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Adoption of GAP standards and its impact on Thai horticultural producers' welfare

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Adoption of GAP standards and its impact on Thai horticultural producers' welfare

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1. Introduction, Knowledge, Objectives

A wide range of standards has evolved in the global horticultural value chain as a result of an increasing awareness on product safety and environmental and social aspects. The Good Agricultural Practices (GAP) are important quality assurance standards at the farm level. Thailand, one of the leading exporters of tropical horticultural products, has actively promoted GAP standards for on-farm and post-farm activities to enhance food quality and safety levels, and to increase the competitiveness of its horticultural sector. Public, so-called Q-GAP (Q denotes quality) standards, are currently the most important standards for export-oriented horticultural producers. But also international private standards such as GLOBALG.A.P. have become essential in the Thai horticultural value chain, especially when exporting to the EU (Kersting and Wollni 2012). The trend towards certification poses many challenges to Thai producers. It involves high investment costs as well as additional workload at the initial stage of adoption. However, complying with GLOBALG.A.P. standards also increases income of producers and creates long-term relations with buyers maintaining their share in lucrative export markets. Furthermore, positive impacts on environment, workers' health, and increased productivity have been reported as effects of implementing GLOBALG.A.P. standards at the producer level (Asfaw et al. 2010b; Bayramoglu et al. 2010; Kersting and Wollni 2012). Still, questions remain whether costs and benefits of public and private GAP compliance do differ for the case of orchids and mangoes in Thailand, and if, how producers perceive these aspects in their own context. This paper thus aims at i) exploring determinants of adopting certification programs, and ii) assessing the impacts of certification on producers' welfare.

2. Material and Methods

A survey of randomly chosen Q-GAP certified and non-certified 256 orchid and 144 mango producers and expert interviews with 4 exporters, 4 cooperatives leaders, 4 middlemen and 8 certified GLOBALG.A.P producers were conducted in Thailand in 2012. Survey locations were stratified based on the importance of production area and number of certified GAP producers. They include Bangkok, Samutsakorn, Ratchaburi, Nakornpatom and Chonburi for orchids, and Chachengsao and Pitsanulok provinces for mangoes. The questionnaire included questions about socioeconomic characteristics, the production and marketing process, cost and benefits of certification, and attitudes toward standards adoption.

Determinants of adopting Q-GAP standards were identified using a binary logit model where y is the latent variable being 1 if producers adopt the Q-GAP standards and zero, otherwise. Non-stochastic vectors of observed farm and non-farm characteristics which are

expected to affect the adoption decision, were included in the estimation. For forecasting GLOBALG.A.P. adoption, a Choice Experiment (CE) was applied. Choice sets were formed from selected relevant attributes and its levels. Producers were asked to choose the most preferred alternative with 4 choice sets each. CE data was then analyzed using a Mixed Logit (ML) model for orchid and mango producer groups separately. The underlying conditional indirect utility function is determined by the attribute levels of alternative j chosen by producer i and socio-economic variables which were proposed as possible determinants of adoption, expressed as a linear function:

$$U_{ij} = ASC + \beta_1 ENV + \beta_2 WORK + \beta_3 TIME + \beta_4 MINCOST + \beta_5 MIDCOST + \mu_1 ENV + \mu_2 WORK + \mu_3 MINCOST + \mu_4 MIDCOST + \alpha_i(ASC*X) + \varepsilon_i$$

ASC denotes Alternative Specific Constant reflecting the differences in utilities for offered alternatives relative to the “no-choice” alternative. ENV and WORK refer to attributes which emphasize the impact of production processes on environmental protection and workers’ health, safety and welfare. MINCOST and MIDCOST denote minimal and medium levels of costs for certification. TIME refers to the time spent (hour/week) for record keeping and training. X refers to non-stochastic vectors of observed farm and non-farm characteristics which are expected to affect the adoption decision. β is the vector of the means of coefficients associated with attributes describing offered alternatives. μ is the vector of standard deviations of coefficients associated with attributes representing individual preferences. μ is assumed to be constant for a given producer across all possible choices (Colombo et al. 2005). To measure the impact of certification on welfare, the Propensity Score Matching (PSM) approach was applied to each producer group. The unbiased estimated outcomes are first produced by predicting the propensity score of each observation based on a logit model describing the probability of being certified and non-certified given the covariates X. In a second step, the performance difference between treatment and control groups is estimated by the average treatment effect on the treated (ATT).

3. Results

The descriptive statistics show that the average cultivation size owned by surveyed orchid and mango producers are 2.7 and 6.8 hectare, respectively. Average farm size owned by Q-GAP mango adopters is significantly higher than non-adopters, whereas there is no significant difference in case of orchid. The bivariate logit model shows that the probability to participate in the Q-GAP program increases if producers receive advice from agricultural extension officers, if producers expect to improve their farm management, and with an increasing number of household members. Moreover, younger producers are more likely to adopt Q-GAP standards than older ones. Environmental concerns and access to a water canal have a positive effect on the decision of Q-GAP adoption. The CE model to forecast GLOBALG.A.P. adoption shows that Thai horticultural producers who would potentially adopt the private GAP standards have a high level of awareness about the importance of environmental protection and working conditions during the production process. However, certification costs and time spent for record keeping are major adoption barriers. Education, prior experience in high-value markets, having proper pesticide storage, and expected price premium are crucial factors which motivate producers to adopt

GLOBALG.A.P. standards.
The expert interviews also reveal that costs of compliance, specifically for training, external auditing and annual certification fee, are mostly supported by government agencies in the case of Q-GAP schemes, and by exporters in the case of GLOBALG.A.P. However, producers still have to cover other costs related to infrastructure and equipment such as storage for pesticides, fertilizers and harvested products as well as washing facilities and protective clothing for farm workers. These costs vary depending on the complexity of the chosen GAP scheme. Higher costs for physical upgrading can be expected from the private GAP standards as compared to the public ones. For instance, following GLOBALG.A.P. criteria, the storage facilities must comply with current national, regional and local legislation, and products must be kept in safe storage places (FOODPLUS, 2013). Next to these costs, the common GAP task of record keeping was described as a major adoption barrier by interviewed producers. In our study, formerly certified orchid producers reported that the complexity of record keeping was one reason for leaving the GAP program as time requirements were substantial, increasing the workload for producers significantly. This becomes especially important during periods of labor shortage or when family members are needed for other farm activities. Nevertheless, the benefits may still outweigh the costs of adoption. Generally, producers would expect to profit from standard compliance directly through a price premium. In our study, certified orchid producers did not receive any price premium in contrast to certified mango producers. This is due to the fact that Thai orchids are still mainly exported to regional markets, without the necessity of certification. Instead, the size and number of flower panicles per stem and being free of pests and diseases are more important criteria which determine the product price. Our impact model also finds no significant evidence on income impacts from Q-GAP certified orchid production or on the share of sold value to export markets. However, Q-GAP adoption has a positive and significant effect on the producers' ability to invest in new land and residential areas/facilities (i.e. toilet) for farm workers. In the case of mangoes, if sold for export and to high-value domestic markets, significant premium payments of 50 % and 100 % on average on the farm gate prices have been found for certified Q-GAP and GLOBALG.A.P. producers, respectively. Accordingly, a benefit of compliance is that standards can be used as a channel to enter and to secure high-value markets. Indeed, GLOBALG.A.P. certified producers directly deal with export companies on the basis of contracts, receiving a guaranteed price premium, with a guaranteed sales volume, from the export company with a floor price based on the market price. Furthermore, companies support certified GLOBALG.A.P producers by covering certification costs and providing training related to the certification procedure and recorded documents. Additionally, companies also set up collection stations nearby production areas reducing transportation cost for producers substantially.

4. Discussion

The finding that Q-GAP adoption increases with improved extension services is supported by Muriithi et al. (2011) who found that exposure to information such as pest management increases the likelihood of adopting international standards among small-scale growers. Among the producer characteristics, age and squared age are statistically significant implying that younger household heads are more likely to adopt GAP standards as compared to older ones. As expected, household size was found to be statistically

significant and positively influencing the adoption decision. In particular orchid production is a labor-intensive business resulting in a high demand for farm workers. Compliance would lead to an additional workload which a larger household can easily address (Muriithi et al. 2011).
The analysis of the CE data reveals that potential GLOBALG.A.P. adopters aim at generating environmental benefits and improving farm working conditions. Previous studies found similarly that GLOBALG.A.P. adoption has quantifiable environmental benefits to farmers such as improved soil quality and the reduction of hazardous pesticides (Karira et al. 2013; Asfaw et al. 2010a). Furthermore, the GLOBALG.A.P. compliance also led to the improvement of family and farm workers' health as a result of using adequate protective clothing and applying safer pesticides (Kersting and Wollni 2012; Asfaw et al. 2010a; Okello and Swinton 2009; Okello and Okello 2010). However, producers are likely to adopt private GAP standards when certification costs are supported by other stakeholders. This result is supported by Kersting and Wollni (2012) stating that financial support by donors and exporters was defined as critical factor to enable producers to upgrade their farm facilities and implement international standards. Training and record keeping are also important criteria in the GLOBALG.A.P. standards' adoption. Increasing time spent for these activities would decrease the probability of adoption as they would culminate in an additional workload for producers. The presence of educated adult members in the household has a positive impact on the adoption of GLOBALG.A.P. standards. This is conform with the results by Asfaw et al. (2010b) stating that the decision to adopt private GAP standards is also influenced by the presence of other household members. Producers who have prior experiences in high-value market channels are likely to be aware of the importance of international certification schemes. However, producers are generally rational and they will be willing to adopt the standard only if it is worthwhile. Having proper storage for pesticides is also a factor to be considered by producers when implementing the private GAP standards. Wealthier households are also more likely to adopt standards due to their higher capacity to absorb risks (Asfaw et al. 2010b). Contrary to our hypothesis, previous experience with record keeping does not motivate producers to adopt the GLOBALG.A.P. standards. This may be because producers expect that the GLOBALG.A.P. protocol is more complex compared to the public one. Contrary to findings from Asfaw et al. (2010b), we find no significant evidence that income from orchid production differs between certified and non-certified Q-GAP producers. This can be explained by the fact that certified and non-certified orchid producers follow the same value chain. Thus, Q-GAP standards do not really improve market access. Furthermore, due to the tasks related to standard compliance, additional skilled labor would be required by certified producers. However, certified producers have been found to be able to pay annual household insurances and invest in buying new land for farm activities as well as proper facilities for their workers.

5. Conclusions

It can be concluded from this paper that the decision of producers in Thailand whether or not to adopt standards is very product- and context-specific. Overall, mango producers are much more likely to adopt certification and to benefit from it than orchid producers. Access to export or high-value domestic markets promising a price premium, and close relations with traders or exporters promote the adoption of standards as in the case of mangoes.

Food safety concerns relevant for mangoes seem to more likely drive standard adoption than environmental concerns relevant for orchids. The Thai government and private actors may want to promote the adoption of standards by decreasing the initial costs of compliance or providing training. But further research needs to explore the longer-term sustainability of certification schemes.

6. Literature

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