International Journal of Innovation, Creativity and Change. www.ijicc.net
Volume 7, Issue 2, 2019

How do Government Policies Influence the Relationship between Predictors and Agricultural Extension?

Ratchada Fongtanakit[a], Kanjaporn Mungmee[b], Kittisak Jermsittiparsert[c,d*], [a,b]Graduate School, Suan Sunandha Rajabhat University, Bangkok, Thailand, [c]Department for Management of Science and Technology Development, Ton Duc Thang University, Ho Chi Minh City, Vietnam, [d]Faculty of Social Sciences and Humanities, Ton Duc Thang University, Ho Chi Minh City, Vietnam,
***Corresponding Author Email:** [c,d*]kittisak.jermsittiparsert@tdtu.edu.vn, [a]rachada.fo@ssru.ac.th

In global perspective, agriculture is emerging as the backbone of the economy. It also reaches strategic importance and is a key resource in providing food to people. The agricultural sector of a developing economy is facing many challenges, due to its low level of knowledge about the latest innovation, with most populations living in rural areas with inefficient farm management and non-supportive government policies (Karamidehkordi, 2010; Pimentel et al., 1992).
Agriculture productivity can be enhanced in Thailand by providing the agriculture extension. The knowledge and adoption of the latest technologies boosted up by extension services, agriculture research activities, modern agriculture technologies information and government policies. The aim of this study is to show how agriculture extension is influenced by the extension services. Agriculture research activities, modern agriculture technologies information and government policies balance the relationship between agriculture extension, extension services, agriculture research activities and modern agriculture technologies information. The study is descriptive and quantitative in nature. The data for the present study is collected from small- and medium-scale farmers in Thailand by using self-administered questionnaires. Three questionnaires were distributed in small villages by using simple random sampling technique. Out of 300 questionnaires, 270 questionnaires were returned by the respondents. The study is cross sectional in nature and data is collected from respondent in one point of time. The smart PLS has been used for data

analysis. The finding of the study shows that all the hypotheses are accepted and shows the positive and significant results for furthering the agriculture extension. The findings revealed the research activities as a strong predictor for the agriculture extension, and government policies played a significant mediation role. Further discussion, limitation and future direction of the study is also discussed at the end of the study.

Key words: *Agriculture extension, extension services, agriculture research activities, modern agriculture technology information, government policies.*

Introduction

In most nation-states, agriculture is the backbone of the whole economy. Over the past years it has arisen with superior potential and provided a major source of income for the world. Almost 50% of the world population's income depends upon agriculture (Abdullah, Gillani, Naveed, Amanullah, & Kashif, 2005; Pimentel et al., 1992). Agriculture, in any country, directly and indirectly supports the population by providing food. Moreover, agriculture plays a vital role for development and growth in many developing countries. Further, agriculture is crucially important for reducing the poverty ratio and has stimulated the economic growth of countries. In a developing economy, there is still a need to develop the latest technologies in the agriculture sector. In Thailand, the agriculture sector needs more improvements because the farmers of Thailand remain poor and in debt (Jermsittiparsert, Sriyakul, & Rodoonsong, 2013; Rangsipaht, Saengchan, & Parnuwad, 2013).

Agriculture extension can play an important role in agriculture development. For improving the agriculture productivity, agriculture extension is the group of institutes that solve the problems of farmers by transferring knowledge, skill and education in the latest technologies. Therefore, there is a need to develop agriculture extension in order to boost agriculture production and development (Ngongo, 2016). In developing countries there is a need to develop the new agriculture technologies for solving the problem of lower agriculture productivity. For instance, there is a need for propagation of these technologies to farmers for adoption also for increasing the agriculture productivity (Luvanda, 2015; Mapila, 2011). According to Ngongo (2016), "Extension services are all sets of actions by agricultural government organizations and their employed personnel that supports and facilitates people engaged in agricultural production activities (farmers) in order to solve existing agricultural problems through the process of passing information, skills and knowledge to them." The personnel of extension services work as a middle party between farmer and research centres.

The adoption of agriculture extension depends on information about the latest technology. Farmers are not easily willing to change the process of agriculture production; but they are more willing to change if they have more information about modern technology.

It is processed and useful information that conveys the meaning of scientific research to the farmers (Toborn & Harvesting, 2011). In the agriculture sector, development of the extension services and agriculture extension is an imperative strategy (Atsan, Isik, Yavuz, & Yurttas, 2009). Agriculture research activities can be conceptualized under this study as "agricultural research activities include all the agricultural scientific processes and procedures whose sole aim is to produce new agricultural technologies, practices, services and products to facilitate improved agricultural production among farmers and those in the agricultural sector". It is one of the important factors to innovate the latest technologies in the agriculture sector (Ngongo, 2016). Government policies support the farmers in getting the latest knowledge and implementing the latest technologies to improve the productivity of the agriculture sector. Government policies are considered to be legal rules that are implement by the government on farmers. Thus, the government takes initiatives to boost the confidence of farmers towards the latest technologies (Boonyanam, 2016, 2018) .

The purpose of the current study is to examine the role of extension services, modern agriculture technology information, agriculture research activities and government policies on the agriculture extensions. Based on the above purpose, the following are the research objectives for this study:

1. To determine the influence of extension services on agriculture extension by the farmers.
2. To establish the influence of agriculture research activities on agriculture extension by the farmers.
3. To examine the influence of modern agriculture technologies information on agriculture extension.
4. To determine the influence of government policies on agriculture extension by the farmers.

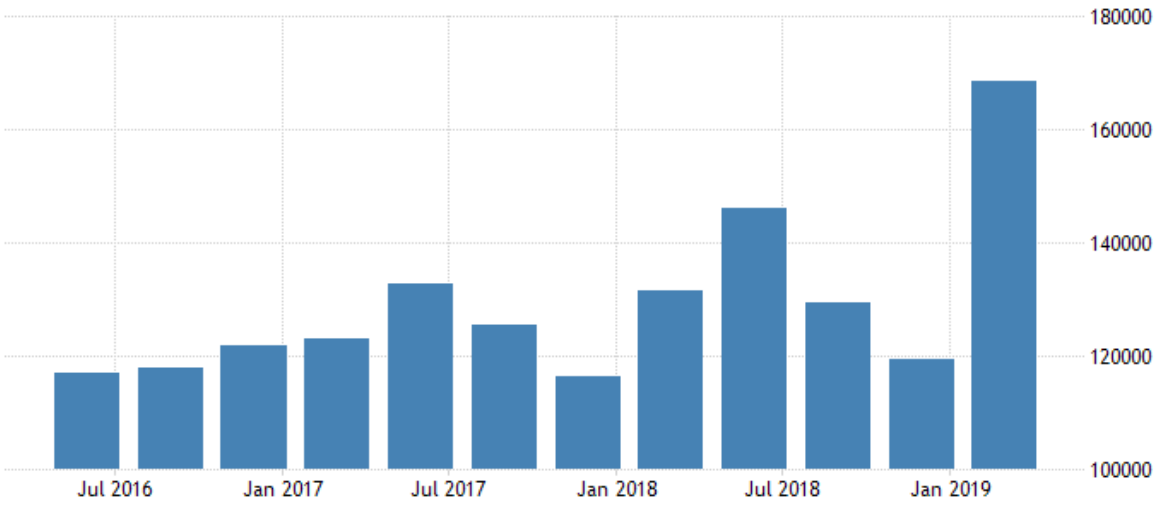
Based on above research objectives the following are the research questions for this study:

1. How do extension services influence the agriculture extension?
2. To what extent does agriculture research activities influence the agriculture extension?
3. How does modern agriculture technologies information influence agriculture extension?
4. Do the government policies influence the agriculture extension?

The literature review of all variables that affect the agriculture extension such as extension services, agriculture research activities, modern agriculture technologies information and government policies are discussed in the following section. Further, after discussing the

literature of variables, the research framework, methodology of the study and findings of study and practical implication and future direction will be discussed.

Figure 1. The Figure 1 shows the Thailand GDP from agriculture. GDP from Agriculture in Thailand increased to 168442 THB Million in the first quarter of 2019 from 119237 THB Million in the fourth quarter of 2018. It shows the importance of agriculture extensions in Thailand.



Source: Economics (2019)

Literature Review

Agriculture Extension

The agriculture extension can be conceptualized as the group of institutes that helps and accelerate people involved in agriculture production (Farmer) to solve the problem and gain knowledge, skill, familiarity with technologies to improve their productivity (Anderson, 2007; Birner et al., 2009; S. M. Hashemi & Hedjazi, 2011). Also, the purpose of agriculture extension is to transfer the latest information and knowledge to farmers, that is, getting from the global and local research base and providing this information to the farmers. By getting latest information, educating them about their goals and better decision making this sheds light on their goals and stimulates agriculture development by enhancing former latest knowledge (Anderson 2004; van de Bar and Hawkin 1996). Similarly, agriculture extension plays an important role for spreading knowledge and technologies among the farmers and works as primary vehicles for development of agriculture sector (Allahyari, 2009; Kidd, Lamers, Ficarelli, & Hoffmann, 2000; Umali-Deininger, 1997).

Additionally, it is one of the important parts of international agendas as agricultural extension is an amenity or structure which helps farm individuals through instructive systems

to improve cultivating strategies and methods, incremental generation proficiency and income, better degrees of living and lift the social and instructive principles of agriculture and rural life (Maunder, 1973). According to Mahaliyanaarachchi and Bandara (2006) it can improve the procedure of rural advancement, living states of farmers and their relatives by expanding the gainfulness of their cultivating activities.

Extension services

Extension services can be conceptualized as an organized system that encourages and empowers farmers, different associations and those in the marketing of the agricultures products to access agriculture learning and data about the market and cultivating abilities. It encourages the farmers' association with other real accomplices in farming exploration, farming education, and agribusiness (Christoplos, 2010). Agriculture productivity depends on the structure of soil and water irrigation, but people today now consider the importance of extension services. It also plays a crucial role. The older people are less involved in extension services because they don't want to change their lifestyle. The literacy rate of these people is less so they are more conservative and don't want to apply any new extension services in their farming. So it can be considered that due to that type of the problem, the agriculture productivity is low in most of the developing countries (Atsan et al., 2009; Ilevbaoje, 2004; Ragasa, Berhane, Tadesse, & Taffesse, 2013; Umeta, Lemecha, & Mume, 2011).

Extension services should be a connector and facilitator connecting the farmers to the agriculture specialist researchers at agriculture research centers and higher-level agriculture educational centers (Agbarevo, 2013). Further, extension training cultivates group development among farmers for sharing expansion data, extension trainings and similarly encouraging agriculture marketing by connecting farmers to business sectors and furnishing farmers with data on where they can sell their production. As of now, within the local communities, extension services also observe and assess the food security issues and evaluate system of agriculture production (USAID, 2002). Extension services depend on three factors namely: access to extension services, frequency of the extension services and extension training approaches.

Modern Agricultural Technologies Information

Modern agriculture technologies information considered as "processed data that conveys useful and understandable meaning about scientifically researched and derived agricultural practices and products, once accessed by farmers' agricultural technologies information can be used by the farmers to make a decision to adopt any given technologies". Modern agriculture technologies information depends on two factors, that is, access to modern agricultural technologies information and agricultural technologies information sources and

communication channels (Ngongo, 2016). For adopting any modern technology there is a need of information and knowledge about advance technologies and benefits of that technology for taking better decision and choices. The farmers can adopt the technology easily if the farmers have enough information about the technologies therefore, access and availability of worthwhile information is very dire (Langat et al., 2013; Umeghalu, Okonkwo, & Nwuba, 2012).

Whether modern technology information is adopted depends on basic three factors. Firstly, the farmer must admit that the advancement or technology exist, secondly the farmer realizes that the innovations are gainful whenever adopted and ultimately the farmer must see how to apply the information about the innovation successfully on his homestead during the adoption procedure. Accordingly, there must be a smooth stream and access to information from the accessible information sources to the farmers through successful and productive correspondence channels. Productive correspondence is encouraged by the presence of powerful correspondence channels. Correspondence channels encourage the passing of information to the farmers inside a network arrangement to impact learning and evaluation of the innovations accessible to the farmers during the adoption procedure (Akudugu, Guo, & Dadzie, 2012; Anaeto et al., 2012; Toborn & Harvesting, 2011).

Agricultural Research Activities

Agriculture research activities "includes all the agricultural scientific processes and procedures whose sole aim is to produce new agricultural technologies, practices, services and products to facilitate improved agricultural production among farmers and those in the agricultural sector." Agriculture research activities depend on three factors such as: dissemination of agriculture research products and services, access to agriculture research products and services and access to agriculture research centers. Agriculture research practices on the planet are mostly attempted by government-supported agriculture research centers and establishments. Other private enrolled organizations additionally attempt and encourage some agriculture research practices in the nation (Ngongo, 2016). Moreover, the agriculture research is not different from the use and dissemination of technologies to the farmers. In Thailand, the Department of Agriculture (DOA) is responsible for farm modernization research. Also, the Department of Agriculture Extension (DOAE) is responsible for the transfer of latest technology (Skerritt, 2015).

Government Policies

Langat et al. (2013), explained that the agriculture extension mostly depends on the number of features which fall into three major categories namely as social, economic and institutional. The economic factors involved land size and cost and benefit of extensions. The

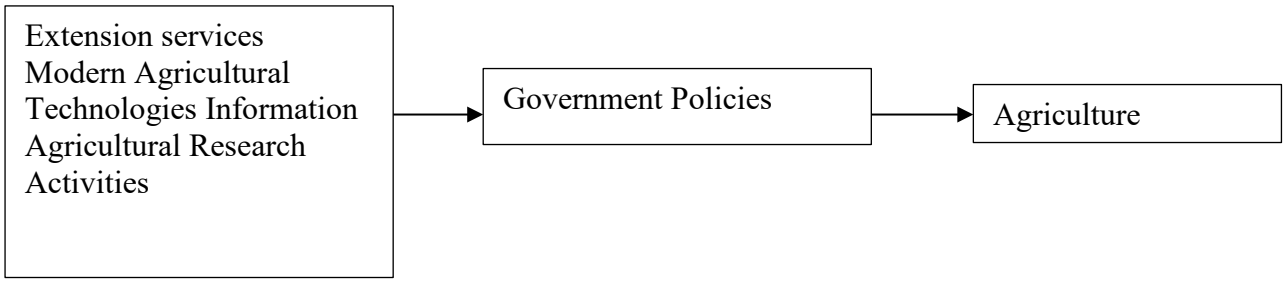
social factors included age, gender and grouping. The institutional factors included the influence and determination of modern technologies, it included access to information about the innovation of agriculture extension through the current and open information sources, nature of policies and provision sanctioned by the government administration and access and nature of the extension service provided. The agriculture extension depends highly on the government policies. The farmers cannot adopt technology and change the production process until the government policies support it. The government policies must not create any hinderance for adaptation of new technologies by the farmers (Ngongo, 2016).

The government of Thailand makes some policies for agriculture to enhance the agriculture productivity. The Thai government Department Agriculture Economic Zone set the policies for agriculture sector. Moreover, the agriculture economic zone policies can be contradicted by the other government sector and this hinders the productivity of agriculture sector. The government should be make supportive agriculture practices that do not create any barrier for enhancing productivity by using latest methods (Boonyanam, 2016, 2018).

Theoretical Model and Hypotheses

The purpose of current study is to examine the entrepreneurial intentions and factors that affect the entrepreneurial intentions. On the bases of the above literature, the following are the hypotheses of study:

H1: There is significant relationship between extension services and agriculture extension.
H2: Agriculture research centers has a significantly relationship with agriculture extension
H3: There is significant relationship of modern agriculture technological information with agriculture extension.
H4: There is significant relationship between extension services and government policies.
H5: An Agriculture research center has significant relationship with government policies.
H6: There is significant relationship of modern agriculture technological information with government policies.
H7: Government policies are significantly associated with agriculture extension.
H8: There is significant relationship between extension services and agriculture extension mediated by government policies.
H9: There is significant relationship between agriculture research activities and agriculture extension mediated by government policies.
H10: There is significant relationship between modern agriculture technologies information and agriculture extension mediated by government policies.



Methodology

The current section of the research paper discusses the research method adopted. The purpose of the present study is to examine the influence of the extension services, modern agricultural technologies information and agricultural research activities on the agriculture extension. Further the mediation role of the government policies has been considered between independent and dependent variables.

The study is quantitative and descriptive in nature and follows the positivism philosophy. The population covers the small farmers in Thailand as the majority of them are small scale farmers (FFTC Agriculture Policy Platform, 2014).
As it is not possible to cover the whole population, for the convenience a small set of the population was selected which is called sample and represent the whole population. The sample size for the present study was selected by using the thumb rule (Hair et al., 2010). As per the rule the number of questions in a measurement are to be multiplied with 10. The outcome will be the sample size. The total questions are 30. Thus, as per the formula the sample size is 300. Other researchers such as Oke, Ogunsami, and Ogunlana (2012), recommended that the sample size should be between 200 to 400 respondents. The maximum sample size in Krejcie and Morgan (1970), table is 384. Hence, the sample size for the present study fits with the proposed sample size of different techniques.

Primary data has been collected and the data collection measuring instrument that has been used entertained the demographic and variable related questions. All the measures were adopted from the previous studies. Extension services were measured by five items (Hashemi & Nadi, 2012), modern agricultural technologies information was measured using five items, agricultural research activities was measured by using six items, government policies was measured by using eight items and agriculture extension was measured by using six items (Ngongo, 2016). Data was collected from the small and medium scale farmers. Data collection time lapse was almost one month. Smart-PLS has been used for the data analysis. The next section elaborates the detailed results of the present study.

Table 1: Results Confirmatory Factor Analysis

Constructs	Items	Loadings	Alpha	CR	AVE
Agriculture Extension	AE1	0.73	0.844	0.885	0.562
	AE2	0.726			
	AE3	0.754			
	AE4	0.758			
	AE5	0.731			
	AE6	0.797			
Agriculture Research Activities	ARA1	0.806	0.773	0.857	0.605
	ARA2	0.824			
	ARA3	0.575			
	ARA4	0.873			
Extension Services	EX.S1	0.752	0.845	0.89	0.621
	EX.S2	0.876			
	EX.S3	0.778			
	EX.S4	0.853			
	EX.S5	0.663			
Government Policies	GP1	0.881	0.851	0.896	0.638
	GP3	0.605			
	GP4	0.716			
	GP5	0.898			
	GP6	0.855			
Modern Agricultural Technologies Information	MATI2	0.835	0.847	0.898	0.688
	MATI3	0.748			
	MATI4	0.844			
	MATI5	0.885			

First of all, confirmatory analysis was performed. The purpose of this analysis is to assess and establish the validity of the scale used in this study. It is the first step which allows proceeding towards the next analysis step.

Confirmatory factor analysis provided 4 values. The purpose to perform CFA is to confirm the convergent validity which depend upon the loadings, CR and AVE. First of all, loadings value should be greater than 0.5 or 0.7. Previously it is proposed that the loadings less than 0.5 will be deleted from the research model. Same has been followed while doing the analysis. All the items having less loadings than 0.5 are deleted. Table 1 shows that all the values for items loadings are greater than 0.5 which fulfilled the first criterion.

CR and AVE are the other two criteria which must be fulfilled to establish the convergent validity. The value for the CR and AVE must be greater than 0.8 and 0.5 respectively. The values for the CR for the variables namely: agriculture extension, agriculture research activities, extension services, government policies and modern technologies are 0.885, 0.857, 0.890, 0.896 and 0.898 respectively. Thus, it fulfilled the first criterion as all the values are more than 0.8. Furthermore, table 1 pointed out that the values for AVE for the variables agriculture extension, agriculture research activities, extension services, government policies and modern technologies are 0.562, 0.605, 0.621, 0.638 and 0.688 respectively. All the parameters are addressed and thus it is stated that the scale has convergent validity.

Discriminant Validity

Table 2: Fornell and Larckers Criterion

	AE	**ARA**	**Ext. Ser.**	**GP**	**MATI**
AE	0.750				
ARA	0.630	0.778			
Ext. Ser.	0.632	0.503	0.788		
GP	0.768	0.566	0.700	0.799	
MATI	0.647	0.629	0.534	0.544	0.829

Fornell & Larckers Criterion has been used to determine the discriminant validity. It is the most widely used technique for discriminant validity. The values of the AVE square root must be greater than the correlation of the constructs of diagonal. As per the tables all correlations of diagonal constructs are less than the AVE square root which establishes the discriminant validity.

Table 3: Heterotrait-Monotrait Criterion

	AE	**ARA**	**Ext. Ser.**	**GP**	**MATI**
AE					
ARA	0.756				
Ext. Ser.	0.722	0.607			
GP	0.807	0.686	0.796		
MATI	0.758	0.769	0.62	0.644	

Besides the Fornell & Larckers Criterion there is another latest technique available to assess the discriminant validity; which is known as HTMT (Heterotrait-Monotrait Criterion). It also does detect the multicollinearity problem. All the correlation values in the table should be less than 0.85. It is obvious from the table 3 that all the values are less than 0.85 which finally confirms the discriminant validity of the scale.

Table 4: Structural Equation Modelling

Relationships	Beta	SD	t value	p value
ARA -> AE	0.164	0.05	3.307	p<0.05
ARA -> GP	0.228	0.041	5.557	p<0.05
Ext. Ser. -> AE	0.081	0.046	1.738	p<0.05
Ext. Ser. -> GP	0.519	0.041	12.709	p<0.05
GP -> AE	0.491	0.045	10.878	p<0.05
MATI -> AE	0.233	0.043	5.368	p<0.05
MATI -> GP	0.123	0.049	2.525	p<0.05

Table 4 shows the direct relationships between the variables under study. As per the table, research activities are linked with the extension. The association is valued at 0.164 which means that 16% variance in agriculture extension has been explained by agriculture research activities. When the extensive research is carried out in the agriculture domain it will result in newer methods invention which can be used and make the agriculture smoother and better regarding the productivity.

Results also revealed that agriculture research activities are significantly associated with government policies. The relationship is valued at 0.228 and direction is positive. It asserts that the minor change in the research activities will result a change in government policies. When there is extensive research in the agriculture the new methods will be introduced. The research will enlighten the existing problems and also propose a solution to them will ultimately shape the government policies in this regard.

Extension services on of the significant variable in the study found to have an association with the agriculture extension. The relationship is valued at 0.081 and significant. The value is low due to several factors. Anyhow, the extension services provided by the different companies to the farmers results in better understanding about the agriculture extension. Thus, it can be stated that the agriculture extension is predicted by the provision of the services. Furthermore, these services also found to have a link with the government policies. As the government is keenly interested to develop the agriculture sector the current services industry will also influence the government decision making in this regard. The relationship is valued at 0.519. It is the strongest of all and means that a slight change in the extension services will bring about a major change in government policies related to the agriculture extension services.

Government is responsible to manage all the resources in a country. All the industries are directly influenced by the government policies and this is the case with the agriculture as

well. Results of the study showed that government policies do influence the agriculture extension. As per the results, the relationship is much stronger. Any policy by government directly influence it.

Finally, the modern agriculture technologies information found to be associated with agriculture extension positively. The value of the relationship is 0.233. Which means that slight change in MATI will bring about small change in AE. In addition, it also found to be associated with government policies. However, MATI's influence on the AE is stronger in comparison to GP. All the direct hypotheses are accepted.

Table 5: Specific Indirect Effects

Relationships	**Beta**	**SD**	**t value**	**p value**
ARA -> GP -> AE	0.112	0.024	4.698	p<0.05
Ext. Ser. -> GP -> AE	0.255	0.03	8.399	p<0.05
MATI -> GP -> AE	0.061	0.024	2.524	p<0.05

Table 5 shows the results for the mediation between the variables. Government policies is the mediator. As per the table, GP is a significant mediator between agriculture research activities and agriculture extension. It means that the more research will tend to increase the agriculture extension and in presence of a supportive government it will have more significant influence on agriculture extension.

Moreover, results also showed that GO is a significant mediator between association of extension services and agriculture extension. The mediation is valued at 0.255 and is the strongest one among all mediations. It means that extension services will influence the government policies which will finally influence the agriculture extension. Finally, study results also showed GP is a significant intervening variable between MATI and AE. The relationship value is weakest of all. Anyhow the results are significant, so all the mediation hypotheses are accepted.

Discussion

The objective of the current study is to examine the role of agriculture extension and how agriculture extension is influenced by the extension services, agriculture research centers and modern agriculture technologies information. The findings of this study supported the 1st hypothesis that is the extension services have positive and significant relationship with agriculture extension. If the extension services increase the knowledge of farmers about new technologies is also improved, in this way agriculture extension develops. Past research also shows that there must be a significant influence between them (Anaeto et al., 2012; Atsan et al., 2009; Birner et al., 2009; Khanal & Gillespie, 2011; Ragasa et al., 2013). The results of

the study supported the 2nd hypothesis that showed that the agriculture research center has significant positive relationship with agriculture extension by the farmers. The agriculture research activities provide innovative ways of doing production and the group of institutes help the farmers to understand updated research related to agriculture productivity. Previous results also provide support to above mention discussion related to 2nd hypothesis (Ngongo, 2016; Skerritt, 2015). Similarly, the findings show that the modern agriculture technologies information also influences the agriculture extension. Therefore, the 3rd hypothesis of the study is also supported. It is the process information related to latest technologies that can transfer to the farmers about the advancement in production process. The change and adaptation of new knowledge is imperative and easily possible by using the agriculture technology information (Ngongo, 2016; Toborn & Harvesting, 2011). Further, the government policies are of dire importance in agriculture sector extension. The government must make policies that support the extensions in agriculture sector and avoid the policies that hinder its productivity. The findings of the study show that government policies influence the agriculture extension and have significant and positive relationship with agriculture extension. In this way the 4th hypothesis is also accepted and shows the significant influence. The agriculture economic zone of Thailand must have policies that must not be contradicted by the other policies for increasing the productivity of agriculture (Boonyanam, 2016, 2018; Langat et al., 2013).

Limitations and Future Direction

Agriculture is one of the focal parts of the economic growth of countries. Different countries used different methods to improve the agriculture production. The extension of agriculture is one of the crucial factors of agriculture that strongly affects the productivity of developing economies. There are some other factors that influence the agriculture extension such as knowledge about agriculture extension, use of ICT in extension services and trainings about the extension. Further studies should investigate these factors and propose any other meditators that strongly affect the agriculture extension. The study is cross sectional in nature and the data is collected from respondents one single time due to shortage of resources and time. It is suggested that future research should try to eliminate those flaws and do more in depth study by collecting data from same respondents a number of times. The unit of analysis of this study is farmers of Thailand. Future researchers could perform comparative studies with other developing countries such as Malaysia, Indonesia, India and Pakistan to evaluate their agriculture extension and government policies for comparison.

Further, by enhancing the knowledge of farmers through different extension trainings and access of modern knowledge changes the traditional way of farming that reduces the costs and provide benefits to farmers. The government of Thailand also considers the extension trainings and enhances the research activities related to agriculture.

REFERENCES

Abdullah, A., Gillani, W., Naveed, S., Amanullah, K., & Kashif, H. (2005). Computerized farm guide: Using ICT for better dissemination of agriculture extension information. *Center for Agro-Informatics Research, National Univ. of Computer & Emerg. Sci., Islamabad, Pakistan*.

Agbarevo, M. N. B. (2013). Farmers' perception of effectiveness of agricultural extension delivery in cross-river state, Nigeria. *Journal of Agriculture and Veterinary Science, 2*(6), 1-7.

Akudugu, M. A., Guo, E., & Dadzie, S. K. (2012). Adoption of modern agricultural production technologies by farm households in Ghana: What factors influence their decisions.

Allahyari, M. S. (2009). Reorganization of agricultural extension toward green agriculture. *American Journal of Agricultural and Biological Sciences, 4*(2), 105-109.

Anaeto, F. C., Asiabaka, C., Nnadi, F., Ajaero, J., Aja, O., Ugwoke, F., . . . Onweagba, A. (2012). The role of extension officers and extension services in the development of agriculture in Nigeria. *Journal of agricultural Research, 1*(6), 180-185.

Anderson, J. R. (2007). Agricultural advisory services. Background paper for the World Development Report 2008. *World Bank, Washington, DC*.

Atsan, T., Isik, H. B., Yavuz, F., & Yurttas, Z. (2009). Factors affecting agricultural extension services in Northeast Anatolia Region. *African Journal of Agricultural Research, 4*(4), 305-310.

Birner, R., Davis, K., Pender, J., Nkonya, E., Anandajayasekeram, P., Ekboir, J., . . . Benin, S. (2009). From best practice to best fit: a framework for designing and analyzing pluralistic agricultural advisory services worldwide. *Journal of agricultural education and extension, 15*(4), 341-355.

Boonyanam, N. (2016). Agricultural Policy Misspecifcation in Thailand. *SOUTHEAST ASIAN JOURNAL OF ECONOMICS*, 29-57.

Boonyanam, N. (2018). Agricultural economic zones in Thailand. *Land Use Policy*.

Christoplos, I. (2010). Mobilizing the potential of rural and agricultural extension.

economics, T. (2019). Thailand GDP From Agriculture.

FFTC Agriculture Policy Platform. (2014). Economy and Agriculture in Thailand. Retrieved 6 August, 2019, from http://ap.fftc.agnet.org/ap_db.php?id=246

Hashemi, S., & Nadi, H. (2012). Agricultural personnel's intrapreneurial behavior: effects of perceived organizational support, psychological empowerment and entrepreneurial self efficacy. *International journal of agricultural science and research (IJASR), 2*(1), 11-19.

Hashemi, S. M., & Hedjazi, Y. (2011). Factors affecting members' evaluation of agri-business ventures' effectiveness. *Evaluation and program planning, 34*(1), 51-59.

Ilevbaoje, I. (2004). Brief History of Nigeria's Agricultural Extension Service. *The Phase, 1*, 1-21.

Jermsittiparsert, K, Sriyakul, T., & Rodoonsong, S. (2013). Power(lessness) of the State in the Globalization Era: Empirical Proposals on Determination of Domestic Paddy Price in Thailand. *Asian Social Science, 9*(17), 218-225.

Karamidehkordi, E. (2010). A country report: challenges facing Iranian Agriculture and Natural Resource Management in the twenty-first century. *Human ecology, 38*(2), 295-303.

Khanal, A. R., & Gillespie, J. M. (2011). Adoption and profitability of breeding technologies on United States dairy farms.

Kidd, A., Lamers, J., Ficarelli, P., & Hoffmann, V. (2000). Privatising agricultural extension: caveat emptor. *Journal of Rural studies, 16*(1), 95-102.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and psychological measurement, 30*(3), 607-610.

Langat, B., Ngéno, V., Nyangweso, P. M., Mutwol, M., Gohole, L., & Yaninek, S. (2013). Drivers of Technology Adoption in a Subsistence Economy: The case of Tissue Culture Bananas in Western Kenya.

Luvanda, M. W. (2015). *Factors affecting the job perfomance of agricultural extension workers in Handeni District, Tanzania.* Sokoine University of Agriculture.

Mahaliyanaarachchi, R. P., & Bandara, R. (2006). Commercialization of agriculture and role of agricultural extension. *Sabaragamuwa University Journal, 6*(1), 13-22.

Mapila, M. (2011). Rural livelihoods and agricultural policy changes in Malawi *Agricultural Innovations for Sustainable Development* (Vol. 3, pp. 190-195): CTA and FARA Accra-Ghana.

Maunder, A. (1973). Agricultural extension. A reference manual.(Abridged version).

Ngongo, R. N. (2016). Factors influencing the adoption of modern agricultural technologies by small scale farmers: The case of Thika East Sub-County, Kenya. *A Masters Project, Nairobi: University of Nairobi*.

Oke, A. E., Ogunsami, D. R., & Ogunlana, S. (2012). Establishing a common ground for the use of structural equation modelling for construction related research studies. . *Construction economics and building, 12*(3), 89-94.

Pimentel, D., Stachow, U., Takacs, D. A., Brubaker, H. W., Dumas, A. R., Meaney, J. J., . . . Corzilius, D. B. (1992). Conserving biological diversity in agricultural/forestry systems. *BioScience, 42*(5), 354-362.

Ploenhad, J., Laoprawatchai, P., Thongrawd, C., & Jermsittiparsert, K. (2019). Mediating Role of Competitive Advantage on the Relationship of Supply Chain Management and Organizational Performance on the Food Industry of Thailand. *International Journal of Supply Chain Management, 8*(4), 216-226.

Ragasa, C., Berhane, G., Tadesse, F., & Taffesse, A. S. (2013). Gender differences in access to extension services and agricultural productivity. *The Journal of Agricultural Education and Extension, 19*(5), 437-468.

Rangsipaht, S., Saengchan, N., & Parnuwad, K. (2013). Agricultural Extension in Thailand Based on the Viewpoints of an Innovative Thinker, Prof. Rapee Sagarik. *Journal of Developments in Sustainable Agriculture, 8*(1), 41-48.

Skerritt, J. (2015). Research organizations of the world: Asia-Pacific, Central-South America, and Africa-Middle East.

Toborn, J., & Harvesting, R. W. (2011). Adoption of agricultural innovations, converging narratives, and the role of Swedish agricultural research for development. *Unpublished discussion paper*.

Umali-Deininger, D. (1997). Public and private agricultural extension: Partners or rivals? *The World Bank Research Observer, 12*(2), 203-224.

Umeghalu, I., Okonkwo, J., & Nwuba, E. (2012). Modern technologies and Nigerian's small scale farmers: constraints and prospects of its adoption. *Scientific Journal of Agricultural, 1*(4), 68-73.

Umeta, G., Lemecha, F., & Mume, T. (2011). Survey on women access to agricultural extension services at selected districts of Mid Rift Valley of Ethiopia. *Journal of agricultural extension and rural development, 3*(3), 51-63.