

Humanitarian Innovation Hackathon



2
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Food Security

The Issue

Fiji lies in an area constantly transversed by tropical cyclones, and climate change is only making this worse.

These climatic events threaten the food security of the Fijian people both directly and indirectly.

Extreme weather brings droughts, floods and high winds which disrupts and damages farms and fisheries which provide a large portion of Fijian food supply. Additionally, post disaster, communities will often prioritize rebuilding necessary housing infrastructure, leaving a reduction in harvesting of local produce.

As a result many depend on crop imports to ensure food availability during the cyclone season and other natural disasters caused by climate change.

Hackathon Challenge E

Humanitarian Mentor: Ivy Susanti

How might Fiji reduce its vulnerability to climatic events and ensure stable local food supply?

Fiji lies in an area constantly transversed by tropical cyclones, and climate change is only making this worse. These events have serious impacts on the Fijian people and economy, and Food Security is one of them.

Persona

Fantasha, 25, saw firsthand the trail of destruction left by Tropical Cyclone Winston in 2016 on her family farm. TC Winston, a Category 5 storm, is the most powerful storm to make landfall in the southern hemisphere to date, causing widespread destruction across the country. It killed 4 people and affected up to 350,000 people in Fiji.

Fantasha's family are indigenous Fijians and made a living from selling produce mainly to resort hotels and businesses catering to tourists. However, Cyclone Winston devastated their 50-acre farming estate in Taveuni, with financial damage of estimated to be over FJ\$300,000.

That year, Fantasha had just finished her postgraduate study in agriculture. As she sadly observed the damage at home and the farm, she set a goal that she would rebuild the family's farm.



The Warren Centre
& Professor Ron Johnston

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Food Security

Resources

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Background

Fiji's climate is generally categorised as an oceanic tropical climate with high rainfall annually which is influenced by seasonal variations, the El Niño–Southern Oscillation (ENSO) phenomenon and the South Pacific Convergence Zone (SPCZ) fluctuations. Annual extremes have increased in recent decades in both frequency and magnitude in Fiji, according to SPREP.

Fiji also lies in an area normally traversed by tropical cyclones mostly during the November–April wet/cyclone season. The tropical cyclones and depressions tend to track from the north and the west, resulting in flooding and multiple landslips that adversely impact on the economy and infrastructure. On the other hand, El Niño events are the major cause of drought in Fiji. A drier and hotter weather can be expected from December to February and drier and cooler conditions from June to August.

Tropical Cyclones (TCs), tropical rainstorms and in turn flooding, affect Fiji on an annual basis; flooding is projected to increase in both frequency and severity over the coming years. These projections suggest a 100% increase in annual losses as a result of a conservative assumption of “moderate” climate change. With an assumed “severe” climate change impact, this estimate becomes a whopping 300% increase in annual losses causing an estimation of between FJ\$76 and FJ\$153 million in damages per annum.

Historically, Tropical Cyclones in the South Pacific occur on average five to six times per year (Gupta, 1988). One of the most destructive floods in Fijian history, associated with the TC Kina (1992–93), resulted in FJ\$88 million in damages to agriculture, housing and businesses.

Tropical cyclones have a reoccurring detrimental impact on many of the Pacific communities – with the greatest impact felt by those in coastal communities, remote or isolated areas. Accounting for a large portion of the Fijian local food supply – fisheries and farms.

Rewa watershed is partially located on a plateau with a maximum elevation of just above 900m. The majority of the drainage basin is located between hills of between 300–600m elevation. The upper reaches of the river are steep with a mean slope of 0.033 and decrease downstream to a mean slope of 0.002. “The northern part of the Rewa watershed is composed mainly of relatively young basaltic rocks and the southern part of older plutonic rocks” (JICA, 1997). Large sections of the basin are covered by dense rainforest, with agricultural areas located along river flood plains. Rainfall on Viti Levu is seasonal, with a wet season during December–May and a drier season from June to November.

Tropical Cyclones occur more frequently in Fiji during negative values in the Southern Oscillation Index, of all TCs, those that occur during El Niño conditions cause floods. However, major floods have still occurred in river regions such as the Ba River when the Southern Oscillation Index (SOI) was both negative and positive, suggesting that the SOI is a poor indicator of flood potential outside of TC events. A majority of floods are caused by more common tropical rainstorms, although the floods resulting from TCs are larger and more intense. TCs typically travel along the length of a watershed, concentrating discharge over shorter periods of time – severely affecting those along the riverbanks.

Prioritising rebuilding necessary housing infrastructure, leaves a reduction in harvesting of local produce post-cyclone. Farmers and fishers who would typically rely on their own produce as food supply are left needing to sell their produce off to local food traders in order to fund their housing and infrastructure repairs. An example of this can be seen post Cyclone Winston, where 52% of female mud crab fishers had to cease harvest to work on re-building their house. Of those remaining fishers, 65% were required to sell their harvest to fund the re-build.

One of the Fijian government's 5-year Strategic Development Plan is to improve food and nutrition security for all Fijians. Nevertheless, Fiji and indeed many other Pacific Island countries will still depend on crop imports to ensure food availability during the cyclone season and other natural disasters caused by climate change.

Location Information

Since gaining independence from the British rule in October 1970, agriculture has been the backbone of Fiji's economy, contributing 11.8% to its Gross Domestic Product in 2019 alone. It plays a key role in Fijian's livelihood as 65% of its 896,000 population derive their income from this sector. A sector which accounts for 45% of total of employment, of which 37% are women. Challenges in agricultural development include population growth, natural disasters due to climate change and rural-urban migration. Most rural and maritime communities in this country rely on subsistence agriculture for survival, using traditional environmental knowledge and practices of crop farming, collective community work and socio-cultural safety net system such as food barter, to ensure food security and wellbeing during hard times including natural disasters and the coronavirus pandemic.

The shift to imported food consumption

Fiji relies heavily on imported food sources, with 54% of household food expenditure sourced from supermarkets –opposed to local fresh food markets. This is exacerbated by increasing urbanisation, with the proportion of Fiji's population living in urban areas increased from 37.2% (588,068) in 1976, to 55.9% (884,887) in 2017.

The Food and Agricultural Organisation (FAO) reports that the change in Fiji's food consumption is attributed to value for money and ease of preparation. However, the diversity in diet has greatly reduced with the ease of access and affordability of imported processed food, leading to increasing rates of disease. The Future Directions International (FDI) reports that consumption of energy-dense processed food has caused high levels of overnutrition, increased obesity rates and associated non-communicable diseases (NCDs). While the adult obesity rate in Fiji was 9.8% in 1993, it increased more than threefold to 32.1% in 2011, this number is still increasing. Increasing rates of obesity in Fiji contributes to additional diseases of the circulatory system (44%); endocrinal, nutritional and metabolic disease (13%) and cancer (10%).



Rapid urbanisation in recent years has resulted in the decline of crop farming in rural areas. The latest census by the Fiji Bureau of Statistics records an increase in the proportion of Fiji's population living in urban areas from 37.2% (588,068) in 1976, to 55.9% (884,887) in 2017.

Further, the Secretariat of the Pacific Community (SPC) reports that urbanisation affects food security in four ways:

- Increasing the population's reliance on commercial food markets as urban consumers tend to purchase disproportionately more imported food products than rural consumers;
- Lowering growth in agricultural production due to migration of young people who supply rural labour force;
- Breaking down traditional food insecurity coping mechanism particularly social safety nets therefore increasing vulnerability, and
- Increasing poverty and poor living conditions leading to nutritional problems. SPC further notes that food production per capita in Fiji has declined since the early 1990s which is associated with an increased dependency on imported food.

In 2017, Johns et al. conducted a consumer survey of 1,000 urban households in the main island of Fiji, Viti Levu, to study the shopping patterns in retail outlets of food categories, as well as general changes in consumption from 2012–2017. They found that modern supermarkets had overtaken traditional markets as the dominant food retail outlet with 100% patronage and taken in 54% of total household food expenditures. However, 97% of survey respondents also visited traditional markets for fresh fruit and vegetables, with 28% of urban household expenditures.

Out of 79 fresh and processed food products being surveyed, the team from the University of Adelaide found that the average urban household spent 568 Fijian dollars (\$360 AUD) per month on food. Approximately 28% of that amount was used to purchase processed and manufactured food that include snacks, meat and bottled drinks. Followed by fresh vegetables (22%), carbohydrates (18%), protein sources (14%), fresh fruit (11%), fats, oils and seasoning (6%) and dairy, cheese and yogurt (1%). Main traditional markets focus less on processed food products but fresh produce categories instead.

The impacts of changes in food consumption

The FAO reports that the change in urban Fijian's food consumption was attributed to value for money and ease of preparation. For example, Fijians tend to reduce eating taro in favour of high calorie food with higher concentrations of carbohydrate and protein such as rice, which is also easier to prepare. Future Directions International (FDI) notes that the typical Fijian diet since 2014 consists of 50% daily rice consumption, 43% daily roti consumption, 15% instant noodles and an overall increasing consumption of processed snack foods such as crisps. Discretion food and drinks which are often high in energy and saturated fat, sugar and/or salt, account for 26% of the average Fijian diet while only 15% of adults eat the recommended five or more fruit and vegetable servings daily and 10% do not eat fruits or vegetables. The combination of increasing consumption of imported food and sedentary lifestyles has resulted in Pacific populations to be among the most obese in the world. Fiji has high prevalence of type-2 diabetes (37,000), iodine deficiency, and endemic goitre. FDI reports that consumption of energy-dense processed food has caused high levels of overnutrition, increased obesity rates and associated non-communicable diseases (NCD). While the adult obesity rate in Fiji was 9.8% in 1993, it has increased more than threefold to 32.1% from 2011. Obesity in Fiji contributes to diseases of the circulatory system (44%); endocrinal, nutritional and metabolic disease (13%) and cancer (10%) which cause between 70 and 75 deaths in the overall Pacific region.

The ability of the government and individual households to pay for imported food will determine food security in the country. The income from service sectors such as tourism and remittances are easily affected by external economic shocks such as global food price increase or coronavirus pandemic that shut down the tourism industry, reducing earnings and the ability to purchase imported food. Gender inequality, including unequal access to productive resources (such as lands, farming services and inputs, finance, training, and information), markets and institutions has also hindered the realisation of women's human and productive potential, Australian Centre for International Agricultural Research says.

Changing the food consumption behaviour

Public communication provides an innovative means to change eating behaviour. One of such examples is the Pacific Island Food Revolution (PIFR) cooking competition featuring contestants from Fiji, Samoa, Tonga and Vanuatu and broadcasted in the region including in Australia and New Zealand. The TV program, which was initially funded by Australian DFAT, promotes healthy diet in a competition that uses local produce. PIFR aims to link improved nutrition outcomes to its viewership subject to continuation of the TV program. Early surveys conducted by the BusaraCenter for Behavioural Economics showed 55% of study participants reported having changed their diets over the past year and most respondents had started to incorporate new ingredients to improve their home-cooked food. One of the Fijian government's 5-year Strategic Development Plan is to improve food and nutrition security for all Fijians. Nevertheless, Fiji and indeed many other Pacific Island countries will still depend on crop imports to ensure food availability during the cyclone season and other natural disasters caused by climate change.