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## **PAPER 2: SUSTAINABLE TROPICAL FRUIT PRODUCTION; FARMER SUPPORT IN THE PACIFIC**

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### **ABSTRACT**

In recent years the impacts from climate events, technology advances, and social change have affected tropical fruit producers across the Pacific. Cyclones have devastated longstanding plantations; cocoa in Samoa, mango, coconut, and banana in the Fiji Islands. Technology has bypassed many traditional producers in economies such as Papua New Guinea where investment from offshore producers now impacts local production. More noticeably however, the succession of the next generation as producers is becoming fraught from the impact of urbanisation and crop issues such as pest and disease vulnerability, biosecurity threats, and changing consumer expectations. What support is needed to ensure tropical fruit production meets the quality and quantity thresholds from local and international markets to guarantee farmer incomes?

A number of farmer support programmes exist across the Pacific, essentially as aid programmes. Whilst often driven by political altruism, they all compete for the farmer's time and skills. The future for fruit producers requires ongoing training in crop husbandry and market drivers to optimise production opportunity, and also through investment in the future — technology for example in diagnosing plant health issues or for crop responses to climate change; e.g., through breeding programmes. Examples of producer support through external programmes can be seen in recent work funded from New Zealand with the fresh produce sector in Papua New Guinea to support existing producers to grow their presence in the local market despite competition or disease pressure, cocoa plantation restoration in Samoa to meet a burgeoning international market demand, and cyclone response work in Fiji where farmers are rebuilding following Tropical Cyclone Winston. These programmes all draw from international experience in tropical fruit related work to help Pacific economies evolve as reliable contributors of food and nutrition to their consumers.

**Keywords:** Pacific horticulture, food security, Papua New Guinea, Fiji, Niue, Samoa

### **INTRODUCTION**

In recent years a series of compounding impacts from climate events, technology advances, and social change have affected tropical fruit producers across the Pacific. The most visible impacts derive from extreme weather events such as cyclones which have devastated longstanding plantations in many of the Pacific islands; cocoa in Samoa, mango, coconut and banana in the Fiji Islands. Other climatic factors such as drought or flooding also impact directly on communities. Technology has bypassed traditional producers in many ways. The development of new products from locally grown fruits, gene technology for crop development, or food safety assurance are often missing or marginalised in local economies such as Papua New Guinea or Fiji. In addition the investment from offshore investors in regional production opportunities further impact on local farmer systems and returns. More noticeably however, the succession of the next generation as producers is becoming fraught from the impact of urbanisation and crop issues such as pest and disease vulnerability, biosecurity threats and changing consumer expectations.

The recently published Framework for Resilient Development in the Pacific (2016) summarises the present situation in the Foreword as follows:

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*'Pacific Island countries and territories (PICTs) are extremely vulnerable to climate change and natural hazards which are major challenges for the development aspirations of the people of the Pacific and their environment. The experience of the region to Tropical Cyclone Winston in 2016, Tropical Cyclone Pam in 2015 and numerous other events have all reinforced that the actions on climate change and disaster risk management have to be better understood, planned for, funded and coordinated at the local, national, regional and international level. The Framework seeks to place sustainable development, that is resilient, front and centre. It recognizes the importance and critical role of political leadership and commitment, and the central government agencies as key actors. It also embraces the role of the private sector and civil society in building resilience. The discourse should continue to shift: from stating the business case to implementing the opportunities to build resilience. Small Island Developing States (SIDS) in the Pacific, are leading this work, but more support is needed.'* (Foreword, p. 7)

This also highlights the growing concern in the Pacific related to climate change and natural hazards – and the impacts they are having on the food production sector among others. Food production is an attractive target for a variety of different aid projects by donor countries (e.g., New Zealand, Australia, EU), development organisations (e.g., World Bank), as well as NGO's (e.g., World Vision, Save the Children). Many of these international aid programmes are consistent contributors to Pacific fruit production sectors, providing investment in development and supporting research or infrastructure to support growers and economies. Recent examples which draw from New Zealand expertise can be found in Papua New Guinea, Fiji, Niue, and Western Samoa. These are examples of ongoing investment from the aid community of the response to climate and climate change, technology advances, and social pressures. NZAid refers to the aid programme which is administered through the New Zealand Ministry of Foreign Affairs and Trade (MFAT).

## **PAPUA NEW GUINEA FRESH PRODUCE SECTOR**

New Zealand through the NZAid partnership programme is supporting Papua New Guinea to achieve sustainable economic and social development so it can reduce poverty and become a more secure and prosperous nation . Within this programme is an NZAid-Massey University (NZ) collaboration alongside the Pacific Adventist University (PAU), 14 mile, Port Moresby. The opportunity exists for PAU Farm to increase food security and replace the import of expensive fresh food, whilst contributing to the development of the local economy and community. PAU farm development goals also align with the Papua New Guinea strategy '2050 PNG Vision' (Treasury Department, 2011) where food production is projected to form the basis for socioeconomic growth. As the farm is part of a PNG-based University, PAU Farm development also aligns with the intent of collaboration between research and higher education institutions and industry in order to add value to local knowledge and enterprise, building knowledge of the processing and downstream management of agricultural products that may yield attractive returns to PNG (PNG Vision 2050 sections 1.17; 1.17.4; 1.20.21). Several challenges for the farm have been identified for immediate action: climate change issues, e.g., recent drought conditions; retaining market share for produce; depleting soil fertility; crop health issues; water security; and farm staff training and development (Roskrue & Semese, 2017).

PAU will only be able to achieve a vibrant and sustainable production system if the strategic industry drivers are either established, or where they already exist, have improved effectiveness and efficiency. Advanced land management practices in their food production systems including up-to-date plant/tree husbandry practices, and application of up-to-date post-harvest handling and management of produce needs to be applied. Furthermore, crop decision systems need to respond to market intelligence on consumer demands and needs,

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be informed by regular and effective extension services, all of which will contribute to a skilled and diverse workforce.

Papua New Guinea is rich in natural resources, however; logistical, climatic, and geographic challenges continue to reduce the availability of local fresh produce around the capital, Port Moresby. Farming is based on subsistence agriculture and lack of local production causes residents to rely on expensive imports for their basic food needs. The development of modern agriculture offers urban residents access to regular supply of fresh and healthier food, while diversifying the local economy and providing much needed employment.

Port Moresby and the nearby Central Province has a population of around 365,000 (2011 census). Recent figures further indicate the city accounts for around 18% of the total PNG population of close to 8 million people. Chang et al. (2015) found that limited options exist in close proximity to Port Moresby for commercial fresh produce production because of issues of land capability and land tenure. However, farmers from more distant areas (>30km) were working in groups to supply supermarkets. Other areas in PNG have high agricultural potential and fertile soils, but poor transport infrastructure is a serious challenge for agricultural development generally. Further, Chang et al. (2015) defined the market situation in Port Moresby as being in a state of flux, on both the demand and supply front, thus considerable opportunity still exists to meet supply needs.

The project scoping exercise identified three key areas for development of the complete produce supply chain as a system. These are: upgrading the cool chain system; brand development based on quality and supply factors; and postharvest handling, i.e., transportation, packaging, hygiene, and presentation. Value addition and branding, market choices, and customer relationships are important factors to maintain the brand going forward. This project will consolidate and build the supply chain of fresh produce into Port Moresby district and therefore create more opportunity for small farmers, many who are women and who are distant from the city to also supply through a recognised entity (Roskrug & Semese, 2017). A particular emphasis is the move from subsistence vegetable production to longer-term fruit production plantations which although presenting higher risk, offer strong market returns if done well.

The alignment of the project outputs to the PNG 2050 vision enhances the drivers for success in working to attaining the PNG nation's dream to be a 'smart, wise, fair, healthy, and happy society' (Ambang, 2012). This project is in its infancy and will be watched with interest as the burgeoning demand for fresh produce from the Port Moresby district continues and local producers are challenged with meeting that demand.

## **FIJI**

Another project currently in its evolutionary stage is the *KANA: Resilience through knowledge and action in agriculture and food security* based in Fiji. This project also comes under the auspices of the NZAid programme. The NZAid programme in Fiji particularly invests in developing agriculture, achieving a more highly skilled, and educated workforce. Rural communities have traditionally relied on home gardens for food and income. Fijian households (78.9%) grow food for home consumption with many households in rural areas obtaining all their food from their garden (NFNC, 2007).

After Tropical Cyclone (TC) Winston in February 2016, many communities were affected with fishing, farm, and plantation activities damaged or destroyed. The cost of Winston in loss of agriculture and horticulture has been estimated at FJ\$ 208.3 million (excluding the sugar sector) and in the worst affected areas, 100% of crops were destroyed. As these communities recover, it is essential to develop food security and family incomes that will build resilience. The worst affected areas were identified as, Vanuabalavu, Lomaiviti, Cakaudrove, Bua, Tailevu

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North, and Ra (Naleba, 2016).

The current project being established by NZAid with Save the Children (NZ and Fiji) will focus on two regions, Ra and Koro Island, where the impacts of TC Winston on the agriculture sector are expected to last for several years due to continued production losses and associated higher production costs. High winds, flooding, and storm surges have imposed substantial damage to permanent plantations for fresh produce (mangoes, banana and coconut and others) which will need to be replanted. The regrowth of the mangoes 12 months and later is now evident but production capability is still affected.

Some villagers have been forced to look for alternative sources of income through jobs in the private sector or have migrated to other provinces for income generation opportunities. This has put an additional strain on food security, and left some productive farm land unattended. There is an increasing domestic market for fruit and vegetable crops in Fiji (ITC, 2017) especially in the tourism and urban markets.

In Ra, coastal region communities had relied almost solely on coconut production for their livelihoods prior to TC Winston. However, the cyclone destroyed most of the coconut trees. It will be at least three years before coconut production recovers and communities are struggling to earn much needed cash. This presents an opportunity to encourage diversification of land use for both food security and increased income. Dalo (taro) and cassava are the main crops grown, but there are opportunities for bee keeping and some different crops such as cocoa and ginger. The project is planned to assist the selection of crops where local farmers can learn from demonstration areas or field days and benefit from access to expertise.

On Koro Island, each village is at a different stage of cyclone recovery. With the relocation of housing and other activities unique to each village following TC Winston, the actual agricultural/ horticultural activities have relocated, often to relatively steep slopes or on plateaus quite a distance from the road. Plantations of dalo, cassava, coconuts, and papaya are evident as they are being replanted. The farmers were confident around these crops — but to achieve crop security, they will need to diversify to crops with a better income opportunity and market demand such as vanilla, ginger, passion fruit, citrus, and others. This island has considerable potential and the most to gain from development opportunities aligned to landuse and cropping.

It is early days for this project but huge potential exists to optimise the food production activity in susceptible regions within Fiji, especially in local fruit production which can supply the local and tourist markets.

### **WESTERN SAMOA COCOA DEVELOPMENT PROJECT**

This project also fits under the NZAid programme and is a collaboration between The Agrichain Centre (NZ), Samoan Chamber of Commerce, and Massey University; also New Zealand. This current (2017–2022) project looks to restore cocoa production in Samoa to strong export levels. Samoa has grown cocoa since 1883 when it was introduced during the period of German colonisation. Since then the loss of markets in the post-war period, changing national priorities, and climate disasters have greatly influenced the shape and nature of the Samoan cocoa industry. In recent years, the Samoan cocoa industry has tried to take advantage of the strategic window for cocoa export supply through building singular cocoa bean supply chains into specific chocolate manufacturers in New Zealand and Australia (PHAMA, 2015).

There are five factors currently causing change in the regional and global cocoa market, which provide opportunities for Samoa: as the world population grows, the demand for cocoa is increasing, there are current harvest shortfalls in the West African cocoa producing countries

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due to political unrest, and adverse climatic conditions in Africa affecting production volumes. The Pacific Island nations are beginning to be recognised by New Zealand and Australia as desired cocoa suppliers as long as they can meet quality standards. New Zealand and Australian markets are beginning to understand that relying on one or two African countries to meet cocoa demand presents an unnecessary risk and that a degree of diversification is available. Over the years, cocoa has also become part of the Samoan culture, represented by the liberal consumption of Koko Samoa. Domestic Koko Samoa production is firmly in the hands of smallholders and subsistence farmers, meeting an important need in the income generation mix of that population segment. Samoan cocoa producers range from smallholders with 10 plus trees, to the state-owned Samoa Trust Estates Corporation (STEC) established under the Samoa Trust Estates Corporation Act 1977 to develop and maintain plantations, and other agricultural activity on Upolu Island.

Samoa has natural constraints in the availability of suitable land for fruit production affecting any push to increase production volumes and improve quality. The opportunity to differentiate Samoan cocoa as an indigenous crop and optimise the outcomes for Samoa from increased supply if traditional knowledge of cocoa is able to be combined and aligned with international best practice as understood by cocoa buyers. The cocoa plantings in Samoa will benefit from improved crop husbandry practices on many farms, a replanting programme with particular emphasis on stock quality to replace the current plantation rejuvenation approach which is based on planting seedlings rather than grafted plants. Seed selection does not currently follow good agricultural practice and as a result, the next generation of cocoa trees currently accessed are variable and will not deliver consistent enough quality attributes to rebuild a sustainable export industry. The national cocoa tree stock can be significantly improved through the introduction of grafting of young plants in the nurseries as well as healthy low yielding trees in the field. Further improvements will come on stream with the introduction of nurseries working to Good Agricultural Principles, which includes taking a systematic and documented approach to the selection of seed material, rootstock, and scion wood. From the producer perspective, this will also require extension services focused on crop husbandry, planting and preparation, harvest techniques, and field grafting.

The project is in its infancy but has committed to developing the sector through farmer support and training, nursery development for new plantings, and processing plants for the harvest produce. The fruit sector generally has much to learn from the continued development of cocoa as a tropical system in Samoa.

## NIUE

One of the smaller nations in the Pacific, Niue has a number of projects focused on land-use, fruit production, and agricultural training. The Food and Agriculture Organization of the United Nations (FAO) currently supports a number of initiatives which draw on New Zealand's expertise through NGO organisations (VSA) and universities (Massey University, NZ). In 2016, a two year project called the Niue Household Fruit and Nut Trees Integrated Replanting Project was launched by FAO and the Government of Niue to increase local fruit production as a means to improve food and nutritional security, and increase employment (FAO, 2017). The development of the fruit tree demonstration area at the Vaipapahi Agricultural Research Farm has been the main area for demonstrating the management techniques to farmers and interested growers. The primary focus is to increase domestic production of fruits and nuts through a selection of fruit species and varieties, and the adoption of improved production techniques and management practices (FAO, 2017). The project also includes supporting farm demonstrations with selected village farmers and schools to adapt technologies to local conditions. Parallel to this is another project where training opportunities were identified for various levels on the island and Massey University experts undertook the initial workshop events in July 2017.

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This emphasis on horticulture in Niue has progressed through their partnership with FAO since the island country joined the organization in 1999, with cooperation focusing on food and nutrition security, and natural resource management. FAO technical assistance has ranged from support to the formulation of agricultural policies and legislation to capacity strengthening in data collection, agri-processing and value addition of agricultural products, and scoping for artisanal and traditional fisheries development (FAO, 2015).

## DISCUSSION

These examples highlight a number of farmer and sector support programmes which exist across the Pacific, essentially as aid programmes. Whilst often driven by political altruism, they all contribute to the skill development and experience of producers. The future for fruit producers requires ongoing training in crop husbandry and market drivers to optimise production opportunity. This can be supported also through investment in the future; technology for example in diagnosing or responding to plant health issues or for crop responses to climate change, e.g., through breeding programmes.

The opportunities to grow a skilled and diverse workforce for fruit and horticultural development in the Pacific are necessary to contribute to existing skills and demographic trends. Young people are needed to sustain and grow the horticultural economy, but they need to have a perspective of their future. Fruit and fresh produce are the focus of a variety of different aid projects by donor countries, development organisations, as well as NGOs. Programmes need to be attractive to the emerging generation to consciously work towards building confidence in them as future managers, to retain them in the rural situation, and to upskill them for decision making systems suited to the contemporary marketplace. This attractiveness will be driven by the fact that food security and climate change responses by Pacific communities will gain in a positive manner from the support of a production mix in tropical gardens. Markets exist and continue to grow, both local and export; however, the need to develop production systems to meet the demands of these markets through Good Agricultural Practises also exists and needs to be achieved for the future to be better secured.

## SUMMARY

A range of support mechanisms are needed to ensure tropical fruit production meets the quality and quantity thresholds from local and international markets to guarantee farmer incomes in the Pacific. The examples cited all draw from regional expertise and contribute to sector and farmer development in Papua New Guinea, Fiji, Niue, and Western Samoa. These are examples of ongoing investment from the aid community as a response to climate and climate change, technology advances, and social pressures. Food security is a popular catch phrase at this time but it will only ever be achieved if local responses to the pressures on food production in the Pacific are realised through investment in the producers themselves and in the systems they manage through education, technological advances, and market alignment.

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