

# Different HLB Management Cases in China

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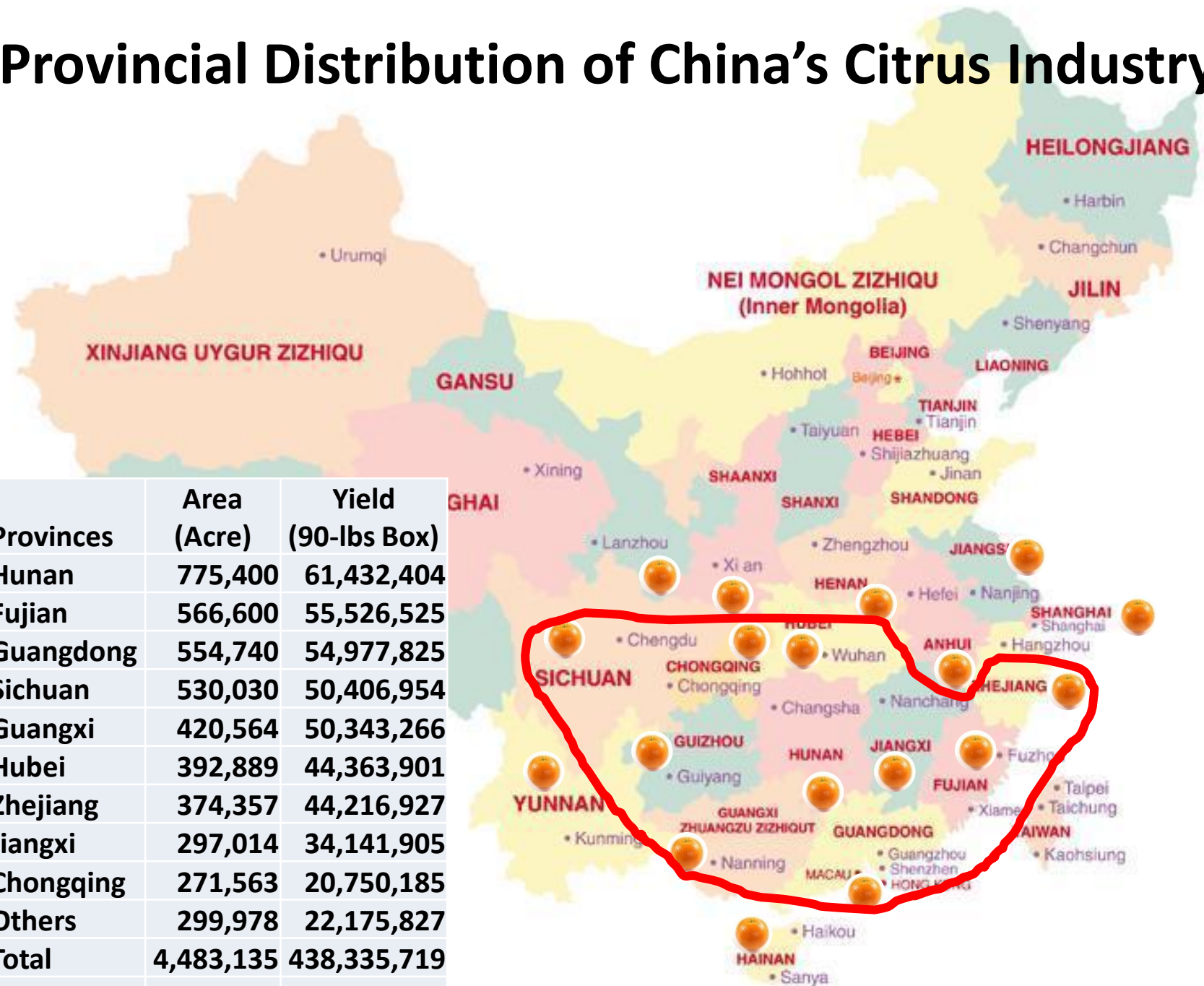
# Outline

- **Overview of citriculture and citrus HLB in China**
- **Successful case – Ganzhou, Jiangxi**
- **Struggling case – Longmeng, Guangdong**
- **Successful & struggling cases – Guilin, Guangxi**
- **Selected answers to our questions & take-home message**

# Provincial Distribution of China's Citrus Industry

Rank	Provinces	Area (Acre)	Yield (90-lbs Box)
1	Hunan	775,400	61,432,404
2	Fujian	566,600	55,526,525
3	Guangdong	554,740	54,977,825
4	Sichuan	530,030	50,406,954
5	Guangxi	420,564	50,343,266
6	Hubei	392,889	44,363,901
7	Zhejiang	374,357	44,216,927
8	Jiangxi	297,014	34,141,905
9	Chongqing	271,563	20,750,185
	Others	299,978	22,175,827
	<b>Total</b>	<b>4,483,135</b>	<b>438,335,719</b>

Deng et al. 2008



# Huanglongbing (HLB) Zones & Severity in China



Provinces	HLB Severity
4 Sichuan	*
6 Hubei	
9 Chongqing	
1 Hunan	**
7 Zhejiang	***
8 Jiangxi	***
2 Fujian	****
3 Guangdong	*****
5 Guangxi	****

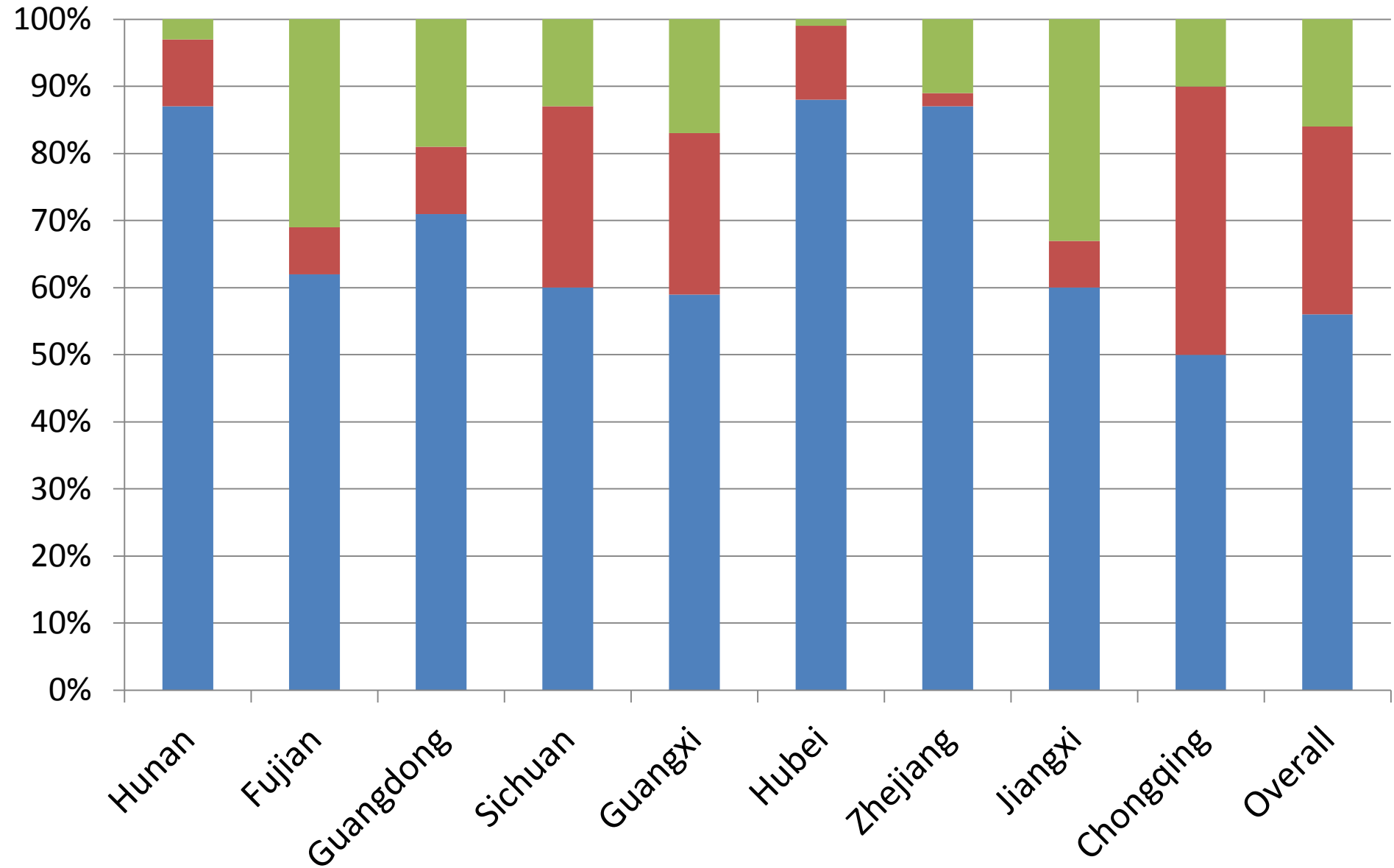
Chaoshan, first reported in 1919

# **Citriculture in China (Different from the US)**

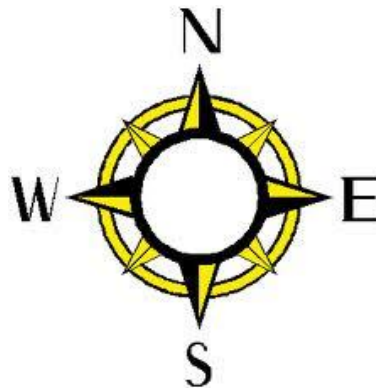
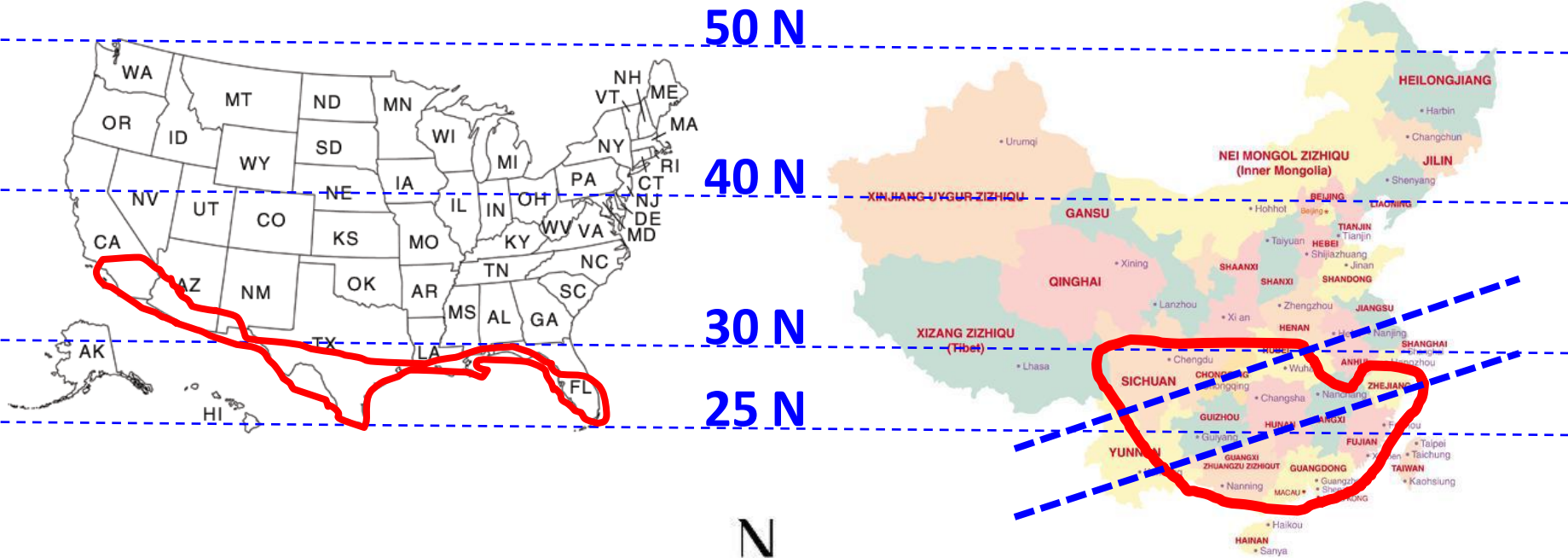
- **~56% are mandarin types, ~28% orange types, and ~16% others.**
- **Most citrus orchards are composed of many very small, family-based patches adjacent to each other in an area.**
- **Almost all citrus trees are planted in hilly / mountainous land with some rocky soil, and in very high density.**
- **Most have no irrigation system or seldom use if installed, and growth largely depends on the mother nature.**
- **Animal manures are predominantly used fertilizer in most patches.**
- **Most trees are dwarf or short, due to the above and other factors.**
- **Almost all culture activities depends on man power, with little / no modern mechanic operation.**
- **Outdoor budwoods and nurseries remain very common.**
- **Provincial and local governments, together with scientists & specialists, play varying roles and have much involvement in local citrus industry.**

# Citrus Cultivar Types and Percentages in China

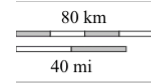
■ Mandarin types    ■ Orange types    ■ Other types



# Latitudes of Citrus Regions in China and the US



# Success in Navel Orange HLB Management, Ganzhou, Jiangxi





# Ganzhou-1. All small, family-based patches



## Ganzhou-2. Always hilly and mountainous



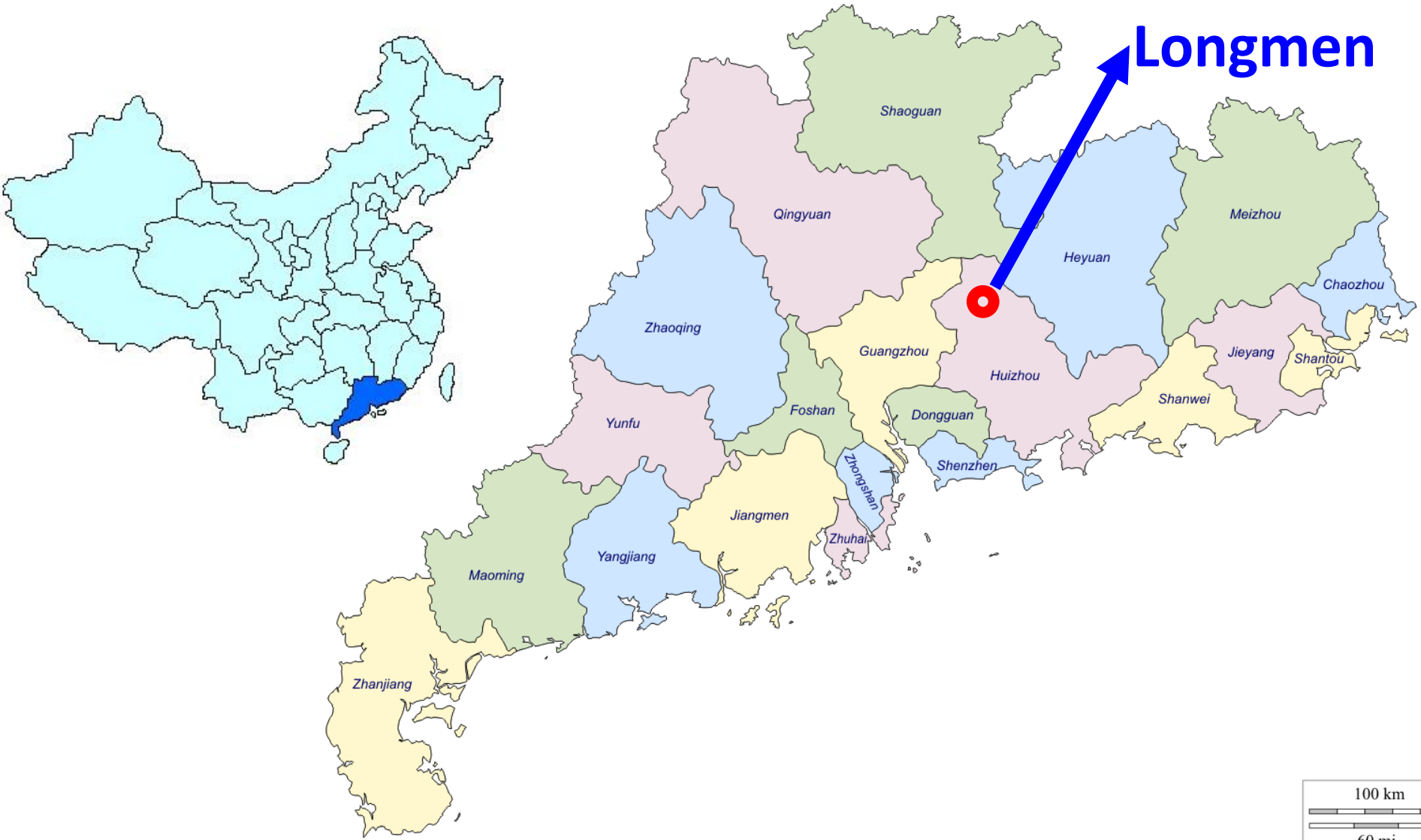
# Ganzhou-3. Productive, and with premium quality & price



# Summary for the Ganzhou, Jiangxi Case

- **All new plantation around 2000, with new regulations**
- **Mandated regulations led by the local government**
  - A department from the (district) city to every county specifically focus on the whole business of navel orange and enforce the regulations, with budget for HLB management;
  - Only certified pathogen-free nursery trees;
  - **Area-wide coordinated psyllid control (spray)**;
  - Removal of infected trees with some compensation;
- **Other beneficial factors**
  - Hilly and mountainous geography help the isolation of small orchards each other.
  - Cold climate and down to -3°C a few days each year in the winter are very unfavorable for overwinter of psyllids.
  - Family-based farming and cheaper labor allow handy removal of summer shoots to minimize the infection possibility.
- **So far so good (< 1 incidence per 10,000 trees)**

# Struggle in Citrus HLB Management, Longmen County, Guangdong





**Longmen-1. Little hope vs. some hope**



Longmen-2. "Little hope!"



**Longmen-3. "Some hope!"**





**Longmen-4. "Some trees better than no trees!"**



**Longmen-5. "Bear fruits, now!"**



**Longmen-6. "Bear more fruits, please!"**



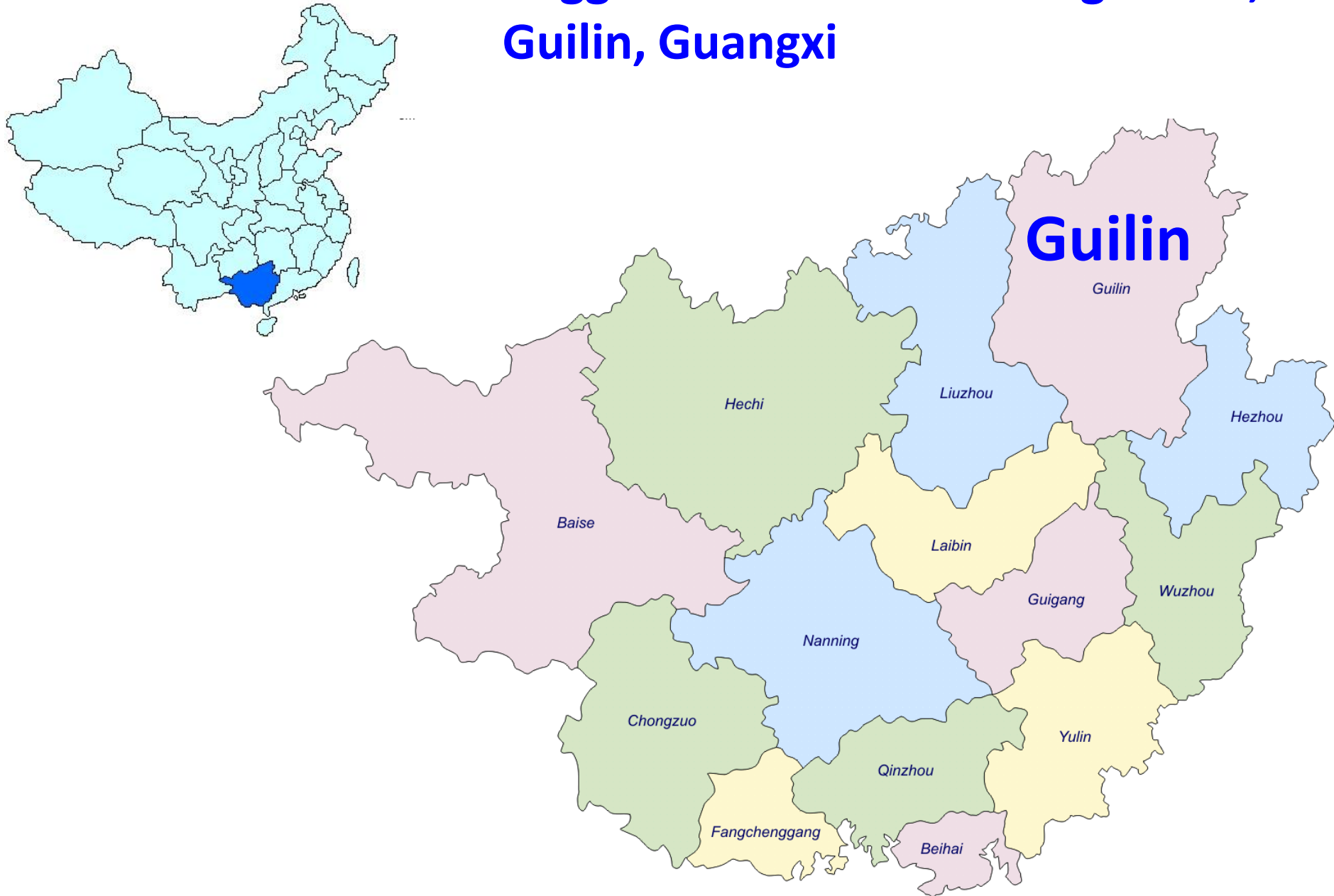
**Longmen-7. "Bye-bye, bad bugs!"**

# **Summary for The Longmen County, Guangdong Case**

**(Different from Ganzhou, Jiangxi)**

- **Old citrus production region, and no mandated regulations**
- **Two local mandarin varieties, Shatangju and Nianju, predominant in plantation**
- **Investment for psyllid/HLB management, largely driven by market and profit (not so constant!)**
- **Competition of resources and budget with other major fruit crops**
- **Extra steps to promote fruiting early and more**
- **Very highly infected rate (many patches up to 100%)**
- **More like a niche market crop**

# Both Success and Struggle in Citrus HLB Management, Guilin, Guangxi



**Guilin-1A. No good!**



**Guilin-1B. Good at a not-far patch.**





## Guilin-2A. Too much yellow radiating out!



**Guilin-2B. No yellow found at an adjacent patch.**



# **Summary for The Guiling, Guangxi Case**

## **(Different from Ganzhou, Jiangxi)**

- **Old citrus production region, and no mandated regulations**
- **The difference between “no good” and “good” is whether family-based farmers constantly suppress the vector, and follow recommended management standards.**
  - **If not, the price is high: 1A. Use of infected nursery trees and poor psyllid control; 2A. No removal of infected trees**
  - **If yes, the reward is obvious: 1B./2B. Low HLB incidence and productive**
- **Mandated regulations under consideration now.**

# Preparation for Clean Mother Trees and Budwood Guangxi



# Preparation for Clean Nursery Trees in Protected Facility Guangxi

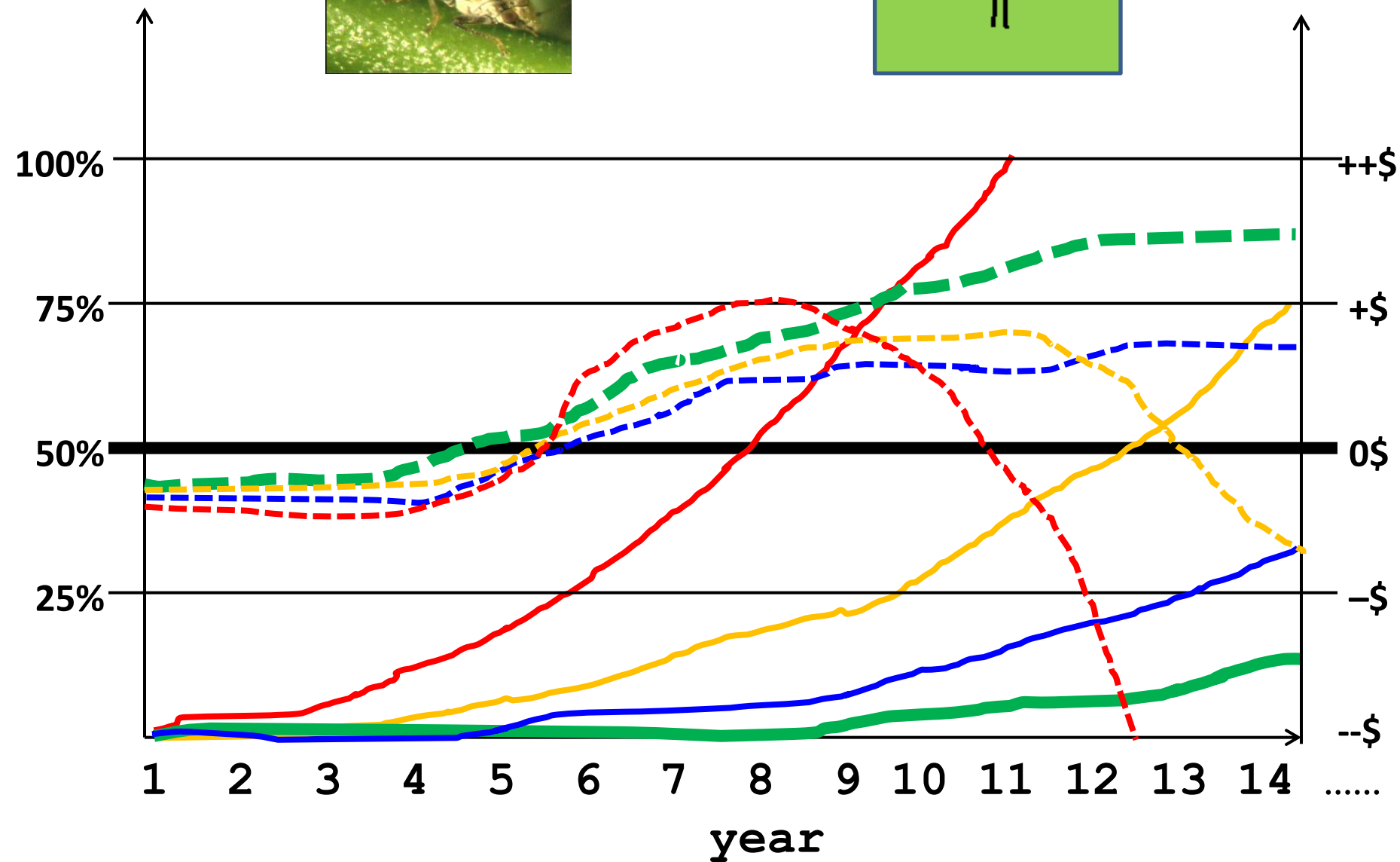


# Selected Answers to Our Questions

- **How many sprays specifically to control psyllids each year?**  
A) 3; B) 4; C) Psyllid-oriented pesticides added in every spray
- **When to spray?**  
A) When spring, summer, fall shoots start sprouting, plus a fall extra; B) When needed by monitoring psyllids; C) Follow the year-round schedule
- **When and how to remove the infected trees?**  
A) Once a year in the fall when fruits are picked and trees are sprayed; B) Remove after confirmed and orchard is sprayed; C) never remove until no production or dead
- **What is the most essential for success in HLB management?**  
A) [Control psyllids](#)
- **Why to abandon the groves?**  
A) [Not profit enough](#)



**Vs.**



# Acknowledgement

## Collaborating Institutes and Colleagues in China

- Guangdong Fruit Tree Institute, Guangzhou, Guangdong Province (Ganjun Yi, Jiwu Zeng, Yun Zhong)
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