



Improving smallholder farmer incomes through strategic market development in mango supply chains in southern Vietnam

**End of Project Review
13-15 September 2022**

Title: Analysis and Validation Study

Presenter: Hoang Dinh Huu, SCAP

Research Team: Hoang Dinh Huu, SCAP
Doan Huu Tien, SOFRI
Alec Zuo, University of Adelaide

Implementing Agency



SIAEP



Funding Agency



Australian Government
Australian Centre for
International Agricultural Research



Aim & Objectives

Focus

- ▶ To evaluate options to overcome selected barriers to competitiveness in fresh and processed mango value chains
- ▶ Undertake financial, economic and business feasibility analysis on selected trial interventions

Research questions

- ▶ What on-farm, post-harvest, marketing and processing innovations are likely to generate the most significant impacts to reduce losses, increase? productivity and quality outputs that will improve returns directly related to smallholder incomes
- ▶ What innovations have the most cost-effective and positive impacts on productivity, losses, quality and harvest timing, leading to improved price and farmer incomes?
- ▶ What is the potential to increase farmer incomes from further developing access to processed fruit chains in the domestic market?



Impact Assessment: Intervention - Fertiliser

Financial analysis

Cat Chu Mango Variety

- ▶ Average cost reduction of fertilizer: 4.02 VND mil/ha/yr
- ▶ Increase income from selling mango grade 1 (grade 1 weights at 400g and sold at a higher price from 1000-3000 VND/kg): Turnover increase from 15,0- 23,3 VND mil/ha/yr.
- ▶ Total additional income: 19,02-27,32 VND mil/ha/yr

Cat Hoa Loc Mango Variety

- ▶ Average cost reduction of fertilizer: 15,6 VND mil/ha/yr (6,8%)
- ▶ Increase income from selling mango grade 1 and 2 (15% và 5% respectively): 51 VND mil/ha/yr
- ▶ Total additional income: 66.6 VND mil/ha/yr

Economic implication

- ▶ Project's fertilizer intervention yields higher economic returns to both mango varieties

Business feasibility

- ▶ Intervention results can be scaled out to increase additional income for mango farmers for both varieties.

Impact Assessment: Intervention - Flowering

Financial analysis

- ▶ **Cat HL:** Net revenue per 100kg mango of PBZ, Prohexadione Calcium, Uniconazole are VND mil. **4.436**, 4.288 and 3.863 respectively. PC has 4.47 % lower in net revenue of PBZ. **Sensitivity Analysis:** decrease 5% when yield change from 70-130 kg regardless price, decrease 2.74%-4.34% and 10.56%-16.7% if use Prohexadione Calcium and Uniconazole respectively if price changes 40-60,000/kg)
- ▶ **Cat Chu:** Net revenue per 100kg mango of PBZ, Prohexadione Calcium, Uniconazole are VND mil. **0.559**, 0.534 and 0.109 respectively. **Sensitivity Analysis:** decrease 2.16%-60.73% and 38.83% to 1093.12% of using Prohexadione Calcium and Uniconazole when yield change from 70-130 kg regardless price, similar pattern if price changes 14-26,000/kg)

Economic implication

- ▶ For all mango varieties: Net revenue of PBZ > Prohexadione Calcium > Uniconazole

Business feasibility

- ▶ Cat Chu: Prohexadione Calcium is a feasible replacement for PBZ (Dong Thap).
- ▶ Cat HL: PBZ is banned, Prohexadione Calcium is a feasible replacement for PBZ (Tien Giang)

Impact Assessment: Intervention – Sap burn

Variables for calculation of sap burn treatment		Value	Value
	De-sapping equipment depreciation	10,000,000 VND	\$620.00 AUD
1	Purchase price of trolley	50,000,000 VND	\$3100.00 AUD
2	Annual cost (based on 5 year life-span)	10,000,000 VND	\$620.00 AUD
3	Supply of tools, crates and other consumables	6,000,000 VND	\$372.00 AUD
4	Sap burn chemical supply (for treatment)	33,000,000 VND	\$2046.00 AUD
5	Labour cost (2 persons) for treating fruit	240,000,000 VND	\$14,880.00 AUD
6	Total (items 2 to 5)	289,000,000 VND	\$17918.00 AUD
7	Total kg treated	240,000 kg	240,000 kg
8	Cost to treat 1 kg (item 6 divided into item 7)	1204 VND	0.07 AUD

Economic implication

- ▶ Wastage is minimal (1% or less), additional price premium in the order of 15%
- ▶ The treated Cat Hoa Loc mangoes retailed price: 125,000 VND (\$7.75 AUD) per kg, almost double the price of untreated mangoes, 5 and 10 times the price of other less preferred untreated varieties. Out of season: 60,000-160,000 VND (\$3.72-\$9.92 AUD).

Business feasibility

The supply sap-burn treatment mangoes in “6-pack” cartons should be actively promoted amongst the mango value chain stakeholders



Impact Assessment: Hot water

Cost to treat 1,000 kg of fruit

1	Equipment depreciation	2,083,333 VND	\$129.17 AUD
2	Equipment repairs and maintenance	625,000 VND	\$38.75 AUD
3	Labour cost (VND/hour, for two labour units)	80,000 VND	\$4.96 AUD
4	Total cost for treatment (1,000 kg treated fruit)	2,788,333 VND	\$172.88 AUD
5	Cost to treat 1 kg of fruit	2,788 VND	\$0.17 AUD

Economic implication

- ▶ <1% of fruit is damaged by scald as a result of the hot water treatment
- ▶ Economic benefit: as of sap-burn

Business feasibility

- ▶ The supply hot water treatment mangoes in “6-pack” cartons should be actively promoted amongst the mango value chain stakeholders
- ▶ Wider dissemination of hot water treatment technology within local pack houses as this is not practiced by all



Pathways to adoption

Fertiliser

- ▶ Wider disseminations of best fertilizing experiments for both Cat Chu and Cat HOA LOC mangoes.
- ▶ The fertilizer intervention demonstrates a broader impact on the country's mango industry (and potentially other fruits), both economically (reducing costs and enhancing fruit quality) and environmentally.

Flowering

- ▶ Wider dissemination of Prohexadione Calcium (PBZ is likely to be banned in the future)

Sap burn and Hot water treatments

- ▶ Further investigations are required to fine-tune the hot water treatment of mangoes.
- ▶ Additional research and development is required: incorporation of a PH fungicide into treatment protocol, encourage on-going record keeping of production practices and chemical applications, GAP standard application, sharing of margin of additional prices.