

The Decision to Adopt Organic Practices in Malaysia; a Mix-method Approach

Nur Bahiah Mohamed Haris¹, Guy Garrod¹, Menelaos Gkartzios¹ & Amy Proctor¹

¹School of Agriculture, Food and Rural Development,
Agriculture Building, King's Road, Newcastle University
Newcastle upon Tyne, Tyne and Wear, NE1 7RU, United Kingdom

Abstract

Organic agriculture is being promoted globally and is considered to have beneficial impacts on sustainable development. Aside from the importance of organic agriculture for human health and the environment, organic farming also indirectly contributes to income generation, development of new technologies and indigenous knowledge, as well as supporting rural development (Darnhofer, 2005; Scialabba, 2000). In Malaysia, people have recently become more aware of the potential advantages of organic food; however, the adoption rate among farmers is still very low and the number of certified farmers remains small. In fact, the demand from consumers for organic products continues to increase and cannot be met by local producers, hence relying on imports from other countries. In this context, this paper aims to investigate the factors that influence the farmer's decision to adopt organic farming practices. This study was carried out in all four regions of Peninsular Malaysia (Northern, Central, Southern, and East Coast) which also represent the four highest number of organic farmers that have been listed by the Department of Agriculture (DoA) Malaysia. Logistic regression analysis was estimated to ascertain the factors. The paper intends to explain the decision to adopt or not adopt organic farming with respect to a variety of socio-economic, social and attitudinal factors. The analysis was done using both qualitative and quantitative methods, towards a more comprehensive understanding of the overall situation of organic farming practices in Malaysia. The results indicate that environmental attitudes is the most influential factor, followed by information sharing attitudes, as well as land ownership. These observations can contribute to national policy development in the context of future sustainable development.

Keywords: Organic Farming, Farmers' Adoption, Logistic Regression, Malaysia

*** Corresponding author, e-mail: bahiaharis@gmail.com**

1. Introduction

Organic agriculture is the fastest growing agriculture-based industry in the world (Paull, 2011). The International Federation of Organic Agriculture Movements (IFOAM) has become the main advocacy group for supporting the global organic movement (Paull, 2010). Recent, data from the IFOAM suggests that organic agriculture is practiced in 160 countries, and that the land devoted to organic agriculture worldwide more than doubled from 15.8 million hectares in 2001 to 37.2 million hectares in 2011 (Paull, 2011). In addition, there has been an increase in the area of organic agriculture land in Asia, Europe, North America and Oceania (Willer *et al.*, 2013). In Asia, the total area of organic agriculture is nearly 3.7 million hectares, which constitutes ten percent of the world's organic land. China leads with 1.9 million per hectares followed by India with 1.1 million hectares.

In Malaysia, over recent decades, the agriculture sector has come to rely more on extensive production practices. In order to reduce the negative impacts that derive from agricultural intensification, environmentally friendly and sustainable production methods, such as organic farming have been fostered. To date, the '*Sustainability and Pursuing the Green Growth*' has become the main agenda (under Strategic Trust 6) in the 11th Malaysian Plan (2016-2020), which is benchmarking Malaysian agricultural practices against international standards. This modernisation of the agriculture sector is the key priority to ensure that the farm produce complies with sustainable agriculture practices as well as meeting food safety requirements, which can increase the income level of smallholder farmers.

Nevertheless, organic food still remains a niche market in Malaysia, although it is growing rapidly each year (Department of Agriculture, 2014). The proportion of organic farming has increased substantially. The latest number of farms that have been registered in 2016 was 179 farms in total, compared with 142 organic farms in 2014 and only 27 organic farms in 2001 (Department of Agriculture, 2016). However, Malaysia lags considerably behind countries like India and China in terms of organic production.

A review of the literature related to organic farming and sustainable agriculture in Malaysia suggests that this topic has been well researched. These studies explore different approaches to organic farming including: (1) farmers' adoption of sustainable agriculture practices (SAP) and good agriculture practices (GAP) (Tey *et al.*, 2014; Terano *et al.*, 2014; Tey, 2013; Barrow, 2009; Hashim, Mustapha & Siwar, 2008), (2) consumer preferences and behavior (Chamhuri & Batt, 2015; Ibitoye & Nawi, 2014; Othman & Rahman, 2014; Wee *et al.*, 2014; Terano *et*

al., 2014; Mohamad *et al.*, 2014; Ahmad & Juhdi, 2013; Che Wel *et al.*, 2012; Saleki & Seyedsaleki, 2012; Shafie & Rennie, 2012); (3) the market and supply chain for fresh fruit and vegetables (Stanton *et al.*, 2011; Man *et al.*, 2009; Ali *et al.*, 2008); and (4) knowledge transfer among extension agents and the key actors involved in the agricultural community (Shariff *et al.*, 2014; Tiraieyari *et al.*, 2013; Tiraieyari & Uli, 2011). However, far too little attention has been paid to farmers' motivation for adopting organic farming practices except for the adoption of fragrant rice farming (Jamal *et al.*, 2014), farmers knowledge, attitude and practices towards organic (Assis & Mohd Ismail, 2011) as well as issues and challenges faced by organic farmers (Suhaimie *et al.*, 2016; Tiraieyari *et al.*, 2014).

The main aim of this paper is therefore to investigate the main factors that affect farmer's decisions to adopt organic farming in Malaysia; as well as to inform policy and practice. This paper begins with some background of the international organic farming related studies, followed by a brief review of the findings of other studies in the development of organic farming in Malaysia. A summary of the methodology adopted in this study is followed by results, discussion and conclusions about the factors that encourage farmers to convert to organic practices.

2. Adoption of Organic Farming Literatures

There is a vast literature on the adoption and diffusion of technologies in agriculture (Feder *et al.*, 1985), and the majority of these studies tend to focus on the adopters and non-adopters of a technology (Burton *et al.*, 2003; De Souza Filho *et al.*, 1999). Organic farming also shares similarities with other agricultural technologies in term of the adoption diffusion process. Burton and colleagues sparked the idea to investigate the factors that adopting organic farming in the UK in 1999, and this inspired other scholars to continue examination on related issues (Burton *et al.*, 1999; Darnhofer *et al.*, 2005; Läßle & Rensburg, 2011; Mzoughi, 2011; Nigussie *et al.*, 2017; Padel, 2001).

A number of studies have examined the organic farming adoption through employing the economic and management theory approaches. For instances, Hattam & Holloway (2005) found that the organic adoption in Mexico is certainly influenced by production cost per hectare and making inputs. Pietola & Lansink (2001) estimated farmers' responses to economic incentives and the importance of input and output prices when converting to organic farming. Some studies have compared the economic and financial performance of organic and conventional farms to show the differences between these two alternatives (Lampkin & Padel, 1994; Offermann & Nieberg, 2000).

Others used a broader approach by considering a variety of socio-economic factors (Burton *et al.*, 2003; Läßle, 2010). These empirical works demonstrated that output prices, policy changes, farm and structural factors, the farmer's own characteristics contributed to the uptake of organic farming. Despite providing valuable insight into the adoption process of organic farming, all of these studies treat farmers as a homogeneous group, and only a few studies that are measuring farmers as heterogeneity (Läßle & Kelley, 2013) as these studies mainly measure for the willingness and ability of farmers to convert to organic farming. Besides, based on the study in Thailand highlighted that the organic adopter might have better access to water, the ability to seek and find higher prices, and also have stronger attitudes toward conventional farming problems (Pornpratansombat *et al.*, 2011).

Another strand of research takes the behavioral approach as motives of farmers to convert to organic farming. As suggestion by Burton *et al.*, (2003), motivation, values and attitudes determine individual farmers' in decision making processes. Thus, farmers type and their rationale have been identified so far by Darnhofer *et al.*, (2005) and Fairweather (1999). Lampkin and Padel (1994) reviewed the evidence on the motivations of organic farmers, and identified the most common factors among organic producers including family's health, concerns about husbandry (e.g., soil degradation, animal welfare), lifestyle choice (ideological, philosophical, religious) and financial considerations.

Beyond those issues, the sociological approach also plays an important role in affecting the adoption of organic agriculture. Breimyer (1984) argued that not all farmers undertake organic practices purely for economic reasons and that social factors can influence conversion decisions. Similarly Lobley *et al.*, (2009) suggested that the "social space" of the farmer is an important component in making a decision, with respect to giving advice and get the information from others.

Moreover, debates have emerged on the importance of the combination of various factors in determining the adoption and diffusion of organic farming, such as socio-demographic and economic variables, perceptions and attitudes, where its influences farmers behavior and decision making (Sattler & Nagel, 2010; Wilson & Hart, 2000). Mzoughi (2011) also emphasised that moral and social concern also play a major role in farmers to opt for organic farming practices. Based on this study, social concern like showing an environmental commitment can drive to adopt organic farming, whereas moral concern will increase the possibility to adopt the organic farming.

Conversion to organic farming is a complex system change, implying lower profitability and higher risk at the earlier stages (which is opposite to the basic values of the common agricultural practices) (Asadollahpour *et al.*, 2016; Padel, 2001). The decision cannot rely upon personal adopters alone; in fact, all factors need to be considered. The literature review has demonstrated mixed evidence so far. Fisher (1989) emphasized that combining both factors, economic and non-economic, may influence a higher probability of a shift to organic farming practices. Therefore, this study is aiming to investigate what factors might influence farmer's decision to farming organic, specifically by looking at several factors like socio-economic, social as well as behavioral factors in the model. A mix methods approach were used in this study, elicit more understanding towards the adoption of organic farming practices in Malaysia.

3. Methodology

This study involved three work stages of data collection, which combines both approaches; quantitative and qualitative methods. The first stage was conducted by exploratory interviews from several key informants, in order to provide some context to aid understanding of policy and government intervention around the growth of organic production in Malaysia (Mohamed Haris, 2016). This also provided information essential for the survey for the next stage.

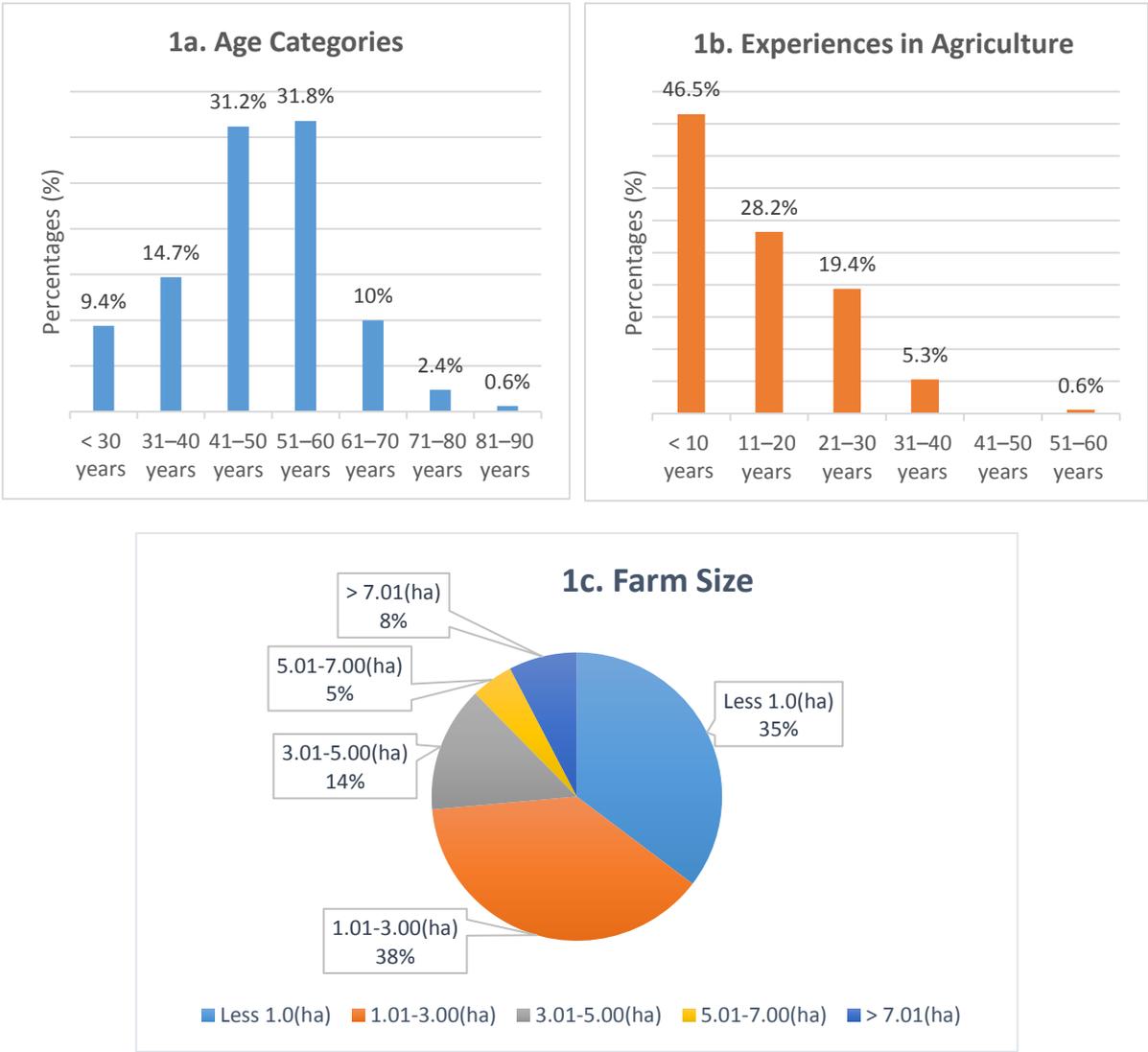
Consequently, a purposive sampling approach was used to gather the quantitative data. The core sampling frame was a list of organic farmers provided by the Department of Agriculture Malaysia (DoA). At the same time, snowball sampling, based on these initial contacts, generated further subjects, with respondents suggesting the names of other local organic or conventional producers who could be asked participate in this study. This helped to identify both organic farmers who were not registered under the *MyOrganic* scheme, and a group of neighboring conventional farmers for comparison. A total of 170 farmers were involved, where 82 were organic farmers and 88 were conventional, and they were assisted through an administered questionnaire survey by the researcher. This study was carried out in all four regions of Peninsular Malaysia (Northern, Central, Southern, and East Coast). This approach was undertaken to gather relevant data regarding farm household, farm enterprises, farmer's attitude and also organic adoption.

Finally, ten farmers who had participated in the questionnaire survey were asked to participate in follow-up interviews. This allowed for the more in-depth exploration of key questions such as why some farmers had converted to organic production and what encouraged them to do so. These qualitative, in-depth interviews enabled respondents to clarify and discuss in more detail some of the underlying factors that may not be identified in the quantitative modelling.

Data on the adoption of organic farming generates a binary dependent variable, based on the outcomes 'adoption' or 'non-adoption'. Based on a review of the relevant literature logistic regression was judged to be an appropriate analytical tool for identifying the factors that influence farmers to adopt organic farming in Malaysia. The resulting logit models, which are estimated using maximum likelihood approaches (Greene, 2013), have been used widely in adoption studies (Finger & El Benni, 2013; Läßle & Rensburg, 2011; Okon & Idiong, 2016).

4. Results

In general, this study involves organic and conventional farmers ascertaining research questions. Drawing the results of demographic background, the proportion of organic and conventional farmers are almost the same (48% and 52% respectively), with almost all organic farmers being certified. Male farmers (89%) far exceed women and most of the respondents are Malay (56%), followed by Chinese (37%) and Indian (6.5%). The majority of the respondents have either primary or secondary education with nearly 15% educated to degree level. The mean age of respondents was 48, with the majority aged between 41 and 60 (62%). In term of the experience, the mean length of time spent in farming was 15 years, though many farmers (46.5%) had less than 10 years of experience; in contrast, nearly a quarter of respondents in the sample had farmed for more than 20 years. Most farmers earned farm size around 4 hectares (ha), with the majority have 3 hectares (ha) and below (See Figure 1a, 1b and 1c).



[Figure 1a and 1b shows the percentage of respondents towards age and experience categories, and Figure 1c present the percentage of respondent’s farm size].

It is worthwhile to divide the socio-economic profiling of each group (organic and conventional farmers), to make it more clear and easier for interpretation, hence the socio-economic profile of organic and conventional is discussed follows (refer Table 1).

Table 1. Socio-economic profile of farmers for each group of farmers

| Variables (n=170) | Organic (%) | Conventional (%) | Total (100%) |
|---------------------------|--------------------|-------------------------|---------------------|
| Gender | | | |
| Male | 69 (40.6%) | 82 (48.2%) | 151 (89%) |
| Female | 13 (7.6%) | 6 (3.5%) | 19 (11%) |
| Ethnicity | | | |
| Malay | 64 (37.6%) | 31 (18.2%) | 95 (55.9%) |
| Chinese | 20 (11.8%) | 43 (25.3%) | 63 (37.1) |
| Indian | 4 (2.4%) | 7 (4.1%) | 11 (6.5%) |
| Other | 0 (0.0%) | 1 (0.6%) | 1 (0.6%) |
| Education | | | |
| Primary school | 22 (12.9%) | 12 (7.1%) | 34 (20%) |
| Secondary school | 40 (23.5%) | 30 (17.6%) | 70 (41.2%) |
| Higher certificate (STPM) | 7 (4.1%) | 5 (2.9%) | 12 (7.1%) |
| Diploma | 6 (3.5%) | 14 (8.2%) | 20 (11.8%) |
| Degree | 11 (6.5%) | 14 (8.2%) | 25 (14.7%) |
| Postgraduate | 2 (1.2%) | 7 (4.1%) | 9 (5.3%) |
| Region | | | |
| Northern | 6 (3.5%) | 0 (0.0%) | 6 (3.5%) |
| East Coast | 34 (20.0%) | 16 (9.4%) | 50 (29.4%) |
| Central | 28 (16.5%) | 65 (38.2%) | 93 (54.8%) |
| Southern | 14 (8.2%) | 7 (4.1%) | 21 (12.4%) |

4.1 Socio-Economic Profile of Organic Farmers

By looking at the organic farmers in this study, most of them are Malay and educated to certificate level. The majority range in age between 41 to 50 years old, and the oldest are 70 years old. Nearly all have experience ten years or lower, and only a few having experiences of 60 years (more than conventional farmers). The organic farm sizes are generally small (almost 1 ha), largely in the East Coast region. This notably indicated the highest proportion of organic farmers by Department of Agriculture Malaysia (DoA). In terms of ownership, organic farmers mostly own their farms. This corresponds to the requirement of applying the *MyOrganic* certification, where the basic process of applying the certification requires the certificate of land ownership. For the supply chain marketing, organic groups prefer regular buyers from specialised organic shops, and local people and restaurants as their main customers, followed by supermarkets. Most of them cultivate mushrooms and vegetables as the main crops. Those who apply for credit and loan access are also from the organic group of farmers.

4.2 Socio-Economic Profile of Conventional Farmers

In contrast, the criteria of conventional farmers in this study are considerably different from the organic farmers. The majority are Chinese, ranging in age between 51 to 60 years old and mostly educated farmers, their education up to higher level (Diploma and above). In terms of experience, mainly 50% of them having their experience ten years and below, and the longest years of experience are up to 40 years only. The farm sizes are generally big, more than 2 ha of land and mostly rented land. The majority of them are from the Central Region, cultivating fruits as well as other crops including vegetables, and more likely to supply their produces to the collector, wholesaler and their own consumer like local people. Almost all are applying for subsidies from the government, and become a member of cooperative and farmers association.

4.3 Logit Modelling

The logit model predicting farmer's adoption of organic practices contained 15 independent variables. These can be divided into three subgroups; 1) socio-economic factors (based on demographic questions), 2) social factors (data derived from the interviewing key informant's results) and 3) farmer's attitudes (based on the questionnaire). The logit model is specified as:

$$\begin{aligned} \text{Logit}(P_i) = & \beta_0 + \beta_1 \text{EXP} + \beta_2 \text{FSIZE} + \beta_3 \text{TRN} + \beta_4 \text{EDU} + \beta_5 \text{OWN} + \beta_6 \text{DUMAGE} \\ & + \beta_7 \text{MMBER} + \beta_8 \text{BUS} + \beta_9 \text{PHIL} + \beta_{10} \text{SUP} + \beta_{11} \text{INF} + \beta_{12} \text{ENV} \\ & + \beta_{13} \text{PRFT} + \beta_{14} \text{RISK} + \beta_{15} \text{INFO} + \varepsilon_i \end{aligned}$$

Where:

- P_i = Adoption of organic farming
- β_0 = Intercept
- EXP = Farm Experience (years)
- FSIZE = Farm size (ha)
- TRN = Farm training attended (Dummy, takes the value 1 if attended and 0 otherwise)
- EDU = Level of education (Dummy, takes the value 1 if schooling and 0 higher education)
- OWN = Farm ownership (Dummy, takes the value 1 if own farm and 0 not own farms)
- DUMAGE = Age of farmers (Dummy, takes the value 1 if less than 50 years old, and 0 is more than 50 years)
- MMBER = Membership of farmers organization (Dummy, takes the value 1 if member or 0 otherwise)
- BUS = Business motives (summated scores)
- LIFE = Organic lifestyle (summated scores)
- SUP = Support from others (summated scores)
- INF = External influences (summated scores)
- ENV = Environmental attitudes (summated scores)
- PRFT = Profit attitudes (summated scores)
- RISK = Risk averse attitudes (summated scores)
- INFO = Information seeking attitude (summated scores)
- ε = Error term

Table 2. Logit Modelling results for the factors influencing the adoption of organic farming

| | B | S.E. | Wald | df | Sig. | Odds ratio | |
|----------------------|--|--------------------|-------------|-----------|----------------|-------------------|---------------|
| Variables | (Coefficient) | (Std error) | | | p-value | | |
| Socioeconomic status | Experience (EXP) | 0.061 | 0.036 | 2.860 | 1 | 0.091* | 1.062 |
| | Farm_size (FSIZE) | -0.022 | 0.030 | 0.537 | 1 | 0.464 | 0.978 |
| | Training (TRN) | 1.595 | 0.733 | 4.741 | 1 | 0.029** | 4.930 |
| | DumEdu (EDU) | -1.130 | 0.655 | 2.976 | 1 | 0.085* | 0.323 |
| | Farm ownership (OWN) | 1.620 | 0.727 | 4.966 | 1 | 0.026** | 5.053 |
| | DumAge (DUMAGE) | -0.750 | 0.665 | 1.274 | 1 | 0.259 | 0.472 |
| | Membership farmers organisation (MMBER) | -1.831 | 0.630 | 8.461 | 1 | 0.004*** | 0.160 |
| Social factors | FAC1_BusinessEnvironment (BUSENV) | 1.562 | 0.435 | 12.904 | 1 | 0.000*** | 4.767 |
| | FAC2_Organic Lifestyle (LIFE) | 1.510 | 0.530 | 8.131 | 1 | 0.004*** | 4.528 |
| | FAC3_Support (SUP) | -0.228 | 0.524 | 0.189 | 1 | 0.664 | 0.796 |
| | FAC4_OthersInfluence (INF) | -0.777 | 0.395 | 3.877 | 1 | 0.049** | 0.460 |
| Attitudes | Environmental_Att (ENV) | 2.730 | 0.828 | 10.865 | 1 | 0.001*** | 15.336 |
| | Profitable_Att (PRFT) | -2.817 | 0.843 | 11.159 | 1 | 0.001*** | 0.060 |
| | Risk_Att (RISK) | -1.775 | 0.729 | 5.924 | 1 | 0.015** | 0.169 |
| | Info_Att (INFO) | 1.799 | 0.893 | 4.058 | 1 | 0.044** | 6.044 |
| | Constant | -8.334 | 4.720 | 3.118 | 1 | 0.077 | 0.000 |

Log likelihood ratio = 95.833
 LR Chi² = 139.625
 Pseudo R² = (Cox & Snell R = 0.560);
 Nagelkerke R² = 0.747)

*** = Significant at 1% level of probability
 ** = Significant at 5% level of probability
 * = Significant at 10% level of probability
 Number of Observation = 170

The model containing all predictors was statistically significant, where χ^2 (15, N=170) = 139.625, ($p < 0.001$), which explained between 56% (Cox and Snell R²) and 74.7% (Nagelkerke R²) of the variance in adoption, and correctly classified 88.8% of cases.

Table 2, shows that 12 independent variables are statistically significant; including five based on socio-economic factors, namely: experience (EXP), training (TRN), Education (DUMEDU), Farm ownership (OWN), and membership of farmers association (MMBER). Three are based on the social factors (i.e. business and environment (BUS), organic lifestyle (LIFE) and influences from others (INF)), while all four attitudinal variables (environmental (ENV), profitable (PRFT), risk averse (RISK) and information sharing (INFO)) were found to be statistically significant. The other variables included in the model were not significant, however they can be used to complement the model output as a whole (Hair *et al.*, 1998).

Based on the odd ratio (OR), this model reveals the environmental attitudes give a high contribution with 15.336, followed by information attitude (6.044) and farm ownership (5.053). This further indicates that the attitude (mainly the environmental and information seeking attitude) and the ownership of the farm increase the likelihood of adopting organic farming practices in Malaysia.

The results revealed environmental attitudes might influence farmer's decision in adopting organic farming. Several farmers highlighted these concerns during the interviews:

Organic is not only for health but also to protect the environment. (OF7)

The use of chemical inputs has a negative impact on the health of people and animals (OF6)

From their socio-economic background, owning their farm and having experience with these activities will make the transition to organic farming more likely to happen. People who really want to get involved in organic need the experience and knowledgeable in handling the organic crops:

To maintain in organic, farmers need experience in handling the organic crops and a full desire to learn organic way. That's the way to develop the skills and confidence among organic farmers. (OF18)

Personally I think why organic farmers cannot sustain is because they are lack of experience and manpower (OF21)

The membership of farmer organisations has a negative coefficient, suggesting that farmers who are converting to organic farming are less involved in organisations. As one of the organic farmers argued, organic farmers should have a support group or organisation that can help them through the journey to conversion. By setting up a connection such a group or organisation, knowledge can be shared more easily and members may collaborate for marketing purposes.

Organic farmers really need agencies or organisations that can help them to sell their products. As a group, the product can easily penetrate a big market like a hypermarket because we could sell it in large volumes (OF19)

The positive coefficient value of the training factor indicates that training is essential when adopting organic farming practices, but on the other hand education level make adoption less likely. Some farmers argued that there is a need to offer more basic education, including specific courses related to organic farming to university level.

Education and awareness is the most important thing... Might propose to the university to have specific coursework or programme on organic (OF4)

The government must do something... educate people about the importance of organics to our health and environment (CF2)

All of the behavioral variables demonstrate significant values, whereby it suggests that attitudes play important role in organic farming adoption. Two factors (profitable and risk averse behaviour) indicate a negative a coefficient. This suggests that organic farmers are not driven by profit motives. They have to maintain premium prices for organic products, and most organic farmers rely on local people to buy their products. As one of the organic farmers argued:

The price is not the main thing. For us, as long as we can survive then it's fine. (OF4)

Most of us (organic farmers) sell to organic shops, as long they trust us, they will take our produce (OF11).

By contrast, the perception of the extension officers about organic farmers is totally different. In the interviews, they suggested that most organic farmers are always looking for higher profits, which threatens their integrity as organic farmers. This may be one of the reasons why the government set up the rules for renewing certification annually.

Here integrity is the main thing. They are more about profit, rather than environmental concerns... Farmers find it hard to maintain their integrity as organic farmers, they will do anything to get a better price. (Extension Officer 5)

In terms of risk behaviour, the negative sign indicates that in general organic farmers is risk averse, though this differs across individuals. When asked about risk, most organic farmers mentioned that they are not willing to take risks to sell in bulk and market their products to larger outlets like hypermarkets.

There is demand from hypermarkets for organic products, especially mushrooms. But we don't want to take the risk because we are afraid that we cannot meet their requirements... we don't want to breach our contract (OF24)

On the other hand, some producers and extension officers revealed that farmers really need to take greater risks in applying new ideas and technology, because they are more likely to survive if they apply new ideas and technologies:

From my experience, in the first three years the yield will get lower... but you have to take the risk. That's why experience and knowledge are very important in organic farming (OF18)

Farmers need to have a passion and dare to take the risk, as usually if they started to farm organically, the yield would be slightly lower almost for 3 years... then it will increase again (Extension Officer 2)

The social factors were derived using Principle Factor Analysis (PCA) following the qualitative interview with the key informants. Two sets of factors “business environment” and “organic lifestyle” tend to influence farmers to convert. On the other hand, the “influences from others” have a negative coefficient, which suggests that other people might have not contributed to the conversion for these farmers, though lack of such support may be a barrier for conventional farmers thinking about converting. The lack of support is making them more dependent on themselves, and they only need the enthusiasm and self-courage to do organic.

There is a lack of support from government... please encourage us to expand further (OF21)

There is also lack of support from the community, probably because they are less aware of the importance of organic food to human health and the environment. Most of the farmers [i.e. OF4, CF2, and CF4] agree about this:

Most people don't aware of organic... the government should create the awareness among consumer (OF4)

5. Discussion

The main objective of this paper is to highlight the factors that influence farmers' decisions to adopt organic farming practices in Malaysia. Past evidence indicates that the organic producers were influenced by the non-economic factors and had different criteria in term of demographics, economic situations and attitudes compared to the conventional ones (Rigby *et al.*, 2001). However, in contrast, there were also other studies indicated the financial and economic motives had become the main focus in converting to organic farming (Best, 2010; Koesling *et al.*, 2008).

Based on this paper, the attitudes particularly the environmental concerns, are the most influential factors in conversion to organic farming. This has been expected to be the case, because the government has been providing various strategies and alternatives to encourage farmers to adopt organic farming practices including free certification processes and upgrading, although few farmers have actually shifted to the organic farming practices. Therefore, the higher level of environmental attitude becomes the turning point of converting to organic, and it is consistent with other studies that also reported the same results (Burton, *et al.*, 2003; Darnhofer *et al.*, 2005; Läßle, 2012).

Apart from that, information sharing is also among the main predictor that contributes to the likelihood of farmers switching to organic. Farmers who are eager to find information, or have the enthusiasm to learn something new are more likely adverse to go organic. Most likely, this is because this way they learn more about the benefits of organic agriculture and thus develop the confidence to adopt organic farming practices. These actions may lead to social networking, where farmers are willing to connect with other farmers to gain input or information, or even share their experience or knowledge with others. Farmers participation in the community would provide a benefit not only for the farmers themselves, but also may improve the marketing channels, labour exchange or even the possibility of receiving funding (Pattanapant & Shivakoti, 2009; Sarker & Itohara, 2009) .

Farmers who have their own land are more likely to adopt organic production in this study. In order to apply for the *MyOrganic* certification program, farmers need to have their farm land certificate attached to the application. Other inspections will follow only after this condition. This result is similar to Nepal and Bangladesh studies, where land ownership is the most important reason for switching to organic farming (Karki & Dhakal, 2009; Sarker & Itohara, 2008). This is because land ownership determines the economic status and represents the social

status of an individual, and farmers who own larger farms, have more capital to expand for new technology and pay for the certification. Thus, the larger the farm is, the more likely they are to become organic. However, this situation is unlikely to happen in Malaysia where the ownership is the prerequisite to apply for organic certification, and there are no limitations regarding farm size.

In terms of experience in this study, the greater experience will influence farmers to adopt organic. Farmers who have more experience, realise the negative impact of conventional production on soil and the environment, hence they are more likely to adopt organic practices. This study is also consistent with other findings which also indicate the same outcomes, where the farming experience influences the adoption of organic vegetables, e.g. in Nigeria, (Okon & Idiong, 2016).

In contrast, many studies reported that organic farmers tend to be educated more than their conventional counterparts (Koesling *et al.*, 2008; Mzoughi, 2011; Padel, 2001); however, this paper revealed that education makes it less likely for farmers to convert to organic farming. This is in line with other studies as well (e.g. Hattam & Holloway 2005; Karki *et al.*, 2011; Sodjinou *et al.*, 2015) that also produced similar results. Burton *et al.*, (2003) further explained this might happen due to the differences in each country and commodity coverage. This situation may be the case in developing countries, where the majority of farmers are found to be less educated (Hattam & Holloway, 2005). In Malaysia, most of the farmers received their formal education until secondary school, and probably during that time there was no subject that had been taught about organic practices, or any related issues regarding environmental concerns. Furthermore, most mushrooms and vegetable farmers are continuing from their parents, and this might lead them to continue to farm traditional methods (keep the organic practices). Therefore, due to the low level of education, farmers might find it hard to understand and adopt new technology and practices, and might be reluctant to update their book keeping (as required for organic farmers) in order to upgrade their certification. They are more relying on the training from informal education and sharing knowledge with their colleagues to gain information.

Nevertheless, training seems to be the influential part for farmers to learn and improve their knowledge. From this study, training contributes a positive motivation for farmers to adopt organic farming. Training is expected to provide more knowledge on informal education regarding the agricultural information, although it does not impact on organic adoption (Singh

et al., 2015). Hence, this studies results are also supported by Karki *et al.*, (2011) who argued that training becomes the main source for improving Nepalese farmer's knowledge, as less educated and illiterate farmers cannot make use of all the information without the great assistance form extension services.

In this paper, the membership of farmer organisations shows a negative coefficient, which suggests that these organisations are mainly for conventional farmers. This is contrary to several studies where the membership of organisation increases the likelihood of adopting organic farming (Karki *et al.*, 2011; Okon & Idiong, 2016). Thus, organic farmers are relying on themselves and are not affected by others, or they might have other sources in connecting with other farmers (like farmer's groups through websites or phone). In fact, in these times, the new channels of extension might vary, while the traditional ways become less important (Hattam & Holloway, 2005).

Apart from this, the social factors which derived from the key informants' interview results suggested that "business environment" and "organic lifestyle" influence farmers to farming organic. The factor of "business environment" in this context covered several aspects including marketing strategy and reducing a cost from the conventional farming. Farmers who are looking to improve economic benefit would probably switch to organic farming. This result is also supported by other studies where economic motives become an important element for conversion to organic farming (Darnhofer *et al.*, 2005; Flaten *et al.*, 2006; Pornpratansombat *et al.*, 2011). The "organic lifestyle" also contributes to the conversion to organic farming. Farmers who hold a strong philosophical belief or concept about organic farming, without chemicals for health reasons and have high awareness towards the environment, would possibly adopt organic. This finding is consistent with other studies which also revealed that the philosophical concerns become the main aim for conversion to organic farming practices (Koesling *et al.*, 2008; Padel, 2001).

6. Conclusion

The understanding of the key factors that affect the adoption decision of organic farming is essential in promoting and designing agricultural policies. The literature gives mixed conclusions (on various aspects such as the age or the education of the farmers) because as Burton study in 2003, highlighted all studies draw on extremely different cultural and policy contexts. It is almost impossible to generalise all these findings, but for the purposes of this paper some of the international literature findings are presented to see how this study fits with the international literature.

By using logit analysis, this paper demonstrates that the environmental and information attitudes become the most influential elements in adopting organic farming. The findings confirm that adoption of organic farming is not only a question of economic prospects, but also involves behaviour and lifestyle beliefs. Most of the non-economic factors such as experience, training, ownership of farms, and personal beliefs (like human health and awareness) were found to play a major role in farmers' decisions to shift to organic farming.

Therefore, it is essential for the government, policy makers and NGOs to be aware of these parameters, and provide extension programs and services that benefit the organic farmers and support their needs. To persuade more conventional farmers to switch to organic farming in the future, is a considerable challenge. Policy makers therefore need not to only get the economic incentives right, but, more importantly, they need to ensure that the non-economic and technical factors prompting farmers to convert are part of their strategy for reaching the desired targets for organic farming.

Reference

- Ahmad, S. N. B., & Juhdi, N. (2013). Organic Food : A Study on Demographic Characteristics and Factors Influencing Purchase Intentions Among Consumers in Klang Valley, Malaysia. *International Journal of Business and Management*, 2(2002), 128–132.
- Ali, R., Jaafar, H. S., & Mohamad, S. (2008). Logistics and Supply Chain in Malaysia : Issues and Challenges. In *Malaysian Universities Transport Research Forum Conference 2008* (Vol. 2008, pp. 1–11).
- Asadollahpour, A., Najafabadi, M. O., & Hosseini, S. J. (2016). Modeling behavior pattern of Iranian organic paddy farmers. *Paddy and Water Environment*, 14(1), 221–229. <https://doi.org/10.1007/s10333-015-0492-0>
- Assis, K. and Mohd Ismail, H. . (2011). Knowledge , Attitude and Practices of Farmers. *Internatinal Journal Ecology Research*, 2(June), 1–6.
- Barrow, C. (2009). Issues and challenges of sustainable agriculture in the Cameron Highlands. *Malaysian Journal of ...*, 10(2), 89–114. Retrieved from http://journalarticle.ukm.my/2290/1/MJEM_2009_6_Barrow__ok_.pdf
- Best, H. (2010). Environmental Concern and the Adoption of Organic Agriculture. *Society & Natural Resources*, 23(5), 451–468. <https://doi.org/10.1080/08941920802178206>
- Breimyer, H. F. (1984). Economics of Farming Systems. In *Organic Farming: Current Technology and its Role in a Sustainable Agriculture, Spec. Pub. 46* (p. 187).
- Burton, M., Rigby, D., & Young, T. (1999). Analysis of the Determinants of Adoption of Organic Horticultural Techniques in the UK. *Journal of Agricultural Economics*, 50(1), 47–63.
- Burton, M., Rigby, D., & Young, T. (2003). Modelling the adoption of organic horticultural technology in the UK using Duration Analysis. *The Australian Journal of Agricultural and Resource Economics*, 47(1), 29–54. <https://doi.org/10.1111/1467-8489.00202>
- Chamhuri, N., & Batt, P. J. (2015). Consumer perceptions of food quality in Malaysia. *British Food Journal*, 117, 1168–1187. <https://doi.org/10.1108/BFJ-08-2013-0235>
- Che Wel C.C., Nor, Sallehuddin Mohd, Omar Nor A., & Hussin Siti, R. (2012). Important Determinant of Consumers ' Retail Selection Decision in Malaysia. *World Review of Business Research*, 2(2), 164–175.
- Darnhofer, I., Schneeberger, W., & Freyer, B. (2005). Converting or not converting to organic farming in Austria: Farmer types and their rationale. *Agriculture and Human Values*, 22, 39–52. <https://doi.org/10.1007/s10460-004-7229-9>
- De Souza Filho, H. M., Young, T., & Burton, M. P. (1999). Factors Influencing the Adoption of Sustainable Agricultural Technologies. *Technological Forecasting and Social Change*, 60(1999), 97–112. [https://doi.org/10.1016/S0040-1625\(98\)00040-7](https://doi.org/10.1016/S0040-1625(98)00040-7)
- Fairweather, J. R. (1999). Understanding how farmers choose between organic and conventional production : Results from New Zealand and policy implications, (1989), 51–63.
- Feder, G., Just, R. E., & Zilberman, D. (1985). Adoption of Agricultural Innovations in Developing Countries : A Survey. *Economic Development and Cultural Change*, 33(2), 255–298.
- Finger, R., & El Benni, N. (2013). Farmers' adoption of extensive wheat production – Determinants and implications. *Land Use Policy*, 30(1), 206–213. <https://doi.org/10.1016/j.landusepol.2012.03.014>
- Fisher, P. (1989). Barriers to the adoption of organic farming in the European Union.
- Flaten, O., Lien, G., Ebbesvik, M., Koesling, M., & Valle, P. S. (2005). Do the new organic producers differ from the “ old guard ”? Empirical results from Norwegian dairy farming. *Renewable Agriculture and Food Systems*, 21(3), 174–182. <https://doi.org/10.1079/RAF2005140>
- Green W. H. (2013). *Econometric Analysis; Seventh Edition*. Pearson Education, Harlow CM20 2JE, England.
- Hashim, N., Mustapha, N., & Siwar, C. (2008). Review of Malaysian Agricultural Policies with Regards to Sustainability Department of Economics , Faculty of Management and Economics , Institute for Environment and Development (LESTARI), National University of Malaysia ., *American Journal of Environmental Sciences*, 4(6), 608–614.
- Hattam, C. E., & Holloway, G. J. (2005). Adoption of certified organic production: Evidence from Mexico. *International Sci-Entific Conference on Organic Agriculture.*, 1–5.

- Ibitoye, O. O., & Nawi, N. M. (2014). Factors Influencing Consumers' Purchasing Behaviour towards Organic Rice in Malaysia. *World Applied Sciences Journal*, 32(4), 611–617. <https://doi.org/10.5829/idosi.wasj.2014.32.04.387>
- Jamal, K., Kamarulzaman, N. H., Abdullah, a. M., Ismail, M. M., & Hashim, M. (2014). Adoption of Fragrant Rice Farming: The Case of Paddy Farmers in the East Coast Malaysia. *UMK Procedia*, 1(October 2013), 8–17. <https://doi.org/10.1016/j.umkpro.2014.07.002>
- Karki, L., & Dhakal, S. (2009). Land Ownership in Nepal : Are Lower Castes Excluded ? In *Biophysical and Socio-economic Frame Conditions for the Sustainable Management of Natural Resources* (p. 34119).
- Karki, L., Schleenbecker, R., & Hamm, U. (2011). Factors influencing a conversion to organic farming in Nepalese tea farms. *Journal of Agriculture and Rural Development in the Tropics and Subtropics*, 112(2), 113–123.
- Koesling, M., Flaten, O., & Lien, G. (2008). Factors influencing the conversion to organic farming in Norway. *International Journal of Agricultural Resources, Governance and Ecology*, 7(1–2), 78–95. <https://doi.org/10.1111/j.1574-0862.2008.00321.x>
- Lampkin, N. H., & Padel, S. (1994). The Economics of Organic Farming - An International Perspective. In *American Journal of Agricultural Economics* (p. 467).
- Läpple, D. (2010). Adoption and Abandonment of Organic Farming: An Empirical Investigation of the Irish Drystock Sector. *Journal of Agricultural Economics*, 61(3), 697–714. <https://doi.org/10.1111/j.1477-9552.2010.00260.x>
- Läpple, D. (2012). Comparing attitudes and characteristics of organic, former organic and conventional farmers: Evidence from Ireland. *Renewable Agriculture and Food Systems*, 28(4), 1–9. <https://doi.org/10.1017/S1742170512000294>
- Läpple, D., & Kelley, H. (2013). Understanding the uptake of organic farming: Accounting for heterogeneities among Irish farmers. *Ecological Economics*, 88, 11–19. <https://doi.org/10.1016/j.ecolecon.2012.12.025>
- Läpple, D., & Rensburg, T. Van. (2011). Adoption of organic farming: Are there differences between early and late adoption? *Ecological Economics*, 70(7), 1406–1414. <https://doi.org/10.1016/j.ecolecon.2011.03.002>
- Lobley, M., Butler, A., & Reed, M. (2009). The contribution of organic farming to rural development: An exploration of the socio-economic linkages of organic and non-organic farms in England. *Land Use Policy*, 26, 723–735. <https://doi.org/10.1016/j.landusepol.2008.09.007>
- Man, N., Nawi, N. M., & Ismail, M. M. (2009). an Overview of the Supply Chain Management of Malaysian. *Journal of Agribusiness Marketing*, 2, 1–18.
- Mohamad, S. S., Rusdi, S. D., & Hashim, N. H. (2014). Organic Food Consumption among Urban Consumers: Preliminary Results. *Procedia - Social and Behavioral Sciences*, 130, 509–514. <https://doi.org/10.1016/j.sbspro.2014.04.059>
- Mohamed Haris, N. B. (2016). The Decision to Adopt Organic Farming in Malaysia (based on the Key Informants Point of View). In *AES 16 Conference*.
- Mzoughi, N. (2011). Farmers adoption of integrated crop protection and organic farming: Do moral and social concerns matter? *Ecological Economics*, 70(8), 1536–1545. <https://doi.org/10.1016/j.ecolecon.2011.03.016>
- Nigussie, Z., Tsunekawa, A., Haregeweyn, N., Adgo, E., Nohmi, M., Tsubo, M., ... Abele, S. (2017). Factors influencing small-scale farmers' adoption of sustainable land management technologies in north-western Ethiopia. *Land Use Policy*, 67, 57–64. <https://doi.org/10.1016/j.landusepol.2017.05.024>
- Offermann, F., & Nieberg, H. (2000). Economic Performance of Organic Farms in Europe. In *Organic Farming in Europe: Economics and Policy* (Vol. 5, p. 198).
- Okon, U. E., & Idiong, I. C. (2016). Factors Influencing Adoption of Organic Vegetable Farming among Farm Households in South-South Region of Nigeria. *American-Eurasian Journal Agriculture & Environment Science*, 16(5), 852–859. <https://doi.org/10.5829/idosi.aejaes.2016.16.5.12918>
- Othman, C., & Rahman, M. S. (2014). Investigation of the Relationship of Brand Personality, Subjective Norm and Perceived Control on Consumers' Purchase Intention of Organic Fast Food. *Modern Applied Science*, 8(3). <https://doi.org/10.5539/mas.v8n3p92>

- Padel, S. (2001). Conversion to Organic Farming: A Typical Example of the Diffusion of an Innovation? *Sociologia Ruralis*, 41(1), 40–61. <https://doi.org/10.1111/1467-9523.00169>
- Pattanapant, A., & Shivakoti, G. P. (2009). Opportunities and Constraints of Organic Agriculture in Chiang Mai Thailand. *Asia Pacific Development Journal*, 16(1), 115–147.
- Paull, J. (2010). From France to the world: the International Federation of Organic Agriculture Movements (IFOAM). *Journal of Social Research & Policy*, 1(2), 93–102.
- Paull, J. (2011). The Uptake of Organic Agriculture: A Decade of Worldwide Development. *Journal of Social and Development Sciences*, 2(3), 111–120.
- Pietola, K. S., & Lansink, A. O. (2001). Farmer response to policies promoting organic farming technologies in Finland. *European Review of Agriculture Economics*, 28(1), 1–15. <https://doi.org/10.1093/erae/28.1.1>
- Pornpratansombat, P., Bouer, B. and Boland, H. (2011). The Adoption of Organic Farming in Northeastern Thailand. *Journal of Organic Systems*, 6(3), 4–12.
- Rigby, D., Young, T., & Burton, M. (2001). The development of and prospects for organic farming in the UK, 26, 599–613.
- Rika Terano, Zainal Abidin Mohamed, M. N. S. and I. A. L. (2013). Farmer Sustainability Index : In *3rd International Conference on Management* (pp. 483–487).
- Saleki, Z. S., & Seyedsaleki, S. M. (2012). The Main Factors Influencing Purchase Behaviour of Organic Products in Malaysia. *Interdisciplinary Journal of Contemporary Research in Business*, 4, 98–116.
- Sarker, M. A., & Itohara, Y. (2008). Factors Influencing the Extent of Practice of Organic Farming Technologies: A Case Study of Tangail District in Bangladesh 1. *American Journal of Agricultural and Biological Sciences*, 3(3), 584–590.
- Sarker and Y. Itohara, M. A. (2009). Factors Influencing the Extent of Practice of Organic Farming Technologies: A Case Study of Tangail District in Bangladesh. *American Journal of Agricultural and Biological Sciences*, 3(3), 584–590.
- Sattler, C., & Nagel, U. J. (2010). Factors affecting farmers' acceptance of conservation measures-A case study from north-eastern Germany. *Land Use Policy*, 27(1), 70–77. <https://doi.org/10.1016/j.landusepol.2008.02.002>
- Scialabba, N. (2000). Factors influencing organic agriculture policies with a focus on developing countries. In *IFOAM 2000 Scientific Conference, Basel, Switzerland* (pp. 28–31). Retrieved from <http://www.fao.org/docs/eims/upload/230159/BaselSum-final.pdf>
- Shafie, F. A., & Rennie, D. (2012). Consumer Perceptions Towards Organic Food. *Procedia - Social and Behavioral Sciences*, 49, 360–367. <https://doi.org/10.1016/j.sbspro.2012.07.034>
- Shariff, N. N. M., Muhammad, a, & Hamidi, Z. S. (2014). Identification of Key Actors of Agricultural Community-based Organization from Communication Perspective in Malaysia. *International Letters of Social and Humanistic Sciences*, 12, 66–72.
- Singh, M., Maharjan, K. L., & Maskey, B. (2015). Factors Impacting Adoption of Organic Farming in Chitwan District of Nepal. *Asian Economic and Social Society*, 5(1), 1–12.
- Sodjinou, E., Glin, L. C., Nicolay, G., Tovignan, S., & Hinvi, J. (2015). Socioeconomic determinants of organic cotton adoption in Benin, West Africa. *Agricultural and Food Economics*, 3. <https://doi.org/10.1186/s40100-015-0030-9>
- Stanton, Emms, & Sia. (2011). *Malaysia's Markets for Functional Foods, Nutraceuticals and Organic Foods: An Introduction for Canadian Producers and Exporters. Agriculture and Agri-Food Canada.*
- Suhaimee, S., Ibrahim, I. Z., Amirul, M., Abd, M., & Malaysian, W. (2016). Organic Agriculture in Malaysia, 1–8.
- Terano, R., Yahya, R., Mohamed, Z., & Saimin, S. Bin. (2014). Consumers' Shopping Preferences for Retail Format Choice Between Modern and Traditional Retails in Malaysia. *Journal of Food Products Marketing*, 20(March 2015), 179–192. <https://doi.org/10.1080/10454446.2014.921874>
- Tey, Y. S. (2013). *The Adoption of Sustainable Agricultural Practices: An Integrative Approach for Malaysian Vegetable Farmers*. The University of Adelaide.
- Tey, Y. S., Li, E., Bruwer, J., Abdullah, A. M., Brindal, M., Radam, A., ... Darham, S. (2014). The relative importance of factors influencing the adoption of sustainable agricultural practices: a factor approach for Malaysian vegetable farmers. *Sustainability Science*, 9(1), 17–29.

- Tiraieyari, N., Hamzah, A., & Abu Samah, B. (2014). Organic Farming and Sustainable Agriculture in Malaysia: Organic Farmers' Challenges towards Adoption. *Asian Social Science*, 10(4), 1–7. <https://doi.org/10.5539/ass.v10n4p1>
- Tiraieyari, N., Hamzah, A., Abu Samah, B., & Uli, J. (2013). Knowledge and perceptions of extension workers on sustainable agricultural practices. *American Journal of Environmental Sciences*, 9(1), 45–50. <https://doi.org/10.3844/ajessp.2013.45.50>
- Tiraieyari, N., & Uli, J. (2011). Sustainable Agriculture in Malaysia: Implication for Extension Workers. *Journal of American Science*, 7(8), 179–182.
- Wee, C. S., Ariff, M. S. B. M., Zakuan, N., & Tajudin, M. N. M. (2014). Consumers Perception , Purchase Intention and Actual Purchase Behavior of Organic Food Products. *Review of Integrative Business & Economics*, 3(2), 378–397.
- Willer, H., Lernoud, J., & Home, R. (2013). Summary The World of Organic Agriculture 2013: Summary. In Frick & Bonn (Eds.), *FiBL & IFOAM (2013): The World of Organic Agriculture 2013* (pp. 25–34).
- Wilson, G.A. & Hart, K., 2000. Financial Imperative or Conservation Concern? EU Farmers' Motivations for Participation in Voluntary Agri-Environmental Schemes. *Environ. Plan. A* 32 (12), 2161–2185.