Postharvest physical risk factors along tomato supply chain: A case study of Fiji

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Background

Problem: Fiji growers currently have limited access to high-value domestic market due to consistency of supply and product quality constraints

Our approach: Develop a participatory guarantee scheme between growers and hotels based on agreed quality and supply. Support this with relationship with grower collaborative network assistance and improved postharvest handling protocols.

Postharvest handling element:
Analyse pre-existing postharvest vegetable supply chains in terms of risk, quality and losses. Then develop tailored low-cost solution specific to local conditions.

Range of production practices




Various on-farm postharvest

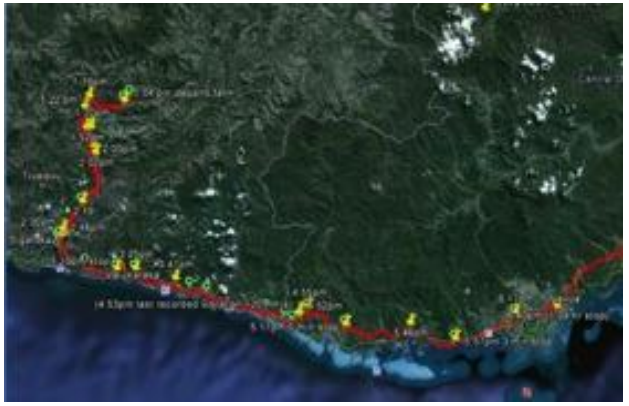


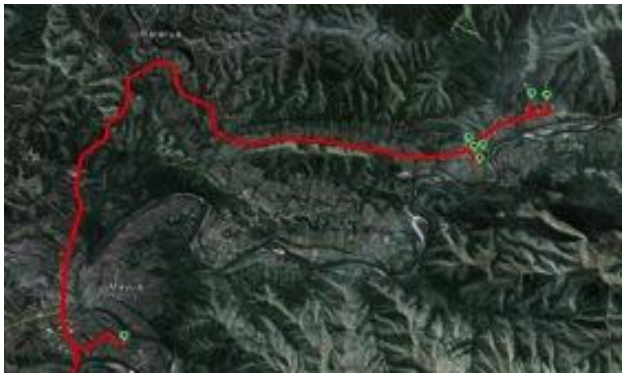

Various packing options

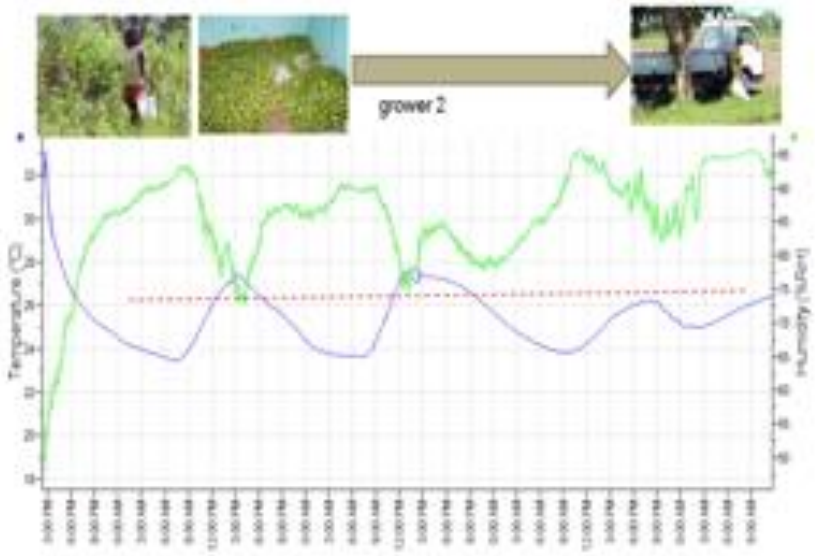
Multiple transport modes

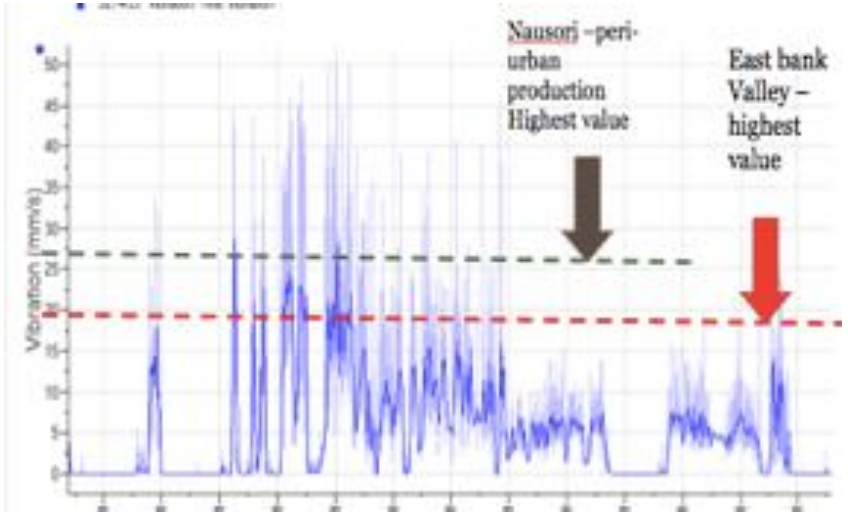
We measured the physical postharvest risk factors along the supply chain

Compared different modes of transport, road conditions, time to market, packaging, maturity, as well as post-market shelf to find out where were the problems occurring









Day 0 – pre-harvest in the field

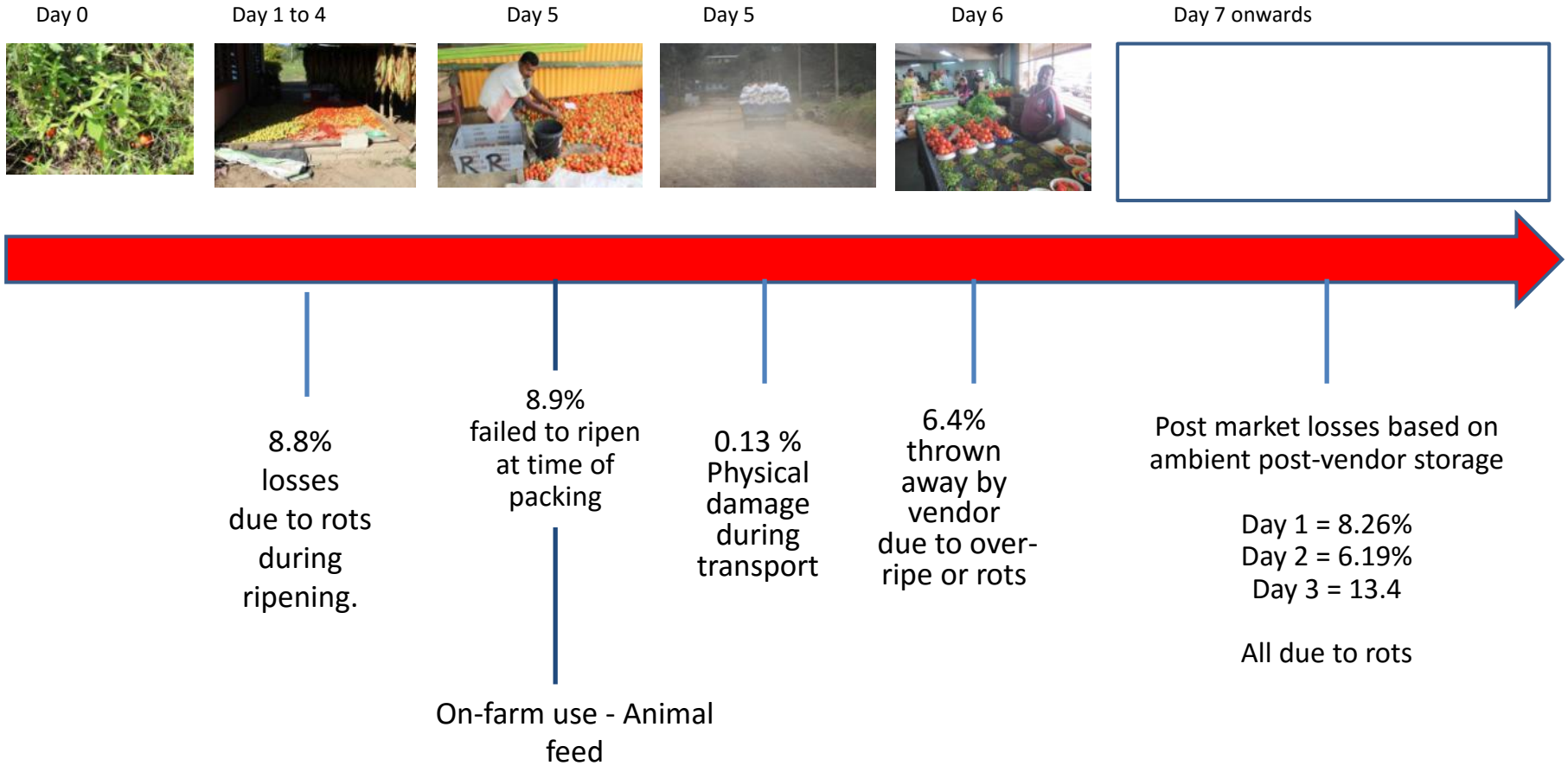
Day 6 (3pm)– departs farm

Day 6 (9pm) arrives at Suva

Day 1 to 4 ambient ripening

Day 5 – packing in plastic boxes

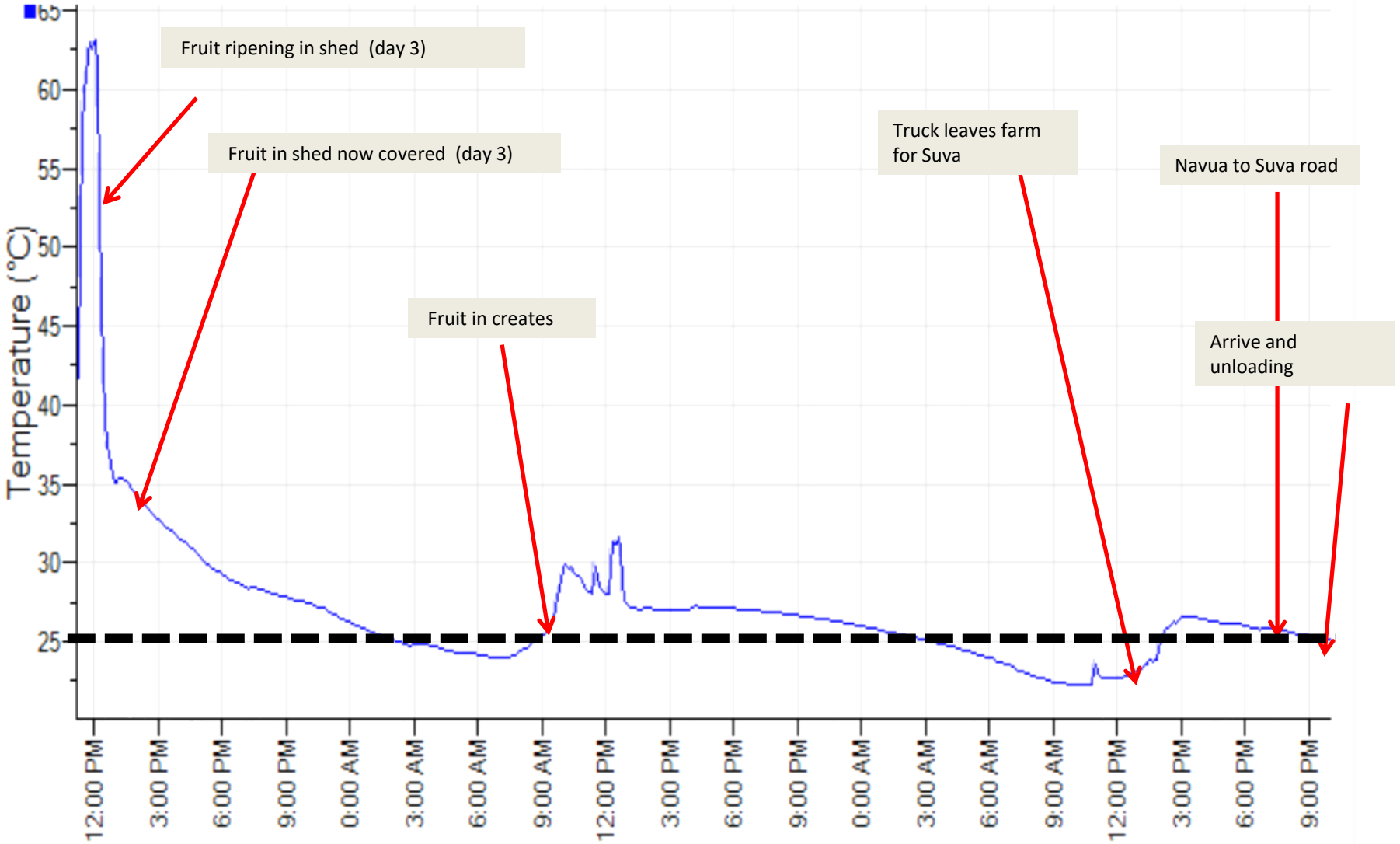
Day 7 Fruit for sale at the Suva municipal markets



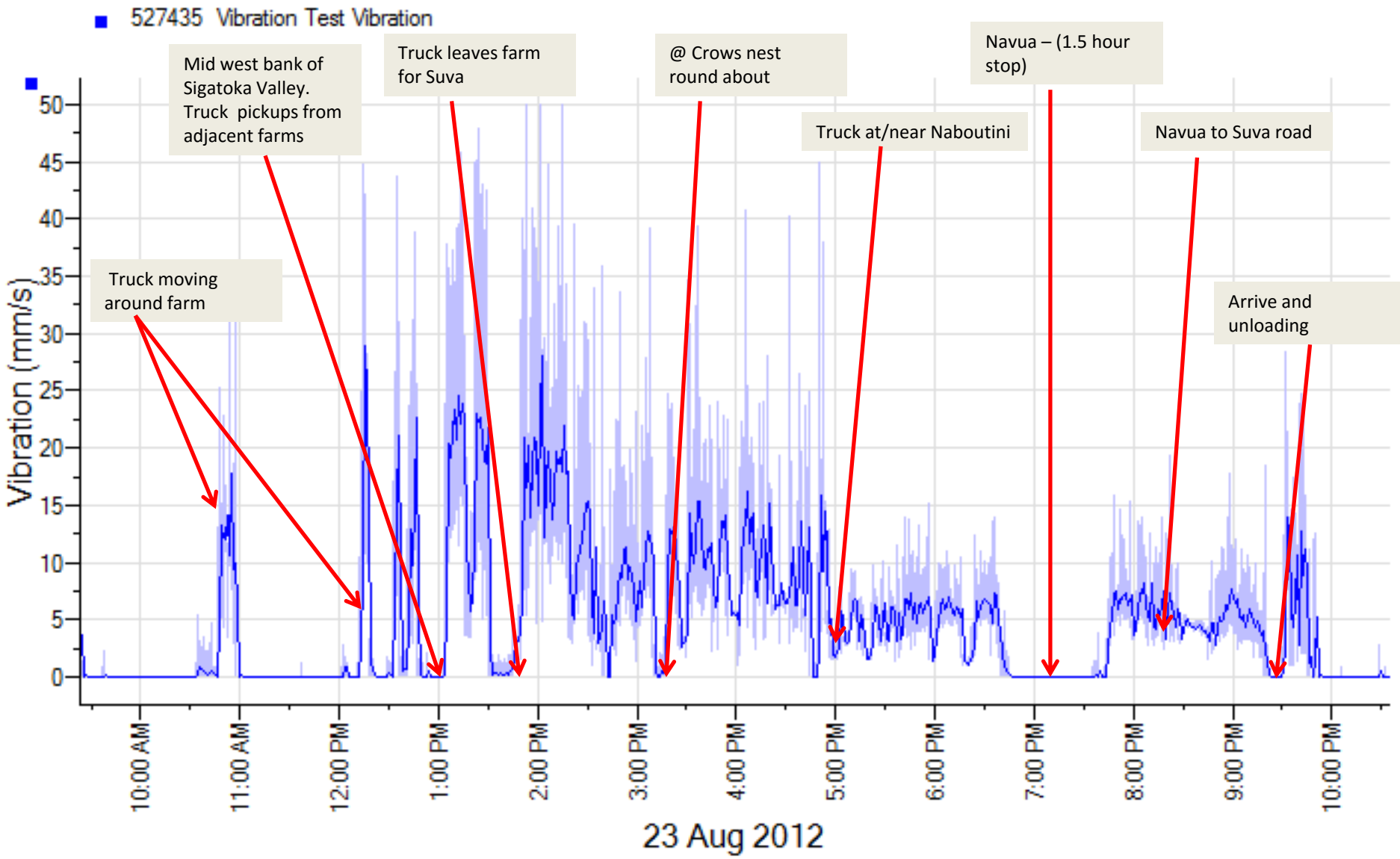
Commercial postharvest losses = 32.93% (farm to vendor)
Projected further 14.45 % loss post-vendor if fruit not consumed within 48hours

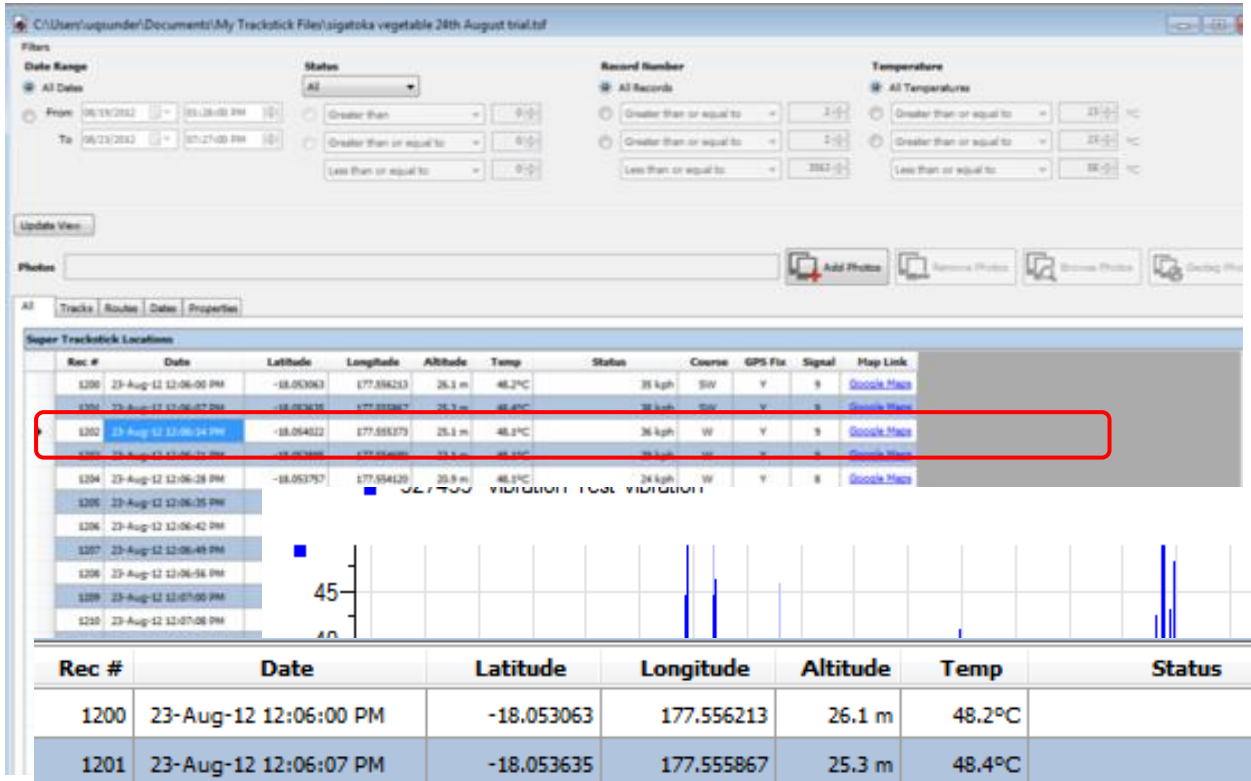
If there was a 1 day delay/break in the chain loses (and a 48hr post-vendor consumption) total postharvest losses = 60.78%.

Fruit storage temperature on-farm and during transport to Suva markets

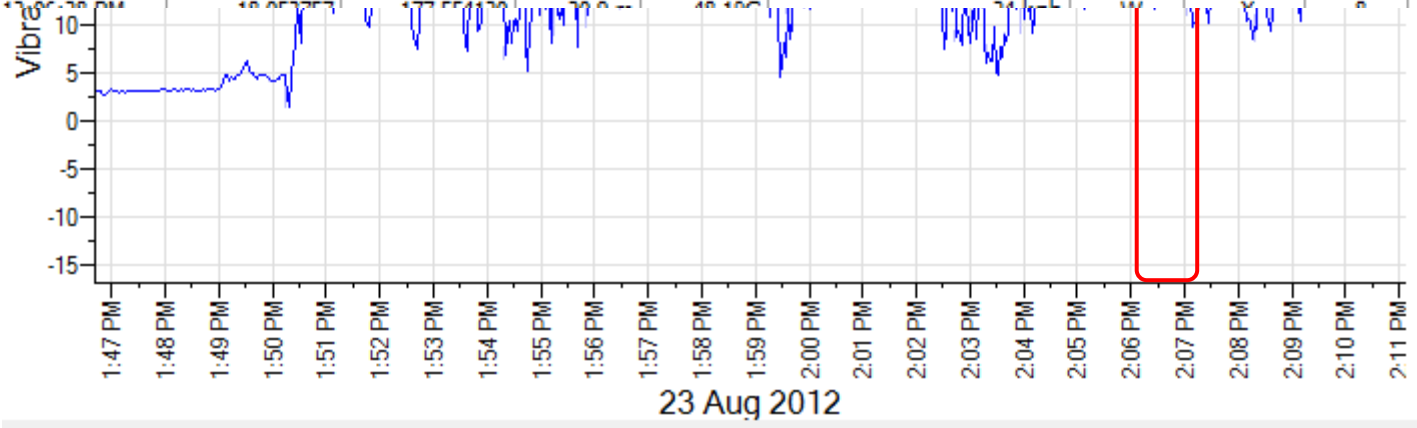


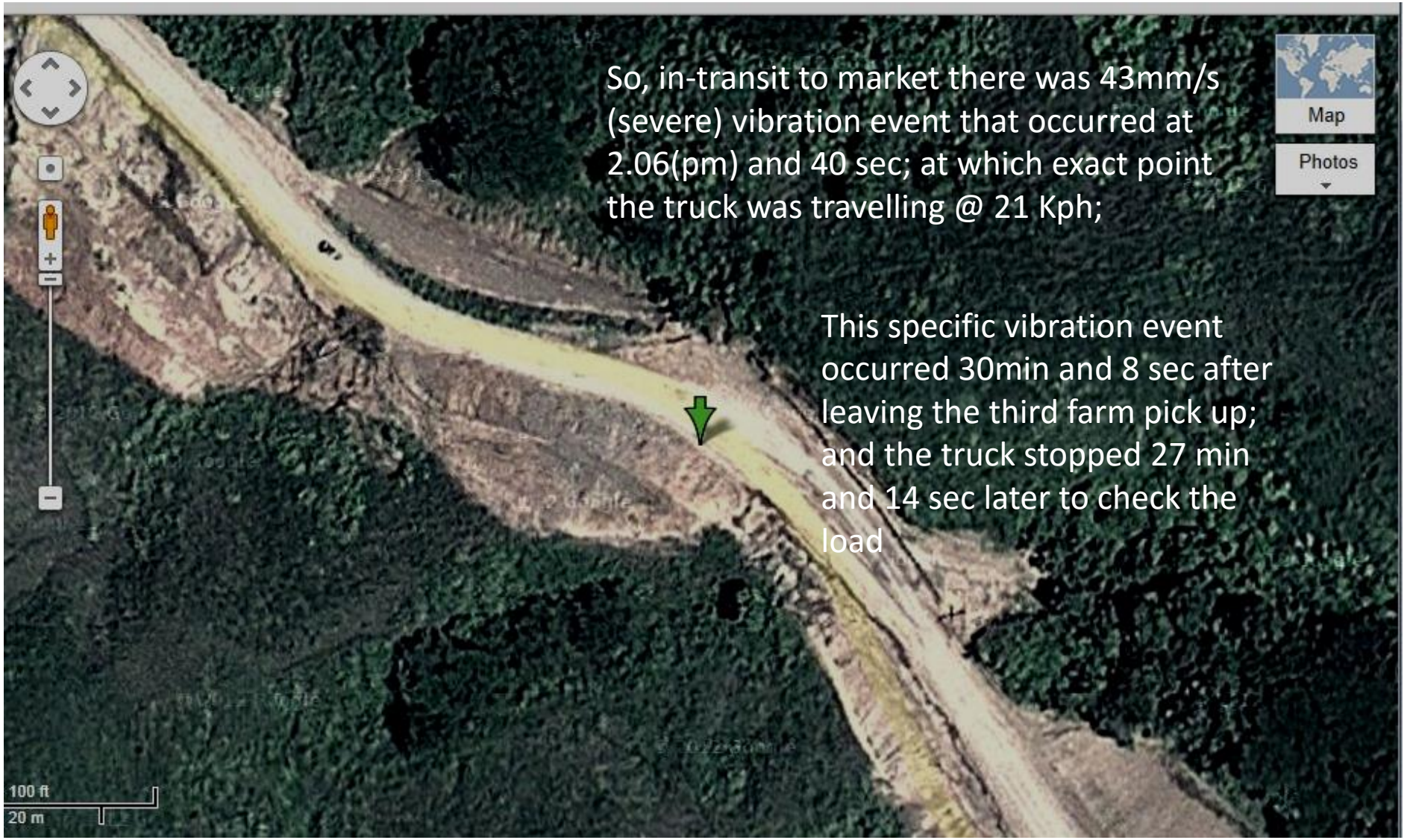
Incidence of vibration/impact loading during transport





Rec #	Date	Latitude	Longitude	Altitude	Temp	Status	Course	GPS Fix	Signal	Map Link
1200	23-Aug-12 12:06:00 PM	-18.053063	177.556213	26.1 m	48.2°C	35 kph	SW	Y	9	Google Maps
1201	23-Aug-12 12:06:07 PM	-18.053635	177.555867	25.3 m	48.4°C	38 kph	SW	Y	9	Google Maps
1202	23-Aug-12 12:06:14 PM	-18.054022	177.555373	25.1 m	48.1°C	36 kph	W	Y	9	Google Maps
1203	23-Aug-12 12:06:21 PM	-18.053895	177.554680	23.1 m	48.1°C	39 kph	W	Y	9	Google Maps




So, in-transit to market there was 43mm/s (severe) vibration event that occurred at 2.06(pm) and 40 sec; at which exact point the truck was travelling @ 21 Kph;
This specific vibration event occurred 30min and 8 sec after leaving the third farm pick up; and the truck stopped 27 min and 14 sec later to check the load
Map
Photos
100 ft
20 m

What we found

The road are poor, the packaging not ideal and production practices variable, **but the key postharvest challenge (the one much of the quality losses could be traced-back to) was poor on-farm ripening practices**

Need for better ambient ripening practices and on-farm postharvest hygiene to reduce disease.

Postharvest behavioural contributors

<u>Positive inadvertent behavioural</u>

1. Packing and pre-loading tomato crates first – **lowers risk of vibration and impact loading stress.**
2. Use of recycled plastic crates (to reduce cost) – **better in-transit protection.**
3. Slow truck speed due to level of loading and vehicle age – **reduction of impact loading**
4. On-farm ripened fruit (while market-based) **– less prone to vibration loading**

<u>Negative behavioural detractors</u>

1. Stage of ripeness at harvest - **inconsistent with time available to harvest**
2. No sorting and removing rotten fruit during – **compounding pathogen losses**

Postharvest capacity building approach we are applying in Fiji and Solomon Islands is all about gaining:

- Knowledge that supports better agribusiness decisions
- Explore alternatives postharvest strategies by providing simple low cost tools to do so.
- Using relatively high-tech equipment in participatory learning environment to highlight relatively fundamental handling practices.
- Highly targeted remediation




Thank-you