



Realizing the Potential of Neglected and Underutilized Bananas in Improving Diets for Nutrition and Health Outcomes in the Pacific Islands

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Pacific Island countries are undergoing rapid food system transformation. This has led to a deterioration in diet quality with decreased consumption of traditional, fresh foods, and increasing consumption of imported, ultra-processed foods. Consequently, the triple burden of malnutrition is now a major issue in the region. It is estimated that Vitamin A deficiency (VAD) is widespread, particularly in Kiribati, Vanuatu, and Solomon Islands. Rates of overweight, obesity, and diet-related non-communicable disease (DR-NCD) are high. Increasing consumption of local, traditional fruits and vegetables, particularly those that have high nutritional value like Pacific Island bananas, could play an important role in improving diets and health outcomes of Pacific Islander populations. Many of the banana cultivars found in the Pacific Islands region are high in carotenoids, an important precursor to Vitamin A. Fe'i bananas, such as Utin lap, have been shown to contain much higher amounts of carotenoids than that of the commonly consumed Cavendish banana. As a traditional, starchy staple food, bananas are a good source of carbohydrate, including resistant starch, with small amounts of protein and little fat. These characteristics also lend themselves to being part of a healthy diet. The promotion of neglected and underutilized banana cultivars in the Pacific region provides a food-based and low-cost solution that simultaneously supports healthy diets and good nutrition, local farming systems and livelihood opportunities. However, to realize this potential, more work is required to understand the availability of nutrient rich banana in the region, current consumption patterns and drivers of consumption.

Keywords: Oceania, food systems, fruit, livelihoods, local food, traditional food

INTRODUCTION

Diets in areas of the Pacific Islands (P.I) have changed dramatically since World War II (Englberger et al., 2003b), with rapid food system transformation underway. Local, traditional foods have been somewhat replaced by an increased reliance on imported, highly processed foods (Englberger et al., 2003b; FAO, 2018; Horsey et al., 2019; Santos et al., 2019; Sievert et al., 2019; Medina Hidalgo et al., 2020; Vogliano et al., 2021b). Diet quality has decreased with reduced consumption of traditional, fresh foods, and increasing consumption of store-bought foods, particularly rice and nutrient poor ultra-processed foods. This appears to have contributed to increased rates of chronic disease and a heavy triple burden of malnutrition. Many P.I are experiencing high rates of both under- and over-nutrition.

Undernutrition is a significant issue in the P.I (FAO et al., 2021), with some of the highest rates globally for stunting, wasting and micronutrient deficiency. The prevalence of stunting in children (under 5 years of age) in the region is 41.4% (FAO et al., 2021), and wasting 9% (FAO et al., 2021). Vitamin A Deficiency (VAD) is estimated to be widespread across the region, particularly in Kiribati, Vanuatu and Solomon Islands (Schaumberg et al., 1995). Vitamin A deficiency is a major cause of morbidity, mortality and blindness among children. Many of the foods now imported into P.I., including refined flours, sugar, white rice and ultra-processed foods (i.e., biscuits, instant noodles), are poor sources of Vitamin A and compound the issues related to overnutrition and diet related non-communicable diseases (DR-NCDs). Additionally, Vitamin A supplementation coverage is low, with less than a third of children reached in Solomon Islands and Vanuatu (UNICEF, 2018).

Overnutrition is also a significant health issue in the region. Many imported, ultra-processed foods are high in energy (kilojoules) but provide very little nutrient value. Rates of obesity are high, with >50% of the adult population (over 18 years) reported as obese in many countries, including Nauru (61%), Marshall Islands (52.9%), Cook Islands (55.9%), Palau (55.3%), Tuvalu (51.6%) and Niue (50%) (FAO et al., 2021). Obesity is a risk factor for many non-communicable diseases (NCDs), adverse health outcomes and mortality. In the P.I. on average, over a quarter of adults have diabetes and NCDs are responsible for around 70% of deaths (World Bank, 2014).

Increasing fruit and vegetable consumption can play an important role in improving diets and health outcomes (FAO, 2020b). Banana, a traditional staple food of the P.I. region (Englberger et al., 2003b, 2006a,b; Nelson et al., 2006) has potential to improve some of the major health issues facing these populations, including VAD and DR-NCDs. Food is intrinsically linked to culture and livelihoods in the P.I, so identifying local, traditional and culturally acceptable foods that are high in Vitamin A/provitamin A carotenoids (Englberger et al., 2006a) is an important step toward addressing undernutrition. Increasing consumption of fruits, like banana, that are nutrient rich, low in energy (kilojoules), and high in fiber can also play an important role in improving health and weight status (Lindström et al., 2006; Slavin and Green, 2007; Brownlee et al., 2017).

Prior to the early 2000s, there was little understanding of the nutrient value of P.I bananas. A substantial body of research and community-based advocacy led by the late Dr Lois Englberger (Englberger et al., 2003a,c, 2006a,b, 2010) showed P.I bananas to have high levels of carotenoids, particularly β -carotene, with higher amounts found in those with deeper-colored flesh (Englberger et al., 2003a,c, 2006a). The Karat, a Fe'i banana (of the Australimusa series), has been the focus of much of this work and has been proposed to play a role in alleviating VAD in the region (Englberger et al., 2006a). Despite being traditional custodians of this genetic resource, the P.I have not yet seen significant investment in research and development to improve the availability and utilization of Fe'i banana, yet there is increasing attention and demand for these naturally occurring vitamin A rich bananas in East Africa (Fongar et al., 2020).

Given 2021 was the International Year of Fruits and Vegetables (FAO, 2020b), it is timely to renew interest in local bananas as part of a nutritious diet in the P.I. In this perspective, we aim to strengthen the call for realizing the potential of local, traditional bananas in improving diets and health outcomes in P.I populations by highlighting key nutritional characteristics of banana with a focus on carotenoids and resistant starch.

BOTANY AND TRADITIONAL USE

The *Musa* genus, thought to have originated in South East Asia (Englberger et al., 2006b), contains many cultivars of banana (Englberger et al., 2006b; Sardos et al., 2018), divided into *Musa* and *Callimusa* (Häkkinen, 2013; Janssens et al., 2016; Sardos et al., 2018). Edible bananas, the most popular being Cavendish (AAA) (Buah et al., 2016; Sardos et al., 2018) and Plantain (AAB) (Buah et al., 2016; Sardos et al., 2018), have either genome A (based on *M. acuminata* Colla) (Englberger et al., 2006b), A with B [B designated as *M. balbisiana* Colla (Englberger et al., 2006b)] as seen in Pome and Silk bananas, or A with S (Sardos et al., 2018). The range of diploidic, triploidic, and tetraploidic hybrid varieties available result in different composition and properties of the banana (Stover, 1987).

Banana plants, a climacteric fruit (Mohapatra et al., 2011), usually grow between 2 and 9 m high, with a bunch of fruit, pseudostem with leaves and a base rhizome, with suckers and roots (Daniells et al., 2011). The plant flowers at any time of the year, with maturation of the fruit taking between 2 and 6 months (Daniells et al., 2011). Forming the bunch of fruit is the female basal flower clusters (Daniells et al., 2011). Bunch size and finger length depend on the variety, as well as environmental conditions (Daniells et al., 2011).

In the P.I region, bananas are typically grown for domestic use and are considered a traditional staple food (Englberger et al., 2003b, 2006a,b; Nelson et al., 2006). Banana and plantain production has been steadily increasing over time in the Pacific Islands, with 1,332,961 tons produced in Melanesia, Polynesia

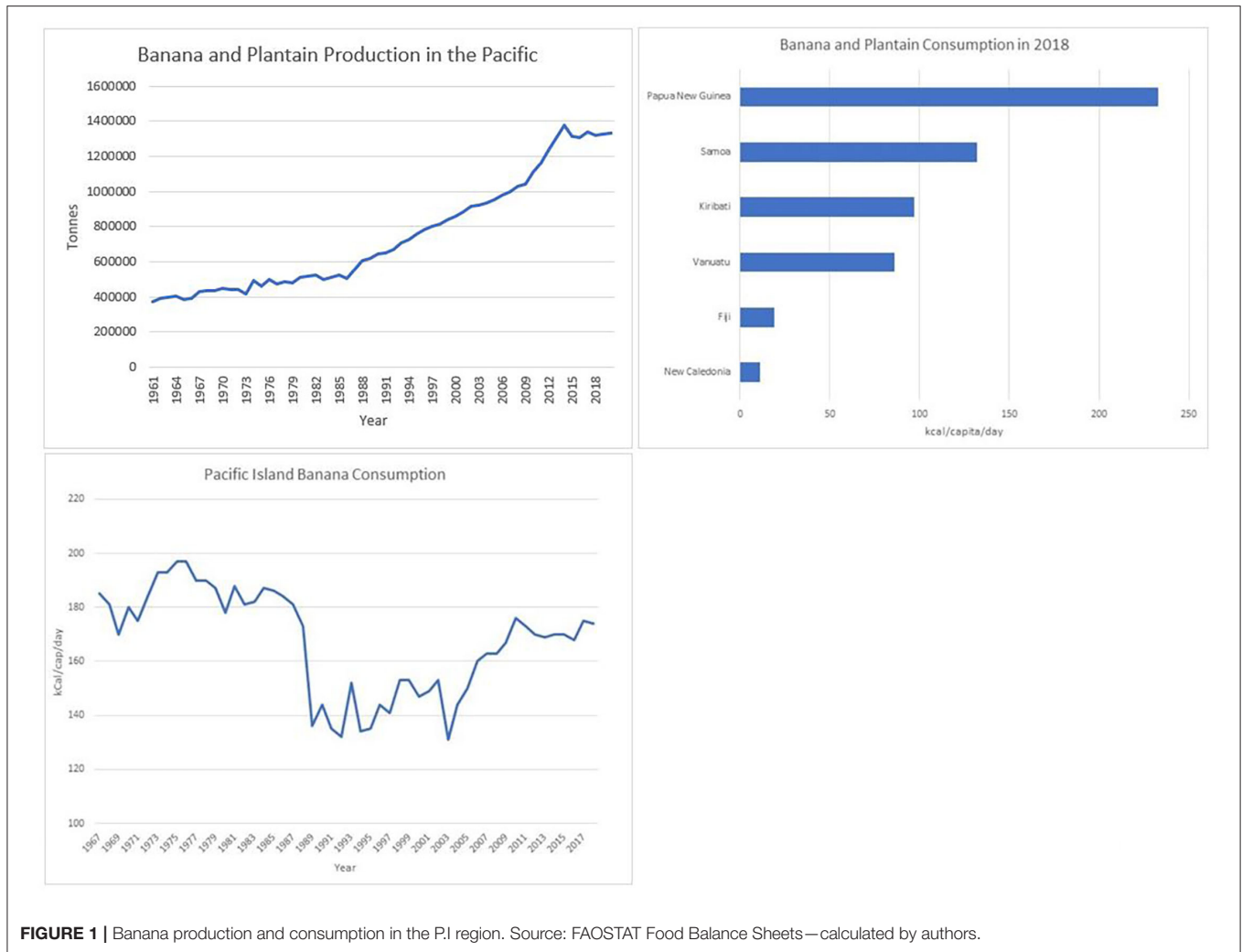


FIGURE 1 | Banana production and consumption in the P.I region. Source: FAOSTAT Food Balance Sheets—calculated by authors.

and Micronesia in 2020 (**Figure 1**), however no information is available to understand production yields of different banana cultivars. Bananas from the Fe'i classification are mostly found throughout the P.I region (Sharrock, 2001; Englberger et al., 2006b), including in the Cook Islands, Federated States of Micronesia, Fiji, Papua New Guinea, Samoa, Solomon Islands, and Tonga (MacDaniels, 1947; Daniells, 1995; Sharrock, 2001; Englberger et al., 2006a; Sardos et al., 2018). They are considered to be highly nutritious but are less studied than other types of banana (Sardos et al., 2018). Fe'i bananas grow in an erect bunch and have richly colored pink to purple/violet sap (Sharrock, 2001; Englberger et al., 2006a,b). Known as banana, plantain, cooking banana and dessert banana in this region, common names vary depending on area/location (Nelson et al., 2006).

Pacific Islanders use banana fruit in green, ripe, or half-ripe stages (Englberger et al., 2006a; Daniells et al., 2011), raw (usually as a snack), or cooked (usually for a meal) (Englberger et al., 2003b, 2006a; Nelson et al., 2006; Sardos et al., 2018) (see **Figure 2**). They are used to produce beverages

(vinegar, beer, and wine) (Nelson et al., 2006), and for medicinal (Nelson et al., 2006; Daniells et al., 2011; Pereira and Maraschin, 2015; Sardos et al., 2018), ornamental (Sharrock, 2001; Daniells et al., 2011; Sardos et al., 2018) and cultural purposes (Sardos et al., 2018). The banana flower, also known as a bud or bell, can also be consumed (Daniells et al., 2011).

Different cultivars have different levels of status in communities, depending on their use and location. For example, Karat is considered of low value in Yap (Federated States of Micronesia) but of high value in Pohnpei (another State within the Federated States of Micronesia), where it has been used traditionally as food for weaning children (Demory, 1976; Englberger et al., 2003b, 2006a). Local bananas have also played an important role in ensuring food security. For example, traditionally in Vanuatu, unripe bananas have been preserved for over 2 years using the “Mara Technique” for cyclone season and associated periods of food insecurity (APTC and DFAT, 2014). While these micronutrient rich cultivars have and could further play a role in the diets of Pacific Islanders, they are



FIGURE 2 | Image of Solomon Islands banana. Left: A cooked banana opened to show rich colored flesh. Right: Fresh, unpeeled banana (Image courtesy Jessica E. Raneri, 2021).

underutilized and could be considered the “forgotten” crop of the Pacific.

NUTRIENT COMPOSITION

As a starchy staple food, bananas are a good source of carbohydrate, with small amounts of protein and little fat (Dignan et al., 2004). Bananas, in general, contain a range of micronutrients, including potassium, magnesium, and sodium and a diverse range of high value bioactive compounds. Bananas are an important food for reaching B1 nutrient adequacy in the Solomon Islands (Troubat et al., 2021). Bananas are particularly rich in antioxidants, including phenolics, carotenoids, ascorbic acid, flavonoids, and biogenic amines (Singh et al., 2016), all important for human health. The high antioxidant capacity of bananas increases as the fruit matures (Singh et al., 2016; Vu et al., 2019).

Banana is not typically considered as a source of Vitamin A, most likely because of the low levels of provitamin A carotenoid content reported in common cultivars such as Cavendish (Englberger et al., 2006b). Research to date, however, suggests

that many of the banana cultivars found in the P.I region are high in carotenoids (Englberger et al., 2003a,c, 2006a,b, 2010), an important precursor to Vitamin A (Gilbert, 2001), supporting the consideration of these local, traditional foods as an opportunity to improve nutrition and health outcomes. For example, Fe'i bananas have been shown to contain up to 8508 μg of β -Carotene per 100g (Utin Iap) (Englberger et al., 2006a). In comparison, common cultivars such as Williams (Cavendish, found widely throughout the World) contain ~ 50 – 64 μg of trans β -Carotene per 100 g (Englberger et al., 2006b; **Table 1**).

A health promoting component of fruits and vegetables is dietary fiber. Derived from plants including banana, dietary fiber is resistant to digestion and absorption in the small intestine, this important class of carbohydrates promotes beneficial physiological effects (Lockyer and Nugent, 2017), and provides further evidence for the potential role of banana in improving health. In humans, through the process of enzymatic digestion, starch chains are broken down into glucose units which are absorbed, however, a proportion of starch is not always entirely digested nor absorbed by the body (Sajilata et al., 2006; Lockyer and Nugent, 2017). This property of some starchy foods is referred to as resistant starch (RS) and

TABLE 1 | Carotenoid composition of selected *Musa* found in Pacific Islands.

Classification ^a	Descriptive information			Carotenoid content, presented as μg per 100 g of edible portion			
	Local name of cultivar	Source	Flesh color (numerical score) ^b	β carotene	α carotene	β carotene equivalents ^c	Total carotenoids ^d
Fe'i	<i>Utin lap</i> *	Pohnpei (FSM)	Orange (15)	8,508	N/R	8,508	N/R
	<i>Utimwas</i> *	Pohnpei (FSM)	Orange (14)	278–7,200	91–1,800	324–8,100	N/R
	<i>Aibwo/Suria</i> **	Makira (Solomon Islands)	Yellow—orange (10, 12, 14 ^e)	2,574–5,945	1,517–2,358	3,331–7,124	4,185–9,400
	<i>Fagufagu</i> ^{fi}	Makira (Solomon Islands)	Yellow—orange (most 8, some 15 in center)	3,428	1,524	4,190	5,054
	<i>Karat</i> *	Pohnpei (FSM)	Yellow—orange (8)	960–2,230	455	960–2,473	4,230
	<i>Gatagata/Vudito</i> **	Guadalcanal (Solomon Islands)	Yellow—Orange (10, 13)	447–695	42–79	468–734	489–774
	<i>Toraka Parao</i> **	Makira (Solomon Islands)	Yellow—Orange (most 10, some 14 in center)	526	250	651	776
	<i>Baubaunio</i> ** ^{fi}	Makira (Solomon Islands)	Light yellow (1)	332	249	457	581
	<i>Warowaro</i> **	Makira (Solomon Islands)	Yellow (most 4, some 8 in center)	166	<2	167	1,444
AAB; Maia Maoli Popoulu	<i>Karat en lap</i> *	Pohnpei (FSM)	Yellow (4)	720	510	980	1,470
	<i>Tangrat</i> *	Yap (FSM)	Yellow (2)	220–460	140–250	290–585	400–790
	<i>Peleu</i> *	Pohnpei (FSM)	Yellow (4)	420	240	540	810
	<i>Huki Matawa</i> **	Guadalcanal (Solomon Islands)	Yellow (4)	296	293	443	589
AAB; Maia Maoli Populu-like	<i>Iemwahn</i> *	Pohnpei (FSM)	Yellow (3)	430–1,209	188–602	524–1,510	N/R
AAB; Mysore	<i>Utin Pihsi</i> *	Pohnpei (FSM)	White <1 (slightly deeper color in center of flesh)	38	24	50	N/R
AAB; Plantain	<i>Mangat en Saipahn</i> *	FSM (Pohnpei)	Yellow (9)	550–4,799	342–3,408	721–6,503	N/R
AAB; Pome	<i>Lady Finger</i> ***	South Johnstone (Australia) ^g	Yellow	95 ^h	132	178	N/R
	<i>Preisihl</i> *	Pohnpei (FSM)	White <1	44	25	57	N/R
AAB; Silk	<i>Utin Menihle</i> *	Pohnpei (FSM)	White <1	128	N/R	128	N/R
AA; Sucrier	<i>Kudud</i> *	Pohnpei (FSM)	Yellow (2)	315	192	411	N/R
AAA; na	<i>Ropa</i> **	Makira (Solomon Islands)	Yellow (5)	1,324	3,682	3,165	5,218
AAA: Cavendish	<i>Williams</i> ***	South Johnstone (Australia) ^g	Yellow (no number)	50–64 ^h	93–123	104–134	N/R
	<i>Saena</i> **	Guadalcanal (Solomon Islands)	White <1	58	79	98	137

*Englberger et al. (2006a).

**Englberger et al. (2010).

***Englberger et al. (2006b). N/R, Not reported; na, not known. ^aSamples classified by Stover and Simmons; ^busing the DSM Yolk color fan, ^cestimate of β carotene equivalents: Content of b-carotene plus one-half of the content of a-carotene and b-cryptoxanthin; ^destimated by calculating total peak areas recorded in the chromatograms (using the response factor of b-carotene); ^erange of yellow orange (12) and (most 10, some 14 in center); ^fhalf ripe; ^gprovided for comparison, sample obtained from Australia; ^hreported as trans β carotene.

is considered a type of dietary fiber. There are five types of RS, including Resistant Starch type 2, whereby the starch is ungelatinized and in a granular form, for example in grains, potatoes, pulses, and green bananas (Lockyer and Nugent, 2017). Resistant starch resists breakdown in the small intestine and arrives intact in the large intestine, where it is fermented by residing bacteria (Lockyer and Nugent, 2017). The production of short chain fatty acids through microbial fermentation provides various physiological benefits, including greater insulin sensitivity and colonic cancer prevention (McNabney and Henagan, 2017).

However, most food sources of starch are not eaten in their raw form, for example potato or rice, as they are unable to be digested and are unappealing for consumption in the raw form. Banana, a starch-rich food that can be eaten raw and is a good source of RS, is an exception to this (Jiang et al., 2015; Wang et al., 2015). While traditional staple foods of the region are typically starchy root crops, like taro and cassava, imported rice, mainly white, is now widely consumed in the region. Interestingly, there is some evidence that rice is linked to diabetes prevalence (Hu et al., 2012). The fiber and starch content of banana have been shown to have protective properties for preventing diabetes, as well as being a low GI food to help with diabetes management (Hermansen et al., 1992). This suggests that substituting local bananas in place of white rice could potentially assist with diabetes management. Additionally, consuming more local bananas could displace ultra-processed foods, which are also associated with adverse health outcomes, including cardiovascular and metabolic diseases (Monteiro et al., 2019).

CURRENT CONSUMPTION PATTERNS

Dietary intake data is limited for the P.I., with most available consumption data obtained from household income and expenditure surveys. In the absence of specific P.I. nutrient reference values (SPC, 2018), there is a reliance on International nutrient reference values for interpretation of adequate intake, for example 300 μg Retinol Equivalents/day for adults (WHO and FAO., 2004). When data is available, banana is often aggregated into food groups of fruit and/or roots and tubers. From the data available, the relative importance of banana to overall daily energy intake (DAI) varies across the region and within countries. In Solomon Islands, cooking banana intake averaged 76 g/capita/day and contributed to 5% of DAI (Troubat et al., 2021). However, a subregional study showed banana consumption more broadly (including dessert banana) ranged from contributing nearly a quarter (21%) of DAI in rural inlands (Vogliano et al., 2021b), to just 7% in a rural coastal region (Vogliano et al., 2021a). In Vanuatu, banana is the second most consumed food after rice, at about 172 g/day contributing 8.5% of daily energy (Vanuatu National Statistics Office, 2021). In the Marshall Islands, between 32 and 45% of households consume bananas with higher consumption in rural areas (EPPSO et al., 2021). Data from the (FAO, 2020a), indicate that on average across the PI, bananas now contribute 174 kCal/capita/day,

having decreased 16% from the average between 1967–1988 and 1989–2018 (Figure 1).

OPPORTUNITIES TO INCREASE CONSUMPTION

While Pacific Islanders currently consume bananas in a variety of ways (Englberger et al., 2003b, 2006a; Nelson et al., 2006; Sardos et al., 2018) there are opportunities for other banana-based food products to be included in diets, potentially increasing consumption.

Banana can be processed in various ways, including as dried banana, banana flour, banana crisps, and banana jam, however these are not common in the P.I. region (Daniells et al., 2011). To date, there appears to be small scale processing of banana in some areas of the region, such as Fiji and Samoa, but little published literature on the process(es) used and products developed. Daniells et al. (2011) suggest that processing banana at a farm or community level could provide opportunities to reduce waste, transform fruit into more “valuable” items and promote increased consumption through greater availability of banana-containing items.

Green banana products are of increasing interest because of their nutritional composition and potential health benefits (Falcomer et al., 2019). Green banana provides a good source of dietary fiber, vitamins, and minerals and many bioactive compounds (Falcomer et al., 2019). The RS content of green banana flour (~74%) makes this an acceptable, and more nutritious, substitute for wheat flour in bread and pasta (Gomes et al., 2016).

Increased promotion of the value of local, nutritious foods to communities, and individuals also provides an opportunity to increase consumption of local bananas. The “Let’s Go Local” campaign, started in the Federated States of Micronesia, is one example of a successful program (Englberger, 2011). There are also opportunities to integrate knowledge of local, traditional foods, including banana, in school curriculum and extra-curriculum activities (Burkhart et al., 2022), to teach children how to produce, prepare, and to eat local bananas. Furthermore, this can support children to understand the value these foods, not only from a health perspective, but also for local livelihoods and food sovereignty.

DISCUSSION

Despite their potential, P.I. banana cultivars remain neglected and underutilized in the region, particularly in the context of domestic commercial trade. There is decreased reliance on banana and other traditional staple foods, in favor of imported options, including rice and wheat-based food products in the region. High in nutrients and fiber, local bananas can play a role in ensuring P.I. populations consume more fruit and could help to alleviate some of the nutrition related health outcomes currently seen in the region. Local P.I. bananas are relatively unique in their nutrient profile. The main cultivar produced and consumed globally is the Cavendish banana, which contains relatively

fewer nutrients, especially carotenoids, compared to some of the more nutrient dense cultivars available in the P.I. Besides health benefits, promoting and using locally produced foods like bananas can positively impact livelihoods and communities through increased domestic production.

The high levels of carotenoids found in P.I. bananas suggest they can play a significant role in improving nutrition related health outcomes in this population, including for VAD. In developing countries, a large proportion of vitamin A consumption is from vegetable sources (Borges et al., 2019). This is in the form of provitamin A carotenoids, which are ultimately converted into vitamin A (retinol). In the P.I. region, animal source foods (ASF), which are a source of retinol, are consumed, but not to the same extent as seen in developed countries. Several factors likely restrict consumption of ASF, including availability, cost/affordability and cultural practices and values (Englberger et al., 2003b; Bottcher et al., 2021). Across the Pacific many Governments include vitamin A supplementation policy as part of their health and nutrition strategies, however given the logistical constraints of disseminating a government wide supplementation program in the region, because of the rural and remote geographies of the P.I, vitamin A supplementation coverage is low (UNICEF, 2018).

As a good source of resistant starch, bananas could also improve digestive health and play a role in mediating type II diabetes and other DR-NCDs. However, to realize the potential health benefits associated with nutrient rich banana PI banana, there is a concurrent need to ensure crop accessibility and consumption. Apart from Dr. Lois Englberger's work in the late 1990s and early 2000s, there has been very little published literature in this area within the Pacific context. Much of the recent literature on P.I banana has centered around the Pacific Community's Center for Pacific Crops and Trees' (SPC-CePaCT) banana genetic resource program (Taylor, 2005; Gwabu et al., 2007; Palanivel and Shah, 2021) and studies to further document regional biodiversity (Kagy et al., 2016; Sachter-Smith and Sardos, 2021a,b). However, there is a dearth of information on P.I banana local consumer accessibility, consumption patterns, and associated drivers.

Consumer accessibility of P.I banana will also necessitate sustainable and semi-commercial scale production, distribution and market-trading. Some P.I banana cultivars have slow growth (Englberger et al., 2006a; Daniells et al., 2011), and often experience increased susceptibility to pests and diseases (Ploetz et al., 2007). As the popular Cavendish is under threat from Panama disease (Dita et al., 2018), there is significant interest in finding alternative cultivars. Further work to explore the characteristics of local P.I bananas is warranted to understand their susceptibility to disease and pest threats and their potential to be cultivated more widely. Englberger et al. (2003b, 2006a) noted that some *Musa* cultivars used in their work were rare, particularly Utin Iap and Utimwas, two of those with the highest β -Carotene levels, suggesting that there may be limited availability of these for local communities. Compounding accessibility and production constraints, much of the P.I region also experiences significant and recurring environmental challenges, for example tropical cyclones, which can adversely impact production and distribution of food, including banana

(Magee et al., 2016). Further work to understand current availability, from a potential local consumer perspective, would be a productive starting point for understanding the potential contribution of P.I banana to healthy diets and resilience in the region.

Current food composition data, and the absence of regionally specific nutrient reference values, constrains our understanding of the contribution of P.I. banana to diets in the region. Food composition tables need to acknowledge the rich diversity available in bananas, and as such, the importance of capturing cultivar information in both food composition tables and during dietary intake assessments. The FAO/INFOODS Food composition Database for Biodiversity contains 59 different varieties of banana (FAO, 2017), however, the most recent published Food Composition Tables for the Pacific (FAO SPC., 2020) only includes three entries for banana: common (Cavendish), cooking and banana (generic) which is mainly derived from the Australian Food database (AUSNUT, AUSNUT). There is a clear need to improve the diversity of bananas included in regional food composition tables, to both better measure the contribution of these bananas in diets, but also help to build awareness around their relative contribution to nutritional intake compared to common cultivars. More work is needed to understand acceptability of banana in local diets, and well as highlighting the benefits of consuming this food in various settings. Similarly, dietary intakes methods and tools, similar to what was used by Vogliano et al. (2021a), are needed to ensure they are adapted to capture biodiversity level information, given the contribution of food diversity to diet quality (Lachat et al., 2018).

Pacific Island bananas have the potential to play an important role in improving food sovereignty and food and nutrition security in this region. As the Pacific region moves on from the COVID-19 pandemic, during which many Pacific populations returned to more subsistence forms of living, there has been discussion about opportunities to re-set food systems and revitalizing traditional foods and farming to improve the resilience of Pacific food systems. The timing may now be more conducive to supporting a newfound return to such traditional banana preservation and consumption practices, whilst leveraging on highly nutritious varieties offering potential health benefits.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

SB and JR conceptualized the work. All authors contributed to the draft and revisions of the final manuscript.

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