# Geographical Indication Protection and Its Role for Rural Livelihoods in Thailand

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To Pinrat & Nate Ngokkuen, Sorn & Chum Inchinda, Suphan Inchinda,

Juthathip & Nisit Boonarun, Tipawan & Pathipat Thintha,

and Marc Völker with love

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## Zusammenfassung

Die Lebensgrundlage weiter Teile der Bevölkerung in den ländlichen Gegenden Thailands besteht aus Einkommen aus verschiedenen Quellen, wie Bodenproduktion, Viehzucht, Fischerei, landwirtschaftlichen Dienstleistungen, Forstwirtschaft, Lohnarbeit, selbstständiger Arbeit und Geldüberweisungen. Obwohl landwirtschaftliche Aktivitäten nur einen kleinen Teil des Bruttoinlandproduktes ausmachen, spielen sie vor dem Hintergrund mehrerer Millionen Menschen, die in diesem Sektor tätig sind, eine wichtige Rolle als Antriebsfaktor des ländlichen Wachstums. Allerdings sind diejenigen Haushalte, die in der Landwirtschaft arbeiten, in der Regel arm, insbesondere im Nordosten Thailands, in dem der Reisanbau die Hauptlebensgrundlage ist. Aufgrund der Bedeutung des Reisanbaus für ländliche Haushalte stellt die Verabschiedung des Gesetzes über Geografische Herkunftsangaben (GIs) im Jahr 2003, welches auch auf Reis angewendet werden kann, eine interessante Fallstudie dar.

Das Ziel dieser Arbeit ist es, den Schutz Geografischer Herkunftsangaben in Thailand zu beschreiben, die ökonomischen Aspekte von Geografischen Herkunftsangaben zu erörtern und ihre Bedeutung für die Lebensgrundlage ländlicher Jasminreisbauern im armen Nordosten Thailands zu untersuchen. Die spezifischen Ziele der Arbeit sind: (1) Den Schutz Geografischer Herkunftsangaben in Thailand zu untersuchen und die in diesem Zusammenhang bestehenden Herausforderungen in Thailand und anderen Entwicklungsländern zu diskutieren; (2) Das GI-Zertifizierungsverhalten von Jasminreisbauern zu studieren; (3) Die Auswirkung der GI-Zertifizierung auf ländliche Lebensgrundlagen zu evaluieren; und (4) Die Ergebnisse zweier empirischer Fallstudien, die in Indien und Thailand durchgeführt wurden, hinsichtlich der Wohlfahrtseffekte von Geografischen Herkunftsangaben gegenüberzustellen.

Diese Arbeit leistet einen Beitrag zur Erweiterung der bereits bestehenden Literatur über den Schutz Geografischer Herkunftsangaben, indem sie die entsprechenden rechtlichen und institutionellen Rahmenbedingungen in Thailand detailliert darstellt. Sie schließt zudem bestehende Forschungslücken hinsichtlich der Übernahme von

Geografischen Herkunftsangaben durch ländliche Haushalte und der Auswirkung von GI-Zertifizierung auf die Lebensgrundlage ländlicher Haushalte.

Die in dieser Dissertation durchgeführten statistischen Auswertungen basieren auf Querschnittsdaten, die im Rahmen einer Haushaltsbefragung in zwei Distrikten der Thung Kula Rong-Hai-Region im Nordosten Thailands von März bis Juni 2009 durchgeführt wurde. Um Haushalte auszuwählen, die repräsentativ für die Grundgesamtheit sind, wurde eine disproportional geschichtete Zufallsstichprobe gezogen. Die Gesamtzahl der befragten Haushalte belief sich auf 541. Eine Reihe von ökonometrischen Verfahren wurde verwendet, um die Forschungsfragen, die sich aus den spezifischen Zielen (2) bis (4) dieser Arbeit ergeben, zu beantworten. Die Analyse der erhobenen Daten erbrachte mehrere wichtige Erkenntnisse, die im Folgenden kurz zusammengefasst sind.

Das Gesetz zum Schutz Geografischer Herkunftsangaben in Thailand wurde nicht nur aufgrund von multilateralen Handelsverpflichtungen im Rahmen des Abkommens über handelsbezogene Aspekte der Rechte an Geistigem Eigentum (TRIPS-Agreement) unter der Schirmherrschaft der Welthandelsorganisation (WTO) verabschiedet, sondern auch insbesondere wegen der zunehmenden Sorge um sogenannte Biopiraterie im Zusammenhang mit dem weltbekannten thailändischen Jasminreis. Diese Sorge wurde zu einem wichtigen Faktor, der den Gesetzgebungsprozess beschleunigte und somit zur Einführung eines Registrierungs- und Zertifizierungssystems für Geografische Herkunftsangaben in Thailand führte. Das GI Gesetz wurde 2003 in Thailand verabschiedet.

Das Verhalten von Jasminreisbauern wurde mit Hilfe eines Adoptionsmodells untersucht. Es wurden mehrere dominierende Einflussfaktoren identifiziert, welche die Entscheidung der Haushalte, sich als GI-Bauern zertifizieren zu lassen, beeinflussen. Zu diesen Faktoren zählen der Zugang zu von staatlichen Stellen bereitgestellten Informationen über Geografische Herkunftsangaben, das Geschlecht des Familienoberhauptes sowie die Mitgliedschaft in landwirtschaftlichen Genossenschaften. Der Erfolg, mit dem ein GI-System eingeführt und gefördert wird, hängt maßgeblich von den Informationen über Geografische Herkunftsangaben ab, die den betroffenen Haushalten zur Verfügung gestellt werden. Landwirtschaftliche

Genossenschaften sind wesentliche Mittler zwischen Haushalten und der Regierung, die als Hauptquelle von Informationen über Geografische Herkunftsangaben fungiert. Die Effektivität der Informationsvermittlung kann verbessert werden, indem die Rolle landwirtschaftlicher Genossenschaften gestärkt wird.

Die Ergebnisse dieser Arbeit zeigen jedoch auch, dass der Verkauf von GI-zertifiziertem Reis mit hohen Transportkosten verbunden ist und dass nicht alle GI-zertifizierten Produzenten ihren Reis an einen der 13 GI-zertifizierten Händler verkauften. Eingeschränkte Vermarktungsmöglichkeiten, die aufgrund von hohen Transportkosten und einer begrenzten Zahl von GI-zertifizierten Händlern bestehen, können somit die Adoption von GI-Reis behindern. Als mögliche Lösung dieses Problems bietet sich eine Restrukturierung der Wertschöpfungskette an mit einem besseren Zugang zu Verkaufspunkten für GI-zertifizierte Produzenten, die zu höheren Anreizen, sich als GI-Produzent registrieren zu lassen, führen könnte.

Die Auswirkung von GI-Zertifizierung auf ländliche Lebensgrundlagen wurde mit Hilfe des Propensity Score Matching-Verfahrens untersucht. Die Analyse ergibt einen positiven und signifikanten Effekt auf die Wohlfahrt der Haushalte und die Reduzierung ländlicher Armut. Die Ergebnisse der Analyse von Jasmin- und Basmatireis unterstützen die positive Rolle, die GI-Zertifizierung für ländliche Lebensgrundlagen spielt. Ohne einen formellen Schutz ist die Gefahr von Produktfälschungen allerdings sehr hoch. GI-Zertifizierung ist daher von essenzieller Wichtigkeit für den Erhalt ländlicher Lebensgrundlagen. Über den ökonomischen Nutzen hinaus trägt sie auch zur Bewahrung des traditionellen Wissens und Erbes des Ortes, welches das GI-Gut produziert, bei.

Trotz des indizierten signifikanten Beitrags von GI-Zertifizierung auf die Verminderung von Armut und die Verbesserung der Wohlfahrt ländlicher Haushalte, besteht für politische Entscheidungsträger die Herausforderung darin, diesen Effekt auch langfristig zu sichern. Die positiven Auswirkungen von GI-Zertifizierung können nur dann über einen längeren Zeitrahmen erhalten werden, wenn sich alle Akteure der Wertschöpfungskette aktiv und nachhaltig engagieren. Lokale und nationale Entscheidungsträger müssen daher für eine überzeugende Atmosphäre im Kreis der Akteure sorgen. Kollektives Handeln und eine Erhöhung der Teilnahme an

der GI-Wertschöpfungskette sind von entscheidender Wichtigkeit, insbesondere im Hinblick auf noch unentschlossene Bauern in der Thung Kula Rong-Hai-Region. Das Bewusstsein der Jasminreis-Haushalte über die Möglichkeit, ihr Recht auf GI-Zertifizierung wahrnehmen zu können, ist von entscheidender Bedeutung, da eine hohe Übernahmerate einen langfristigen positiven Effekt auf Wohlfahrt und Armutsreduzierung ermöglichen kann. Um den Registrierungsprozess zu vereinfachen, sollte das Registrierungssystem gut funktionieren und einfach zugänglich sein.

**Schlagwörter**: Geografische Herkunftsangaben, Geistiges Eigentum, Ländliche Lebensgrundlagen, Ländliche Armut, Wohlfahrt von Haushalten, Jasminreis, Thailand

**Abstract**

In rural Thailand, the livelihoods rely on cash and subsistence income from a number of sources, namely crop production, livestock production, husbandry, fisheries, agricultural services, forestry, wage employment, small-scale enterprises, and remittances. While agricultural activities account for only a small amount of the national Gross Domestic Product (GDP), they play an important role as an engine of the rural growth given the fact that millions are employed. However, rural households engaged in those activities are usually poor, especially the ones in the poorest part of the country, i.e. the Northeast where rice cultivation is its main livelihood strategy. Given the importance of rice cultivation for rural livelihoods in the Northeast, the release of the Act on Geographical Indications (GIs) Protection in 2003 which can be also applied to rice, provides an interesting case study in Thailand.

The objective of this thesis is to describe GI protection in Thailand, to explore the economics of GIs and to investigate their role for the livelihoods of rural Jasmine rice households in poor Northeastern Thailand. The specific objectives of the thesis are: (1) to investigate GI protection in Thailand and discuss its challenges being relevant to developing countries and Thailand; (2) to study the behavior of Thai Jasmine rice households in adopting the GI certification; (3) to evaluate the impact of GI certification adoption on rural livelihoods, namely on the household welfare and rural poverty; and (4) to synthesize the results from two empirical case studies undertaken in India and Thailand regarding the welfare impacts of geographical indications.

This first objective of this work is adding to the existing policy papers on GI protection by providing detailed information on how the legal and institutional framework of GI protection in Thailand is shaped. This work also fills the research gaps on the GI adoption studies as well as on the GI impact on the rural livelihoods.

The thesis uses cross-sectional data collected from a household survey in two districts of the Thung Kula Rong-Hai area in Northeastern Thailand between March and June 2009. A disproportionate stratified random sampling technique was used to select representative sample households. In total, 541 farm households were

interviewed. To answer the research questions for the last three specific objectives, different econometric techniques were used to analyze the data. The investigation and data analysis yielded some important results in view of the research objectives being briefly summarized in the following paragraphs.

The Thai GI Act was released not only due to the requirement of the multilateral trading framework under the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement under the auspices of the World Trade Organization (WTO), but also due to the concern about biopiracy related to the widely known Thai Jasmine rice. The biopiracy issue was seen as the main driving factor accelerating the process for enacting the GI Law which provides for a GI registration and certification system.

The analysis of adoption behavior of Jasmine rice farm households using a logit model shows that the main factors influencing the decision of the Jasmine rice farm households on adopting the GI certification are the access to information on GIs from governmental bodies, gender and the membership in cooperatives. How a GI system is successfully introduced and promoted in specific GI regions depends crucially on the information about GIs provided to the rural farm households and finally on the information sources. Agricultural cooperatives serve as a crucial intermediary between farm households and the government being the primary source of information about GIs. The effectiveness of information dissemination can be thus promoted by strengthening the role of the agricultural cooperatives.

However, the descriptive findings demonstrate that the GI rice sale is involved with high transportation costs and not all certified GI producers sold their rice to the thirteen certified buyers who provide the price premium payment guarantee. Limited marketing options of GI certified rice, characterized by high transportation costs and limited availability of certified buyers, may thus be a potential constraint to GI certification adoption. A restructuring of the value chains with better access to points of sale for certified GI rice farm households should be provided in order to increase the farmers' incentives to adopt GI certification.

The findings of an evaluation of impact of GI certification adoption on rural livelihoods using the Propensity Score Matching method indicate a positive and

significant impact of GI adoption on the household welfare and rural poverty reduction. The results of an analysis of Jasmine rice along with the case of Basmati rice support a positive role of GI protection on the livelihoods of farm households in rural communities. Without formal protection, the likelihood of counterfeiting is very high. GI protection is essential for rural livelihoods not only in terms of its economic prominence, but it also preserves the traditional knowledge embedded in a GI good as well as the traditional heritage of the locality that produces the good.

Despite the significant contribution of GI introduction on the reduction of the poverty incidence and an improvement of the household welfare in rural areas, a crucial point for any policy-makers is a long-lasting positive effect. The positive effect of GI introduction can only last longer given the active and sustainable participation of all stakeholders in the GI product value chain. This suggests the challenge of the local and national policy-makers and policy implementers in creating a persuasive atmosphere among all stakeholders. The motivation of collective action and increase of the participation level within the GI value chain are also crucial, particularly by those TKR farm households who are unassertive to participate in this value-added process using GI label. The awareness of the TKR farm households to make use of their embedded right to apply for GI certification is crucial, since the rate of GI adoption of the TKR farm households can guarantee a long lasting positive effect of GI certification on the household welfare and poverty reduction in rural areas. In order to facilitate the registration process for GI certification of the TKR farm households, the GI registration system should be sustainable, well-functioning and for the producers reachable.

**Keywords:** Geographical Indication, Intellectual Property, Rural Livelihoods, Rural Poverty, Household Welfare, Jasmine rice, Thailand

## List of Abbreviations

| | |
|---|---|
| AB | Accreditation Body |
| ACFS | National Bureau of Agricultural Commodity and Food Standard |
| ADB | Asian Development Bank |
| APEC | Asia-Pacific Economic Cooperation |
| APEDA | Agricultural and Processed Food Products Export Development Authority of India |
| ASEAN | Association of South-East Asian Nations |
| ATT | Average Treatment Effect on the Treated |
| AUC | Area under the corresponding receiver operating characteristic Curves |
| BOT | Bank of Thailand |
| BRR | Balanced Repeated Replication |
| CA | Competent Authority |
| CAP | Common Agricultual Policy |
| CB | Certification Body |
| CBD | Convention on Biological Diversity |
| CIA | Conditional Independence Assumption |
| CIMMYT | International Maize and Wheat Improvement Center |
| COO | Country of Origin |
| CTMs | Certification Trademarks |
| DFT | Department of Foreign Trade |
| DIP | Department of Intellectual Property |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |

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| FAOSTAT | Food and Agriculture Organization of the United Nations Statistics |
| FGT | Foster-Greer-Thorbecke |
| FTA | Free Trade Agreement |
| GAP | Good Agricultural Practice |
| GDAPs | Geographically Differentiated Agricultural Products |
| GDP | Gross Domestic Product |
| GIs | Geographical Indications |
| HYVs | High Yielding Varieties |
| IP | Intellectual Property |
| IPRs | Intellectual Property Rights |
| IRRI | International Rice Research Institute |
| IV | Intrumental Variable |
| KM | Kernel Matching |
| MFN | Most Favoured Nations |
| MH | Mantel-Haenszel test statistics |
| ML | Maximum Likelihood |
| MNCs | Multinational Corporations |
| MoAC | Ministry of Agriculture and Cooperatives |
| MOC | Ministry of Commerce |
| NESDB | National Economic and Social Development Board |
| NIEs | New Institutional Economics |
| NNM | Nearest Neighbor Matching |
| NSO | National Statistical Office |
| NSTDA | National Science and Technology Development Agency |
| NT | National Treatment |

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| OAE | Office of Agricultural Economics |
| OECD | Organisation for Economic Cooperation and Development |
| OLS | Ordinary Least Squares |
| PDO | Protected Designations of Origin |
| PSM | Propensity Score Matching |
| RM | Radius Matching |
| ROC | Receiver Operating Characteristic |
| Rs. | Rupees |
| RTA | Regional Trade Agreement |
| TDRI | Thailand Development Research Institute |
| THAT | Thai Hom Mali Rice Trade Association Thung Kula Rong-Hai Geographical Indication |
| TISI | Thai Industrial Standards Institute |
| TKR | Thung Kula Rong-Hai Thai Hom Mali Rice |
| TKRH | Thung Kula Rong-Hai |
| TPA | Trade Promotion Authority |
| TRIPS | Trade-Related Aspects of Intellectual Property Rights |
| UNCTAD | United Nations Conference on Trade and Development |
| UPOV | International Union for the Protection of New Varieties of Plants |
| US | United States |
| USDA | United States Department of Agriculture |
| USPTO | United States Patent and Trademark Office |
| VIF | Variance Inflation Factor |
| WTO | World Trade Organization |
| WTP | Willingness to Pay |

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# 1 INTRODUCTION

## 1.1 BACKGROUND AND PROBLEM STATEMENT

Poverty alleviation is one of the primary objectives in economic development. The concepts of rural livelihoods, rural poverty and rural development are related to each other in the development discourse. Rural development aims at improving household welfare or reducing poverty in rural areas (Toborn, 2003). In rural development projects, participatory or bottom-up approaches have been promoted instead of top-down or supply-driven approaches which have been found to have insignificant impacts on poverty reduction (ADB, 2004). The concept of rural livelihoods is regarded as an entry point for the participatory approaches emphasizing the local perspectives (Scoones, 2009). However, rural livelihoods are complex and dynamic. Based on disposable livelihood resources, rural people pursue several livelihood strategies such as agricultural intensification and extensification, migration and livelihood diversification in order to improve their well-being and reduce poverty (Scoones, 1998 and 2009; Hussein and Nelson, 1998).

In Thailand, rural livelihoods rely on cash and subsistence income from a number of sources, namely crop production, livestock production, husbandry, fisheries, agricultural services, forestry, wage employment, small-scale enterprises, and remittances. Agriculture accounts for only 12% of the GDP (Office of Agricultural Economics (OAE), 2011). However, the agricultural sector is regarded as a basis of the rural livelihoods and is the predominant economic sector in many rural regions of Thailand. As an engine of rural growth, it employs a large share of the rural labor force (Bresciani and Valdés, 2007; Cervantes-Godoy and Dewbre, 2010) or around 13.5 million people accounting for approximately 35% of the total labor force (National Statistical Office (NSO), 2012).

Rural households engaged in agriculture are mostly poor in particular in the Northeast of Thailand where rice cultivation is one of the most important livelihood activities, with almost 70% of the total agricultural land being used for rice cultivation (OEA, 2011). The importance of rice for Thailand is not only because it is a major staple food for domestic consumption, but it is also considered as one of the

most important export crops of the country. Thailand has been one of the world's largest rice exporters for nearly three decades since 1982 (IRRI, 2005). Its market share amounted to more than 25% between 2005 and 2010, leaving the second and third largest exporters, i.e. Viet Nam and Pakistan far behind. Exporting rice to the world market has resulted in considerable export revenues for Thailand as a whole but also for the individual rice farmers. Jasmine rice makes up more than a quarter of Thai rice exports each year. In 2011, approximately a third of the rice export value stemmed from exporting Jasmine rice which brought foreign currency of around US$ 2 billion to Thailand (Ministry of Agriculture and Cooperatives (MoAC), 2009 and 2010).

Geographical Indications (GIs) indicating that a certain good originates in a particular region where a given quality of the good is attributable to its geographical origin (TRIPS Agreement) are a new form of intellectual property rights (IPRs) being hotly debated at the multilateral trade level. Given its characteristics that do not exist in other kinds of Intellectual Property (IP), they offer a valuable framework for advancing economic and commercial interests while potentially integrating local needs anchored in cultural tradition and broad levels of participation of all stakeholders (Giovannucci et al., 2009). In this aspect, GIs can provide higher economic returns to holders of traditional knowledge through price premia (see e.g. Teuber, 2007), foster tourism (Vivas-Eugui, 2001; Suh and MacPherson, 2007; Giovannucci et al., 2009) and therefore act as rural development tools (e.g. Tregear et al., 2007). The European Union (EU) for example has long seen their potential, included them as one of two pillars of its Common Agricultural Policy (CAP) (Folkeson, 2005; Teuber, 2009), and made exploitation of the marketing potential of them as an important element of its agriculture and rural development strategy (Giovannucci et al., 2009; Becker, 2009).

GIs recognize and support the concept of "local" via market mechanisms. Their potential long-term value is not only economic as to greater income, or fostering tourism, but also social as to the recognition of value-adding and habitual traditions which convey a very local sense of people, their history and their relationship to a place. The local characteristics of GIs thus relate them directly to the concept of rural

livelihoods. Given the fact that only 10% of the world's protected GIs come from developing countries, there is a great potential to use GIs as a tool to reduce poverty (Giovannucci et al., 2009).

Unlike other forms of IP, GIs are a unique and important form of collective intellectual and cultural property with various rights. They may be registered and protected in different forms including *sui generis*[1] systems, trademarks, certification marks, collective marks, and denominations of origin. Sometimes, they are also protected via administrative ruling or under generic laws on unfair competition (Giovannucci et al., 2009). Some countries such as China protect them with a dual system of protection: On the one hand, geographical names are protected as certification and collective trademarks. On the other hand, geographical names of specific products of high quality are protected by the *sui generis* system (Xiaobing and Kireeva, 2007). Sometimes, they are not legally protected and may be recognized due to accepted common use such as in the case of Basmati rice (Indo-Pakistani rice) (Giovannucci et al., 2009, Jena and Grote, 2012).

In many cases, the forms and scope of protection for certain GIs are often different from country to country or they are protected in one country but not in another. This is well-known with the case of Feta and Champagne which are protected in the EU but not in the United States (US) (Giovannucci et al., 2009). GIs are also not necessarily the geographical names such as Basmati rice or Feta (cheese from Greece) (Belletti and Marescotti, 2005; Giovannucci et al., 2009). Standing at the intersection of the three important issues of international law, i.e. intellectual property, international trade, and agricultural policy (Rauschtiala and Munzer, 2007), GIs and their protection thus become popular.

From the intellectual property point of view, the rationale of GI protection is triggered by the problem of asymmetric information. This is especially true for the quality products, because information on quality is difficult and expensive for consumers to obtain despite their experience or search activities (Nelson, 1970). And

[1] Sui generis is a Latin expression, literally meaning unique in its characteristics. In IP law, this expression is mainly used to identify a legal classification that exists independently of other categorizations due to the specific creation of an entitlement or obligation or its uniqueness (Giovannucci et al., 2009).

such public goods as information on quality are typically under-supplied without a clear assignment of property rights (Waglé, 2007). Without correct information on quality for the consumers, sellers tend to sell low quality products with the same price as high quality products leading to the problem of "the bad driving out the good" in the market or known as Akerlof's (1970) *market for lemons*. If such quality products are not protected, particularly once their reputation has been established and their market value has increased, they are at risk from fraud which reduces market value and damages reputation. This can lead to the loss of consumer confidence and thus the drop in price and finally producers may not maintain quality standards (Sautier et al., 2011).

The public intervention such as the introduction of GIs, labeling, branding, and/or regulation all serve to reduce potential inefficiencies resulting from imperfect information about product characteristics (Beales et al., 1981; OECD, 2000; Marette et al., 1999; Vivas-Eugui, 2001; Marette and Babcock, 2008). GIs, like other forms of IP, with a peculiar feature relating to pieces of information that are incorporated into tangible objects (United Nations Conference on Trade and Development (UNCTAD), 2002), confer the exclusive right to all producers from a particular region to use a distinctive sign to identify their products (Raustiala and Munzer, 2007; Giovannucci et al., 2009; Sautier et al., 2011). Highlighted in the label, they do not confirm only a link between a product and a specific geographic region like trademarks, but usually they also indicate unique production methods, characteristics or qualities that are known to exist in the particular region (Giovannucci et al., 2009). GIs, thus, enable the producers to convey a considerable quantity of information on quality to consumers and become a worthwhile marketing tool if they are used properly and well protected (Tregear et al., 1998; Addor and Grazioli, 2002; Rangnekar, 2004; Jena and Grote, 2010).

Thailand ensures GI protection by having enacted a GI law in 2003. An effective GI protection is expected to have important implications for Thailand's rural households, since many of them are involved in the production of GI products. Benefits of having effective GI protection under the specific Act may arise for many regions of Thailand since GIs could provide an assured and continuous source of

income through their reputation. Within the last ten years, 42 different products have been registered and certified as GIs in Thailand. As of July 2012, there have been eight product types, i.e. handicrafts, food, coffee, wine and spirits, horticultural products, rice, pottery, general textiles and textiles goods and silk registered as GIs. The most often registered GI products are horticultural products with 12 products, followed by eight kinds of GI rice.

*Thung Kula Rong-Hai Thai Hom Mali Rice (TKR)* from the poor Northeast being the most popular registered GI rice counts as the first registered Thai Jasmine rice, followed by *Surin Hom Mali Rice* from the same region. To promote its cultivation and marketing world-wide, the *Thai Hom Mali Rice Trade Association Thung Kula Rong-Hai Geographical Indication (THAT)* has been established in 2008. By 2008/2009, there were 1,131 Thai Jasmine rice farmers, 13 exporters and four processors certified as GI operators for the *TKR* by the DIP (Ngokkuen and Grote, 2011 and 2012). At the international level, the GI registration application for the *TKR* labelled "Khao Hom Mali Thung Kula Rong-Hai" has been submitted by the DIP to the EU's GI Registry on 20 November 2008 (European Commission, 2010). This GI application is the first one from Asia and the first attempt to seek GI protection abroad, although as of July 2012 its protection under the EU GI law has still not been ensured.

However, the proportion of Jasmine farm households being GI certified for the TKR accounts only for around 1.3 percent of the total TKRH farm households (Ngokkuen and Grote, 2012). The question thus arises why not more farmers adopt GI certification, especially against the background of price premia being generally paid to GI products (Suh and MacPherson, 2007; Teuber, 2007). There should be existing factors predicting the behavior of the farmers in adopting or rejecting such new idea. Therefore, it is important to understand the role of these determining factors to ensure the design of a successful introduction of new projects or policies such as GIs for rural development. Furthermore, the question arises whether GI adoption has had an impact on the livelihoods of the TKR farm households being GI certified as compared to the TKR farm households not being GI certified. A positive impact would suggest a stronger promotion of GI certification adoption in the region in

order to reduce rural poverty. Finally, there exist GI-like rice products such as Basmati rice which are not officially registered yet as a GI product. A further investigation of the impact of Basmati rice and of a legal GI product such as Jasmine rice on the rural livelihoods is useful to show the implications of GI registration for the livelihoods of smallholder farmers from the period of transition to the establishment of GI protection.

### 1.2 RESEARCH OBJECTIVES

The overall research objective of this thesis is to describe GI protection in Thailand, to explore the economics of GI and to investigate its role for the livelihoods of rural Jasmine rice households in poor Northeastern Thailand. The specific objectives of the thesis are as follows:

1. To investigate GI protection in Thailand and discuss its challenges being relevant to developing countries and Thailand.

2. To study the GI adoption behavior of Thai Jasmine rice households, i.e. to identify factors that are likely to predict the behavior of Jasmine rice farm households in the Thung Kula Rong-Hai area in adopting GI certification; and to estimate the marginal effects of key factors on the probability of adoption.

3. To evaluate the impact of GI certification adoption on rural livelihoods, i.e. to assess the causal effect of GI certification on the well-being of Thai Jasmine rice households and rural poverty.

4. To synthesize the results from two empirical case studies undertaken in India and Thailand regarding the welfare impacts of geographical indications.

### 1.3 STRUCTURE OF THE DISSERTATION

The dissertation is organized in three main parts. The next part consists of three modules including five articles. Table 1 provides an overview about all included articles and their allocation to one of the three modules.

**Table 1: List of articles included in the dissertation**

| Module | Authors | Title | Published in/Submitted to/ Presented at |
|---|---|---|---|
| **I** Article (1) | C. Ngokkuen U. Grote | Protection of geographical indications in Thailand | Submitted to *Asia-Pacific Development Journal* |
| **II** Article (2) | C. Ngokkuen U. Grote (2011) | The prediction of household's behavior in adopting geographical indication certification for jasmine rice from Northeastern Thailand | Published in *The GSTF Business Review (GBR)*, Vol. 1 (August 2011), No. 1: 173-178 |
| | | | An earlier version was accepted for presentation at the International Conference on Qualitative and Quantitative Economics 2011 (QQE 2011) in Singapore |
| **II** Article (3) | C. Ngokkuen U. Grote (2012) | Geographical indication for jasmine rice: Applying a logit model to predict adoption behavior of Thai farm households | Published in *Quarterly Journal of International Agriculture, (QJIA)* Vol. 51 (2012), No. 2: 157-185 |
| | | | An earlier version was presented at the German Development Economics Conference 2010 (AEL Conference 2010) held at Leibniz University Hannover, 18 June 2010, Hannover, Germany. |
| | | | Presented at the Tropentag 2011 held at the University of Bonn, 5-7 October 2011, Bonn, Germany |
| **III** Article (4) | C. Ngokkuen U. Grote | Impact of geographical indication adoption on household welfare and poverty reduction | Submitted to *International Journal of Arts and Sciences (IJAS)* |
| | | | Presented at the Jour Fixe International at Leibnizhaus hosted by the DAAD-Freundeskreis Event -Section Hannover and the International Office of Leibniz University Hannover, 8 May 2012, Hannover, Germany |
| | | | Presented at the 3rd International Journal of Arts and Sciences' (IJAS) International Conference for Academic Disciplines held at Harvard University, 27-31 May 2012, Cambridge, USA |
| | | | Accepted for presentation at the Tropentag 2012 organized by University of Göttingen and University of Kassel-Witzenhausen, 19-21 September 2012, Göttingen, Germany |
| **III** Article (5) | P.R. Jena C. Ngokkuen U. Grote | Geographical indication protection and rural livelihoods: Some insights from Asia | Submitted to *Journal of Rural Studies* |

Source: Own presentation

Module I consists of one article discussing the legal and institutional framework of GI protection as well as its challenges. The article describes the economic rationale of the GI protection and gives an overview of the GI protection in Thailand.

Examples of already registered GI products in Thailand are given. At the end, it discusses challenges of Thailand and other developing and least developed countries with respect to GI protection given the rising trend of bilateral trade talks and conflicts of interests concerning different types of intellectual property rights.

Module II includes two articles investigating the behavior of Jasmine rice households in adopting GI certification. Both articles are based on the logistic regression analysis to help finding factors determining the adoption behavior of the households. The analysis in module II is based on cross-sectional data collected in two districts of the Thung Kula Rong-Hai (TKRH) area in Northeastern Thailand between March and June 2009. The total sample size used for this analysis is 370 representative households.

Module III deals with results of the impact evaluation. It consists of two articles, article (4) and article (5). Article (4) studies the impact of GI certification adoption on the rural livelihoods in Northeastern Thailand. The study uses the non-parametric Propensity Score Matching (PSM) method to assess the causal effect of GI certification on household welfare and rural poverty. The same data set is used for data analysis. The total sample size of 541 farm households is used for the data analysis. Article (5) synthesizes general findings of the impact studies on the role of GI for rural livelihoods in the two GI-proponents, i.e. India and Thailand.

The third part of the thesis provides a synthesis summarizing the main results, drawing conclusions and policy recommendations as well as highlighting limitations of the study and suggesting other areas or aspects that merit further research.

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**Note**: The contribution of the authors to the submitted theses articles are as follows: The data collection, literature review, all calculations and the drafting of the text related to the Thailand case study have been done solely by Ngokkuen. The contribution of Grote can be defined as: overall supervision; providing suggestions and guidance on methods, results and general contents; as well as thorough editing. The contribution of Jena in the last article is restricted to the information on the India case study.

# 2 MODULES

## 2.1 MODULE I: GEOGRAPHICAL INDICATION PROTECTION IN THAILAND

1. NGOKKUEN, C. and GROTE, U. (2012).” Protection of Geographical Indication in Thailand”, submitted to *Asia-Pacific Development Journal*.

# PROTECTION OF GEOGRAPHICAL INDICATIONS IN THAILAND

Chuthaporn Ngokkuen and Ulrike Grote

**Abstract**

This paper analyzes the legal and institutional framework for the protection of Geographical Indications (GIs) in Thailand and discusses challenges the country has been facing. Though the legal protection of GIs has been ensured under the realm of the World Trade Organization, GI protection remains an important issue in Thailand. Biopiracy, existing conflicts of interests concerning different types of intellectual property rights (trademarks and patents versus GIs), and the rise in regional and bilateral trade deals create major challenges at the multilateral level. Taking the example of GI products, especially Jasmine rice, these challenges to GI protection will be further analyzed from the perspective of Thailand. This paper finally suggests how these challenges can be mitigated and in which direction trade negotiations should be shaped.

**JEL Classification**: O13 O34 Q17 Q18

**Keywords**: Intellectual property, geographical indications, biopiracy, Jasmine rice, Thailand

## I. Introduction

In the past three decades, the role of intellectual property rights (IPRs) in agribusiness has increased enormously. The Green Revolution in the 1960s was the most significant reason for the introduction of proprietary aspects in industrial agriculture. Seeds became private property of multinational seed companies and international research institutions like the International Maize and Wheat Improvement Centre (CIMMYT) or the International Rice Research Institute (IRRI). The protection of IPRs is ensured by various conventions such as the International Convention for the Protection of New Varieties of Plants with its resulting International Union for the Protection of New Varieties of Plants (UPOV), the Convention on Biological Diversity (CBD) and the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement. While developed countries producing most of the world's intellectual property (IP) and possessing biotechnological knowledge, accuse developing countries of IP piracy, the latter accuse the former of biopiracy despite the existing IPR Conventions. There were reported attempts of Multinational Corporations (MNCs) mainly owned by developed countries to exploit advantages and weaknesses in various conventions by trying to monopolize the seed and germplasm industry (Adi, 2006). However, their attempts often neglect due consideration of farmers in the developing countries who own large reserves of the earth's pool genetic resources (Adi, 2006; GRAIN, 1998).

Some developing countries such as India, Kenya and Thailand thus hope to utilize the TRIPS Agreement of the World Trade Organization (WTO) to protect their national intellectual and cultural heritage as well as their rich biodiversity resources (Zou, 2005). The TRIPS Agreement which establishes a comprehensive framework on intellectual property protection covers the following main areas of IPRs: copyright, trademarks, geographical indications, industrial designs, patents, the lay-out designs of integrated circuits, and undisclosed information. It is considered as the first international treaty to protect GIs through substantive provisions (Jain, 2009). GIs which indicate that a certain good originates from a particular region, where a given quality of the good is attributable to its place of origin, have become a hotly discussed issue in the international trade context. They stand at the intersection of three issues in international law: international trade, intellectual property and

agricultural policy (Rauschtiala and Munzer, 2007). The demand for extending protection on products other than wine and spirits under the multilateral framework is becoming stronger and louder not only because GIs provide protection against counterfeiting and free riding on the reputation of the GI products and protect public goods like traditional and indigenous knowledge (Grote, 2009). But there is also evidence that they can provide higher economic returns to holders of traditional knowledge through price premia (see e.g. Teuber, 2007), foster tourism (Suh and MacPherson, 2007) and therefore act as rural development tools (e.g. Tregear and others, 2007).

Until now, there is still no conclusion as regards the scope extension of GI protection at WTO. The stalemate at the WTO is caused by two strands of viewpoints with respect to the exceptions clause: the grandfather clause under article 24.5 of the TRIPS Agreement has driven the rise in regional and bilateral trade talks between the Member countries led by the United States of America and the European Union (EU). While the United States emphasizes in its regional and bilateral trade deals the exceptions clause in favour of trademarks that are identical with or similar to GIs, provided certain conditions are satisfied, the EU seeks to eliminate the exceptions available under this clause in order to establish a sui generis form of GI protection that clearly prevails over trademarks (Das, 2007; Jain, 2009). Given endless negotiations regarding the GI protection extension under WTO and being convinced of the economic benefits and trade potential inherent to GIs, some developing countries voluntarily started to register their GI products in other countries. Thailand e.g. registered its GI products in the EU (Grote, 2009).

At the national level, Thailand ensures GI protection by having enacted a special GI law in 2003. An effective GI protection is expected to have important implications for Thailand's rural households, since many of them are involved in the production of GI products. Benefits of having effective GI protection under the specific Act may arise for many regions of Thailand since GIs could provide an assured and continuous source of income through their reputation. This could reduce vulnerability to poverty of the rural poor and thus reduce the migration to urban areas by retaining labour and other production factors in the geographical area (Correa, 2002).

This paper analyzes how the legal and institutional framework of GI protection in Thailand has been shaped. It is structured as follows: chapter 2 gives a theoretical background of the GI protection. Chapter 3 describes the legal and institutional modes of and needs for GI protection in Thailand. It illustrates important issues around the institutional framework for GI protection in more detail and provides information on the registration process in Thailand. Chapter 4 describes the current status of the GI registration and mentions important GI products in Thailand, while chapter 5 highlights the challenges of GI protection. Chapter 6 concludes and gives some policy recommendations.

## II. The economics of GI protection

An overview of the economics of GI protection has been provided by Bramley and others (2009), Jena and Grote (2010), and Teuber and others (2011). This chapter focuses on some economic aspects of GIs being of relevance to this paper, namely the role of information on quality and reputation which is conveyed via certification or labelling. The GI registration and certification process again involves the institutional framework of GI protection which will be discussed later on.

The importance of GI protection can be explained on the basis of different theories: i.e. information theory, Shapiro's reputation theory and theories from New Institutional Economics (NIE). The use of distinctive or quality signs such as geographical names is based on the information theory or Shapiro's model on reputation (OECD, 2000). Despite the experience or search activities of consumers, it is more difficult and more expensive for them to obtain information about quality than about prices (Nelson, 1970). The consumers are not always able to use the experience from repeated purchases to discern the product quality (Marette and others, 1999). Akerlof (1970) stressed the importance of information for the proper functioning of the market, since market failures occur when asymmetric information exists. If the qualities are given exogenously, the problem is one of adverse selection meaning that the sellers know the actual quality of their products while the consumers do not. Without any means of differentiating goods, there will be no incentives for producers of high-quality goods to remain in this market, because all

goods tend to be sold at the same price. This situation is well-known under the term "market for lemons".

One solution to reducing information asymmetry and improving consumer information about product quality could be public intervention for example by introducing labeling schemes which supply consumers with information about ingredients, production methods, packaging, storage, product origin, etc. (Beales and others, 1981; OECD, 2000, Marette and others, 1999; Vivas-Eugui, 2001). Apart from labelling, both private sector and government can take a number of steps such as advertising (e.g. Nelson, 1970), certificates of guarantee (OECD, 2000), or warranties (e.g. Allen, 1984).

To protect themselves from the risks of asymmetric information, producers use various signs as markers of quality and assurance of reputation. Thus, distinctive signs and reputation (e.g. Stigler, 1961; Schmalensee, 1978; Shapiro, 1982 and 1983) which denotes the persistence of quality (Stigler, 1961), play an important role in signalling a certain level of quality (Rangnekar, 2004). Reputation which is conveyed via a distinctive sign economizes search costs for consumers (Stigler, 1961; Rangnekar, 2004). The saving in search costs then allows reputable goods to receive a price premium, which consumers are somewhat willing to pay (Stigler, 1961) and which also serves compensating sellers for their investments in reputation (Shapiro, 1983). This is true especially with the case of origin-linked products for which reputation is a factor that can lead to a higher price based on the recognized tradition and excellence of the product. Such a reputation thus often requires the use of legal instruments to protect the product name (Vandecandelaere and others 2009). Like trademarks and commercial names, GIs are used to identify products and confer the exclusive right to all producers from a given geographical area to use a distinctive sign to identify their products. GIs thus enable the producers to convey a considerable quantity of information to consumers and become a worthwhile marketing tool if they are used properly and are well protected (Tregear and others, 1998; Addor and Grazioli, 2002; Rangnekar, 2004; Jena and Grote, 2010).

## III. GI protection in thailand

For the consolidation of benefits via GI protection for developing countries possessing GI assets, actions are needed not only at the international level in order to reach a consensus on the extension of GI protection for products other than wine and spirits, but also at the national level. Since negotiations in the WTO might take years to reach any consensus, an international recognition of GIs already registered nationally is needed (Vivas-Eugui, 2001). National regulations which only apply to one country are not sufficient in a global economy where products often travel beyond national borders (Addor and Grazioli, 2002). The most fundamental aspects that GI protection encompasses are legal rules and their implementation. The legal rules ensure adequate protection not only for countries' own GIs at the national level, but also the effective protection granted for all GIs at the international level (Jena and Grote, 2010). Regarding the implementation of GI rules, setting product standards as well as origin requirements is needed to justify the strong rights granted not subject to any defence of genericness. A GI regulation might therefore be desirable for both low- and high-quality producers, especially when an imperfect enforcement mechanism is given (Anania and Nisticò, 2004). Without such regulations, the value of a GI for all other legitimate users may be negatively affected when one registered GI user decides to sell his or her low-quality products on the high-quality market (Anania and Nisticò, 2004; Jena and Grote, 2010). The system of GI registration therefore serves as a tool by which producers can reach the consumers with a consistent quality signal.

### Calls for better geographical indications protection: the issue of biopiracy

Being a member of the WTO and an attendant of the TRIPS Agreement, it is required to take appropriate measures to implement the provisions within the domestic legal framework. However, enacting the GI protection law in Thailand is not only a consequence of this requirement, but it is also considered as an urgent necessity to be able to attack biopiracy which is an exploding issue in Asia (Thailand, 2003a). Biopiracy means the uncompensated exploitation of developing countries' natural resources (Afreen and Abraham, 2008). It arises when the IP systems are used to legitimize the exclusive ownership and control of genetic

resources and knowledge without recognizing the rights and without compensating the indigenous and rural communities (Delgado, 2002). Biopiracy can be related to the spread of genetic resources and to the traditional knowledge which has been gained, adapted and embedded in the local culture of an indigenous community over time. For the past years, there has been an increasing number of reported cases of biopiracy and commercial exploitation of plants, genetic resources and traditional knowledge from developing countries. Natural products such as Neem, Turmeric, Ayahuasa, Hoodia Cactus and Basmati rice are well-known examples of such reported cases of misappropriation (O'Connor, 2003).

Thailand experienced the first cases of biopiracy when their medical plant called Plao-noi (Croton sublyratus) and a variety of bitter gourd (Momordica spp.) which is known to slow the HIV virus (Kerr and Yampoin, 2007) have been reported. However, a big shock hit Thailand when a newly developed hybrid variety was registered under the name "Jasmati" by the Rice Tec Corporation at the United States Patent and Trademark Office (USPTO) in 1997. The name contains two variants of two rice varieties: Jasmine rice from Thailand and Basmati from India. However, „Jasmati" rice which is a hybridized variety called Della and which was developed from the Italian Bertone rice in the United States has characteristics other than those one could find in the Basmati and Jasmine rice. The use of the name Jasmati could therefore mislead rice consumers by making them wrongly believe that Jasmati rice would have the same characteristics as Jasmine rice from Thailand and/or Basmati rice from India, even though the rice was not genetically related to the Jasmine rice grown in Thailand. This concern was reinforced by a market survey finding that over half of the consumers in the United States buying "Jasmati" thought it was related to Jasmine and Basmati rice (Roggemann, 2005).[1]

The discussion on special protection of GI products has been brought to the public since the case of "Jasmati" (O'Connor, 2004). Concerns have derived from the economic importance of Thai Jasmine rice which is one of Thailand's most

[1] More threatening than the „Jasmati" patent is "Jasmine 85" which was developed by IRRI to create an „improved" Jasmine rice variety that can be grown in the United States using Jasmine rice seed, namely Khao Dawk Mai 105 which is a major rice variety grown in the Northeast of Thailand, although it still has a limited effect in the United States market, especially for Asian Americans (Goodwin and others, 1992).

crucial agricultural export crops and which is regarded as a source of culture and belief. Against this backdrop, the adoption of a more proactive approach was considered in Thailand: the Geographical Indications Act B.E. 2546 entered into force on 28 April 2003. Prior to its enactment, no specific provisions existed to protect GIs in the country (Thailand, 2003a). However, Thailand has been providing general protection against the deceptive use of GIs for many years via e.g. the Consumer Protection Act 1979, the Food Act 1979, and the Penal Code B.E. 2499 (A.D. 1956) as amended by the 1994 Act. Furthermore, certain general legislations such as the protection under criminal law, tort law and the protection under the Trademark Act were applied, although they provide only inadequate protection in the Jasmati case (Thailand, 2003a; O'Connor, 2004).

**Act on GI Protection B.E. 2546 (2003)**

Implementing TRIPS standards on GI protection at the national level can be done either through the sui generis system following the collective or public approach inherent to a GI, or the common-law system of certification trademarks (CTMs) pursuing an individual ownership or private approach (Vivas-Eugui, 2001; Addor and Grazioli, 2002; Vandecandelaere and others, 2009). Many countries have chosen to protect GIs using the CTM system. This means that if one specific country wants to register a GI in any common-law country, it would then have to protect the GI through the registration of a CTM in the national office of that country (Vivas-Eugui, 2001). For Thailand, the sui generis GI Protection Act is based on collective approach. Its objectives are: (i) to protect consumers from misleading information about the product and producers from unfair competition; (ii) to add value to products and serve as marketing tool for the producers; (iii) to maintain product standards; (iv) to distribute GI income to rural areas and support industries in the rural communities; and (v) to protect traditional knowledge and strengthen indigenous community (Thailand, 2004).

According to the Thai Act on GI Protection B.E. 2546 (2003), GIs are defined (Thailand, 2003b, Section 3) as „a name, symbol or any other thing used for calling or representing a geographical origin and capable of identifying that the goods originating in that geographical origin are the goods, the particular quality, reputation

or characteristic of which is attributable to such geographical origin". The geographical origin refers to a certain area, district, region or locality, including sea, lake, river, watercourse, island, mountain or alike.

The Act therefore classifies GIs into two types: (i) *direct GI* - a geographical name that relates directly to GI products such as Chaiya Salted Eggs or Thung Kula Rong-Hai Thai Hom Mali Rice (TKR) and (ii) *indirect GI* – sign or anything that does not contain a geographical name to identify the geographical origin or production origin such as a „Yamo"[2] picture.

Excluding services, the Act refers to goods that can be purchased, exchanged or transferred. They can originate from nature or they can be agricultural products including handicrafts and industrial products. There are two protection levels: (i) *general protection* against any use of GIs that are misleading or constitute unfair competition (Section 27), and (ii) *higher level of protection for special products named by the Minister of Commerce*. Salted eggs producers in Chiangmai can for example not use the name "Chaiya Salted Eggs" since it would mislead consumers and constitute unfair competition. A higher level of protection is provided, even when the use of such GI does not mislead the public about the true origin. The prohibition is also valid for any use of GI in translation or accompanied by the expressions „kind" or „type" or the like. Thailand has named special products for this category of GI protection such as rice, silk, wine and spirits.

The owners of a registered GI are communities or organizations located in the geographical origin. These owners have the exclusive right to prevent all third parties to use their GI. Since GIs are the rights of the community, they cannot be transferred or consented to others for their use.

**GI registration process in Thailand**

In order to have GIs being protected, the Thai GI Protection Act provides for a registration system through application by certain stakeholders. Section 7 of the GI Act identifies three groups of stakeholders eligible to apply for registration: i.e. (i) *governmental bodies, governmental offices, state-owned enterprises or local administration organizations* which are registered as a juristic person; (ii) *single*

[2] A female hero from Nakornratchasrima Province in Northeastern Thailand.

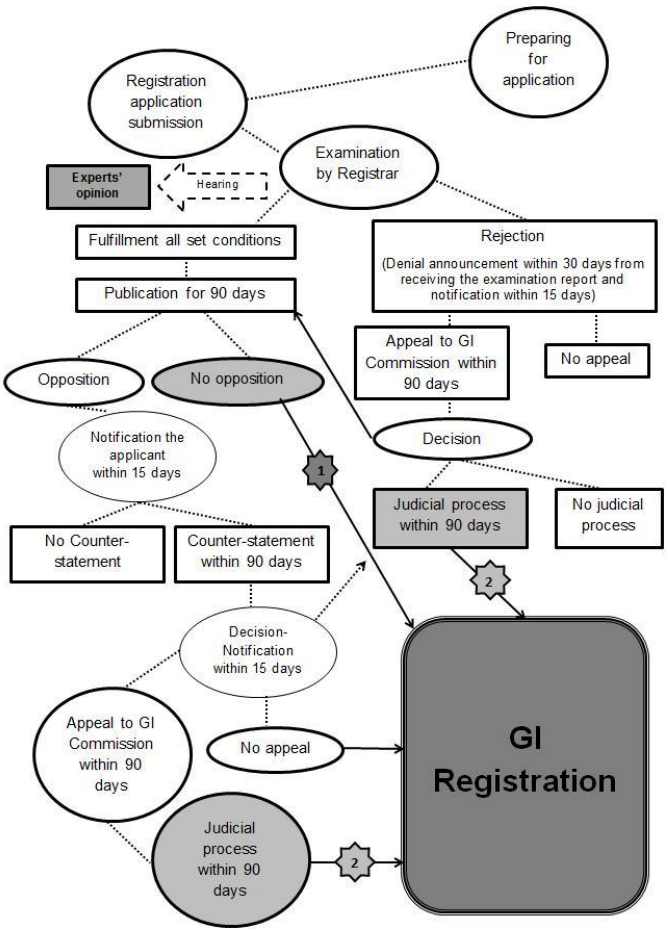
*persons, groups of persons or juristic persons* who do business with GI products and who are located or live in the GI area; and (iii) *groups or organizations of consumers* who make use of GI products. These stakeholders represent the interests of producers of the products concerned (Thailand, 2003b). In addition, applicants can be Thai nationals or foreigners. Foreigners who want to register their GIs in Thailand must either hold a nationality in the Member countries of treaties or multilateral GI Protection Agreements of which Thailand is a Member, or they must have settled down or own enterprises in Thailand or in its Member countries. Regarding foreign GIs, there must be clear evidence showing that they have already been granted protection in the country of origin and used until the date of GI application in Thailand. Section 5 of the Act gives a list of GI names which cannot be registered: i.e. generic names or names that are commonly used in the trading of those goods as well as those GIs being contrary to the public order, morality and public policy (Thailand, 2003b).

According to the Department of Intellectual Property (DIP) (undated), there are several stages for obtaining a GI. Starting with the network building of business operators of a specific GI, all business operators in the production line from upstream raw material producers to downstream process operators must be assembled and then the goods which need protection under the GI Protection Act are identified. The origin and quality as well as the reputation or other characteristics of the goods along with the history of the production of concerned goods in that geographical origin must be documented. Furthermore, there should be evidence about the consumer perceptions concerning those goods, and finally a cost benefit analysis which considers the monitoring and marketing costs should provide insights on whether GI application would pay off for the stakeholders involved. It is clearly noted that not all area names or all kinds of products need protection in the form of a GI. The product specification also requires the zoning or boundary setting for the GI production and the establishment of the inspection structure and control system. The draft production standard can be then submitted to request for certification of such standard from a foreign Certification Body (CB). Finally, marketing and public relation plans for GI products should be established. Once all these stages have been finalized, the GI registration application must be submitted either to the GI Registry or the Provincial

Office of Commercial Affairs under the Ministry of Commerce (MOC). The DIP is then responsible for the examination of all applications, the registration of GIs and ultimately the licensing of a Thai GI label.

Within 120 days from the date of receiving the application, the examination officer must submit the examination report to the Registrar who will consider the report and make a decision whether to register the product in question as GI or not. In case the Registrar sees the fulfillment of all inherent conditions of the GI application for registration, the DIP will make an announcement of the GI registration application. If there is no opposition of other interested parties, the product in question will be registered as GI as shown in Figure 1 (Line No. 1).

**Figure 1. Featuring procedures for registration of GIs in Thailand**




Source: own presentation based on Thailand (2003b) and information on the DIP homepage.

Any interested parties or even the government official is entitled to request the GI Commission not to register a product of concern as GI, or to cancel already registered ones if (Thailand, 2003b):

(i) The registration application for a GI or a GI registration has not been proceeded publicly or any statement in the application does not reflect the true reality during the registration procedure; and

(ii) The changed situation after registration leads the registered GI to become generic or contrary to public order, morality and public policy or this changed situation leads to the change of the characteristics, quality and reputation of the concerned GI goods.

Once the name is registered as GI by the Registrar, the protection of GI is valid from the submission date onwards and the GI label, as shown in Figure 2, can be used. Only producers of that geographical origin and entrepreneurs of such GI products are granted the right over the use of the particular GI and its label. However, it is important to note that only the producers must come from the geographical origin, but not the entrepreneurs who do not necessarily originate from that particular GI area. The use of a GI by the GI value chain actors on their GI product can nevertheless be cancelled when it is misleading and deceptive and leads to reputation damage of other users of the same GI and when GI is used for other products which are not registered and do not come from the same origin (Section 27 of the Act). Any person who uses a GI without the legitimate right or uses it to mislead the consumers shall be liable to a fine of up to 200,000 Baht.

**Figure 2. GI label for Thai GIs**

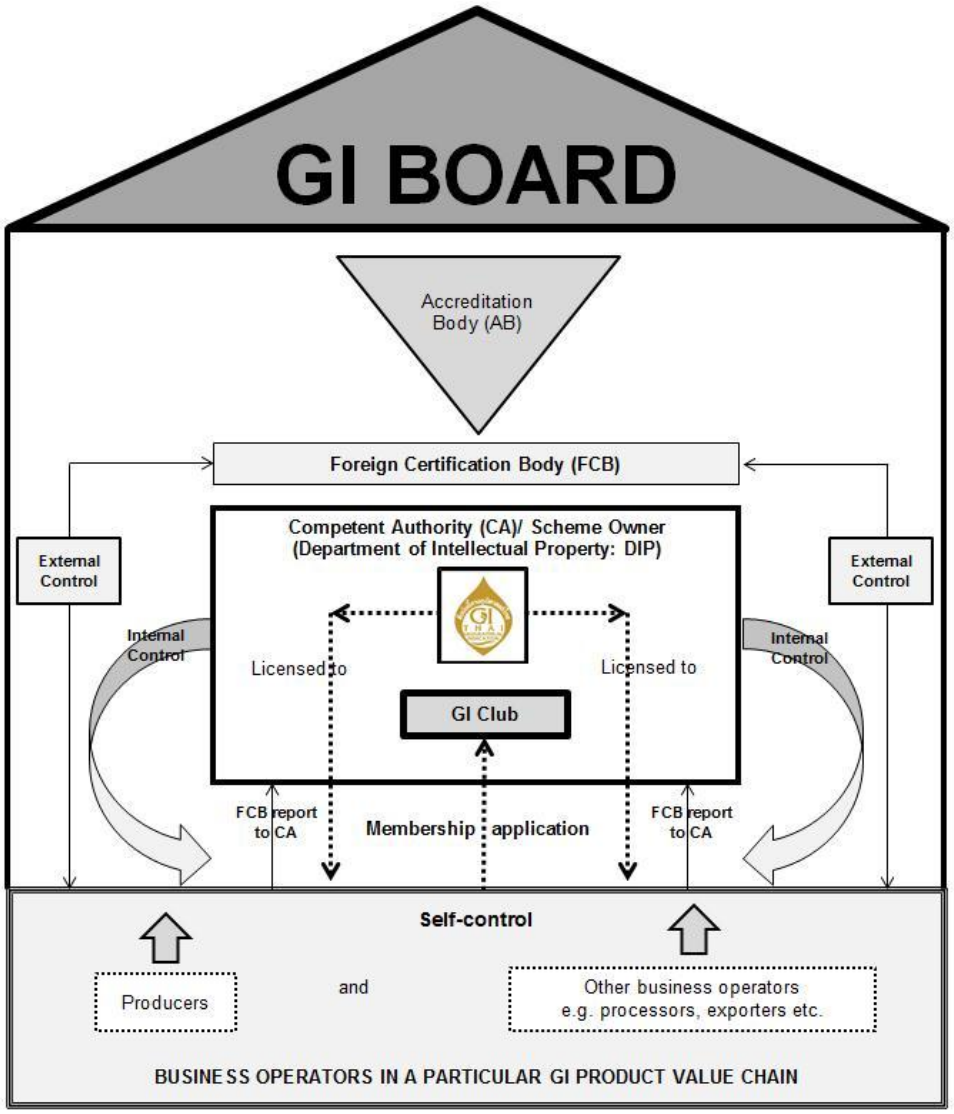

Source: DIP, Thailand's Ministry of Commerce.

**GI certification process in Thailand**

After approval of the GI membership application, the GI producers and business operators of that particular GI product still need to be certified. Figure 3 illustrates the GI certification process in Thailand. According to Ngokkuen and Grote (2011), three important steps are required for certifying commercial operators of the GI product production line: (i) self-control; (ii) internal control; and (iii) external control by the foreign CB on behalf of the Competent Authority (CA), i.e. the DIP. The self-control is the initial step of the quality control management of the concerned GI product. This implies that producers follow the producer manual and the control plan given by the DIP in order to maintain the quality of the concerned GI product. The internal control means the control within the border of the country. It involves the control of all GI producers, processors or other stakeholders involved by local and national governmental bodies, usually the GI committee at the provincial level. Finally, these actors have to be certified by the DIP. The external control involves the quality control and formality checks by the foreign CB. This is particularly the case when such GI products are exported abroad in particular to the countries where the GI certification is required (Ngokkuen and Grote, 2011). The external control will also be carried out by the Accreditation Body (AB) which has the responsibility to accredit the CB. The responsible AB in Thailand is the Thai Industrial Standards

Institute (TISI) and the National Bureau of Agricultural Commodity and Food Standard (ACFS).

**Figure 3. GI certification process and GI control system in Thailand**




Source: Own presentation based on information on DIP Homepage and Ngokkuen and Grote (2011, p. 174).

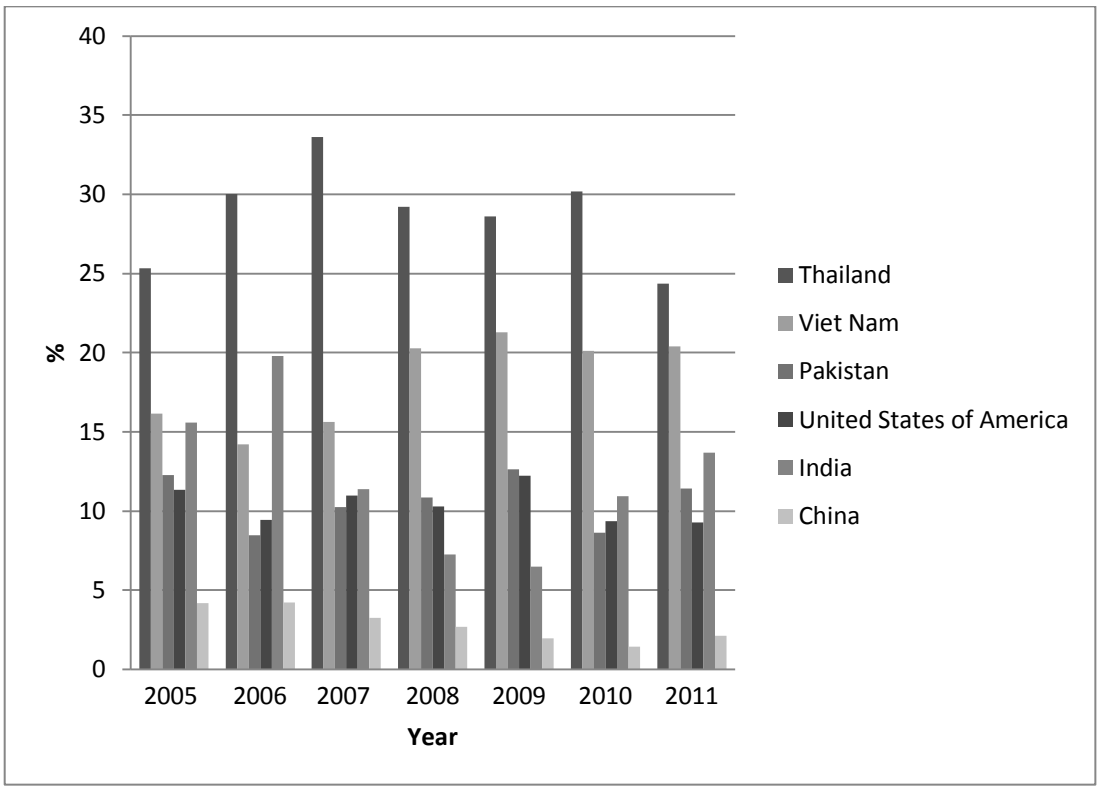
After being certified by the DIP, the GI producers or GI business operators can use the GI label on their product packages and for their marketing campaigns. However, the membership status of the GI business operators must be yearly renewed by the CA.

## IV. GI products in Thailand

Within the last ten years, 42 different products have been registered and certified as GIs in Thailand. Panasnikom Handicrafts, Trang Roast Pork, Doi Tung Coffee and Phurua Plateau Wine became the first four registered GIs of Thailand (see Annex 1). As of April 2012, there have been eight product types, i.e. handicrafts, food, coffee, wine and spirits, horticultural products, rice, pottery, general textiles and textiles goods and silk registered as GIs. Most of the registered GIs in Thailand are Thai GIs. Seven registered GIs are foreign GIs. The most often registered GI products are horticultural products with 12 products, followed by eight kinds of GI rice. Thung Kula Rong-Hai Thai Hom Mali Rice (TKR) being the most popular registered GI rice has been counted as the first registered Thai Jasmine rice from the Northeast, followed by Surin Hom Mali Rice from the same region.

The importance of rice for Thailand is not only because it is a major staple food for domestic consumption, but it is also considered as one of the most important export crops of the country. Thailand has been one of the world's largest rice exporters for nearly three decades since 1982 (IRRI, 2005). Its highest market share amounted to more than 25 per cent between 2005 and 2010, leaving the second and third largest exporters, i.e. Viet Nam and Pakistan far behind as shown in Figure 4. Exporting rice to the world market has resulted in considerable export revenues for Thailand as a whole but also for the individual rice farmers.

**Figure 4. World market shares of rice export by country, 2005-2011**




Sources: Own presentation based on data from Grains: World market and Trade Archives, The United States Department of Agriculture (USDA).

Jasmine rice makes up more than a quarter of Thai rice exports each year. As Table 1 shows, in 2011, approximately a third of the rice export value stemmed from exporting Jasmine rice which brought foreign currency of around US$ 2 billion to Thailand (Thailand, 2009 and Thailand, 2010).

**Table 1. Rice trade**

| Item | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| World rice exports (1 million ton of milled rice) | 29.48 | 31.93 | 29.22 | 29.53 | 31.61 | 34.76 |
| Thailand's world market share (%) | 25.4 | 28.8 | 35.0 | 29.1 | 29.5 | 30.2 |
| Domestic consumption (1 million ton of milled rice) | 10.50 | 10.73 | 11.28 | 12.12 | 12.08 | 12.08 |
| Export | | | | | | |
| - Total export volume (1 million ton of milled rice) | 7.49 | 9.19 | 10.22 | 7.26 | 8.94 | 10.71 |
| - Total export value (1 000 million US$)[a] | 2.59 | 3.45 | 6.06 | 5.01 | 5.30 | 6.40 |
| - Total Thai Jasmine rice export volume (1 million ton of milled rice) | 2.60 | 3.07 | 2.52 | 2.63 | 2.36 | 2.36 |
| - Total Thai Jasmine rice export value (1 000 million US$)[a] | 1.06 | 1.39 | 1.81 | 2.0 | 2.0 | 2.09 |
| Export price for Thai Jasmine rice (US$/ton)[a] | 475 | 565 | 910 | 937 | 1023 | 1043 |

Note: [a] Exchange rates for 2006, 2007, 2008, 2009, 2010 and 2011 are 37.93 Baht/US$, 34.56 Baht/US$, 33.36 Baht/US$, 34.34 Baht/US$, 31.73 Baht/US$ and 30.49 Baht/US$ respectively (Bank of Thailand (BOT), 2002-2011).

Source: Own presentation based on data from Thailand (2009); Thailand (2010) and Thailand (2011).

Jasmine rice or Hom Mali rice (in Thai: Khao Hom Mali) is a rice variety which is grown in the uplands of Thailand only once a year using two kinds of Thai Jasmine rice seeds: Khao Dawk Mali 105 and RD15 (in Thai: Gor Khor 15). Khao Dawk Mali 105 is a result of the further development of the local Thai Jasmine rice seeds. It was first discovered in Laempradoo Sub-District, Panasnikom District of Chonburee Province in Southeastern Thailand. It was then taken to be cultivated in Tatonglang Sub-District in Bangkla District of Chachoengsao Province, a neighbour province of Chonburee, and it was found that it reached high yields and became therefore very popular among farmers. Even though this traditional Jasmine rice was not widespread and relatively expensive, it became popular among Thai consumers, in particular among the rich from Bangkok. Since 1950, this traditional Thai Jasmine rice was further bred and developed at the field trials of Chachoengsao Province's Rice Research Centre. After six years of cultivation tests in many areas of Thailand, it was found that the Northeast with its unique sandy loam and rain-fed upland is the most appropriate part for Jasmine rice cultivation using Khao Dawk Mali 105 seed. The next generation of rice breeders used Khao Dawk Mali 105 as a parent for the crossing and then irradiated it by the Gamma ray to allow the mutation of the rice. The outcome of this breeding development is the RD 15 which has been cultivated in

the North and Northeast of Thailand since 1965 (Thailand (undated); iCoopThai, undated).

After it was found that the Northeast of the country called Isaan is the most appropriate area for Jasmine rice production, the Royal Thai government has made efforts to promote the cultivation of Jasmine rice using Khao Dawk Mali 105 and RD 15. However, since the Northeastern Thais prefer sticky rice as a staple food, a breakthrough was achieved only in three Southern Isaan provinces, namely Bureeram, Surin and Srisaket where local people are Khmers with a preference for Jasmine rice. Within these provinces, a huge flat and dry area called *Thung Kula Rong-Hai (TKRH)* was then used for the cultivation of the first Thai Jasmine rice. This premium rice has a unique texture and a natural and distinct aromatic fragrance of Jasmine flower from the smell essence called **2-acctyl-1-pyrroline (2AP)**. The popularity of Jasmine rice has been passed through to consumers not only in Thailand, but also beyond.

To promote its cultivation and marketing world-wide, the *Thai Hom Mali Rice Trade Association Thung Kula Rong-Hai Geographical Indication (THAT)* has been established in 2008. By 2008/2009, there were 1,131 Thai Jasmine rice farmers, 13 exporters and four processors certified as GI operators for the *TKR* by the DIP (Ngokkuen and Grote, 2011).

At the international level, the GI registration application for the *TKR* labelled "Khao Hom Mali Thung Kula Rong-Hai" has been submitted by the DIP to the EU's GI Registry on 20 November 2008 (European Commission, 2010). This GI application is the first one from Asia and the first attempt to seek GI protection abroad. As of April 2012, the term *Khao Hom Mali Thung Kula Rong-Hai* has still not been registered by the EU's GI Registry due to the opposition of five EU countries. Belgium, France, Italy, the Netherlands, and the United Kingdom contend that Thailand should not be the only country allowed to register the term *Khao Hom Mali*, as other countries can also grow Jasmine rice. EU's rice traders were concerned about not being able to use the word *Khao Hom Mali* in branding other Jasmine rice products from Thailand once the term *Khao Hom Mali Thung Kula Rong-Hai* would have been registered as GI in the EU. They suggest that Thailand

should apply for GI registration only with the term *Thung Kula Rong-Hai* ("Five European nations oppose Thai registration of Thai Hom Mali rice", *(MCOT online news* (Bangkok), 26 January 2011). Thailand then agreed to apply for GI protection only for the term *Thung Kula Rong-Hai*. Nevertheless, the DIP insisted on having its *Thung Kula Rong-Hai* Jasmine rice to be sold at a premium price with the GI designation displayed on the packaging. In addition, the rice must be packed at the site where it was cultivated and be traceable back to the field in order to keep the quality of the concerned Jasmine rice which originated from the GI area. Thailand does not forbid the EU's rice traders to import and pack in the EU varieties of Thai Jasmine rice grown in other areas of Thailand, next to other premium rice, brown rice, or other kinds of rice provided that the traders have an appropriate supervised packing system making all rice imported from Thailand being traceable to the origin. This is in order to protect the reputation of Thai rice ("Hom Mali rice GI registration likely this year", *Bangkok Post* (Bangkok), 25 June 2011; "Thailand/European Union: EU nations oppose Thailand's registration with European Commission for geographical indication of Thai jasmine rice." Thai Press Reports, 2011).

Besides the attempt to protect the reputation of Thai Jasmine rice abroad via the GI protection law, there have been also intensive attempts by the Thai government to protect it under the trademark law in other countries since 2001 (Thailand, 2002). Thai Jasmine rice under the name "THAI HOM MALI RICE" with an official Thai-language term "KHAO HOM MALI THAI" or "KAOW HOM MALI THAI" has already been successfully registered as a certification mark, as shown in Figure 5, by the Trademark Office in more than 50 countries including Australia, Canada, Malaysia, Singapore or the United States (Thailand, 2002). The Thai-language terms "Khao" and „Hom Mali" refer to rice and Jasmine in English, respectively. The reason behind the registration application of Thai Jasmine rice labelled „Khao Hom Mali" instead of "Jasmine rice" is due to the existing common law in some countries, including the United States of which the court considers the term Jasmine as generic. The Department of Foreign Trade (DFT) of Thailand's MOC controls the use of the certification mark which is aimed to provide consumers with the information and the assurance that rice imported with the mark meets its

quality standards. The mark is also used to certify the origin, composition and method of production, quality or other quality characteristics of a product.

**Figure 5. Certification mark/ Trademark of THAI HOM MALI RICE originated in Thailand**


Source: Department of Foreign Trade, Ministry of Commerce of Thailand.

## V. Challenges of GI protection

### Regional Trade Agreements, TRIPS-Plus and TRIPS-Minus

Due to the slow progress of completing the current Doha Round, more and more regional and bilateral Free Trade Agreements (RTAs and FTAs) have been negotiated in the recent past (El-Said, 2005). This changing trend in trade negotiations has also been induced by (i) Article 24.1 of the TRIPS Agreement which encourages the WTO Members to have recourse to bilateral agreements and by (ii) the TRIPS Agreement's minimum IP standards allowing the creation of higher standards in any IP agreement negotiated subsequent to TRIPS among WTO members. This introduction of minimum IP standards is allowed as long as the principles of non-discrimination, i.e. Most-Favoured-Nation (MFN) and National Treatment (NT), are respected (Mercurio, 2006). However, it is important to note that these newly generated RTAs and FTAs operate outside the jurisdiction of the WTO, since they are only notified to the WTO, but not governed by its rules and dispute settlement arrangements. And since a new trade round can be launched easier than under the multilateral framework, they are thus multiplying very fast (GRAIN,

2001). As of 15 January 2012, a total of 511 RTAs were notified to the GATT/WTO, of which 319 agreements were in force with most of them being FTAs (90%), while customs unions account only for 10% (WTO, 2012).

Having failed to achieve stronger IPR protection in the TRIPS negotiations, developed countries have included more protectable subject matter, broader and more extensive coverage, increased harmonization, stronger enforcement mechanisms, and a weakening of flexibilities and special and differential treatment in the bilateral FTA negotiations with the developing and least developed countries (Mercurio, 2006). The TRIPS provisions contained in the RTAs and FTAs are considered as the "TRIPS-plus" provisions if the country is being forcefully required to implement more extensive levels and standards of IPR protection than required under the TRIPS Agreement, or if they have to reduce the scope of their rights and exceptions as well as to eliminate an option which was awarded to them under the TRIPS Agreement (Musungu and Dutfield, 2003). The TRIPS-plus agenda was made particularly by the United States and the EU through a series of RTAs and FTAs, with the United States pursuing its strategy of „competitive liberalization" and thus counting as the most active country on bilateral trade talks (Mercurio, 2006).

While the EU stressed in FTAs with other countries the recognition of selected European GIs, particularly GIs for wines and/or spirits, the United States focused to a large extent on the elimination of domestic sui generis GI protection systems and their replacement by regular trademark systems (Vivas-Engui and Spennemann, 2006a and 2006b). Vivas-Engui and Spennemann (2006a) term such provisions by the United States as "TRIPS-minus" provisions. This preference by the United States for trademarks is explained by their own legal tradition of having trademarks, and also because they do not consider GIs as community rights but rather as private rights which can be licensed or sold (Charlier and Ngo, 2007). Binding into FTAs or RTAs with such standards will therefore prevent a government to use proactive legal measures created under the national GI Act to punish free-riders in case of deception or misuse of the national GIs by the trading partner. Agreeing to such standards therefore not only means agreeing to amend the national IP law, but it also means that countries may be agreeing to standards that are far from their own economic and social needs (Mercurio, 2006). The TRIPS-plus or TRIPS-minus provisions have

therefore very important implications for developing countries because of their higher level of flexibilities which again put developing countries as negotiating partners in a plight (George, 2004). Rules and practices under these concepts limit their ability to protect the public interest (Musungu and Dutfield, 2003).

Even though Thailand supports multilateral trade liberalization, as a member of the Asia-Pacific Economic Cooperation (APEC) forum and as a Party to the Association of South-East Asian Nations (ASEAN), the country is also committed to „open regionalism". Since 2002, Thailand has actively negotiated preferential trading arrangements with countries such as Australia, China, India, New Zealand and the United States. As of 5 April 2012, Free Trade Talks of Thailand comprised totally 22 FTAs and RTAs of which six agreements became effective (Thailand, 2012). Many FTAs and RTAs are seen as beneficial for Thailand's economy. However, the Thailand-United States FTA has been considered as the most critical one since it is comprehensive and very detailed. GIs sections in its chapter on IPRs have included a dual system of protection with GIs/trademarks meaning that trademark holders are granted exclusive rights over third parties who use trade-identical or similar signs including subsequent GIs (TDRI, 2003).

Farmers, especially Jasmine rice farmers, activists and academic people in Thailand have voiced strong opposition against the FTA negotiations with the United States due to the fear of their strong power and particularly due to their role as a funder of Jasmine rice bioengineering projects (Roggemann, 2005). The imbalance in bargaining power for developing countries vís-à-vís developed countries is very pronounced and can be more easily exploited in the bilateral negotiations context than in the multilateral setting. The developing countries, particularly the smaller and weaker amongst them, have little ability to counter the negotiating demands of powerful trading partners, in particular the United States in bilateral FTA negotiations (Buckley and others, 2008). A challenge for a developing country like Thailand is thus how to counter the negotiating demands of the United States.

Until now, the Thailand-United States FTA has not been concluded. The negotiations have been put on hold by the United States since February 2006, mainly due to the political situation in Thailand. The hold was also due to the expiration of

the United States Bipartisan Trade Promotion Authority (TPA) Act of 2002 in June 2007. The Act has still not been renewed or extended by the Congress since then (Hornbeck and Cooper, 2011). The continuation of the FTA negotiations with the United States has therefore been postponed to an unknown date (Thailand, 2012).[3] Thus, Thailand still has some time to explore means to strengthen its national legislation for better GI protection before committing itself to such an FTA and concluding further FTAs or RTAs with other leading economies. This could be done for example by amending and upgrading the existing GI Protection Act to a higher level of protection over the trademark law but still being conform with the TRIPS rules. The country should also carefully assess whether the ensuring obligations in the RTAs or FTAs correspond with its economic, cultural and societal priorities (Vivas-Eugui and Spennemann, 2006a and 2006b). This challenge is therefore a domestic matter.

It is important to emphasize that the GI protection should be based on the same standards for all countries, namely rather under the multilateral trade framework and not under the bilateral ones (Mercurio, 2006). At the international level, Thailand and all other developing and least developed countries should make sure that long-term policy goals and coherence with the multilateral obligations are adequately taken into account (Vivas-Eugui and Spennemann, 2006a and 2006b). The multilateral trading system is beneficial for them because of its ability to extend dispute settlements across agreements (Mathur, 2001). Moreover, in the WTO forum, they have at least the power of numbers. By grouping together similarly situated Members, they have been able to have a significant impact on the direction of the multilateral trade agenda, whereas such outcome is not feasible in the bilateral context (Buckley and others, 2008). Thailand should thus stress its position to support the multilateral trade rules of the TRIPS Agreement under the auspices of the WTO. The country should actively work more closely together with other „GI alliances“ in order to make the GI issue more public. The target should be not only to improve information for

[3] Senator Jim Webb, a Chairman of the United States Senate's Subcommittee on East Asian and Pacific Affairs, has lately expressed hope that both countries will coordinate their bilateral cooperation and further foster the already strong relations between the two countries and that the United States was ready to support Thailand with the newly elected government of Ms Yingluck Shinnawatra in various fields during his visit in Thailand ("US senate committee welcomes new Thai PM", Editorial, *Thailand Business News* (Bangkok), 16 August 2011).

consumers of Thai GIs in the world market but also to raise recognition from all parties about the importance of having domestic GIs being better protected. Given the facts that the Member countries are already banded into different groups, that developing countries themselves do not share the same viewpoints with respect to the issue of GI protection extension under TRIPS, and that the promotion of bilateralism by developed countries such as the United States also encompasses „dividing" developing coalitions (Mercurio, 2006), it is currently very difficult to gather alliances and find the consents for setting standards for GI protection at the multilateral level.

**Conflicts of interests concerning different types of intellectual property rights and the future of Hom Mali Rice**

Since January 2008, the National Science and Technology Development Agency (NSTDA) in Thailand has obtained the patent on genes that generate aroma in the world famous Jasmine rice in the United States. This was considered by NSTDA as a necessity to be able to protect Thailand's national treasure by keeping other countries from obtaining the patent on rice which would damage Thai farmers and rice industry. However, due to the existing conflicts of interests regarding IPR types, i.e. whether GI products should be protected by the patent and trademark law or by the specific GI Act, this move to patent Thai Jasmine rice genes could send a wrong signal to other trading partners. Since the country has strongly opposed the patent registration of living organisms and genetic resources, the alliance seeking activities with respect to better protection of agricultural GIs at the multilateral level are therefore in the situation of self-challenge. However, this rice patent could later develop into a double-edged sword due to the limited duration period of the patent protection of up to 20 years. Law experts, NGOs and farmers thus see this rice patent as more harmful than beneficial for the long-term protection of Thai Jasmine rice. Anybody could benefit from it by adopting the genetic engineering technology to put these aromatic genes in any rice variety to make it aromatic like Thai Jasmine rice after the expiration of the patent protection period. Combining this concern with the issue of biopiracy, the damage would be much more tremendous, since foreigners could also apply for patents of other living organisms and genes ("Thai rice gene patent sends wrong signal'", Editorial, *Bangkok Post* (Bangkok), 3 July 2009), even

though such living organisms and genetic resources do not have an origin in their countries. Old bad experiences such as the cases of Plao-noi and a variety of bitter gourd could affect Thailand again.

Even though there still exists a space for relief, since the CBD tends to be willing to assign ownership rights to the first phase of the biotechnology process and at the multilateral level, the TRIPS still does not grant patent protection to any products resulting from the first phase of the biotechnology process (Kerr and Yampoin, 2007) and it allows Member countries to exempt and exclude plant and animal patents from their national patent laws (El-Said, 2005). However, the harmonized convention to protect such living organisms and genetic resources is still not ratified at the international level. Furthermore, even if the products from the first phase of the biotechnology process will not be granted patent protection under TRIPS, the extension of GI protection under Article 23 of the TRIPS to agricultural products is still under negotiation. The challenge for the GI protection would therefore increase to a greater extent not only for the GI protection in Thailand, but also for the whole GI protection system under the TRIPS. What Thailand could do alternatively with respect to the concerned issue is to take the initiative to open the floor for negotiations going much further than the existing request of extending GI protection under Article 23. Upgrading its national sui generis system for GI protection could be alternatively done by adding the protection on genetic resources of GI plants. Such tightened sui generis system should not only be integrated into the national legal framework but it should also conform well to specific needs of indigenous communities and best protect the genetic resources of the country. Hence, a comprehensive approach with a bundle of complementary legal, non-legal and voluntary mechanisms such as GI registration currently serves as the best solution for enhanced GI protection.

## VI. Conclusion

In the recent past, the discussion on better IPR protection has taken center stage. Developed nations which produce most of the world's IPs resulting from high knowledge-based technologies seek to protect their self-interest by trying to

influence the IPRs Conventions. They complain about the inadequacy of IPR protection in developing countries and accuse them of IP piracy. The developing countries, however, accuse the developed countries of biopiracy. Given the endless negotiations to extend the GI protection to products other than wine and spirits at the multilateral level, together with no ratification of the CBD, the ability of the WTO to cope with the problem of biopiracy around the globe is weak. Some countries, in particular those which possess GI products, have released a national law to protect their GIs. Thailand with its sui generis GI protection system hopes to mitigate the problem of exploitation. The Thai GI Act was released not only due to the requirement of the multilateral trading framework, but also due to biopiracy related to its widely known Thai Jasmine rice. The biopiracy issue was seen as the main driving factor accelerating the process for enacting the GI Law.

However, increased trade liberalization through bilateral FTAs and RTAs with economies such as the United States and the attempt to protect its national „assets“ by obtaining the patent for the rice genes in the USPTO have started to challenge the GI protection in Thailand. This is due to the limited protection period for patents registered in the United States of only up to 20 years. Furthermore, patenting life forms was never a position of Thailand at the multilateral trade negotiation on patent protection. Suggestions on how to solve such problems do exist like e.g. opening negotiations which go much further than the existing request of extending GI protection under Article 23, or upgrading its national sui generis system for GI protection by adding the protection on genetic resources of GI plants. However, there is a cost to such suggestions and the expected outcome is unsure. Raising the issue of automatic protection on genetic resources of GI plants within the scope of GI protection is much more challenging, while there is criticism of the sui generis system of GI protection by opponents in a series of bilateral FTAs and RTAs. It is to question whether the country would be better off by using its resources on other facets of development that are more likely to yield sustainable outcomes. While creating consumers' awareness about GIs for example is generally recommendable, it must be also considered that GI promotion is expensive and sustainable benefits are not guaranteed. Nevertheless, given the social, cultural and economic importance of GIs for Thailand, it is necessary and worth trying to seek win-win solutions which

are of benefit to both sides, the opponents and proponents of GI protection. Many Thai GIs are of agricultural nature involving all kinds of actors from poor rural households to GI exporters. Losing „GI assets“ due to inadequate protection might reduce an independency in self-sufficiency for the country and the costly possible outcome would be the economic burden which concerns most of the million poor in the rural areas.

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## Annex

## A1: Registered GIs in Thailand classified by product type, 2003 – 2012

| No. | Geographical indications | Product type | Registered date |
|---|---|---|---|
| 1 | Panasnikom Handicrafts | Handicrafts | 26 August 2005 |
| 2 | Bor Sang Umbrella | Handicrafts | 01 June 2006 |
| 3 | Chiang mai Celadon | Handicrafts | 31 August 2007 |
| 4 | Yok Blabri Nan | Handicrafts | 23 December 2010 |
| 5 | Trang Roasted Pork | Food | 18 April 2006 |
| 6 | Surat Thani Oyster | Food – Seafood | 23 June 2006 |
| 7 | Prosciutto Di Parma | Food – Ham | 21 July 2006 |
| 8 | Chaiya Salted Eggs | Food- Eggs | 27 September 2007 |
| 9 | Doi Tung Coffee | Coffee | 18 April 2006 |
| 10 | Doi Chaang Coffee | Coffee | 27 September 2007 |
| 11 | Phurua Plateau Wine | Wine | 18 April 2006 |
| 12 | Brunello Di Montalcino | Wine | 27 September 2007 |
| 13 | Napa Valley | Wine | 12 June 2008 |
| 14 | Cogyac | Spirits | 27 September 2007 |
| 15 | Pisco | Spirits | 30 September 2007 |
| 16 | Champagne | Sparkling Wine | 15 December 2006 |
| 17 | Scotch Whisky | Whisky | 13 July 2007 |
| 18 | Chainat Khaotangkwa Pomelo | Horticultural Product | 23 June 2006 |
| 19 | Sriracha pineapple | Horticultural Product | 23 June 2006 |
| 20 | Chiangrai Phulae Pineapple | Horticultural Product | 15 December 2006 |
| 21 | Nanglae Pineapple | Horticultural Product | 15 December 2006 |
| 22 | Nakornchaisri Pomelo | Horticultural Product | 30 September 2007 |
| 23 | Petchabun Sweet Tamarind | Horticultural Product | 30 September 2007 |
| 24 | Phuket Pineapple | Horticultural Product | 26 October 2007 |
| 25 | Phet Rose Apple | Horticultural Product | 17 April 2008 |
| 26 | Glauy Hin Bannang Sata | Horticultural Product | 8 June 2009 |

| | | | |
|---|---|---|---|
| 27 | Kathon Hor Bangkrang | Horticultural Product | 11 May 2010 |
| 28 | Nont Durian | Horticultural Product | 11 May 2010 |
| 29 | Sangyod Muang Phatthalung Rice | Rice | 23 June 2006 |
| 30 | Hang-Hom-Thong-Sakon-Tawapee Rice | Rice – Brown rice | 15 December 2006 |
| 31 | Kaowong Kalasin Sticky Rice | Rice – Sticky rice | 16 May 2007 |
| 32 | Thung Kula Rong-Hai Thai Hom Mali Rice | Rice – Jasmine rice | 27 September 2007 |
| 33 | Surin Hom Mali Rice | Rice – Jasmine rice | 26 February 2008 |
| 34 | Khao Kum Lanna | Rice | 17 September 2008 |
| 35 | Jek Chuey Sao Hai Rice | Rice | 30 December 2008 |
| 36 | Leuang Pratew Chumporn Rice | Rice | 30 December 2008 |
| 37 | Ban Chiang Pottery | Pottery | 10 August 2007 |
| 38 | Kohkret Pottery | Pottery | 11 May 2010 |
| 39 | Mae Jam's Tin Jok woven cloth | Textiles and Textile Goods | 27 September 2007 |
| 40 | Lamphun Brocade Thai Silk | Silk | 27 September 2007 |
| 41 | Praewa Kalasin Thai Silk | Silk | 27 September 2007 |
| 42 | Chonnabot Mudmee Thai Silk | Silk | 14 January 2009 |

Source: DIP, own compilation

## 2.2 MODULE II: GEOGRAPHICAL INDICATION CERTIFICATION ADOPTION: JASMINE RICE HOUSEHOLDS' BEHAVIOR

2. NGOKKUEN, C. and GROTE, U. (2011). "The Prediction of Household's Behavior in Adopting Geographical Indication Certification for Jasmine Rice from Northeastern Thailand", *The GSTF Business Review (GBR)*, vol. 1, No. 1, pp. 173-178.


URL:
http://dl.globalstf.org/index.php?page=shop.browse&category_id=58&option=com_virtuemart&Itemid=4&vmcchk=1&Itemid=4

3. NGOKKUEN, C. and GROTE, U. (2012). "Geographical Indication for Jasmine Rice: Applying a Logit Model to Predict Adoption Behavior of Thai Farm Households", *Quarterly Journal of International Agriculture (QJIA)*, vol.51, No. 2, pp. 157-185.

# The Prediction of Household's Behavior in Adopting Geographical Indication Certification for Jasmine Rice from Northeastern Thailand

C. Ngokkuen and U. Grote

**Abstract**— Since the release of the Act on Geographical Indication (GI) protection in Thailand, Thung Kula Rong-Hai Thai Hom Mali Rice (TKR) is considered as the first officially registered GI Jasmine rice under this Act. This paper aims at identifying factors that predict the behavior of Jasmine rice households in adopting GI certification for TKR rice. The logit model was used to analyze the primary data of 370 households collected through a formal survey in two districts of the Thung Kula Rong-Hai (TKRH) area. The logistic regression results indicate the significant influence of institutional and social factors such as information, membership in a cooperative and transportation costs on the decision of the Thai Jasmine rice households to adopt the GI certification-.

**Keywords**: Certification, Geographical Indications, Jasmine rice, Logit Model, Thailand

## I. INTRODUCTION

Geographical indications (GIs) are a kind of intellectual property right which are used to identify products and confer the exclusive right to all producers from a given geographical area to use a distinctive sign to identify their products as in [1]. They have gained increasing interest since their protection has been ensured multilaterally under the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement of the World Trade Organization (WTO). The "Act on Geographical Indications Protection B.E. 2546 (2003)" is a first specific Act on GI protection released by the Thai government in 2003. Its release was mainly driven by the public interest in the fight against biopiracy along with the given attempt of the EU in seeking alliance for

better GI protection around the globe. The act release as a proactive legal provision is also due to the WTO requirement to the Member countries to provide a legal and institutional framework of GI protection in their own national borders as in [2]. As of May 2011, totally 35 products from different regions in Thailand were registered as GIs.

Thung Kula Rong-Hai Thai Hom Mali Rice (TKR) which is traditionally being produced in the Thung Kula Rong-Hai (TKRH) region in the Northeast region is considered as the first registered GI Thai Jasmine rice. GI certification is expected to promote its export which currently mainly goes to the EU. Through the establishment of such quality labels, economic agents involved in the GI product value chain are able to gain economic advantages due to differentiation. They can obtain differentiated incomes via increasing the added value of the product as in [3]. Consumers consider the distinctive signs as markers of quality and assurance of reputation are thus willing to pay a price premium as in [4]. There are many studies about technology and innovation adoption e.g. in [5]. Also studies on the adoption of certification schemes, like for organic rice in Thailand, have shed some light on the factors that play a crucial role in affecting the household's adoption decision e.g. in [6]. However, studies on GI adoption are still missing and this paper would contribute to fulfill this research gap. This paper aims to identify the determining factors that are likely to predict the behavior of Jasmine rice households in the TKRH area in adopting GI certification and to estimate the marginal effects of key factors on the probability of adoption.

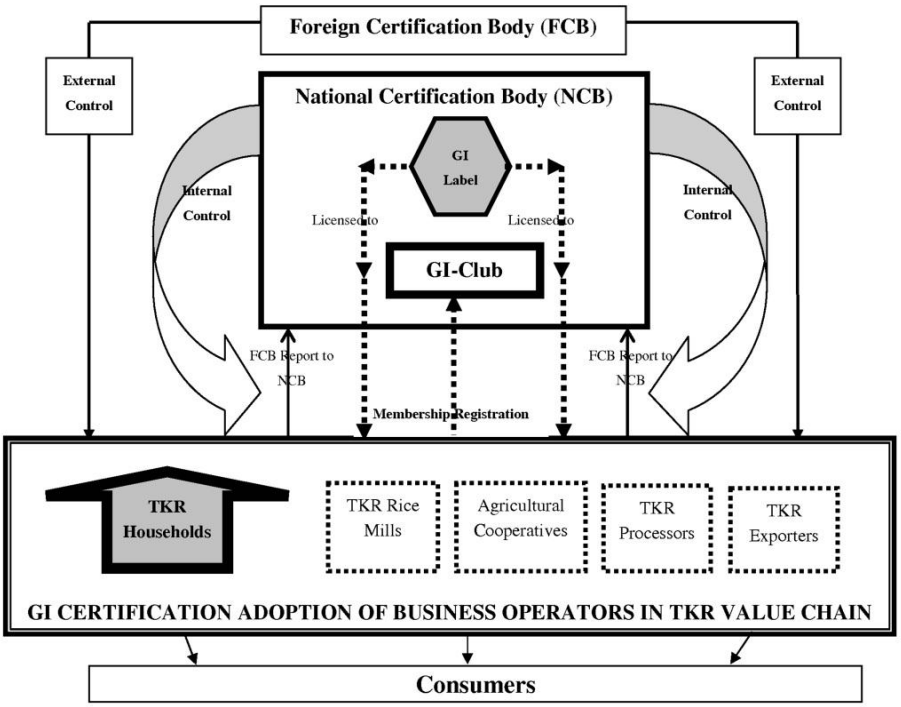
## II. PROCESS OF GI CERTIFICATION IN THAILAND

Fig. 1 presents the process of GI certification for Jasmine rice from the Northeast region of Thailand. Once the product of concern is registered and certified as GI from the registrar, Thailand's Department of Intellectual Property (DIP), the use of the GI label for identifying GI products is possible. The procedure of certifying commercial operators of the GI product production line encompasses three important steps as follows: (i) self-control; (ii) internal control; and (iii) external control by the Certification Body (CB). The self-control step is the initial step of the quality control

management of the concerned GI product. According to this, producers have to follow the producer manual and the control plan given by the DIP. The internal control means the control within the border of the country and involves the control by local and national governmental bodies. The internal control is ensured by the membership application of all related GI business operators within the GI area. The producers and other business operators of the production line of a specific GI product must apply for a membership in the GI club. Finally, these actors have to be certified by the national CB which is also the responsibility of the DIP. The external control involves the quality control and formality checking by the foreign CB. In case of the TKR, the company BioAgriCert based in Italy is responsible for the external inspection. This is particularly the case when such GI products should be exported abroad in particular to the EU where the GI certification is required. After being certified as GI producers or GI business operators by the DIP, in particular those who directly use the GI label can then use the GI label on their products packages and use it together in their marketing campaign. The GI label then serves as information or reputation channel for consumers.

How a GI certification is adopted is based on the diffusion of innovation theory of [7]. An innovation is defined in [7], p. 12 as an "idea, practice, or object that is perceived as new by an individual or other unit of adoption." A GI certification is the innovation since all parties in the GI area considered it as a new certification system, whereupon an organizational innovation resulting from it is particularly seen as a key part in disseminating knowledge and innovation on the ground and in relating quality policy to the entire value chain as in [3].

**Figure 1. Process of GI certification in Thailand**




Source: own presentation

This study relates to four main stages defined by [7] in the innovation-decision process as follows: (i) knowledge, (ii) persuasion, (iii) decision, and (iv) implementation. The TKR farmer households accumulate knowledge by learning from the existence of a GI certification system and gain some information and understanding of how the GI certification system functions. The persuasion stage is reached when the households form a favorable or unfavorable attitude towards the GI certification. The decision occurs when the households engage in activities that lead to a choice of adopting or rejecting the GI certification. They decide to adopt when registering their name with the national CB. Finally, the implementation is reached when the GI certification is used, i.e. they follow the TKR production manuals received from the GI CB. This manual is released to control quality of the TKR production at the initial stage of the TKR value chain.

Adoption in this classical adoption diffusion model is regarded as being inevitable since the model assumes that the innovations are profitable and that the

farmers behave rational in economic terms as in [8]. According to [8], in the case GI certification which is considered as commercial innovation, a lack of adoption can be solely explained by the lag time in the communication between the extension agency and an individual farmer household or the lag time in how long the individual farmer takes to try-out the GI certification. In addition, the opportunity to adopt new technologies or innovations might also sometimes be limited by infrastructure such as access to inputs, to markets as in [8] and to information as e.g. in [9].

## III. ANALYTICAL FRAMEWORK AND LOGIT MODEL

Even though economic theory has been criticized to provide limited guidance on the selection of variables to explain the behavior of the farmers in the adoption decision as in [10], the variables selection for this study is however mainly based on the helpful guidance of the theoretical model of the innovation-decision process as in [7] along with the research literature accumulated about variables related to innovativeness as e.g. in [5] and [8]. Moreover, an econometric model of a logistic regression (logit model) is used to help selecting key variables which could best explain the behavior of the farmer households to adopt GI certification. A logit model is a probability model which is a regression of the conditional expectation of Y on X. It allows one to examine how a change in any explanatory variable changes all the outcome probabilities as in [11]. The model in terms of Y is written in (1) as follows:

$$Y_i = \alpha + \sum_{k=1}^{K} \beta_k X_k + \varepsilon \qquad (1)$$

where Yi is a dichotomous dependent variable; and Yi=1 when a household adopted GI certification and Yi=0 otherwise. Xk is a vector of independent variables determining the probability of adoption. The parameter α is the unknown constant term and βk are regression coefficients of k explanatory variables to be estimated and ε is the error term. The key is therefore to find β that produces the logits and the conditional mean of Y given X values that have the greatest likelihood of producing the observed data as in [12].

The GI issue involves three different levels, namely (i) micro level: the individual farmer household; (ii) meso or community level: this is when factors such as bargaining power, communication behavior indicated by a variable participation and social status indicated e.g. by income play a role; and finally (iii) macro level: this level involves the institutional aspects such as information provided by the government and transaction costs (search and monitoring costs). Accordingly, this study classifies factors influencing the adoption decision into three main categories with the first two being summarized in [7]: (i) household and farm characteristics, (ii) socioeconomic factors, and (iii) institutional factors. All variables included in the model are described in Table I.

**Table I. Classification and Description of Variables Used in the Model**

| Different level involved in the GI issue | Variables in each category | Description | Values/measure |
|---|---|---|---|
| Micro level | Household and farm characteristics | | |
| | Gender ($X_1$) | Sex of household head | 1= male; 0= female |
| | Education ($X_2$) | Schooling of household head | years |
| | Land size ($X_3$) | Total land size for agricultural use | Rai |
| Meso level | Socioeconomic factors | | |
| | Member of cooperative ($X_4$) | Household is a member of the cooperative | 1= yes; 0= no |
| | Participation ($X_5$) | Household participated in meetings organized in the village | 1= yes; 0= no |
| | Bargaining power ($X_6$) | Household could bargain the price | 1= yes; 0= no |
| | Income ($X_7$) | Total annual income | Baht |
| Macro level | Institutional factors | | |
| | Information ($X_8$) | Access to information | 1= yes; 0= no |
| | Time to markets ($X_9$) | Time to the nearest markets for rice sale | hours |
| | Transportation costs ($X_{10}$) | Transportation costs per unit sold | Baht per ton |
| | Monitoring costs ($X_{11}$) | Household faces information asymmetry in the quality control | 1= yes; 0= no |

Source: own compilation

Key categorical factors shaping the adoption behavior of the decision-making unit defined in [7] are socioeconomic characteristics, personality variables and communication behavior. They play a role in the initial stage of the innovation-decision process when the decision-making unit seeks information about the new innovation.

## IV. DATA COLLECTION

A case study was conducted in Rasrisalai District and Kasetwisai District in the TKRH area in Northeastern Thailand. Using the disproportionate stratified random sampling technique, the total population for each district was then stratified into two main groups: GI group and non GI group. The data were collected through a formal survey from March to June 2009. The total sample size for data analysis is 370 households. Sampling weights are applied to the data during the data analysis to correct for unequal probabilities of selection due to stratification and finally to obtain unbiased and consistent estimates as in [13].

## V. RESULTS AND DISCUSSION

### A. Descriptive Findings

Table II presents the descriptive and comparative statistics of variables included in the model. Comparing both groups, the results show that the GI group has a higher number of male farmers with almost 60 percent compared to that of the non GI group with only 38 percent. The average education level of household heads in our sample is quite low with only around six years of schooling and 70 percent of them having at most primary education. The adjusted Wald test indicates a significant difference in the education level of the household head between both groups at 5 percent level.

**TABLE II. DESCRIPTIVE AND COMPARATIVE STATISTICS OF FACTORS AFFECTING GI CERTIFICATION ADOPTION**

| Variable | Mean (Std. dev.) or % for Total Sample (N=370) | Mean (Std. dev.) or % for GI Group (n=142) | Mean (Std. dev.) or % for non-GI Group (n=228) | Test of significance |
|---|---|---|---|---|
| Household and farm characteristics | | | | |
| Gender (1=male) in % | 38.54 | 59.87 | 37.74 | 10.41** |
| Education (years) | 5.27 (2.81) | 6.21 (11.03) | 5.23 (2.22) | 5.42** |
| Land size (Rai) | 38.93 (29.98) | 43.93 (110.86) | 38.75 (23.90) | 1.23 |
| Socioeconomic factors | | | | |
| Member of cooperative (1=yes) in % | 67.88 | 81.09 | 67.38 | 5.27** |
| Participation (1=yes) in % | 79.62 | 88.31 | 79.3 | 2.96* |
| Bargaining Power (1=yes) in % | 0.00046 | 0.6 | 0.03 | 14.48*** |
| Income | 388.20 (374.04) | 393.80 (1738.53) | 387.99 (293.07) | 0.01 |
| Institutional factors | | | | |
| Information (1=yes) in % | 40.97 | 66.48 | 40 | 15.17*** |
| Time to markets (hours) | 0.86 (0.65) | 0.97 (2.69) | 0.85 (0.51) | 1.61 |
| Transportation costs (Baht per ton) | 233.29 (430.97) | 309.13 (2011.67) | 230.42 (337.35) | 1.08 |
| Monitoring Costs (1=yes) in % | 8.3 | 10.35 | 8.22 | 0.26 |

Source: own compilation

The participation in cooperatives is relatively widespread among the sampled farmers. Comparing between groups, we find that more GI households (approx. 80 percent) than non GI households (approx. 67 percent) are member of the cooperative. The Pearson chi-square test confirms the significant difference at the 5 percent level. Regarding other social factors, it can be seen that a high proportion (almost 80 percent) of the households participate in meetings organized in the village. The bargaining power has been found to be negligible for the sampled farmers.

With respect to information, we find a significant difference between both groups. More GI farmer households (66 percent) received information than non GI farmers (40 percent). Regarding the negotiation costs, we find that the rice farmers face the problem of long distance to rice markets. They spend on average close to 1 hour to reach the markets in order to sell their rice. With respect to transportation costs, the farmer pays on average 233 Baht per ton. While GI farmers pay around 309 Baht per ton, the non GI farmers pay only 230 Baht per ton. These higher costs

for the GI farmers are due to the fact that they face longer distances because many of them (42 percent) sell rice to the certified GI buying points located in the district center as shown in Table III. Many non GI households, however, sell rice to other buyers, as shown in Table III, such as government (20 percent), middlemen (25 percent) or small traders (8 percent) who usually come directly to the rice field or to the village to take the rice. A slightly higher percentage of the GI farmers than the non GI farmers sells their rice to private rice mills which are known for their strict rice quality controls, as opposed to other rice buyers such as middlemen, retailers in the district center or small traders. Around 8 percent of the farmer households reported the existence of information asymmetry in the quality control when selling their rice to private rice mills.

**TABLE III. RICE BUYERS IN THE TKRH AREA**

| **Rice buyers** | **GI (in %)[a]** | **Non GI (in %)[a]** |
|---|---|---|
| Local markets (Fresh) | 0 | 2.29 |
| Agricultural cooperatives | 12.03 | 13.4 |
| Middlemen | 17.72 | 23.53 |
| Traders | 5.06 | 5.88 |
| Private rice mills | 10.13 | 7.19 |
| Government | 12.03 | 20.26 |
| Retailers | 0.63 | 0 |
| Certified GI buyers | 42.41 | 27.45 |

[a] The numbers do not add up to 100 because of several choices.

Source: own calculation

## A. Logistic Regression Results

A series of logistic regression diagnostics were applied for detecting interaction effects, correlations, multicollinearity and other specification errors. Moreover, a two-stage Hausman specification test as described in [14] was used to determine whether any of the adoption variables was endogenous in the model. The test failed to reject exogeneity at $P < 0.05$. Finally, a goodness-of-fit test of [15] showed no lack of fit of the selected logistic regression model using survey sample data.

The logistic regression results presented in Table IV show that four factors gender, member of cooperative, information, and transportation costs have significant impacts on the decision of Thai Jasmine rice households to adopt GI certification.

**TABLE IV. PARAMETER ESTIMATES AND ODDS RATIO**

| Variable[a] | Coef. | Linear. Std. Err. | t | P>t | [95% Conf. Interval] | | Odds Ratio |
|---|---|---|---|---|---|---|---|
| Intercept | -6.5547 | 0.758 | -8.64 | 0.000 | -8.05 | -5.06 | |
| Gender | 1.0936 | 0.384 | 2.85 | 0.005[c] | 0.34 | 1.85 | 2.99 |
| Education | 0.0694 | 0. 057 | 1.23 | 0.221 | -0.04 | 0.18 | 1.07 |
| Land size | 0.0051 | 0.005 | 1.01 | 0.314 | -0.01 | 0.02 | 1.01 |
| Member of coop. | 0.9577 | 0.437 | 2.19 | 0.029[c] | 0.01 | 1.82 | 2.61 |
| Participation | 0.6908 | 0.4712 | 1.46 | 0.144 | -0.24 | 1.62 | 2.00 |
| Bargaining power | 1.7938 | 1.557 | 1.15 | 0.250 | -1.27 | 4.86 | 6.01 |
| Income | -0.0000 | -0.000 | -0.73 | 0.469 | -0.00 | -0.00 | 1.00 |
| Information | 1.3336 | 0.351 | 3.80 | 0.000[b] | 0.64 | 2.02 | 3.79 |
| Time | 0.1147 | 0.238 | 0.48 | 0.629 | -0.35 | 0.58 | 1.12 |
| Transportation costs | 0.0006 | 0.000 | 1.67 | 0.095[d] | 0.00 | 0.00 | 1.00 |
| Monitoring costs | 0.4030 | 0.559 | 0.72 | 0.471 | -0.70 | 1.50 | 1.50 |

[a]Dependent variable: certified GI and non-certified GI farmer households; n=370
[b]Significant at 1% level; [c]5%; [d]10%

| | |
|---|---|
| F-adjusted mean residual test to test a goodness-of-fit | F (11,370) = 0.676; Prob > F = 0.731 |
| Area under the ROC curve | 0.7469 |

Source: own calculation

At the significance level of 5 percent, gender has a positive influence on GI adoption which was previously expected. The rate of adoption was found to be increased by more than 100 percent if the household heads are male farmers. The GI adoption rate was found to be increased by approximately 96 percent when farmer households are members of the cooperative. The odds ratio of 2.61 for member of cooperative confirms the estimated result that being member of a cooperative makes the GI certification adoption 2.61 times more probable. Beside the role of

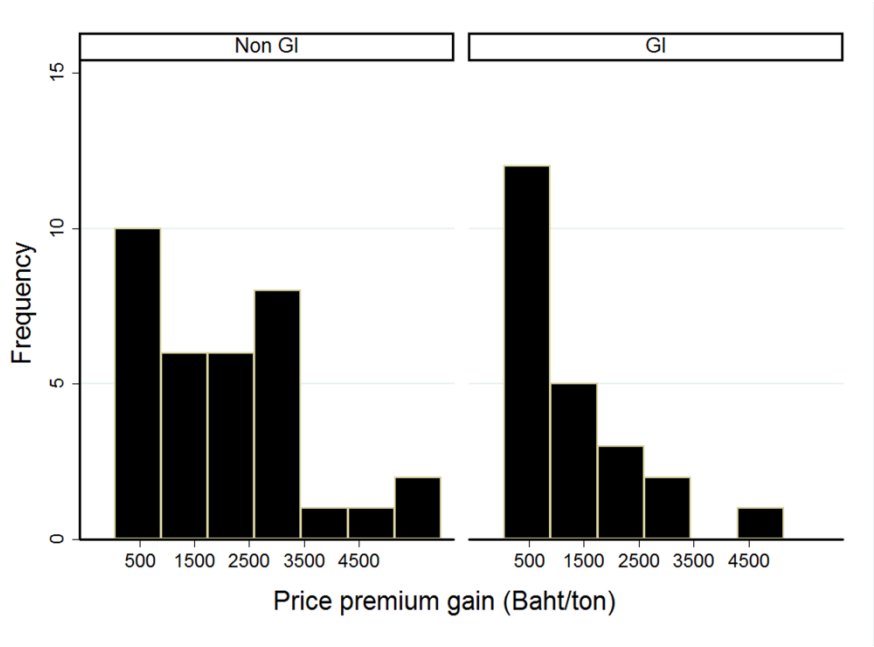
information dissemination as well as knowledge and skills transfer, the cooperatives in the TKRH area are depicted by the fact that they also help facilitating the farmer households in case of the membership application for a GI club.

The coefficient for information is statistically significant at the 1 percent level and is the largest positive and significant coefficient. This implies that GI certification adoption is increased by 133 percent if the farmer households have access to information about GI certification. The odds ratio of 3.79 for information reinforces this finding which implies that information makes the GI adoption about three times more probable. Information transfer is regarded in the literature to be the primary factor that influences the adoption rates as mentioned in [16]. Similarly, extension services by the government promote innovations or technologies by providing necessary knowledge and information to enable the farmer households to apply the new idea as in [17]. Reference [18] stresses the importance of accurate information as a basis for farmers through contacts with such extension agencies for a cost-benefit analysis of such innovations. Limited access to information due to a lack of well-functioning extension services hence negatively influences the decision making of farmers to adopt a new innovation as stated in [9], since the farmers may be extremely uncertain about its profitability.

Another factor that may have a significant impact on the adoption decision is transportation costs. In this study, its extent depends on the distance between the residence or the rice field and the markets. The road condition also matters as e.g. in [19]. The rice markets are sometimes located in the district center, while the households are widely dispersed in the huge TKRH area. Moreover, the road conditions in the area are mostly poor so that the households often have to make detours to reach the markets. It was therefore expected that the higher the transportation costs per unit the less willing the farmer households are to adopt GI certification. The coefficient of 0.0006 for transportation costs is statistically significant at the 10 percent level. This result is positive and contrary to the a priori expectation. It implies that the higher the transportation costs the higher the likelihood of a farmer household's adoption of GI certification. The coefficient is very low but nevertheless implies an existing direct relationship between transportation costs and GI adoption. A plausible explanation for the positive

correlation relates to the location of GI markets. After the rice harvesting period, the households in the TKRH area have choices to sell rice to many different buyers such as retailers in domestic markets, agricultural cooperatives, middlemen, traders, private rice mills, government and/or certified GI rice buyers as shown in Table III. Due to quality control in the value chain of GI products, GI rice is given a GI price premium if and only if rice meets the given quality and is sold to certified GI buyers. Accessing GI rice markets for the GI households is therefore associated with limited choices when they want to get the GI price premium. As confirmed by Table III, more than 40 percent of the GI households sell rice to the certified GI buyers. As previously mentioned, these specialty markets are normally located in the district center which is quite far away from their residence. Thus, higher transportation costs are necessarily associated with the GI certification adoption. Nevertheless, the GI farmers were promised to get a price premium of 500 Baht per ton when selling their rice to the certified GI buying points. This premium should serve as a financial incentive for the farmers to enter the GI certification system and to sell the most part of their rice to the certified GI buying points. It should also take the function to compensate for the higher costs relating to the rice transportation to the district center. Sometimes the price premium is also paid by other rice buyers since jasmine rice from the TKRH area is in demand due to its high quality. Fig. 2 gives this illustration and confirms the results in Table III that most of the GI farmers got the price premium amount as have been promised of 500 Baht per ton. Fig. 2 also shows that even the ones who were not certified as GI farmers also got the price premium by the rice sale. These non-GI farmers are mostly the ones who are in the process of practicing the organic cultivation.

**Figure 2. Price premium gain of jasmine rice households in the TKRH**




Source: own presentation

Table V shows some more detailed figures related to the price premium gain by the rice sale of farmer households. Around 18 per cent (=25/142) of GI farmers got the GI price premium from the rice sale to the certified GI rice buyers and an average GI price premium for the GI group amounts to around 222 Baht per ton. Compared to the average total transportation costs of 309 Baht per ton for the GI group as mentioned before, it seems that this average GI premium amount is not enough to compensate for the higher transportation costs at the first look. However, considering the average total premium gain of the price premium gained group (GI) (N=25), we find a considerable higher amount of the average price premium, says around 1,500 Baht per ton. And it is even higher than the average total transportation costs per ton of the premium gain groups (N=25 for GI group and N=40 for non GI group). So that we can conclude that the higher transportation costs were compensated by a received price premium for the farmer households who got the price premium in practice. Other GI farmers who also sold their rice to the certified GI buyers but did not get the GI price premium should thus improve their rice quality in order to meet the given quality of the GI buyers.

**TABLE V. AVERAGE PRICE PREMIUM GAIN BY THE RICE SALE OF JASMINE RICE HOUSEHOLDS IN THE TKRH AREA**

| Household Group | Average Total GI Price Premium Gain by Rice Sale to Certified GI Rice Buyers[a] (Baht/ton) | Average Total Price Premium Gain by Rice Sale to All Rice Buyers[a] (Baht/ton) | Average Total Price Premium Gain of Price Premium Gained Groups[b] (Baht/ton) | Average Transportation Costs of Price Premium Gained Groups[b,c] (Baht/ton) |
|---|---|---|---|---|
| [I] GI | 221.90 | 356.17 | 1,515.90 | 174.21 |
| [II] Non GI | 16.2 | 17.21 | 2,082.98 | 191.99 |

[a] N=142 for [I] and N=228 for [II]; [b] N for these two columns are the total numbers of households who gained the price premium due to the rice sale where N=25 for [I] and N=40 for [II].
[c] N=25 for [I] by the rice sale to certified GI rice buyers located in the district center and N=40 for [II].

Source: own calculation

## B. Marginal effects

In terms of marginal effects, Table VI shows that the model predicts higher and more significant marginal effects for four factors, namely information, membership in a cooperative, participation and gender. All other significant variables including transportation costs and participation also have positive but extremely small effects on the probability of adoption for the TKR farmer households. The marginal effects thus indicate the same trend as the parameter estimates in Table IV.

**TABLE VI. MARGINAL EFFECTS**

| Variable | dy/dx | Std. Err. | z | P>z | X |
|---|---|---|---|---|---|
| Gender[a] | 0.0296 | 0.0112 | 2.63 | 0.008 | 0.39 |
| Education | 0.0016 | 0.0013 | 1.24 | 0.216 | 5.27 |
| Land size | 0.0001 | 0.0001 | 1.01 | 0.312 | 36.88 |
| Member of cooperative[a] | 0.0194 | 0.0074 | 2.63 | 0.008 | 0.68 |
| Participation[a] | 0.0133 | 0.0076 | 1.76 | 0.078 | 0.80 |
| Bargaining power[a] | 0.1032 | 0.1734 | 0.60 | 0.552 | 0.00 |
| Income | -0.0000 | 0.0000 | -0.74 | 0.460 | 388200 |
| Information[a] | 0.0366 | 0.0102 | 3.59 | 0.000 | 0.41 |
| Time | 0.0026 | 0.0055 | 0.48 | 0.628 | 0.86 |
| Transportation costs | 0.0000 | 0.0000 | 1.69 | 0.090 | 233.29 |
| Monitoring costs[a] | 0. 0110 | 0.0176 | 0.62 | 0.534 | 0.08 |

[a] dy/dx is for discrete change of dummy variable from 0 to 1. The marginal effect is the marginal change in probability (after svy: logit) evaluated at the sample means.

Source: own calculation

## VI. CONCLUSION AND POLICY RECOMMENDATION

This article investigated the determinants which are likely to predict the behavior of farmer households in adopting GI certification for the TKR rice from the Northeast of Thailand. A major finding of this study stresses the importance of institutional and social factors, i.e. access to information and membership of a cooperative which mostly determine the probability of GI certification adoption by Thai Jasmine rice households in the TKRH area. This finding is in line with previous adoption studies confirming the importance of the access to information and the status of being a member in organizations such as cooperatives for the farmers' adoption decision. How a GI certification system is successfully introduced and promoted in specific GI regions depends particularly on the information provided to farmer households and finally on the information sources. Organizations such as cooperatives serve as a crucial intermediary between a primary source of information about GI, i.e. government and farmers. Strengthening its role may therefore promote the effectiveness of information dissemination.

In this study, GI farmer households do not sell all their rice to certified GI buyers, although a GI price premium would be paid once their rice quality meets the quality criteria. Instead, they also sell part of their rice to other rice buyers such as

agricultural cooperatives, government or middlemen who sometimes also give them the price premium for their rice. This selling behavior could be explained by the fact that selling Jasmine rice to the certified GI buying points results in additional and high transportation costs since the certified buying points are located in the district center which is quite far away from their residence or their rice field. In contrast, many non GI farmers sell their rice to middlemen or small traders who usually come to the rice fields or to the village. Furthermore, it is because the price premium was also paid by other rice buyers. It therefore seems that a GI system faces the problem of not collecting enough of the GI rice to keep the certification system going. Too little supply of the GI rice for business operators of the GI rice value chain would cause high marketing costs and it could result in the business operators losing interests to continue participating in the GI certification system. The price premium seems therefore essential in compensating the transportation costs which are associated with the GI certification adoption and more importantly in guaranteeing the net benefit of being GI farmers. It is also expected to provide an incentive to rice farmers to adopt GI certification leading to higher production volumes, thus solving the problem of too little GI rice supply. A restructuring of the value chains with better access to points of sale for certified GI rice farmer households should be provided in order to increase the farmers' incentives to adopt GI certification. Future research is still needed to analyze the welfare impact of GI certification for the households in the TKRH area and to conduct a cost benefit analysis of such certification. To what extent the access of GI farmer households to their points of sale can be improved would be additionally best revealed by a value chain analysis.

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# Geographical Indication for Jasmine Rice: Applying a Logit Model to Predict Adoption Behavior of Thai Farm Households[1]

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**Abstract**

Geographical indications (GIs) have gained increasing interest since their protection has been ensured multilaterally under the TRIPS Agreement of the World Trade Organization (WTO). Thung Kula Rong-Hai Thai Hom Mali Rice (TKR) is the first officially registered GI Jasmine rice in Thailand. This paper aims at identifying factors that predict the behavior of Thai Jasmine rice farm households in adopting GI certification. Primary data of 370 Thai Jasmine rice farm households were collected through a formal survey in two districts of the Thung Kula Rong-Hai (TKRH) area. The results of the logistic regression analysis indicate that social and human capital variables significantly influence the decision of Thai Jasmine rice farm households to adopt GI certification.

**Keywords**: Geographical Indication, Certification, Logit Model, Jasmine rice, Thailand

**JEL:** O13 O34 Q18

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## 1. Introduction

As one kind of intellectual property right, geographical indications (GIs) have gained increasing interest since their protection has been ensured multilaterally under the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement under the auspices of the World Trade Organization (WTO). In order to have GIs being protected by the TRIPS rules, WTO Member countries are required to provide a legal and institutional framework of GI protection in their own national borders (Grote, 2009). In the fight against biopiracy and given the EU's attempt in seeking alliance for better GI protection around the globe, the Thai government has released its first specific Act on GI protection in 2003, known as "Act on Geographical Indications Protection B.E. 2546 (2003)". As of January 2012, totally 38 products from different regions in Thailand were registered as GIs.

Under the protection of the Act, Thung Kula Rong-Hai Thai Hom Mali Rice (TKR) is the first registered GI Thai Jasmine rice. It is traditionally being produced in the Thung Kula Rong-Hai (TKRH) region in the Northeast of Thailand, and GI certification is expected to promote its export which currently mainly goes to the EU. Stakeholders involved in the GI production line can apply for membership in a GI club which allows them to use a label on their certified product in order to reap benefits from the GI protection. In 2008, there were totally 13 TKR processors and exporters and 1,131 TKR farm households being GI certified. Thus, the proportion of the GI certified farm households is still very small accounting only for around 1.3 percent of the total TKRH farm households. The question arises why not more farmers adopt GI certification, especially against the background of price premia being generally paid to GI products (Suh and MacPherson, 2007; Teuber, 2007). There should be existing factors explaining the behavior of the farmers in adopting or rejecting such new idea. Thus, it is important to understand the role of these determining factors to ensure the design of a successful introduction of new projects or policies such as GIs for rural development.

Against this background, the objectives of this paper are to: (i) identify factors that are likely to predict the behavior of Thai Jasmine rice farm households in the TKRH area in adopting GI certification; and (ii) to estimate the marginal effects of key

factors on the probability of adoption. A logit model will be used to analyze the primary survey data collected from individual farm households in Northeastern Thailand. The rest of the paper is divided into five sections: (i) the literature review, (ii) the conceptual framework and model specification, (iii) the survey site and data collection, (iv) empirical results, and (v) the conclusion.

## 2. Literature review

A thorough and comprehensive survey of the literature on the economics of geographical indications has been provided by Bramley et al. (2009) and Teuber et al. (2011). Empirical evidence from Europe related to the socio-economics of GIs has been reviewed by Rangnekar (2004). There are also quite a few policy papers discussing GIs under TRIPS calling for enhanced protection (e.g. Addor and Grazioli, 2002; Carboli, 2006). However, only very few quantitative papers on GIs have been published so far. The following subsections present the theoretical and empirical literature reflecting some of the specific economic aspects of GIs being of relevance to this paper. These include the role of information, reputation, quality and price along the value chain as well as welfare implications. The GI adoption by farm households is for example expected to depend on quality and price premia paid by final consumers and being transferred to the producers along the value chain.

### 2.1 Asymmetric information, reputation and governance of value chains

Unlike information on prices, the information on quality is difficult to obtain (Nelson, 1970). In the market of high-quality goods, consumers often face the problem of asymmetric information when quality cannot be readily ascertained prior to purchasing. The experience from repeated purchases does not help the consumer to discern the product quality (Marette et al., 1999). In order to avoid market failure due to adverse selection, Akerlof (1970) stressed the importance of information. He found that there will be no incentives for high quality producers to remain in the market without any means of differentiating goods, because all goods tend to be sold at the same price and quality. Stigler (1961) and Schmalensee (1978) pointed out that reputation is very important in signaling a certain level of quality. Reputation which is conveyed by a distinctive sign reduces search costs for the consumers, and the savings in search costs allow reputable goods to receive a premium on the price.

Shapiro (1983) stressed that the quality premia resulting from reputation serve compensating the producers for their investments in the reputation. Some empirical studies e.g. of Cañada and Vázquez (2005) found that quality labels such as the GI label (i.e. Protected Designations of Origin (PDO) labels) can become useful means of producers to signal reputation linked to the distinctive quality of their products to the consumers.

Another issue being crucially related to quality signals is their credibility. Raynaud et al. (2002) stressed the importance of relationships between quality signal owners and suppliers in the value chain of many agricultural products. They hypothesized that there must be an efficient alignment between quality characteristics and governance of the value chain in order to assure the credibility of a quality signal. The results of a structural analysis of 42 case studies in three different agrifood sectors conducted in seven European countries showed that when an agent creates a quality signal whose value can be influenced by several other agents in the chains, he will design the governance of transactions in order to assure product quality and improve the credibility of his signal. Barcala et al. (2009) used the case of fresh meat to analyze the governance aspects of the vertical chain and its impact on product quality. They concluded that the quality of end products largely depends on decisions made by economic agents at various stages of the value chain and concluded that the vertical chain could be more efficiently organized as a GI than in the case of hierarchy in order to promote high-quality products. In addition, Verhaegen and Van Huylenbroeck (2001) in their cost-benefit analysis of farmers' participation in innovative marketing channels for quality food products found that co-operation of the farmers decreases transaction costs. Without investing excessive capital or labor, the farmers are enabled by collective initiatives to enter the pathway of quality-food production.

### 2.2 Consumers' willingness to pay for GIs

Growing attention has been paid to the questions how consumers perceive high-quality products originating from a particular region and whether quality premia exist for these goods, in particular the ones with distinctive signs like GIs. Menapace et al. (2011) analyzed on the Canadian olive oil market the demand for two distinct label

types: country of origin (COO) and GIs. They investigated whether consumers value the informational content of a set of geographical origin labels with different levels of geographical differentiation. They found that consumers' willingness to pay varies with the oil's COO and is greater for GIs than for non-GIs. Van Ittersum (2007) investigated consumers' image of regional certification labels by proposing a structural equation model that relates this image to consumers' willingness to buy and pay for protected regional products. Results suggested that consumers' image of these labels consists of a quality warranty dimension and an economic support dimension, which positively relate to consumers' willingness to pay for the protected regional product. Teuber (2009) investigated the case of GI for coffee from the region Marcala, i.e. Café de Marcala, using a hedonic price analysis. Her results indicate that coffee from this region has on average higher quality than coffee grown in other Honduran regions and achieves on average higher prices. However, whether this GI coffee can also achieve a higher price due to an already established reputation could not be confirmed.

### 2.3 Welfare analysis

Some theoretical studies considered the welfare impact of labeling policies of agricultural products with specific characteristics. Zago and Pick (2004) e.g. found that consumers and producers of high-quality goods are better off, while producers of low-quality goods are worse off. With high administrative regulation costs and low quality differences, the total welfare impact of the labeling policies can be negative. Findings also show that when producers of high-quality goods can exercise market power either in the form of land restrictions or joint price determination, the labeling policies could be more easily accepted by producers, but the impact on consumers would be negative. Not only theoretical studies focused on the analysis of welfare given the asymmetric information problem, as discussed in Section 2.1, also many empirical studies explored the implications of GI certification for consumer and producer welfare. Lence et al. (2007) found that legal systems that limit the producer organizations' market power can lead to reduced social welfare and result in large technological distortions. In addition, increased fixed costs of development and marketing costs lead to an increased need for supply control to cover the fixed costs associated with the introduction of differentiated products. Contrary to intuition, they

also highlighted that stronger IPR protection for producer organizations may enhance welfare even after a differentiated product has been developed. Moschini et al. (2008) found a supportive role of GI certification on a competitive provision of quality leading to clear welfare gains for consumers, though it falls short of delivering the first best outcome. Producers may also reap some benefits if production of high-quality products draws on scarce factors they own. Anders et al. (2009) investigated the extent to which a phased reduction of initial governmental support levels impacts farmers' price premia and welfare by using the equilibrium displacement model for markets segmented by regional-origin labeling with quality. They found that the price impacts on high-quality and low-quality segments crucially depend on substantive relationships between the markets and the advertising elasticities. Welfare implications for producers depend on costs of participation including quality control and on the co-financing mechanism between the government and producers.

Langinier and Babcock (2008) adopted the interpretation of GIs as "club goods" (nonrival, congestible, and excludable) and modeled a group of producers as a club and analyzed the certification decision of the club and its welfare implication. They found that for intermediate values of certification costs, the industry and the club of given size have divergent incentives, and there may be overprovision of certification. A conflict between the efficient outcome (that maximizes the aggregate profit of the firms) and the equilibrium may exist, which may be socially undesirable. However, in the absence of a barrier to entry, it is less likely that the club will emerge. Benavente (2010) proposed a model on the welfare effects on the retrieve or so-called "claw-back" of GIs; i.e. the protection in a country (Home) of a GI of another country (Foreign). She found that although there is a loss in global welfare when fewer varieties are available in a market, results suggest that industrialized Home countries with sophisticated consumers tend to lose less from protecting Foreign GIs (e.g. Basmati rice) than developing Home countries, where the opposite is true. Since benefits and rents may be available for developed countries, for the developing countries, however, these benefits are not sustainable given the fact that they have few such claw-back GIs with strong consumer attachments based on geographic association. Scarce resources should thus be better utilized on other development

strategies being more likely to yield sustainable development as discussed by Kerr (2006).

Not only welfare impacts of GI certification have been studied, but also the impacts of GI certification on rural development. This strand of empirical literature has been taken up e.g. by Tregear et al. (2007) or Callois (2004) but will not be further reviewed here.

### 2.4 GI certification adoption

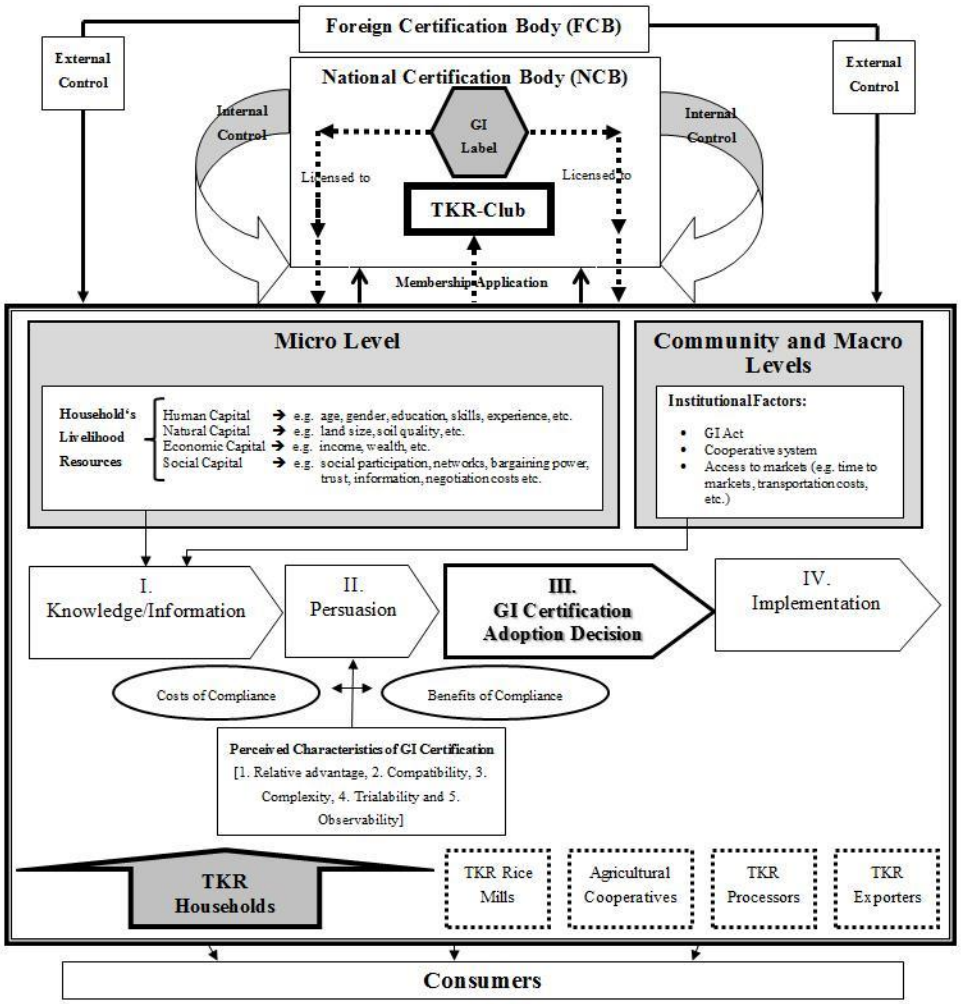
Studies on GI certification adoption are still missing, however, results of previous adoption studies can be a useful guidance to help selecting appropriate factors determining the GI certification adoption. Adoption studies generally focus on an innovation or a technology, mostly agricultural modern technologies such as high yielding varieties (HYVs) and the inputs associated with them (e.g. fertilizer, irrigation, and pesticides) as well as corresponding land practices. A number of constraints have been identified impeding the rapid innovation adoption like the lack of credit, limited access to information, aversion to risk, inadequate farm size, inadequate incentives associated with farm tenure arrangements, insufficient laborers, absence of farm equipment, insufficient supply of complementary inputs (e.g. seed, chemicals, and water), inappropriate transportation, or poor infrastructure (Feder et al., 1985). However, the factors affecting farmers' adoption behavior may differ across techniques, across socioeconomic groups and over time. In addition, adoption studies may be based on different definitions of adoption as stated by Feder et al. (1985). Thus, generalization is to be avoided.

Therefore, it is important to concentrate on adoption studies being closely related to GI certification. There are in fact a number of empirical studies which focused on the adoption of certification schemes in certain agricultural sectors. Carambas (2007) studied the adoption of certification schemes e.g. for organic rice in Thailand, and Dörr (2009) looked at the fruits sector in Brazil. Factors such as certification costs and trust have been found to play an important role in determining the adoption of certification by farm households in these two cases. Asfaw (2008) investigated the adoption of the GlobalGAP certification for vegetables in Kenya. He found that education, household wealth, access to information technologies and group

membership have the positive role on the decision of the small-scale vegetables producers in adopting the GlobalGAP certification. In addition, Kersting and Wollni (2011) studied the GlobalGAP certification adoption behavior of small-scale fruit and vegetable farmers in Thailand and found that age, availability of family labor, education, household wealth, farm size, intensity of irrigation use, support by exporters and farmer trainings have a significant influence on the farmer adoption decision.

The literature review highlights some major issues being also of relevance to the GI certification process. Some of these relevant factors have been incorporated in Figure 1 which presents the legal and institutional process for GI registration and certification in Thailand.

**Figure** 1**: The legal and institutional process for GI registration**




Source: own presentation

How a GI certification is adopted by a decision-making unit is conceptually informed by Rogers's (1962) theory of diffusion of innovation. According to the theory, an innovation is an "idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 2003, p.12). GI certification is considered as an innovation since it is new to all parties in the GI region. An organizational innovation resulting from such systems is seen as a key part in disseminating knowledge and innovation on the ground and in relating quality policy to the entire value chain (Cañada and Vázquez, 2005). Four main stages in the innovation-decision process defined by Rogers (2003) are related to this study: (1) knowledge, (2) persuasion, (3) decision, and (4) implementation. In the context of GI certification adoption of TKR farm households, knowledge occurs when the farm households learn from the existence of the GI certification and gain some information and understanding of how it functions. The second stage is called persuasion. This is when the farm households form a favorable or unfavorable attitude towards the GI certification. At the third stage of the innovation-decision process is the decision which occurs when the farm households engage in activities that lead to a choice of adopting or rejecting the GI certification. The farm households decide then to apply for membership in a GI club, the TKR club, by registering their names with the GI Certification Body (CB) (Figure 1). The final step of an innovation-decision process is implementation. The use of the innovation by the farm households in this context means that they follow the manuals for the TKR production received from the GI CB. This production manual is released in order to control quality of the TKR production at the initial stage of the TKR value chain.

GI certification adoption depends on the available livelihood resources or different types of capital of a farm household. These include i.e. natural, economic or financial, human and social capital (Scoones, 1998). It is hypothesized in this study that the farm households' decision to adopt or reject a GI certification is influenced by a wide range of factors categorized into two domains as shown in Figure 1. The first domain includes four types of household's livelihood resources: (i) *human capital variables* e.g. age, gender, education, and experience; (ii) *natural capital variables* such as land size; (iii) *economic capital* indicated by such variables as income or wealth; and (iv) *social capital variables* including social participation,

networks, bargaining power, being member of cooperatives, trust, information and negotiation costs. The second domain includes institutional or access-related variables like time to markets and transportation costs. A number of hypotheses can be developed with respect to the importance of these factors for the adoption of GI certification for Jasmine rice by Thai farm households.

## 3. Conceptual framework and model specification

When trying to answer the question which factors influence the decision of the farm household to adopt GI certification, decision theory tells us what the farm household may rationally prefer between choices (to adopt or to reject) (Dreier, 1996). It is presupposed that rational farm households optimize their objective function such as expected utility (Dreier, 1996; Kalyebara, 1999) or net present value of benefits from adopting the innovation (Dörr, 2009). However, economic theories have been criticized for providing only limited guidance on the selection of variables to explain the behavior of farmers in the adoption decision (Gyawali et al., 2003; Kalyebara, 1999).

Therefore, the linear random utility model is applied in this study. It provides an alternative interpretation on the individual's utility of two choices by considering the observed choice between the two revealing which one provides the greater observable utility (Green, 2003). Due to the fact that the farm household's perception of utility or profit, its level of risk aversion and the weights it puts on profitability, risk and subsistence requirements are difficult to estimate, the probability of adoption is predicted as a function of proxy factors that are likely to predict the expected values of the farm household's objective function (Kalyebara, 1999). The variables selection in this study is guided by the literature review in general, and by the model of the innovation-decision process of Rogers (1962) in particular. Furthermore, we use an econometric model of a logistic regression (logit model) to help selecting key variables which could best explain the behavior of farm households to adopt GI certification. A logit model is a probability model regressing a set of independent variables (X), which can be categorical or continuous, on the conditional expectation of the binary dependent variable (Y) (Liao, 1994). The logit model uses a logistic cumulative distribution function to estimate the linear determinants of the logit ($L_i$) or the logged odds and has the following form:

$$L_i(Y) = \ln\left[\frac{P_i}{1 - P_i}\right] = \beta_0 + \beta_k X \qquad (1)$$

where ($P_i$ /1- $P_i$ ) is the odds expressing the conditional mean or probability of an occurrence of the event relative to the likelihood of a nonoccurrence given X; $\beta_0$ is the unknown constant term or intercept, $\beta_k$ is a vector of regression coefficients to be estimated and X is a set of independent variables determining the probability of the event. The model in terms of Y would then be written as:

$$Y_i = \alpha + \sum_{k=1}^{K} \beta_k X_k + \varepsilon \qquad (2)$$

where $Y_i$ is a binary dependent variable; and $Y_i$ equals 1 when a farm household adopted GI certification and 0 otherwise, $\alpha$ is the unknown constant term and $\beta_k$ are regression coefficients of k independent variables to be estimated and $\varepsilon$ is the error term. The parameter $\alpha$ and $\beta_k$ are typically estimated by the maximum likelihood (ML) method, which is preferred over the weighted least squares approach. The key is to find $\beta$ that produces the logits and the conditional mean of Y given X values that have the greatest likelihood of producing the observed data (Pampel, 2000).

**Empirical model specification**

The logit model of GI certification adoption ($Y_i$) was specified as a function of all independent variables as follows:

$$Y_i = f(X_1, \ldots, X_{11}) + u \qquad (3)$$

with $X_1$ to $X_{11}$ representing the 11 independent variables (Table 1) and u representing the random disturbance. Gender ($X_1$) is a binary variable taking on the value of 1 if the household head is male and 0 if female. Gender is known to affect the decision-making given the fact that males are more dominant, assertive, objective and realistic, while females are more affected by the environment, tend to rely more on information and dedicate more time to the decision process (Lizárraga et al., 2007). However, the expected sign of the effect of gender on the GI adoption is ambiguous. Nkamleu and Manyong (2005) found that a male household head has a highly significant and positive impact on the adoption of agroforestry practices. Similarly, Ouma et al. (2002) used the logit model to analyze the behavior of Kenya's farmers

in adopting improved maize seed and found that gender has a significant relationship with the adoption of improved seeds. However, Doss and Morris (2001), for instance, found no significant difference in rates of modern seed variety adoption between male and female farmers in Ghana. Similarly, Chirwa (2005) stated that there is no significant difference between men and women plot owners with respect to fertilizer adoption. Given the fact that roles and responsibilities of gender are dynamic and respond to changing economic circumstances as discussed by Doss (2001), gender may or may not have an influence on the household's decision-making.

Education ($X_2$) is a continuous variable measured by years of schooling of the household head. It is seen as an important basis for human capital creation and is often used as a proxy to indicate the ability to acquire and process information (e.g. Scoones, 1998; Feder et al., 1985). In general, farmers with higher education tend to possess higher capability to analyze information and knowledge being beneficial to farming operation and necessary to successfully implement a new technology (Uematsu and Mishra, 2010). Better educated or more literate farmers have been found to be earlier adopters of new technologies (Feder et al., 1985; Rogers, 2003). A positive link between education and technology adoption has been also found by Kabede et al. (1990). It is hypothesized that education positively affects the technology adoption.

Land size ($X_3$) represents the total land size owned by the farm household measured in Rai and used for agricultural production. It is hypothesized to also impact positively on innovation and technology adoption. A positive relationship between land size or farm size and innovation adoption has been already reported by some empirical studies (e.g. Saka et al., 2005, Kebede et al., 1990; Rogers, 2003).

The next variables are social capital variables: Member of cooperative ($X_4$) is a binary variable measuring whether the farm household belongs to the cooperatives and takes on the value of 1 for membership and 0 otherwise. Participation ($X_5$) is a binary variable and takes on the value of 1 if the farm household participated in meetings organized in the village and 0 if otherwise. Bargaining power ($X_6$) is also a binary variable which takes on the value of 1 if the farm household could bargain the

price and 0 if otherwise. Information ($X_7$) takes on the value of 1 if the farm household received information about GIs from local governmental bodies and 0 if otherwise. These four social capital variables ($X_4$ to $X_7$) are hypothesized to positively affect the adoption decision based on the following evidence: An important role of being member of associations or cooperatives for technology or innovation adoption has been reported by previous studies e.g. of Nkamleu and Manyong (2005) and Asfaw (2008). Members of organizations such as cooperatives are privileged in terms of receiving managerial as well as financial support. But membership also serves as a source of skills, knowledge and information (Mburu et al., 2007; Nwankwo et al., 2009). Likewise, participation explains the adoption behavior (Rogers, 2003). Early adopters are usually more socially involved than late adopters. With respect to the bargaining power, farmers in developing countries are typically in a weaker position than their buyers. However, participation in the quality assurance system, or the adoption of its certification system could increase their bargaining power. The work of Hobbs (2003), for instance, stated the positive effect of the participation in the GAP systems on increasing individual farmers' bargaining power vis-à-vis larger retailers or processors, especially when these farmers are members of farmers associations or cooperatives. Thus, the bargaining power can be increased not only by the quality but also by the volume of the products (Lemeilleur, 2011). Also the transfer of information via extension services by the government or via training courses which help overcoming the human capital constraints has been found to be crucial for the adoption decision (Longo, 1990; Karki and Bauer, 2004). Farmers with access to information through contacts with extension agencies will have more accurate information to do a cost-benefit analysis of such technologies or innovations (Buyinza and Wambede, 2008; Saka et al., 2005; Doss, 2006). In contrast, limited access to information due to a lack of well-functioning extension services negatively influences the decision making of farmers to adopt a new innovation (Zhao, 2005; Nguyen et al., 2007), since the farmers may be extremely uncertain about its profitability. However, observing the performance and procedures of relatives, neighbors, and friends having experimented with the innovation could be another alternative source for the farm households to access information in case the

extension service has failed to provide them with the necessary information about the new innovation (Feder et al., 1985).

The last social capital variable is trust ($X_8$) which is a binary variable indicating whether the farm households trust rice mills in giving correct information on rice quality in terms of moisture content. The rice moisture metering is done by the buyers, namely the rice mills and big agricultural cooperatives, without the farm households having the opportunity to control the measurement process and result. They have to accept the measurement result which determines the price. A trust-based type of contractual arrangement between buyers and producers has been found to be vital (Dörr, 2009). This factor is hypothesized to have a positive influence on the adoption behavior of the farm households.

The economic capital variable income ($X_9$) is continuous representing the total annual income in Baht gained from all sources, namely (i) farm income from sales of livestock and crops including rice, and (ii) off-farm income from wage employment, from selling other valuable assets, and including pensions and remittances. Rogers (2003) and Asfaw (2008) found a strong relationship between wealth and innovativeness. Assuming to be a proxy for wealth, income is therefore hypothesized to have a positive effect on adoption behavior.

Time to markets ($X_{10}$) and transportation costs ($X_{11}$) are continuous institutional variables. The time to markets measures the distance to the nearest market for buying or selling rice measured in hours, and the transportation costs represents the annual costs of transporting rice to the markets measured in per one unit of rice sold (Baht per ton). Negative relationships with the adoption decision are expected for time to markets and transportation costs. These hypotheses are based on the following evidence: The functioning of the GI system requires not only the availability of information about GIs, as discussed above, but also the functioning of GI markets and finally transparency of the monitoring process. The opportunity to adopt new technologies or innovations might sometimes be impeded by poorly developed institutions and infrastructure. This poor development of markets or institutions is characterized by a limited access to inputs and to markets (Vanclay and Lawrence, 1994), as well as to capital and to information (Yesuf and Köhlin, 2008). It is also

characterized by high transaction costs arising from heavy search, monitoring and transportation costs, which particularly depend on the location of roads, markets and the road condition (Yesuf and Köhlin, 2008) and may affect the response of the potential adopter (Brown and Lentnek, 1973). A summary of all the variables is presented in Table 1.

**Table 1: Definition of variables in the empirical model**

| Variable | Description | Values/measure | Variable type | Expected sign |
|---|---|---|---|---|
| ***Dependent variable:*** | | | | |
| GI certification adoption ($Y_i$) | Farm household adoption decision | 1= yes; 0= no | Binary | |
| ***Independent variables:*** | | | | |
| **Household-level factors:** | | | | |
| Human capital | | | | |
| Gender ($X_1$) | Sex of household head | 1= male; 0= female | Binary | ± |
| Education ($X_2$) | Schooling of household head | years | Continuous | + |
| Natural capital | | | | |
| Land size ($X_3$) | Total land size for agricultural use | Rai[1] | Continuous | + |
| Social capital | | | | |
| Member of cooperative ($X_4$) | Household is a member of the cooperative | 1= yes; 0= no | Binary | + |
| Participation ($X_5$) | Household actively participated in meetings organized in the village | 1= yes; 0= no | Binary | + |
| Bargaining power ($X_6$) | Household could bargain the price | 1= yes; 0= no | Binary | + |
| Information ($X_7$) | Household got information on GIs from local governmental bodies | 1= yes; 0= no | Binary | + |
| Trust ($X_8$) | Household trusted rice mills in giving correct information on rice quality | 1= yes; 0= no | Binary | + |
| Economic capital | | | | |
| Income ($X_9$) | Total annual income | Baht | Continuous | + |
| **Institutional factors:** | | | | |
| Time to markets ($X_{10}$) | Time to the nearest markets for rice sale | hours | Continuous | - |
| Transportation costs ($X_{11}$) | Transportation costs per unit sold | Baht per ton | Continuous | - |

Note: [1]1 Rai = 0.16 ha.

Source: own compilation

## 4. Survey site and data collection

In comparison with the industry sector which accounts for about 40 percent of GDP in 2008, agriculture accounts for only 8.8 percent of the GDP (National Economic and Social Development Board (NESDB), 2008). Nevertheless, agriculture is still an important sector for Thailand's economy. Almost 15 million people are engaged in agriculture. This accounts for around 39 percent of the total labor force (NSO, 2009 and 2010). About 53 percent (or 58 million Rai) of the country's total agricultural

area is used for rice cultivation. Rice is not only a major staple food for domestic consumption, but it is also one of the most important export crops in Thailand, next to sugarcane, palm oil and natural rubber (NESDB, 2008). The country has long held a reputation as the world's leading rice exporter (USDA, undated). It controls more than 30 percent of all milled rice exports and more than 50 percent of all broken rice exports (FAOSTAT, 2009). In 2008, about 10 million tons were exported. In 2009, this amount dropped to 8.6 million tons (Office of Agricultural Economics (OAE), 2008-2009) mainly due to weak demand especially from the main importing and well stocked Asian countries and due to the relatively high price of white rice in Thailand propped up by government intervention as compared to e.g. Vietnam (Bangkok Post, 2009). Overall, also the rice export value has gone up, namely from US$ 1.6 billion (with 44.48 Baht/1 US$) in 2001 to US$ 5 billion (with 34.34 Baht/ 1 US$) in 2009. For the export year 2009, almost 40 percent of the total rice export value stems solely from exporting Thai Jasmine rice, also called Thai Hom Mali rice, which brought foreign currency of around US$ 2 billion to the country (OAE, 2008-2009). From the total cultivated area for rice, almost 70 percent can be found in Northeastern Thailand with an average major rice production of about 10.4 million tons per year and an average second rice production of about 3 million tons per year (OAE, 2010). From the total labour force of around 15 million people being engaged in agriculture, around 7 million farmers or about 2.8 million rural households are from Northeastern Thailand. At the same time, the Northeast is the poorest part of Thailand with the lowest per capita monthly income of 6,272 Baht or around US$ 183 (with 34.34 Baht/1 US$) (OAE, 2010; NSO, 2009). In 2009, the poverty incidence in the Northeast region amounts to around 14 percent, taking into account the poverty line of 1,473 Baht per capita per month (NESDB, 1988-2009).

In order to study the behavior of Thai Jasmine rice farmers, a case study was conducted in 2009 in Northeastern Thailand. The distribution of Thai Jasmine rice certified farm households in the TKRH area is shown in Table 2. In order to avoid distortionary effects caused by other certification schemes, Surin province was excluded from the sample due to the presence of organic certification in the area. The two districts Kasetwisai and Rasrisalai with the highest ratio of GI certified farmers were purposively selected. Using the disproportionate stratified random sampling

technique, the total population for each district was stratified into two main groups: (1) GI group and (2) non-GI group. The total sample size is 370 farm households of which 142 farm households are GI certified and 228 farm households are not GI certified. A pilot study was a priori conducted in May 2008 in Kasetwisai District for pre-testing the questionnaire. In addition, it served to collect the list of the target population for sampling purpose. The main survey was then conducted from March to June 2009 using face-to-face interviews with a structured questionnaire. The questionnaire included sections about farm household characteristics, the production pattern, farm and non-farm income, perception about GIs, social capital such as cooperation, trust and network building, bargaining power, obstacles in the GI registration procedure, costs and benefits of certification, assets and expenditures for food and non-food consumption, shocks, borrowing and savings, and finally housing conditions of the farm households.

**Table 2: Certified GI households of all provinces in the TKRH area**

| Province | District | No. of certified GI farmers | Certified farmers of the district/certified farmers of the province (in %) | Own sample | |
|---|---|---|---|---|---|
| | | | | No. of GI farmers | No. of non-GI farmers |
| Roi Et | **Kasetwisai** | **330** | **59.35** | **85** | **169** |
| | Patumrat | 55 | 9.89 | | |
| | Ponsai | 58 | 10.43 | | |
| | Suwannaphoom | 113 | 20.32 | | |
| | Total | 556 | 100 | | |
| Surin | Chumponburee | 250 | 85.32 | | |
| | Tatum | 43 | 14.67 | | |
| | Total | 293 | 100 | | |
| Srisaket | **Rasrisalai** | **102** | **83.61** | **57** | **59** |
| | Silalad | 20 | 16.39 | | |
| | Total | 122 | 100 | | |
| Mahasarakam | Payakkaphoompisai | 90 | 100 | | |
| | Total | 90 | 100 | | |
| Yasothorn | Mahachanachai | 70 | 100 | | |
| | Total | 70 | 100 | | |
| TOTAL | | 1,131 | | 142 | 228 |

Source: own compilation based on data from DIP, 2007

## 5. Results and discussion

In this section, descriptive statistics first describe the background characteristics and distribution of variables among the sample population. A logit model is then used to examine associations between the dependent variable and the independent variables.

All analyses presented in this paper relied on the design-based approach, as design features were incorporated in the analysis due to the disproportionate stratified sampling technique[2].

### 5.1 Descriptive findings

The characteristics of the sample households, their farms, their economic conditions and income profile are presented in Table 3. The statistics are the estimated means for the continuous variables and for their ratios. The last column represents the F statistic from the test of significance using adjusted Wald tests for comparing means of all continuous variables between GI and non-GI groups.

**Table 3: Characteristics and income profile of sample farm households**

| Indicators | Total (N=370) | GI (n=142) | Non-GI (n=228) | Test of Sig. |
|---|---|---|---|---|
| Household and farm characteristics | | | | |
| Age of household head (Years) | 52.25 (10.28) | 54.06 (35.95) | 52.18 (8.19) | 1.62 |
| Family size (Persons) | 4.63 (1.38) | 4.71 (5.24) | 4.63 (1.09) | 0.15 |
| Total owned land[a] (Rai) | 38.18 (29.45) | 43.33 (110.16) | 37.98 (23.39) | 1.43 |
| Total land under rice (Rai) | 37.56 (29.66) | 42.83 (107.57) | 37.36 (23.59) | 1.52 |
| Total land under jasmine rice (Rai) | 33.89 (29.61) | 39.95 (108.23) | 33.66 (23.54) | 1.99 |
| Ratio of land under rice in total owned land (%) | 85.66 (16.70) | 90.48 (105.30) | 85.48 (12.61) | 3.51 |
| Ratio of land under jasmine rice in total owned land (%) | 85.66 (16.70) | 90.48 (105.30) | 85.48 (12.61) | 3.51 |
| Experience in rice cultivation (Years) | 38.46 (10.81) | 38.26 (41.65) | 38.47 (8.57) | 0.02 |
| Income profile | | | | |
| Household total annual income (1,000 Baht) | 388.20 (374.04) | 393.80 (1738.53) | 387.99 (293.07) | 0.01 |
| Household total annual farm income (1,000 Baht) | 134.87 (256.38) | 143.05 (720.61) | 134.56 (205.99) | 0.06 |
| Household total annual non-farm income (1,000 Baht) | 253.33 (267.08) | 250.75 (1430.24) | 253.43 (206.47) | 0.00 |
| Ratio of rice income in total annual income (%) | 25.84 (26) | 40.13 (103.78) | 25.30 (20.53) | 13.33*** |
| Ratio of rice income in total farm income (%) | 71.13 (34.71) | 82.92 (88.82) | 70.69 (27.98) | 7.04** |
| Ratio of non-farm income in total annual income (%) | 58.91 (33.81) | 49.88 (111.59) | 59.25 (27.07) | 3.73 |
| Annual per capita household income (1,000 Baht) | 89.14 (91.97) | 87.59 (337.60) | 86.20 (73.16) | 0.01 |
| No. of households below poverty line | 71 | 35 | 36 | 0.26 |

*Note*: * Significant at α=5%; ** significant at α=1%; *** highly significant at α=0.1%; Standard deviation is in parenthesis;

[a] Including residential area

Source: own calculation

[2] Sampling weights are applied to each observation of the sample in order to correct for unequal probabilities of selection due to stratification and to obtain unbiased and consistent estimates of effects or associations (Deaton, 1997; Lee and Forthofer, 2006). All quantitative analyses in our study were performed using the survey (*svy*) methodology in the software package Stata (version 11). The survey methodology in Stata accounts for the effects of weights on significant tests and it also contains procedures using the Taylor Linearization Method for correctly estimating the variance when analyzing survey data with complex survey design. This method is one of the three most commonly used and available statistical approaches, besides the Balanced Repeated Replication (BRR) and the Jackknife to correctly estimate variance for regression models using survey data (Johnson and Elliott, 1998; Sturgis, 2004; StataCorp, 2009).

The rice farmers in our sample are on average 52 years old and they have a very long experience in rice cultivation with 38 years. In general, the GI farm households have larger families and own more land, and have a higher total farm income than the non-GI group. The weighted means of ratios of rice land in total owned land and jasmine rice land in total owned land reveal that almost all land (about 86 percent) in both groups is devoted to rice cultivation, namely to Jasmine rice cultivation. Accordingly, an average of 71 percent of the farm income is derived from rice cultivation. For the GI group, this share amounts to 83 percent, compared with 71 percent for the non-GI group. Considering the total annual income, around 40 percent is derived from rice cultivation for the GI group, compared with around 25 percent of the non-GI group. The total annual income does not differ between the two groups, but the ratio of rice income in the total annual income and the ratio of rice income in total farm income. On average, around 59 percent of the farm households' total annual income is derived from non-farm income, including salaries from public sector employment or remittances. In the non-GI group, 36 farm households (or 16 percent) were counted as poor with a total annual income falling below the regional poverty line, compared with 35 farm households (or 25 percent) in the GI group.

Table 4 shows the descriptive and comparative statistics of variables included in the model. The figures present the estimated means for the continuous variables and proportions given in percentage for the binary variables. The test of significance has been carried out by using adjusted Wald tests for comparing continuous data, and Rao-Scott corrected tests[3] for comparing categorical data between the two groups.

On average, around 40 percent of the rice farmers in our sample are men. Comparing the mean values between the groups clearly indicates that the GI group has a higher number of male farmers with almost 60 percent compared to that of the non-GI group with only 38 percent. The means of the two groups are significantly different ($p < 0.01$). The average education level of the household heads in our sample is quite low with only around six years of schooling and 70 percent of them having at most

[3] The Rao-Scott corrected test is a Pearson chi-square statistic with the Rao and Scott (1984) second-order correction. After the Rao and Scott (1984) second-order correction, the Pearson chi-square statistic is converted into an F statistic (Lee and Forthofer, 2006; StataCorp (2009, p. 116).

primary education. The adjusted Wald test indicates a significant difference in the education level of the household head between both groups at the 5 percent significance level. On average, the GI group has relatively more land (around 43 Rai) available for agricultural use than the non-GI group (around 37 Rai), but the difference is not significant.

**Table 4: Descriptive and comparative statistics of factors affecting GI certification adoption**

| Variable | Mean (Std. dev.) or % for total sample (N=370) | Mean (Std. dev.) or % for GI group (n=142) | Mean (Std. dev.) or % for non-GI group (n=228) | Test of significance |
|---|---|---|---|---|
| **Household-level factors:** | | | | |
| Human capital | | | | |
| Gender (1=male) in % | 38.54 | 59.87 | 37.74 | 10.41** |
| Education (years) | 5.27 (2.81) | 6.21 (11.03) | 5.23 (2.22) | 5.42* |
| Natural capital | | | | |
| Land size (Rai) | 36.88 (29.44) | 42.60 (107.98) | 36.66 (23.41) | 1.79 |
| Social capital | | | | |
| Member of cooperative (1=yes) in % | 67.88 | 81.09 | 67.38 | 5.27* |
| Participation (1=yes) in % | 79.62 | 88.31 | 79.30 | 2.93 |
| Bargaining Power (1=yes) in % | 0.00046 | 0.60 | 0.03 | 14.48*** |
| Information (1=yes) in % | 40.97 | 66.48 | 40 | 15.17*** |
| Trust (1=yes) in % | 8.3 | 10.35 | 8.22 | 0.26 |
| Economic capital | | | | |
| Income (in thousand Baht) | 388.20 (374.04) | 393.80 (1738.53) | 387.99 (293.07) | 0.01 |
| **Institutional factors**: | | | | |
| Time to markets (hours) | 0.86 (0.65) | 0.97 (2.69) | 0.85 (0.51) | 1.61 |
| Transportation costs (Baht per ton) | 233.29 (430.97) | 309.13 (2011.67) | 230.42 (337.35) | 1.08 |

*Note*: * Significant at α=5%; ** significant at α=1%; *** highly significant at α=0.1%; Standard deviation is in parenthesis

Source: own calculation

The participation in cooperatives is relatively widespread among the sampled farmers. Close to 70 percent of farm households are members of cooperatives. Comparing between groups, we find that about 80 percent of the farm households in the GI group are members of the cooperative compared to the non-GI farmers with only 67 percent. This difference is significant at the 5 percent level as can be seen from the Rao-Scott corrected test. With respect to other social capital factors, it can be seen that a high proportion (almost 80 percent) of farm households participate in meetings organized in the village. The bargaining power has been found to be negligible for the sampled farmers. Almost all of them had to accept the rice price being fixed by the buyers, even though most of the GI farm households expect to receive a price premium when adopting GI certification. Nevertheless, the mean difference is highly significant at the 0.1 percent level. Regarding information, the result shows that around 40 percent of farm households had access to information

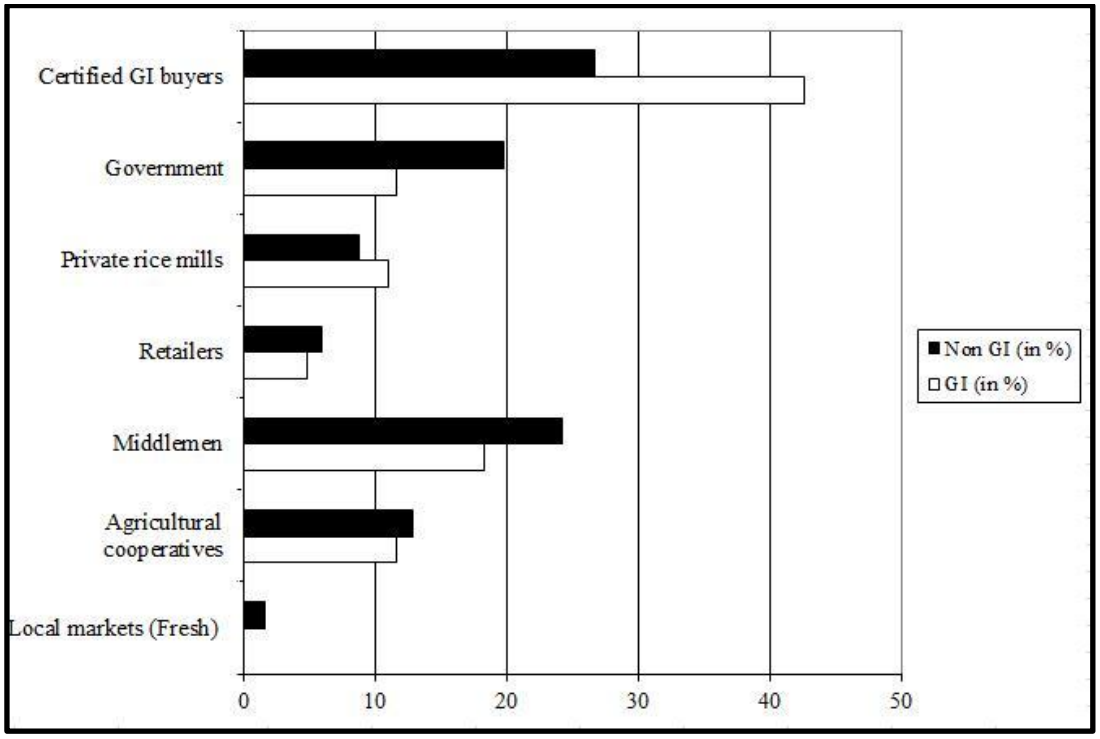
about GI from local governmental bodies. There is a significant difference between the groups. More GI farm households (66 percent) received information about GI from local governmental bodies than non-GI farm households (40 percent). When selling rice to the rice mills, a slightly higher percentage of the GI farm households (10 percent) than the non-GI farm households (8 percent) trusted rice mills in giving correct information on quality in terms of rice moisture content. This difference is, however, insignificant.

In order to sell their rice, the rice farmers face the problem of long distance to rice markets. They are widely dispersed in the huge TKRH area spending on average close to 1 hour to reach the markets which are sometimes located in the district center. They often have to make detours to reach the rice markets due to the poor road conditions. The farmers' costs of transporting the rice to the markets amount on average to 233 Baht per ton. While GI farmers pay around 309 Baht per ton, non-GI farmers pay only 230 Baht per ton.

After the rice harvesting period, the farm households have the choice to sell rice to many different buyers such as retailers in local markets, agricultural cooperatives, middlemen, private rice mills, government and/or to very few certified GI rice buyers (Figure 3), however, a price premium for GI rice is only paid by certified GI buyers. Accessing GI rice markets by the GI farm households is thus associated with limited choices when they want to get a price premium and with relatively higher transportation costs since they must often travel longer distances to sell their GI rice to the certified GI buyers located in the district center. Thus, the GI farmers only sell their GI rice to the GI buying points if the price premium of 500 Baht per ton compensates for the higher transportation costs. Figure 3 confirms that while more than 40 percent of the GI farm households sell rice to the certified GI buyers, they also choose other options like middlemen, cooperatives or rice mills. Many non-GI farm households also sell their rice to the certified rice buyers, but compared with the GI farm households they sell more often to the government (20 percent) or to middlemen (25 percent) who usually come directly to the rice field or to the village to pick up the rice. Selling rice to the government means that the farm households

participate in the rice price guarantee scheme[4] of the government and store rice at home until the concessionaire, cooperative or private rice mills in the region come to their residence and take the rice. The farm households were promised that their rice will be bought at a certain price level which is normally slightly higher than the market price.

**Figure 3: Rice buyers in the TKRH area**




Source: own presentation

As can be seen from figure 3, private rice mills are often not the preferred points of sale. This might be explained by the observation that rice mills are known for their strict rice quality controls, as opposed to middlemen or retailers.

### 5.2 Logit model results

The results of the logit model are presented in Table 5. A series of logistic regression diagnostics were applied for detecting interaction effects, correlations, multicollinearity and other specification errors. The specification link test was used to detect a specification error. Collinearity was assessed by the correlation matrix for

[4] This price guarantee scheme has been now replaced by a rice pledging scheme introduced by the newly elected government in August 2011.

variables in which optional significance levels are calculated, based on survey-based variance estimates for the correlations. Additionally, measures of tolerance and variance inflation factors (VIF) were examined. To determine whether any of the adoption variables such as information or member of cooperative was endogenous in the model, a two-stage Hausman specification test was used (Hausman, 1978). The test failed to reject exogeneity at $P < 0.05$. The adjusted Wald test statistic is used to assess the model fit (Lee and Forthofer, 2006). For more statistical power, a goodness-of-fit test, i.e. F-adjusted mean residual test, of Archer and Lemeshow (2006) was used in our analysis. The test showed that there is no lack of fit of the selected logit model using survey sample data (see also Archer et al., 2007). Finally, we have evaluated the predictive accuracy of our fitted model by reporting the area under the corresponding receiver operating characteristic (ROC) curves (AUC) (Cleves, 2002) measuring how well a parameter can distinguish between two groups. The AUC of 0.7469 reveals that our model correctly predicts around 75 percent of the cases. Table 5 also gives design effects of the regression coefficients. Design effects of all regression coefficients are less than 1 indicating that only very few cases would be needed to obtain the same measurement precision obtained with simple random sampling. This suggests that our complex design is statistically efficient for the given sample size ($N = 370$) as opposed to a simple random sample.

The regression coefficients show that information, gender, and member of cooperatives, are as earlier expected, positively and significantly related to the logged odds of GI certification adoption at the significance level of 0.1 percent, 1 percent and 5 percent, respectively. All other factors turn out to be insignificant. The marginal effects indicate the same trend as the parameter estimates. The model also predicts higher and more significant marginal effects of information, gender and member of cooperative on the GI certification adoption. The odds ratio of the information of 3.79 means that the odds of GI certification adoption are 3.79 times as large indicating that a one-unit increase in the variable (from 0 to 1) multiplies the odds of the GI certification adoption by 3.79, suggesting that receiving information about GI from local governmental bodies makes the GI certification adoption almost four times more probable. The importance of information for the adoption decision

has been also found by many other studies e.g. of Saka et al. (2005) and Doss (2006) as discussed in Section 3.

Likewise, for gender, the odds ratio of 2.99 means that the odds of GI certification adoption are almost 3 times higher for male farmers than for female farmers. When the household heads are male, the GI certification adoption is thus made around 3 times more probable. Our result supports the findings of Nkamleu and Manyong (2005). Finally, the odds ratio of 2.61 for member of cooperative indicates that the odds of the GI certification adoption for farm households being members of cooperatives are 2.61 times as large. This means that being a member of the cooperative makes the GI certification adoption 2.61 times more probable. An important role of being member of cooperatives has been also found to be significant for innovation adoption by other studies e.g. of Nkamleu and Manyong (2005) and Asfaw (2008).

**Table 5: Parameter estimates for GI adoption model and odds ratio**

| Variable[a] | Coef. | Linearized std. err. | P-Value | Odds ratio | dy/dx[b] | Design Effects |
|---|---|---|---|---|---|---|
| Intercept | -6.5547 | 0.7582 | 0.000 | NA | NA | 0.3156 |
| Gender | 1.0936 | 0.3838 | 0.005 | 2.9850 | 0.0368** | 0.2317 |
| Education | 0.0694 | 0.0566 | 0.221 | 1.0719 | 0.0023 | 0.3099 |
| Land size | 0.0051 | 0.0050 | 0.314 | 1.0051 | 0.0002 | 0.6259 |
| Member of cooperative | 0.9577 | 0.4366 | 0.029 | 2.6057 | 0.0322* | 0.2990 |
| Participation | 0.6908 | 0.4719 | 0.144 | 1.9954 | 0.0233 | 0.2349 |
| Bargaining power | 1.7938 | 1.5565 | 0.250 | 6.0122 | 0.0604 | 0.0631 |
| Income | -0.0000 | 0.0000 | 0.469 | 0.9999 | 0.0000 | 0.2378 |
| Information | 1.3336 | 0.3511 | 0.000 | 3.7945 | 0.0449*** | 0.2671 |
| Time to markets | 0.1148 | 0.2375 | 0.629 | 1.1216 | 0.0039 | 0.2370 |
| Transportation costs | 0.0006 | 0.0003 | 0.095 | 1.0006 | 0.0000 | 0.2656 |
| Trust | 0.4029 | 0.5588 | 0.471 | 1.4963 | 0.0136 | 0.2719 |

*Note.* [a] Dependent variable: certified GI ($n_1$ = 142) and non-certified GI farm households ($n_2$ = 228); N = 370.
[b] Stata reported the exact discrete change of the dummy independent variables from zero to one.[5]
* Significant at α=5%; ** significant at α=1%; *** highly significant at α=0.1%
NA = not applicable.
Except p-value, all other statistics reported herein use 4 decimal places in order to maintain statistical precision.

| | | |
|---|---|---|
| F-adjusted mean residual test to test a goodness-of-fit | F (9, 359) | = 0.676; |
| Prob > F | | = 0.731 |
| Area under the ROC curve | | = 0.7469 |

Source: own calculation

[5] The calculating procedure of the marginal effects in Stata is discussed e.g. by Wooldridge (2009, pp. 583-584).

## 6. Conclusion

This paper explored the determinants which are likely to predict the behavior of farm households in adopting GI certification for Jasmine rice in the TKRH area in the Northeast of Thailand. A major finding of this study is that access to information mostly determines the probability of adoption of GI certification, followed by membership of cooperative and the personal variable gender. This finding is in line with previous adoption studies on certification in other agricultural sectors. How a GI system is successfully introduced and promoted in specific GI regions depends particularly on the information provided to the farm households and finally on the information sources. The cooperative serves as a crucial intermediary between the farm households and the government being the primary source of information about GI. Strengthening the role of the cooperatives may therefore promote the effectiveness of information dissemination.

The descriptive data in the paper indicate that the limited marketing options of GI certified rice, characterized by high transportation costs and limited availability of certified buyers, may be a potential constraint to GI adoption. A value chain analysis could reveal to what extent the access of GI farm households to their points of sale can be improved. Future research is also still needed to analyze to what extent GI certification affects the welfare of the farm households in the TKRH area; possible benefits such as price premia paid for GI Jasmine rice on the one hand and costs of certification on the other hand need to be considered. Another area that merits further research is the issue how the decision-making processes within households affect the GI certification adoption.

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## 2.3 MODULE III: IMPACT OF GEOGRAPHICAL INDICATION PROTECTION ON RURAL LIVELIHOODS

4. NGOKKUEN, C. and GROTE, U. (2012). "Impact of Geographical Indication Adoption on Household Welfare and Poverty Reduction", submitted to *International Journal of Arts and Sciences (IJAS)*.

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# Impact of Geographical Indication Adoption on Household Welfare and Poverty Reduction

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**Abstract**: This study sheds light on the impact of adopting Geographical Indication (GI) certification on household welfare. It uses data obtained from a cross-sectional survey of 541 Jasmine rice households in Northeastern Thailand. Given the "self-selection into treatment" problem, a non-parametric propensity score matching (PSM) analysis is applied to assess the causal effect of GI certification on farm households' welfare. It evaluates whether adopting GI certification causes farm households to improve their welfare in terms of increased consumption expenditures and decrease their propensity to fall below the poverty line. The study finds a significant and positive effect of GI certification adoption on household welfare and poverty reduction in rural Thailand.

**Keywords**: Geographical Indication, Rural Livelihoods, Poverty, Propensity Score Matching, Thailand

## 1. Introduction

The reduction of poverty is one of the primary objectives in economic development. Thus, it is necessary to understand the effects of specific policies on household welfare (Glewwe, 1991). In the development discourse, the two concepts of rural development and rural livelihoods, which are related to each other, exist. Rural development aims at improving household welfare or alleviating poverty in rural areas (Toborn, 2003). Top-down or supply-driven approaches in rural development projects have been found to have insignificant impacts on poverty reduction. Participatory or bottom-up approaches have been promoted instead (ADB, 2004). The concept of rural livelihoods is regarded as an entry point for participatory approaches emphasizing the local perspectives (Scoones, 2009). However, rural livelihoods are complex and dynamic. Based on disposable livelihood resources, rural people pursue several livelihood strategies such as agricultural intensification and extensification, migration and livelihood diversification, i.e. a combination of a portfolio of activities in agriculture, wage employment, farm labor, or small-scale enterprises (Scoones, 1998 and 2009; Hussein & Nelson, 1998).

In Thailand, rural livelihoods rely on cash and subsistence income from a number of sources, namely crop production, livestock production, husbandry, fisheries, agricultural services, forestry, wage employment, small-scale enterprises, and remittances. The industry sector plays a key role for both rural and urban livelihoods contributing around 36% to the national Gross Domestic Product (GDP), while agriculture accounts for only 12% of the GDP (Office of Agricultural Economics (OAE), 2011). Nevertheless, agriculture is regarded as a basis of rural livelihoods and is the predominant economic activity in many rural regions of Thailand in particular the Northeast. It plays a crucial role as an engine of rural growth, since it employs a large share of the rural labor force (Bresciani & Valdés, 2007; Cervantes-Godoy & Dewbre, 2010). Around 13.5 million people are engaged in agriculture accounting for approximately 35% of the total labor force (National Statistical Office (NSO), 2012). These rural households engaged in agriculture are mostly poor. According to the poverty incidence, the Northeast is the poorest part of the country with the highest headcount ratio of around 14% and a national headcount ratio of 8% (NSO, 2010). In this region, besides husbandry and wage employment, rice

cultivation is one of the most important livelihood activities, with almost 70% of the total agricultural land being used for rice cultivation (OEA, 2011).

National governments in the past have implemented several policies with the purpose to combat poverty (Siriprachai, 2009). Thailand has been very successful in reducing poverty from around 22 million in 1988 to only 5.1 million poor in 2010 (National Economic and Social Development Board (NESDB), 2011). This success is considered to be a result of economic growth (D'Silva & Bysouth, 1992; Jitsuchon, 2006; Cervantes-Godoy & Dewbre, 2010). However, poverty remains high in rural areas accounting for around 4.5 million poor or 90% of the total poor compared to less than one million poor in urban areas (Siriprachai, 2009; NESDB, 2011). In the Northeast, poverty is the highest with almost 3 million poor or almost 60% of the total poor (NESDB, 2011).

Given the importance of rice cultivation for rural livelihoods in the Northeast, the release of the Act on Geographical Indications (GIs) Protection in 2003 which can be also applied to rice, provides an interesting case study in Thailand. GIs, a kind of new intellectual property right, are "indications which identify a good as originating in the territory of a Member, or a region or locality in that territory, where a given quality, reputation or other characteristic of the good is essentially attributable to its geographical origin" (Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), Annex 1C, article 22(1)). They identify the specific geographical origin of a product and usually consist of the name of the place of origin (Commission on Intellectual Property Rights, 2002). Thus, the GI Jasmine rice called Thung Kula Rong-Hai Thai Hom Mali Rice (TKR) originates from the respective Thung Kula Rong-Hai (TKRH) area in Northeastern Thailand. It is regarded as the most well-known Jasmine rice being mainly exported to the European Union (EU).

In 2008, there were totally 1,131 TKR rice farm households being GI certified by Thailand's Department of Intellectual Property (DIP). These TKR farm households account for only around 1.3% of the total TKRH farm households (Ngokkuen & Grote, 2012). The question arises whether GI certification adoption has had an impact on the livelihoods of the TKR farm households being GI certified as compared to the TKR farm households not being GI certified. A positive impact

would suggest a stronger promotion of GI certification adoption in the region in order to reduce rural poverty.

A Propensity Score Matching (PSM) method is applied to evaluate the potential impact of GI certification adoption on household welfare and rural poverty. The rest of the paper is divided into four sections: (i) the literature review and conceptual framework, (ii) the methodology and data collection, (iii) results, and (vi) the conclusion and recommendation.

## 2. Literature Review and Conceptual Framework

The literature can be categorized into three different strands. First, there are a number of theoretical and empirical papers on the GI adoption process. A summary of that literature has been provided by Ngokkuen and Grote (2012). Second, research focuses on the impacts of GI adoption. And third, there are a number of policy papers discussing the enhanced protection of GIs beyond wines and spirits under TRIPS (e.g. Addor & Grazioli, 2002; Caboli, 2006; Jain, 2009). This paper focuses on the second strand of the literature.

### *2.1 GIs and Their Impacts*

#### Welfare impacts of GIs

There are a number of theoretical and empirical papers which investigated the welfare implications of GIs (Grote, 2009). A theoretical study of Zago and Pick (2004) considered the welfare impacts of labeling policies of agricultural products with specific characteristics on producers and consumers. They found that producers of high-quality goods are better off, while producers of low-quality goods are worse off. However, their findings showed that when high-quality producers can exercise market power, there is a negative effect on consumers. With high administrative regulation costs and low quality differences, the total welfare impact of these labeling policies can be negative. Some important empirical studies explored the implications of GI certification for consumer and producer welfare.

The study of Lence, Marette, Hayes and Foster (2007) highlighted that stronger intellectual property right protection for producer organizations may enhance welfare even after a differentiated product has been developed. By analyzing market and welfare effects of alternative producer organizations, discussing circumstances under which they will evolve, and describing implications for the ongoing debate between the EU and the United States (US) on the GI protection expansion, Lence et al. (2007) also stated that new Geographically Differentiated Agricultural Products (GDAPs) would enhance both producer and consumer surpluses in the US.

Using the equilibrium displacement model for markets segmented by regional-origin labeling with quality, Anders, Thompson and Herrmann (2009) investigated the role of governmental support levels on farmers' welfare. They found that welfare implications for producers depend crucially on costs of participation including quality control and on the co-financing mechanism between the government and producers.

Menapace and Moschini (2011) developed a reputation model to assess the role of certification for agricultural and food products with GIs in a context in which firms already have access to private trademarks to establish their reputation for quality. Assuming that all factors of production are in perfectly elastic supply, their model indicated that producers are either unaffected or negatively affected by the introduction of a GI certification scheme. However, if this assumption is relaxed, it is possible to envision benefits to GI producers that are not accounted for in their model. The welfare gains that arise from GI certification also accrue to consumers, especially those with a taste for higher qualities. Considering the features of two major forms of GI certification schemes, i.e. the EU-style sui generis system and the US-style certification mark approach, they showed that a sui generis scheme discloses more information than a certification mark scheme and it is generally preferable to a certification mark scheme.

Likewise, Mérel and Sexton (2011) investigated the choice of quality by producer organizations in charge of defining product specifications for GIs. They found that by providing a credible certification mechanism to establish product quality, the GI framework has a clear potential to improve welfare. Individual producers can signal

the quality of their product, and consumers can receive correct information on product quality.

Moschini, Menapace and Pick (2008) assessed the economics of GIs within a vertical product differentiation framework being consistent with the competitive structure of agriculture. Assuming that certification costs are needed for GIs to serve as (collective) credible quality certification devices, and production of high-quality product is endogenously determined, they found that GIs can support a competitive provision of quality and lead to clear welfare gains, mainly for consumers. For producers, they concluded that there may be some benefit for them if the production of the high-quality products draws on scarce factors that they own.

Likewise, Kolady et al. (2011) in their comparison study of Darjeeling and Oolong teas showed that the benefits sharing from a GI going to producers/landowners increases with a less elastic supply of land or with more elastic demand for output, or with increased elasticity of substitution between land and other inputs, all of which increase the derived demand for land. And in the extreme case, when the supply of land is fixed or perfectly inelastic, all benefits from a GI go to landowners. They suggested that countries must select their GIs very carefully as the confluence of product familiarity in international markets and land ownerships patterns which are needed for the generation and widespread distribution of benefits will be rare events.

Taking Basmati from India as a case study, Jena and Grote (2012) used the Heckman selection model to evaluate the impact of traditional GI-like Basmati rice cultivation in Uttarakhand State of Northern India. Using net rice income as an indicator for the rural livelihoods, they found that Basmati rice cultivation has a positive and significant impact on the rural livelihoods. Their results imply a significant and important role of GI-like certification for livelihood outcomes.

**GI Impact on Rural Development**

Further papers focused on the impacts of GI adoption on rural development. A brief overview of such papers is provided for example by Jena and Grote (2011). These papers relate the concept of rural development directly to the concept of rural livelihoods. By using a case study, Tregear, Arfini, Belletti and Marescotti (2007)

examined the role of product qualification for regional foods in rural development. Their overall results suggested that the product qualification is a means by which local actors can attract revenues from non-local actors and institutions. Callois (2004) applied a microeconomic model with the co-operation of farmers for the production of a differentiated agricultural good. He found that there is a trade-off between the number of differentiated farmers and their individual income. The rise in some farmers' income does not benefit the rural region as a whole. This income rise, on the contrary, benefits urban workers who get a higher wage and can improve their utility while consuming new products.

In sum, quantitative studies on evaluating the potential impact of GIs on rural livelihoods, on poverty reduction and on rural development are still scarce. This study contributes to filling this knowledge gap by taking data of Jasmine rice farm households to evaluate the impact of GI certification on the two related livelihood outcomes, i.e. household welfare improvement and poverty reduction. The next subsection explains how GI certification adoption can be connected to the framework of rural livelihoods.

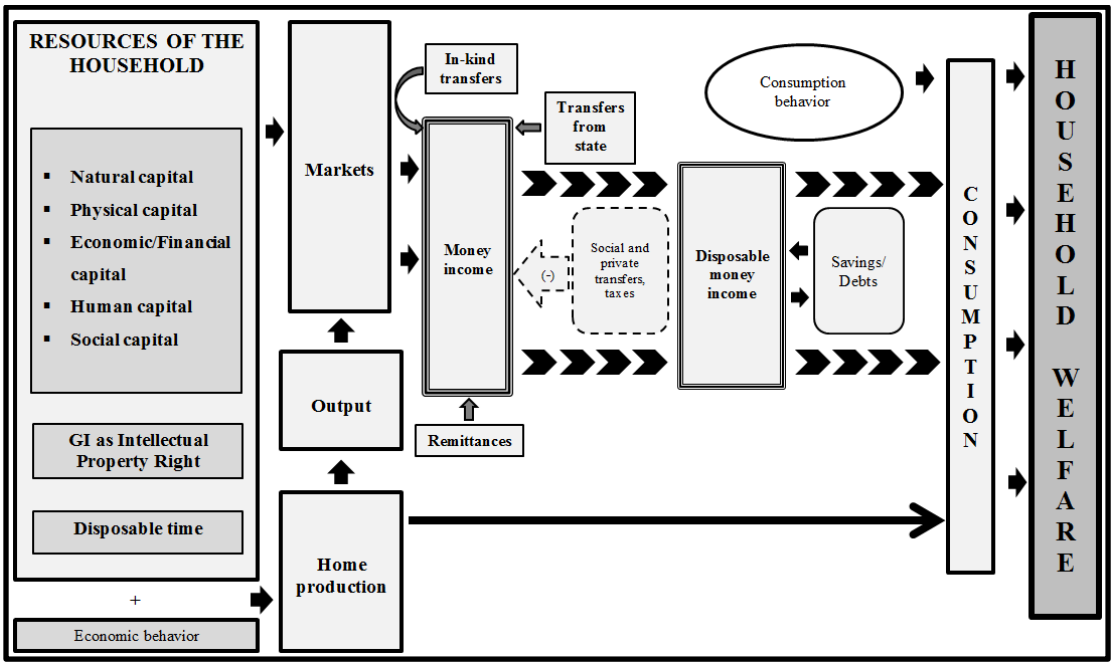
### *2.2 Conceptual Framework*

This study is based on the rural livelihood framework conceptualized by Chambers and Conway (1991) and later Scoones (1998) to understand the livelihoods of people in rural areas. According to Chambers & Conway (1991, p.6), a livelihood "comprises the capabilities, assets and activities required for a means of living". Rural livelihoods can be achieved when rural households have the access to livelihood resources, i.e. natural, physical, economic, human and social capital. These assets or capital resources are combined with livelihood strategies like agricultural intensification and extensification, diversification or migration the rural households pursue in order to achieve the livelihood outcomes which again can influence the resources of the rural households (Scoones, 1998). The livelihood "is sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets, while not undermining the natural resource base" (Scoones, 1998, p. 5).

Adopting GI certification can be pursued as a useful livelihood strategy for rural households to achieve the desired livelihood outcomes, i.e. household welfare improvement and rural poverty reduction. Figure 1 demonstrates the role of GIs in improving household welfare. Based on Strengmann-Kuhn's (2000) definition of household welfare and Scoones's (1998) rural livelihood resources classification in his rural livelihoods framework, the household welfare is produced by the process presented in Figure 1. The household uses disposable resources to derive monetary income. Added to this are any monetary transfers the household receives from the government or other households; substracted are any private transfers given to other households or taxes paid to the government. The disposable money income is the result being used for consumption and saving. Besides buying goods, it is also possible to receive goods from home production or from other households or the government. All these goods together determine the household welfare and it is possible to measure welfare and poverty in all stages of this welfare production process (Strengmann-Khun, 2000).

Institutional aspects related to GIs included in the rural livelihood context involve key governance issues at two different levels: (i) micro level, and (ii) community and macro levels. At the micro level, it requires the active participation and involvement of the rural households in claiming and exercising their right to apply for GI club membership. At the community and macro levels, it involves the role of local governmental bodies, cooperatives and a GI network like GI association in facilitating an effective and reachable GI registration system as well as in providing farm households information on GIs. An active participation of a private sector directly involved in the GI value chain is also crucial in a GI control system. A competent authority is required to govern the GI control system, i.e. the DIP under Thailand's Ministry of Commerce. Moreover, a legal framework of GI protection must be provided. A sui generis GI Act, i.e. a specific Act on GI protection, gives the direction how to implement the GI registration as well as the GI certification at the local and national levels. Finally, in order for GI households to be able to sell GI products, markets for GI certified products must be available.

**Figure 1. GI Role for Household Welfare**




Source: own presentation based on Scoones (1998) and Strengmann-Kuhn (2000)

The availability of information on quality is assured by the GI certification, visualized by the GI label. A credible certification mechanism is needed in order to ensure product quality. The farmers' welfare depends also crucially on the level of government supports. If the costs of participation and quality control are not too high and the co-financing mechanism between the government and the producers is clearly set, the household welfare is expected to be positive. The efficiency of the markets for GIs also depends on other factors such as the mobility of GI goods and the number of buyers and sellers. As a new kind of intellectual property right, creating a recognized image of a GI product is thus the major task of the government.

## 3. Methodology and Data Collection

### *3.1 Methodology*

**Measurement of Household Welfare and Poverty**

This study uses the Foster-Greer-Thorbecke (FGT) (Foster, Greer & Thorbecke, 1884) measure to compare farm households with an exogenously defined poverty line (measured by consumption expenditures) and these households are categorized

as poor or non-poor if their well-being is below or above the poverty line. The FGT class of poverty measure is decomposable across subgroups, i.e. GI households and non-GI households and can be written as:

$$P\alpha = \frac{1}{N}\sum_{i=1}^{q}\left(\frac{z-yi}{z}\right)\alpha \qquad (1)$$

where the parameter α reflects poverty aversion. If α = 0, $P_0$ is equal to the poverty headcount index, i.e. the proportion of households whose well-being level (income or consumption expenditure) is below the poverty line. This study uses the headcount index since it gives a simple-to-understand first look at the incidence of poverty (Shimeles & Thoenen, 2005) in the study area.

Individual households are treated as the units whose welfare is measured since an individual basis for measurement is conceptually clearer (Deaton, 1997). We use the consumption expenditure data to measure the economic welfare of individual households (Figure 1) adjusted by the modified consumption unit scale (adult equivalent) of the Organisation for Economic Co-operation and Development (OECD, 2009) in order to capture age differences, and economies of scale in consumption (Haughton & Khandker, 2009).

Accordingly, household welfare is treated as a function of household characteristics, and whether that household adopts GI certification. The household consumption expenditure (log) equation per adult equivalent and the poverty status equation of the household can be written in (2) as:

$$Y = \alpha + \beta X + \beta A + \varepsilon \qquad (2)$$

where Y is the monthly consumption expenditure of a household (in logarithm) and the household is regarded as poor when its consumption expenditure is below the regional and national poverty line; accordingly, for the poverty status equation, Y equals 1 when its consumption expenditure is below the regional and national poverty line and 0 otherwise; X is a vector of covariates; A is a dummy variable taking the value 1 for households that adopted GI certification and 0 otherwise; α is the intercept; β are the estimated coefficients and ε is the error term.

To evaluate the potential effects of GI certification adoption on household welfare and poverty reduction, we use the PSM method.

**Impact Evaluation Strategy: Propensity Score Matching Method**

The impact of GI certification on those households who adopted and those who did not adopt can be written in (3) and (4), respectively, as follows:

$$ATT = ATE \mid_{A=1} = E(Y_{1i} \mid A_i = 1) - E(Y_{0i} \mid A_i = 1) \quad (3)$$

$$ATU = ATE \mid_{A=0} = E(Y_{1i} \mid A_i = 0) - E(Y_{0i} \mid A_i = 0) \quad (4)$$

where $E(Y_{1i} \mid A_i = 1)$ is the observed average outcome of the GI certification adoption of GI households; $E(Y_{0i} \mid A_i = 1)$ is the average outcome that the GI households would have gained if they had not adopted the GI certification; $E(Y_{1i} \mid A_i = 0)$ is the average outcome that non-GI households would have obtained if they had adopted the GI certification; and $E(Y_{0i} \mid A_i = 0)$ is the observed average outcome that the non-GI households have gained.

A general issue is that the treated individual households may not be random of the population, but they may have received the treatment on the basis of criteria or characteristics that also influence their outcomes (Sianesi, 2001). As described in Ngokkuen & Grote (2011, p.173), TKR households will be "selected" to be GI households by the DIP once all their formalities are fulfilled. Moreover, the voluntary nature of GI adoption, i.e. the individual households decide to adopt the GI certification by themselves given the information they have, may be related to the benefits of the GI adoption. Thus, we only observe outcomes for a non-random subsample of all households assigned to treatment (Rosenbaum, 2002). This introduces the potential for selection bias, i.e. "self-selection into treatment" (Wooldridge, 2002). A fundamental problem in estimating the causal effect - as stated by Holland (1986) - is the missing data so that we are not able to estimate the unobserved counterfactual $E(Y_{0i} \mid A_i = 1)$ in (3) and $E(Y_{1i} \mid A_i = 0)$ in (4). Instead, we rely on a group of control households, i.e. non-GI households. Directly inferring ATT by substracting the observed $E(Y_{0i} \mid A_i = 0)$ from the observed $E(Y_{1i} \mid A_i = 1)$ in a non-random assignment in such observational study could thus be misleading,

since treatment and control groups generally differ systematically from each other (Rosenbaum & Rubin, 1983). The treatment effect estimation may be biased by the existence of confounding factors (Becker & Ichino, 2002).

To solve the problem of such threats to internal validity as the selection bias and to increase precision in observational studies, several methods can be considered. Multivariate analysis of GI certification impact can be used to control for the difference in observable characteristics. However, the OLS estimates of the GI certification impact using cross-sectional data can be seriously affected by omitted variable bias and bias due to selection on unobservables (i.e. correlation between the participation decision and unobserved household characteristics, which affects outcome variables). If we argued that OLS estimates are biased due to selection on unobservables, we would treat the GI adoption variable as endogenous and use an instrumental variables estimator (IV). But again, the exclusion restriction condition that the IV is independent of outcomes given observable controls is very difficult to hold. In our study, we face the problem of weak instruments and non-compliance that the control of the treatment assignment is imperfect.

Thus, the non-parametric PSM method is regarded as one of the best alternatives to estimate the causal effects based on counterfactual approach, particularly when using cross-sectional data (Bandyopadhyay, Humavindu, Shyamsundar & Wang, 2004). PSM is an alternative to correct the estimation of the treatment effect controlling for the existence of these confounding factors. The treatment effect estimation correction is based on the idea that the bias is reduced when the outcomes comparison is performed using treated and control subjects which are as similar as possible (Becker & Ichino, 2002). Since matching subjects on an n-dimensional vector of characteristics are typically not feasible for large n, the propensity score, P($X$), can be used to group treated and control subjects so that the direct comparisons are possible and meaningful (Rosenbaum & Rubin, 1983; Becker & Ichino, 2002). P($X$) is the probability of GI certification adoption conditional on some observed covariates $X$ as in (5):

$$P(X) = \Pr(A=1 \mid X) \qquad (5)$$

Using PSM method, two specific assumptions must be met to produce valid matching estimator, i.e. (i) the *Conditional Independence Assumption (CIA)*[1]; and (ii) the *common support* or *overlap condition*. According to Rosenbaum & Rubin (1983), if the CIA holds, then it will also hold when one conditions on the P(*X*) instead of on X itself. Given P(*X*), the CIA implies that given observable control variables, assignment to treatment is then unconfounded, i.e. random and independent of (or uncorrelated with) the outcome, i.e. $Y_0$ or $Y_1$ for each household as written in (6) as follows:

$$(Y_0, Y_1) \perp A \mid P(X) \qquad (6)$$

The exact matching on P(*X*), i.e. the balancing property is satisfied, implying that the covariates for the resulting matched control and treated units must have the same distribution (Rosenbaum & Rubin, 1985; Becker & Ichino, 2002; DiPrete & Gangl, 2004). The CIA thus helps creating the condition of a randomized experiment, i.e. finding the missing counterfactual that is similar in all relevant observed characteristics to treated units, in order to evaluate a causal effect as in a controlled experiment (Mendola, 2007; Heinrich, Maffioli & Vázquez, 2010). It also ensures that although treated and untreated groups differ, these differences may be accounted for in order to reduce the selection bias (Heinrich, Maffioli & Vázquez, 2010). PSM therefore eliminates the bias in estimated treatment effects due to observable heterogeneity (Jalan & Ravallion, 2003; Solivas, Ramirez & Manalo, 2007). It thus provides an estimate of the impact of a treatment variable on an outcome variable that is largely free of bias arising from association between status and observable variables (Solivas, Ramirez & Manalo, 2007).

As shown by Rosenbaum & Rubin (1983), the exposure to treatment is random within the cells defined by the values of P(*X*), if it is random within cells defined by X. The ATT can then be estimated as follows:

$$ATT = E\{E[Y_{1i} \mid A_i = 1, P(X_i)] - E[Y_{0i} \mid A_i = 0, P(X_i)] \mid A_i = 1\} \qquad (7)$$

The *common support* or *overlap condition* can be written in (8) as follows:

[1] It is also known as the ignorability of treatment assumption (Rosenbaum & Rubin, 1983) or selection on observables (Heckman & Robb, 1985) or unconfoundedness (Becker & Ichino, 2002).

$$0 < \Pr(A=1 \mid X) < 1, \text{ for all } X \quad (8)$$

This condition implies that for each value of X, there is a positive probability of being both treated and untreated. It ensures that each treated household can be matched with an untreated household, i.e. households with the same X values have a positive probability of being both GI and non-GI households. The condition also ensures that there is sufficient overlap in the characteristics of the treated and untreated households to find adequate matches. Given this condition, the calculation of the difference in mean outcomes for each value of X, for each possible value of the vector of covariates X, is thus possible (Caliendo & Kopeinig, 2005).

**PSM Impact Evaluation Procedures**

The procedure of estimating the impact of GI certification adoption involves four main steps:

First, a logit model is specified to derive the propensity scores which capture similarities. The dependent variable equals 1 if the household adopted GI certification and 0 otherwise. Different ranges of households' ex-ante characteristics have been included as regressors. Since the logit is used to predict the propensity scores, the log odds of the propensity score are a linear combination of the independent variables. According to the common support condition, for a GI household, there should be a positive probability of finding a match from the non-GI group based on the propensity score.

Second, once the propensity score is estimated, each observation of the treated group (GI households) is matched with control group observations (non-GI households) based on their propensity score. To obtain the matched samples, we use three matching algorithms: the Nearest Neighbor Matching (NNM) (with five neighbors), the Kernel Matching (KM), and the Radius Matching (RM). By changing the matching algorithms, the robustness of the estimations is tested increasing the reliability of the results (Becker & Ichino, 2002; Heinrich, Maffioli & Vázquez, 2010).

According to the NNM, the propensity score is used to match each GI household with its five closest neighbors, i.e. non-GI households, without replacement. Estimates of the GI certification adoption effects, the ATT, are then computed as the average difference of households' well-being indicators between each pair of matched households. The KM estimator is a nonparametric matching estimator following the same steps as the NNM but the matched household is identified as the weighted average of all non-GI households within a certain propensity score distance, with weights that are inversely proportional to the distance between the propensity scores of treated and controls (Becker & Ichino, 2002) (the bandwith is 0.06). The KM compares the outcome of each treated household with a weighted average of the outcomes of all the untreated households, with the highest weight being placed on those with scores closest to the treated household (Heinrich, Maffioli & Vázquez, 2010). With the RM, each treated household is matched only with the control households whose propensity score falls into a predefined neighborhood of the propensity score of the treated household (Becker & Ichino, 2002). The RM specifies a capiler (in our study 0.1), i.e. a maximum propensity score distance by which a match can be made, in order to avoid the risk of poor matches (Heinrich, Maffioli & Vázquez, 2010).

After matching, we perform *t*-tests and Pearson chi-square tests in order to see whether the balancing property is satisfied, i.e. whether or not the means of each characteristic differ between treated and control households. Balancing tests have the objective to verify that treatment is independent of unit characteristics after conditioning on observed characteristics as estimated in the propensity model as in (6) (Heinrich, Maffioli & Vázquez, 2010). That means that after conditioning on P(*X*), there should be no other variable that could be added to the conditioning set of the PSM models that would improve the estimation. Moreover, there should be no statistically significant differences between covariate means of the GI and non-GI groups. We attempted to address potential concerns over unobserved bias by including as many theoretically and empirically relevant covariates as possible in the propensity score model. The output of *t*-tests in *Stata* gives the percentage reduction in bias to assess how well the matching improves balance between the GI and non-GI groups.

Third, after propensity scores have been estimated and matching algorithms have been chosen, the impact of GI certification adoption as in (7) is calculated by averaging the differences in outcomes between each treated household and its neighbors. A significant difference between the mean consumption expenditure per adult equivalent (log) and poverty incidence at the national level and in the Northeast Region of the two matched groups indicates the existence of GI adoption effects on household welfare and poverty alleviation, respectively. The estimated standard errors provide an indicator of the importance of sampling error in the estimates and make the interpretation of the results possible (Heinrich, Maffioli & Vázquez, 2010). Due to the critique on the failure of the bootstrap for matching estimators (see e.g. in Abadie & Imbens, 2006), this study thus does not use bootstrapping methods for inference. However, the bootstrap for matching estimators has been done for rechecking the calculations of the standard errors.

Fourth, based on the *selection on observables* assumption (or the CIA) as in (6), this study attempts to address potential concerns over unobserved bias by including as many theoretically relevant and empirically proven covariates as possible in the PSM models. Furthermore, in order to evaluate the extent to which the treatment effects obtained are robust to the possibility of hidden bias from unmeasured variables (selection on unobservables), we conduct Rosenbaum bounds sensitivity analyses (Becker & Caliendo, 2007).

### *3.2 Survey Area and Data Collection*

This study was conducted in the Thung Kula Rong-Hai (TKRH) area in Northeastern Thailand. The TKRH area is a huge area covering 12 districts of five provinces: Roi Et, Surin, Srisaket, Mahasarakam, and Yasothorn with the total land size of approximately 337,000 ha. These five provinces of the TKRH area are among the ten provinces with the lowest Gross Provincial Product (GPP) per capita. The economy in the region is oriented towards agricultural production and many small-scale industries. There is a lack of investment in non-agricultural production, in particular in manufacturing and services, and the population in this region is increasing (NESDB, 2011).

As a case study, a cross-sectional survey was conducted in two districts of the TKRH area, i.e. Kasetwisai and Rasrisalai districts. Before the actual data collection, a pilot study was *a priori* conducted in May 2008 in Kasetwisai district in order to pre-test the questionnaire and collect household lists for the sampling purpose. The total population of each district was stratified into two main groups: (1) GI group and (2) non-GI group. Farm households in the GI group are certified Jasmine rice farm households. Taking a representative sample of 541 farm households, the choice-based sampling technique was used to get a larger number of observations on treated farm households. Accordingly, we disproportionately oversampled the GI groups and undersampled the non-GI group. The total sample size of 541 farm households includes 180 GI certified farm households and 361 non-GI farm households.

The field survey was conducted from March to June 2009 using face-to-face interviews with a structured questionnaire including sections on farm household characteristics, the production pattern, farm and non-farm income, perception about GIs, social capital such as cooperation, trust and network building, bargaining power, obstacles in the GI registration procedure, costs and benefits of certification, assets, expenditures on food and non-food consumption, shocks, borrowing and savings, and finally housing conditions of the farm households.

## 4. Results

### *4.1 Sample Households' Characteristics*

Table 1 describes characteristics of the sample households that influence the GI adoption and well-being classified according to five types of livelihood resources, institutional factors and poverty status. It presents the results of the *adjusted Wald tests* for comparing continuous variables, and of the *Rao-Scott corrected tests* for comparing categorical variables between GI and non-GI groups.[2] Some of these characteristics are the explanatory variables of the estimated models we present further on.

[2] Sampling weights are applied to each observation of the sample in order to correct for unequal probabilities of selection due to stratification (i.e. choice-based sampling) (Deaton, 1997; Lee & Forthofer, 2006). The Rao-Scott corrected test is a Pearson chi-square statistic with the Rao & Scott (1984) second-order correction. The Pearson chi-square statistic is converted into an F statistic after the Rao & Scott (1984) second-order correction (Lee & Forthofer, 2006; Statacorp, 2009, p. 116).

Results of Table 1 show that the two groups can be distinguished in terms of household characteristics such as land size. The land sizes for total agricultural production as well as for Jasmine rice cultivation are significantly higher for the GI group. Similarly, the two groups are distinguishable in terms of physical capital. The GI group owns more productive assets and transportation vehicles than the non-GI group, but no statistically significant difference is observable in the holding of communication devices like mobile phone, radio, computer or TV.

Likewise, the two household groups cannot be distinguished in terms of income, rice yield and livestock assets. With respect to the level of education, the household heads in the GI groups have significantly more years of schooling than those in the non-GI groups. All other human capital variables, i.e. age and gender of the household heads, household size, experience in rice cultivation and dependency ratio, and institutional factors, i.e. time to markets and transportation costs, do not differ between the two groups.

GI and non-GI groups are very distinct in terms of social capital. The number of GI households with cooperative membership is significantly higher than the number of non-GI households. The GI households are also more likely to have better access to information on GIs and to participate more in village meetings. Similarly, their bargaining power in determining the rice price seems to be higher. The GI households are also more likely to follow the GAP than the non-GI households, while no significant difference is observable in the trust level with respect to rice mills and in the rice seeds group membership for the two groups.

The GI group is significantly distinguishable in terms of welfare measured in consumption expenditures and poverty incidence (p-values in bold). Means of consumption expenditures both in total and per adult equivalent and the poverty status both at the national and Northeast regional levels of the GI group are significantly different from those of the non-GI group. However, since GI certification adoption is endogenous, the simple comparison between the means of these outcome variables for the two groups has no causal interpretation. Whether these differences in welfare and poverty status remain unchanged after controlling for all confounding factors will be discussed in the section on the PSM results.

**Table 1. Descriptive Statistics: Weighted Mean of Variables by Status of GI Adoption**

| Variables | GI Households (N= 180) | Non-GI Households (N= 361) | Test of significance |
|---|---|---|---|
| *Natural capital* | | | |
| Total own land (Rai) | 40.95 (104.17) | 34.93 (23.70) | 0.13 |
| Total land under all crops (Rai) | 40.32 (101.97) | 33.64 (23.65) | 0.09* |
| Total land under Jasmine rice (Rai) | 37.72 (101.18) | 28.96 (23.07) | 0.03** |
| *Physical capital* | | | |
| Value of productive assets (in 1,000 Baht) | 113.16 (717.58) | 58.58 (134.05) | 0.04** |
| Own transportation vehicle (yes = 1) in % | 35.35 | 22.33 | 0.02** |
| Own communication devices (yes = 1) in % | 36.96 | 33.88 | 0.61 |
| *Economic/Financial capital* | | | |
| Total annual income (in 1,000 Baht) | 740.89 (3,204.35) | 696.78 (569,91) | 0.69 |
| Total annual farm income (in 1,000 Baht) | 134.03 (671.80) | 132.88 (214.44) | 0.97 |
| Total annual non-farm income (in 1,000 Baht) | 240.34 (132.97) | 234.42 (242.14) | 0.90 |
| Rice yield (ton/Rai) | 0.23 (0.51) | 0.22 (0.13) | 0.60 |
| Value of livestocks and aquaculture (in 1,000 Baht) | 62.38 (353.30) | 68.02 (87.27) | 0.68 |
| Total annual consumption expenditures (in 1,000 Baht) | 95.62 (251.80) | 78.13 (41.77) | **0.04**** |
| Monthly consumption expenditure per adult equivalent (Baht) | 2,992 (7,298) | 2,498 (1,329) | **0.05**** |
| *Human capital* | | | |
| Age of household head (Years) | 56.03 (29.88) | 55.94 (8.30) | 0.94 |
| Gender of household head (male = 1) | 87.84 | 82.87 | 0.23 |
| Household size (Persons) | 4.72 (4.97) | 4.60 (1.14) | 0.53 |
| Education level of household head (Years) | 6.15 (10.59) | 5.33 (2.37) | 0.04** |
| Experience in rice cultivation (Years) | 38.20 (40) | 37.25 (9.35) | 0.52 |
| Dependency ratio (%) | 37.04 (140) | 37.13 (49.27) | 0.99 |
| *Social capital* | | | |
| Member of cooperative (yes = 1) in % | 81.16 | 65.25 | 0.0029* |
| Participation in village meetings (yes = 1) in % | 89.46 | 78.95 | 0.02** |
| Bargaining power (yes = 1) in % | 1.9 | 0.36 | 0.03** |
| Access to information on GI (yes = 1) in % | 66.13 | 38.5 | 0.000**** |
| Trust in rice mills yes = 1) in % | 9.54 | 7.29 | 0.52 |
| Member in rice seeds group (yes = 1) in % | 14.26 | 11.82 | 0.55 |
| Followed Good Agricultural Practice (GAP) (yes = 1) in % | 52.44 | 24.26 | 0.000**** |
| *Institutional factors* | | | |
| Time to markets (hours) | 0.97 (2.46) | 0.92 (0.51) | 0.58 |
| Transportation costs (Baht) | 302.84 (1,927) | 201.41 (323.83) | 0.14 |
| *Poverty status* | | | |
| Poor (using national poverty line) (yes = 1) in % | 20.91 | 34.43 | **0.014**** |
| Poor (using poverty line of Northeast region (yes = 1) in % | 18.43 | 30.54 | **0.02**** |

**Notes**: * significant at α = 10%; ** significant at α = 5%; *** significant at α = 1%; **** highly significant at α = 0.1%
Standard deviation is in parenthesis; P-values are given in the column test of significance.

Source: Own calculations

### *4.2 Results of PSM Procedures*

Table 2 reports the coefficient estimates from the propensity score model.[3] The results inTable 2 indicate that GI households headed by young household heads are more likely to pursue this newly introduced livelihood strategy based on the information about GI they got from the governmental bodies. The significant result

[3] In the literature, it is still unclear how to accommodate sampling weights in the context of matching. However, the selection and matching procedures can still be implemented using propensity scores fit on choice-based samples with misspecified weights. This is because only a monotonic transformation of the propensity score is required when implementing both matching and classical selection models. In the choice-based samples, odds ratio of the propensity score estimated with misspecified weights is monotonically related to the odds ratio of the true propensity scores (Todd, 2006; Heckman & Todd, 2009). Froelich (2007) stated that the PSM can be used to estimate both the adjusted means and their distributions even with non-iid sampling. Hence, the analysis was run with and without the sampling weights providing conclusive results.

on age squared indicates that the relationship between age and the logit is non-linear. Thus, with increasing age, the household heads are less likely to adopt GI certification. The social capital also significantly determines the participation in the GI system of the TKR households in particular those who are members of the agricultural cooperatives and often participate in the village meetings.

**Table 2. Propensity Score Model Coefficient Estimates**

| **Variables** | **Coefficient** | **z** | **P>\|z\|** |
|---|---|---|---|
| Age of household head | -0.043850 | -2.02 | **0.043** |
| Age of household head squared | 0.000683 | 3.27 | **0.001** |
| Gender of household head | 0.067283 | 0.23 | 0.820 |
| Education of household head | 0.015233 | 0.45 | 0.654 |
| Experience | 0.000706 | 0.06 | 0.951 |
| Household size | 0.090968 | 1.19 | 0.233 |
| Dependency ratio | -0.002190 | -0.95 | 0.343 |
| Off-farm employment | 0.203032 | 0.83 | 0.408 |
| Log yield | -0.441571 | -0.52 | 0.600 |
| Good Agricutural Practice (GAP) | -0.286837 | -2.08 | **0.037** |
| Rice seeds group member | -0.364547 | -1.28 | 0.202 |
| Information | 0.994815 | 4.20 | **0.000** |
| Membership of cooperative | 1.3986 | 5.75 | **0.000** |
| Participation in village meetings | 0.882201 | 2.45 | **0.014** |
| Log time to markets | 0.202998 | 1.18 | 0.239 |
| Constant | -2.61228 | -2.39 | 0.017 |
| Observations (Common support) | 505 (503) | | |
| GI = 1 | 169 (169) | | |
| GI = 0 | 336 (334) | | |
| Log likelihood | -269.68 | | |
| LR Chi2 | 104.43 | | |
| Prob>Chi2 | 0.0000 | | |
| Pseudo R2 | 0.1622 | | |

**Notes**: A separate set of logit regressions was computed adjusted for sampling weights. However, the use of sampling weights led to very minor changes, i.e. slightly lower significance levels for few coefficients when sampling weights were applied and all significant coefficients are the same as the ones from the logit regression without the sampling weights. The results in this table do not consider sampling weights.

Source: Own calculations

## Table 3. Balancing Tests of PSM: Difference in Ex-Ante Variables

| Panel A: Mean tests and bias reduction | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Variable** | **Sample** | **Mean** | | **Mean test*** | **P-Value** | **% Bias** | **% Bias reduction** |
| | | **Treated** | **Control** | | | | |
| Propensity score | Unmatched | 0.47 | 0.27 | 11.41 | **0.000** | 105.2 | |
| | Matched | | 0.47 | 0.06 | 0.952 | 0.7 | 99.3 |
| Age of household head | Unmatched | 56.37 | 54.77 | 1.61 | 0.109 | 15.3 | |
| | Matched | | 56.91 | -0.51 | 0.608 | -5.2 | 66.0 |
| Age of household head squared | Unmatched | 3133.4 | 2747 | 3.50 | **0.001** | 32.6 | |
| | Matched | | 3141.8 | -0.07 | 0.947 | -0.7 | 97.8 |
| Gender of household head | Unmatched | 0.86 | 0.80 | 1.83 | **0.068** | 17.7 | |
| | Matched | | 0.83 | 0.82 | 0.415 | 8.5 | 51.8 |
| Education of household head | Unmatched | 6.43 | 6.11 | 1.02 | 0.309 | 9.6 | |
| | Matched | | 6.44 | -0.02 | 0.988 | -0.2 | 98.2 |
| Experience | Unmatched | 37.02 | 34.34 | 2.26 | **0.024** | 21.1 | |
| | Matched | | 38.04 | -0.76 | 0.450 | -8.0 | 62.2 |
| Household size | Unmatched | 4.80 | 4.65 | 1.13 | 0.259 | 10.5 | |
| | Matched | | 4.78 | 0.16 | 0.875 | 1.8 | 83.3 |
| Dependency ratio | Unmatched | 41.67 | 39.94 | 0.37 | 0.714 | 3.5 | |
| | Matched | | 41.52 | 0.03 | 0.977 | 0.3 | 91.0 |
| Off-Farm employment | Unmatched | 1.31 | 1.26 | 1.15 | 0.251 | 10.7 | |
| | Matched | | 1.30 | 0.35 | 0.724 | 3.9 | 63.6 |
| Log yield | Unmatched | 0.23 | 0.24 | -0.61 | 0.543 | -5.7 | |
| | Matched | | 0.23 | -0.03 | 0.979 | -0.3 | 95.1 |
| Good Agricutural Practice (GAP) | Unmatched | 1.66 | 1.98 | -4.07 | **0.000** | -38.7 | |
| | Matched | | 1.61 | 0.52 | 0.603 | 5.3 | 86.2 |
| Rice seeds group member | Unmatched | 0.18 | 0.18 | -0.03 | 0.977 | -0.3 | |
| | Matched | | 0.16 | 0.41 | 0.686 | 4.3 | -1468.0 |
| Information | Unmatched | 0.69 | 0.45 | 5.36 | **0.000** | 51.1 | |
| | Matched | | 0.69 | 0.09 | 0.925 | 1.0 | 98.1 |
| Membership of cooperative | Unmatched | 0.82 | 0.53 | 6.60 | **0.000** | 64.7 | |
| | Matched | | 0.82 | 0.00 | 1.000 | 0.0 | 100.0 |
| Participation | Unmatched | 0.92 | 0.86 | 2.07 | **0.039** | 20.3 | |
| | Matched | | 0.93 | -0.29 | 0.770 | -2.7 | 86.8 |
| Log time to markets | Unmatched | -0.26 | -0.32 | 0.96 | 0.337 | 9.0 | |
| | Matched | | -0.27 | 0.07 | 0.947 | 0.8 | 91.4 |
| **Panel B: Pseudo R2 before and after Matching** | | | | | | | |
| **Matching algorithm** | **Sample** | **Pseudo R2** | | | | | |
| Nearest Neighbor Matching (NNM) | Unmatched | 0.168 | | | | | |
| | Matched | 0.008 | | | | | |
| Kernel Matching (KM) | Unmatched | 0.168 | | | | | |
| | Matched | 0.006 | | | | | |
| Radius Matching (RM) | Unmatched | 0.168 | | | | | |
| | Matched | 0.007 | | | | | |

**Note: *** t-tests for continuous variables and Pearson chi-square tests for categorical variables.

Source: Own calculations

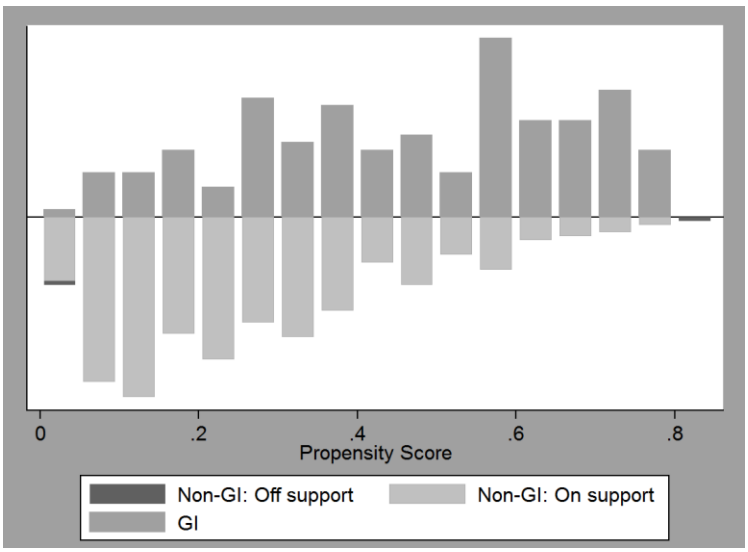
Table 3 presents results of balancing tests of ex-ante variables. Panel A shows the paired *t* and chi-square statistics on the differences in the variable means between GI households and the matched sample of non-GI households. In addition, the table also displays the percentage reduction in bias from the unmatched to the matched sample. The matched sample was processed using the NNM, the KM and the RM methods

with the psmatch2 program for Stata. Observations outside the common support were discarded. Of the 505 observations, 2 observations from the non-GI group were discarded for the three algorithms leaving a sample size of 503 observations.

In Panel A of Table 3, results of the t-tests and Pearson chi-square tests show that the conditioning variables are well balanced. Matching works well regarding the pretreatment variables such as gender, experience, Good Agricultural Practice (GAP), information, member of cooperative and participation that differed considerably between the GI and non-GI groups before matching. The balance between the GI and non-GI groups is improved by around 50 percent using all three matching estimators for the unmatched sample for 7 of 15 variables. The average reduction bias is 90 percent. All three algorithms reduce bias and are preferable to the unmatched sample.

Figure 3 illustrates the distribution of the propensity score before and after matching. It shows that the model specification is able to balance the ex-ante variables across the GI households and their matches. As shown in Table 3, the matching procedure reduced bias in the propensity score, i.e. probability of adopting the GI certification scheme, by 95 percent.

**Figure 3. Distribution of Propensity Scores for GI and Non-GI Farm Households**




Source: Own calculations

The second balancing test re-estimates the propensity score on the matched sample and compares the *pseudo-$R^2$* before and after matching (Sianesi, 2001). The *pseudo-$R^2$* indicates how well the regressors explain the probability of adopting GI certification. After matching there should be no systematic differences in the distribution of covariates between both groups. Hence, the *pseudo-$R^2$* should be fairly low after matching (See e.g. in Heinrich, Maffioli & Vázquez, 2010). The *pseudo-$R^2$* in Panel B in Table 3 approaches zero for all algorithms after matching. The study demonstrates the substantial overlap (common support) in propensity scores between the treated and control households. Furthermore, with the large sample size of 505 households, the large sample requirement of Shadish et al. (2002) is also satisfied.

Table 4 gives the results of matching estimates how GI certification adoption affected the households' welfare (log consumption expenditure per adult equivalent) and poverty reduction (household poverty (national) and household poverty (Northeast)).[4] The results show that estimates of the 5-NNM, the KM and the RM for log expenditure per adult equivalent are 0.15, 0.13 and 0.11, respectively which are significant at 5% (for NNM) and 10%, respectively. This suggests that the welfare of households adopting GI certification is significantly higher than the ones not adopting the GI certification.

Table 4 also demonstrates the impact estimates of the three matching estimators for poverty reduction outcomes and shows that they are almost the same, i.e. either 0.11 or 0.12 which are significant at 5%. This suggests that GI certification adoption has a positive and significant effect on poverty reduction. It is apparent that the incidence of poverty (poverty headcount) is lower among GI farm households than non-GI farm households when taking the poverty line both at the national and the Northeast Regional level into consideration.

[4] The results reported in this table do not consider sampling weights. With stratified sampling, the propensity score estimator generally must take account of the sampling weights. However, under certain conditions on the stratification scheme, sampling weights can be neglected for the propensity score, but need to be accounted for in the weighted matching estimator. In the presence of choice-based sampling, however, the sampling weights can be neglected in any case (Froelich, 2007).

**Table 4. GI Adoption Effect on Households' Welfare and Poverty Matching Estimates**

| Estimates | Matching estimators | | |
|---|---|---|---|
| | **NNM (5)** | **KM** | **RM** |
| Log consumption expenditure per adult equivalent | 0.15** | 0.13* | 0.11* |
| | (1.98) | (1.82) | (1.67) |
| Household poverty (national) | -0.12** | -0.12** | -0.11** |
| | (2.27) | (2.42) | (2.21) |
| Household poverty (Northeast) | -0.11** | -0.12** | -0.11** |
| | (2.24) | (2.42) | (2.38) |
| Balancing property satisfied | yes | Yes | yes |
| Common support imposed | yes | Yes | yes |
| Observation total | 505 | 505 | 505 |
| Treated | 169 | 169 | 169 |
| Controls | 334 | 334 | 334 |

**Notes**: *t*-statistics in parenthesis; * Significant at α = 10%; ** Significant at α = 5%; *** Significant at α = 1%.
Source: Own calculations

### *4.3 Sensitivity Analysis*

The impact evaluation of GI certification adoption needs to answer the question whether the apparent effect of GI adoption on the households' welfare and poverty indicators compared to the control household group is due to the GI certified status or some unobserved characteristics of GI farm households compared to the non-GI farm households. PSM can only control for observables but it cannot control for unobservables (Caliendo & Kopeinig, 2005 and 2008). Thus, it is recommended that sensitivity analyses should be used to check whether it is to inform discussions of hidden bias due to unobserved covariates. This should be especially done in an observational study in which the treatment and control groups look the same in terms of observed covariates and in consequential way in terms of unmeasured covariates (Lin, Psaty & Kronmal, 1998; Rosenbaum, 2002 and 2010). As stated in the literature e.g. of Ichino, Mealli & Nannicini (2008), sensitivity tests should always complement the presentation of matching estimates.

The sensitivity analysis using the Rosenbaum bounds approach is based on the basic question whether unobserved heterogeneity (hidden bias) between the treatment and control cases can alter inference about treatment effects and what happens when there are deviations from the underlying identifying CIA. This approach does not test

the CIA itself, instead it provides evidence on the degree to which any significant results hinge on this untestable assumption (Becker & Caliendo, 2007). This approach can be implemented by using the Stata's commands *rbounds* and *mhbounds.* Rosenbaum (2002) suggested to imagine a number Γ which captures the required degree of association of an unobserved characteristic with the treatment. Γ is the odds ratio, i.e. the ratio of odds, that the treated units have this unobserved characteristic to the odds that the control have this characteristic (Rosenbaum, 2002, p. 106).

*Rbounds* tests the sensitivity for the continuous outcome variable: log consumption expenditure per adult equivalent. For the increase in the log consumption expenditure per adult equivalent, the sensitivity analysis procedure is based on the Wilcoxon's sign rank test and the Hodges-Lehmann point estimate for the sign rank test. *Mhbounds* focuses on the two binary outcomes variables: poverty (national) and poverty (Northeast). The procedure calculates Mantel-Haenszel (MH) test statistics that give bound estimates of significance levels at a given level of a hidden bias of size Γ under the assumption of either systematic under- or overestimation of treatment effects. The assumption of overestimation of treatment effects is relevant when the expected treatment effect is positive, i.e. poverty reduction due to GI certification adoption. Several values of Γ are considered. A study is sensitive if values of Γ are close to 1 leading to inferences that are very different from those obtained assuming the study is free of hidden bias (Γ = 1). A study is then insensitive if extreme values of Γ are required to alter the inference (Rosenbaum, 2002). Sensitivity analysis was conducted on all the outcome variables presented in Table 5; testing the sensitivity of all impact estimates.

The second column in Table 5 gives the results of the sensitivity analysis for the significance levels from Wilcoxon's signed test of log consumption expenditure per adult equivalent. The range of possible significance levels for various values of Γ is presented. The upper bounds on the significance levels for Γ = 1, 1.10, 1.20 and 1.30 are 0.01, 0.04, 0.09 and 0.20, respectively. The study is insensitive to a bias that would change the odds of exposure to GI adoption by up to 20 percent implying that the hidden bias is not likely to explain the observed association between exposure to

GI adoption and increased household welfare. However, when Γ = 1.3 or more, the study is sensitive to a bias that would change the odds of GI adoption by 30 percent or more. This means that such an unobserved confounding variable, i.e. unobserved characteristics that account for GI adoption and/or its welfare impact, exists. The household welfare impact estimate thus overstated and should be treated with caution.

**Table 5. Rosenbaum Bounds Sensitivity Analysis Tests for Hidden Bias**

| Gamma (Γ) | Outcome variables | | | | |
|---|---|---|---|---|---|
| | Log consumption expenditure per adult equivalent | Poverty (national) | | Poverty (Northeast) | |
| | p-critical | $Q_{MH+}$ | $P_{MH+}$ | $Q_{MH+}$ | $P_{MH+}$ |
| 1 | 0.01062 | 1.8650 | 0.03109 | 1.5917 | 0.05573 |
| 1.10 | 0.0385 | 2.2483 | 0.01228 | 1.9530 | 0.02541 |
| 1.20 | 0.0996 | 2.5982 | 0.00468 | 2.2829 | 0.01122 |
| 1.30 | **0.2004** | 2.9220 | 0.00174 | 2.5884 | 0.00482 |
| 1.40 | 0.3334 | 3.2237 | 0.00063 | 2.8732 | 0.00203 |
| 1.50 | 0.4802 | 3.5064 | 0.00022 | 3.1402 | 0.00084 |
| 1.60 | 0.6204 | 3.7726 | 0.00008 | 3.3917 | 0.00035 |
| 1.70 | 0.7394 | 4.0243 | 0.00003 | 3.6295 | 0.00014 |
| 1.80 | 0.8309 | 4.2631 | 0.00001 | 3.8554 | 0.00006 |
| 1.90 | 0.8957 | 4.4905 | <0.00001 | 4.0705 | 0.00002 |
| 2 | 0.9386 | 4.7076 | <0.00001 | 4.276 | <0.00001 |

**Notes**: The reported p-critical values are the upper bounds on the significance levels resulting from the Wilcoxon's sign test. The results of the Hodges-Lehmann point estimate for the sign rank test are not reported here. They can be obtained from the author upon request. $Q_{MH+}$ is the reported Mantel-Haenszel (MH) statistics under the assumption of overestimation of the treatment effects. The corresponding p-value is reported as $P_{MH+}$. Given the positive estimated treatment effect, the bounds under the assumption that we have underestimated the true treatment effect ($Q_{MH-}$) are less interesting.

Source: Own calculations

Consequently, we can argue that the observed impact of GI certification adoption on household welfare is not significantly different from zero, and the association between GI adoption exposure and a higher level of household welfare may well be due to unobservables. However, this sensitivity result presented here is considered as a worst-case scenario. It does not mean that with a critical value of 1.3 an unobserved heterogeneity really exists and does not prove that GI certification adoption has no positive effect on the household welfare. It only states that the confidence interval for the effect would be zero if an unobserved variable caused the odds ratio of GI adoption to differ between GI and non-GI groups by a factor of 1.3. The Rosenbaum

bounds are quite conservative, i.e. they are valid regardless of the strength of the effect of the treatment on the outcome. Furthermore, they assume that the unobserved or confounding variable has a far stronger effect on the outcome variable than we might *a priori* predict. Nonetheless, these sensitivity tests convey important information about the level of uncertainty contained in matching estimators and allow the quantification of selection on unobservables (DiPrete & Gangl, 2004). Based on this sensitivity result for welfare impact estimate, even though PSM fails to account for unobservables which are quite likely to exist, it can still be used to estimate even if selection is on unobservables, as shown in some literature e.g. Froelich (2007). Thus, we can still conclude that the ATT estimate for household welfare is a pure effect of GI certification adoption.

The last two columns of Table 5 report the sensitivity analysis for Mantel-Haenszel (MH) statistics under the assumption of overestimation of the treatment effects ($Q_{MH+}$) and corresponding p-value ($P_{MH+}$). The results show that to explain away the observed association between poverty alleviation and GI adoption, a hidden bias or unobserved covariate would need to increase the odds of adoption by extreme values of $\Gamma$ meaning that the association cannot be attributed to small hidded biases and the study is then insensitive. Thus, the positive and significant effects of GI certification adoption on the poverty reduction obtained are robust to the possibility of hidden bias from unmeasured variables.

## 5. Conclusion and Policy Recommendation

This paper evaluates the impact of the GI certification adoption on rural household welfare and rural poverty. A positive and significant effect of GI certification adoption on the household welfare and poverty alleviation has been found when conducting the Propensity Score Matching analysis. Given a conservative nature of the Rosenbaum bounds and their strong assumption of the effect of a confounding variable on the outcome variable, we can still conclude that the positive household welfare is a pure effect of the GI certification adoption.

Using cross-sectional data in analyzing poverty, this study can only observe how the poverty incidence has been changed due to GI introduction. Without longitudinal data, we cannot study the dynamic impact of implementing the GI system for rural

livelihoods. Nevertheless, this study provides a snap shot of poverty reduction and the welfare improvement of Jasmine rice farm households in the TKRH area. The positive effect of GI can only last longer given the active and sustainable participation of all stakeholders in the GI product value chain. This suggests the challenge for the local and national policy makers and policy implementers to create transparency and a persuasive atmosphere among all stakeholders. The motivation of collective action and increase of the participation level within the GI value chain are also crucial, particularly for those TKR farm households who are unassertive to participate in this value-added process using a GI label. A long lasting positive impact of GI certification adoption on households' well-being and poverty reduction in rural communities depends on the awareness and the rate of adoption of the TKR farm households to make use of their embedded right to apply for GI certification. Hence, the GI registration system should be sustainable, well-functioning and for the producers reachable in order to facilitate the registration process for GI certification to the TKR farm households.

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# Geographical Indication Protection and Rural Livelihoods: Some Insights from Asia

Pradyot R. Jena, Chuthaporn Ngokkuen, Ulrike Grote

**Abstract**

This paper synthesizes the results from two empirical case studies undertaken in India and Thailand regarding the welfare impacts of geographical indications (GIs). Our findings support a positive effect of GI protection on the livelihoods of farm households in rural communities. GI adoption increases well-being of rural farm households and reduces rural poverty. Our findings also support a call for stronger intellectual property rights protection. GI protection is essential for rural livelihoods not only in terms of its economic prominence, but it also preserves the traditional knowledge embedded in a GI good as well as the traditional heritage of the locality that produces the good.

**Keywords:** Geographical indication, impact evaluation, Basmati rice, Jasmine rice, propensity score matching, Heckman selection model

## I. Introduction

The emergence of geographical indications (GIs) in the last decade as collective Intellectual Property Rights (IPRs) to protect traditional goods such as agricultural goods, handicrafts and hand-made textiles has implications for both consumers and producers of such goods. Consumers of GI goods benefit from the quality assurance provided by the GI protection that helps them overcome the asymmetric information problem. The goods that have successfully qualified for GI protection carry a GI logo when they are marketed. These GI symbols act as a quality and origin signal to the consumers who in absence of such logo would have incurred significant transaction costs for quality assurance (Rangnekar, 2004; Jena and Grote, 2010). Saving these transaction cost creates an incentive for the consumers to pay a price premium for the GI good (Stigler, 1961), which again creates an incentive for the producers to produce the GI good. Apart from the price premium benefit for producers, producers also benefit from the limited supply that is ensured by GI protection. By successfully

delimiting the geographical boundary of the production of a good, GI protection effectively controls the supply which in turn raises the price of the good and creates economic benefits for the producer. Furthermore, GI protection preserves the traditional heritage of the locality that produce a GI good which has positive externalities both in the short and long run.

The focus in the current paper is to measure the likely benefits of GI protection for the producers. Our paper makes use of two empirical case studies to provide some insights regarding the welfare impacts of GI protection for smallholder farmers. The case studies are based on Basmati rice from India and Jasmine rice from Thailand. While the first case study refers to a potential likely GI, the second one focuses on an established GI. Basmati is not yet a legal GI in its country of origin(s) i.e. both India and Pakistan on account of reasons ranging from Basmati's cross-border spread in two countries to selection of varieties of the rice that qualifies for GI registration[1] (Rangnekar and Kumar, 2010; Das, 2009; Giraud, 2008). Jasmine rice has been granted GI registration in Thailand in 2007 (Ngokkuen and Grote, 2012). The purpose of combining these two case studies is to show the implications of GI registration for the livelihood of smallholder farmers from the period of transition to establishment of GI protection.

The existing literature about income and welfare impacts of GI products on producers is scarce and limited in their selection of method of analysis. Most of the empirical studies used rather a descriptive analysis of price increases of GI goods before and after the GI registration to show the monetary benefits of a GI. The key issue in this branch of research is to measure the magnitude of impact and to distinguish it from other factors that may play a role in shaping the overall performance indicators. Keeping this broad objective in mind, this paper has employed a treatment vis-à-vis control group in which the treated farmers are the adopters of either Basmati rice or Jasmine rice and the control farmers are the non-

[1] The debate surrounding a US-based company Rice Tec's patenting of Basmati rice and subsequent legal wrangling between the Government of India and the company over the patent is well documented in many studies (Rangnekar and Kumar, 2010; Marie-Vivien, 2008). Finally, Rice Tec had to withdraw the patent yet it was the beginning of a real concern in developing countries especially in India about protection of the so-called unique goods originating in these countries.

adopters who cultivate other varieties of rice. The paper uses propensity score matching method and Heckman selection method to correct for the selection bias related endogeneity.

The paper is structured as follows – section 2 provides a review of the literature. Data collection methods and empirical models are explained in section 3. Section 4 presents the empirical results and finally concluding observations are laid out in the last section.

## 2. Literature Review

GI products expressing the peculiarities of rural areas are regarded as one of the most evident manifestations of locality and often play a central role in the rural development strategies carried out by local actors in rural areas (Belletti et al., 2002). The production, processing and/or preparation of these GI products usually take place in the defined geographical region (Loureiro and McCluskey, 2000). The link of a GI product with its area of origin makes it unique and may represent an important differentiation leverage for producers to gain a price premium coming from the intrinsic quality of the product and/or from the image of the area it comes from (Belletti et al., 2001; Giovannucci et al., 2009).

A number of papers analyzing the attitude of consumers towards GIs by evaluating their willingness to pay (WTP) do confirm a positive WTP for GI products. Loureiro and McCluskey (2000) for example found that GI labels for high quality cuts of meat like the Spanish Glacian Veal can obtain a premium. Hassan and Monier-Dilhan (2006) in their analysis of the WTP for French GI ham also stated that GI ham price is about 15% higher than the average price. The Italian Tuscany olive oil case study conducted by Origenandino (2008) reported a 20% increase of the price for this olive oil since it was registered as a GI in 1998. Not only the consumers in developed countries are willing to pay for the price premium for quality products, also the consumers in developing countries demand such quality products and are somewhat willing to pay for the higher price. Seetisarn and Chiaravutti (2011) used auction methodology to study the WTP of 60 participants for three GI food products, i.e. Doi

Tung Coffee, Thung Kula Rong-Hai Thai Hom Mali Rice (TKR) and Chaiya salted eggs. The results suggest the influence of the GI label on the participants' WTP. However, since the origin of each product was also printed on the label together with the GI sign, there is no confirmation that the GI label can create an influence on the participants' WTP for Doi Tung Coffee and Chaiya salted eggs. But the GI label did have an influence on the consumers' WTP for the TKR.

Supported by empirical evidence of both developed and developing countries, price premia ensured by GI protection, thus, have been accrued to GI goods based on their place of origin and their special quality. The price premium may give origin to economic rents which benefit both owners of the assets used in the production process of GI products, and other actors whose assets are directly or indirectly connected to the GI products. However, the rent of origin can guarantee only a normal remuneration for the assets which are less efficient than the standard ones. In fact, production costs of such typical products as GIs are much higher than "conventional" (or industrial) ones due to the use of labor-intensive and traditional techniques in the production process. And this is often realized in marginal or disadvantaged areas (Belletti et al., 2001).

Several other theoretical and empirical papers investigating the welfare implications of GIs have been provided. A theoretical study of Zago and Pick (2004) e.g. found that producers of high-quality goods are better off, while producers of low-quality goods are worse off. The study of Lence et al. (2007) highlighted that stronger intellectual property right protection for producer organizations may enhance welfare even after a differentiated product has been developed. A supportive role of GI certification on a competitive provision of quality was found e.g. by Moschini et al. (2008). They concluded that if the production of high-quality products is drawn on scarce factors which the producers own, these producers may reap some benefits. Likewise, in a comparison study of Darjeeling and Oolong teas, Kolady et al. (2011) showed that the benefits sharing from a GI going to producers/landowners increases with a less elastic supply of land or with more elastic demand for output, or with increased elasticity of substitution between land and other inputs, all of which

increase the derived demand for land. And in extreme case, when the supply of land is fixed or perfectly inelastic, all benefits from a GI go to landowners. They suggested that countries must select their GIs very carefully as the confluence of product familiarity in international markets and land ownerships patterns which are needed for the generation and widespread distribution of benefits will be rare events.

Anders et al. (2009) used the equilibrium displacement model for markets segmented by regional-origin labeling with quality to investigate the role of governmental support levels on farmers' welfare. They found that welfare implications for producers crucially depend on costs of participation including quality control and on the co-financing mechanism between the government and producers.

Menapace and Moschini (2011) developed a reputation model to assess the role of certification for agricultural and food products with GIs in a context. They concluded that if their assumption that all factors of production are in perfectly elastic supply is relaxed, it is possible to envision benefits to GI producers that are not accounted for in their model. Likewise, the study of Mérel and Sexton (2011) found that by providing a credible certification mechanism to establish product quality, the GI framework has a clear potential to improve producer welfare. Consumers can receive also correct information on product quality.

Further papers which relate the concept of rural development directly to the concepts of rural livelihoods have focused on the impacts of GI adoption on rural development. Tregear et al. (2007) conducted a case study and examined the role of product qualification for regional foods in rural development. Their overall results suggested that the product qualification is a means by which local actors can attract revenues from non-local actors and institutions. Applying a microeconomic model with the co-operation of farmers for the production of a differentiated agricultural good, Callois (2004) found that there is a trade-off between the number of differentiated farmers and their individual income. His results implied that the rise in some farmers' income does not benefit the rural region as a whole. On the contrary,

this income rise benefits urban workers who get a higher wage and can improve their utility while consuming new products.

## 3. Background Information, Data and Empirical Methods

The following section provides some background information, describes the sampling method and briefly characterizes the area of survey in both case studies. Furthermore, the theoretical underpinning as well as empirical methods are discussed.

### 3.1 Background information

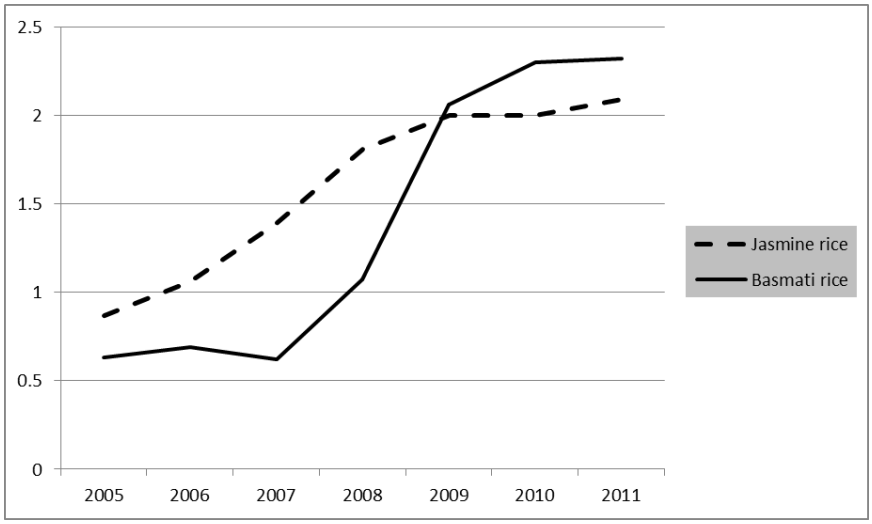
Rice is important to India and Thailand not only because it is a major staple food for domestic consumption, but also because its exports to the world market have resulted in considerable export revenues for the countries in general and for the individual rice farmers in particular. As shown in Figure 1, the export values of Basmati and Jasmine rice have gone up every year since 2005.

In Thailand, approximately a third of the total rice export value stemmed from exporting Jasmine rice which brought foreign currency of around US$ 2 billion to the country in 2011. Jasmine rice export makes up for more than a quarter of Thai rice exports each year.

Similarly, Basmati rice is considered as potentially one of India's most valued GIs. It is an established brand in the international market and is known for its specific characteristics such as aroma and size of the grain in contrast to relatively recent GIs such as *Feni* liquor from Southern India that still need investments into their marketing. This also means that the former has a large export market whereas the latter is yet to create its brand name (Jena and Grote, 2010). Nearly two-thirds of all Basmati rice produced in India is exported. Its total export earnings during 2010-11 were close to Rupees (Rs.) 105.7 billion (approximately US$ 2,321 million), which accounts for about 98% of total rice exports (see Table 1). Its share of total agricultural exports was about 24%, which is quite significant. Furthermore, according to FAO (2008), Basmati trade (from both India and Pakistan) has

increased from 5.2% to 8.3% of all rice world trade from 2003 to 2008, with a record of 2.45 million tons on milled basis. Recent volatility in prices of agricultural commodities has affected the rice trade market, but Basmati trade remained unaffected and its price is still the highest among all the rice varieties in the world rice market.

**Figure 1. Total export value of Basmati and Jasmine rice from 2005-2011 in billion US$**




Source: Own presentation based on data from India's Agricultural and Processed Food Products Export Development Authority (APEDA) (2011) and from Thailand's Office of Agricultural Economics (OAE) (2011)

Under the purview of "The Geographical Indications of Goods (Registration and Protection) Act, 1999" (GI Act) which came into force with effect from 15 September 2003 in India, the Central Government of India has established the 'Geographical Indications Registry' with all-India jurisdiction at Chennai, where the right holders can register their GIs.

An application for GI registration for Basmati rice was forwarded to the GI Registry of the Government of India way back in 2004 (Geographical Indications Registry, 2006) and subsequently several attempts have been made to ensure a national GI registration for Basmati rice which continues to date. Rangnekar and Kumar (2010)

have offered certain alternative models through which a successful GI registration can be contemplated for Basmati.

In Thailand, there is the "Act on Geographical Indications Protection" since 2003. Under this Act, the provincial governmental bodies had applied for registration of their *Thung Kula Rong-Hai Thai Hom Mali Rice (TKR)* as GI at the Department of Intellectual Property (DIP) under the Ministry of Commerce of Thailand. The *TKR* was registered in September 2007 and is regarded as the first GI Jasmine rice in Thailand. It is the most popular GI rice from the Northeast, bears a well-known denomination and has a particular appeal to foreign markets. Its exports mainly go to the European Union (EU) where there is an attempt for its registration with the EU GI Registry.

### 3.2 Sampling and area of data collection in India and Thailand

Basmati rice in India is grown in the states of Haryana, Uttar Pradesh, Punjab, Jammu Kashmir, and Uttarakhand. The survey has been undertaken in the Uttarakhand state which is situated in the Northern part of India on the foothills of the Himalayas. The state is believed to have been home to Basmati cultivation since long and several varieties of Basmati such as Type-3 (Dehradun Basmati), Pusa Basmati 1, Basmati 370, Taraoari Basmati, Sugandh 4 and Kasturi are cultivated in the state[2] (Singh et al., 2006). Furthermore, a sizable number of small-scale farmers predominantly depend on agriculture for their livelihoods in the state. Basmati rice is cultivated in four districts of Uttarakhand such as Hardwar, Udham Singh Nagar, Dehradun and Nainital. The topography of these districts can be divided into two distinct production environments such as plains and hills. Both Dehradun and Hardwar belong to the plain areas where soil is highly fertile, irrigation facilities are well in place and climatic conditions suit higher yields; on the other hand, Udham Singh

[2] Different varieties of Basmati seed can be grouped under two categories such as traditional variety and evolved variety. The traditional varieties are – Basmati-370, Basmati-386, Type-3, Taraori Basmati (HPC-19), Basmati-217 and Ranbir Basmati (IET-11348) (Nagaraju et al., 2002). Evolved varieties are – Pusa Basmati-1 (IET-1064), Super Basmati, Punjab Basmati-1 (Bauni Basmati), Haryana Basmati-1 (HKQ-228/IET- 10367), Mahi Sugandhi and Kasturi. It is important to note that – EU recognizes all the six traditional varieties and two evolved varieties such as Pusa Basmati-1 (IET-1064) and Super Basmati as the original Basmati from India (European Commission, 2004).

Nagar and Nainital belong to the hilly region with terrace topography that relies entirely on rainfall which resulted in poor productivity (Singh et al., 2006).

A sample of 299 farm households has been selected using a multi-stage sampling procedure for this study. In the first stage, Dehradun district is chosen on the basis of quantity of production. Out of the six blocks in Dehradun, Basmati rice is cultivated in four blocks, namely Vikasnagar, Sahaspur, Raipur, and Doiwala. In the second stage, 30 villages were randomly selected from the four Basmati producing blocks of the Dehradun district and finally, 10 households were randomly selected from each of the villages. A structured household survey has been undertaken in the selected villages during August-September 2008. It is to be noted that since villages differ in their population size, the probability weights are different for the samples drawn from the villages.

Jasmine rice involves millions of rural poor households in the Northeast of Thailand which is the delimited area for GI Jasmine rice production. From the two GI Jasmine rice products of the region, the *TKR* originating from the respective *Thung Kula Rong-Hai (TKRH)* area is regarded as one of the most well-known local peculiarities. The *TKRH* area with its unique sandy loam and rain-fed upland is a huge area covering 12 districts of five provinces: Roi Et, Surin, Srisaket, Mahasarakam, and Yasothorn.

We conducted a cross-sectional survey in two districts of the TKRH area, i.e. Kasetwisai and Rasrisalai districts from March to June 2009. A total representative sample of 541 randomly selected farm households including 180 GI households and 361 non-GI farm households was used for data analysis.

The field survey in both case studies was conducted using face-to-face interviews with a structured questionnaire including sections on farm household characteristics, the production pattern, farm and non-farm income, perception about GIs, social capital such as cooperation, trust and network building, bargaining power, obstacles in the GI registration procedure, costs and benefits of certification, assets,

expenditures on food and non-food consumption, shocks, borrowing and savings, and finally housing conditions of the farm households.

### 3.2 Empirical Strategy

The theoretical underpinning of this paper is based on Strengmann-Kuhn's (2000) definition of household welfare and Scoones's (1998) rural livelihood resources classification in his rural livelihoods framework. The household uses productive resources to derive monetary income. Added to this are any monetary transfers the household receives from the government or other households; subtracted are any private transfers given to the other households or taxes paid to the government. The disposable income is used for consumption and savings. Besides buying goods, it is also possible to use goods from home production or to receive them from other households or the government. All these goods together determine the household welfare and it is possible to measure welfare and poverty in all stages of this welfare production process (Strengmann-Kuhn, 2000).

The welfare function can be written as:

$$W_i = W\left(c_i^*(r_i); x_i\right) = W(r_i; x_i) \qquad (1)$$

where the resources of individual *i* are called $r_i$. The individual welfare $W_i$ is directly dependent on a bundle of goods $c_i$*, which is dependent on resources $r_i$. The bundles of goods $c_i$* may not necessarily be identical to the observable bundle of goods $c_i$, as preferences of the individual may differ from those preferences implied by the welfare function *W* defined by society. $c_i$* is the result of maximizing the socially-defined function $W_i$ subject to the available resources $r_i$. Relevant for poverty definitions is this value of $W_i$ which depends on an optimization process theoretically restricted by available resources. This is the well-known resource definition of poverty (Hagenaars, 1986; Strengmann-Kuhn, 2000). The empirical approach in this paper uses this resource-based welfare definition to estimate the welfare impacts of GI good production, treating the latter as a positive resource intervention or as an additional livelihood strategy which the individual farm household can pursue in

order to reach desirable outcomes, i.e. for example well-being improvement and poverty reduction. The underlying hypothesis is that benefits from GI protection enhance the adopters' resource base. Controlling for other sources of income, the GI producers are likely to experience a higher level of welfare compared to the non-GI producers who share almost the same level of socio-economic characteristics. The welfare function (1) is transformed into a reduced-form equation such as:

$$Y_i = \alpha_0 + \alpha_1 GI + \alpha_2 R_i + \alpha_3 H_i + \alpha_4 L_i + \varepsilon_i \qquad (2)$$

In (2) $Y_i$ is the welfare indicator proxied by net rice income and consumption of a household. *GI* is the positive resource intervention that is hypothesized to increase adopters' income level. $R_i$ is a vector of other resources that affect income. $H_i$ is a vector of household-specific characteristics which represents the social and cultural capital which can also affect the income level, and $L_i$ relates to land-specific characteristics such as elevation of land. $\varepsilon_i$ is the stochastic error.

The *GI* variable is a dummy taking value 1 if the household is a GI good adopter (Basmati or Jasmine rice farmer) and 0 if it is a non-GI rice farmer. If being a GI good producer - controlling for other factors - increases the welfare indicator $Y_i$ then the hypothesis that GI adoption increases producer welfare is supported. However, there could be an endogeneity problem in the above specification. The causality in specification (2) which states that a GI farmer earns more income than a non-GI farmer could as well flow in the reverse direction.

Endogeneity bias is well documented in the literature and is quite prevalent in cross-sectional studies (Heckman, 1979). To correct such self-selection bias, we have followed the propensity score matching method and a Heckman selection model for the Thai and Indian case studies, respectively (for more details on the methods for the Indian case study, see Jena and Grote, 2012).

## 4. Results and Discussion

The results of this paper are presented in three parts: first the case studies are compared with respect to some basic figures on yields and the livelihood situation of households. Second, the impact of GI adoption on household welfare in terms of consumption expenditures from the Basmati case study in India is analyzed and discussed followed by the Jasmine rice case study in Thailand.

### 4.1 Comparative figures on the two case studies

Comparative figures on yield, price, net rice income earned from one ha of land allocated to rice, and the poverty incidence for both GI and non-GI groups for both India and Thailand are provided in Table 1. Basmati is generally a low yielding rice variety compared to non-Basmati rice varieties. Basmati farmers have reported a yield of 2.75 tons per ha while the same for the non-Basmati farmers is 4.8 tons per ha. The price in PPP US$ per ton of paddy is substantially higher for Basmati, i.e. US$ 964 compared to non-Basmati rice which is US$ 421. The higher prices for Basmati compensate the lower yield and higher costs for it relative to the non-Basmati rice. This is evident in the net rice income earned per ha. Basmati farmers have earned US$ 1,930 per hectare compared to US$ 1,361 for the non-Basmati farmers. This is also evident in the lower poverty incidence for the Basmati farmers. Although, the poverty incidence for the whole sample is quite low, i.e. 13.4% owing to fertile land in the region and adequate access to off-farm sources of income, the poverty incidence for Basmati farmers is lower than for non-Basmati farmers.

**Table 1: Comparative figures on Yield, Price, Net rice income and Poverty incidence in India and Thailand**

| Indicators | India | | Thailand | |
|---|---|---|---|---|
| | Basmati | Non-Basmati | GI Jasmine | Non-GI Jasmine |
| Yield (ton/ha) | 2.75 | 4.8 | 1.43 | 1.4 |
| Price (US$ in PPP exchange rate/ton) | 964 | 421 | 804[b] | 790[b] |
| Net rice income (US$ in PPP exchange rate/ha) | 1,930 | 1,361 | 511 | 464 |
| Proportion of households below poverty line[a] (%) | 8 | 22 | 19 | 25 |

Note: [a] For Thailand, the consumption poverty line is used as baseline (Baht per month per capita). The poverty line for India is calculated using the World Bank poverty line of $ 1.25 at 2005 PPP exchange rate.; [b] Price of 2008 (after GI registration in 2007).

Source: Own calculations

Compared to Basmati, Jasmine rice has a much lower yield, lower price and amounts to a lower net rice income per ha. Both Jasmine farmer groups reported almost the same yield, i.e. of around 1.4 ton per ha. GI farmers reported a higher price of paddy rice, namely US$ 804 compared to US$ 790 for the non-GI group. The net rice income per ha for both Jasmine rice groups is very low compared to Basmati and non-Basmati groups which can be partly explained by the lower yields. However, the GI group has a slightly higher net rice income per ha amounting to US$ 511 as compared to the non-GI group with US$ 464. This is also evident in the lower poverty incidence for GI Jasmine farmers of 19% compared to 25% for the non-GI Jasmine farmers.

### 4.2 Welfare impacts in the Basmati case study

A mean comparison test between the Basmati and the non-Basmati groups reveals that there is significant difference between the groups in terms of both annual household income and daily per capita income. While the average annual income for the Basmati groups stands at Rs. 93,406 (€1,557 using an exchange rate of 1€ = Rs. 60) the same for the non-Basmati group is Rs. 73,949 (€1,233). The per capita income of the Basmati group is Rs. 55 as opposed to Rs. 40 for the latter. A further investigation of the different sources of income between these groups yields that the two groups differ significantly in terms of income from rice cultivation and off-farm income (which does not include remittances). Intuitively, this indicates that controlling for off-farm income, the income from rice cultivation affects the household income and hence requires to be analyzed whether Basmati cultivation plays any role in determining the household income.

Both OLS and Heckman selection models are estimated with the dependent variable being the net income from rice. The regression results are reported in Table 2. The estimated figures of the OLS regression show that the Basmati dummy is statistically significant and positive with a coefficient of 15.10. Since the model controls for the likely impacts from other explanatory variables on income, the magnitude of the Basmati coefficient shows the incremental income that Basmati rice cultivators have earned over their non-Basmati counterparts, which is in the order of Rs. 15,000. The

estimated coefficients from the Heckman selection model show that most of the variables retain their sign and level of significance between the two specifications that is with the organic certification and without the certification. The Basmati dummy is positive and highly significant with the coefficient of 15.12 (Col. 3). Hence, there is a consensus between both the models about the impact of the Basmati dummy on income. A household by choosing to cultivate Basmati rice over non-Basmati rice earns an increment of Rs. 15,000. Together with the findings from the descriptive statistics and from the regression results, it is evident that Basmati cultivation adds more income to an average household.

**Table 2: Income regressions**

| **Explanatory variables** | **OLS** | | **Heckman Endogeneity-corrected** | |
|---|---|---|---|---|
| | **With organic certification** | **Without organic certification** | **With organic certification** | **Without organic certification** |
| Intercept | - 26 (6.48)*** | -13.82 (6.7)** | -21.63 (7.24)*** | -6.66 (7.27) |
| Age | 0.04 (0.06) | 0.007 (0.07) | 0.04 (0.07) | 0.02 (0.07) |
| Edu dummy 1 | 2.61 (2.71) | 4.26 (2.68)* | 3.01 (2.42) | 5.21 (2.41)** |
| Edu dummy 2 | 3.10 (2.52) | 1.54 (2.39) | 2.76 (2.5) | 0.5 (2.53) |
| Basmati | 15.10 (2.16)*** | 10.62 (1.99)*** | 15.12 (2.26)*** | 10.55 (2.05)*** |
| Yield of rice | 5.21 (0.74)*** | 4.58 (0.8)*** | 4.9 (0.96)*** | 4.05 (0.95)*** |
| Land size | 1.81 (0.23)*** | 1.16 (0.25)*** | 1.72 (0.11)*** | 1.00 (0.14)*** |
| Cost of cultivation | -0.006 (.002)*** | -.005 (.002)** | -.007 (.002)*** | -.006 (.002)*** |
| Elevation of land | 1.53 (2.21) | 0.14 (2.38) | 1.12 (2.58) | -1.27 (2.83) |
| Idiosyncratic shock | -0.17 (1.93) | 2.10 (2.24) | -.17 (1.94) | 2.47 (2.04) |
| Covariate shock | -0.51 (2.96) | 2.8 (2.88) | -.56 (2.49) | 3.04 (2.75) |
| Household labor | 1.37 (2.02) | -.87 (1.81) | 1.25 (1.34) | -1.52 (1.38) |
| Observations | 237 | 159 | 292 | 201 |
| $R^2$ | 0.62 | 0.48 | | |
| Wald stat | | | 283.01*** | 112.10*** |
| Inverse-mills ratio | | | - 7.16 (3.84)*** | - 10.65 (3.5)*** |

Note: The estimated standard errors are in parenthesis. ***, **, and * show levels of significance at 1%, 5%, and 10%, respectively. The standard errors are estimated using the robust standard error method.

Source: Jena and Grote (2012).

Among the control variables, the amount of land owned is positively significant, indicating that land as an asset increases the income potential. As per the human capital is concerned, there are two dummy variables used for the education level of household heads in the regression. The education dummy 1 takes the value 1, if the household head has school education and the education dummy 2 takes the value 1, if the head has a college or university degree; otherwise 0 in both cases. School education is significant and positively contributing to rice income in the regression specification 2 where the organic GI group is excluded. The variable "higher than school level education" is not statistically significant which is due to the fact that only few household heads have such education level. The yield rate is, as expected, positive in its impact on income. Further, the unit cost of cultivation has been found to be significant and negative. The shock variables such as idiosyncratic shock and covariate shock are found to be statistically insignificant, but have the right sign, i.e. negative. Other control variables such as age of the household head, household labor (number of members of household in agriculture) and elevation of land have appeared with statistically insignificant coefficients.

### 4.3 Welfare impacts in the Jasmine case study

Table 3 reports the first stage logit coefficient estimates from the propensity score model. The results indicate that GI households headed by young household heads are more likely to pursue this newly introduced livelihood strategy based on the information about GI they got from the governmental bodies. The significant result on age squared indicates that the relationship between age and the logit is non-linear. Thus, with increasing age, the household heads are less likely to adopt GI certification. The social capital also significantly determines the participation in the GI system of the TKR households in particular those who are members of the agricultural cooperatives, follow the Good Agricultural Practice (GAP), and often participate in the village meetings.

**Table 3: Propensity Score Model Coefficient Estimates**

| Variables | Coefficient | z | P>\|z\| |
|---|---|---|---|
| Age of household head | -0.043850 | -2.02 | 0.043 |
| Age of household head squared | 0.000683 | 3.27 | 0.001 |
| Gender of household head | 0.067283 | 0.23 | 0.820 |
| Education of household head | 0.015233 | 0.45 | 0.654 |
| Experience | 0.000706 | 0.06 | 0.951 |
| Household size | 0.090968 | 1.19 | 0.233 |
| Dependency ratio | -0.002190 | -0.95 | 0.343 |
| Off-farm employment | 0.203032 | 0.83 | 0.408 |
| Log yield | -0.441571 | -0.52 | 0.600 |
| Good Agricutural Practice (GAP) | -0.286837 | -2.08 | 0.037 |
| Rice seeds group member | -0.364547 | -1.28 | 0.202 |
| Information | 0.994815 | 4.20 | 0.000 |
| Membership of cooperative | 1.3986 | 5.75 | 0.000 |
| Participation | 0.882201 | 2.45 | 0.014 |
| Log time to markets | 0.202998 | 1.18 | 0.239 |
| Constant | -2.61228 | -2.39 | 0.017 |
| Number of Observations | 505 | | |
| Pseudo $R^2$ | 0.16 | | |

Notes: With stratified sampling, the propensity score estimator generally must take account of the sampling weights. However, in the presence of choice-based sampling, the sampling weights can be neglected both for the propensity score and in the weighted matching estimator (Froelich, 2007).

Source: Own calculations

Table 4 summarizes the results of the PSM which produces the treatment effects of GI certification on outcome variables of interest. The outcome variables of this model are log consumption per adult equivalent and poverty headcount. The poverty headcount is calculated by using both the national poverty line of Thailand and the regional poverty line of Northeastern Thailand. The results show that the estimates of the average treatment effect on the treated (ATT) using the three matching estimators, i.e. the Nearest Neighbor Matching (NNM), the Kernel Matching (KM), and the Radius Matching (RM) for log consumption per adult equivalent are 0.15, 0.13 and 0.11, respectively and are statistically significant. These positive treatment effects suggest that the GI certification has increased the household welfare. By choosing to adopt GI certification, Jasmine rice households earn an increment of monetary income between 12,713 Baht (by using RM) and 15,400 Baht (by using NNM) annually as compared to the non-GI farm households.

Table 4 also demonstrates the impact estimates of the three matching estimators for the poverty reduction outcomes. The estimates are statistically significant and negative indicating that the incidence of poverty (poverty headcount) is lower among GI farm households compared to the non-GI ones. GI adopters are more likely to have experienced poverty reduction relative to the non-adopters.

**Table 4: GI Adoption Effect on Households' Welfare and Poverty Matching Estimates**

| Estimates | Matching estimators | | |
|---|---|---|---|
| | **NNM** | **KM** | **RM** |
| Log consumption expenditure per adult equivalent | 0.15** | 0.13* | 0.11* |
| | (1.98) | (1.82) | (1.67) |
| Household poverty (national) | -0.12** | -0.12** | -0.11** |
| | (2.27) | (2.42) | (2.21) |
| Household poverty (Northeast) | -0.11** | -0.12** | -0.11** |
| | (2.24) | (2.42) | (2.38) |
| Balancing property satisfied | yes | yes | yes |
| Common support imposed | yes | yes | yes |
| Observation total | 505 | 505 | 505 |
| Treated | 169 | 169 | 169 |
| Controls | 334 | 334 | 334 |

Notes: *t*-statistics in parenthesis; * Significant at α = 10%; ** Significant at α = 5%; *** Significant at α = 1%.

Source: Own calculations

These differences in welfare and poverty status remain unchanged after controlling for all confounding factors using the PSM. This outcome supports the results of the simple comparison of means of consumption expenditures both annually and per adult equivalent and of the poverty status both at the national and Northeast regional levels.

## 5. Concluding Remarks

This paper analyzes the welfare impacts of GIs taking two empirical case studies from India and Thailand. The findings of the paper support a positive impact of GI protection on the livelihoods of farm households in rural communities in both countries.

GI adoption has contributed to improving well-being and reducing rural poverty. Production of both, Basmati and Jasmine rice involves labor-intensive and traditional techniques of production which increases their production costs relative to modern varieties of rice. Although our study cannot show the direct impact of GI adoption on the consumer price, i.e. the magnitude of the price premium that might have accrued to the producers from GI adoption, the findings imply that producing a GI good does provide the producers extra earnings through its quality signaling.

Both Basmati rice and Jasmine rice have been long recognized in the international market as high quality rice varieties with certain characteristics such as fragrance that draws huge popularity among consumers. However, without formal protection, the likelihood of counterfeiting is very high. GI protection, by successfully delimiting the geographical boundary of the GI good, has effectively controlled the volume of supply which in turn raised the price of the good and created economic benefits for the producers. For the rural community as a whole, GI protection for such agricultural products is seen as an important means by which local actors can attract revenues from non-local actors.

Our findings advocate a stronger intellectual property rights protection regime since such protection can enhance the rural livelihoods. GIs as collective property rights not only hold significant potential for amelioration of the rural livelihoods, it also preserves the traditional heritage of the locality that produces a GI good.

However, to further support these findings, a number of research needs have been identified. While the current data sets could serve as baseline surveys, a follow-up survey is needed after a longer period of GI adoption. Only then, it can be seen whether the GI adoption is a sustainable system with positive long-term effects on the producers. Closely related to this, it needs to be analyzed to what extent the GI certification and marketing costs can be covered by the farmers themselves after a certain period of time. Finally, GI product adoption is expected to have positive effects on the development of rural areas. However, little is known about the synergy

effects so far. This is partly due to the lack of indicators being available for the analysis.

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# 3 SYNTHESIS

## 3.1 SUMMARY

The thesis uses cross-sectional data collected from a household survey in two districts of the Thung Kula Rong-Hai area in Northeastern Thailand. These data were collected between March and June 2009. A disproportionate stratified random sampling technique was used to select representative sample households. In total, 541 farm households were interviewed. The analysis yielded some important results in view of the research objectives summarized in the following paragraphs.

Article (1) in Module I describes GI protection in Thailand and discusses its challenges being relevant to developing countries and especially Thailand (Objective 1). Some facts which derived from detailed investigation of GI protection are important to note. **First**, negotiations on extending the GI protection to products other than wine and spirits, e.g. agricultural products, have given rise to a separation of the WTO Member countries into two main positions, i.e. GI proponents and GI opponents. As a consequence, there is no multilateral GI register of GI products so far. Besides, no unique approach of GI protection at the multilateral trading system is available. The WTO member countries can implement the TRIPS standards on GI protection at the national level through two different approaches, i.e. either through (i) the sui generis system of GI protection following the collective or public approach inherent to GI; or through (ii) the common-law system of certification trademarks (CTMs) pursuing an individual ownership or private approach. The majority of countries have chosen to protect GIs using the CTM system. For Thailand, the released sui generis GI Act in 2003 was driven not only due to the requirements of the TRIPS Agreement under the WTO, but also due to the issue of biopiracy, especially with the well-known case of Thai Jasmine rice. The Thai GI Act provides for a GI registration system through application. All related stakeholders can benefit from having GI certification by applying for membership in the particular GI club in order to be allowed to use the GI label for their packages. GI certification thus provides for rural households such as Jasmine rice farm households a new livelihood strategy which they can pursue to reach the desirable livelihood outcomes.

**Second**, there is a rising trend in bilateral and regional trade negotiations due to slow progress in completing the current Doha Round at the multilateral trade level. This trend has been induced (i) by Article 24.1 of the TRIPS Agreement encouraging the WTO Members to have recourse to bilateral agreements, and by (ii) minimum IP standards of the TRIPS which allow the creation of higher standards in any IP Agreement negotiated subsequent to TRIPS among the WTO members. This changing trend in trade negotiations has challenged the GI protection in Thailand since a series of FTAs and RTAs includes the TRIP-plus and TRIPS-minus provisions which have a higher level of flexibilities. For Thailand, rice gene patent registration with the United States Patent and Trademark Office (USPTO) has caused another challenge for GI protection. While it is necessary as claimed by rice gene proponents, NGOs and many Jasmine rice farmers see it rather harmful for the future of Jasmine rice.

Module II identifies key determinants which influence the behavior of Thai Jasmine rice households in the TKRH area in the Northeast of Thailand in adopting GI certification (Objective 2). The linear random utility model is applied in order to provide an alternative interpretation on the individual's utility of two choices, i.e. to adopt GI certification or not to adopt GI certification. This is done by considering the observed choice - between the two revealing choices - which provides the greater observable utility (Green, 2003). The variables' selection in this study is generally guided by the review of earlier empirical studies on adoption behavior and it is particularly guided by the model of innovation-decision process of Rogers (1962). A logit model is used to help selecting key variables which could best explain the behavior of farm households to adopt GI certification. The findings show that GI adoption behavior of the Thai Jasmine rice households has been influenced positively and significantly by three important determinants, i.e. information on GI from governmental bodies, gender and the membership in cooperatives. All other factors turn out to be insignificant determinants to influence the adoption decision of the Jasmine rice farm households. The marginal effects of the three key factors also indicate the same trend as the parameter estimates of these three factors.

Module III evaluates the impact of GI certification adoption on rural livelihoods (Objective 3). Article (4) assesses the causal effect of GI certification on the well-being of Thai Jasmine rice households and rural poverty. The study uses cross-sectional data for analysis. The non-parametric PSM method is used in order to correct the estimation of treatment effect controlling for the existence of confounding factors. The sensitivity analysis has been conducted after the effect estimation with the purpose to check the robustness of the treatment effects obtained to the possibility of hidden bias from unmeasured variables. The findings indicate a positive and significant impact of GI certification on the household welfare and rural poverty reduction. The results of Rosenbaum bounds sensitivity analyses indicate a robust effect of the GI certification on reducing rural poverty but a less robust effect of the GI certification on the household welfare. Nevertheless, given a conservative nature of the Rosenbaum bounds and their strong assumption of the effect of confounding variable on the outcome variable, the following conclusion still holds that the household welfare is a pure effect of the GI certification adoption.

Given two kinds of GI products, i.e. the officially registered GI Jasmine rice and the GI-like Basmati rice with unofficial GI status, article (5) in Module III also provides a synthesis of two case studies conducted in India and Thailand. The results imply that a positive role of GIs on rural livelihoods in both countries does exist for both types of GI products. The findings from the Basmati case study show that adopting Basmati cultivation increases the net income of the rice farmers while the findings from the GI Jasmine rice case study show that adoption of GI improves the consumption possibilities of the adopters and reduces rural poverty.

### 3.2 CONCLUSIONS AND POLICY RECOMMENDATIONS

The findings of this study lead to a number of conclusions and recommendations. Given no multilateral standard GI registration system and no unique approach of GI legal system, GI protection is costly, since the GI registration application must be done in each Member country. For small developing and least developed countries with a lack of capital and resources, the costs of GI protection can outweigh the benefits.

Moreover, it is clear that obstacles and conflicts of interests regarding the GI protection exist. Given the rising trend in bilateral and regional trade talks and conflicts of interests regarding two different types of intellectual property rights, i.e. GI vs. patent, the GI protection has been challenged. The TRIPS-plus and TRIPS-minus provisions in a series of RTAs and Thailand's rice gene patent registration in the US have put Thailand to a plight. On the one hand, Thailand is a GI-proponent, but on the other hand, its rice gene patent sends a wrong signal to other trading partners given its interest of no patent protection for plants, animals and microorganisms. Besides, 20 years of patent protection for a newly registered Thai rice gene are too short compared to a much longer history of Jasmine rice. Not only the issue of GI protection per se has been challenged, but in this regard also its potential benefits for such rural GI assets as Jasmine rice would not be sustained. Hence, before committing itself to each RTA or FTA, a thorough and comprehensive cost-benefit analysis of each agreement is required in due consideration of general public interest. Information should be fully available to the general public at the national level to provide all affected parties enough time for voicing their views as well as for adaptation in case of the conclusion.

How a GI system is successfully introduced and promoted in specific GI regions depends crucially on the information about GIs provided to the rural farm households and finally on the information sources. Agricultural cooperatives serve as a crucial intermediary between farm households and the government being the primary source of information about GIs. The effectiveness of information dissemination can be thus promoted by strengthening the role of the agricultural cooperatives. However, the descriptive findings in the adoption study in Module II indicate that the GI rice sale is involved with high transportation costs and not all certified GI producers sold their rice to the thirteen certified buyers given the price premium payment guarantee. Limited marketing options of GI certified rice, characterized by high transportation costs and limited availability of the certified buyers, may thus be a potential constraint to GI certification adoption. A restructuring of the value chains with better access to points of sale for certified GI rice farm households should be provided in order to increase the farmers' incentives to adopt GI certification.

Although it has been shown in Module III that the poverty incidence is reduced due to the GI introduction and the household welfare is increased, a crucial point for any policy-makers is a long-lasting positive effect. The positive effect of GI introduction can only last longer given the active and sustainable participation of all stakeholders of the GI product value chain. This suggests the challenge of the local and national policy-makers and policy implementers in creating a persuasive atmosphere among all stakeholders. The motivation of collective action and increase of the participation level within the GI value chain are also crucial, particularly by those TKR farm households who are unassertive to participate in this value-added process using the GI label. The awareness of the TKR farm households to make use of their embedded right to apply for GI certification is crucial, since the rate of GI adoption of the TKR farm households can guarantee a long lasting positive effect of GI certification on the household welfare and poverty reduction in rural areas. In order to facilitate the registration process for GI certification of the TKR farm households, the GI registration system should be sustainable, well-functioned and for the producers reachable.

It is important to note that, both Basmati rice and Jasmine rice have been long recognized as high quality rice varieties with certain characteristics such as fragrance in the international market and have been popular among consumers. Thus, without formal protection the likelihood of counterfeiting is very high. GI protection, by successfully delimiting the geographical boundary of the GI good, has effectively controlled the volume of supply which in turn raised the price of the good and created economic benefits for the producers. For the rural community as a whole, GI protection for such agricultural products is seen as an important means by which local actors can attract revenues from non-local actors. The findings of the paper support a positive role of GI protection on the livelihoods of farm households in rural communities in India and Thailand. Production of both Basmati and Jasmine rice involves labor-intensive and traditional techniques of production which increases their production costs relative to modern varieties of rice. Although the study cannot show the direct impact of GI adoption on the consumer price, i.e. the magnitude of the price premium that might have accrued to the producers from GI adoption, the findings imply that producing a GI good does provide the producers extra earnings

through its quality signaling. The findings of analyzing the two cases support the importance of stronger intellectual property rights protection since such protection can enhance the rural livelihoods even after such a differentiated product has been developed. GIs, as collective rights, are thus considered as the most appropriate and fittest alternative for the rural livelihoods, not only in terms of their economic prominence, but also in terms of the preservation of the traditional knowledge embedded in a GI good as well as the traditional heritage of the locality that produces it which has positive externalities both in short run and long run.

### 3.3 LIMITATIONS OF THE STUDY AND FURTHER RESEARCH NEEDS

Article (1) in Module I tries solely to highlight aspects being relevant to GI protection. However, the issue of intellectual property right protection is very broad given different types of intellectual property rights and complex given different positions or interests of countries on each intellectual property right type as well as different effects and implications of each intellectual property right type on each stakeholder. A framework of protection on each intellectual property right is shaped depending on its importance each country has put on. An effective GI protection depends on the design of the GI law including a practical guide or tool for those involved in national legislative processes. And a successful GI protection depends on the active participation of all stakeholders. However, it is important to note that an effective protection of one type of the intellectual property right does not automatically mean an effective protection of other types of the intellectual property rights. Given the conflicts of interests of GIs vs. patents, a quantitative analysis can help compare the impacts and implications of both types of intellectual property rights for a particular product.

The price premium seems essential in compensating the transportation costs which are associated with the GI certification adoption and more importantly in guaranteeing the net benefit of being GI farmers. However, not all GI certified farm households sold their rice to the certified buyers. It is not clear what exactly determines the selling behavior of GI certified households in the TKRH area. As shown in the descriptive data, high transportation costs involved with the rice sale

may play a key role in the selling behavior of the GI households. Furthermore, GIs were fairly new to the Jasmine rice farm households at the survey time. Misperceptions about GIs may have driven the GI households hesitating to reap benefits offered. In these premises, a value chain analysis could reveal to what extent the access of GI farm households to their point of sale can be improved. How the decision-making processes within the households affect the GI certification adoption is also another area that merits further research.

It is important to note that by using cross-sectional data in analyzing poverty, this study can observe the change of poverty incidence only at one particular point in time. This study can only observe how the poverty incidence has been changed due to GI introduction and how the welfare of Jasmine rice farm households in the TKRH area has been improved. Without longitudinal data, it is impossible to study the dynamic impact of the GI system implementation on the rural livelihoods. Since there is a yearly renewal of GI club membership application, it is possible to collect panel data of Jasmine rice households for further investigation provided that there are enough TKR club members having been renewed their GI certified status with the DIP at the survey time.

Furthermore, the sustainability of a certification system often depends on whether the GI certification and marketing costs can be covered by the farmers themselves in the long run. Thus, cost-benefit analyses are needed to consider more adequately the costs of GI certification and the costs related to their successful marketing.

The findings in this study stress that GIs do contribute to rural poverty reduction. The economic performance of supply chains is likely to be linked to rural development benefits. However, although this study found a positive impact of GI on livelihoods of rural households, it could not assess the synergy effects on the GI region as a whole. It also could not consider inequalities in the distribution of costs and benefits of GI protection, or the underlying power relations due to data limitations. The experience with a case of Mexican Tequila already showed that it is possible that GI schemes can be manipulated to benefit powerful local actors while excluding the farmers and rural regions that GIs are theoretically designed to protect (Bowen and Zapata, 2009). Well-considered governance structures would guarantee that

economic benefits of GIs are to be shared across the supply chain and among stakeholders (Giovannucci et al., 2009). How successful GI contributes to rural development and whether GI protection leads to a fair and appropriate distribution of costs and benefits among the stakeholders, requires a detailed investigation of the governance structure within each GI supply chain.

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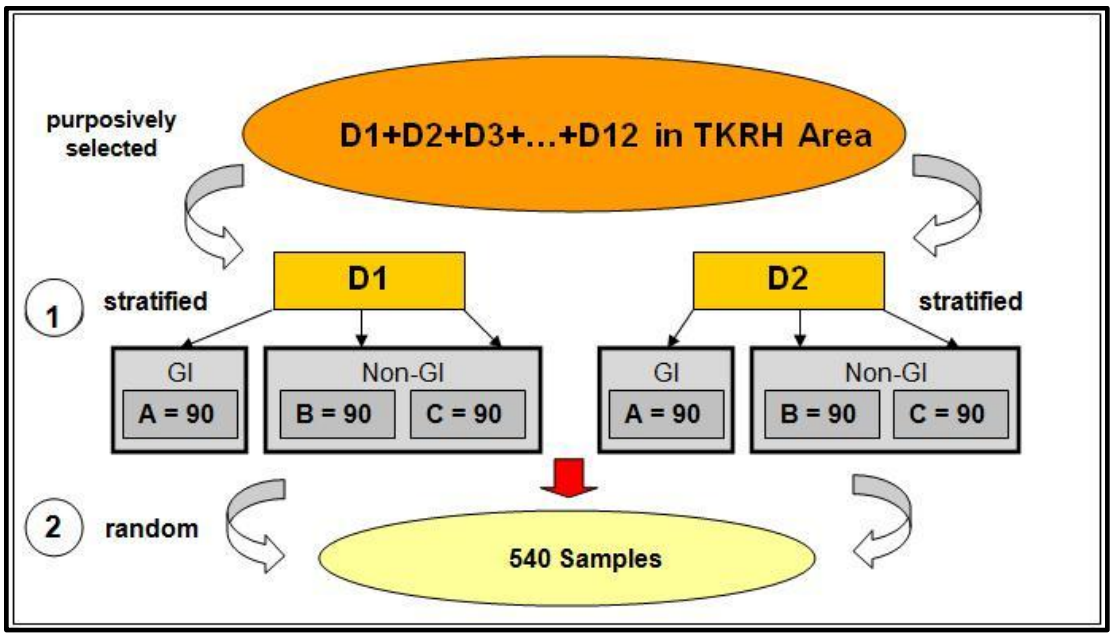
# APPENDICES

## APPENDIX A: SAMPLING PLAN




D1 = Kasetwisai District
D2 = Rasrisalai District

A = GI Households
B = Pure non-GI Households
C = Non-GI Households with organic farming practice

**Source**: Own presentation

APPENDIX B: SAMPLING RATES AND SAMPLING WEIGHTS EMPLOYED IN THE STUDY

| District | Stratum size | No. of households in district | Sampling rate | Weight | Sum of weights |
|---|---|---|---|---|---|
| Kasetwisai | | | | | |
| GI households | 90 | 330 | 0.2727 | 3.67 | 330 |
| Non-GI households (pure) | 90 | 10061 | 0.0089 | 111.79 | 10061 |
| Non-GI households (organic farming) | 90 | 226 | 0.3982 | 2.51 | 226 |
| Rasrisalai | | | | | |
| GI households | 90 | 102 | 0.8824 | 1.13 | 102 |
| Non-GI households (pure) | 90 | 1804 | 0.0499 | 20.04 | 1804 |
| Non-GI households (organic farming) | 90 | 112 | 0.8036 | 1.24 | 112 |
| **Total** | 540 | 12523 | | | 12523 |

**Source:** Own calculations

# APPENDIX C: QUESTIONNAIRE OF HOUSEHOLD SURVEY

1

Questionnaire Number

## The Impact of Geographical Indications for Household's Welfare and Rural Development: A Case Study of Thai Jasmine Rice in Northeastern Thailand
## Household Survey in Northeastern Thailand

**2009**
**English Version 1.6**

**Introductory Statement**

The main objective of this project is to study and examine the impact of using geographical indications on welfare at household level and finally on rural development in the Northeastern part of Thailand by taking Thai Jasmine Rice/Thai Hom Mali Rice which has been registered as geographical indications by the Department of Intellectual Property, Thailand's Ministry of Commerce, as a case study. To achieve this main objective of my research, the researcher would kindly like to ask for your cooperation.

I assure you that all information you give during the interview will be kept strictly confidential. Data will be used for scientific purposes only and will not be given to any other outside person. As a sign of our great appreciation that you take your time for our interview, please accept this small present from us.



| | |
|---|---|
| * | GI producer |
| ** | Non GI producer |
| *** | Non GI producer (Organic Farming Practice) |



2

**Section 1: Survey information**

| | | | |
|---|---|---|---|
| 1 Province: | | 7 Date of Interview (dd/mm/yy) | |
| 2 District: | | 8 Time started (hh:mm) | |
| 3 Sub-district: | | 9 Time finished interview (hh:mm) | |
| 4 Village: | | | |
| 5 Household I.D.: | | | |
| 6 Address (or description) of the household: | | | |

10 Name of Household Head (I.D. Code: 01) _____ 11 I.D. Code _____

12 Name of Respondent: _____ 13 I.D. Code _____ Refer to Section 2 Col. 1

14 Tel. No.....
15 Notices: .....
.....

**Codes for Section 2: (Q5-Q9)**

| Code A | Code B | Code C | Code D |
|---|---|---|---|
| 1 Self | 1 unmarried | 1 Engaged in own agriculture | 1 Hindu |
| 2 Wife/Husband | 2 married | 2 Engaged in fishing, hunting or collecting | 2 Muslim |
| 3 Son/daughter (incl. Adopted) | 3 widow | 3 Non-farm owned business | 3 Christian |
| 4 Son/daughter in law | 4 divorced/separated | 4 Casual off-farm labour in agriculture | 4 Buddhist |
| 5 Father/Mother | | 5 Casual labour in non-agriculture | 5 Jain |
| 6 Father/Mother in law | | 6 Permanently employed in agriculture | |
| 7 Sister/Brother | | 7 Permanently employed in non-agriculture | |
| 8 grandchild | | 8 Government official | |
| 9 nephew/nice | | 9 Housewife | |
| 10 cousin | | 10 Student/Pupil | |
| 11 other relatives | | 11 Child below school age | |
| 12 non-relative | | 12 Unemployed | |
| | | 13 Performing only occasional and light work | |
| | | 14 Monk | |
| | | 90 Other, please specify... | 90 Other, specify |
| 97 do not know | 97 do not know | 97 do not know | |

| | | | |
|---|---|---|---|
| 98 no answer | 98 no answer | 98 no answer | |
| | 99 not applicable | 99 not applicable | |

**Section 2: Socio-Demographic Information on Household**** (as of the date of interview)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| I.D.Code | Name/Nickname | Gender<br>0=female<br>1=male | Age | Relation to household head<br>A | Marital status<br>B | Main* Occupation<br>C | Second* Occupation<br>C | Religion<br>D | Education<br>How many years of schooling do you have? (year) |
| 01 | | | | | | | | | |
| 02 | | | | | | | | | |
| 03 | | | | | | | | | |
| 04 | | | | | | | | | |
| 05 | | | | | | | | | |
| 06 | | | | | | | | | |
| 07 | | | | | | | | | |
| 08 | | | | | | | | | |
| 09 | | | | | | | | | |
| 10 | | | | | | | | | |

* **Occupation** is determined on the basis of time spent in an occupation during the employment period. Main occupation is defined as the profession in which the household spends more than half of the employment period.

** **Household**: Is a person or group of people sharing accommodation and foods for at least **3 months over the past 12 months** calculating from the time of the survey. These people also share a collective fund.

**Codes for Section 3.1 and 3.2: Land/Land Use and Production of Agricultural Commodities**

| Code A | Code B for only Section 3.1 | Code B | Code C for product unit | Code D | Code E |
|---|---|---|---|---|---|
| 1 residential use | 1 owned plot (unmortgaged) | 1 Khao Khao Dok Mali 105 | 1 Tones | 1 in the same village | 1 irrigated (artesian well) |
| 2 rented out | 2 rented | 2 Kor Khor 15 | 2 Kilogram | 2 in the same district (rural area) | 2 irrigated (well) |
| 3 other field crops | | 3 Patumthanee 1 | 3 Ta | 3 in the same district (urban area) | 3 irrigated (pipe/tap) |
| 4 permanent crops | | 4 Kor Khor 6 | 4 1 Kwian = 1,000 kg. | 4 in the same province (rural area) | 4 irrigated (gravity) |
| 5 pasture | | | 5 1 Hap (small) = 60 kg. | 5 in the same province (urban area) | 5 pumped from public irrigation canal |
| 6 aquaculture or pen | | | 6 1 Hap (big) = 100 kg. | 6 in another province (rural area) | |
| 7 forest (planted) | | | 7 1 Muen (rice) = 12 kg | 7 in another province (urban area) | |
| 8 vacant land | | | 8 1 Lit (rice) = 0.75 kg | 8 in Bangkok | |



| | | | | | |
|---|---|---|---|---|---|
| 9 Rice | | | 9 1 Thang (paddy) = 10 kg. | | |
| 10 Corn | | | 10 1 Thang (rice, other beans, and maize) = 15 kg. | | |
| 11 Peanuts | | | 11 1 kg.(dry cassava) = 2.2 kg. (fresh cassava) | | |
| 12 Soybeans | | | 12 1 kg. (dry cassava) = 2.2 kg. (fresh cassava) | | |
| 13 Mungbeans | | | 13 1 kg. (cassava pellet) = 2.4 kg. (fresh cassava) | | |
| 14 Cassava | | | | | |
| 15 Sugarcane | | | | | |
| 16 Kenaf | | | | | |
| 17 Vegetables | | | | | |
| 18 Para rubber | | | | | |
| 19 Coffee | | | | | |
| 20 Pepper | | | | | |
| 21 Fruits | | | | | |
| 22 Tea | | | | | |
| 23 Cashew nuts | | | | | |
| 24 Others, please specify | | | | | |
| 25 Do not know | | | | | |
| 26 No answer | | | | | |
| 90 Others, specify…… | 90 Others, specify… | 90 others, please specify | 90 Others, please specify | 90 Others, specify… | 90 Others, specify… |
| 97 do not answer | | 97 Do not know | 97 Do not know | 97 do not know | 97 do not know |
| 98 no answer | | 98 No answer | 98 No answer | 98 no answer | 98 no answer |
| 99 not applicable | | | | 99 not applicable | 99 not applicable |

## Section 3: Production and Farm Income

### 3.1 Land/Land Use

#### 3.1.1 Total land area

| No. | Details of land | 2008 | 2007 | 2006 | 2005 | 2004 |
|---|---|---|---|---|---|---|
| 1 | Total owned land (rai) | | | | | |
| 2 | Total cultivated land (self) (rai) | | | | | |
| 3 | Leased in land (rai) | | | | | |
| 4 | Leased out land (rai) | | | | | |
| 5 | Land price per rai (in Baht) | | | | | |

#### 3.1.2. Land use

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Land Parcel number | Plot No. | Land area/Plot size<br>TH: rai | Main land use<br>A | Tenure status<br>*If code > 3 go to Q7*<br>B | When did you purchase the land?<br>(year) | Rental rate per year whether rented out or rented in<br>Rented in (Baht or kind and quantity) | Rented out (Baht or kind and quantity) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| a | | | homestead | 1 | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

9. (* and ***) How much land was certified for GI (organic) Thai Jasmine rice cultivation?.....rai
10. (* and ***) From Q 9, which land parcel and land plot, please specify……

**Section 3.2: Production of Agricultural Commodities**

| 1 | 2 | | | 3 | 4 | 5 | | | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plot No. | Crops grown A | | | If rice in column 2, Do you cultivate Thai Jasmine Rice? 1=yes, 2=No | If code 1 in column 4 which Thai Jasmine Rice variety? B | Production quantity (last season) of A ( see also column 2) (unit) C | | | And how long have you been experienced in RICE cultivation? | Location D | Distance from homestead (km) | Is it irrigated? 1=yes; 2=no | Type of irrigation E | If it is Irrigated in Q9 since when? (Which year?) |
| | 1 | 2 | 3 | | | 1 | 2 | 3 | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

| | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|
| Plot No. | What is the slope of the plots? | How would you classify the overall soil quality for production in each of your plots? | Have you implemented soil erosion | Fertilizer use 1= organic fertilizer | Do you plan to increase the TJR | Do you have organic certification | If yes, which year did you receive your organic certification? |



| | 1 = steep 2= flat | 1 = very good 2 = good 3 = bad 4 = very bad | control techniques? 1 = yes 2= no | 2= chemical fertilizer 3 = both | cultivation next year 1= yes, If yes, how many rai?.... 2= no | 1= yes 2= no | If No, Are you in a process of getting organic certification? 1) Yes; 2) No |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

19. Is there a major change in the cropping pattern in last 5 years? (1) Yes (2) No (3) Do not know (4) Not sure
20. Why has this change happened?
(1) grow crops that are profitable (2) grow staple crops for food security (3) less available labor for agriculture (4) declining soil fertility (5) increased yield from chemical inputs (6) more/less of water available (7) Others, please specify……
*Please give the year of each change here*:……
……
21. Is there a major change in the Thai Jasmine rice production pattern in last 5 year? **If yes, please give the year of each change**

(1) Shifted from non-GI Rice to GI Thai Jasmine Rice cultivation (……)
(2) Thai Jasmine Rice cultivation has been increase (……)
(3) Thai Jasmine Rice cultivation has been reduced (……)
(4) Shifted from GI Thai Jasmine Rice to non-GI rice cultivation (No registration for certification anymore) (……)
(4) No change took place
(5) others, specify……
22. From the last question, why has this change happened? ( **you can answer more than one option**)
(1) Due to the higher price (2) Costs for cultivating Jasmine Rice is lower (3) Support from the government and/or NGO (4) Governmental campaign
(5) Higher demand from the consumer for high quality rice (6) For household consumption (7) Others, specify……
23. Is cultivation of Thai Jasmine Rice your main farm income source? [ ] 1= Yes; 2= No; 3= Do not know; 4= No answer
24. Have you applied GAP? (1) Yes (2) No
25. Have you got subsidies for cultivating Thai Jasmine rice from the Royal Thai government? (1) Yes (2) No

**Section 3.3(*,**,***): Production Cost for Cultivating Thai Jasmine Rice and Non-GI Rice**

Column1: **a**= *Labor cost for land preparation*; **b**= *Labor cost for seeds and seedling*; **c**= *Labor cost, for hand weedings*; **d**=*Labor cost for fertilizer application*; **e**= *for pesticides (herbicides, insecticides and fungicides, snail likkers)* and **f**= *Labor cost for harvesting)*

1.What are costs of the production for for GI Thai Jasmine rice in (i) **2004**, (ii) **2005**, (iii) **2006**, (iv) **2007** and (v) **2008** ?

| | 1 | | | | | | 2 | 3 | 4 | | 5 | | 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Hired Labor (Baht) | | | | | | Variable Machine# | Seeds/ Seedlings | Fertilizer (Baht) | | Pesticide (Baht) | | Irrigation Expenditures |
| | a | b | c | d | e | f | (Baht) | (Baht) | Organic | Chemical | Bio | Chemical | (Baht) |
| (i) | | | | | | | | | | | | | |
| (ii) | | | | | | | | | | | | | |
| (iii) | | | | | | | | | | | | | |
| (iv) | | | | | | | | | | | | | |
| (v) | | | | | | | | | | | | | |

# **Variable Machine costs** include fuel costs, lubricant, and wear and tear cost.

7. What are main costs?.....

8. Do you feel substantial rise in cost? (1) yes (2) No

9. Which one is rising?.....

10. What is the cost per rai for the non-GI rice production totally?.....

11. How much of your income did you **use for your whole agricultural production in 2006**, **2007** and **2008** (for the whole farm, incl. other kinds of field crops)? (*Hired labor, variable machine, seeds/seedlings, fertilizer, pesticide, irrigation expenditures*) **in total.**

**2006**……..Baht/year; **2007**……Baht/year; **2008**……..Baht/year

**Section 3.4: Certification cost and disadvantage of certification**

**Section 3.4.1: Certification Cost for Organic Thai Jasmine Rice Cultivation (only***)**

1. Do you make any extra expenses because of organic certification? ☐ 1 = Yes 2 = No; If yes go to 2 or go to 3.

2. What extra spendings you do?

| *Options* | *Value (Baht)* |
|---|---|
| Auditoring by a Thai Certification Body | |
| Auditoring by a foreign certifying company | |
| Machinery:<br><br>Equipments, tools: | |
| Tests of agrochemical residues | |
| Test of water | |
| Test of leaves | |
| Training courses | |



| | |
|---|---|
| **Others, please specify…** | |

3. How frequently somebody comes for inspecting to your field?
(1) once in two-months (2) once in 6 months (3) once in a year (4) no inspection took place so far (5) I have no idea about any inspection

4. Do you pay the inspectors? If yes, how much ……(Baht)

5. Did you have to invest in any infrastructure in order to qualify for organic certification? ☐ 1= yes; 2=no

6. What infrastructure did you need to build new at your farm? Also mention the amount spent on that.....
.....

7. What is the cost of maintenence?

| *Options* | *Baht* | *Time Period* |
|---|---|---|
| Renew of auditorship | | |
| Maintaining infrastructure | | |
| **Other, specify** | | |

**Section 3.4.2. Erection costs (Registration) and exclusion costs (control) for GI Thai Jasmine rice farmers (only for * )**

1. Do you make any extra expenses for GI registration? ☐ 1 = yes; 2 = No; If yes, go to Q 2

2. What extra spendings you do?

| **Options** | **Value (Baht)** |
|---|---|
| Auditoring by Thai Certification Body | |
| Auditoring by Foreign Certification Company | |
| Registration fee for GI | |
| Renew of registration | |
| Others, Please specify... | |
| Others, Please specify... | |
| Others, Please specify... | |

3. Do you have inspectors come to visit you?
(1) Yes (2) No (3) Do not know (4)No answer ……;If yes, go to the next question

4. Who are these inspectors? Thai or Foreign inspectors?.....
.....

5. what do they usually do?/ Why did they make a visit?
(A)……
(B)……
(C)……

6. Where did they visit you?
a. At home
b. In the rice fields
c. Somewhere else, please specify……

7. How frequently somebody comes for inspection to your field?
   (1) once in two-months (2) once in 6 months (3) once in a year (4) no inspection took place so far (5) I have no idea about any inspection
8. What did they do/ask you? Please specify……
   ……
   ……
9. Do you pay the inspectors? If yes, how much ……(Baht)/visit or per inspector

**Section 3.4.3. Disadvantage of certification**

1. Do you think that certification has some disadvantages for you (other disadvantages beside certification costs)? (1) Yes (2) No (3) Do not know
2. In your opinion, what are disadvantages of certification (*, ** and ***)? Please specify,……
   ……
   ……
   ……
   ……

**Section 3.5: Benefit of certification (for all *,** and ***)**

1. Has your sells increased after receiving organic certification? (***)
   ( ) no, the volume of sell is the same
   ( ) yes, the volume increased due to certification, by……t/year (on average since organic certification)
   ( ) yes, the volume of sell increased but due to other reasons. Which?……
2. Has your sells increased after receiving GI certification? (*)
   ( ) no, the volume of sell is the same
   ( ) yes, the volume increased due to certification, by……t in 2008/2009
   ( ) yes, the volume of sell increased but due to olther reasons. Which?……
4. Do you receive a price premium for your certified Thai Jasmine Rice? (* and ***)
( ) Yes, how much……( ) No
6. Did you have any expectation to receive a price premium? (* and ***)
( ) Yes ( ) No
7. Is income gained from price premium sufficient for your certain minimum standard of welfare? (* and ***)
( ) Yes ( ) No
8. Which monthly income do you consider to be the absolute minimum for your household in your circumstances to acquire a certain minimum standard of welfare?……(Baht)
9. Are you aware about decreasing environmental damages at your farm? (*, ** and ***) (Choose 1 for the fist option, 2 for the second, etc):
( ) No, I am not concerned about this issue



( ) No, It is so complicated to conciliate rice production and environment
( ) Yes, I do not contaminate water wells and recycle empty agro toxics packages
( ) Yes, environmental damages have been reduced
( ) ……
10. What are the advantages of having certification? (Choose 1 for the first more important, 2 for the second, etc):

| *Options* | *Organic* | *GI* |
|---|---|---|
| Do not know about any benefits | | |
| There are no benefits | | |
| Rice quality has improved | | |
| More intensive support from the governmental bodies | | |
| To have a better farm management | | |
| To receive a price premium | | |
| To follow the welfare requirements (do not have child labour, etc) | | |
| To seek the welfare of workers | | |
| The concern of food safety | | |
| To decrease environmental damages | | |
| To decrease the use of pesticides and agro toxics | | |
| The possibility to export to new markets | | |
| To remain in the market | | |
| To settle better negotiations to the traders | | |
| To decrease the production cost | | |
| To have a differentiated product | | |
| **Other reason: which one?** | | |

11. What are the main disadvantages of having certification? (* and ***) (Choose 1 for the most important, 2 the second, etc):

| *Options* | *Organic* | *GI* |
|---|---|---|
| Only disadvantages | | |
| I do not see any disadvantage | | |
| To compete with producers without certification in the market | | |
| Do not receive a price premium due to certification | | |
| The cost of compliance is too high | | |
| **To have restricted use of certain products** | | |

12. Which are the main reasons that let you to adopt certification? (* and ***) (Choose 1 for the most important, 2 the second, etc):

| *Options* | *Organic* | *Other* |
|---|---|---|
| The expectation to receive a price premium | | |
| To protect and conserve the environment | | |
| To produce a product with higher quality | | |
| To have a certified rice is a requirement from the buyer | | |
| The facility to have support from organizations | | |
| Due to the farm size: opportunity to increase the volume exported | | |
| **Other reason: which one?** | | |

13. Why did you decide for non-adopting certification? (**) (Choose 1 for the most important, 2 the second, etc):
( ) financial condition
( ) lack of information
( ) lack of support of organizations
( ) difficulties to meet the requirements
( ) due to the farm size, the investment is too high
( ) I had problems with the buyer
( ) other reason, which one?.....

**Section 3.6: Sale, Storage and consumption of Thai Jasmine Rice** (Between March 2008 – March 2009)
(For all GI *, Non-GI ** and organic *** farmers)

Please give me the information of your Thai Jasmine Rice sale (See code B in codes for production part)
The first two rows are for GI-Thai Jasmine Rice (*from two seed varieties*)

| 1 | 2 | 3 | | 4 | | 6 | 7 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Variety of rice** | **Home Consumption** | **Sold amount** | | **Stored amount** | | **To whom did you sell?** | **Price Change** (unit as in Co. 2) (Baht) | | | | |
| **B** | **(t)/(kg)** | **Qt** | **(Unit)** | **Qt** | **(Unit)** | *See code below this table!* | 2004 | 2005 | 2006 | 2007 | 2008 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

Column 1*: Put P for paddy ; M for milled*



For column 2: How much Thai Jasmine rice do you purchase for your home consumption?.....(Kg)

For column 4: 5. Please indicate how long did you store rice?.....

Codes for column 6:

| Code number | Code Name |
|---|---|
| 1 | Domestic/local market |
| 2 | Cooperatives (not certified ones) |
| 3 | Middle Man |
| 4 | Traders |
| 5 | Rice Millers (not certified ones) |
| 6 | Government Agencies |
| 7 | Retailers |
| 8 | Wholesalers |
| 9 | Certified GI buyers (certified GI cooperatives and/or rice millers) |
| 90 | Other, please specify…. |

8. (* and ***) How did you sell your rice?

(1) I bring rice to the buying point (2) Buyers came to buy my rice at the field (3) Buyers came to buy my rice at home (4) Sometimes I bring rice to the buying point and buyers also come to buy my rice at the filed or at home

(*If answer 1 please go to Q9 and Q10*)

9. (*) How long did it take to bring rice to the certified GI Thai Jasmine rice buyers (in hrs.)? ..... (Hrs.)

10. (*) How expensive was your rice transportation to the buyers? ..... (Baht)

**Section 3.7 Household Assets (Productive assets and other assets)**

| | 1<br>Assets Items | 2<br>How many items does<br>the household own? | 3<br>How old is the most recently item?<br>(Year) | 4<br>How much did<br>you pay for the last recent obtained item?<br>(Baht) | 5<br>Present Value<br>(Baht) | 6<br>What have you sold<br>last year? | 7<br>How much did you get?<br>(Baht) |
|---|---|---|---|---|---|---|---|
| 1 | Tractor 2 wheel (s) | | | | | | |
| 2 | Tractor 4 wheel (s) | | | | | | |
| 3 | Knapsack sprayer (s) | | | | | | |
| 4 | Engine spray (s) | | | | | | |
| 5 | Water pump (s) | | | | | | |
| 6 | Water tanks (field use) | | | | | | |
| 7 | Pipe (s) | | | | | | |
| 8 | Hoe (s) | | | | | | |
| 9 | Spade (s) | | | | | | |
| 10 | Harrow (s) | | | | | | |
| 11 | Rice Mill | | | | | | |
| 12 | Threshing Machine | | | | | | |
| 13 | Sewing Machine (s) | | | | | | |
| 14 | Iron (s) | | | | | | |
| 15 | Truck (s) | | | | | | |
| 16 | Pick up (s) | | | | | | |
| 17 | Motocycle (s) | | | | | | |
| 18 | Others..... | | | | | | |
| 19 | Others..... | | | | | | |
| 20 | Others..... | | | | | | |

**Sales of other assets**

8. Did you sell any other household assets between **March 2008-March 2009**?
(E.g. TV, VCD/DVD player, Mobile phone, Regular phone, Radio and stereo, Refrigerator, Gas stove, water heater, Iron, Electric fan, Electric rice cooker, rings and necklaces, Personal computer, Furniture, watches and clocks, etc.)

| No. | Assets | Sold Value<br>(Baht) |
|---|---|---|
| 1 | | |



| | | |
|---|---|---|
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |

**Section 3.8: Livestock, Aquaculture and Their Products**

| 1 | | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Animal Species | | How many do<br>you have? | Cash Expenditures (March 2008 - March 2009) | | | | | How much could you get from selling this livestock (Baht) | What have you sold<br>last year? (Baht) |
| | | | How much do<br>you pay? | Feeding<br>Cost | Venetarinary<br>Treatment | Hired<br>Labor | Others | | |
| 1 | Buffalo | | | | | | | | |
| 2 | Beef cattle | | | | | | | | |
| 3 | Dairy cattle | | | | | | | | |
| 4 | Pig (pattening) | | | | | | | | |
| 5 | Pig (piglet production) | | | | | | | | |
| 6 | Goat | | | | | | | | |
| 7 | Chicken | | | | | | | | |
| 8 | Duck | | | | | | | | |
| 9 | Fighting cocks | | | | | | | | |
| 10 | Silk worms (kg.) | | | | | | | | |
| 11 | Tiger prawns/fresh water prawns | | | | | | | | |
| 12 | Tilapia | | | | | | | | |
| 13 | Carp | | | | | | | | |
| 14 | Others, please specify | | | | | | | | |
| 15 | Others, please specify | | | | | | | | |
| 16 | Others, please specify | | | | | | | | |

| 10 | | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|
| Livestock/Aquaculture<br>Products | | Total Production<br>(Individual unit) | Cash Cost of Inputs | | | How much could you get from selling this livestock (Baht) | What have you sold<br>last year? (Baht) |
| | | | Packaging and<br>Storage | Others, specify | Description | | |
| 1 | Milk (Kg) | | | | | | |
| 2 | Calves (heads) | | | | | | |
| 3 | Piglets (heads) | | | | | | |
| 4 | Chicken Eggs (pieces) | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5 | Duck Eggs (pieces) | | | | | | |
| 6 | Silk (kg) | | | | | | |
| 7 | Fish fry specify | | | | | | |
| 8 | Other,..... | | | | | | |

**Codes for section 4: Non-Farm Income**

***Code A*** **(Profession type)**

| Agriculture | Industry | | | Public Sector |
|---|---|---|---|---|
| | Production Worker | Clerk/ White collar worker | Service | |
| 1 Agricultural wage labourer | 4 Food processing | 11 Food processing | 21 Watchman | 38 Nurse |
| 2 Logger | 5 Textile, Apparel | 12 Textile, Apparel | 22 Carwasher | 39 Policeman |
| 3 Fisher | 6 Electronics | 13 Electronics | 23 Shoecleaner and shoerepairer | 40 Teacher |
| | 7 Wood Products | 14 Wood Products | 24 Shoemaker | 41 Soldier |
| | 8 Furniture | 15 Furniture | 25 Barber | 42 Other public servant |
| | 9 Metal Products and Machinery | 16 Metal Products and Machinery | 26 Tailor | |
| | 10 other industry | 17 other industry | 27 Vendor | |
| | | 18 Miner, Quarryman | 28 Cook | |
| | | 19 Construction worker | 29 Waiter | |
| | | 20 Silk spinner/ weaver | 30 Cleaner | |
| | | | 31 Housemaid | |
| | | | 32 Driver | |
| | | | 33 Carpenter | |
| | | | 34 Mechanician | |
| | | | 35 Electrician | |
| | | | 36 Plumber | |
| | | | 37 Other service worker | |
| 90 Other, specify | 90 Other, specify | 90 Other, specify | 90 Other, specify | 90 Other, specify |
| 97 Do not know | 97 Do not know | 97 Do not know | 97 Do not know | 97 Do not know |
| 98 No answer | 98 No answer | 98 No answer | 98 No answer | 98 No answer |
| 99 Does not have to reply | 99 Does not have to reply | 99 Does not have to reply | 99 Does not have to reply | 99 Does not have to reply |

| *Code B* | *Code C* |
|---|---|
| 0 job in the same village | 1 in the same village |
| 1 commuting | 2 in the same district (rural area) |
| 2 migrated | 3 in the same district (urban area) |
| | 4 in the same province (rural area) |
| | 5 in the same province (urban area) |
| | 6 in another province (rural area) |
| | 7 in another province (urban area) |
| | 9 in Bangkok |
| 90 Other, specify | 90 Other, specify |
| 97 Do not know | 90 Other country |
| 98 No answer | 97 Do not know |
| 99 Does not have to reply | 98 No answer |

**Section 4: Non-Farm Income**
**( March 2008-March 2009)**

1. Has anyone of your household members worked as a wage-employee? [ ] 1 = yes; 2 = No
2. How many members of your household have worked as a wage-employee? [ ] Person(s)



| | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|
| I.D. Code | Occupation No. | Profession Type<br>A | How much do you earn from that? (Baht)/year | Since when is...working in this job? (Year) | Is...commuting or migrated for this job?<br>B | Name of City / Country<br>C |
| | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |
| | 1 | | | | | |
| | 2 | | | | | |
| | 3 | | | | | |

**Codes for section 5:Migration**

| Code A | Code B | Code C |
|---|---|---|
| 1 Short-term (less than 6 months) | 1 In search of job | 1 Engaged in own agriculture |
| 2 Long-term (more than 6 months) | 2 Higher wage | 2 Casual off-farm labour in agriculture |
| 3 Other, specify | 3 Better job opportunity | 3 Non-farm owned business |
| | 4 Persuaded by friends/relatives/contractors | 5 Casual labour in non-agriculture |
| | 5 Job transfer | 8 Government official |
| | 6 got the job | 9 Housewife |
| | 7 Education | 10 Student/Pupil |
| | 8 Marriage | 11 Unemployed |
| | 9 Accompanying migrant worker | 12 Priest |
| | 10 Natural calamities | 100 Others, specify |
| | | 105 Too old to work |
| | 100 Others, specify | 106 Too young to work |
| | | 107 Retired |
| | | 108 no answer |

**Section 5: Migration**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| ID Code | Has any of your family members migrated? (if so, migrant status) A | Reasons for migration (Two reasons according to preference) B | Where to migrate? 1 = city, 2 = village | Current Occupation C | Value of remittanced Cash or kind) received last year | How often she/he visits to village? |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

**Section 6: Perception about GI**

1. Do you know what Geographical Indications (GI) means? (1) Yes (2) No, If yes go to Q 2 If No go to Q 3
2. From where did you get the information about GI? Please specify……..
3. Do you know if the rice you are cultivating GI or not? (1) Yes (2) No
4. Do you think that Thai Jasmine Rice is a superior variety in comparison to other kinds of Rice? (1) Yes (2) No, please specify why not……
5. Do you think that Thai Jasmine rice cultivation increases the reputation of your place?
   ( ) absolutely yes ( ) I think so ( ) am not sure ( ) no, it does not ( do not know
6. Does Thai Jasmine Rice cultivation in your plot increase the soil quality?
   ( ) yes, soil quality improves significantly
   ( ) yes, soil quality improves marginally
   ( ) No, no change in soil quality
   ( ) I am not aware of any change in soil quality
7. Do you know whether your Thai Jasmine Rice is finally sold in the national market or in the international market? ( 1 ) = Yes ( 2 ) = No
8. Do you think that introduced GI scheme for your Thai Jasmine rice could be successful regarding its contribution to rural development?
   ( ) yes, it is successfully introduced and it contributes to the rural development, go to Q 9.
   ( ) no, it is not successful and it does not contribute to the rural development, go to Q 10.
   ( ) I do not know.
9. If yes, which determinants are to your mind critical regarding GI introduction for rural development? Please give the value 1 for the most critical ones, 2 for the second and so on.
   ( ) Impact of GI on increasing tourism for the region



   ( ) Increased employment due to GI introduction
   ( ) Efficiency of the Thai Jasmine rice household increases due to GI introduction
   ( ) Closer cooperation between groups
   ( ) New created products used Thai Jasmine rice as main raw material
   ( ) Other, please specify……..
   ( ) Other, please specify……..
10. If no, why? Please specify,……
11. Is income gained from price premium sufficient for you (*) ? (1) Yes (2) No
12. Did you build a group to produce products used Thai Jasmine rice as main raw material? (1) Yes (2) No
13. If yes, when did you build a group?.....
14. Are there any known pilot cases regarding Thai Jasmine rice in your TK region? (1) Yes (2) No
15. How is the local supply of Thai Jasmine rice?
   (….) There is a reduced local supply of Thai Jasmine rice due to GI introduction
   (….) There is no reduction of local supply of Thai Jasmine rice due to GI introduction because of little demand for Thai Jasmine rice consumption in the region
   (….) I do not know
   (….) No answer
16. Do you want a GI certification for your Thai Jasmine Rice? (** **and** ***) (1) = Yes; (2) = No; (3) = Do not know
17. **If yes**, why do you want to have GI certification for your Thai Jasmine Rice? (** **and** ***)
   (You can answer more than one option, put 1 for the most important and 2 for the second most important reason and so on)
   (……) GI certification would help us fetch a higher price
   (……) GI certification together with organic certification would help me to gain a higher price premium due to both certifications
   (……) My neighbor(s), who is(are) already GI farmers(s), has(have) already realized advantages of having GI certification
   (……) Other, please specify……
18. Do you think that after introduction of GI for your Thai Jasmine your revenue would raise? (** **and** ***) ( 1 ) Yes; ( 2 ) No
19. How secured do you feel financially?
   a) well secured b) can manage c) unsecured d) very unsecured
20. Given a chance to a job in the city, would you migrate?
   a) certainly b) may or may not c) never d) cant say
21. Does the **GI association** provide you information about the GI product? (1) Yes, if yes go to Q22; (2) No (3) Do not know
22. What kind of information?
   (1) information about market demand (2) Information about market price (3) Information bout market links (4) Information about better agricultural practices (5) Others, please specify ……..
23. Do **Agricultural Cooperatives** provide you information about the GI product? (1) Yes, if yes go to Q24; (2) No (3) Do not know
24. What kind of information?
   (1) information about market demand (2) Information about market price (3) Information bout market links (4) Information about better agricultural practices (5) Others, please specify ……..

25. Do **government officials** provide you information about the GI product? (1) Yes, if yes go to Q27; (2) No (3) Do not know
27. What kind of information?
(1) information about market demand (2) Information about market price (3) Information bout market links (4) Information about better agricultural practices (5) Others, please specify ……
28. Being GI-Farmers, what do you expect from the governmental bodies? (*)
(you can answer more than one option, put 1 for the most important one, 2 for the second most and so on)
( ) Improvement of access to water
( ) Extending the irrigation system for the region
( ) More training practices how to increase the yield
( ) Finding more export markets for Thai Jasmine Rice
( ) Financial funds against risk/shocks for Thai Jasmine Rice farmers
( ) More financial supports for farmers
( ) Others, please specify……
29. What is(are) the most important factor(s) for the success of the GI introduction to your mind?
(Please give the value from 1 for the most important one, 2 for the second most important one and so on)
( ) Good quality management
( ) Price premium guarantee
( ) Cooperation between value chain actors of the GI Thai Jasmine rice value chain
( ) Trust between value chain actors of the GI Thai Jasmine rice value chain
( ) Other, please specify……

**Section 7: Experience**

1. Do you experience a substantial rise in cost of Thai Jasmine Rice production for the last 5 years? ( 1 ) = Yes ( 2 ) = No
2. If yes, which costs are rising?
[put 1 for most important cost and 2 for second most important and so on]
( ) cost of seeds/seedlings are rising
( ) cost of fertilizers are rising
( ) cost of pesticides are rising
( ) costs for organic cultivation is generally higher and difficult to maintain
( ) other, specify……
3. Do you think revenues from Thai Jasmine Rice production are enough to cover the costs and give you some profits
( ) it is profitable
( ) only costs are covered but no profit
( ) costs are not covered
( ) very difficult to sustain with Basmati cultivation
( ) can't say
4. Do you think that Thai Jasmine Rice cultivation has improved your living conditions? ( 1 ) Yes ( 2 ) No



5. If No, what problems do you face by cultivating Thai Jasmine Rice?……
6. Do you receive support from the following organizations? If yes, what kind of support?
(You can answer more than one option)
A) NGO…….B) Governmental bodies…….C) Trader association…….D) Agricultural cooperative…….E) Producer groups…….F) Others, please specify……
Codes for 6: (1) seeds/seedlings (2) Fertilizer (3) Pesticides (4) Cash loan (5) Price guarantee (6) Expert advice (7) Others, specify……
……
7. Does **GI association** help you gaining access to a buyer? (1) Yes (2) No (3) Do not know……

8. How far is the nearest market from your home? In Kilometers (put 00 for < 1 k.m.)……..

9. How do you reach there usually? Walking ( ) Vehicle ( )
1= Rickshaw, 2=cycle, 3=auto-rickshaw, 4=motor-cycle, 5= Bus, 6= others, please specify……

**(For farmers having organic certification) (***)**

11. How long did it take to certify?
Technique implementation:…… months
Infrastructure: …… months
12. In your opinion, was certification a voluntary or enforced process? **(also for *)** 1= voluntary 2 = enforced
13. Do you know why certification is needed? (choose 1, 2, 3, etc according to level of importance):
( ) no, I have no idea
( ) no, I need to fill many documents, but I do not know why
( ) it is an excuse to make the farmers spend more money
( ) the domestic consumers are not aware about certification and therefore, are not willing to pay more
( ) yes, it is a guarantee that crops are produced safely, according to the international standards
( ) other reason……

**Section 8: Social Capital**

**Cooperation**

1. Of what kind of these organizations are you member? Please answer in the table above!

| Organisation | Yes | No | If yes, since when? | The two most important ones, please mark (x) |
|---|---|---|---|---|
| (a) Rice seeds group | | | | |
| (b) Rice community centre of the village | | | | |

| | | | | |
|---|---|---|---|---|
| (c) Voluntary clinical staffs of the village | | | | |
| (d) Village fund | | | | |
| (e) Cooperative | | | | |
| (f) Customer and membership of Bank of Agriculture and Cooperative (BAC) | | | | |
| (g) Other,specify | | | | |
| (h) Other,specify | | | | |
| (i) Other,specify | | | | |

2. Why do you think that it is important to be a member of an organization?
   (1) some help (2) price guarantee (3) buying guarantee (4) Information
   (5) Others, specify……
3. If no member, do you at least cooperate in some of village level organizations? (1) Yes, go to *Q4* (2) No
4. What kind of cooperation? Please specify……
5. What kind of help/cooperation do you get from the fellows members of the organization to which you belong to?
   (1) Labor Exchange (2) Equipment exchange (3) Information sharing (4) Monetary help (5) Others, please specify……
   ……
6. Are you involved in promoting GI-Thai Jasmine Rice? [ ] 1= yes, if yes, go to *Q7*; 2= No
7. How? Please specify ……
8. How often do you participate in meetings?
   (1) Every time (2) very often (3) often (4) sometimes (5) no participation at all
9. Did you participate in any other activities for promoting GIs? (1) yes, go to *Q10* (2) No
10. If yes, what were you exact tasks in that registration process? Please specify……
11. Do you also cooperate with other cooperatives from other areas?
    (1) Yes (2) No
12. If yes, what kind of cooperation?..... ……If no, why not?……
13. Do you cooperate with the rice millers in your area?
    (1)Yes (2) No
14. If yes, what kind of cooperation? ……If no, why not?.....……

**Trust**

1. Do you agree that most of the **people in your village (community)** can be trusted?
   (1) Strongly agree (2) Agree (3) Indifferent (4) Disagree (5) Strongly disagree
2. Do you think the level of trust over the last five years?
   (1) got much better (2) better (3) stayed the same (4) got worse (5) got much worse



3. Why this opinion? Please specify……
4. How much do you trust the **government officials**?
   (1) very much (2) much (3) medium (4) little (5) not at all (6) not sure
5. Why this opinion? Please specify……
   ……
6. How much would you trust in **cooperatives**?
   (1) Very much (2) Much (3) medium (4) little (5) not at all (6) not sure
7. Why this opinion? Please specify……
   ……
8. How much would you trust in the **rice millers**?
   (1) Very much (2) Much (3) medium (4) little (5) not at all (6) not sure 1
9. Why this opinion? Please specify……
   ……
10. How much would you trust in the **traders**/**middlemen**? (If you sell Thai Jasmine Rice to them)
    (1) Very much (2) Much (3) medium (4) little (5) not at all (6) not sure
11. Why this opinion? Please specify……
    ……
    ……

**Network Building**

1. Do you have contacted more people after having certification comparing with before certification? (1) yes (2) No (3) Do not know (4) Not sure
2. How do you and other farmers get along?
   (1) very well (2) there is not much interaction (3) there is always in-fighting (4) we are mostly on our own
3. Does the cooperative organize training programs or meetings? ( 1 ) Yes ( 2 ) No
4. Do you attend those meetings? ( 1 ) Yes ( 2 ) No
5. If yes, how often these meetings are organized?
   (1) once in a fortnight (2) once in a month (3) once in 3 months (4) once in 6 months (5) once in a year
6. How do you contact the cooperatives? (You go to meet them or they come to see you?) Please specify……
7. How do you contact the rice millers? (You go to meet them or they come to see you?) Please specify……
8. How do you contact the traders? (You go to meet them or they come to see you?) Please specify ……
9. Is there a GI association in your area? (1) Yes (2) No (3) Do not know (4) Not Sure
10. Are you a member of that association? (1) Yes (2) No (3) Do not know; If **Yes** go to the next question
11. Since when are you a member? Please give the **year**……

**Section 9: Bargaining Power**

1. Do you have choices/options of selling your Basmati rice to your trading partners when the price is already fixed by them?
   (1) Yes (2) No (3) Do not know (4) No answer
   If yes, why? ……
   If no, why not?……
2. How do you deal with your trading partner?
   (1) quality as negotiating basis (b) volume of rice as negotiating basis (c) others, specify……..
3. Can you change selling your Thai Jasmine Rice to other different cooperatives/trading partner?
   (1) Yes (2) No (3) Do not know (5) No answer
   Do you have a contract for producing Thai Jasmine Rice for specific trading partners? *If yes, go to the next three questions!*
   (1) Yes (2) No (3) Do not know (4) No answer
4. What kind of contract?
   (1) written (2) oral (3) price arrangements (fixed price etc.) (4) Others, please specify……

5. What is the duration of the contract? ……..Year(s)

6. Do the traders come directly to you and buy your Thai Jasmine Rice?
   (1) Yes (2) No (3) Do not know (4) No answer
7. Can you fix the price for Thai Jasmine Rice buy yourself?
   (1) Yes (2) No (3) No Answer
   *If yes, go to the next question (Q13); If no, go to Q 14!*
8. Who normally fix the price for your Thai Jasmine Rice? Please specify……
9. Is the price fixed by them or by agreement between you and the cooperative? [ ] 1=by others, specified above; 2=you and agri. cooperatives
10. Do you think that you get **fair price**?
    (1) Yes (2) No (3) Do not know (4) No answer
11. From Q15, if no why not? Please specify……

**Section 10: Obstacles in GI-Registering Procedure**
*(Only *)*

1. Do you face problems and obstacles in registering of GI?
   (1) Yes (2) No (3) Do not know (4) No answer……If yes go to Q2
2. When/In which stage of registering process did you confront with such problems?
   ……
   ……
   ……



3. What were your problems and obstacles in the GI-Registering Procedure?
   (You can answer more than one option)

   (A) Cost for registering is too high. Please specify how high it is……(Baht)/ (unit)
   (B) Transportation cost to go to do registering.
   (C) Staffs in the registration authorities.
   (D) Lack of qualified staffs with respect to the registration for GI.
   (E) Complicated registration process, please specify how……
   (F) Takes too long time, please specify how long did it takes?……(Month (s)/Year (s))
   (G) Others, please specify……

4. Which authorities do you usually contact when you face such problems or obstacles (related to GI-Registration)?
   (You can answer more than one option)

   (A) Local government authorities, when……
   (B) Community Development Department, when……
   (C) Department of Agricultural Extension, when……
   (D) Department of Export Promotion, when……
   (E) Department of Foreign Trade, when……
   (F) Department of Internal Trade, when……
   (G) Department of Trade Negotiation, when……
   (H) Department of Intellectual Property, when……
   (I) Others, please specify and when……

**Code A for Section 11: Household Expenditures**

| | |
|---|---|
| 1 | Daily |
| 2 | Weekly |
| 3 | Monthly |
| 4 | Bi-annually |
| 5 | Annually |
| 90 | Other, specify |
| 97 | Don't know |
| 98 | no answer |
| 99 | does not apply |

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**Section 11: Household Expenditures for Food and Non-Food Consumption**

1. How much is your monthly total expenditure?.....(Baht)

| | 1 | 2 | 3 |
|---|---|---|---|
| | Categories | Total Amount (Baht) | specify time period A |
| 1 | **Food Consumption** (Rice, beef/pork, Fish, Poultry, Eggs, Vegetable, Fruit, Food ingredients, spices, oil, Take home and eat out, Other food) | | |
| 2 | **Education** (School fees, books, students dress/uniform, Tuition fee, Rental fee (Dorm, apartment), Other costs of schooling) | | |
| 3 | **Health** (Medicine (Purchase in Pharmacy only), Doctor fee, Others…) | | |
| 4 | **Social** (Celebrations and funerals, Donations (to temples, social organizations, schools), Recreation and entertainment, Lottery, Taxes (income, land taxes), Others…) | | |
| 5 | **Non-Food** (Rent (for housing), Personal care supplies, Clothes, shoes and bags, accessories, Detergent/washing powder, Electricity, Water Cost, Liquid propane gas/Charcoal, Hair dresser, Others…) | | |
| 6 | **Transportation and Communication** (Fuel, maintenance, insurance and tax for motorbike/car, Public transportation, Telecommunication, Others…) | | |
| 7 | **Expenses for Loan Interest Rates** | | |

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**Section 12: Shocks**

When considering the past 5 years, has there been any event causing a big problem (shock) affecting the HH? Please think of any problems related to your family, farm, house or job (**Table 12.1**)! And what were your coping strategies for which shocks? (**Table 12.2**)

**Table 12.1**

| Shocks Code | Type of Shocks | Shocks Level (Please put X in the blank space for applicable case) | | | | Year of Occurrence | Reduced Consumption because of the event? 1=Yes;2=No;97=Do not know 98=No answer | How many years to recover from the event? 0 for<1year; 1 for 1 year; 2 for >1 year but now recovered; 90 = Others, specify...; 97=Do not know;98=No answer;99=not applicable |
|---|---|---|---|---|---|---|---|---|
| | | High | Medium | Low | No impact | | | |
| | **Demographic** | | | | | | | |
| 1 | Illness of HH member | | | | | | | |
| 2 | Death of HH member | | | | | | | |
| 3 | HH member left the HH | | | | | | | |
| 4 | Person joined the HH | | | | | | | |
| 5 | Money spent for ceremony in the HH | | | | | | | |
| | **Social** | | | | | | | |
| 6 | HH Damage | | | | | | | |
| 7 | Theft | | | | | | | |
| 8 | Conflict with neighbours in the village | | | | | | | |
| 9 | Relatives/Friends stopped sending money (remittances) | | | | | | | |
| | **Agriculture** | | | | | | | |
| 10 | Flooding | | | | | | | |
| 11 | Drought | | | | | | | |
| 12 | Unusual heavy rainfall | | | | | | | |
| 13 | Crop pests | | | | | | | |
| 14 | Storage pests (incl. rats) | | | | | | | |
| 15 | Livestock disease | | | | | | | |
| 16 | Landslide/Erosion | | | | | | | |
| | **Economic** | | | | | | | |
| 17 | Job loss | | | | | | | |
| 18 | Collapse of business | | | | | | | |
| 19 | Strong decrease of prices for output | | | | | | | |
| 20 | Strong increase of prices for input | | | | | | | |

**Table 12.2**

| No. | Coping Strategies | For which shocks in Table 12.1? Please put the shocks code in here! | | | | |
|---|---|---|---|---|---|---|
| 1 | Did nothing | | | | | |
| | **Economics** | | | | | |
| 2 | Took up additional occupation | | | | | |
| 3 | Diversify agricultural portfolio | | | | | |
| 4 | Substitute crops | | | | | |
| 5 | Reduced production inputs | | | | | |
| | **Demographics** | | | | | |
| 6 | Took children out of school | | | | | |
| 7 | Sent children to relatives/friends | | | | | |
| 8 | Adult migrated to look for job | | | | | |
| 9 | Adult migrated to live with relatives/friends | | | | | |
| 10 | Adult migrated to marry | | | | | |
| | **Sale** | | | | | |
| 11 | Sold livestock | | | | | |
| 12 | Sold land | | | | | |
| 13 | Sold storage (e.g. rice) | | | | | |
| 14 | Sold other assets | | | | | |
| | **Borrowing and Saving** | | | | | |
| 15 | Used savings | | | | | |
| 16 | Used insurance | | | | | |
| 17 | Borrowed from relatives | | | | | |
| 18 | Borrowed from friends/neighbours | | | | | |
| 19 | Borrowed from pawnshop | | | | | |
| 20 | Borrowed from informal money-lender | | | | | |
| 21 | Borrowed from banks and funds | | | | | |
| | **Grants** | | | | | |
| 22 | Help from government | | | | | |
| 23 | Help from NGOs | | | | | |
| 24 | Help from relatives | | | | | |
| 25 | Help from friends/neighbours | | | | | |
| 90 | Other, specify… | | | | | |
| 97 | Do not know | | | | | |
| 98 | No answer | | | | | |
| 99 | Does not have to reply | | | | | |



**Section 13: Borrowings and Savings**

**13.1: Borrowing**

1. Do you have an access to credit?? [ ] 1= Yes, 2= No, go to the next section

2. Where do you get the loan?
( ) Borrowed from relatives ( ) Borrowed from friends/neighbors ( ) Borrowed from pawnshop ( ) Borrowed from informal money-lender
( ) Borrowed from village funds ( ) Borrowed from commercial banks ( ) Borrowed from BAAC/Coop. Bank ( ) Borrowed from Government Savings Bank
( ) Borrowed from village Bank ( ) Borrowed from commercial bank ( ) Others, please specify……

3. Do you face difficulty in paying back loan? [ ] 1= Yes, 2= No, 97= Do not know, 98= No answer

**13.2: Savings**
For the survey period between **March 2008 and March 2009**

1. Do you have any savings? [ ] 1 Yes; 2= No

2. Could you save parts of your yearly income? [ ] 1= Yes; 2= No

3. How much of your yearly income do you save?.....Baht

4. Do you possess any other financial assets*? [ ] 1= Yes, go to Q5; 2= No
* for example federal savings bond etc.

5. Please give the value of these other financial assets…… ……Baht

**Section 14: Additional Questions**

**Housing Particular**

1. Do you have a dwelling? [ ] 1= Yes; 2= No

2. How is the ownership of the dwelling? [ ] 1=owned;2= hired; 99= other, please specify……..

3. Type of dwelling [ ] 1= independent house; 2= flat; 90=others, please specify……

4. Construction Style of the house [ ] 1= on ground; 2= wooden poles; 3= cement poles; 98= no answer; 99: does not apply

5. The walls of main dwelling is mainly made of [ ] 1= wood; 2= cement; 3= metal; 98= no answer; 99= does not apply

6. The windows of main dwelling is mainly made of [ ] 1= glass; 2= bamboo; 3= wood; 4= metal; 98= no answer; 99 = does not apply

7. The roof of main dwelling is mainly made of [ ] 1= straw; 2= tin; 3= wood; 4= slate; 5= flat roof; 98= no answer; 99= does not apply

8. Lighting [ ] 1= none; 2= electricity; 3= kerosene lamp; 4= other lamp; 97= others, please specify……..

9.Cooking fuel [ ] 1= LPG/piped gas; 2= local/lobar gas; 3= electricity; 4= kerosene; 5= coal; 6= firewood; 90= others, please specify……..

10.Source of drinking water [ ] 1= tap; 2= tube-well; 3= tank/pond; 4= river/canal/lake; 5= spring; 90= others, please specify……

11. Mode of Sanitation [ ] 1=Water sealed, 2=Fixed pit, 3=Hanging, 4=Open space

12. What is the average level of income as result from all the economic activities in your household per year **(March 2008 to March 2009)**?

a) Less than Baht 10,000
b) From Baht 10,000 to Baht 19,999
c) From Baht 20,000 to Baht 29,999
d) From Baht 30,000 to Baht 49,999
e) From Baht 50,000 to Baht 99,999
f) From Baht 100,000 to 499,999
g) Up to Baht 500,000