

The Tonga Food Road Map 2014 - 2064

Navigating climate change potholes with a mash-up of traditional and bio-technical capacity building

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Progressive climate change will lead to an intensification of existing food insecurity for people of the Pacific Island Countries (PICs). It is critical that the governments of the PICs lead the development of a formalized action plan to achieve long term food security across household, community and national levels. This bold plan for a long term resilient food system must consider the inclusion of staple food groups modified to withstand predicted local climate change effects.

Aim

The aim of this brief is to outline the opportunities that exist for PICs like Tonga in planning for selective inclusion of genetically modified food for long term resilience. This plan, or the Tonga Food Road Map (TFRM), mimics the framework of the successful Tonga Energy Road Map 2010 – 2020 and encourages acknowledgement and formalization of traditional food production and sharing systems in addition to investing in local capacity for the production and management of climate resilient staple crops in Tonga.

Problem

Food insecurity can be defined as an inability of individuals, households and communities to acquire appropriate and nutritious food on a regular and reliable basis, by socially acceptable means. Food security assessments carried out by the Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific (CGPRT Centre) in 2000 showed that provincial and household food security are of more serious concern than national food security in Tonga. Unfortunately, there are major gaps in regular and detailed reporting of food insecurity in Tonga, with the Food and Agriculture Organization of the United Nations (FAO) unable to report any statistics on per capita food supply, food aid shipments or the prevalence of under nutrition in Tonga as of 2012. Other statistics, such as a decrease in agricultural productivity per capita between 2006 and 2011 give reason for concern. Yet for geographically isolated Tonga, with 41 inhabited outer islands, productivity is only one piece of the puzzle; formalizing systems of access to locally produced food is essential for long term food resilience. Food access, availability, utilization and source stability must be considered as a whole.

Climate change and food insecurity in Tonga

Reports already indicate shifts in the PICs climate, including a drop in precipitation and rise in atmospheric temperatures. Other progressive climate change effects in the PICs, such as increased soil salinity, reduced precipitation and irregular seasons will increase existing levels of food insecurity for Tonga. Reduced precipitation will be of particular concern as the majority of food grown in Tonga relies on rain water; i.e. irrigation capacity is low. Incremental sea level rise, coastal erosion and ocean acidification will pose major challenges to the local food systems, as will building capacity to recover from the likelihood of more frequent storms.

Capacity – gaps and risks

Local resilience capacity to monitor and act on the challenges from climate change in Tonga is currently low. Gaps include local scientific knowledge and skills, long-term partnerships with those with specialized biotechnical knowledge, and a significant lack of public research facilities and laboratories for local training and field testing. At this point, PICs like Tonga are in a precarious position of ignorance and exclusion from the global knowledge economy, with a resultant high risk of exploitation from external interests (case in point, Autogen and their attempts to appropriate the entire Tongan gene pool), and the long term resilience capacity of those within the PICs is being increasingly threatened with shifting global environmental realities. In a search for solutions to bridge these gaps, an opportunity arises for the conceptualization of a plan; the Tonga Food Road Map.

Opportunity – Capacity Building

Vermeulen et al (2012) recommended a multi-pronged strategy for coping with the effects of progressive climate change and building capacity through an overall food system. These recommendations can be summarized as:

- *Analysis of existing farming and food systems*
- *Encouraging community-based approaches*
- *Generation and use of new technologies*

1. Analysis of existing farming and food systems / 2. Encouraging community-based approaches

Deputy Director of Te Kotahi Research, Maui Hudson recommended a focus on the overall system of food production (across scales, for both household security and profit) and distribution/movement (access) for food security in the PICs (talanoa, September 2013).

To ponder an appropriate form for a formalized system of production and distribution, context is essential. The Tongan social structure is maintained through an adherence to key values including *‘ofa* (love/compassion), *faka ‘apa‘apa* (respect) and *fetokoni‘aki* (reciprocity and a responsibility for others) (Vaioleti, 2006). The emphasis is constantly and consistently on maintaining healthy group harmony and the collective interest will always override that of the individual.

In no other way are these values more visible than in the sharing of food within extended families and the wider community in Tonga; there is an informal system of food distribution that has been maintained for millennia, yet with unchecked preoccupation with the production of food for profit, food, land sharing and subsistence farming which minimizes household food insecurity, is threatened.

Subsistence work is still the main activity for 20% of the population in Tonga and in agriculture, residents report the growth of a movement to return to home gardening and organic farming, aided in part a NGO initiative to grow and distribute seedlings in the community for household food production. Interviewees from Tongatapu report an especially dedicated movement to home based and community food gardens in the outer islands of Ha'apai (talanoa, Huni, November 2013; talanoa, Taunaholo, November 2013). Interestingly, this movement coincides with a significant decrease in overall pesticide imports to Tonga (FAO, 2013). Vaoleti (talanoa, November 2013) reports that practices of food sharing are well established in Tongan society, and this also extends to the sharing of land for growing food in rural communities. Developing a food plan that recognizes the governing values of social behavior in Tonga, will lead to the highest chance of its acceptance and success.

3. *Generation and use of new technologies - Adding biotechnology to the Food map mix for climate resilience*

Established global laboratories have identified and isolated plant genes that will allow tolerance for adverse growing conditions from climate change, including drought conditions and increased soil salinity. There is a need to build local capacity in Tonga to manage and develop plant varieties suitable for the local, changing environment. Partnering with established laboratories of major trade partners such as New Zealand and Australia, and funded in part by climate adaptation aid, local skill and knowledge capacity will be significantly improved. The focus will be on publicly funded plant research and application. The goal is not simply technology transfer as cases in other developing nations show the modification to be labor intensive and often difficult to reproduce – knowledge and skill transfer with ongoing support is needed to accompany the technology transfer.

From exclusion and appropriation risks to inclusion and empowerment

With the PICs sullied initial experience with biotechnology due to extensive efforts to appropriate genetic material (both human and non-human) from the Pacific, it is critical that efforts for local participation in applied biotechnology be based on contextually-founded ethics. Petera (2007) outlined recent legal progress in the PICs for resisting genetic appropriation (the Model Law/ML) and Kanongata'a (2007) states that Tonga's social structure, cultural norms, traditions and customs must be taken into consideration, with applied respect for the maintenance of human dignity. Vermeulen et al (2012) writes that the success of crop breeding for future climates chance will be higher if conducted *with* farmers, which will also allow for external parties to gauge the ability and willingness of [Tongans] to adopt new biotechnology.

Preferentially partnering with public research institutions, funded with climate adaptation aid will further minimize the risk of exploitation, and improve chances to meet the transparent goals of the Road Map; household food security first, export productivity and profits second.

Options for entry of local biotechnology to the Tonga Food Road Map

Biotechnology for subsistence

As climate progresses, current crops may struggle to tolerate an increasingly saline soil and more uncertain precipitation and seasonal patterns. Coconuts, pumpkin, cassava, taro, roots and tubers and fresh fruit are the foods produced in the highest quantities in Tonga (FAO, 2013). Ensuring food security for Tonga means building local skill capacity to develop resilient versions of these key crops through biotechnology. To align with social systems that value the collective and sharing, this capacity building should be done through publicly funded agricultural research – there are frameworks in place internationally that has set a legal precedent for intellectual property (IP) sharing (Public Intellectual Property Resource for Agriculture – PIPRA) for open access to agricultural biotechnology (Chi-Ham et al, 2012). Traditional systems of food sharing therefore will translate in future to a culture of agricultural IP sharing for resilience.

Biotechnology for profit – food exports

FAO records from 2011 show the highest value exports for Tonga to be coconuts, pumpkin and squash, cassava, fresh fruit/vegetables, roots and tubers and vanilla. Export partners (current and potential) should be engaged early and encouraged to invest in capacity building for mutually beneficial productivity growth under an increasingly challenging changing climate.

A map to food resilience

In 2010, the Tongan government implemented the Energy Road Map 2010-2020. This plan set in motion a set of actions to reduce Tonga's vulnerability to oil price shocks ensure an increase in quality access to modern energy services, in an environmentally sustainable way. Essentially – it is a plan to minimize economic and social risks for the nation. This Road Map has been acclaimed internationally and has catalyzed valuable partnerships between the government of Tonga and organizations such as NZAid, AusAid, the Asian Development Bank, the World Bank and a number of global NGO's. The success of this framework for guiding policy and action, as well as directing aid funding and identifying needs for knowledge transfer is one which can be translated to meet another critical need for the nation; an adaptive and progressively resilient national food system.

Tonga Food Road Map 2014 – 2064

1

Formalise community training/sharing programmes. Achieve food security in > 80% households

2

Formalise ongoing partnerships with established public research facilities for biotech skills transfer

3

Set export and trade plan in partnership with (current and potential) export partners

2014 - 2064

- Broad stakeholder engagement. Formalise progressive Tonga Food Road Map across social scales.
- Monitor food insecurity - household monitored at community level.
- Education/training/ community partnership for TEK knowledge sharing - household food security met; availability and access

2020 - 2064

- Seek educational external and training partnerships with major current and potential export partners for local capacity building in biotechnology; production stability
- Seek aid/public funding for tailored biotech projects to ensure climate resilience of staple local food crops
- Open access of IP for use by PICs. Commercial use explored outside PICs.

2040 - 2064

- Work placement partnerships for locally trained biotech scientists in NZ/Australia and other PICs
- Monitor shifts in food capacities as climate change advances - ongoing partnerships with establish external laboratories.
- Monitor balance of subsistence farming and biotech crops for optimal food system resilience.

Recommendations

- Engage with community, subsistence farmers, educational institutions and development partners to understand and formalize current systems of local food production and sharing. Educate on the predicated climate shifts and the impacts on current production capacity. Emphasize the ongoing importance of traditional systems of food distribution (based on accepted value systems).
- Engage with, educate and seek perspectives on the inclusion of biotechnology in the national food system for both household food security, and further down the line, for export.
- Develop an official framework for action (TFRM, 2014-2064), for which future biotechnology for climate resilience will be but one part.
- Measure and monitor indicators of food security at household and national levels from now – there are current information gaps, and there will be a need to monitor progress of the TFRM.
- Establish current food production capacity and skill/facility gaps - sighting the TFRM seek dedicated funding and ongoing training partnerships with established laboratories in New Zealand/Australia/Asia. Establish skill based/human capacity milestones to meet changing production needs.
- Formulate a trade and export plan – develop this in partnership with key export partners to establish quality and extent of demand to guide future biotechnology and production goals.

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About the Author

Lora Vaioleti is a Fulbright scholar who recently worked in a leadership development and strategy role for the Global Islands Partnership (GLISPA). A New Zealander of Tongan ancestry, her work has centred on exploring human security challenges within the wider Pacific, especially in regards to climate change and forced relocation. To this end, Vaioleti has led national, regional, and international research projects for a number of Pacific-focused organizations. A continuing research fellow for the Center of Unconventional Security Affairs at the University of California, Irvine, and the Indigenous Maori and Pacific Adult Education Charitable Trust (IMPAECT), she continues to research the latent value of traditional Pacific social practices in increasing human security and social resilience to both abrupt and long-term climate change effects. Vaioleti received a Masters of Management with a concentration in Sustainability from the University of Waikato, New Zealand, and a Bachelor of Physiotherapy from the University of Otago, New Zealand.

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