012, the RMI had a tuberculosis prevalence of 1,080 per 100,000—one of the highest in the world.[35] While the climate change literature makes frequent mention of expected rises in water-borne arthropod-borne diseases, climate change may worsen the range of RMI epidemics, both infectious diseases and NCDs.

A popular public health concept is the "epidemiological transition," that is, as nations develop economically, they undergo a transition from communicable diseases (such as infectious diarrhea or tuberculosis) to NCDs (such as diabetes and heart disease).[36] In the Marshall Islands, diabetes is recognized as the top medical and public health problem. It is also experiencing the rapid worsening of a tuberculosis epidemic of white plague proportions.[37] As a risk factor for tuberculosis, the diabetes epidemic fosters the tuberculosis epidemic. Merrill Singer uses the term "syndemic" for such situations. "At its simplest level. . . the term syndemic refers to two or more epidemics (i.e. notable increases in the rate of specific disease in a population), interacting synergistically and contributing, as a result of their interaction, to excess burden of disease in a population."[38] Amplified by ecological pressures, factors that contributed to the cholera epidemic of December 2000 continue to be operant throughout the entire archipelago.[39]

Under the ICESCR, the RMI government has the obligation to:

- Take measures to prevent, treat and control epidemic and endemic diseases;
- Provide education and access to information concerning the main health problems in the community, including methods of preventing and controlling them.[30]

While the control of tuberculosis requires a robust health service program, the ICESCR also acknowledges that

> "The right to health embraces a wide range of socio-economic factors that promote conditions in which people can lead a healthy life, and extends to the underlying determinants of health, such as food and nutrition, housing, access to safe and potable water and adequate sanitation, safe and healthy working conditions, and a healthy environment."[30]

Effective control of the Marshall Islands' syndemics will necessitate addressing such social determinants of health.

The 2013 drought and relief efforts

During the 2013 drought, local food crops in the northern atolls were severely stunted or permanent-

Item	Delivered amount (in lbs)	Pounds per person, per day	Daily amount of calories	Daily amount of fat (% recommended)	Daily amount of carboydrates (% recommended)	Daily amount of protein	Other significant nutrients
Spam	513	.213	296	25.6 g (39.2%)	3.4 g (2%)	12.6 g (26%)	sodium 55%
Rice	2325	0.968	571	1 g (2%)	125 g (42%)	10.4 g (21%)	folate 64% iron 35% thiamine 50%
Flour	1080	0.45	743	2 g (3.3%)	155.1 g (52%)	21 g (42%)	folate 93% thiamine 106% niacin 60% riboflavin 59% iron 52%
Canned fruit	891	0.371	90	0 g	24 g (6%)	0 g	
Canned green beans	788	0.328	22	0 g	5.2 g (1%)	1.2 g (2%)	fiber 9% vitamin C 9% vitamin A 10%, sodium 16%
Vegetable oil	550	0.229	918	104 g (160%)	0 g	0 g	vitamin E 91% vitamin K 92%
Powdered milk (enriched)	812	0.338	761	41 g (63.5%)	59 g (19%)	40.3 g (80%)	vitamin D 119% vitamin A 28% calcium 140%
Total*			3401	268%	122	171%	

* Percentage of recommended daily amount based on 2000 calorie diet.

TABLE 2 Nutritional value of food aid supplied to Wotho during 2013 RMI drought.
Data courtesy of RMI Emergency Operations Center

ly decimated, including coconuts, which had been an important source of hydration and nutrition, as well as disposable income. Survey photographs depict plant necrosis, stunted growth, defoliation, and the loss of immature fruits – all of which pose fire hazards. On some islands, the only remaining drinking coconuts were the size of one's fist. In response, the RMI government initiated its National Disaster Committee, and four clusters were established to manage specific interventions: Water, Sanitation, and Hygiene (WASH); Health; Food Security; and Logistics. Food and water were distributed to the northern atolls in order to meet minimum humanitarian standards for the 6,384 affected individuals.

Early response included the installation of solar powered reverse osmosis (RO) machines on several affected outer atolls. Supplementary food was primarily provided by the US Agency for International Development (USAID), with donations from the US Department of Agriculture (USDA). These included items "whose elements have been tested over time" from the Federal Emergency Management Agency (FEMA)-developed food basket, as outlined in the FEMA/USAID Operational Blueprint.[40,41] The basket includes "rice, wheat flour, cooking oil, canned yams and fruits, and fruit juices." The RMI also produced its own food basket recommendations. Led by the RMI's Ministry of Resource and Development, the document recommended a 30-day food basket for each household (an average RMI household includes seven people) consisting of: "4 bags rice, 2 bags of flour, 4 bags of sugar (8kg), 4 cans baking powder, 10 cans tuna, 2 carton milk powder, 2 bottle vegetable oil, 10 cans of mixed veg, 10 cans of canned fruit, and 1 tin of biscuits."[42]

In early multi-agency meetings preparing for these food drops, some donors declined to pay for the inclusion of the sugar, baking soda, or biscuits.[43] The RMI government, supported by aid from Japan, supplied these items for the first and second months of food delivery. They were not included in later ones. The food aid to Wotho, which has 80 people in 20 households, was given as a supplement for 30 days (Table 2).

International aid efforts can have negative unintended consequences. In post-earthquake Hai-

ti, persistent provision of donated food and water contributed to ongoing dependence on foreign aid.[44] In Haiti, food aid and the lower price of imported alternatives was linked to diminished domestic rice production. A similar effect is seen in the Marshall Islands. Historically in the RMI, food aid has led to a decline in local food production, and an increase in preferences for convenient, higher-prestige imported foodstuffs.

Drought response and long-term food security in the RMI

The priorities for the health sector in the 2013 Drought Response Plan focused on "drought-related diseases and illnesses," including diarrheal/gastroenteritis illnesses, influenza-like-illnesses, and conjunctivitis.[42] There was no mention of NCDs. The plan does, however, include food security as a strategic priority for humanitarian response for long-term recovery needs. This priority refers to the planting of seedlings, including alternative salt- and drought-resistant crops. Seedlings recommended in the Response Plan include the replanting of indigenous breadfruit, swamp taro, banana, pandanus, and coconut, as well as the introduction of eggplant, cucumber, radish, tomato, watermelon, pumpkin, papaya, long beans, okra, and spinach. While a few of these foods are eaten in small amounts by a segment of the population in the capital atoll of Majuro, they are less familiar or desired in the other atolls.

Since the 1970s, several agricultural pilot projects have been initiated, with little to no continued results. Reporting on these projects has been minimal, and there is no central office that collects and catalogues such reports. While hydroponics technology generated interest for a period, salt spray and the lack of high-quality water impeded progress. A Taiwanese-funded and run farm based on Majuro, the Taiwan Technical Mission (Laura Farm), has thrived for many years, providing eggplant, cucumbers, tomatoes, and squash to local stores and seeds to individuals. But the conditions that make this farm able to succeed—the availability of water, and a relatively privileged community with funds and time to pursue home garden projects—are limited in the outer atolls.

Current trends in outer-atoll agricultural practices suggest that Marshallese do little crop tending. Breadfruit, pandanus, and coconut grow with minimal intensive maintenance. Taro, which requires more tending and is sensitive to salt water intrusion, is no longer grown consistently in many of the outer atolls. According to some informants in Wotho, taro "just doesn't grow here." An analysis of soil by a visiting surveyor, however, noted ideal organic soil conditions in October 2013.[45] It is more likely, which some admit, that taro is no longer grown due to its lengthy growing cycle and slow return. So, for alternative seed plantings to be successful—particularly at a level that could replace canned goods—cultural change in the form of popular education and adoption of new agricultural practices is necessary to influence food choices.[46] As noted above, education about healthy food choices needs to be viewed as a human right.

The human right to food and nutrition, food preferences, and public health policy

Article 25, section 1 of the Universal Declaration of Human Rights reads as follows:

> Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.[47]

The UN Special Rapporteur on the Right to Food notes,

> [W]hen people are not able to feed themselves with their own means, for instance because of an armed conflict, natural disaster or because they are in detention, the State is under an obligation to provide food directly.[48]

Thus, the RMI government and the international community do have an obligation to feed its people in the face of natural disasters. However:

> The right to food is not a right to a minimum ration of calories, proteins and other specific nutrients, or a right to be fed. It is about being guaranteed the right to feed oneself, which requires not only that food is available—that the ratio of production to the population is sufficient—but also that it is accessible—i.e., that each household either has the means to produce or buy its own food.[48]

The Special Rapporteur also notes that adequacy is one key element of the right to food:

> **Adequacy** means that the food must satisfy dietary needs, taking into account the individual's age, living conditions, health, occupation, sex, etc. For example, if children's food does not contain the nutrients necessary for their physical and mental development, it is not adequate.[48]

It is evident that the current diet of Marshallese—one that results in child malnutrition, obesity, diabetes, and other NCDs—is not an *adequate* diet. The human right to food buttresses the public health imperative, which, however, collides with the problem of cultural food preferences. Nonetheless, under ICESCR, the RMI government is obligated "[t]o ensure access to the minimum essential food which is nutritionally adequate and safe, to ensure freedom from hunger to everyone."[30]

There are currently no laws in the RMI specifically aimed at limiting imported food or otherwise increasing the competitiveness of locally produced products. As an island nation reliant on imported food, the RMI government is in a position to encourage dramatic changes in the availability and unavailability of various food items. Other nations, such as Brazil and Chile, have controlled the marketing of unhealthy foods, while Mexico has imposed regulations on saturated fats and added sugars in feeding and welfare programs. [49] Other Pacific Island nations have implemented labeling regulations and imposed taxes on sweetened drinks, confections, and ice cream. Fiji has banned the import of mutton flaps, and Samoa has banned the import of turkey tails.[50]

Following the example set by other nations, policy options for the Marshall Islands include subsidies and taxation to lower the cost of fruits and vegetables and raise the relative cost of white rice and bleached flour, as well as packaged, processed, and snack foods. RMI authorities could also insist upon better supplemental food in disaster relief situations.

The Majuro Declaration and policy choices

Since the early 1990s, the scientific community has recognized the ramifications of global warming on climate change and rising sea levels. In 1997, recognizing the need for action, many nations committed to reducing greenhouse gas emissions and developing clean and renewable energy sources, in a landmark compact known as the Kyoto Protocol.[51] Despite such efforts, on May 9, 2013, the world reached a new climate milestone, with carbon dioxide levels reaching 400 parts per million, the planet's highest in the last 3 million years.[52]

In September 2013, the Republic of Marshall Islands hosted the 44th Pacific Islands Forum Summit. A key topic was the Majuro Declaration, a commitment by nations in the Pacific Rim to use renewable energy and reduce greenhouse gas emissions and carbon emissions.[53] The Declaration is intended to support the efforts already made by the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. While climate change has the most severe effects on vulnerable nations such as the RMI, it is important to note that the Declaration reemphasizes the effects of global warming on the entire world and reminds us that the responsibility to act lies in "every government, every company, every organization and every person."[53] In an expression of the Marshallese people's will not to surrender to climate change, RMI President Chris Loeak declared, "My land is my home, my heritage and my identity . . . This is my country and I will always stay here. If water

comes, it comes."[54]

In November 2013, subsequent to the Majuro Declaration, the UNFCCC met in Warsaw at the 19th Conference of Parties (COP19). Prior to COP19, the UNFCCC had two mechanisms, adaptation and mitigation, to assist developing nations with the consequences of climate change. (Assistance with crop substitution or techniques is an example of adaptation, while disaster aid is an example of mitigation.) At COP19, the UNFCCC adopted loss and damage as a third mechanism to deal with climate change.

As the RMI has taken a strong stance on climate change, it also needs to take a similar firm stance on nutrition choices. As Rudiak-Gould notes about the local interpretation of the scientific concept of climate change:

> If one discards the unidirectional model of science education in favor of a bidirectional model of dialogue . . . the 'mistranslation' [of "climate change"] is understood instead as a reinterpretation, and the Marshallese view of climate change as a hybrid sociocultural/environmental risk emerges as a wholly reasonable, and indeed insightful and sorely needed, framing of the issue.[55]

The seriousness with which Marshallese people take climate change should be a lesson to us all.

Conclusion

The Marshallese have had little agency in their own modern history, leading to a dependence on imported, unhealthy food. This, in turn, has led to syndemics of non-communicable and communicable diseases. In the post-World War II period, as well as during population relocation because of nuclear testing, dependence on outside foodstuffs was imposed. As people migrated to the population centers of Majuro and Ebeye, the urban population could not be sustained on native crops and reef resources. Over time, imported food became the preferred items, such that contemporary cultural food preferences are for items such as white rice and canned meat products.

Now, the Marshall Islands are experiencing the effects of fossil fuel-induced climate change, for which the Marshallese are responsible for a negligibly small proportion. The human right of Marshallese people to continue to live in their ancestral homelands is threatened by sea level rise, inundation, and weather events such as prolonged drought. The US, historically responsible for one-quarter of carbon emissions, and the dominant power in the Marshall Islands since 1944, bears a great responsibility. We suggest that while international aid may address immediate hunger issues, they can also contribute to the existing epidemic of NCDs. In order to address this public health issue, food aid, regulation of food imports, and more robust popular diet education should all aim towards a healthier diet. In addition, despite the inherent barriers, a return to local food production must be encouraged. In periods of disaster relief, external agencies should work with the RMI government to introduce healthier foods.

Without drastic reductions in global emissions, sea level rise will likely make the Marshall Islands uninhabitable for humans. In the face of climate change, advocating for the human rights of Marshallese to the highest attainable standard of health should be a Marshallese, US, and global concern.

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