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Determinants of Adopting GLOBALG.A.P. Certification in Thailand

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1. Introduction, Knowledge, Objectives

A wide range of private standard and certification schemes evolved in the global horticultural value chain during the last decades. This trend was driven by the emergence of new institutional arrangements along the supply chain. Private actors such as supermarket chains and retail cooperations started to govern the chain. They became rule-setters and often took the initiative to ensure high safety and quality levels and to create market demand for exotic produce (Fuchs et al., 2011). Within this transformation process, a consortium of major European retailers developed a private voluntary standard, nowadays referred to as GLOBALG.A.P. The standard has been described as a global model for exporting countries to harmonize the existing national standards (Amekawa, 2009).

Thailand is one of the leading exporters of tropical horticultural products and was chosen as a case for this study. The country has started to actively promote a set of “Good Agricultural Practices” (GAP) standards for on-farm and post-farm activities aiming to enhance food quality and safety levels, and to increase the competitiveness of its horticultural sector. The Q-GAP standard issued by the Thai government is currently the most important standard for export-oriented producers. On the other hand, Thai authorities and horticultural stakeholders have increasingly paid attention to recognized international standards such as GLOBALG.A.P. This private voluntary standard has become important in order to sustain market accessibility to the EU market (Ussavasodhi, 2011; Kersting and Wollni, 2012). Moreover, the national private voluntary GAP standard called ThaiGAP was initiated in 2007. ThaiGAP is a viable alternative for Thai producers and exporters due to the lower costs of the auditing process compared to the GLOBALG.A.P. standard (Kersting, 2009).

This trend towards certification results in new challenges for Thai producers. Complying with these private voluntary GAP standards is a rather complex task and can involve high investment costs at the initial stage of adoption. Recent empirical evidence revealed that education, availability of family labor, previous experience in high-value supply chains, support by donors and exporters (i.e. training) and cost of compliance are important factors in adopting the GLOBALG.A.P. standard for the case of Thai fruit and vegetable producers (Kersting and Wollni, 2012). However, no local study currently exists which analyzes the role of standard specifications related to environmental protection and working practices for the adopting decision. Furthermore, also the flower market was not investigated so far. Hence, this study aims to identify the determining factors of the adoption decision on GLOBALG.A.P. certification. The results support the design of adoption programs of private GAP certification schemes in the Thai horticultural sector.

2. Material and Methods

Data collection

Orchids and mangoes were chosen as representative products due to their economic importance and high export potential to regional and EU markets. Interviews were carried out with orchid and mango producers employing a structured questionnaire. Based on the pre-survey and expert interviews, we found that no private GAP standard orchid adopters and only a very small number of GLOBALG.A.P. mango adopters existed in Thailand at the time of study. Therefore, survey locations were purposely selected based on the intensity of the representative's crop production and the existence of certified Q-GAP producers. By applying a stratified random sampling technique, 400 certified and non-certified Q-GAP producers were interviewed in 2012. The sample consists of 256 orchid producers from 5 provinces located in the Central and Western regions and 144 mango producers in Chachengsao province.

Methodology

In absence of GLOBALG.A.P adopters in the study areas, a Choice Experiment (CE) was applied to forecast the adoption of this private certification program. The advantage of employing the CE approach is that respondents can be asked several times to choose their most preferred option. Thus, by applying 4 rounds of the CE, we obtained more observations compared to previous studies (Breustedt et al., 2008). In the experimental study design, major attributes with corresponding levels were selected based on the literature review and expert interviews (Table 1).

Table 1: Attributes and levels used in the CE design and effect coding (Source: own illustration based on Table 4.8 in Louviere, Hensher and Swait (2010)).

Attribute	**Descriptive**	**Levels**	**Effect coding (EC)**	
			EC1	EC2
Environment	Emphasizes the impact of production processes on environmental conditions	1 Yes	+1	
		2 No	-1	
Worker	Emphasizes the impact of production processes on workers' health safety and welfare	1 Yes	+1	
		2 No	-1	
Time	Time spent for record keeping and training (hours/week)	2	Value coding	
		3		
		4		
Cost	Cost of certification (certification fee, auditing costs; minimal and medium cost levels refer to 80% and 50% of the costs being supported by donors/stakeholders)	1 Minimal	+1	0
		2 Medium	0	+1
		3 High	-1	-1

A set of attributes and its levels formed a complete factorial design with $2^2 \times 3^3$ possible combinations. By applying an orthogonal design, 16 treatment combinations were obtained, and presented in option 1 of the choice set. Option 2 was constructed using an approach of Street and Burgess (2007). The final design is nearly optimal (with the determinant of the variance-covariance matrix, det (C^{-1}) being $1.26e^{-10}$ and the efficiency compared with optimal design for choice set size 2 equal 97.7 %) for the estimation of main effects. The 16 choice sets consist of two options versus an opt-out option for each. All choices were divided randomly into 4 blocks. Blocks of choice sets were randomly applied for respondents in each group, namely certified and non-certified Q-GAP producers. In the implementation process, enumerators presented and explained information on existing private GAP standards versus the governmental ones, as well as further details of each attribute level. Then, producers were asked to choose the most preferred option which could maximize their utility in each choice set.
Based on the random utility function by McFadden (1974), the systematic portion (V_{ij}) of the utility can be determined by the attribute levels of alternative *j* chosen by producer *i*, as follows:

(1) $V_{ij} = ASC_i + a_{ij}x_{ij} + b_{ij}x_{ij} + e_i$

with *ASC* the Alternative Specific Constant presenting the utility of choosing the opt out option, *x* the vector of attribute levels and e_i as error term. A Mixed Logit model was applied, with *a* as the mean of coefficients and *b* the standard of coefficients representing individual preference. *b* is assumed to be constant for a given producer across all possible choices, however are not constant across all producers. This implies that the Independence of Irrelevant Alternatives (IIA) is not a property of the Mixed Logit Model (Colombo et al., 2005). All qualitative attributes were included in the model with coding effects and were estimated as random parameters under a normal distribution assumption. A simulation was performed by using 1000 draws and keeping the time variable fixed. Preference variation by choosing a preferred alternative between orchid and mango producers is reflected by the interaction term of *ASC* and type of producer variable (with dummy variable orchid = 1).

3. Results

Table 2 presents the estimation results of the Mixed Logit model (Equation 1). All coefficients' signs of attributes are intuitively plausible. The difference in utilities of choosing the opt-out option in relation to the offered option is reflected by the significant level of the *ASC* variable. The negative sign of ASC indicates that producers in general do not prefer an opt-out option. Standards which emphasize the environmental protection as well as workers' health, safety and welfare are preferred by producers, represented by the positive significant level of these two attributes. As hypothesized, the time needed for record keeping and training has a negative effect on the adoption decision. In line with *a priori* expectation, producers are likely to adopt the private GAP standards when certification costs are supported by exporters or donors. The significance levels of the

standard deviation (SD) of coefficients indicate considerable preference‘s heterogeneity among respondents on aspects of environmental protection, workers ‘welfare and certification costs.

Table 2: Mixed Logit model estimation results on forecasting the adoption of private GAP standards (N = 400) (Source: Own calculation based on producer survey 2012).

Variables	Mean of coefficient	SD of coefficient
Constant (ASC)	-1.1814* (0.6471)	4.5836*** (0.5472)
Environment	1.9003*** (0.2404)	1.4691*** (0.2362)
Workers	2.4071*** (0.2975)	1.3971*** (0.2045)
Time	-0.5945*** (0.1423)	-
Minimal cost	1.0875*** (0.2018)	1.3912*** (0.2884)
Medium cost	0.7011*** (0.1745)	0.9223*** (0.3351)
ASC * orchid	-2.2751*** (0 .6476)	-
Log likelihood	- 1036.57	
LR chi2(5)	450.2	

Note: *p<0.1; **p<0.05; ***p<0.01. Numbers in parentheses are standard errors.

4. Discussion

The positive significances of the environmental and workers’ welfare attributes reveal that Thai producers care about environmental effects from production processes as well as safety and health of farm workers. In that sense, producers would adopt the GLOBALG.A.P. standard to generate environmental benefits and improve farm working conditions. This is line with studies where fruit and vegetable growers applied less hazardous pesticides as a result of adopting the GLOBALG.A.P. standard (i.e. Asfaw et al., 2009). The impact of certification system can also significantly improve working conditions, i.e. flowering farms in Ecuador (Balas et al., 2009) or certified GLOBALG.A.P. fruit and vegetable growers in Thailand (Kersting and Wollni, 2012). However, adoption barriers occur simultaneously. A positive sign of minimal and medium cost levels indicate that producers are not willing to pay for certification costs. In the case of Thailand, financial support by donors and exporters was defined as critical factor to enable producers to upgrade their farm facilities and implement international standards (Kersting and Wollni, 2012). Training and record keeping are also important criteria in the private GAP standards. Increasing time spent for record keeping and training would decrease the probability of adoption. This could be explained by the fact that record keeping and training results in an additional workload for producers, especially in times of labour shortage or when family members are required in farming activities.

5. Conclusions

The analysis of the Choice Experiment data reveals that producers who would potentially adopt a private certification program such as GLOBALG.A.P aim to reduce environmental contamination and to improve farm workers' welfare. Certification costs and time needed for record keeping and training are major adoption barriers, among others. However, the likelihood of adoption increases if certification costs are supported by donors or other stakeholders of the supply chain. Further research is needed to analyze the long-term sustainability of the adoption of GLOBALG.A.P. certification. In addition, empirical evidence is scarce on the impact of certification on welfare and the environment. Hence, it is an important prerequisite to understand the different consequential impacts associated with the emergence of GAP standards, especially at the producer and trade level.

6. Literature

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