PRODUCERS' PERCEPTIONS OF PUBLIC GOOD AGRICULTURAL PRACTICES AND THEIR PESTICIDE USE:

THE CASE OF MYGAP FOR DURIAN FARMING IN PAHANG, MALAYSIA

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GLOBALGAP

EUREPGAP® （1997～2008）

GLOBALG.A.P. （2008～）

- GlobalGAP: Private standard (by EUREP = Euro-Retailers Working Group)

By 2012: the total of about 123,000 farmers had been certified out of 111 countries

- Benchmarking with private national GAP standards

MexicoGAP, ChileGAP, ThaiGAP, etc.

- Recent academic studies demonstrate the socioeconomic advantage of GlobalGAP certified farms over uncertified farms

(e.g., Asfaw et al 2010; Colen et al 2012; Henson et al 2011; Holzapfel & Wollni, 2014; Kersting & Wollni 2012; Kleemann et al. 2014; Tallontire et al. 2013)

NATIONAL PUBLIC GAP STANDARDS IN SOUTHEAT ASIA (as compared with GLOBALGAP)

Country/region	Program	Year of Inception	Number of Certified Farms (year)
Europe	GlobalGAP	1999	123,000 (2012)
Malaysia	MyGAP	2002	313 (2013)
Thailand	Q-GAP	2004	≒220,000 (2012) ≒119,000 (2015)
Singapore	SingaporeGAP-VF	2004	7 (2013)
The Philippines	PhilGAP	2005	15 (2013)
Viet Nam	VietGAP	2008	575 (2013)
Brunei	BruneiGAP	2013	1 (2014)
Asean region	AseanGAP	2015 (planned)	T.B.D.

Source: created through reference to the GAP protocol and direct contact to the agency in charge.

☆ Indonesia, Cambodia, Laos and Myanmar are currently still on the planning stage of establishing public GAP standards

EXISTING RESEARCH ON PUBLIC GAP AND PESTICIDE USE

- Schreinemachers et al. (2012) compared the practices of pesticide use and handling of 45 Q-GAP certified and 245 uncertified fruit and vegetable growers for a total of 9 fruits and vegetables in a watershed of northern Thailand. They found that there are no significant statistical differences between those types of growers with regard to the amount of pesticides used, methods of pest control, and pesticide handling.
- Amekawa (2013) conducted a survey of 64 Q-GAP certified pomelo farmers in Chaiyaphum province, Northeast Thailand, and identified only one out of 35 farmers who were using pesticides as attributing the reduction of their pesticide use to experiences of Q-GAP

Reference:

Schreinemachers, P., Schad, I., Tipraqsa, P., Williams, P. M., Neef, A., Riwthong, S., Sangchan, W., & Grovermann, C. (2012). Can public GAP standards reduce agricultural pesticide use? The case of fruit and vegetable farming in northern Thailand. *Agriculture & Human Values, 29, 519-529.*

Amekawa, Y. (2013). Can public GAP approach ensure safety *and* fairness? A comparative study from Thailand. *Journal of Peasant Studies* 40(1): 189-217.

DIFFERENCES IN THE REQUIRED COMPLIANCE LEVELS ACROSS GLOBALGAP, MYGAP & Q-GAP

GlobalGAP	**MyGAP**	**Q-GAP** (TAS 9001-2013)
-Major must (100%): 74	- Major must (100%): 29	- Major must (100%): 23
-Minor must (95%): 125	- Minor must (90%): 77	- Minor must (60%): 41
-Recommended: 37	- Encouraged: 57	- Recommended: 52
Total: **236** CP*	Total: **162** CP*	Total: **116** CP*

* CP = control points

Stringency in Compliance

GlobalGAP <<<<<<< MyGAP <<<<<< Q-GAP

MyGAP performs better than Q-GAP in certified farmers' pesticide use practices?

PURPOSES OF THIS RESEARCH

(1) To examine the perceptions of MyGAP certified durian farmers regarding their participation in the policy program

(2) To compare the performance of pesticide use and handling between MyGAP certified and uncertified durian farms

RESEARCH AREAS

18 certified
54 uncertified

1 certified
3 uncertified

19 certified
57 uncertified

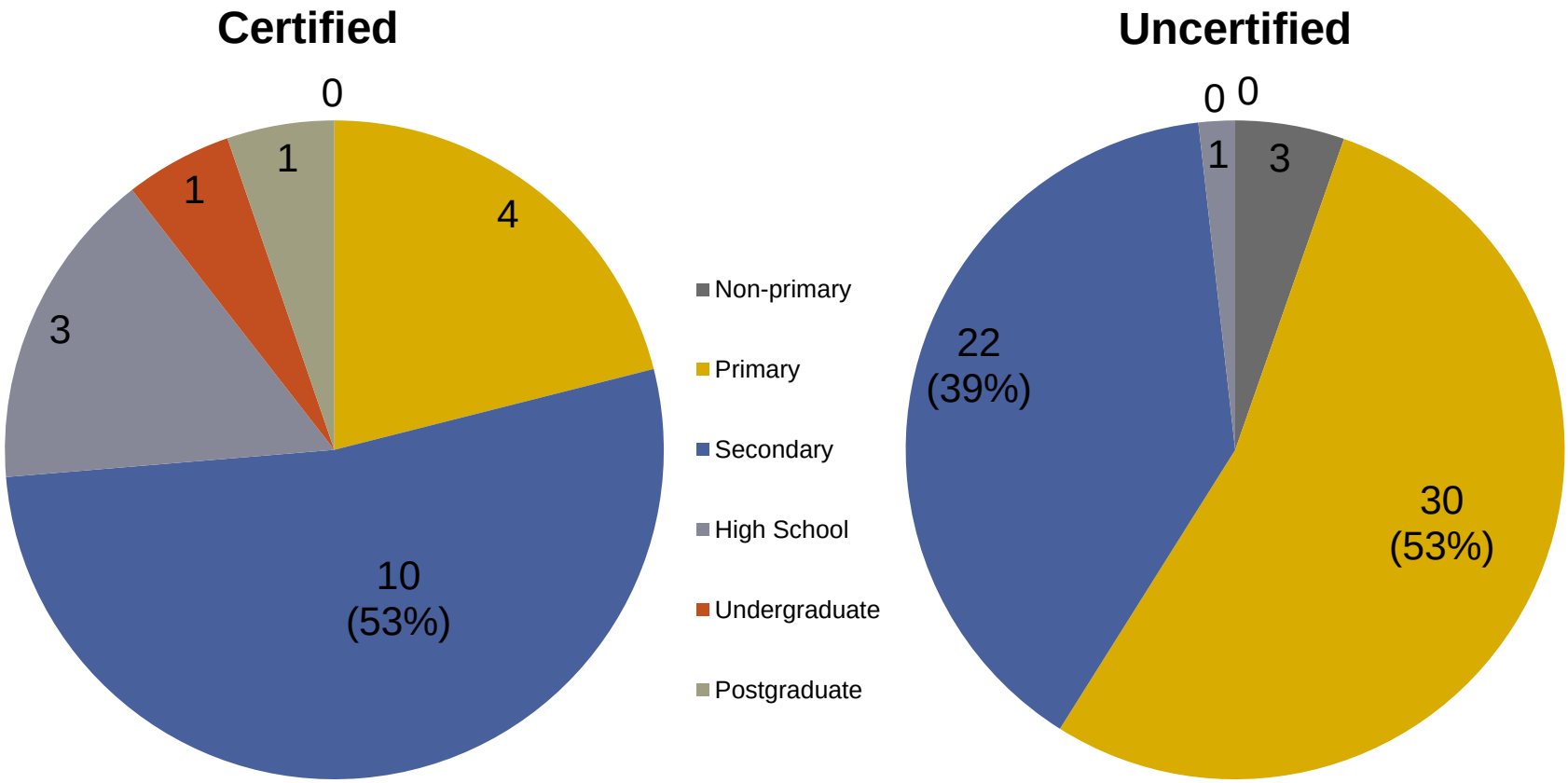
BACKGROUND OF INTERVIEWED FARMERS

	Certified	Uncertified
Total number of studied farms	19	57
Farms in Raub	18	54
Farms in Bentong	1	3
Chinese (farm manager)	19	55
Malay (farm manager)	0	2
Male (farm manager)	17	52
Female (farm manager)	2	5
Average number of employed farm workers	3.3	1.2
Average total farm land size (ha)	7.4	3.9
Average durian farm land size (ha)	5.7	3.7
Average monthly salary to workers (US$)[a]	346	308
Average total farm expenditure in 2012 (US$)[a]	17,862	6,172
Number of farms whose data of durian produce in 2012 is available	18	47
Average farm durian produce in 2012 (ton)	25.2[b]	17.4[b]
Average durian produce per hectare (ton/ha)	4.4[b]	3.9[b]

[a]1USD was approximately 3.2 Malaysian Ringgit (MYR) at the time of the research.

[b]The results refer only to the farms whose data of annual durian produce are available.

EDUCATIONAL BACKGROUND



AWARENESS/KNOWLEDGE OF MYGAP POLICY

	Number	%
Can relate MyGAP to food safety (19 certified)	19	100
Know MyGAP (57 uncertified)	20	35
Can related MyGAP to food safety (20 uncertified)	11	55

☆ Only 34 out of the 64 Q-GAP certified pumelo farmers in Chaiyaphum, Northeast Thailand correctly related Q-GAP to the food safety goal (Amekawa 2013)

Reference:
Amekawa, Y. (2013). Can public GAP approach ensure safety *and* fairness? A comparative study from Thailand. *Journal of Peasant Studies* 40(1): 189-217.

IF PROPERLY MANAGED, PESTICIDES ARE NOT HARMFUL TO:

(19 certified)

	Number	%
Pesticide applicators	19	100
Consumers	19	100
Environment	19	100

(57 uncertified farms)

	Number	%
Pesticide applicators	45	79
Consumers	53	93
Environment	48	84

TRAINING EXPERIENCES

Had any training of pesticide management through DoA?

	Number	%
Yes (19 certified)	9	47
Yes (57 uncertified)	6	11

Had any training of MyGAP certification through DoA?

	Number	%
Yes (19 certified)	14	74
Yes (57 uncertified)	4	7

Have you worked with other farmers to understand and process MyGAP?

	Number	%
Yes (19 certified)	11	68
Yes (57 uncertified)	5	9

ARE YOU AWARE OF THE TYPES OF CHEMICALS THAT ARE OFFICIALLY REGISTERED UNDER THE PESTICIDE ACT?

	Number	%
Yes (19 certified)	18	95
Yes (57 uncertified)	44	77

HOW DID YOU COME TO RECOGNIZE THE TYPES OF CHEMICALS UNDER PESTICIDE ACT?

(18 certified who are aware)

	number	%
Suppliers	10	53
Self knowledge/experience	4	21
Pesticide label	3	10
Internet, book references	1	5
All sold should be registered	1	5

(44 uncertified who are aware)

	number	%
Suppliers	35	80
Pesticide label	7	18
All sold should be registered	3	8

HOW TO GET ADVICES ON PESTICIDE USAGE?

Do you seek advice on pesticide usage from competent authorities?

	Number	%
Yes (19 certified)	13	68
Yes (57 uncertified)	31	57

If yes, who are the authorities?

(13 certified who seek advices)

	Number	%
Pesticide suppliers	12	92
Pesticide manufacturers	3	23
DoA	1	8

(31 uncertified who seek advices)

	Number	%
Pesticide suppliers	31	100

INSECTICIDE USE

	Certified (19 farms)		Uncertified (57 farms)	
Number of farms whose data are available	17	(84%)	48	(84%)
Number of farms who use insecticide	17	(100%[d])	45	(94%[d])
Annual amount of active ingredients (a.i.) per hectare (kg/ha)	1.01[b]		4.04	

[a] $p < 0.01$, [b] $p < 0.05$, [c] $p < 0.10$; *NS* not significant at 0.01.

[d] The percentage refers to the number of farms who use a particular pesticide in question divided by the number of farms whose data are available.

The difference in the annual amount per ha between certified and uncertified farms is significant ($p < 0.05$)

FUNGICIDE USE

	Certified (19 farms)		Uncertified (57 farms)	
Number of farms whose data are available	15	(79%)	54	(95%)
Number of farms who use fungicide	4	(27%[d])	10	(19%[d])
Annual amount of a.i. per hectare (kg/ha)	0.23[c]		0.25	

[a] $p < 0.01$, [b] $p < 0.05$, [c] $p < 0.10$; *NS* not significant at 0.01.

[d]The percentage refers to the number of farms who use a particular pesticide in question divided by the number of farms whose data are available.

The difference in the annual amount per ha between certified and uncertified farms is significant ($p < 0.1$)

HERBICIDE USE

	Certified (19 farms)		Uncertified (57 farms)	
Number of farms whose data are available	14	(74%)	49	(86%)
Number of farms who use herbicide	13	(93%[d])	32	(65%[d])
Annual amount of a.i. per hectare (kg/ha)	0.69[b]		7.26	

[a] $p < 0.01$, [b] $p < 0.05$, [c] $p < 0.10$; *NS* not significant at 0.01.

[d]The percentage refers to the number of farms who use a particular pesticide in question divided by the number of farms whose data are available.

The difference in the annual amount per ha between certified and uncertified farms is significant ($p < 0.05$)

TOTAL PESTICIDES
(INSECTICIDE + FUNGICIDE + HERBICIDE)

	Certified (19 farms)		Uncertified (57 farms)	
Number of farms whose data are available	11	(58%)	36	(70%)
Number of farms who use at least one type of pesticide	9	(82%[d])	34	(94%[d])
Annual amount of a.i. per hectare (kg/ha)	1.42[a]		11.37	

[a] $p < 0.01$, [b] $p < 0.05$, [c] $p < 0.10$; *NS* not significant at 0.01.

[d] The percentage refers to the number of farms who use a particular pesticide in question divided by the number of farms whose data are available.

The difference in the annual amount per ha between certified and uncertified farms is significant ($p < 0.01$)

ALTERNATIVE PEST MANAGEMENT

	Certified (19 farms)		Uncertified (57 farms)	
Number of farms who adopt alternative pest management	6[a]	(32%)	6	(11%)
Number of certified farms who use:				
Rodent trap	2		0	
Biological control (birds)	2		0	
Cutting weeds	1		0	
Burning litters	1		0	
Shot gun	0		1	
Wire fence	0		1	
Mesh wire trap	0		1	
Cats catching rats	0		1	
Smoke release to scare pests	0		1	
Biological control (lizards)	0		1	

[a] $p < 0.01$, [b] $p < 0.05$, [c] $p < 0.10$; *NS* not significant at 0.01.

PESTICIDE HANDLING 1: ITEMS COVERED IN MYGAP

	Certified (19 farms)		Uncertified (57 farms)		t-test
1. Change clothes after spraying pesticides	18	(95%)	50	(88%)	NS
2. Wear long-sleeved shirt for spraying	18	(95%)	50	(88%)	NS
3. Wear long-sleeved pant for spraying	19	(100%)	55	(96%)	NS
4. Wear mask for spraying	19	(100%)	56	(98%)	NS
5. Take care of wind direction while spraying	18	(95%)	49	(86%)	NS
6. Follow product label to decide on the dosage	10	(53%)	33	(58%)	NS
7. Have a pesticide storage that does not store other things but pesticides	18[a]	(95%)	40	(77%)	

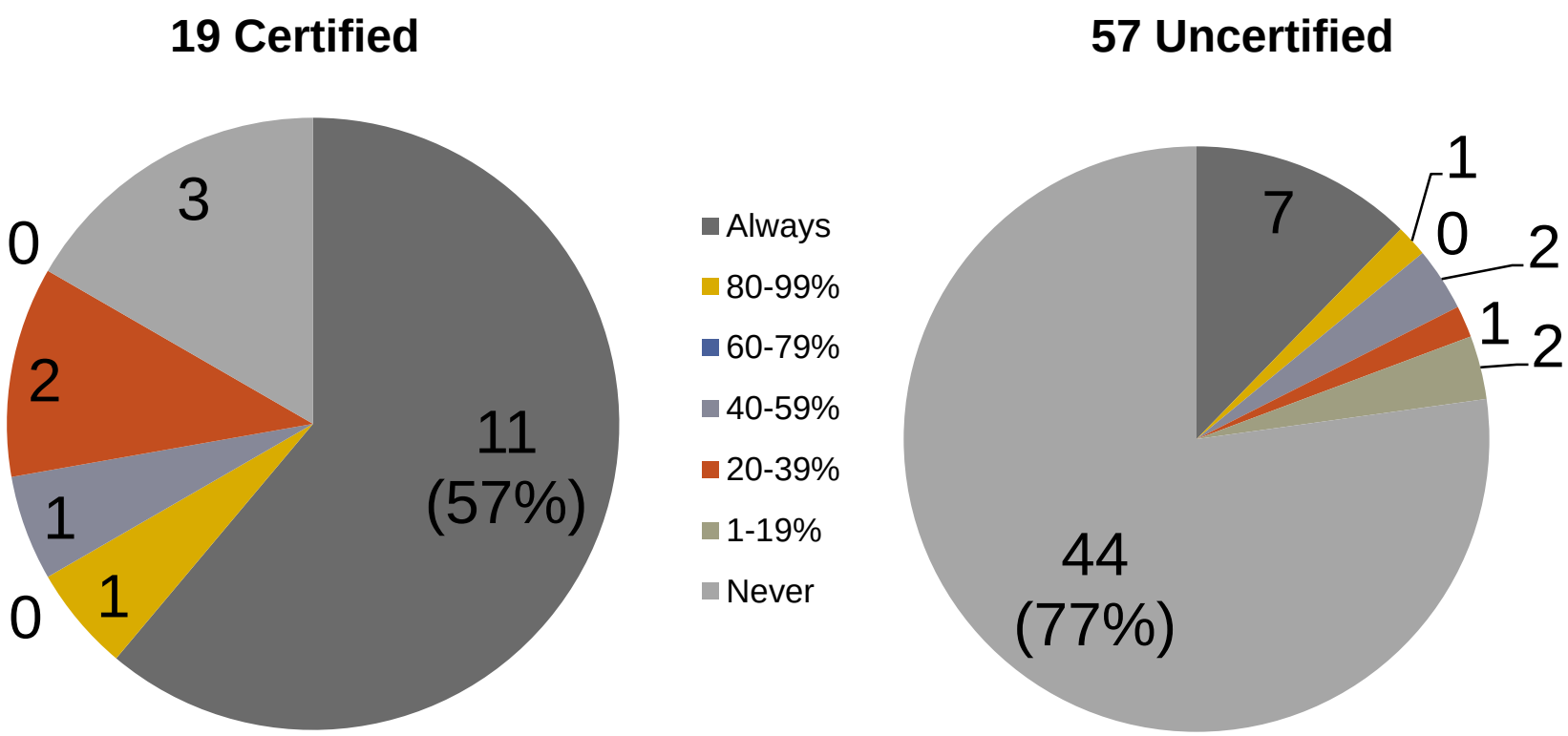
[a] $p < 0.01$, [b] $p < 0.05$, [c] $p < 0.10$; *NS* not significant at 0.01.

PESTICIDE HANDLING 2: ITEMS NOT COVERED IN MYGAP

	Certified (19 farms)		Uncertified (57 farms)		t-test
1. Strictly follow the pre-harvest intervals as prescribed on pesticide labels	5	(26%)	21	(37%)	NS
2. Smoke while spraying pesticides	0[b]	(0%)	4	(7%)	
3. Eat anything while spraying pesticides	0[b]	(0%)	4	(7%)	
4. Drink anything while spraying pesticides	0[a]	(0%)	14	(25%)	
5. Take shower within one hour after spraying	17	(89%)	44	(77%)	NS
6. Change clothes after spraying and as soon as arriving at home	19[a]	(100%)	45	(79%)	
7. Wash clothes used during spraying together with clothes not used for spraying	10	(53%)	25	(44%)	NS

[a] $p < 0.01$, [b] $p < 0.05$, [c] $p < 0.10$; *NS* not significant at 0.01.

HOW OFTEN DO YOU RECORD APPLICATION OF PESTICIDES?



CONCLUSIONS

(1) For each of the three kinds of pesticides and their combinations, certified farms were found to use smaller annual amounts of pesticides than uncertified farms with statistical significance.

(2) Overall, certified farmers demonstrated a good understanding of the MyGAP policy, and also showed superior pesticide knowledge and handling practices than uncertified farms

(3) Farmers have gained their knowledge of pesticides and their usage more from agrochemical suppliers than government agencies such as DoA

(4) Due to the case study approach with limited samples, the finding of this study is not generalizable at the national level but may provide comparative insights with the case of Thailand's Q-GAP.


THANK YOU VERY MUCH
FOR YOUR ATTENTION!