

The Role of Agricultural Extension Services and a New Ecological Paradigm in Determinants of Perceived Crop Yield and Pro-Environmental Social Norms

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In this research, the aims of the research are included to find out the impact of ecological paradigm and agricultural extension services on both perceived crop production and pro environmental social norms. Furthermore, the researcher considered a significant mediator "personal norm", in the relationship among ecological paradigm, perceived crop production and pro environmental social norms. And this mediator is also considered in the relationship among agricultural extension services, perceived crop production and pro environmental social norms. The adopted research design involves Quantitative research method, deductive research approach, cross sectional time horizon and positivist research philosophy. The research population is the agricultural industry of Malaysia, out of which the target sample is taken out by the researcher with the help of purposive sampling technique. The researcher has collected the data with the help of self-administered questionnaire-based survey from 320 participants of the Malaysian agricultural industry. The collected data is screened, and 305 valid responses are analyzed with the help of Microsoft Excel and SPSS. The results of the study proposed that the impacts of ecological paradigm and agricultural extension services are positive and significant on both perceived crop production and pro environmental social norms. Furthermore, the mediating impact of personal norms has been found to be significant both in the case of ecological paradigm and perceived crop production and pro environmental social norms and ecological paradigm. Moreover, the impact of personal norms as a mediator is significant in the case of both agricultural extension services and perceived crop production and agricultural extension services and pro environmental social norms. The study significantly focuses on pro environmental social norms, which adds to the novelty and innovation as well, moreover, considering ecological paradigm along with personal norms is also a significant and novel factor of this study.

Keywords: Perceived Crop Yield, Pro-Environmental Social Norms, Agricultural Extension Services, New Ecological Paradigm

1. INTRODUCTION

Last couple of decades has brought environmental pollution to light as a major challenge to human beings. Environmental pollution has become a dreadful reality. Expansion of industries access consumption of natural resources and increasing pollution in air and water bodies a few examples of increased environmental pollution (Chua, Quoquab, Mohammad, & Basiruddin, 2016). The sustainability of the environment has become even more difficult due to human consumption of natural resources. (Mainieri, Barnett, Valdero, Unipan et al., 1997) Hence it is necessary for human beings to change the ways of living with nature. In all the educational and academic fields numerous researchers have been conducted to devise better ways to reduce the destruction of environment. For example Ojea and Loureiro (2007) showed through their research that norms and values help in formation of attitudes towards ecological economics.

The obligations a person feels or perceives towards protection of the environment are known as personal norms (Chua et al., 2016). Whenever a human being

accepts a responsibility toward something and realize the consequences that would result otherwise a norm is formed (Schwartz, 1977). Human beings are seeing to adult altruistic behaviors in the development of obligations whenever and enormous activated and it leads them. This is the reason why scientists and resources have had great interest in norms specifically personal norms in human behavior and environmental studies. Affecting the environment there has not been a single type of norm that affects or influences it (Lam & Chen, 2006; Robertson & Barling, 2013). The reason of interest in norms is that it helps to understand and explain human behaviors for instance the research indicates that how a person behaves towards his or her environment depends on the personal norms he or she has (Clark, Kotchen, & Moore, 2003; Sahin, 2013). Personal norms leads to two types of other norms pro-personal norms and pro-social norms. P. Stern (2000) Viewed and researched on personal norms as a means to influence social norms in relation to environmental studies. He moreover suggested that believes and values have greater influence on environmental norms. Individual norms or a personal norm

collectively leads to development of social norms. Hence pro environmental social norms are affected by personal norms. Major studies focus on the impact created by personal norms and pro environmental social norms in agriculture and farming (P. C. Stern, Dietz, Abel, Guagnano et al., 1999).

The demographics regarding some of the crops are not known to farmers. Hence to build expectations or expect performance to a certain extent is difficult for farmers (Bergtold, Duffy, Hite, & Raper, 2012). This may develop constrain for farmers to skew the expectations regarding the benefits or yield they would have from a certain crop harvesting (Gould, Saupe, & Klemme, 1989). Perceived crop yield is seeing to be affected by risk attitudes and expectations towards environmental conservation (Featherstone & Goodwin, 1993). Perceived yields are seemed to be affected by the farmer's expectations towards environmental benefits and costs. High costs are likely to decrease the cultivation of crops with low perceived crop yield. Research conducted on Maryland farmers give results that the PCY of the crop decreases by 14% if the cost to harvest the crop increases by 1%. It explains that whenever the crop cost increase the perceived crop yield for farmers would decrease (Lichtenberg, 2004). The reason is that the farmer's not only focus on explicit costs but rather the implicit cost as well. The opportunity costs would be considered as the input towards the crop cultivation (Pannell, Marshall, Barr, Curtis et al., 2011). The actual yield of crops and the perceived yields create huge difference as one is dependent on what is actually harvested and the later depends on how the farmers perceive the scenario. It is seen that farmers would perceive crop yield as high for the crops which make them earn more, would have a positive impact on the perceived gains. Similarly the environmental benefits associate with crops are dependent on the gains the production of crop would give them (Snapp, Swinton, Labarta, Mutch et al., 2005).

Advices related to agriculture and agricultural system of provided to the farmers through set of services these services are known as agricultural extensions services (Chetthamrongchaia, Fooksirib, & Jermisittiparsertc, 2019). The main goal of these services is to improve the economic growth ultimately. To improve food security, enhance the standard of living, increase agriculture productivity, and promote agriculture it is important that farmers should be delivered scientific research and other related knowledge to farming (Benin, Nkonya, Okecho, Randriamamonjy et al., 2011). The importance of adopting agriculture extension services system are well known to too many countries regarding the help achieving the agricultural objectives set by the governments (Österle, Koutsouris, Livieratos, & Kabourakis, 2016). In development of agricultural extension services, a single stakeholder cannot achieve anything thus it is a vital that different or all stakeholders participate in achieving the objective. For example, the customers, landowners, management, government, and clients etc. Development of agricultural extension services systems for the leads to increase or developing of perceived crop yield (Chetthamrongchaia et al., 2019). The products of agricultural extension services like agribusiness centers and Agri clinics can help farmers

change the way they perceive the problems in the face in everyday work but utilization of information and knowledge. The increase of growth rate of crops and their perceived crop yield is due to successful utilization of agricultural extensions services. For example use of agro machinery fertilizers pesticides seeds and other techniques would increase the productivity of farmers and the expertise in the field (Aker, Ghosh, & Burrell, 2016). The use of agriculture extension services is not limited to production or harvesting only but also the services can help farmers to promote an environment that is based on agricultural well-being and utilization of better farming styles.

The most common belief of individuals relating to the environment's current state with respect to their mental states is known an ecological paradigm (Chua et al., 2016). Ecological paradigms have been observed to affect the pro-environmental norms. The behavior of human beings towards the environment or its components is dependent on the belief that has been formed over the years. The discussion or debate on ecological conservation and betterment would help in creating or forming behaviors of individuals towards the environment (Bruvold, 1973). This article explains how perceived crop yield (PCY) and Pro-environmental social norms (PSN) are affected by ecological paradigms (EP) and agricultural extension services (AES) and how already present personal norms mediates that effect of ecological paradigms and agriculture extension services on perceived crop yield and pro-environmental social norms.

2. LITERATURE REVIEW

2.1. Social attribution Theory

This theory sheds light on the reason behind the variation in the human behavior. The theory suggests that human behavior is influenced by the situations, and which can be internal attributes or external attributes. When considering the internal attribution, the reason behind the variation in the human behavior, it is associated with the personal and internal characteristics. The two key elements theory relates with the internal attributions are perceived behavior control and personal norms. Perceived behavior control is referred to the individual's perception of ease of difficulty to perform as task of personal capability (Weiner, 2010). However personal norms are regarded as the self-concept and feelings related to moral obligation of people in which they find performing a behavior is mandatory. The attributions that are part of human behavior because of some event or experience and are outside a person's control. Social norms are considered as a component of external attributes and significantly shape the behavior of people (MG, Ab Yajid, & Shukri, 2020). Social norms are considered as mutually shared standards of the acceptable behavior in the social groups or societies. Social norms are considered as main pivotal forces that lead to the human behavioral changes. Norms are the part of societies in order to create the social roles that each individual plays. In addition to this personal norms are the part of each person's own personality and is the sense of ethical obligation that shapes the behavior and actions of

each person according to their personal opinion regarding ethics (Kelley & Michela, 1980). These reflect the internal attributions and moral obligations that shape an individual's behavior which also has a considerable influence in decision making of the individual. Personal norms are said to play a mediating role in relation between awareness, consciousness and social standards that are set by the society. Stronger personal norms result in the pro-environmental behavior which then shapes the decision making of the person.

2.2. Agriculture Extension Service and Perceived Crop Production

Farmer's perception of crop production depends on certain factors that are based on the farming skills and farming techniques of the farmers. However, a correct knowledge of these factors that influence the crop production will ultimately enhance the farmer's perception. This is achieved by the agriculture service extension, which is being practiced all around the world to polish and amplify the farming skills and abilities of farmers (Labarthe, 2009). This aims to educate the farmers regarding techniques that can escalate the crop production, thereby affecting the perception of the farmers regarding the crop yield. A correct and sufficient knowledge of land preparation, seeding, watering, fertilizers and use of pesticides and herbicides can help not only to positively influence the perception of the farmers but also the boosts the crop productivity and crop yield (Emmanuel, Owusu-Sekyere, Owusu, & Jordaan, 2016). Agents of agriculture service extension service work to enhance the farming techniques and influence the farmer's perception towards the crop production.

2.3. Mediating Role of Personal Norms in relation between Agriculture Extension Service and Perceived Crop Production

Human being social animals are greatly influenced by the social as well as personal norms. Personal norms are the set values of a person according to the personal ethical standards that shape the actions and behavior of the people (Shenaar-Golan & Walter, 2020). In addition to this the decision taking abilities of people are also under the outsizing effect of the personal norms. Farmer's also take the decisions of the farming aspect under the influence of their personal norms (Mukherjee & Maity, 2015). The goal of agriculture extension service is to assist the farmers regarding farming practices which also has an impact on their personal norms. Farmer's perception regarding the crop production are also influenced by the personal norms and personal believes of dealing with farming techniques (Anderson & Feder, 2007; Birkhaeuser, Evenson, & Feder, 1991). Acceptance of the education and guidance received by the agriculture service extension and its practical implication is also affected by the personal norms which in turn influence the farmers perception about the crop production.

2.4. Agriculture Extension Service and Pro-Environmental Norms

With the increasing concern about the negative impacts of the industrialization and other human activities towards the

environment, the idea of sustainable development is the best solution. This aims at development while posing no threats and negative harms towards the environment (Ali & Rahut, 2013). The agriculture service extension aims to educate the farmers regarding the farming skills and techniques to uplift their livelihood as well as improve the crop production. Along with this the agriculture service extension also aims to create awareness in the farmers regarding the negative effect of human activities towards the environment (Anderson & Feder, 2004). The agents of agriculture service extension also guide the farmers to use the farming techniques that pose no threat to the environment and also help them in the practical implication of these techniques. The practice of agriculture service extension across the world can greatly influence the farmer's practices towards the pro-environmental norms in farming.

2.5. Mediating Role of Personal Norms in relation between Agriculture Extension Service and Pro-Environmental Norms

Personal norms influence the behavior, actions, attitude and decision taking abilities of the people. The agriculture service extension works with the goal to influence the farmers towards the new farming techniques that are introduced by the science and technology (Terblanche, 2013). These can not only boost the crop production but also the crop production but also aim to improve the livelihood of the farmers. In addition to this the agents of agriculture service extension also provide knowledge and create awareness in the farmers regarding the pro-environmental behavior and the practices and norms that affect the pro-environmental behavior (Cerdán-Infantes, Maffioli, & Ubfal, 2008). Therefore, acceptance of these norms and behavior is mediated by the personal norms on the farmers towards the practice of pro-environmental farming techniques.

2.6. Ecological Paradigm and Perceived Crop Value and Mediating Role of Personal Norms

Ecological paradigm is the most frequent measure used towards the environmental concern that has been rising due to the human activities. Over the period of last century rapid developments by the human beings have led to main concerns towards the environmental stability as well as impacts towards the human health. These activities also include the farming techniques and agriculture that pose a threat towards the environment (Farrow, Grolleau, & Ibanez, 2017). New ecological paradigm and human norms that strongly effect the behavior of the farmers towards the new farming techniques that pose no environmental threat and cause no crisis to the environment (Zeng, Tian, He, & Zhang, 2019). Environmental attitude of the farmers is of prime importance in this regard. Their personal norms play an important role which influence their perception towards the crop production.

2.7. Ecological Paradigm and Pro-environmental Norms

Conventionally the farming practices and agriculture used to focus of increasing the crop yield and maximizing the profit, however these farming practices in agriculture led

to emission of toxic gases that led to greenhouse effect ultimately resulting in the global warming (Chua et al., 2016). However, with time the idea of green and ecologically safe farming practices was introduced in the agriculture. The perception of sustainable agricultural and adoption of such techniques that pose little or no harm to the environment depend on the idea and awareness in the farmers. Ecological paradigm is the endorsement of the pro-ecological point of view to save the ecosystems (Krettenauer & Lefebvre, 2021). Therefore, awareness regarding pro-environmental norms in the agriculture can lead to the positive outcomes and adoption of pro-environmental farming practices in the farmers that can lead to stability of ecosystems in the environment. The concept of new ecological paradigms can greatly influence the practice of pro-environmental behavior and norms in agriculture which will lead to development of sustainable society.

2.8. Mediating Role of Personal Norms in relation between Ecological Paradigm and Pro-environmental Norms

Sustainable agriculture is the idea of agriculture and farming practices which pose no risk to the ecosystem and also maintain the biodiversity of the planet. The idea of sustainable agriculture is considered a positive alternative towards the conventional farming techniques. To ensure the adoption of these farming techniques on the basis of the new ecological paradigm, educating the farmers towards new scientific and technological farming is of great importance (Price & Leviston, 2014). Personal norms also play an important role in this aspect. Personal norms

shape the behavior of people and also their decisions taking abilities. Strong personal norms will influence the farmers towards the adoption of the new techniques in the light of the new ecological paradigm which will ensure the pro-environmental norms as a part of agriculture and farming practices (Bissing-Olson, Fielding, & Iyer, 2016). Therefore, to enhance the pro-environmental behavior in the farmer's awareness regarding ecological paradigm and sustainable environment is of prime importance in which personal norms play a mediating role.

The following hypothesis can be generated for this study.

H1: Agriculture extension service effects perceived crop production.

H2: Personal Norms play a mediating role in relation between agriculture extension service and perceived crop production.

H3: Agriculture extension service effects Pro-Environmental norms.

H4: Personal Norms play a mediating role in relation between agriculture extension service and pro-environmental norms.

H5: Ecological paradigm effects perceived crop production.

H6: Personal Norms play a mediating role in relation between ecological paradigm and perceived crop production.

H7: Ecological paradigm effects Pro-Environmental norms.

H8: Personal Norms play a mediating role in relation between ecological paradigm and pro-environmental norms.

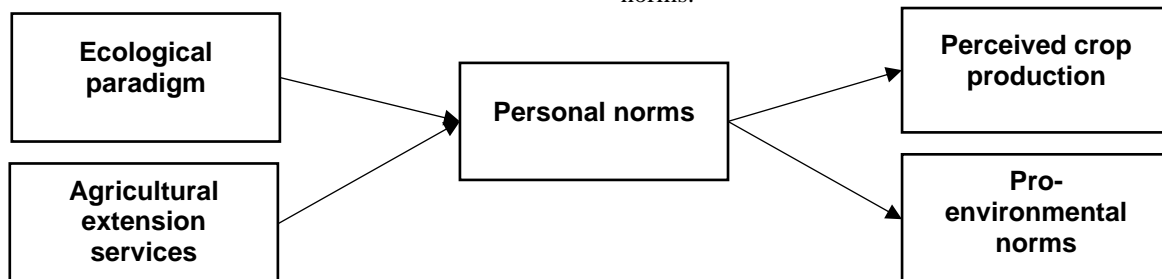


Figure 1: Theoretical framework

3. RESEARCH METHODOLOGY

3.1. Research method

The selected method for this research is the quantitative research method, and following this method, the researcher has quantitatively analyzed the impacts of ecological paradigm and agricultural extension services on perceived crop production and pro environmental social norms respectively. Moreover, the researcher has also quantitatively analyzed the impacts of personal norms as a mediator in the relationship between ecological paradigm and perceived crop production and in between ecological paradigm and pro environmental social norms. Similarly, the mediating impact of personal norms is considered among agricultural extension services, perceived crop production and pro environmental social norms (Auer, Beretvas, Colton, Hill et al., 1977). Various previous studies have

suggested the adoption of quantitative research method while the major objectives are to analyze the impacts of the independent variables on dependent variables quantitatively (Crossan, 2003). The research philosophy that is used by the researcher is positivist research philosophy, which has assisted the researcher in keeping personal bias opinion and interference in the research data collection, analysis and interpretation to a minimum level (Mkansi & Acheampong, 2012). The results are completely based upon the collected and analyzed data. Furthermore, the approach employed by the researcher is the deductive research approach, and it is applied because the researcher wanted to first propose hypothesis statements on the basis of the review of previous studies, then to collect relevant data, analyze it and lastly reject or accept the statements of hypothesis on the basis of the results (Mkansi & Acheampong,

2012). According to previous researchers as well, in the case of this method and such a design, the best suited philosophy of research is the positivist research philosophy (Holden & Lynch, 2004; Kenneth, 2000). Following these methods, the most suitable time horizon of research is cross sectional time horizon, which is employed by the researcher as well, following the studies of (Östlund, Kidd, Wengström, & Rowa-Dewar, 2011; Park & Park, 2016).

3.2. Sampling and population

The population of interest for the researcher is the Malaysian agricultural sector, and the target sample involves participants from Malaysian agricultural organizations. From these organizations, the sample is captured with the help of purposive sampling technique, and the decided sample size is equal to 320 participants from the targeted organizations. The purposive sampling technique is applied by the researcher as it has helped the researcher in keeping the participants significantly relevant with the personal judgment of the researcher and also with the questions and objectives of the research (Quah, 1993; Rutberg & Bouikidis, 2018). So, the frame of sampling is the agricultural sector of Malaysia whereas, the sampling unit for this study involves one participant from the agricultural sector of Malaysia (Saunders, Lewis, Thornhill, & Bristow, 2015).

3.3. Measures

For the questionnaire, there are 15 measures of ecological paradigm adopted from the study of Zhu and Lu (2017), for agricultural extension services, 4 items are adopted from the study of Diawara, Dicko, Coulibaly, N'diaye et al. (2018), for personal norms, three items are adopted from the study of (Diawara et al., 2018). Whereas, for measuring perceived crop production, 2 items are adopted from the study of Fang, Ng, and Zhan (2018) whereas, for pro-environmental social norms, 2 items are adopted from the study of (Fang et al., 2018).

3.4. Data collection and procedures

The tool that is adopted for data collection in this study is a structured questionnaire, so, in this study, the researcher has collected the data with the help of self-administered questionnaire-based survey technique (Soiferman, 2010). The data is collected by the researcher himself and the participants are supervised, for unbiased and completely conscious opinions and responses from the participants. After the collection of data, only 305 valid responses have been obtained by the researcher, which are later on arranged in the software Microsoft Excel (Saunders et al., 2015).

3.5. Data analysis

For the analysis of the data, the arranged data is imported from Microsoft Excel to the software SPSS, in this software, the researcher has arranged and labeled the data, and after that, different tools and techniques of analysis are applied for the purpose of analyzing the data to obtain the outcomes of the study (Soiferman, 2010). The researcher has applied demographic analysis, KMO and Bartlett's Test, descriptive analysis,

convergent validity and reliability, rotated component matrix, correlation analysis, regression analysis and confirmatory factor analysis (Suen, Huang, & Lee, 2014; Tongco, 2007). After the analysis of the data, the results are imported into Microsoft Word in the form of tables, these tables are arranged, and interpretation is provided regarding every result and every test applied on the data (Suen et al., 2014; Tongco, 2007).

3.6. Ethical considerations

The researcher has formulated and presented the consent forms to the participants, according to which, all of the participants are completely and vividly informed regarding the objectives and background of this research. The identity of the participants is kept private and confidential, and the collected data is only utilized by the researcher for fulfilling the objectives of the current research, and this data will not be utilized for any other purpose as well.

4. DATA ANALYSIS AND INTERPRETATION

4.1. Demographics

The table below presents with the details of the demographics of the respondents, focusing on the gender, age and experience of the respondents, the frequency and percentage of these factors are provided as well (Woiceshyn & Daellenbach, 2018).

Table 1: Demographical details

	Dimensions	Frequency	Percent
Age	20-25	40	13.1
	26-30	60	19.7
	31-35	110	36.1
	36-40	53	17.4
	40+	42	13.8
	Total	305	100.0
Experience	2 years or less	191	62.6
	Above 2 years	69	22.6
	Above 4 years	45	14.8
	Total	305	100.0
Gender	Male	130	42.6
	Female	175	57.4
	Total	305	100

According to the table above, 40 of the participants were of age between 20 to 25, 60 of the participants were of age between 26 to 30, 110 of the participants were of age between 31 to 35 years, 53 of the participants were of age between 36 to 40 years and 42 of the participants were of age above 40 years. According to the table, the experience of 69 of the participants was above two years, the experience of 191 participants was two years or less and the experience of 45 of the participants was more than four years. Moreover, 42.6% of the participants were males whereas, 57.4% of the participants were females, which means that most of the females were responsive towards the study rather than the males.

4.2. Descriptive statistics

The table below is representing the descriptive analysis or statistics of the study, representing with the total number of responses, the minimum values, maximum values, mean values standard deviation values and the skewness and standard error values (Diawara et al., 2018).

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
EP	305	1.00	7.00	3.4397	1.00268	-.717	.136
AES	305	1.00	7.00	3.6781	1.31108	-.633	.136
PN	305	1.00	7.00	3.0048	1.47301	-.747	.136
PCP	305	1.00	7.00	4.7312	1.61237	-.752	.136
PEN	305	1.00	7.00	3.8322	1.53237	-.742	.136

According to the table above, the total valid responses are equal to 305, the mean values lie in between 1.00 and 7.00, which are both the minimum and maximum values, which means that the data is normal and normally distributed. No value is extremely low or high, all of the values significantly lie around the mean values. The significantly moderate level of standard deviation and skewness is representing that the data is not very much skewed or dispersed around the mean value, most of the values lie all around the mean value and are also close to the mean point.

Which means that the data is normal and normally distributed.

4.3. KMO and Bartlett's Test

The table below is representing the results for the KMO and Bartlett's Test, according to the standard, the value for Kaiser-Meyer-Olkin Measure of Sampling Adequacy should be more than 0.8 whereas the value of Bartlett's Test of Sphericity should be less than 0.05, so, the results for this study are presented below (Fang et al., 2018).

Table 3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.948
Bartlett's Test of Sphericity	Approx. Chi-Square	11364.400
	df	1071
	Sig.	.000

According to the table above, the value for Kaiser-Meyer-Olkin Measure of Sampling Adequacy is equal to 0.948, which is obviously more than 0.8, which means that the standard is fulfilled, and the model and the collected data is significant. Moreover, the value for Bartlett's Test of Sphericity is equal to 0.000, which is also less than 0.05, which means that the outcomes and the model are both significant and the data is good to go for further testing and analysis.

4.4. Rotated Component Matrix

The table below is representing the results for rotated component matrix, which is establishing a relationship in between the items of this study, related to all the variables and the components of the study, which are presented in the rows horizontally (Fang et al., 2018).

Table 4: Rotated Component Matrix

	Component				
	1	2	3	4	5
EP1					0.755
EP2					0.687
EP3					0.706
EP4					0.735
EP5					0.768
EP6					0.782
EP7					0.754
EP8					0.741
EP9					0.706
EP10					0.747
EP11					0.756
EP12					0.755
EP13					0.746
EP14					0.722
EP15					0.788
AES1				0.619	
AES2				0.698	
AES3				0.736	
AES4				0.709	
PN1			0.775		
PN2			0.785		
PN3			0.834		
PCP1		0.722			
PCP2		0.768			
PEN1	0.714				
PEN2	0.751				

According to a standard, the values should be equal to 0.7 or more than 0.7, in this case, it can be observed that around all of the values are equal to or more than 0.7 like the value of the first component with PEN1 is equal to 0.714, the value of the second component with PCP1 is equal to 0.722, and similar is the case with all of the other items and components as well. This establishes a significant relationship among the items and the components, which means that the model and the data are both significant and the data is further good to go for more testing and analysis.

4.5. Convergent Validity and Reliability

The results for the convergent validity and reliability are represented in the table below, according to a standard, the value of CR is supposed to be more than 0.7 whereas the value for AVE is supposed to be equal to or more than 0.5. Whereas the value for MSV is supposed to be lower than the value of MSV (Zhu & Lu, 2017).

Table 5: Convergent Validity and Reliability

	CR	AVE	MSV
EP	0.981	0.543	0.250
AES	0.991	0.537	0.327
PN	0.944	0.546	0.363
PCP	0.924	0.534	0.250
PEN	0.914	0.595	0.249

In this case, it can be observed that all of the values represented against all of the variables for CR are more than 0.7, whereas all of the values against all of the variables for AVE are more than 0.5. Moreover, the values of MSV are also lower than the values of AVE, which means that the results are significant, and the data is good to go for further testing and analysis.

4.6. Correlations

The table below represents the results for correlation analysis and the values for Cronbach alpha as well these values are supposed to be more than 0.9 according to a standard (Zhu & Lu, 2017).

Table 6: Correlations

		EP	AES	PN	PCP	PEN	Cronbach Alpha
EP	Pearson Correlation	1					0.912
	Sig. (2-tailed)						
AES	Pearson Correlation	.371**	1				0.987
	Sig. (2-tailed)	0					
PN	Pearson Correlation	.433**	.609**	1			0.946
	Sig. (2-tailed)	0	0				
PCP	Pearson Correlation	.346**	.468**	.481**	1		0.954
	Sig. (2-tailed)	0	0	0			
PEN	Pearson Correlation	.346**	.468**	.481**	1	1	0.934
	Sig. (2-tailed)	0	0	0	0		
	N	305	305	305	305	305	

** . Correlation is significant at the 0.01 level (2-tailed).

It can be observed from the table above that there is significant correlation present in between all of the variables, the correlation is significant among the variables and with the variable itself as well. Furthermore, according to the standard, the values for Cronbach alpha against every variable is significant as well.

4.7. Model Fit Indices

The table below is representing the results for model fit indices or confirmatory factor analysis, the observed and threshold values are presented to test the validity of the model and the data (Zhu & Lu, 2017).

Table 7: Model Fit Indices

CFA Indicators	CMIN/DF	GFI	IFI	CFI	RMSEA
Threshold Value	≤ 3	≥ 0.80	≥ 0.90	≥ 0.90	≤ 0.08
Observed Value	1.924	0.803	0.917	0.916	0.054

Table 8: Regression results

Regression		Estimate	S.E.	C.R.	P	Hypothesis	Decision
EP	→ PCP	.236	.055	5.557	.000	H5	Accepted
AES	→ PCP	.207	.046	5.132	.000	H1	Accepted
EP	→ PEN	.338	.029	11.157	.000	H7	Accepted
AES	→ PEN	.348	.039	10.157	.000	H3	Accepted
Mediation		Estimate	S.E.	C.R.	P	Hypothesis	Decision
EP*PN	→ PCP	.268	.041	5.440	.000	H6	Accepted
AES*PN	→ PCP	.155	.043	4.189	.000	H2	Accepted
EP*PN	→ PEN	.174	.044	4.120	.000	H8	Accepted
AES*PN	→ PEN	.195	.054	5.120	.000	H4	Accepted

According to the table above, the impact of the ecological paradigm on perceived crop production is significant and is equal to 23%, which means that with every 1% increase in the ecological paradigm, there will be 23.6% increase in the perceived crop production. The impact of agricultural extension services on perceived crop production is significant as well, as the significance value is lower than 0.05. Furthermore, the impact of ecological paradigm on pro-environmental social norms and the impact of agricultural extension services on the pro-environmental social norms is significant as well. With values equal to 33.8% and 34.8% respectively. This means that with every 1% increase in the ecological paradigm and agricultural extension services, the pro environmental social norms will enhance by 33.8% and 34.8% respectively. The mediating role of personal norms in between ecological paradigm and perceived crop production and in between ecological paradigm and pro environmental social norms is significant and equal to 26.8% and 17.4% respectively. Furthermore, the mediation of personal norms in the case

of agricultural extension services, perceived crop production and pro environmental social norms is significant as well and is equal to a value of 15.5% and 19.5% respectively. So, in accordance with the results, all of the proposed statements of hypothesis are accepted.

4.8. Regression

The table below is representing the regression results, representing the impacts of the variables on each other along with the results of the testing of the hypotheses (Diawara et al., 2018).

of agricultural extension services, perceived crop production and pro environmental social norms is significant as well and is equal to a value of 15.5% and 19.5% respectively. So, in accordance with the results, all of the proposed statements of hypothesis are accepted.

5. DISCUSSION AND CONCLUSION

5.1. Discussion

The increased use of machines and technologies for production purposes as well as many other purposes, has led to an increase in the emission of gases which are found to be toxic for the environment as well as for the people. This hazardous situation has led to the promotion of pro-environmental social norms which play a significant role in promoting sustainable development leading to the formation of a “green environment”. This research study was also conducted to determine the impact of different variables such as ecological paradigm, agricultural extension services and personal norms on the perceived crop production and pro-environmental social norms taking personal norms as the mediating variable.

The results obtained from this research study showed that the ecological paradigm has significant impact on perceived crop production as well as on pro-environmental social norms. According to Ateş (2020), the ecological paradigm provides the necessary education about the environment to the individuals. Both the negative as well as positive aspects of the environmental changes are discussed which help the individuals to understand the safety of the environment. Thus, this leads to the sensitivity of the individuals towards the environment, and they prohibit themselves from harming it. This leads to promotion of pro-environmental social norms. Thus, Chwialkowska, Bhatti, and Glowik (2020), stated that the farmers plant more trees and crops to improve the sustainability as they consider themselves responsible for keeping the environment safe and healthy.

However, the agricultural extension services have also found to have a significant impact on perceived crop production and pro-environmental social norms. According to Fornara, Molinaro, Scopelliti, Bonnes et al. (2020), the perception of the farmers regarding the production of crops, is dependent upon a no. of factors. Some of these important factors include: the skills of the farmers, the new techniques used by the farmers and many others. The extension services provide the necessary information to the farmers as well as educate them to obtain the perceived crop production (Olya & Akhshik, 2019). Such improved gain of knowledge also encourages them to promote the pro-environmental social norms for sustainable development. The main impact of sustainable development is to retain the natural resources, and this can only be done if proper balance is maintained between the nature and human consumption. For this reason, many countries around the world, are promoting “green environment” by encouraging more production of the crops as well as other natural resources.

However, the personal norms are considered to have a very important significant impact on perceived crop production and pro-environmental social norms as the belief and the value system is highly supported by the farmers even in today’s world. It has been observed that the personal norms of the farmers help in improving the understanding of ecology paradigm that leads to better perception of crop production as well as pro-environmental social norms. According to Gholamrezai, Aliabadi, and Ataei (2021), the values of the farmers support them to improve the crop productivity to increase the sustainable development for preventing the world from the external harms of chemicals and many other toxic substances. This encourages the pro-environmental social norms by keeping the environment safe and healthy. However, Li and Wu (2020), also stated that the personal norms help in the proper understanding of the knowledge as well as education provided through extension services for improving the crop production which ultimately leads to forwarding of the pro-environmental social norms (Sharma & Gupta, 2020). All the efforts put in by the farmers help in improving the overall crop production thus keeping the environment safe and healthy leading towards the sustainable development in the world.

5.2. Conclusion

Along with the economic growth, the sustainable development is also considered to be very important in today’s world of destruction and development. Many economists as well as scholars have worked to determine the significance of sustainable development in order to retain the natural resources for future generations. This research study was also conducted to determine the impact of different variables on pro-environmental social norms which play an important role in promoting the sustainable development (Trautwein, Babazade, Trautwein, & Lindenmeier, 2021). The results obtained from this research study showed that both agricultural extension services as well as ecology paradigm has significant relationship with perceived crop production as well as with the pro-environmental social norms. The personal norms are found to play a significant mediating role in this context. It has been observed that the extension services also educate the farmers about the harmful effects of human activities on the nature and how it can destroy the natural resources of the world in coming years if no proper measures are taken within time. Such services also encouraged them to use the techniques which are not harmful for the environment to increase the productivity of the crops thus leading towards the sustainable development. The personal beliefs as well as values of the farmers, are found to have a strong influence on them as it impacts their behaviors towards the technologies, they are using to gain profits. The sense of responsibility helps in promoting the pro-environmental social norms in the agricultural sectors around the world.

5.2.1. Limitations and future research indications

Even though people are well aware of the significance of “green environment”, but still very limited studies are conducted to determine different means to improve the environment in order to promote sustainable development. This research study will help in providing a base for the future research studies in order to have a proper direction while carrying out the study to promote better and effective results as these results could help in improving the overall environmental conditions in the society.

The pro-environmental social norms are considered to play a vital role in promoting the sustainable development. However, only a few variables were discussed in this research study. However, for future research studies, other variables such as the impact of natural resources, their access etc. should also be considered as the main focus of sustainable development is to retain the natural resources.

This research study was conducted in the context of Malaysia leading to restricted results. However, for the future research studies, the cross-sectional data should be obtained and well analyzed in order to determine the differences in the developing and the developed countries in order to improve such conditions so that it could lead the world towards the sustainable development.

5.2.2. Implications of the research

This research study helped in changing the views of the farmers towards sustainable development. It has helped in

developing different policies to promote the sustainable development. However, along with the agricultural sectors, the significance of the sustainable development was also being taught in the schools making people aware of it at a national level. Different technologies were developed which improved the crop production without harming the surrounding environment. This helped in promoting the pro-environmental social norms which led to the sustainable development. The sessions for encouraging personal norms were also held. The farmers were given the full rights to express themselves through their beliefs as well as values and based on such results, the government of Malaysia devised new policies promoting the reformations for sustainable development at the national as well as international level. This also encouraged other countries to take necessary steps in promoting the sustainable development as the whole world is found to be together in this. It is considered to be the responsibility of each and every individual in the world to protect the environment by every possible means.

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