

APPENDIX A

I Questionnaires for tangerine production systems in Chiang Mai province

1. Name..... Surname.....
2. Gender Male Female
3. Age.....years
4. Address.....
..... Tel.....
5. Schedule of orchard.....
6. Profession.....
7. Education level
- Primely school
- Secondary school.....
- Vocational school.....
- Other.....
8. How many tangerine orchard areas / how much do you have?
- One orchard, size.....rais
- Two orchard, size.....and.....rais
- Three orchard, size.....,.....and.....rais
- Four orchard, size.....,.....and.....rais
- Five orchard, size.....,.....and.....rai
9. What list of tangerine agro-ecosystem do you have?
- Lowland Plain
- Upland Other.....
10. While list of preceding crops found before tangerine cultivation do you have?
- Rice Shallot and garlic
- Lychee Longan
- Mango Vegetables
- Denuded forest Other.....

11. What list of land ownership certificate of tangerine orchard do you have?

- | | |
|--|---|
| <input type="checkbox"/> Land title deed | <input type="checkbox"/> Sor Por Kor 4-01 |
| <input type="checkbox"/> Sor Tor Gor | <input type="checkbox"/> Nor Sor 3 Gor |
| <input type="checkbox"/> Non-certificate | <input type="checkbox"/> Other..... |

12. What list of the cultivars of tangerine grown in orchard do you have?

- | | |
|--------------------------------------|---|
| <input type="checkbox"/> Sainampueng | <input type="checkbox"/> Sithong or Pillthong |
| <input type="checkbox"/> Freemont | <input type="checkbox"/> Other..... |

13. Do you pruning?

- Yes, it can be post harvest time
- No

14. What list of the plant propagation of tangerine in orchard do you have?

- | | |
|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> Grafting | <input type="checkbox"/> Air layering |
| <input type="checkbox"/> Other..... | |

15. What list the rootstock cultivars for grafting of tangerine do you have?

- | | |
|--------------------------------------|-------------------------------------|
| <input type="checkbox"/> Troyer | <input type="checkbox"/> Cleopatra |
| <input type="checkbox"/> Sainampueng | <input type="checkbox"/> Other..... |

16. How old tangerine trees in orchard do you have?

- | | |
|------------------------------------|----------------------------------|
| <input type="checkbox"/> 1 year | <input type="checkbox"/> 2 years |
| <input type="checkbox"/> 3 years | <input type="checkbox"/> 4 years |
| <input type="checkbox"/> 5 years | <input type="checkbox"/> 6 years |
| <input type="checkbox"/> 7 years | <input type="checkbox"/> 8 years |
| <input type="checkbox"/> > 8 years | |

17. Planting methods of tangerine do you have?

- | | |
|--|-------------------------------------|
| <input type="checkbox"/> Raised bed | <input type="checkbox"/> Ridge |
| <input type="checkbox"/> Contour & terrace | <input type="checkbox"/> Other..... |

18. How much the space for planting tangerine? xmeters

19. What list irrigation systems in tangerine orchard do you have?

- | | |
|---|-------------------------------|
| <input type="checkbox"/> Mini sprinkler | <input type="checkbox"/> Hose |
| <input type="checkbox"/> Furrow | <input type="checkbox"/> Drip |
| <input type="checkbox"/> Other..... | |

20. How many time and how long irrigation systems in tangerine?

.....day/time

the length of each irrigation.....minute

21. What list of water source can be used through the year do you have?

- Rainfall harvesting reservoir
- River and water way
- Water supply from hill
- Artesian well
- Other.....

22. What list of the type of fertilizer application in tangerine orchard do you have?

- Organic fertilizer
- Organic-chemical fertilizer
- Chemical fertilizer

23. What are the organic fertilizer, quantity and source of organic fertilizers on tangerine orchard?

- 1.....
- 2.....
- 3.....
- 4.....

24. Which formula and how much quantity of chemical fertilizer applied in tangerine at different stages?

- 1.....
- 2.....
- 3.....
- 4.....
- 5.....
- 6.....
- 7.....
- 8.....

25. Please list all kinds of pesticides for pest and disease tangerine

- Pest
- 1.....
 - 2.....
 - 3.....
 - 4.....
 - 5.....

6.....

7.....

8.....

9.....

10.....

11.....

12.....

13.....

14.....

15.....

Disease

1.....

2.....

3.....

4.....

5.....

6.....

7.....

8.....

9.....

10.....

11.....

12.....

13.....

14.....

15.....

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26. What are the sources of local knowledge on tangerine orchard management?

Self experience

Neighbors

Pesticide shops

Chemical agent or Salesman

Publications

Radio and Television

Local extension officer

Other.....

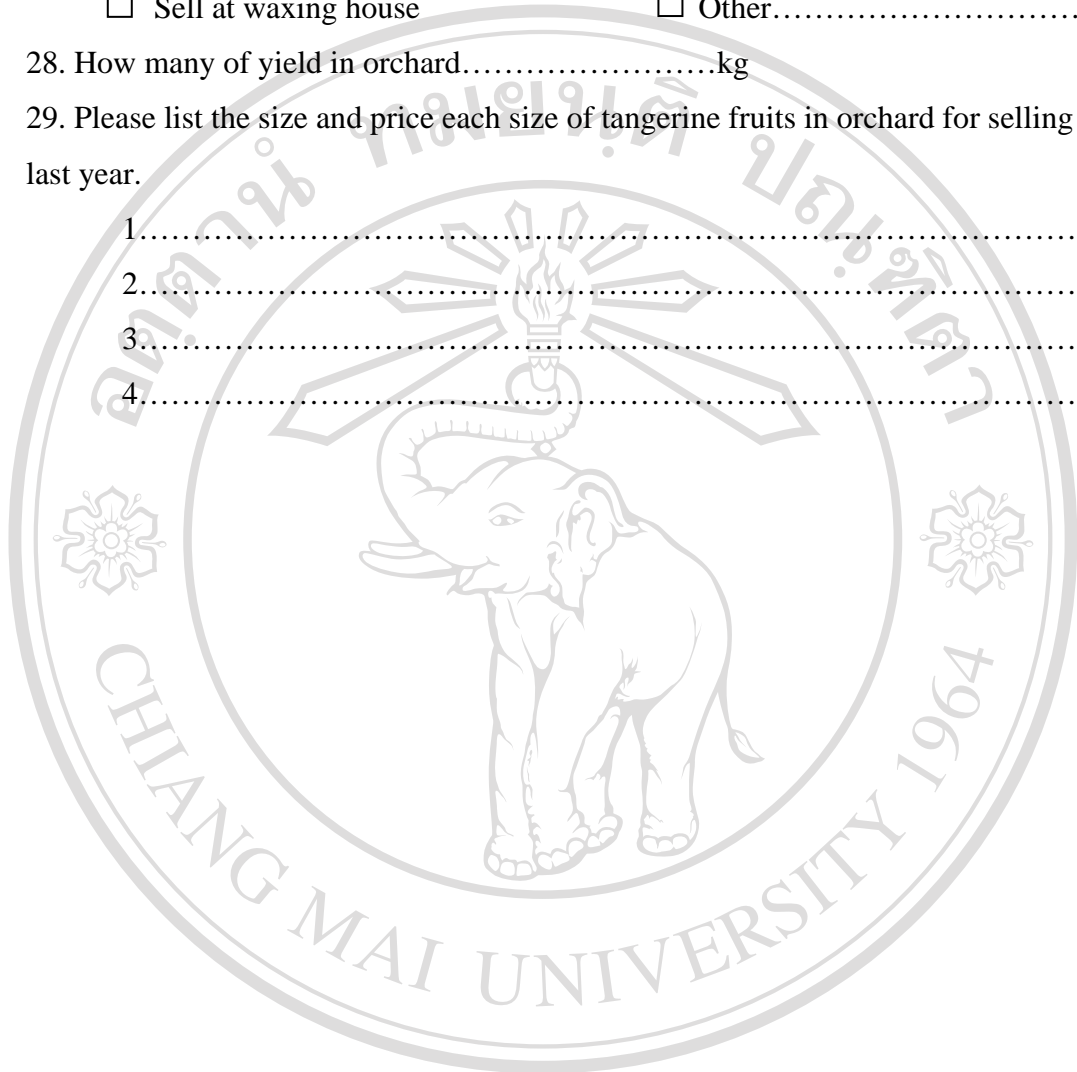
27. Which ways for selling of tangerine of the orchardists

- The dealer
- Sell directly
- Sell at waxing house
- Other.....

28. How many of yield in orchard.....kg

29. Please list the size and price each size of tangerine fruits in orchard for selling in last year.

- 1.....
- 2.....
- 3.....
- 4.....



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APPENDIX B

Table 1 Property in soil at two depths and the optimum concentration.

Nutrient	Soil nutrient concentration		Optimum concentration ^{1/}
	0-15 cm depth	15-30 cm depth	
pH	4.7	5.1	6 - 7
OM (%)	2.9	1.7	2.5 - 3.0
P (mg/kg)	337.0	91.0	26 - 42
K (mg/kg)	300.0	207.0	130
Ca (mg/kg)	918.0	1074.0	1040
Mg (mg/kg)	136.0	118.0	130
Fe (mg/kg)	213.0	124.8	11 - 16
Mn (mg/kg)	51.5	25.2	9 - 12
Cu (mg/kg)	6.0	2.9	0.9 - 1.2
Zn (mg/kg)	7.4	3.0	1.1 - 3.0
B (mg/kg)	0.35	0.39	0.6 - 3.0

¹ Supakumnerd, 2004

Table 2 Fertilizer application by growers during the productive year of tangerine cv. Sainampueng

Month	Soil Fertilizer	Leaf Fertilizer
January	-	Fish bioextract juices, Mg, Zn
February	-	Fish bioextract juices, Urea, Ca, Mg, Zn, Mn, B
March	Urea, Cow dung	Fish bioextract juices, Ca, B
April	Fish bioextract juices	Fish bioextract juices, Mg, Zn
May	Dolomite	Fish bioextract juices, Urea, Mg, Zn
June	Chicken dung	Fish bioextract juices, Urea, Ca, Mg, Zn, B
July	Organic fertilizer	Fish bioextract juices, Dextrose, Ca, Mg, Zn, B
August	Chicken dung	Fish bioextract juices, Ca, Mg, Zn, B
September	Organic fertilizer	Fish bioextract juices, Urea, Ca, Mg, Zn, B
October	Organic fertilizer	Fish bioextract juices, Mg, Zn
November	13-13-21 + 0-0-60	Fish bioextract juices
December	-	-

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Education Background

Certificate Degree	Institute	Academic year
Senior high School	Montfort, Chiang Mai	1992
B.S. (Agriculture)	Faculty of Agriculture, Chiang Mai University, Chiang Mai	1996
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Work experience

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