POSTHARVEST HANDLING OF TROPICAL FRUITS IN THE SOUTH PACIFIC

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Outline

1. Overview of fruit postharvest handling systems in the Pacific
2. Key challenges
3. Strategic opportunities

This presentation specifically focusses on small island states and locally grown fruits

Historical overview of postharvest practice in the South Pacific

- In the 1920's to 1970's, there were several important Pacific fruit export industries
  - Sea-freight-based supply into Australian and New Zealand markets
  - Postharvest handling practices were poor
- Pest and disease incursions, increased competition, and quarantine disinfestation protocols radically re-shaped the fruit sector over the last 30 years.

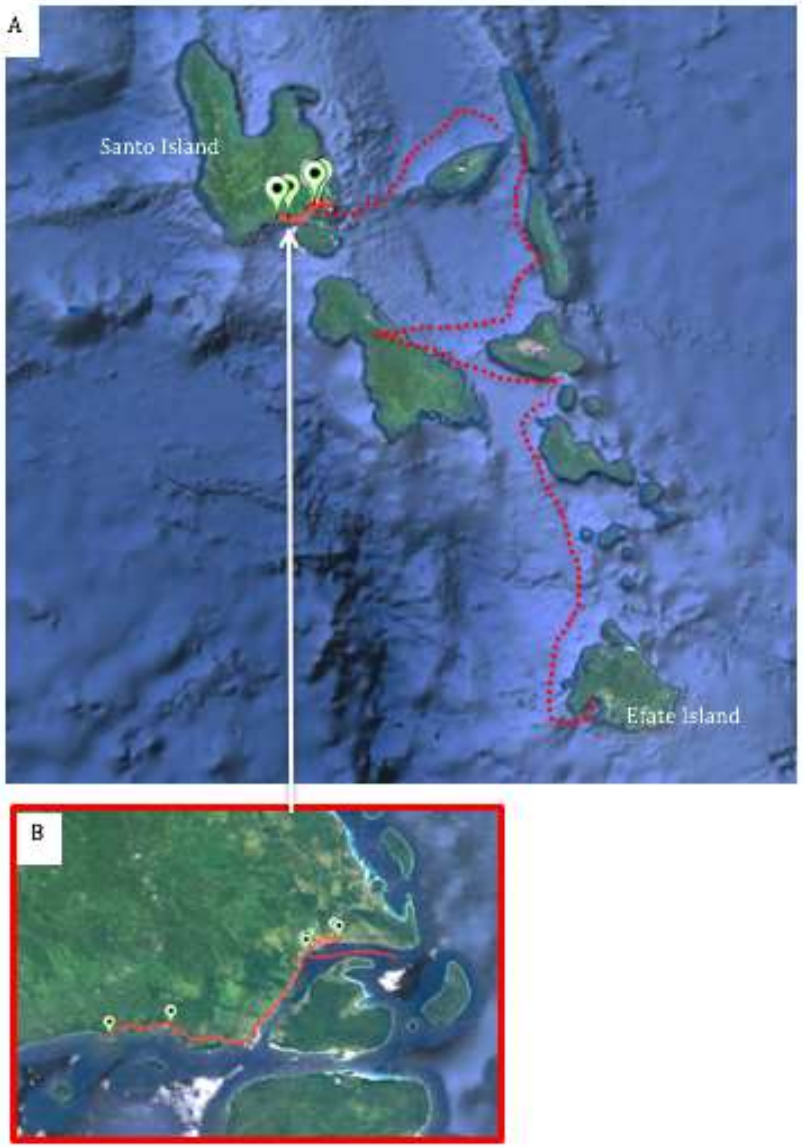
- Currently most fruit postharvest handling systems are orientated towards domestic supply.
- Pacific export supply chains concentrated around those countries and crops with market access.

Fruit Production Systems in the Pacific

- Declining farming participation
- Land access challenges
  - Limited arable land
  - Customary land access
  - Short term 3-5 years land leases
- Trends towards urbanisation
  - Declining access to labor

- Poly-cultural based production systems
- Declining or challenged soil fertility due to past production practices
- Low-input production system & limited ground water
  - Limited pest and disease remediation
  - Reliance on rain-fed production
  - Limited tree or orchard management practice
- Highly seasonal production- sporadic market oversupply
- Limited access to planting material or new elite cultivars

Santo to Efate Islands, (Vanuatu) Pineapple



Postharvest supply chain case study

- Production remote from market demand
- 4-8 day transit time.
- 10 to 24% loss on arrival, increasing to 38% @ 4 days.
- Storage and transport conditions not major contributors to loss.
- Colour grade at harvest of critical importance to the level of losses.
- Economic viability of chain dependent on predictability of ferry.
- Limited cultural acceptance of middle-men/traders.

Efate Island (Vanuatu) pineapple supply chain

- Harvested in Epoa village and road transported to Port Vila markets.
- 2hrs 20min from harvest to market arrival
- No in-transit loss
- 7-10 day in-market product shelf-life
- Loss due to diseases.

Transport route from farm to Market for chain three. Farm and Market location are indicated.

Denotes a stop in the transport chain of >1min.

Supply chain 3(A) Farm in Epao village, NE Efate Island (B) Harvesting of pineapples) (C) Product harvest, de-crowned and placed directly into local woven baskets (D) In this chain assessment fruit were transported using a local utility vehicle (E) Unscaled track between farm and main road (F) Example of the local trucks commonly used to transport into Port Vila (G) Product (full mature –top; ¾ mature-bottom) on arrival at the DARD research station for simulated market storage to determine shelf-life.

Samoa pineapple supply chain

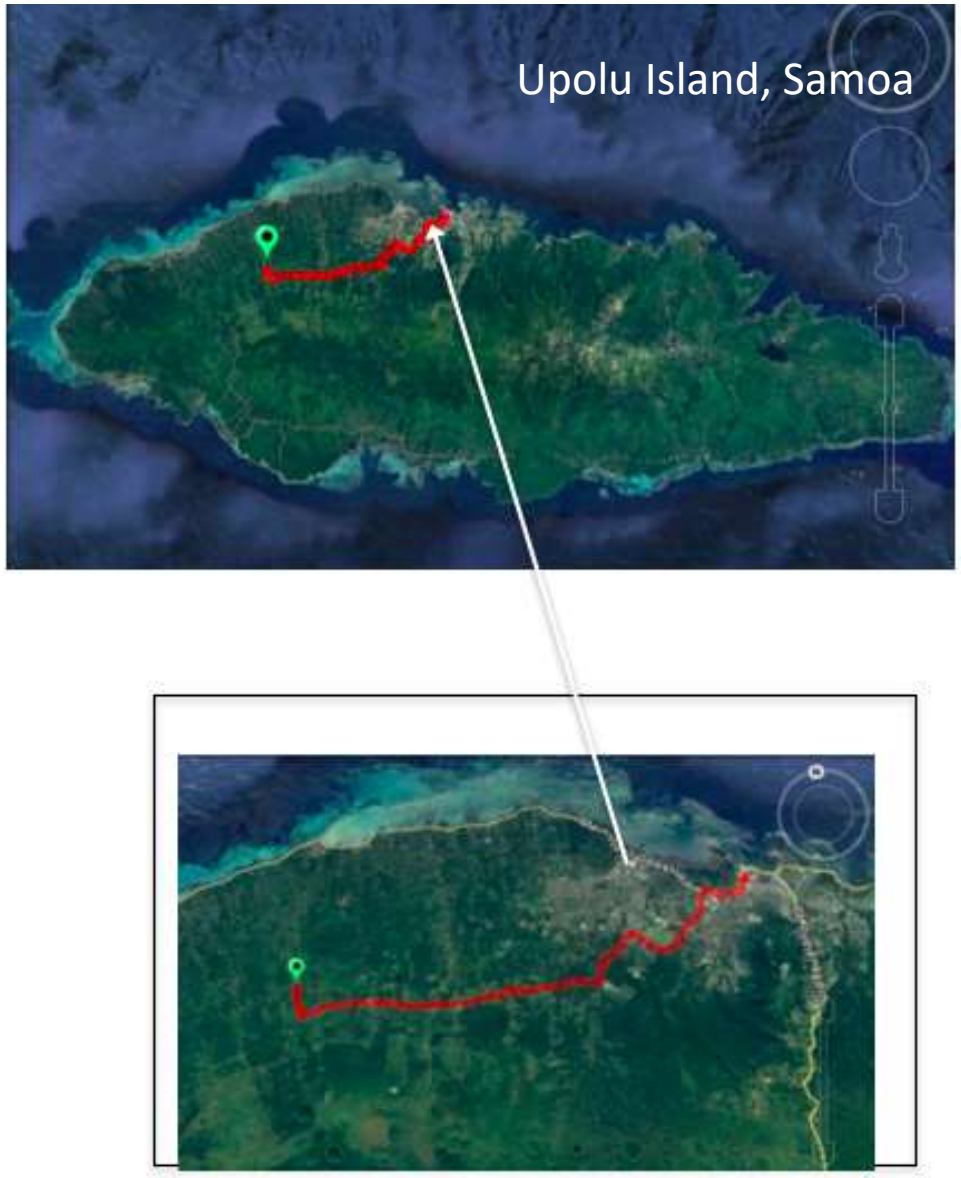
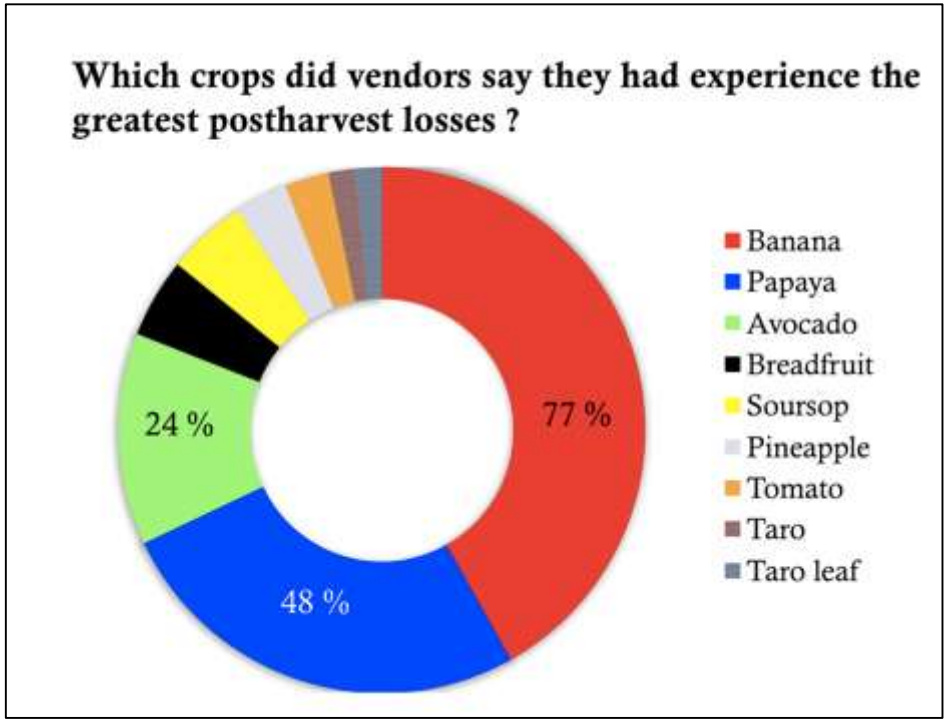


Table 1 Postharvest loss, transport distance and storage time for a range of fruits and vegetables in the Fugalei municipal fruit and vegetable market

Commodity	*Mean daily postharvest loss[a] (%)*	*Mean time at municipal market[b] (days)*	*Mean postharvest loss (%) (a*b)*	*Volume assessed (kg)*
Soursop	21.8	5.33	100	20.88
Papaya	12.4	2.13	26.4	208.53
Tahitian lime	8.8	3.91	34.2	43.80
Pak choi	6.8	1.38	9.4	93.50
Mustard cabbage	6.1	2.25	13.6	12.37
Choko	5.1	1.70	8.7	109.71
Chinese cabbage	2.8	2.25	6.4	35.16
Head cabbage	2.5	3.5	8.9	559.25
Chili (small)[c]	2.5	4.13	10.4	5.96
Avocado	2.2	3.09	6.7	147.57
Pineapple	1.9	1.94	3.7	45.60
Banana (all types)	1.0	1.94	2.0	125.18
Lime	0.6	3.80	2.3	51.96
Vi (*Spondias dulcis*)	0.5	5.00	2.5	36.89
Eggplant	0.4	3.36	1.3	316.45
Long bean	0.3	1.29	0.4	108.40
Soa'a (Incl. Plantains)	0.3	2.86	0.7	14.52
Lemon	0.2	2.80	0.7	84.60
Cherry tomato	0.01	1.50	0.02	26.47
Cucumber	0.01	2.50	0.03	119.65
Pumpkin	0.0	2.35	0	885.31
Ginger	0.0	4.55	0	23.11
Samoan Orange (navel type)	0.0	3.3	0	82.49
All vegetables	2.3a	2.64	6.0	2272.22
All fruits	2.5a	3.13	7.7	894.33
Total	2.1	2.89	6.2	3166.54

Samoa

- **Fruit crops consistently have the highest amount of postharvest toss**
- Soursop, papaya, banana, lime and avocado high-risk crops
- High-fruit loss is shaping vendor trading practice in terms of crops being sold



On-farm practice challenges

1. Under-development commercial fruit tree nursery sector
    - Poorly performing cultivars
    - Aging or large trees that are difficult to harvest
2. Poor and low-input production practices
    - Fruit quality is inconsistent @ point of harvest
    - Reticence amongst fruit growers to adopt better postharvest handling practice
3. Sporadic or opportunistic harvesting
4. Little or no on-farm postharvest handling infrastructure (even in the larger commercial farmers)

Transport challenges

1. Inter-island fruit supply chain prone to high-losses
2. High cost limiting market access
   - Eg. Big bay, Santo to Port Vila supply chain = 60% consignment value (pre and post-wharf costs disproportional high)
3. Poor or nil packaging options increasing handling and in-transit damage
4. Predictability
   - Poor or nil storage infrastructure at wharf terminals
5. Coordination
   - Vendor-farmer links are strongest counter seasonal.


Digicel
Bongo III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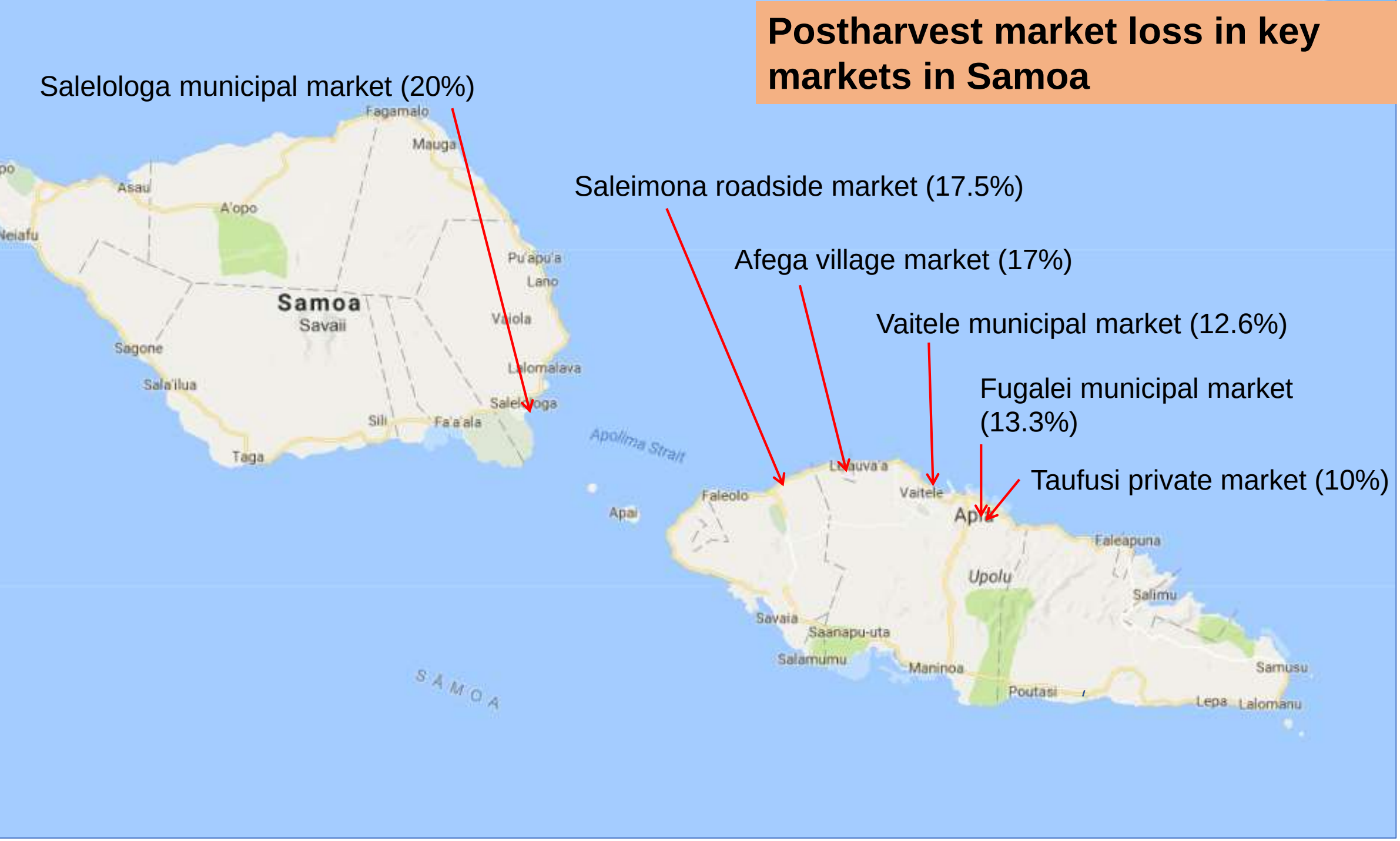
NOMO

Market challenges

1. Highly seasonal supply
    - Prolonged market storage due to over-supply
    - Reduced vendor profitability
    - High postharvest losses
2. Change consumer purchasing behaviour
    - In Polynesia island states there is a particular stronger trend towards convenience based purchasing
3. Poor or inappropriate market design or location is eroding the profitability of fruit (and vegetable) supply chains
4. While there are number value added fruit products and some successful business, the industry remains under-developed.


BAKERS
FLOUR

Postharvest market loss in key markets in Samoa



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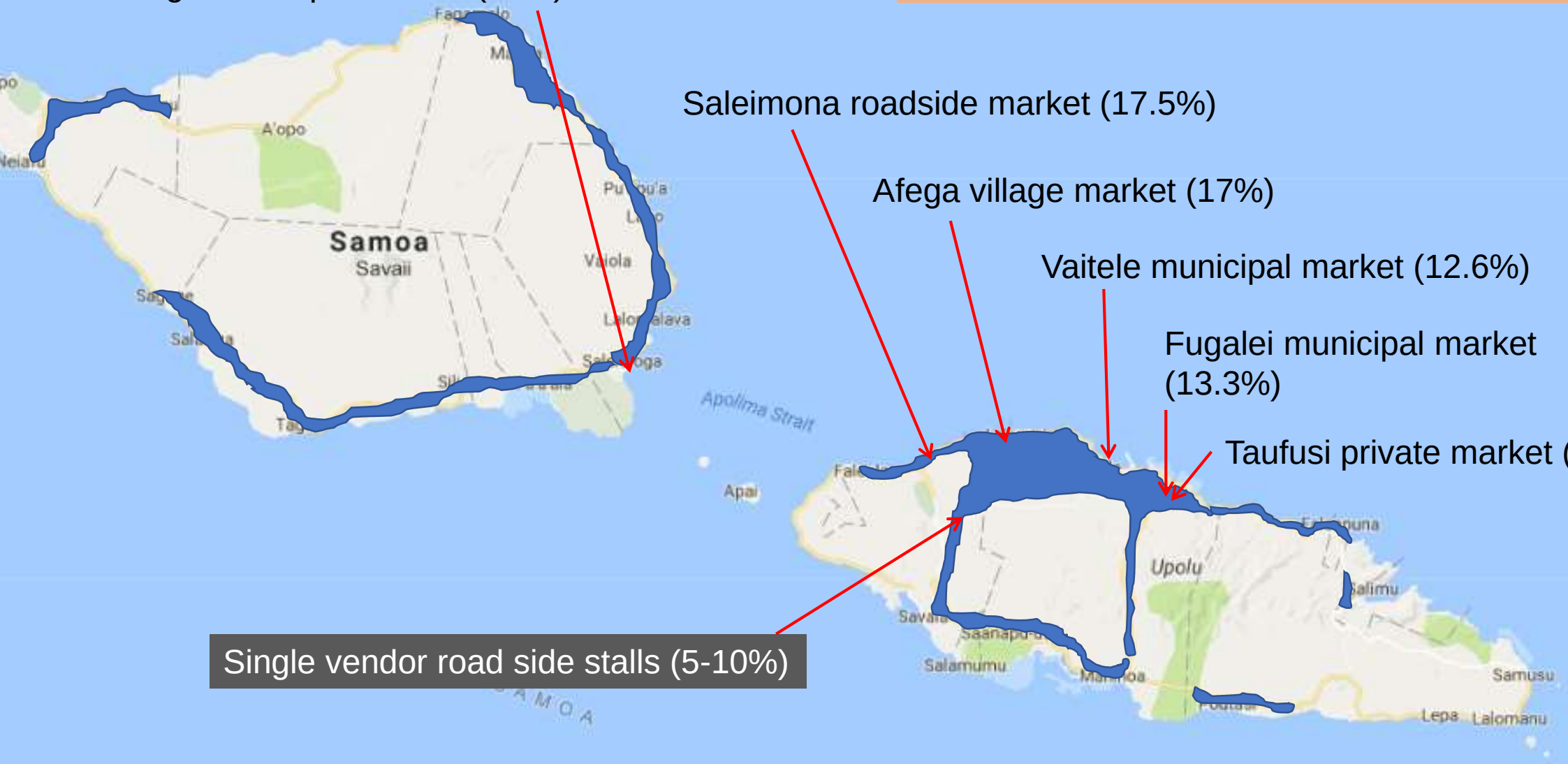

Why is Pacific Island government strategies and policies to reduce postharvest loss only partial success ?

1. Only about 5% of donor investment in support fresh food systems in the Pacific is focussed on reducing food loss.
2. Lack of appropriate postharvest expertise to develop and apply food loss policies.
3. Remediation often involves strong private sector-government partnerships.
4. Tackling food loss requires a coordinated and multi-government agency approach.
5. Food marketing systems in the Pacific are changing rapidly due to consumer purchasing trends

We believe that to enhance postharvest handling practice in the Pacific will require:

1. Raising awareness of good postharvest practice
2. Better institutional capacity in postharvest extension and research
3. Better access to postharvest information
4. Enhanced availability of elite fruit cultivars

Pacific institutional postharvest capacity building

1. The Scientific Research Organisation of Samoa (SROS) aims to become a Pacific-wide Postharvest Research and Develop Centre.
2. FNU and Ministry of Agriculture establish a joint postharvest research and training laboratory @ Nausori
3. The horticultural curriculum at USP, FNU, NUS and Hango College should be reviewed and the postharvest training updated.
4. PIRAS's on-line postharvest extension resource material is reviewed, updated and expanded.
5. PIFON should receive donor funding to increase postharvest farmer training capacity and initiatives.
6. Develop a network of Pacific Islander postharvest specialists.