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Reasons Behind the Farmers' Behaviour About the Implementation of Sustainable Farming Practices

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ABSTRACT The present study aimed to investigate the factors affecting the farmers' behaviour towards the implementation of sustainable farming practices by using the theory of planned behaviour (TPB) in Northern Cyprus. For this reason, a total of 208 farmers were randomly selected and an adopted TPB survey was carried out with face-to-face interviews. Results demonstrated that the farmers' past behaviour about the application of sustainable farming practices is low. The three constructs of TPB, that is, attitudes (ATT), subjective norms (SN) and perceived behavioural control (PBC), were all found to have large to weak positive influence on the behavioural intention. Among the three TPB constructs, SN was found to have the highest score, but the highest impact on the behaviuoral intention was measured as ATT. Results showed that improving farmers' attitude about the sustainable farming practices would improve the farmers' behavioural intentions and education plays an important role in it.

INTRODUCTION

Agriculture has changed dramatically since the end of the World War II. Technological developments in mechanisation, use of ever more sophisticated technologies, and the intense activities in farming practices in association with chemical fertilisers and agro-chemicals, led to an increase in productivity for a short period of time (Binswanger 1986). However, from 1960s, it was observed that the way of production also caused degradation to the environment and harmed society. One of the first warnings was by Carson (1962), who noted that the use of agro-chemicals causes damages on the farmland biodiversity and negatively impacts human health. Continued studies showed that there are challenges between the agricultural intensification and biodiversity conservation (Pimentel 2006; Kremen and Miles 2012; Celik and Islam 2019). Hereafter, a need arose to balance productivity with the environmental and social outcomes, that is, the concept of sustainable farming. One of the first and most comprehensive definitions of sustainable development was by the United Nations in 1987 as "meeting the needs of the present without compromising the ability of future generations to meet their own needs". The Earth Charter Initiative had widened the concept of the sustainability in 2000 and mentioned that the definition of sustainability should include the idea of a global society "founded on respect for nature, universal human rights, economic justice, and a culture of peace" (Earth Charter 2019). Thus it was defined that an action should be environmental, social and economic to be accepted as sustainable. Nowadays, it is accepted throughout the world that the current agricultural practices are not sustainable. Not only the ways of production, but also the ways of consumption and industrialisation are not supporting the sustainability of life in the world. Therefore, a new and sustainable approach is needed to thrive to ensure humans' sustainable access to natural resources and to food. As mentioned above, the first and most comprehensive definitions of sustainable development by the United Nation included the word "needs" instead of "wants" in it (United Nations 2019). One important concept in economics says that the needs are the goods and/or services, which are required in order to survive, and the wants are the goods and/or services that are not necessary but are desired or wished. Thus, it is of great importance for the both producers and consumers to define their real needs and to minimise their wants in order to reduce the pressure on the natural resources. To do so, it is important

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to understand the constructs affecting the farmers' intentions and behaviours on the application of agricultural practices.

Previous studies have shown that there are some important socio-psychological factors behind the farmers' behaviours, like perceptions and attitudes (Fischer and Vasseur 2002; Sileshi et al. 2008; Uthes and Matzdorf 2013; Burton and Schwarz 2013; Ar and Gul 2019). Not only the financial problems (Sutherland 2010), but also the social and cultural context, self-identity, attitudes and prestige were reported to have an important role on the farmers' decision to apply measures for the protection of natural resources (Fielding et al. 2008; Burton and Paragahawewa 2011). Moreover, previous studies have noted that education, gross income (Carlson et al. 1977), age (Hoover and Wiitala 1980), land ownership (Lee 1980), and farm size (Westra and Olsen 1977) play an important role on the application of sustainable agricultural practices. Many techniques from social psychology were used before to determine the constructs behind the farmers' intention and behaviours. The most comprehensive method was reported by Ajzen (1991) who developed a new behavioural approach with the name of the Theory of Planned Behaviour (TPB) to explain intention (INT) and behaviour (BHV). The TPB of Ajzen suggests that three factors define the behavioural intentions of a person, namely, attitudes (ATT), subjective norms (SN) and perceived behavioural control (PBC). An attitude is defined as "a person's favourable or unfavourable evaluation of the behaviour", subjective norm is "the perceived social pressure to engage or not to engage in a behaviour" and perceived behavioural control refers to "people's perceptions of their ability to perform a given behaviour" (Fishbein and Ajzen 1975). These three constructs were noted to lead the formation of a behavioural intention, which then leads to the performance of the behaviour (Ajzen 1991). To the author's knowledge, the TPB was not previously tested for the determination of the reasons behind the farmers' behaviour about the implementation of sustainable farming practices. In a more close study, Wang et al. (2019) used TPB to identify the environmental behaviours of farmers. They noted that the subjective norms have the highest influence on the farmers' behaviour, while the attitude and subjective norm reported were to have mediate effect. In another study, it was suggested that the TPB can be used to identify factors affecting farmers' intention and it was noted in this study that attitude, subjective norm and perceived behavioural control well describes the farmers' intention (Rezaei et al. 2019).

Objectives

The objective of this research was to study the factors affecting the farmers' behaviour and intentions towards the implementation of sustainable farming practices by using the theory of planned behaviour in Northern Cyprus. The main reason behind this objective was the increase in the number of food safety issues and reduction of the available natural resources. Cyprus is located near the Mediterranean Sea and is considered to be a semi-arid region and exposed to a severe shortage of water resources (EEA 2009). Moreover, the use of high amount of and unnecessary agro-chemicals caused reduction in productivity and food safety problems due to the chemical residues on fruits and vegetables. Furthermore, it is highly important to apply sustainable practices and before this, it is of utmost important to determine the reasons behind the farmers' behaviours.

MATERIAL AND METHODS

Theory

The theory of planned behaviour (TPB) was used in the present study. The social psychological theory was developed by Ajzen (1991) and previously tested many times for the explanation of the human intention and behaviour in different disciplines. The TPB theory argues that the human action is guided through three considerations, that is, the attitude (ATT), which represents willingness, subjective norm (SN), which covers the direct and wider social influences, and perceived behavioural control (PBC), the ability. According to Ajzen (1991), a positive intention to perform an action might not always result in the execution of the behaviour. Thus, there should be a sufficient actual behavioural control to carry out their intentions.

In the present study, it was hypothesised (H1) that attitudes, subjective norms and perceived

behavioural control are positively correlated with the intention and directly or indirectly on the behaviour to apply sustainable farming practices. It was also hypothesised that (H2) the relationship among farmers' behaviours, intentions, attitudes, subjective norms and perceived behavioural control would differ in relation to the demographic characteristics (gender, age, level of education, share of agricultural income, farm type, farm size, land ownership and years of experience) of farmers.

Research Area, Study Sample and Variables

The present research was conducted in Northern Cyprus. Total landed devoted to agriculture is 187,069 hectares (ha), which equals 56.7 percent of the total area of the country. Out of this, only 9,766 ha (5.22%) is currently irrigated. The number of farmers that specialise in crop production is estimated to be around 2,000 (ARAS 2018). The study was carried out on the base of a quantitative data collection by using the above-mentioned theory of planned behaviour. For the determination of TPB constructs in the present study, some statements of the adopted version of the TPB by Wauters et al. (2017) were used. Thus, some statements were modified according to the suggestions of the experts in the field. A grammar check was then performed to ensure better understanding of the survey form by the farmers. Hereafter, a pre-test was performed to identify problems that were left uncorrected and reduce the measurement error. Number of farmers for the pre-tests was determined as 50, as of the maximum number of general recommendations (30-50) for such studies by previous studies (Beaton et al. 2000; Blair and Conrad 2011; Perneger et al. 2014). After that, data was subjected to factor analysis, reliability and validity checks and then the final version of the survey instruments were used to access the constructs behind the intentions and the past behaviours of farmers. A total of 208 farmers (approximately 10% of total population) were randomly selected and survey forms were filled in face-to-face interviews.

Eight statements were prepared to explain farmers' past behaviours to apply sustainable farming practices and another thirteen statements to directly explain the constructs of attitude, subjective norm, perceived behavioural control and intention. A 7-point scale was used to construct the behaviours with 1 referring to 'Never', 2 referring to 'Rarely' (less than 10%), 3 referring to 'Occasionally' (about 10-30%), 4 referring to 'Sometimes' (about 31-50%), 5 referring to 'Frequently' (about 51-70%), 6 referring to 'Usually' (about 71-90%) and 7 referring to 'Every Time'. For other constructs, again a 7-point scale was used with the codes from 1 to 7 referring to 'extremely disagree', 'quite disagree', 'slightly disagree', 'neither agree nor disagree', 'slightly agree', 'quite agree' and 'extremely agree', respectively.

Data Analysis

First of all, a reliability analysis was performed for the data and the Cronbach's Alpha of the survey data was found to be 0.754. Furthermore, factor analysis was carried. The extraction was performed based on eigenvalues greater than "1" and rotation was done with direct Oblimin method with a delta of "0". Moreover, 0.30 was used as the coefficient display value for the correlations among the statements and factors. Results showed that 3 statements (all related with past behaviour) were affecting more than one factor and thus, these statements were removed from the calculations. Then, the Kaiser-Meyer-Olkin (KMO) was measured as 0.738.

Furthermore, the statements of each factor were used to calculate the average scores of behaviour (BHV), attitude (ATT), subjective norm (SN), perceived behavioural control (PBC), and intention (INT). The IBM SPSS 22.0 was used to perform the above-mentioned analysis. After the calculation of the TPB constructs, IBM SPSS version 23.0 was used to perform structural equation model (SEM) to test for the significance of the variables on the intention and behaviour. Descriptive statistics were also performed to explore the research findings in terms of demographic characteristics. Finally, the comparison of the TPB constructs for the demographic characteristics (gender, age, level of education, share of agricultural income, farm type, farm size, land ownership and years of experience) were also performed to test H2.

Afterwards, the Kolmogorov-Smirnov test was performed to determine the normality of the data. Results showed that the data was not normally distributed (Asymp significant found to be 0.001 for all parameters lower than 0.05). Furthermore, non-parametric tests (Mann-Whitney U and Kruskal-Wallis tests) were selected for the com-

parison of the TPB constructs for the demographic characteristics.

RESULTS

Reliability, Validity and Factor Analysis

Cronbach's Alpha of the survey data was found to be 0.754 (higher than 0.70, which is considered "acceptable" in social sciences). The KMO measure of sampling adequacy was found to be 0.738 (acceptable for factor analysis by being above 0.50) with a Chi-square of 1,773.49. The df of Bartlett's test of sphericity was 153 with a 0.000 significance level. These results suggest that the factor analysis was useful and thus a factor analysis was performed. After the elimination of the 3 statements, which are affecting more than one factor, a well-distributed data was obtained (Table 1).

Table 1: Factor analysis results after data reduction and rotation through Oblimin with Kaiser Normalization

Statement component	*1*	*2*	*3*	*4*	*5*
$SN._1$	0.921				
$SN._3$	0.908				
$SN._2$	0.719				
$SN._4$	0.668				
$BHV._7$		0.793			
$BHV._5$		0.779			
$BHV._6$		0.739			
$BHV._4$		0.560			
$BHV._8$		0.518			
$PBC._1$			0.859		
$PBC._2$			0.697		
$PBC._3$			0.593		
$ATT._2$				0.851	
$ATT._1$				-0.740	
$ATT._3$				-0.733	
$INT._1$					-0.924
$INT._2$					-0.792
$INT._3$					-0.707

Measurements of TPB Constructs and Correlations among Them

The factorial analysis made it possible to determine the TPB constructs for the past behaviour and behavioural intention. Average scores of the TPB constructs were all calculated and given in Table 2. The calculated behaviour was found to be 3.23 over 7.00, which equals to forty-six percent referring "sometimes". These results showed that the farmers' past behaviour is far from the application of the sustainable farming practices. Among the statements of behaviour, the highest score was obtained from the statement about "maintaining soil quality". All other practices were found to have a score of less than 3.50, which means that the farmers in Northern Cyprus are not familiar with the sustainable agricultural practices. It is clear from the results that decision-makers in Northern Cyprus have to take measures to improve the farmers' behaviour about the application of sustainable agricultural practices.

Four statements were used in the present study to explain the subjective norm (SN) of the farmers. The average score for subjective norm was measured as 4.62. Among the TPB construct of the farmers, SN was found to have the highest score, which is for "slightly agree". When evaluating the statements, which form the subjective norm, the statement about the "rights of the future generations" was found to have the highest score. This is a quite promising result in which the decision-makers may focus on the rights of future generations to improve the subjective norms, which in turn may have a direct or indirect effect on the farmers' behaviour. When it comes to the measurement of the farmers' attitudes (ATT), three statements were used and only one of them, which is related with the "use of natural resources", was found to have a higher score. Furthermore, the calculated attitude of the farmers was found to be 3.63 for "neither agree nor disagree". Similar with the attitude, the perceived behavioural control (PBC) of the farmers was measured with three statements and the average score was found to be 3.74. The low scores of the attitude and perceived behavioural control might be reason of the low score of past behaviour. Finally, to measure the intention (INT) three statements were used and result was found to be 3.66. As a concluding remark for the TPB constructs, the calculated BHV and INT was found to have lower values meaning that farmers are not familiar with the application of sustainable farming practices and they have moderate intentions to apply them.

The correlations among the TPB constructs were measured with Pearson coefficient are giv-

Table 2: Means and standard deviations (SD) for the statements used to measure TPB constructs, and calculated values for all constructs

Statements and TPB constructs	*Mean*	*SD*
Removed.$_1$ When deciding what to produce, How often do you select adapted/ suitable crops for the climate and soil?	4.32	1.83
Removed.$_2$ How often do you use alternative pest management strategies (measures other than pesticides)	4.16	1.82
Removed.$_3$ How often do you perform pesticide rotation?	3.37	1.58
BHV.$_4$ How often do you use cover crops or mulching in your farm?	2.16	1.64
BHV.$_5$ How often do you select your practices in order for maintaining biological diversity?	3.49	2.40
BHV.$_6$ How often do you select your practices in order for maintaining soil quality?	4.41	2.17
BHV.$_7$ How often do you use instruments to measure soil moisture to schedule your irrigation?	2.81	1.86
BHV.$_8$ How often do you plan your practices by thinking sustainability (environmental, economic and social)?	3.26	1.88
Calculated BHV	**3.23**	**1.38**
SN.$_1$ Most people whose opinions I value think "I should apply sustainable farming".	4.01	1.96
SN.$_2$ Most people who are important for me think "I should apply sustainable farming".	5.00	1.37
SN.$_3$ It is expected from me to apply sustainable farming.	4.08	1.84
SN.$_4$ Future generations will haveright to angry me, if I do not apply sustainable farming.	5.40	1.68
Calculated SN	**4.62**	**1.46**
ATT.$_1$ Pesticide rotation and reducing the use of pesticides are important for sustainability.	3.24	2.14
ATT.$_2$ Reducing the use of natural resources (i.e. water) is essential for agricultural sustainability.	5.47	1.67
ATT.$_3$ Selecting site-specific crops is very important for a sustainable farming.	2.17	1.27
Calculated ATT	**3.63**	**0.82**
PBC.$_1$ It is mainly up to me to select crop types in my own farm.	4.11	1.93
PBC.$_2$ For me it is possible to select sustainable agricultural practices to apply in my own farm.	2.78	1.64
PBC.$_3$ I have very much control over the decision about the practices that I apply in my own farm.	4.34	1.59
Calculated PBC	**3.74**	**1.34**
INT.$_1$ Do you intend to get involved in any education related with sustainable farming?	3.75	1.96
INT.$_2$ I plan to apply any means of sustainable production in near future (i.e. GLOBALGAP).	3.51	1.63
INT.$_3$ I intent to reduce the use of chemicals in near future and protect natural resources for sustainability.	3.71	1.73
Calculated INT	**3.66**	**1.57**

en in Table 3. According to the results, farmers' past behaviour was found to have a very weak positive correlation with subjective norms and intention, and no correlation was found with attitude and perceived behavioural control. As expected, all three constructs (ATT, SN and PBC) were found to have a moderate positive correlation with intention.

Table 3: Pearson coefficient for the correlation among TPB constructs

TPB constructs	*BHV*	*SN*	*ATT*	*PBC*
SN	0.170*			
ATT	-0.006	0.248**		
PBC	0.004	0.264**	0.302**	
INT	0.130	0.462**	0.474**	0.338**

*Significant correlations at p <0.05; **Significant correlations at p <0.01

Relationships between TPB Constructs with the Intention and Behaviour

The model fits of the SEM (root mean square error of approximation 'RMSEA': 0.051 [lower than 0.06], adjusted goodness-of-fit statistic 'AGFI': 0.933 [very close to the well-fitting value of 0.90], comparative fit index 'CFI': 0.980 [between 0.90 and 1.00]) indicate an acceptable fit of the model (Hooper et al. 2008). All of the TPB constructs, ATT, SN and PBC (P = 0.000, P = 0.000 and P = 0.015) were found to significantly contribute to the model and explain variation in INT (Fig. 1). On the other hand, INT also significantly explained the variation in BHV (P = 0.047) but the effect was measured as 0.10 meaning "small effect" (0.10). However, the PBC was found to have no significant direct effect on the BHV (P = 0.533). The correlations among the ATT, SN and PBC were also found to be signif-

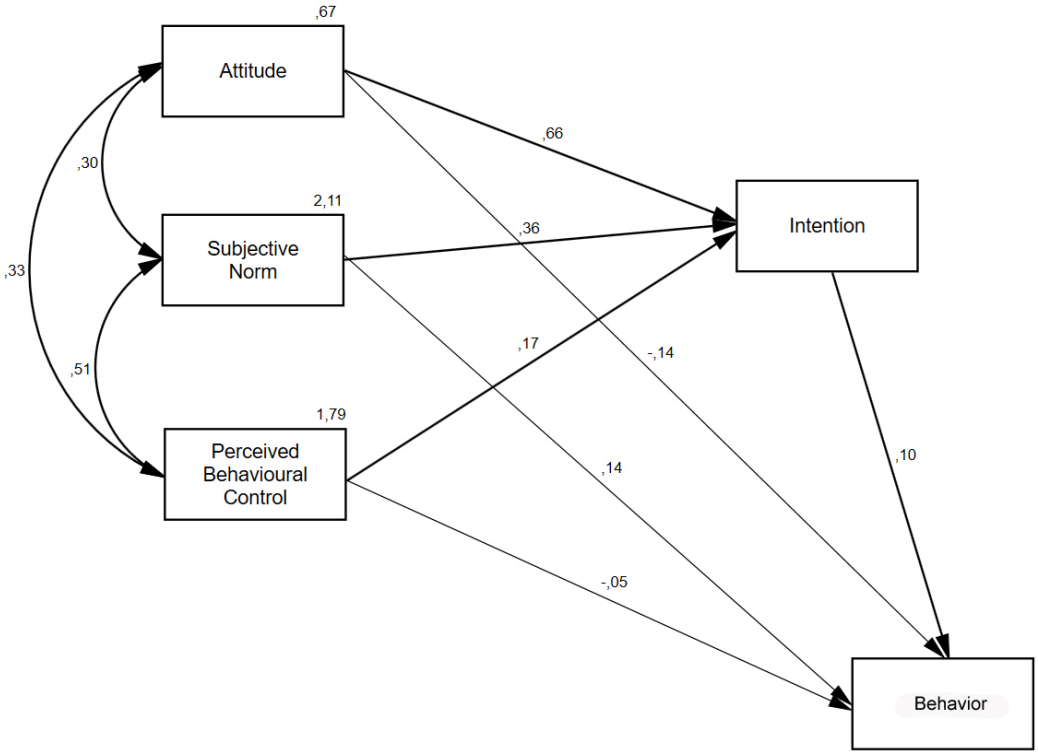

Fig. 1. Standardized estimates for the structural equation model (SEM) of the TPB constructs.
Source: Author

icant for all conditions. Among these constructs, ATT was found to have a "large effect" on the INT with a standardised path coefficient of 0.66 (greater than 0.50). Moreover, the impact of SN on the INT was "medium" with a standardised path coefficient of 0.33 (around 0.30). The standardised path coefficient of PBC on the INT was 0.17, which might be accepted as "small to medium effect".

As suggested by Ajzen (1991) the positive ATT, SN and INT are not enough for the execution of the BHV and a sufficient PBC is required. Apart from the direct effects of TPB constructs on the INT, the indirect effects of these three constructs on the BHV via INT were also measured. To test for standardised indirect effects of TPB constructs on the BHV a bootstrapping analysis was performed (Preacher and Hayes 2004). The bias corrected bootstrap estimate of the indirect effect of ATT: 0.050, PBC: 0.021 and SN: 0.049 with a 95.0 percent confidence interval. Results of present study confirmed Hypotheses 1 that attitudes, subjective norms and perceived behavioural control (the traditional constructs of TPB) are positively correlated with the intention and (indirectly on) the behaviour to apply sustainable farming practices.

The second hypothesis of present study was also found to be meaningful but it was found to be far from the expectations. Before the study, it was hypothesised that the farmers' behaviours, intentions, attitudes, subjective norms and perceived behavioural control would significantly differ in relation to the demographic characteristics (gender, age, level of education, share of agricultural income, farm type, farm size, land ownership and years of experience) of farmers. For some characteristics, a significant difference was obtained but not for most of them. The comparison of the TPB constructs among the

gender showed that there are no significant differences among the TPB constructs between the female and male (Table 4.). On the other hand, among the five TPB constructs, only farmers' past behaviour was found to significantly differ among the farmers' age. Studies showed that young farmers, with an age of 25-34, have the highest behaviour scores for the application of sustainable farming practices. This group was followed by the farmers of age 18-24 and the least behaviour score was obtained from the elder farmers, above 55 years.

Level of education was an important demographic characteristic that was expected to have a meaningful impact on the farmers' behaviour. However, the results showed that although the level of education has an impact on the TPB constructs, this impact was found significant only for intention. On the other hand, results showed that as the level of education increases, all TPB constructs show an increase. An important result of the present study showed that the agricultural education improves the scores of subjective norms of the farmers. This is due to,

Table 4: Comparison of the TPB constructs of farmers among the demographic characteristics

Compare groups		*Frequency*	*TPB Constructs*				
			BHV	*SN*	*ATT*	*PBC*	*INT*
Gender	Female	27.9%	3.23	4.75	3.49	3.66	3.51
	Male	72.1%	3.23	4.57	3.68	3.78	3.72
Age	18-24	16.3%	3.11 b	4.72	3.60	3.87	3.48
	25-34	35.6%	3.69 a	4.83	3.48	3.64	3.54
	35-44	15.4%	3.03 b	4.29	3.73	3.65	3.50
	45-54	12.0%	3.25 ab	4.56	3.76	3.80	3.87
	55-64	14.9%	2.78 b	4.65	3.81	4.06	4.21
	65-74	4.8%	2.36 bc	4.18	3.63	3.63	3.70
	75+	1.0%	2.20 c	3.13	3.50	1.50	2.00
Level of education	No formal education	6.7%	2.71	3.88	3.24	3.29	3.07 b
	Mid-school	13.0%	2.76	4.84	3.93	3.69	3.91 a
	High-school	28.8%	3.25	4.52	3.64	3.86	3.80 a
	Undergraduate	43.3%	3.45	4.65	3.59	3.70	3.44 a
	Postgraduate	8.2%	3.12	5.10	3.65	4.00	4.35 a
Agricultural Education	Yes	23.1%	3.26	5.07 a	3.56	3.68	3.63
	No	76.9%	3.22	4.49 b	3.65	3.76	3.67
% of Agri income in total Earnings	Less than 25%	38.9%	3.04	4.60	3.66	3.86	3.62
	Between 25-50%	26.5%	3.29	4.62	3.56	3.54	3.60
	Between 51-75%	16.8%	3.42	4.47	3.56	3.84	3.40
	More than 75%	17.8%	3.37	4.81	3.72	3.68	4.08
Farm Type	Vegetable farming	30.8%	3.89 a	4.44 b	3.51	3.62	3.55
	Fruit production	48.1%	2.75 b	4.63 b	3.65	3.79	3.72
	Dry land farming	4.8%	2.10 b	3.90 b	3.63	3.10	3.53
	Mixed production	16.3%	3.72 a	5.17 a	3.78	4.02	3.72
Farm Size	Less than 10 dö	35.1%	3.16 a	4.61 b	3.64	3.93	3.41
	Between 10-50 dö	44.2%	3.28 a	4.67 b	3.64	3.75	3.86
	Between 51-200 dö	15.9%	3.35 a	4.36 b	3.57	3.23	3.57
	More than 201 dö	4.8%	2.74 b	5.15 a	3.63	4.00	3.93
Ownership of the Land	Own	56.7%	3.11	4.47	3.60	3.77	3.57
	Rented	35.6%	3.35	4.48	3.68	3.76	3.75
	Mix	7.7%	3.50	5.02	3.63	3.48	3.85
Years of Experience in Farming	Less than 5 years	22.6%	3.77	4.39	3.60	3.50	3.19
	6-10 years	24.0%	3.22	4.53	3.48	3.98	3.41
	11-20 years	29.8%	2.78	4.88	3.72	3.68	3.89
	21-30 years	26.8%	3.42	4.67	3.74	3.82	4.08
	More than 31 years	6.7%	2.94	4.46	3.62	3.79	4.14

Values followed by the * in the same column for same group were significantly different according to the Mann-Whitney U test at $p < 0.05$. Values followed by the different letter or letters within the same column for same group are significantly different at 5 percent level (Kruskal-Wallis test). Number which are not followed by any signs or letters are not significantly different.

as Ajzen (1991) reported, the subjective norm, which is "the perceived social pressure to perform or not to perform the behaviour". Furthermore, it was expected that the social pressure is higher on the farmers with an agricultural background. As expected, it was found that the increase in the share of agricultural income in total earnings would increase the scores of traditional TPB constructs. However, although there is an increase in the construct scores, this increase was found to be significantly important. However, the results in current form are also meaningful showing that farmers who pay more attention to farming and whose life relies on agriculture are more aware of the importance of sustainable farming. Significant differences were also obtained for the farmers' behaviour among the farm types. Vegetable producers were found to have highest behaviour while the dry land farmers had least. Increasing farm size was also found to increase the farmers' scores of subjective norms but the land ownership and years of experiences had not affected the TPB constructs.

DISCUSSION

Some socio-psychological studies were previously conducted to identify the factors affecting the farmers' behaviours towards the implementation of agricultural and environmental practices (Fischer and Vasseur 2002; Sileshi et al. 2008; Uthes and Matzdorf 2013; Burton and Schwarz 2013). Previous studies suggest that financial problem, social and cultural context, self-identity and prestige (Fielding et al. 2008; Burton and Paragahawewa 2011; Carlson et al. 1977) play an important role in the individuals' behaviours. The most comprehensive explanation for the individuals' behaviour was by Ajzen (1991) who mentioned the theory of planned behaviour (TPB). TPB suggests that the individuals' behaviour is driven by the behavioural intentions and there are three factors explaining the individuals' behavioural intentions, that is, attitude, subjective norms and perceived behavioural control. Results of the present study showed that the farmers' behavioural intention was highly influenced by the farmers' attitude. These results are in accordance with the findings of Meijer et al. (2015) who similarly reported that attitude plays an important role in the farmers' behaviours. Farmers' calculated overall attitude was found to be 3.63 over 7.00, in which these results is promising for the policymakers. Namely, ATT plays an important role on the INT and improving the farmers' ATT would improve the behavioural intentions and may cause farmers to apply sustainable farming practices. Similarly, Fatmawati et al. (2018) reported that agricultural counselling and education would improve farmers' attitude and behavioural intentions for the application of environmental friendly practices. The importance of the education on the farmers' attitude was previously validated with some similar studies (Ibitayo 2008; Oztas et al. 2018). These results are also in agreement with the notes of Rezaei et al. (2019) who suggested that the attitude is so important for describing farmers' behavioural intention.

The second important factor influencing the behavioural intention was found to be subjective norms. Although the subjective norm of the farmers in the present study was found to have the highest score among the TPB constructs, the influence of SN on the INT was measured relatively small. The calculated score of the farmers' perceived behavioural control was 3.74 over 7.00. The results of present study demonstrated that not only the farmers' PBC score was low, but the farmers' PBC also had the least correlational effect on the INT among the three TPB constructs. Results also suggest that the reason to not exhibit positive behaviour towards the implementation of sustainable farming practices might be the insufficient perceived behavioural control. Results of the present study are also in conjunction with the findings of Wang et al. (2019) who noted that the subjective norms have an important influence on the farmers' behaviour for adopting environmental practices. Previously, Meijer et al. (2015) reported that the farmers' PBC would have least influence on the past behaviours of farmers. They noted that both SN and PBC were not significant predictors of behaviour for tree planting. Results of the present study also showed that INT and BHV are positively associated, in line with the assumptions of TPB. By considering the INT, the strongest impact was measured from ATT and is followed by SN.

The present study also supported the findings of some previous studies that the demo-

graphic characteristics would have an influence on the farmers' behaviours and behavioural intentions (Meijer et al. 2015). Among the tested demographic characteristics, age, level of education, farm type and farm size were found to have a significant influence on the behaviour, intention and/or subjective norm. On the other hand, gender, share of agricultural earnings in the total earnings, land ownership and years of experience were found to have a slight but not significant influence. Similarly, Despotevic et al. (2019) reported that the ATT, SN and PBC together with farm size, explain forty-nine percent of the farmers' intentions to adopt integrated pest management practices. They also noted that the farmers' knowledge and education level do not play a significant role in IPM adoption. Previously Conradie et al. (2013) also noted that gender had no significant influence on the environmental behaviour. The relationship between the farming experience and adoption of environmental behaviour is, on the other hand, not simple. Some studies reported an increased likelihood for the adoption of sustainable practices with an increase in past experience (Smithers and Furman 2003), but some studies reported a decreased likelihood (Moon et al. 2012; McCann et al. 1997). Although the years of experience in farming were not a significant factor in the TPB, age was found to significantly impact farmers' behaviour. The results are in accordance with the findings of Hoover and Wiitala (1980) who noted that age significantly affects the farmers' behaviours. Moreover, the "sustainability" term might be accepted as new for the world and this is not surprising for the younger farmers to have higher scores for the application of sustainable farming practices. As expected with the knowledge from the previous studies (Smithers and Furman 2003; Best 2009; Barreiro-Hurle et al. 2010) it was found that education has an important influence on the farmers' behaviours and behavioural intentions. Increase in the level of education was found to increase all the constructs of TPB, but this increase was only significant for INT. In a previous study, Carlson et al. (1977) reported that the share of agricultural income in gross income significantly affects the farmers' behaviours. In the present study, the share of agricultural income in total earnings had meaningful influence on the TPB constructs, but the influence was not statistically significant. Significant differences were also obtained for the farmers' behaviour among the farm size as suggested by Westra and Olson (1977). On the contrary to Lee (1980) land ownership was found to have no any influence on the TPB constructs of the farmers in current study. Results of the present study demonstrated that education and introducing the young generations to these agricultural practices are the two most important factors that would be used as a tool to improve the farmers' behaviour for the application of sustainable farming practices.

CONCLUSION

Results of the present study showed that the farmers' past behaviour for the application of sustainable farming practices is low. The constructs of TPB were all found to have weak to large positive influence on the behavioural intention. Results of the present study confirmed Hypotheses 1 that attitudes, subjective norms and perceived behavioural control (the traditional constructs of TPB) are positively correlated with the intention and (indirectly to) the behaviour to apply sustainable farming practices. Among the three TPB constructs, the subjective norm was found to have the highest score, but the highest impact on the behavioural intention was measured from attitude. The perceived behavioural control was found to have a low score and a weak effect on the behavioural intention. Reading all of the above mentioned results together suggested that the insufficient perceived behavioural control of the farmers might be the main reason behind the lack of execution of a past behaviour about the implementation of the sustainable farming practices. The correlations among the ATT, SN and PBC were also found to be significant for all conditions.

RECOMMENDATIONS

Results of the present study suggested that the farmers' behaviour and intention for the implementation of sustainable farming practices are highly affected by farmers' attitude. Therefore, it might be recommended that the adoption of sustainable farming practices could be achieved by the improvement of farmers' atti-

tude. Thus, special attention must be paid to improve the farmers' understandings such that they have the ability to implement sustainable farming practices.

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