

Levels of involvement and understanding in agriculture: The case of Bintulu, Sarawak, Malaysia

Izzah AH¹, Wan Asrina WY²

^{1,2}Department of Crop Science, Faculty of Agriculture and Food Sciences, Universiti Putra Malaysia Bintulu Sarawak Campus,, Bintulu, Sarawak, Malaysia

Abstract

Agricultural activities are usually considered as sustenance which dominate rural farm areas and solely support household consumption. The purpose of this study is to investigate the types of agricultural activities by Bintulu residents and to understand their comprehension of agriculture. The data presented in this paper focuses on the basic understanding of respondents on agricultural sectors through the distribution of questionnaires at an agricultural event. Our findings indicated that the majority of respondents were male (59.9%), obtained SPM level education (30.7%) and 64.4% participated in agricultural activities in their home. This finding showed that most agricultural activities support their vegetable consumption and to provide income to support household expenses. Their activities are also limited to small acreages of available land for cultivation which focuses on limited soil near their houses with limited profit (<RM1, 000). Hence, these findings may provides significant findings for establishing an approach to help these farmers.

Keywords: agriculture, Borneo, education, literacy, Sarawak, sustenance

1. Introduction

Agricultural activities were necessary for most of human history. It may be used for sustenance, a hobby or commercialisation activities. The importance of agriculture is not only to supply adequate food but also to generate income (Aliber and Hart, 2009; Seng, 2015; Sibhatu and Qaim, 2017) ^[1, 2, 3]. Accordingly, profit gained from the agriculture sector has been reported in Malaysia from 2009 to 2013 (Noraniza, 2016) ^[4]. This indicates good growth of this industry even through it is only a small-scale production. Most countries around the world have highlighted the importance of this activity to support household consumption and to improve their welfare (Onakuse, 2012; Zhong *et al.* 2013; Vlad, 2014; Sibhatu and Qaim, 2017) ^[3, 5, 6]. This activity helps rural farmers to earn extra income to cover their expenditure such as groceries, children's education and utility bills. Commonly, agricultural activities in rural areas were dominated by females rather than males because males tend to join the workforce for a stable monthly income. Adding to this, Chen *et al.* (2019) ^[7] found that most males have a brighter future in accessing the workforce rather than females as they can easily join any type of labour work. Women are mostly represented by housewives that live in rural areas and tend to grow vegetables as sustenance and help the males to support the family.

There are several problems that made agricultural activities less profitable, such as limited land availability, high cost of production and limited knowledge. Limited land availability also causes major implications to agriculture. The majority of rural farmers have less than 1 ha of land (Malaysia's Open Data Portal, 2019) ^[8]. Their land comes with housing which leaves limited land space to be used for agriculture. Other than the problem of land availability, limited resources such as high-quality seeds, tools, fertiliser and other related agricultural requirements are also limited. Findings by Das (2015) ^[9] also revealed that the land size,

fertiliser and educational status have a positive relationship on the income of farmers. This is why most farmers in rural areas tend to cultivate and sustain crops only for sustenance due to limiting factors. According to Abdul Nasir and Norliza (2015) ^[10], those problems can be resolved through giving adequate funding and providing substantial agricultural courses and incentives. Moreover, lucrative profits in agriculture may provide more incentive to the other farmers to elevate their interest in cultivating crops. Research by Drakel (2012) ^[11] and Hilmanto (2012) ^[12] emphasised that a major contributor to the agricultural sector is a focus on commodity prices. As the prices increase, this substantially covers their expenses in agricultural activities, leading to a higher tendency of farmers cultivating crops.

One of the obstacles that exists in the agricultural sector is that the sector is mainly ventured by the older generation, specifically being dominated by >45 year old farmers (Drakel, 2012; Susilowati, 2016; Ansong Omari *et al.* 2018) ^[11, 13, 14], as the younger generation is more interested in working in a more conducive environment with stable income. Moreover, the older generation applies old agricultural knowledge or relies on indigenous knowledge which is unprofitable compared to the recommenced practises by local agricultural authorities. This has been supported by other studies on age gaps between the farmers which limit the potential of this industry (Drakel, 2012; Susilowati, 2016) ^[11, 13]. However, Dian *et al.* (2016) ^[15] in their research highlighted that education affects production of agriculture compared to age gaps among farmers, while Susilowati (2016) ^[13] pointed out that high risk of agricultural activity also limits the potential involvement of the younger generation. This can be explained through unpredictable commodity price and climate change which may increase the loss of potential crops.

Most rural farmers search for aid to help their agriculture activity even though they are not intentionally cultivated for

commercialisation. The main type of aid was fertiliser as this helps in increasing their productivity and habitual conceptual (Yang and Fang, 2015; Echoh *et al.* 2017) ^[16, 17]. Searching for aid to help develop their land for farming also plays a major role in establishing agricultural land. Due to limited education, farmers may commit to false aid or subsidies information and suffer from miscommunication between themselves and subsidies agencies. This has been pointed out by Echoh *et al.* (2017) ^[17] in their research on paddy cultivation which emphasises on how the lack of education sometimes limits the potential of subsidies to be used by the farmers. This has contributed to wastage of subsidies or may contribute to other problems such as environmental issues or degradation of soil fertility.

Due to illiteracy problems, gathering outsourced information from the internet is also restricted among farmers. In some cases, the farmers tend to misunderstand or even misuse the information published online. According to Watti and Tiwari (2015) ^[18], only 6.25% of their respondents have the ability to access to internet based on middle educational backgrounds. Reasons attributed to this limited access was limited internet coverage to certain areas and websites published in foreign languages (e.g. English). However, those who completed their tertiary education may find the internet as an alternative to solve their problem.

Lack of education also contributed to the lack of interest among farmers and potential farmers to seriously take agriculture as a commercial activity (Dian *et al.*, 2016) ^[15]. According to Oduro-Ofori *et al.* (2014) ^[19], education plays important roles in agriculture, as lack of education or education below secondary level tends to lead to literacy problems. This kind of problem may lead to lower agricultural productivity, leading to less favourable conditions to cultivate a crop into commercialisation. This finding is also supported by Padhy and Jena (2015) ^[20] and Alene and Manyong (2007) ^[21] who focus on the importance of education to ensure rural farmers have a better understanding of agriculture and the successful adoption of better agricultural techniques and technologies. All related agricultural activities will improve their production and therefore improve their family economy. This can be seen through their understanding of basic agricultural practices such as chosen crop variety, soil fertility and farm management. Inadequate land also limits the potential of the industry to grow due to limited availability of land that is dense with development of houses, factories and other related buildings.

The increasing population of the world indeed needs to be addressed by consequently increasing agricultural activities.

The purpose of this study is to examine the understanding and tendency to participate in agricultural activities with possible respondents populated in Bintulu, Sarawak. Consequently, this study addresses two objectives: (1) to investigate the type of agricultural activities practiced by Bintulu residents and (2) to understand their comprehension of agriculture.

2. Materials and methods

This study was conducted at a one-day program organised by Universiti Putra Malaysia Bintulu Sarawak Campus during the University Agriculture Park Division’s open day on 28th November 2018. A total of 250 questionnaires were distributed to the respondents and 202 were returned. The respondents were randomly selected and informed that their participation was voluntary, and all the information would be kept confidential. The questionnaires were segmented into four main parts according to the research objectives. Section A focused on demographics such as gender, age, marital status, level of education and occupation, section B focused on their agricultural involvement, section C focused on their tendency to get expert’s advice on aids/subsidies or advice and section D focused on respondent’s understanding of agriculture through site visiting at any model farms and internet use. All collected data were analysed using Statistical Package for Social Sciences (SPSS) version 23.0.

3. Results & Discussion

3.1 Demographics

The percentage of male and female respondents involved in the survey are 59.9% and 40.1%, respectively (Table 1). Respondents aged between 41-60 years old made up the majority with 41.6% followed by the 19-30 year olds, 31-40 year olds, 60-70 year olds, respondents less than 18 and those older than 71 years old. In terms of marital status, 77.2% of the respondents were married and only 1.5% were divorced. Only 21.3% of respondents who joined this survey were single. It is noted that 30.7% of respondents have SPM education background, followed by diploma (21.8%), others (16.3%), Bachelor’s degree (11.9%), SRP/PMR (10.9%), certificates (5.4%), UPSR (2.5%) and STPM (0.5%). About 31.7% of respondents stated their occupation as “others” as subjected to unknown self-reasoning. Most of the respondents declared their occupations as “police”, “labour”, “factory supervisor” and “clerk” in the “others” section. However, 18.3% of respondents were housewives and actively supported their partners by generating side income through small businesses such as online business and selling local vegetables.

Table 1: Demographic information of respondents

Items	Information	N (202)	%
Gender	Male	121	59.9
	Female	81	40.1
Ages	≤ 18	2	1.0
	19 – 30	54	26.7
	31 – 40	34	16.8
	41 – 60	84	41.6
	60 – 70	25	12.4
	≥ 71	3	1.5
Marital status	Divorced	3	1.5
	Married	156	77.2
	Single	43	21.3
Level of education	UPSR	5	2.5

	SRP/PMR	22	10.9
	SPM	62	30.7
	STPM	1	0.5
	Certificate	11	5.4
	Diploma	44	21.8
	Bachelor	24	11.9
	Others	33	16.3
Occupation	Entrepreneur	9	4.5
	Housewife	37	18.3
	Professional	18	8.9
	Retired	17	8.4
	Student	29	14.4
	Teacher	24	11.9
	Unemployed	4	2.0
	Others	64	31.7

3.2 Involvement in agricultural activities

An analysis was made on the agricultural involvement patterns among the sampled respondents. According to Fig. 1, 64.4% of respondents are involved in agricultural activities in their daily life. From that group, only 38.8% (52) had declared that the activity was meant for sustenance while 38.1% (51) were involved in agriculture as a hobby. Only 20.1% (27) of respondents were seriously committed to their involvement in agriculture as a business venture or for commercialisation, while only 3.0% ventured into

agricultural activities following trends such as cultivating figs, strawberries and other seasonal crops. This finding also showed the most common farm acreages owned by respondents was <1 ha (46.6%) which supported their purposes in agricultural activity as a means for sustenance, followed by 1-5 ha, 5-10 ha and >10 ha. More than half of the respondents generated monthly profits of <RM10,000 (66.4%). 23.4% which owned >10 ha of farmland decided not to declare their monthly income.

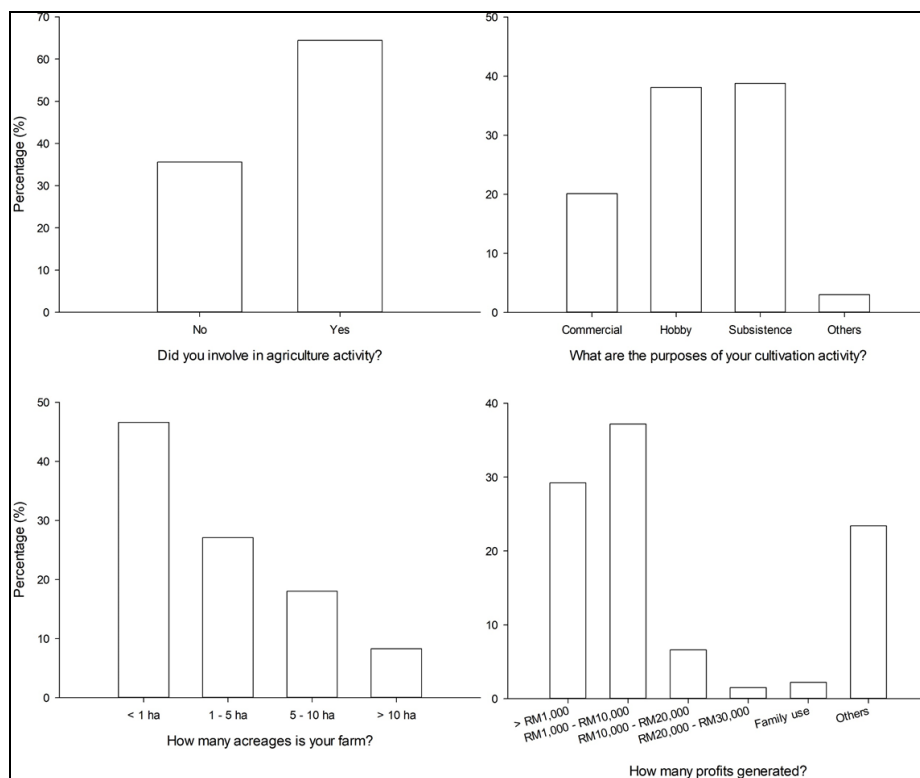


Fig 1: Background of agricultural preferences

This study revealed that agricultural activities performed in Bintulu was more on for sustenance and as a hobby. This research also indicated that most of the agricultural activities are led by females compared to males, similar to research by Diiro *et al.* (2018) [22] and Doss (2018) [23]. Even though the survey respondents were mostly male (59.9%), their involvement in agriculture was only on a commercialisation scale. Most of the male respondents primarily worked in non-agricultural industries to earn a stable monthly income to support their families. According

to Chen *et al.* (2019) [7], males may easily access the workforce industry rather than females. This provides an explanation for our study which has similar findings to other studies in terms of gender preferences. Since the agricultural activities mostly focus on sustenance and as a hobby, most of the farm acreages were less than 1 ha (46.6%). This limited farm size is often used to supply basic vegetables for family consumption continuously and is easily manageable among female farmers. These findings were also supported by other researchers who discovered the tendency of

subsistence agriculture to support household food supplies in Southern Africa (Aliber and Hart, 2009) [1], Africa (Sibhatu and Qaim, 2017) [3] and Indonesia (Syuaib, 2016) [24]. Excess supply of vegetables from their farm will be sold at the nearest market to generate income for buying other household supplies such as rice, cooking oil, flour and eggs. This result was comparable with the monthly income recorded in this study, which was less than RM1,000.00/month. However, 23.4% (others) decided not to declare their income as they generally generate more than RM30,000/month, notably respondents with acreages of more than 10 ha (8.3%) and those who participate in commercial agriculture (20.1%).

3.3 Approaching expert’s advice

Seeking expert advice regardless if it is from government or non-government agencies on agriculture management and problems was unfamiliar among respondents. This fact was evident where 50.8% of respondents have never consulted or asked any agricultural experts for advice. Meanwhile, those who actively seek advice from experts (49.2%) have shown 91.3% success in crop and livestock productivity and farm management. Only 8.7% have indicated that they gained no positive results from the help and aid obtained from the experts. Meanwhile, most of the respondents get fertiliser (41.0%) as the main type of aid followed by other types of aid (31.7%).

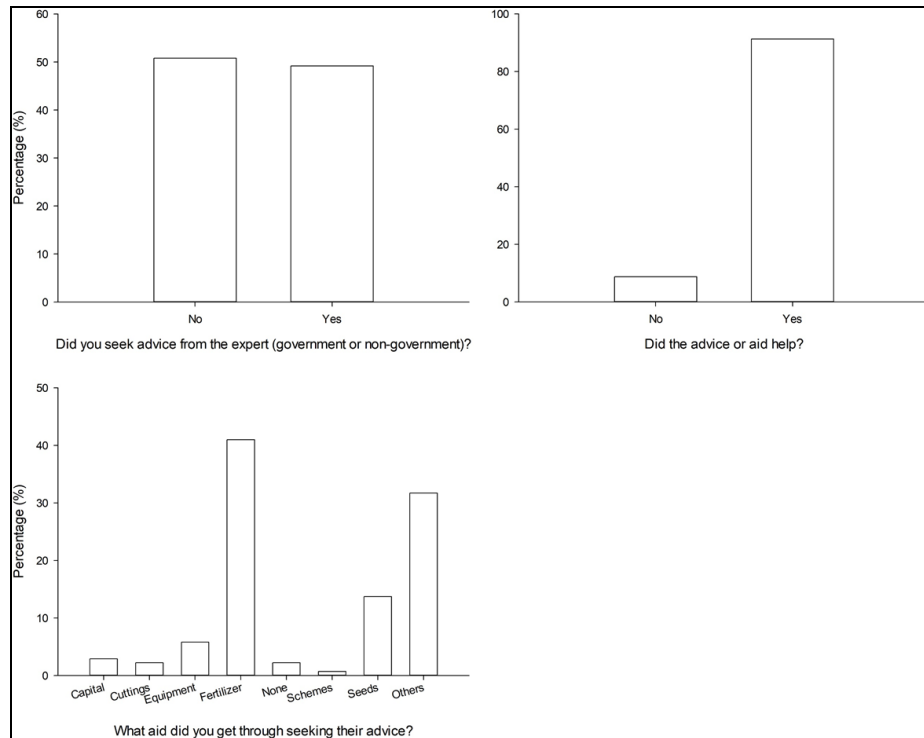


Fig 2: Preference for seeking advice from the experts

This study revealed that the tendency of agricultural activity in Bintulu was mostly for sustenance and as a hobby. Therefore, the intention of seeking or not seeking for agricultural advice among respondents was equal. The main reason that contributed to not seeking advice was the respondents feeling timid and embarrassed to meet the experts. This may relate to the background of the respondents where the majority had SPM level education (30.7%) and only focused on sustenance and hobbies. This finding was similar to Khapayi and Celliers (2016) [25] who reported that most of the farmers in rural areas rarely get tertiary education and thus have limited knowledge. Due to this problem, most of the farmers were only interested in cultivation to cover their expenditures. Based on the results in Fig. 2, 91.3% of respondents believe the advice and aid provided by government and private agencies helped their agricultural activities. Most of the respondents revealed, that aid such as fertiliser (41.0%) was always essential for them together with other types of aid (31.7%). This includes advice in managing disease, pesticide and herbicide aid, water storage aid and tools for farming activities. However, even though the aid may improve respondents’ welfare, it does not improve their total household income (Zhong *et al.*, 2013) [6]. Meanwhile, 8.7% reported that the aid and

advice didn’t help in their agricultural activities. Some of the main reasons leading to unsuccessful aid and advice may be the inability of the respondents to clearly describe their problems related to agriculture production and being unable to meet the basic requirements under some government schemes, such as small farming areas or growing crops other than national commodities or food crops.

3.4 Understanding of agriculture

To understand their comprehension of agriculture, an analysis of their preferences and knowledge related to agriculture was conducted. 58.5% had previously visited successful agriculture farms and used it as a model for information and farm operation. Based on their visit, most of the respondents acknowledged and believed the visited farm was productive because of several factors such as the type of crop in the area (32.1%), soil type (27.0%), land type or topography (18.9%), fertiliser used (16.4%) and others (5.7%). “Others” (5.7%) includes drainage and irrigation systems and high quality of fertiliser including foliar. Other than visiting a successful farm as a role model, 53.8% actively use the internet to search for information related to agriculture. Most of them (94.8%) showed positive impressions on using the internet to help them

solved specific problems such as disease and crop and soil management. The rest (5.2%) believe that the source of

information was unreliable.

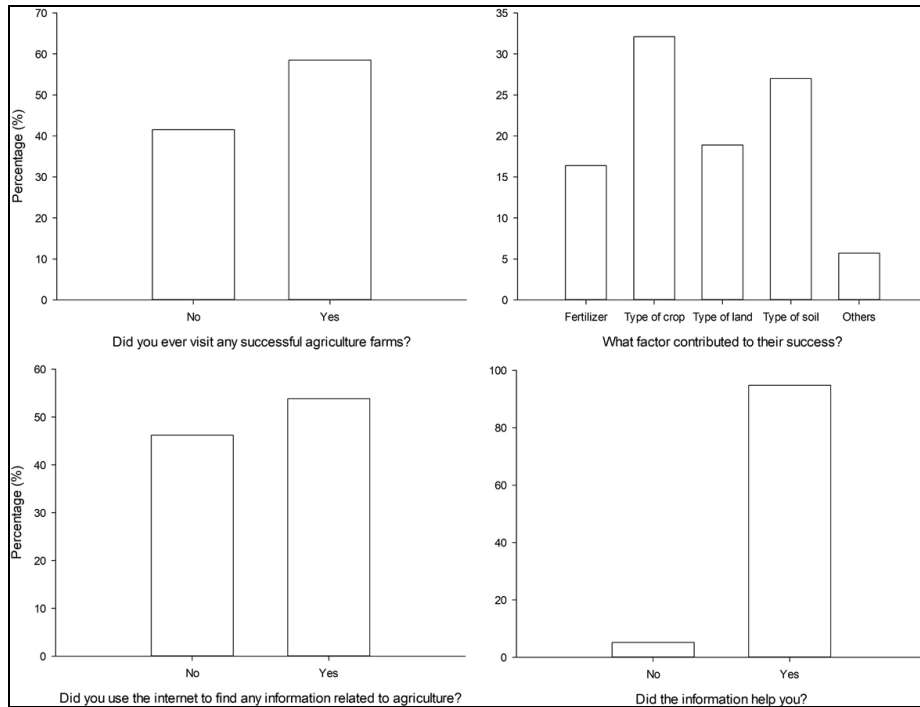


Fig 3: Understanding of agriculture based on observation and self-learning

On top of that, 58.5% of the respondents also revealed that they had visited a role model or successful farms to be their references or guidance. Based on the respondents’ observation, they often classified type of crop (32.1%) as a significant contributor to the success of the farms. Respondents also reported that crops such as oil palm might be easily cultivated compared to black pepper. This may be attributed to indigenous knowledge present in the family which believe the type of crop and soil may affect their crop growth (Ansong Omari *et al.*, 2018) [14]. Accordingly, indigenous knowledge carried by respondents may eventually support agriculture production security and has been proven by research conducted in West Sumatera, Indonesia. Instead of visiting a successful farm, respondents’ tendency to use the internet to search for information related to agriculture was also recorded. Based on the data presented in Fig. 3, 53.8% of respondents use the internet to seek for information related to agriculture while the rest of the participants (46.2%) never use the internet. This interesting finding indicates that most of the respondents rely on indigenous knowledge rather than well-known knowledge published on the internet or advice from experts. This finding may have a close relationship with respondent ages, with the majority of respondents falling within the 41 to 60 year old category (41.6%). Most of the respondents older than 50 years old were uninterested in using the internet as they have a problem with computer literacy. Our results were also supported by Ajani and Agwu (2012) [26] who stress on the problem with computer literacy in obtaining information related to agriculture as grouped by ages and capability to own electronic devices. Lastly, 94.8% of the information gathered from the internet helped the farmers in selecting fertiliser, pesticide, managing nutrient deficiencies and identifying pest and disease symptoms. However, 5.2% of respondents indicated that the information gathered from the internet didn’t solve their

problems and sometimes caused other serious problems.

4. Conclusions

The main agricultural activities by respondents in Bintulu, Sarawak mostly concentrated on sustenance due to limited land availability and lack of education which has restricted their potential to explore and understand agricultural knowledge. Most of the agricultural knowledge was gained from agriculture-based websites which is sometimes impractical for the farmers. Therefore, this may be used to serve as a baseline guide for anyone who would like to extend agricultural activities to rural farmers by using specific approaches such as designing a good program by extension officers in the future.

5. Acknowledgments

The authors would like to thank all the students of Diploma in Agriculture, Universiti Putra Malaysia Bintulu Sarawak Campus who enormously helped in distributing and collecting survey forms. Also, thank you to all the staff of University Agriculture Park Division (TPU) for all the facilities given and the opportunity to conduct this survey.

6. References

1. Aliber M, Hart TG. Should subsistence agriculture be supported as a strategy to address rural food insecurity?. *Agrekon*. 2009; 48(4):434-458.
2. Seng K. The effects of nonfarm activities on farm households’ food consumption in rural Cambodia. *Development Studies Research*. 2015; 2(1):77-89.
3. Sibhatu KT, Qaim M. Rural food security, subsistence agriculture, and seasonality. *PloS one*. 2017; 12(10):1-15.
4. Noraniza Y. Analysis on cost and profit in farming activity in Malaysia. *Modern Accounting and Auditing*. 2016; 12(4):183-207.

5. Onakuse S. The future of subsistence agriculture in the rural community of Uzanu, Edo state, Nigeria. *Journal of Agriculture, Food Systems, and Community Development*. 2012; 3(1):61-71.
6. Zhong C. Chen S. Xiao Q. A case study of the effectiveness of agricultural subsidies policies: Theory and evidence from Huangpi District, Hubei, China. *Journal of Economics and Development Studies*. 2013; 1(2):1-18.
7. Chen X. Chen J. Huang CY. Too risky to focus on agriculture? An empirical study of China's agricultural households' off-farm employment decisions. *Sustainability*. 2019; 11(3):1-18.
8. Malaysia's Open Data Portal. Information on Agricultural Land Use in Sarawak. Department of Statistics Malaysia, 2019.
9. Das P. Problems of rural farmer: A case study based on the Lowphulabori village under the Raha Block development area of Nagaon district, Assam. *IOSR Journal of Humanities and Social Science*. 2015; 20(1):40-43.
10. Abdul Nasir AR. Norliza M. Faktor pengabaian tanah pertanian dan solusi: kajian kes ladang pertanian LTS di negara Brunei Darussalam. *International Journal of Business, Economics and Law*. 2015; 7(3):1-13.
11. Drakel A. Kajian usahatani tanaman tomat terhadap produksi dan pendapatan petani (studi kasus di Desa Golago Kusuma, Kecamatan Jailolo Timur, Kabupaten Halmahera Barat). *Agrikan: Jurnal Agribisnis Perikanan*. 2012; 5(1):31-36.
12. Hilmanto R. Optimalisasi harga komoditi agroforestri untuk meningkatkan pendapatan petani. *Jurnal Administrasi Bisnis*. 2012; 1(1):84-91.
13. Susilowati SH. Fenomena penuaan petani dan berkurangnya tenaga kerja muda serta implikasinya bagi kebijakan pembangunan pertanian. *Forum Penelitian Agro Ekonomi*. 2016; 34(1):35-55.
14. Ansong Omari R, Bellingrath-Kimura S. Sarkodee Addo E. Oikawa Y. Fujii Y. Exploring farmers' indigenous knowledge of soil quality and fertility management practices in selected farming communities of the guinea savannah agro-ecological zone of Ghana. *Sustainability*. 2018; 10(4):1-16.
15. Dian S. Nurul HL. Tri W. Pengaruh umur petani, tingkat pendidikan dan luas lahan terhadap hasil produksi tanaman sembung. 2016; 9(2):75-82.
16. Yang X. Fang S. Practices, perceptions, and implications of fertilizer use in East-Central China. *Ambio*. 2015; 44(7):647-652.
17. Echoh DU. Nor NM. Gapor SA. Masron T. Issues and problems faced by rural farmers in paddy cultivation: A case study of the Iban paddy cultivation in Kuala Tatau, Sarawak. *Journal of Regional and Rural Development Planning*. 2017; 1(2):174-182.
18. Watti UK. Tiwari B. A study on mass media literacy among Indian farmers with special reference to Chhattisgarh. *Library Waves*. 2015; 1(2):95-104.
19. Oduro-Ofori E. Aboagye AP. Acquaye NAE. Effects of education on the agricultural productivity of farmers in the offinso municipality. *International Journal of Development Research*. 2014; 4(9):1951-1960.
20. Padhy C. Jena BK. Effect of agricultural education on farmers efficiency: A review. *International Journal of Engineering Technology, Management and Applied Sciences*. 2015; 3(2):247-258.
21. Alene AD. Manyong V. The effects of education on agricultural productivity under traditional and improved technology in northern Nigeria: an endogenous switching regression analysis. *Empirical Economics*. 2007; 32(1):141-159.
22. Diiro GM. Seymour G. Kassie M. Muricho G. Muriithi BW. Women's empowerment in agriculture and agricultural productivity: Evidence from rural maize farmer households in western Kenya. *PloS one*. 2018; 13(5):1-27.
23. Doss CR. Women and agricultural productivity: Reframing the Issues. *Development Policy Review*. 2018; 36(1):35-50.
24. Syuaib MF. Sustainable agriculture in Indonesia: facts and challenges to keep growing in harmony with environment. *Agricultural Engineering International: CIGR Journal*. 2016; 18(2):170-184.
25. Khapayi M. Celliers PR. Factors limiting and preventing emerging farmers to progress to commercial agricultural farming in the King William's Town area of the Eastern Cape Province, South Africa. *South African Journal of Agricultural Extension*. 2016; 44(1):25-41.
26. Ajani EN. Agwu AE. Information communication technology needs of small-scale farmers in Anambra State, Nigeria. *Journal of Agricultural & Food Information*. 2012; 13(2):144-156.