

Where is the postharvest loss occurring in tomato supply chain?

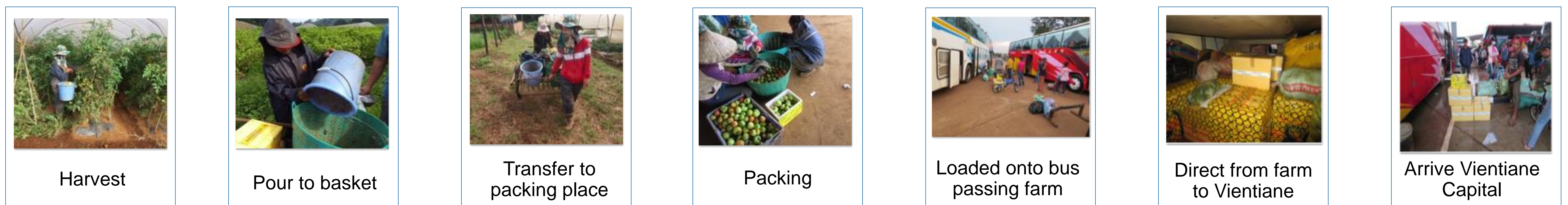
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Tomato supply chain: Paksong district, Champasak province – Vientiane Capital

Option 1



Option 2



Background

The rich soil, cool climate, adequate rainfall and the altitude (>1000 metres) of the Paksong District (Bolaven Plateau) provide opportunities to grow many high value vegetable crops. However, the region's vegetable producers suffer from high postharvest losses. Postharvest loss is generally classed as:

1. *Outright loss* in which vegetables are rendered unsaleable due to disease, insect damage or physical damage during harvest, handling and transport operations
2. *Poor quality* in which produce of secondary quality receives a lower price in the market due to inferior appearance (e.g. size or colour) and/or flavour.

Monitoring damage and quality losses along the supply chain (from farm to market) is key to understanding where these losses are occurring and developing solutions to limit losses.

Methods

Three consignments of tomatoes were mapped from farm in Paksong District to Vientiane Capital in September-October 2016. Temperature/humidity loggers were inserted into boxes of tomatoes to record temperature and humidity change from farm in Paksong District, Champasak Province to sale at a wholesale market in Vientiane Capital. The tomatoes were packed into Styrofoam boxes with 25kg per box as per common farmer/collector practices. Quality was assessed at each transit point in the supply chain (see conceptual supply chains above). Quality assessments included colour score, cuts, cracking, insect damage, disease development, bruising and firmness.

Results

Tomatoes with bruise symptoms were found at each transit point. Bruising is tissue damage leading to tissue deformation and accelerates deterioration. About 40% fruits found to be bruised at harvest, and this increased to 65% at Pakse before departing to Vientiane Capital and 78% on arrival at Vientiane Capital. The severity of bruise advanced during the supply chain; 30% tomatoes were scored as severe bruising at destination. Tomatoes were also exposed to relatively high temperatures throughout the supply chain (Figure 1). Mixed maturity packing and the high temperature supply chain journey initiated undesirable ripening. As a result, all tomatoes reached a more mature stage and were softer in texture.

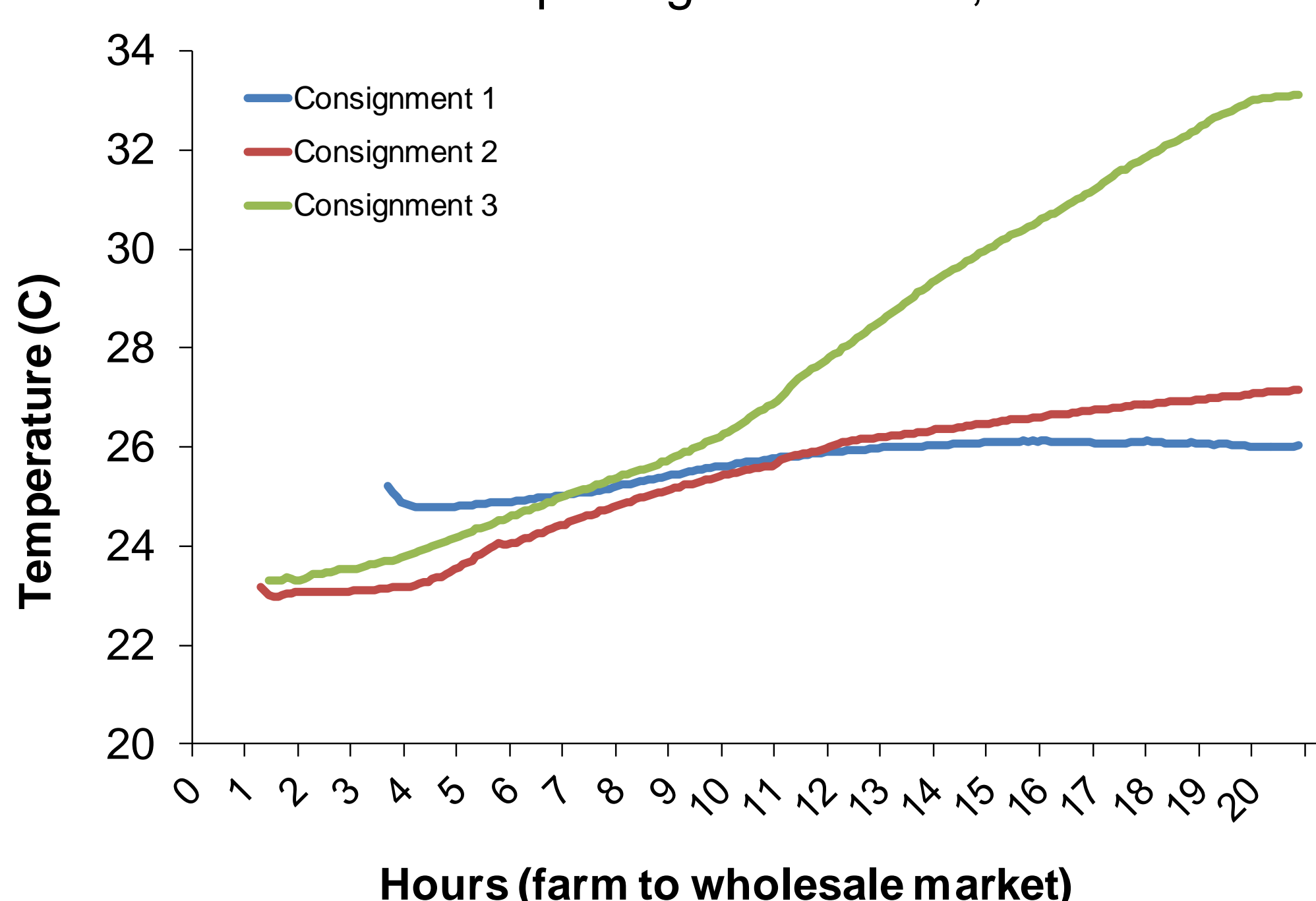


Figure 1. Temperature profile of tomato supply chain from farm in Paksong district, Champasak Province, Lao PDR to wholesale market in Vientiane Capital (Hour 0, 09:18 am 17 September 2016; Hour 20, 5:18 am 18 September 2016). Consignment 1 was transported direct from farm to Vientiane Capital and Consignments 2 and 3 both travelled from farm to Pakse before travelling on to Vientiane.

Proposed solutions to limit postharvest losses

1. Protect tomatoes from direct sunlight after harvest (ideally, harvest in the early morning and store harvested tomatoes in the shade in baskets covered by cool microfibre cloth; Figure 2)
2. Send tomatoes direct from farm to Vientiane Capital, rather than via Pakse
3. Use alternative packing methods
 - a. Tomatoes should be graded and sorted before packing, same maturity should be packed in a box
 - b. Pack tomatoes into smaller boxes (e.g. 10kg) to minimise the impact between tomatoes which led to bruising
 - c. Insert low cost ethylene absorbent into the box to minimise the undesirable ripening induced by ethylene during transit.



Figure 2. Crate covered by a moist microfibre towel and in the shade of a tree to reduce exposure to high temperatures.



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More information

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