

# Promoting Nutrition Sensitive and Climate Smart Agriculture through Increased Use of Traditional Underutilised Species in the Pacific

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## Introduction

Recent studies have shown that some Pacific crops, for example, breadfruit (*Artocarpus altilis*) and the Karat banana variety from the Federated States of Micronesia (FSM) are more climate resistant and more nutritious than major staple food crops (Table 1). However, diversity and malnutrition often coexist. In Pohnpei (FSM) for example, although 133 different breadfruit and 55 banana varieties are found, half of Pohnpei children between 24-48 months are vitamin A deficient<sup>1</sup>. Utilizing these crops in food-based approaches to tackle malnutrition and in traditional Pacific cropping systems, where farming practices utilize crop and tree diversity and nurture soil health and fertility, will further enhance the conservation of these species and promote the inherent resilience found in many of these crops. The Island Food Community of Pohnpei (IFCP) is already utilizing the diversity found in bananas and plantains to promote healthier diets while farmers are using this diversity to ensure production in locations where rainfall is increasingly erratic.

### Diversity sustains livelihoods

Low-lying coastal regions and small islands will be particularly vulnerable to the rises in sea level, soil and freshwater salinization, pest and disease incidence and decreased pollinator availability predicted to occur with climate change. These changes will adversely impact domestic food production but also imported food supplies on which many small islands depend. Climate-smart agriculture, using traditional multi-crop garden systems is an approach being recommended to achieve sustainable agricultural development for food security under climate change. Traditional farming systems of the Pacific are inherently resilient. Plots are protected by trees both within the garden and often by surrounding forest (primary or secondary), need very limited external inputs, are adjusted to the seasons, and are able to cope with occasional natural disasters (McGregor et al., 2014<sup>2</sup>; Taylor et al., 2014<sup>3</sup>).



Traditional Pacific multi-storey gardens. SPC/A. McGregor



Bele, Samoa. USC/M.Taylor

### Diversity sustains diets

Bele also known as aibika, island cabbage or slippery cabbage (*Abelmoschus manihot*) is found throughout the Pacific. It is highly nutritious and ranks with taro leaf as one of the most important leafy vegetables in the Pacific. The lack of agronomic, morphological and nutritional information and limited availability of good quality planting material through seed systems are just two of several reasons given for the failure of indigenous vegetables to make the transition from subsistence crops of limited use to crops that are more researched, available, utilized and commercially competitive.

Table 1. Carotenoid content of selected Pohnpei, FSM traditional staple food compared to rice ( $\mu\text{g}/100\text{g}$  edible portion). Adapted from IFCP Englberger and Johnson (2013)<sup>1</sup>

Cultivar	Species	Flesh colour <sup>a</sup>	$\beta$ -carotene	$\alpha$ -carotene	$\beta$ -cryptoxanthin	$\beta$ -carotene equivalents <sup>b</sup>	RE <sup>c</sup>	RAE <sup>d</sup>	Total carotenoids <sup>e</sup>
<b>Banana</b>									
Utin lap	<i>Musa</i> spp.	Orange: 15	8508	na	na	8508	1418	709	na
Karat	<i>Musa</i> spp.	Yellow/Orange: 15	2230	455	30	2473	412	206	4320
<b>Giant swamp taro</b>									
Mwagh Tekatek Weitahta	<i>Cryptosperma merkusii</i>	Yellow: 1	4486	na	na	4486	748	374	na
Mwahngin Wel	<i>Cryptosperma merkusii</i>	Yellow: 4	2930	2040	120	4010	668	334	5630
<b>Breadfruit</b>									
Mei Kole	<i>Artocarpus mariannensis</i>	Yellow	868	142	-	939	132	78	na
<b>Pandanus</b>									
Luarmwe	<i>Pandanus tectorius</i>	Yellow	310	50	20	345	58	29	5200
<b>Imported food</b>									
Rice, white or brown	<i>Oryza sativa</i>	White	na	na	na	0	0	0	0

- Raw flesh colour was described visually and estimated using the DSM Yolk Colour Fan, numbers ranging from 1 to 15 for increasing coloration of yellow and orange
- $\beta$ -carotene equivalents: content of  $\beta$ -carotene plus half of  $\alpha$ -carotene and  $\beta$ -cryptoxanthin
- Retinol equivalents (conversion factor 6:1 from  $\beta$ -carotene equivalents to RE). The estimated Recommended Dietary Intake (RDI) for a non-pregnant, non-lactating female is 500  $\mu\text{g}$  RE/day and for a child 1-3 years old is 400  $\mu\text{g}$  RE/day (FAO/WHO 2002).
- Retinol Activity Equivalents (conversion factor 12:1 from  $\beta$ -carotene equivalents to RAE)
- This includes estimates of identified and unidentified carotenoids levels



Top left:  $\beta$ -carotene-rich Pandanus, FSM. IFCP/L. Englberger. Top right: Karat banana, FSM. IFCP Bottom: Giant swamp taro. SPC/Tolo Iosefa

## References:

- Englberger L. and Johnson E. (2013) Traditional foods of the Pacific: Go Local, a case study in Pohnpei, Federated States of Micronesia. In *Diversifying Food and Diets: using agricultural biodiversity to improve nutrition and health*. Fanzo J., Hunter D., Borelli T. and Mattei F. (eds) Routledge, UK.
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