

Volume 2, 2018

UNCOVERING THE DETERMINANTS OF SUSTAINABILITY PRACTICES: PERCEPTIVE OF SMALL SCALE DAIRY FARMERS

Nalini Arumugam* Faculty of Bioresources and Food Industry, nalini@unisza.edu.my
Universiti Sultan Zainal Abidin

Zainab Mohd Karim Faculty of Bioresources and Food Industry, zainadmohdkarim7@gmail.com
Universiti Sultan Zainal Abidin

* Corresponding author

ABSTRACT

Aim/Purpose	This research will explore the factors that determine the level of adoption and participation in sustainability practices among the local dairy farmers in Malaysia.
Background	Sustainability is often aimed at a solution in most fields: economics, social, and ecological welfare. Sustainability is known as the best technique to practice farming, which ensures the continuity of the practices, guarantees the continuous access to economic resources; the social well-being of the people; and also the preservation of the environment. In order to improve productivity of the dairy industry in Malaysia, it is important for the dairy farmers to be encouraged to embrace the adoption of sustainable agricultural practices in their management of farm operations.
Methodology	Data were collected with the use of well-structured questionnaires. The face-to-face interview was conducted for 167 dairy farmers from six selected states in Malaysia. Likert-like scale was used to determine the practices that were adopted by the dairy farmers. The data obtained were analyzed using descriptive analysis and regression.
Contribution	This paper attempts to bring into focus the sustainable practices in farming industry especially local dairy farmers in Malaysia. It also helps to prioritize the determinants which mainly influence the sustainability in dairy industry.

Accepting Editor: Raafat George Saadé | Received: January 20, 2018 | Revised: March 21, 2018 | Accepted: March 26, 2018

Cite as: Arumugam, N. & Karim, Z.M, (2018). Uncovering the Determinants of Sustainability Practices: Perceptive of Small Scale Dairy Farmers. *Informing Science: International Journal of Community Development & Management Studies*, 2, 37-47, Retrieved from: <http://ijcdms.org/Volume02/v2p037-047Arumugam4369.pdf>

(CC BY-NC 4.0) This article is licensed to you under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/). When you copy and redistribute this paper in full or in part, you need to provide proper attribution to it to ensure that others can later locate this work (and to ensure that others do not accuse you of plagiarism). You may (and we encourage you to) adapt, remix, transform, and build upon the material for any non-commercial purposes. This license does not permit you to use this material for commercial purposes.

Findings	The findings suggest that the most significant element contributing to sustainability in the Malaysia's dairy industries was environmental sustainability. It can be concluded that farm sustainability, environmental sustainability, and social sustainability variables explained about 42.6% of the variance that reflected sustainability.
Recommendations for Practitioners	The overall findings revealed that the entire element gave a significant role in the sustainability of the dairy industry. It is suggested that the industry in Malaysia develops over time towards sustainability.
Recommendation for Researchers	There is need for measuring sustainability thoroughly in every aspect and separately measured the sustainability determinants.
Impact on Society	Adopting the good management practices in improving the production by potentially revealing the dairy farmers sustainable operation practices, give benefits determinants influences dairy farmers adoption of sustainability practices; and also insights into the decision making process of dairy farmers in adopting sustainability practices.
Future Research	Cross Regional study will provide better insights on intensifying the determinants of sustainability and improving the livelihood of small farmers.
Keywords	Sustainability, Sustainability Development, Dairy Farmers, Agribusiness

INTRODUCTION

The dairy market in Malaysia is mainly dependent on imported milk and other milk products. The self-sufficiency level (SSL) in Malaysia is merely 6% and this lead to the urgency of importing more milk from other countries: Australia, Holland and others (Zainab et al., 2016). The Increase in population and changes in lifestyle resulted in an increase in the demand for milk over the years. Total milk consumption in Malaysia adds up to about 1000m litres per annum, which was reported as RM 852.89 million liters by the Department of Statistics, Malaysia, 2013. In order to meet this demand, Malaysia produces about 56m litres of milk, which is equivalent to a self-sufficiency index of about 5%. The rest of the milk needs is imported, notably from Australia. Milk demand is expected to increase by more than about 30%, whereas the local market share is only approximately 5% (Dong, 2006). However, it starts increasing gradually every year, while the self-sufficiency of milk was about 13% in the year 2015 (Department of Statistics Malaysia, 2015). Most dairy farms in Malaysia are considered as smallholders, which are equipped with less than 30 breeds of dairy cows. Zainab et al., (2016) stressed that the Malaysia's dairy sector seems not to understand the concept of sustainability and its practices. Consequently, the dairy farmers' productivity had resulted in very low (SSL) in milk production. Sustainability is known as the best technique to practice farming, which ensures the continuity of the practices, guarantees the continuous access to economic resources; the social well-being of the people; and also the preservation of the environment (Karim et al., 2016). Dairy farming in Malaysia is no exception and the farming systems have to readily key into this direction. The main problem in local dairy farming is the low SSL in milk production, which cannot meet the local demand.

In order to improve productivity of the dairy industry in Malaysia, it is important for the dairy farmers to be encouraged to embrace the adoption of sustainable agricultural practices in their management of farm operations (Karim et al., 2016). Implementation of sustainable practices in the dairy industry should start from the farm where as the farmers should understand the concept thoroughly. This will avail them an opportunity to engage in the sustainable practices in an efficient and effective manner. Sustainable practices will also enhance food security, increase in profitability, as well as a sustainable use of environmental resources: the soil fauna and soil flora. However, to overcome this matter, it is important for the farmers to apply sustainable practices in their farm. It is very crucial for

the farmers to believe in the practices, which will aid them in sustainable production, consequently improving their livelihood activities (Tatlidil et al., 2009). To implement sustainable dairy farming practices among the dairy farmers, there is a need to determine their level of perception towards sustainable practices. This may be achieved by critically assessing the farmers' perception and their socio-economic characteristics that affect their level of perception. However, most of the farmers do not have the knowledge and understanding of the term sustainability. Consequently, they may not be aware of the benefits inherent in the adoption and practice of sustainability. Azman et al., 2013 indicated that there are many international studies, which have discovered that several factors impinged on the acceptance of sustainable practices among farmers. However, a similar situation is lacking in Malaysia as recent data or studies related to dairy farming are almost very difficult to access. In situations where it can be accessed, it may not be up to date. It is a known fact that Malaysia's dairy farmers are both small and large scale farmers, hence they may differ in terms of their skills and experiences put into their practices. This is in consonant with the findings of Boniface (2010). He showed that farmers are not homogenous but heterogeneous in their practices and nature. In consequence, it is expected that farmers should not assess using similar measurement parameters: assessing them on a similar level of husbandry practices, skills, or proficiency, and their level of expertise in farming operations. Therefore, this study uncovers the determinants affecting the adoption and practices of sustainable dairy farming among the small-scale dairy farmers.

METHODOLOGY

The study was conducted in six selected states: namely Terengganu, Selangor, Melaka, Johor, Negeri Sembilan and Sabah (Figure 1). A random sampling method was used in this research study. In the study, the population sampled was dairy farmers from the six selected states, which are expected to be representative of the total dairy farming operations in Malaysia. This is because they represent the various forms of the marketing channels and scales of operation. The sample size randomly observed was 167 from the estimated size of about 700 dairy farmers in these states (Department of Veterinary Services(DVS), 2014). The study areas selected were based on their more frequent agricultural potentials, location, population density, and the extent to which they represented the socio-economic characteristics. The Statistical Package for Social Sciences (SPSS 17.0) was used for data analysis. Factor analysis is a statistical method used to study the dimensionality of a set of variables. In factor analysis, latent variables represent unobserved constructs and are referred to as factors or dimensions. The analysis serves several related purposes. One of its primary functions is to aid an investigator in determining how many latent variables underlie a set of items.

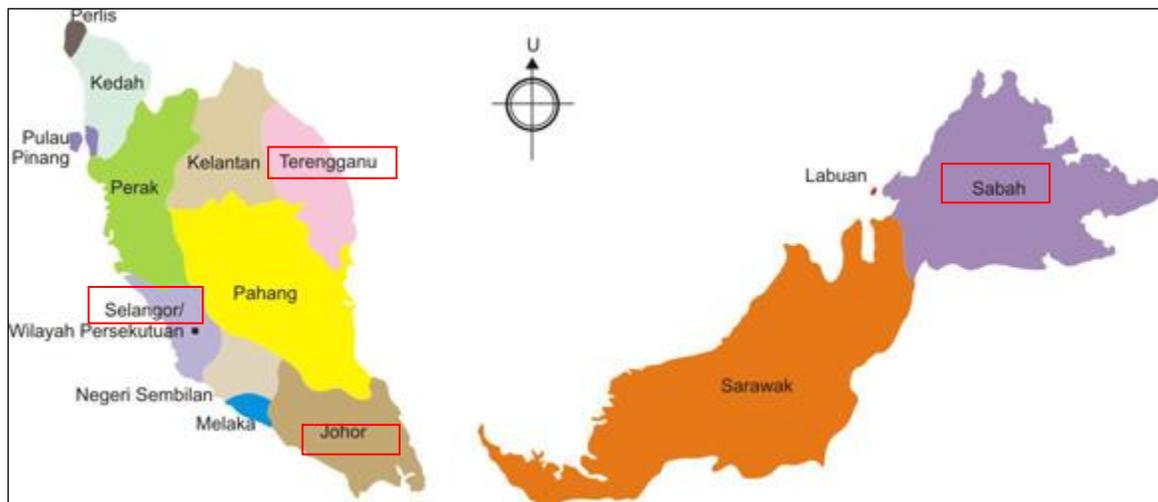


Figure 1: Location of the study

Source: Google

Regression analysis was used to capture the relationship between two or more variables in a linear relationship. Cooper and Schindler (2011) identified the general linear regression model, with $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_nX_n + \epsilon$, where β_0 = a constant, the value of Y when X values are zero β_i = the slope of the regression surface (The β represents the regression coefficient associated with each X_i). ϵ = an error term, normally distributed about a mean of 0 (for the purpose of computation, the ϵ is assumed to be zero).

RESULTS AND DISCUSSION

A detailed and complete discussion on the 167 dairy farmers randomly sampled from six selected states in Malaysia were captured in Table 1.

FARMERS' DEMOGRAPHIC AND SOCIO-ECONOMIC PROFILE

The age of the dairy farmers were classified into five distinct groups. From Table A1 (Appendix), majority of the respondents are above the age of 49 (32.9%) This is followed by ages 42-49 years (22.8%), next is 34-41 years (20.4%), age 26-33 (16.2%), while age 18-25 (7.8%) has the least frequency. The findings, according to youthfulness showed that about 44.0% of the farmers involved in dairy farming were above the age of 41. Individuals within this range are considered as youths in Malaysia (Bahaman et al., 2009). Majority of the youths are less interested in participating in agricultural activities like dairy farming. It is suggested that their family influences those that are engaged in this field as the farms are inherited from their parents. However, some farmers are having trouble, as their children do not intend to continue in this profession handed to them by their farm families. Studies by Spyros Vassiliadis and Achilleas Vassiliadis (2014) indicated that the main difficulties faced by family businesses are the issue of succession, as the probability of taking charge of the company reduces from generation to generation, while the lack of interest to be successors and inadequate succession plans result in a shutdown of about one-third of family businesses. The sample respondents have more males 147 (88%) as compared to females 20 (12%) respectively. It is normal in many agricultural fields to have a pattern in which there would be more males as compared to females. However, females are involved in the dairy farming operations to aid their husbands on the field as well as in other related capacities: managing certain farming activities such as milking and feeding the dairy cattle. Supports from the farm family are crucial in dairy farming since the family can render reasonable assistance in the management of the farm. This is expected to help drive down certain operational costs. Majority 49 (29.3%) of the dairy farmers were drawn from Johor, followed by Malacca 37 (22.2%), while 30 (18.0%) were drawn from Negeri Sembilan and Selangor respectively.

This is followed by 18 (10.8%) dairy farmers drawn from Sabah, and 3 (1.8%) from Terengganu (Table A1). Some of the dairy farmers were not actively participating in dairy farming, hence were less committed to the farming operations. Most of the farmers declined the interview as they were occupied with some other non-dairy farming. Nonetheless, they only get involved in dairy farming activities based on part time. These farmers also own a small number of dairy cattle, which were less than ten in numbers. Najim et al., 2015 stated that there were only 36 dairy cattle in Terengganu. In terms of ethnicity, 126 (75.4%) were Indians, 16 (9.6%) Malay, 12 (7.2%) were Chinese, while the other race(s) were 13 (7.8%) (Table 1.1). From this result, majority of the respondents in this study were Indians, which showed that the other races: Malays, Chinese were not fully involved in dairy farming. The interviewed Indians were involved in the dairy farming right from their childhood as it is their family heritage. This suggests that the preoccupation is passed down from one generation to the other. The Indians were very experienced while they showed a keen interest in dairy farming. Consequently, this helps explain their reason for the consumption of cow milk. More so, milk consumption plays important role in the Indian cuisine. For status, majority 137 (82%) were married while only 30 (18%) were single. Majority of these married respondents were the household heads. They are responsible for providing household income for the household livelihoods. To be a household head

brings some level of responsibilities on the shoulders of such individual. Hence, a household head is expected to assume a higher degree of responsibility and commitment to the household livelihood activities. The result in Table A1 also showed that majority 92 (55.1%) of the respondents had household size of three and less family members. About 65 (38.9%) had between four to six family members, while the rest, 10 (6.0%) of the respondents had household size of seven to nine family members. The number of family members is important to aid in the supply of labour, to meet with labour shortages, hence reduces the tasks on the farm. Farm family labour also aid in the management and operational activities of dairy farming. Having family support is also crucial to the farmers as their commitment on the dairy farm is very high. The respondents were classified into four categories based on their educational background. Majority 109 (65.3%) had secondary education, followed by 29 (17.4%) with tertiary education, 25 (15%) had primary education while only four (2.4%) had no education among the dairy farmers (Table A1). The respondents' involvement in dairy farming was divided into two categories: the full time, part-time dairy farmers. Majority 140 (83.8%) were full time while 27 (16.2%) were part-time dairy farmers. Dairy farming requires lots of commitment in its farming operations and farm management. Farmers who are involved in dairy farming operations have longer working hours as compared to the other types of job opportunities. Hence, they should display high commitment since they commence work early in the morning at about 5 a.m. or 6 a.m. to start with the milking process and end the routine dairy farming activities late in the evening. The farmers milk their cattle twice on daily basis as they have many tasks to be performed. Majority of the farmers do dairy farming on full-time basis since they cannot afford the cost of labour. More so, this is due to their high commitment in this field. In addition, the full-time dairy farmers depend solely on the dairy farm livelihood activities for their livelihood income. On the contrary, the part-time dairy farmers have some other livelihood activities where they can earn income other than the income they earn from the dairy farming operations. In terms of experience, majority 61 (36.5%) have been involved in dairy farming for between 11-20 years, 53 (31.7%) have been involved for less than 10 years, 37 (22.2%) for between 21-30 years, while 16 (9.6%) have been involved in dairy farming for more than 30 years. Majority of these farmers have experience for more than 10 years in the dairy farming activities. The dairy farmers mostly are experts in their field since their experiences gained over the years were either formal or informal from families, friends, and extension agents. More so, part of the experiences gained were from attending courses and seminars. Majority 82 (38.93%) received household monthly income of greater than RM3,000 (USD 758), 26 (15.57%) received household income of between RM2,001 to RM3,000 (USD 500 to USD 760) while 59 (35.33%) received RM2,000 (USD 500) and below.

FACTOR ANALYSIS FOR DETERMINANT OF SUSTAINABILITY IN DAIRY INDUSTRY

The data obtained from the sample respondents (167) were analysed and measured against the established hypotheses. First, factor analysis was used to determine if any variable was to be excluded from the final constructs in the analysis and tested for reliability using the Cronbach's alpha test. Afterwards, the regression model was presented, which tests the hypotheses that were established earlier. The factor analysis in this paper was divided into several parts. Firstly, a justification of the chosen variables and sample size for the factor analysis. Secondly, a preliminary analysis was done to test if the sample was suitable for a factor analysis. Thirdly, factors were extracted and presented. Next, factors were rotated to see if any variables should not be included in the intended constructs. Lastly, the reliability of the chosen constructs were tested using the Cronbach's alpha test. All the 52 lists of items in the questionnaire were sorted into five variables for further analysis. The dependent variable (DV) was Sustainability in Dairy Farming (SDF), while Farm Sustainability (FS), Economic Sustainability (ECS), Social Sustainability (SS) and Environmental Sustainability (ES) were set as independent variables (IDV). The data for each of the variables were tested using descriptive analysis (frequency counts) to find any missing values. Afterwards, normality test was done. The test showed that all the data were normal, so factory loading was applied. Factor analysis was used to determine if any of the independent variables comprise common underlying dimensions called "factors." Through factor analysis, we find variables that are correlated with one another, but relatively independent of

other sets of data. Factor analysis is particularly helpful in developing and testing theories. In this study, factor analysis was done to test if the studied variables were correlated with one another or not. Reliability test was done to find the alpha value. Table 1 presents the descriptive statistics and reliability values for the variables on sustainability practices. The first hypothesis was that all the independent variables (IDV) were responsible for the adoption and practice of sustainability in the dairy industry in Malaysia. After the analysis, the alpha value (0.383) for economic sustainability was not significant; hence, the variable deleted. Further analysis was conducted on the other variables to determine their Cronbach alpha values: Sustainable Dairy Farming (SDF) (0.646), Farm Sustainability (FS) (0.858), Social Sustainability (SS) (0.750), and Environmental Sustainability (ES) (0.760).

Table 1: Descriptive Statistics and Reliability Analysis

Variables	Number of Items	Alpha	M	SD
1. SDF (DV)	3	0.646	4.253	0.65062
2. FS (IDV)	8	0.858	4.665	0.43718
3. SS(IDV)	6	0.750	4.214	0.61981
4. ES(IDV)	6	0.760	4.586	0.41591
5.ECS(IDV)	3	0.383	3.752	0.4371

Source: Survey (2015)

Note: SDF= Sustainable Dairy Farming; FS= Farm Sustainability; SS= Social Sustainability; ES= environmental Sustainability

RELIABILITY ANALYSIS

Reliability test conducted on these factors before testing the constructs of the IVs against the DV using the Cronbach's alpha test. The Cronbach's alpha is determined based on the average inter-item correlation. According to Pallant (2005), a scale with a Cronbach's alpha higher than 0.7 is required in order to create a reliable construct of multiple variables. All five variables that were supposed to form the construct of the dependent variable were tested and Cronbach's alpha for all these variables was above 0.7, which is a good score (Table 2). The analysis also showed how much the reliability would increase/decrease if any of the items have to be deleted. It was therefore rational to delete the economic sustainability variable from the constructs, which implied that four of the initial five variables for this construct were retained for the regression analysis.

Table 2: Cronbach Alpha

Variables	Number of Items	Alpha	M	SD
1. SDF	3	0.646	4.253	0.65062
2. FS	8	0.858	4.665	0.43718
3. SS	6	0.750	4.214	0.61981
4. ES	6	0.760	4.586	0.41591

Source: Survey (2015)

Table 2 shows the Cronbach's alpha value for the variables: Sustainable Dairy Farming; 0.646, Farm Sustainability; 0.858, Social Sustainability; 0.750; and Environmental Sustainability; 0.76. Similar results with factor analysis showed that all the variables in the table (Table 2) were used for next step on regression analysis.

REGRESSION ANALYSIS ON SUSTAINABILITY OF DAIRY FARMING IN MALAYSIA

As it shows in Table 3, the correlation matrix value of all the variables: Sustainable Dairy Farming (SDF), Farm Sustainability (FS), Social Sustainability (SS) and Environmental Sustainability (ES). The correlation matrix values of all the variables were above 0.3, which implied that they correlate with each other at 0.01 level of significance. Pallant (2005) suggested that several correlations should be at

least above 0.3. All the variables were considered correlated with one another to some degree, even if the value of the correlation was not particularly large; they were still significant to be used for further analysis. The strength of the correlation can be justified as a moderate positive relationship to a strong positive relationship, according to Pearson Correlation rule of thumb.

Table 3: Correlation Matrix

Variable	1	2	3
1. SDF	1.00		
2. FS	0.478**	1.00	
3. SS	0.509**	0.491**	1.00
4. ES	0.550**	0.560**	0.341**

** Correlation is significant at 0.01 levels (two- tailed)

In addition, results from Table A2 (refer to Appendix), a model summary of regression analysis showed that R was 0.652, R Square was 0.426. The summary showed the R square of 0.426 (0.426 x 100 =42.6%). This is interpreted to mean that about 42.6% of the variance in the dependent variable (mean sustainability variable) was explained by all the predictor variables in this model. The model was significant with $p < 0.05$ level of significance.

Table 4 shows the regression analysis for examining the relationship between social sustainability and environmental sustainability. The analysis was conducted to test the unique contribution between the predictive variables and the dependent variable by assigning coefficients to each predictive variable. The result showed that both the social and environmental variables were significant at 0.05 level of significance ($p < 0.05$). The result also showed that the standardized beta value in the environmental sustainability ($\beta = 0.426$) was higher as compared to that of social sustainability ($\beta = 0.364$).

Table 4: Regression Analysis for Examining the Relationships between Social Sustainability and Environmental Sustainability

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.409	.447		-.916	.361
	Mean social	.382	.066	.364	5.743	.000
	Mean environmental	.666	.099	.426	6.725	.000

From Table 5, the prediction equation of the sustainability of dairy farming could be suggested as:

$$Y = b_0 + b_1(X_1) + b_2(X_2) + e$$

Where: Y = Sustainability of Dairy Farming

X1 = Social Sustainability

X2 = Environmental Sustainability

e = error term

Based on the table of coefficient (Table 4), the data were analyzed using the enter method, with the estimated equation of the simple linear regression model:

$$Y = - 0.409 + 0.382(X1) + 0.606(X2) + e$$

The result of the regression analysis (Table A2) showed that the $R^2 = 0.426$ for environmental and social explained about 42.6% variance in the DV, sustainability of dairy farming. Table 5 showed the result of the ANOVA that tested the slope of the model. The result of the analysis showed that the F-statistics ($F=59.182, p<0.05$) was significant, which means that there was a significant linear relationship between environmental, social, farm and sustainability of dairy farming.

Table5: Results from ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	29.908	3	9.969	40.262	.000a
Residual	40.361	163	.248		
Total	70.269	166			

a. Predictors: (Constant), mean environmental, mean social, mean farm, b. Dependent Variable: mean sustainability

The R square value was statistically significant with $F(40.262), p<0.05$ (Table 5). The assumptions of normality, linearity and equal variance of the regression model were met. The results were showed in the figures 2 and 3 respectively.

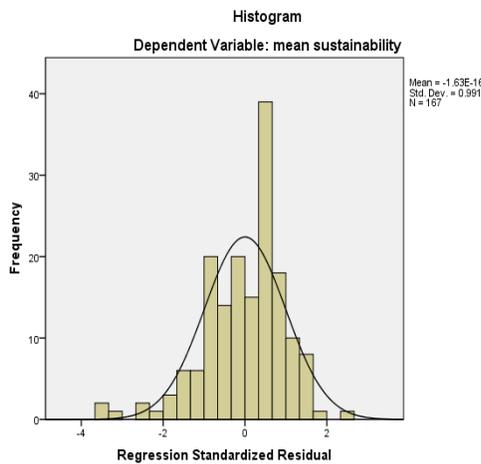


Figure 2: Standard Normal Graph

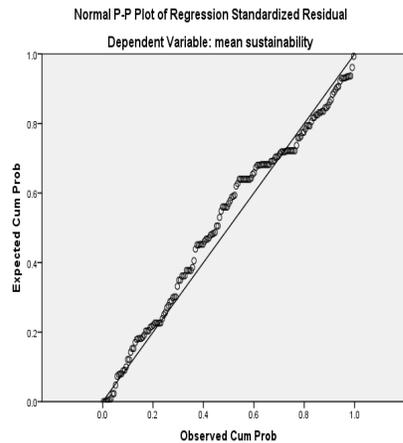


Figure 3: Normal P-P Plot

From the normality graph, the graph showed that the residuals fall approximately along the straight line, indicating that they were from a linear population. It also indicated that the errors were normally distributed and that it meets the assumption that errors or residuals are normally distributed. This is showed in the above figures. In the Normal Probability Plot, almost all the points lied in a reasonably straight diagonal line from the bottom left to the top right. This showed that there was no major deviation from normality.

CONCLUSION

Factor analysis was used in this study to ensure that the intended constructs or variables in the hypotheses of the theoretical framework were justified. After the constructs have been developed, regression analysis was used to test the established hypotheses. Regression analyses were conducted to explore the relationship between the independent variables and dependent variable in this study. Regressions analysis was used to determine which of the independent variables was the best predictor

or determinant of sustainable dairy farming and the analyses ranked the independent variables in order over sustainable dairy farming. The purpose of regression analyses was to discover the relationship between each individual predictor variables and the dependent variable. After undergoing factor analysis, the independent variable, economic sustainability was dropped from the model because its Cronbach alpha was not reliable. Other variables such as farm sustainability, environmental sustainability and social sustainability were further analysed using regression analysis. The result indicated that all the variables studied showed significant correlation towards the DV, sustainable dairy farming. From the regression analysis, the best indicator for a sustainable dairy system was environmental sustainability. The findings indicated that the most significant element contributing to sustainability in the Malaysia's dairy industries was environmental sustainability. It can be concluded that farm sustainability, environmental sustainability, and social sustainability variables explained about 42.6% of the variance that was reflected in sustainability. The overall findings revealed that the entire element played a significant role in the sustainability of the dairy industry in Malaysia. The findings recommend that acceleration on adoption of sustainability among dairy farmers should be carried out in near future to increase the milk productivity and as well as to have better livelihood. In wider aspects, Malaysia Milk production will meet the domestic and international demands by adopting the sustainability practices. Higher milk production and profit margins enables dairy farmers to make more investments in dairy farm innovations and best management practices. The findings provide new insights for dairy stakeholders in sustaining the industry by creating competitive advantage. This paper also explains the needs and the urgency of adopting the good management practices in improving the production by potentially revealing the dairy farmers sustainable operation practices, give benefits determinants influences dairy farmers adoption of sustainability practices; and also insights into the decision making process of dairy farmers in adopting sustainability practices.

REFERENCES

- Azman, A., Silva, J. L. D., Samah, B. A., Man, N., & Shaffril, H. A. M. (2013). Relationship between attitude, knowledge, and support towards the acceptance of sustainable agriculture among contract farmers in Malaysia. *Asian Social Science*, 9(2), 99.
- Bahaman, A. S., Jeffrey, L. S., Hayrol Azril, M. S., & Jegak, U. (2010). Acceptance, attitude and knowledge towards agriculture economic activity between rural and urban youth: The case of contract farming. *Journal of Applied Sciences*, 10(19), 2310-2315.
- Boniface, B., Gyau, A., Stringer, R., & Umberger, W. (2010). Building producer loyalty in Malaysia's fresh milk supply chain. *Australasian Agribusiness Review*, 18(5), 1-19.
- Cooper, D.R. & Schindler, P.S. (2011) Business research method (11th ed.) Singapore DairyNZ. (2011). *Annual Report 2010/11*. Hamilton: LIC.
- Department of Statistics (DOSM), 2013
- Department of Statistics (DOSM), 2015
- Department of Veterinary Services (DVS), 2014.
- Dong, F. (2006). The outlook for Asian dairy markets: The role of demographics, income, and prices. *Food Policy*, 31(3), 260-271.
- Pallant, J. (2005). SPSS survival manual: A step by step guide to data analysis using SPSS for Windows (Version 12).
- Tatlidil FF, Boz I, Tatlidil H (2009). Farmers' perception of sustainable agriculture and its determinants: A case study in Kahramanmaraş province of Turkey. *Environ. Dev. Sustain.*, 11: 1091-1106.
- Vassiliadis, S., & Vassiliadis, A. (2014). The Greek family businesses and the succession problem. *Procedia Economics and Finance*, 9, 242-247.
- Karim, Z. M., Arumugam, N., & Bonaventure, B. (2010). The sustainability practices among dairy farmers: the case of Johor. *International Journal of Agricultural Management and Development*, 6 (1), 109-115.

APPENDIX

Table A1: Demographic Profile of Respondent

Variable	Frequency		
	n= 167	Percentage (%)	
Age	18-25	13	7.8
	26-33	27	16.2
	34-41	34	20.4
	42-49	38	22.8
	Above 49	55	32.9
Gender	Male	147	88.0
	Female	20	12.0
State	Terengganu	3	1.8
	Johor	49	29.3
	Negeri Sembilan	30	18.0
	Melaka	37	22.2
	Sabah	18	10.8
	Selangor	30	18.0
Ethnic	Malays	16	9.6
	Chinese	12	7.2
	Indian	126	75.4
	Bumiputera Sabah/Sarawak	11	6.6
	Others	2	1.2
Status	Married	137	82.0
	Single	30	18.0
Number of Family Members	3 and less	92	55.1
	4 – 6	65	38.9
	7 – 9	10	6.0
Education	No Education	4	2.4
	Primary	25	15.0
	Secondary	109	65.3
	Tertiary	29	17.4
Involvement	Full Time	140	83.8
	Part Time	27	16.2
Experience	<10 Years	53	31.7
	11-20 Years	61	36.5
	21-30 Years	37	22.2
	>30 years	16	9.6
Income*	<RM 1,000	11	6.59
	RM 1,000- RM 2,000	48	28.74
	RM 2,001-RM 3,000	26	15.57
	RM 3001-RM 4000	28	6.59
	> RM 4,001	54	32.34

Source: Survey (2015)

*RMY 1 = USD 0.16

Table A2. Pricing Model Summary of regression analysis for sustainability

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
Dimension	0.652a	0.426	0.415	0.49761	0.426	40.262	3	163	0.000

a. Predictors: (Constant), mean environmental, mean social, mean farm, b. Dependent Variable: mean sustainability

BIOGRAPHIES



Nalini Arumugam currently working as Deputy Dean (Academics & Post Graduates) with Faculty Bioresources and Food Industry, University Sultan Zainal Abidin at Besut Campus since year 2013 till now. Her areas of specialization are in Agribusiness Marketing, Contract farming, Agribusiness Supply chain management and Agribusiness Small Medium Enterprises. Her research interests is in agribusiness marketing; farmers and consumers survey on attitude; knowledge and practices (AKP); fresh produce supply and value chain; fresh produce contract farming and agribusiness small medium enterprises (ASMEs).