SOCIO-ECONOMIC FACTORS THAT INFLUENCE PRODUCTIVITY OF VEGETABLES IN SANDAKAN DISTRICT, SABAH

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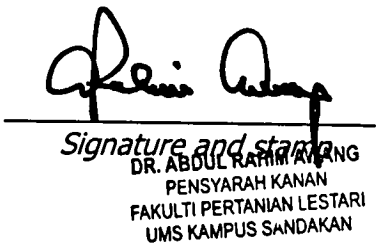

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ABSTRACT

Vegetable production is one of the crucial components in agricultural practices. It is always cultivated for dietary consumption as well as source of downstream economic sectors. Cultivation of vegetable is also important to feed population's nutritional need in urban and semi-urban area such as Sandakan district. Besides that, there are few items or aspects that always act as socio-economic factors that influence crop productivity from time to time. Therefore, a research was conducted in Sandakan district from August until November 2015 to find out socio-economic factors that influenced vegetable productivity in that region. It was carried out in survey form with structured questionnaires under the cross sectional design. From this research, demographic characteristics and socio-economic background of vegetable farmers as respondents were identified. The data collected from these respondents were then analysed through descriptive and inferential statistics by using Statistical Package for the Social Science (SPSS) Version 21 software. Generally, majority of vegetable farmers in Sandakan district was made up of male and non-Malaysian citizens with mainly Tator ethnicity from Indonesia. Most of the respondents had received schooling. The average age was 37.85 years old, and had average farming experience of 8.23 years. Average of their vegetable farm size was 1.93 acres. Most of their farms were under rental status that ranged from less than 1 year to 10 years. Majority of them had received 11 to 20 times of extensional service contact in the past 12 months. Almost all respondents had no labour force in their farms, and all respondents did not received access of credit. Besides that, the study found that there was no significant correlation relationship between demographic and socioeconomic characteristics of the vegetable farmers and vegetable productivity. However, there were socioeconomic factors found that dominantly influenced vegetable production including farmers' education level, farming experience, and age associated with involvement of young people. Therefore, education level should be strengthened by improving extension service and initiating knowledge and skill sharing between technical staffs and the farmers in order to strengthen vegetable productivity in Sandakan District.

FAKTOR-FAKTOR SOSIOEKONOMI YANG MEMPENGARUHI DAYA PENGELUARAN SAYUR-SAYURAN DI DAERAH SANDAKAN, SABAH

ABSTRAK

Pengeluaran sayur-sayuran merupakan salah satu komponen penting dalam kegiatan pertanian. Ia kerap diusahakan untuk pengambilan gizi dan sumber sektor-sektor ekonomi aliran hilir. Pengusahaan sayuran juga penting untuk memenuhi keperluan nutrisi populasi dalam kawasan bandar dan luar bandar seperti daerah Sandakan. Selain itu, terdapat beberapa perkara atau aspek yang selalu berperanan sebagai faktor sosioekonomi yang mempengaruhi daya pengeluaran tanaman dari masa ke masa. Oleh itu, suatu penyelidikan telah dijalankan di daerah Sandakan dari bulan Ogos sehingga November 2015 untuk mengenalpasti faktor-faktor sosioekonomi yang mempengarhi daya pengeluaran sayur-sayuran di rantau berkenaan. Ia telah dijalankan dengan bentuk soal selidik berborang selidik dengan berlandaskan tatacara Tinjauan Keratan Rentas. Daripada penyelidikan ini, ciri-ciri demografi dan latar belakang sosioekonomi di kalangan pengusaha sayur-sayuran sebagai responden telah dikenalpasti. Kemudian, data yang dikumpul daripada para responden berkenaan telah dicerakinkan menerusi statistik deskriptif dan inferential dengan menggunakan perisian Pakej Statistik untuk Sains Sosial (SPSS) berversi 21. Secara umumnya, kebanyakan pengusaha sayuran di daerah Sandakan terdiri daripada lelaki dan bukan warganegara Malaysia terutamanya berketurunan Tator dari Indonesia. Kebanyakan responden telah menerima pendidikan. Purata umur mereka sebanyak 37.85 tahun, dan mempunyai purata pengalaman bertani sebanyak 8.23 tahun. Purata kebun sayuran mereka sebanyak 1.93 ekar. Kebanyakan kebun mereka berstatus sewaan yang tempohnya merangkumi antara kurang daripada setahun sehingga 10 tahun. Kebanyakan daripadanya telah menerima perhubungan khidmat pengembangan sebanyak 11 hingga 20 kali sepanjang 12 bulan lepas. Hampir semua responden tiada tenaga buruh di kebun mereka, and semua responden tidak menerima akses kredit. Selain itu, kajian ini mendapati bahawa hubungkait korelasi bererti tidak wujud antara ciri-ciri demografi dan sosioekonomi pengusaha sayuran dengan daya pengeluaran sayuran. Namun begitu, terdapat faktor-faktor sosioekonomi yang secara dominannya mempengaruhi pengeluaran sayuran ditemui adalah merangkumi faktor-faktor tahap pendidikan pengusaha, pengalaman bertani serta umur yang berkaitan dengan penglibatan golongan muda. Oleh itu, tahap pendidikan perlu diperkukuh dengan menambahbaik perkhidmatan pengembangan serta mewujudkan perkongsian ilmu dan kemahiran antara staf-staf teknikal dengan para pengusaha untuk memperkukuh daya pengeluaran sayuran di daerah Sandakan.

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%	Percentage
CMU	Central Mindanao University
DAPM	Department of Agriculture of Peninsular Malaysia
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
N	Number of Respondents
p	Critical Level
r	Correlation coefficient
RM	Ringgit Malaysia
SFP	Single Factor Productivity
SPSS	Statistical Package for the Social Sciences
TFP	Total Factor Productivity

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3.1	Percentage of Particular Category or Option Percentage (%)= $\frac{Total\ Repetition}{Total\ Respondent} \times 100\%$	18

CHAPTER 1

INTRODUCTION

1.1 Introduction

Agriculture is one of the important economic sectors in Malaysia which has significant impacts to every citizen. It essentially consists of plantation crop production, horticultural production like fruits and vegetables, mushroom, cereal crops like paddy and corn, and livestock production. Although this sector contributes relatively lesser part than other economic sectors to the national economy growth since 1987, it still plays important roles indirectly for national food security and socio-economic development. In 2010, agricultural sector had contributed 7.3% to the Gross Domestic Product (GDP) (Department of Statistics Malaysia, 2011), and the figure dropped to 7.1% in 2013 (Malaysian Productivity Corporation, 2014). In spite of this trend, there was little positive contribution of output and productivity exhibited in each state. According to Department of Statistics Malaysia (2011), in Sabah alone, 22.9% to 28.8% of the state GDP was contributed by the agricultural sector during 2006-2010. Furthermore, together with Sarawak and Johor, Sabah had also been regarded as one of the main contributors to national agriculture GDP as Sabah contributed 17.9% to overall national agricultural GDP in 2010. In addition, in terms of productivity, agricultural sector showed improvement from -11.1% in 2012 to -3.5% in 2013 with productivity arising from RM34,202 to RM33,006 (Malaysian Productivity Corporation, 2014).

Vegetable is one of the important dietary components in human daily life. Due to its rich content of fibre, vitamins and other nutrients, vegetables are consumed in both raw and cooked form, as well as being processed in food-based industries. To supply sufficient vegetables for fulfil increasingly demand, numerous lands are utilised for cultivating these food source. Thus, vegetable production as agri-food commodity becomes one of the major horticultural components in national agricultural sector.

According to Ministry of Agriculture and Agro-based Industry Malaysia (2015), vegetable production amount has increased from around 623,000 tonnes in 2009 to around 1,434,000 tonnes in 2013. Apart from that, in 2013, the total cultivated area of vegetables in Malaysia was 67,777 ha, while the overall production amount of the vegetables has achieved 143,200 tonnes. Pahang from Peninsular Malaysia was the biggest vegetable producer which has 26,753 ha of cultivated area with the production amount of 718,709 tonnes in 2013.

There are many factors play significantly important roles in vegetable production from pre-production to marketing. Field topography, climatic condition and seasonal changes, soil type and nutrient availability, farming practice types, availability of water supply, crop and variety types and market development are among the key factors that determine the success in any of agricultural cultivation. Farming technology such as fertilizer quantity (Alimi *et.al.*, 2006; Xaba and Masuku, 2013), planting materials particularly high quality of seeds (Shehu *et.al.*, 2007), and crop variety (Tan, 2009) and access of agrochemicals (Ogundele and Okoruwa, 2006) were identified as key determinants. Besides that, socio-economic factors are highlighted as it also able to influent the production status and successfulness of vegetable production. It refers to those aspects that related to economy progress or social processes-based environment. The main socio-economic factors that mainly influence directly and indirectly to the vegetable productivity include age (Nosiru *et.al.*, 2012), farm size (Obasi *et.al.*, 2013), 'access to credit, distance to market, and gender of the farmer' (Xaba and Masuku, 2013). Other aspects, such as education or literacy level (Omoregbee and Onemolease 2013), extension services (Obwona, 2000; Haq, 2011), labour force composition (Darpiex, 2009) and type of labour input (Nosiru *et.al.*, 2012) are also counted in.

1.2 Significance of Study and Problem Statement

Vegetable production is a highly productive industry in Malaysia including in Sabah. Both main vegetable like mustard or *sawi*, water spinach, cabbage, and spinach, as well as, other vegetables such as cauliflower, asparagus, and broccoli are produced in abundant amount annually (Department of Agriculture Peninsular Malaysia, 2012). For instance, 928,182.94 and 10,427.12 tonnes were produced for main and other vegetables respectively in 2011 (Ibid). Due to the very importance of this agri-food

industry to national economic growth and socioeconomic progress, a study that assessing productivity of vegetable production in a particular district could be useful to boast vegetable production of that place which in turn would contribute to overall performance in national vegetable production.

Besides that, the study on how socioeconomic factors affecting productivity in local vegetable production could indirectly facilitate agricultural authorities to explore more suitable approaches for improving vegetable production. In agricultural extension, problems and related issues in a local agricultural community are being assessed from time to time so that a better farming management can be advocated and implemented. Furthermore, there are numerous researches which have studied determinants of productivity as well as impacts of socioeconomic factors in agri-food production in both local and foreign regions. Since Sandakan district has moderately abundant presence of vegetable production, therefore this study could be an attempt that specifically focuses on Sandakan district so that it helps agricultural extension agencies to get a clearer understanding regarding the current situation of local vegetable production.

Apart from that, the study on how socioeconomic factors influence local vegetable productivity could be a little contribution for future agricultural planning in Sandakan District. Recently, urbanisation is rapidly on-going in every developing country including Malaysia; it in turn rising up concerns about urban food security and role of rural livelihoods as important market centres for agricultural products. In this case, Sandakan as the second largest city in Sabah consists of both increasingly urbanised city centre and semi-urban townships. In order to fulfil increasing food demand that has been resulted from growing population, urban agriculture is important to be advocated as a potential solution for strengthening urban food security and accessibility from rural to urban. Thus, this study can be also a little contribution for sustaining self-affordable vegetable supply that requires less costly transportation from distant production sites.

1.3 Terminologies

'Socio-economic' and 'productivity' are the terminologies that important in this research. Therefore, in this section, these will be explained and defined clearly so that the research will be kept onto its track properly.

1.3.1 Socio-economic

The term is derived from 'socio-economics'. Business Dictionary (2010) defines 'socio-economic' as 'a field of study that examines social and economic factors to better understand how the combination of both influences something'. Therefore, socio-economic factors that states in this research are referring social and economy-based phenomena that make effects in the productivity of vegetable production in Sandakan district. It can be either directly or indirectly, and in positive and negative manners.

1.3.2 Productivity

In agriculture, 'productivity' is always read as 'agricultural productivity'. The latter one refers to 'the ratio of the value of total farm outputs to the value of total input used in farm production' (Olayide and Heady, 1982). Besides that, Business Dictionary (2010) defines that terminology as 'a measure of the efficiency of a person, machine, factory, system, etc. in converting inputs into useful outputs' which can be determined mathematically 'by dividing average output per period by the total costs incurred or resources consumed in that period'. In this study, productivity of vegetable production was measured in yield (tonnes) per farm size (acres).

1.4 Objectives

The objectives for this research were:

a) To identify demographic characteristics and socio-economic background of the vegetable farmers involved in this study in Sandakan District.
b) To identify the socio-economic criteria or factors that influenced the productivity of vegetable production in Sandakan District.
c) To determine relationships between demographic and socio-economic characteristics of the farmers and the productivity of their vegetables.

CHAPTER 2

LITERATURE REVIEW

2.1 Vegetable Production in Malaysia

Food and Agriculture Organisation (FAO) (1994b) defined vegetables as 'mainly annual plants cultivated as field and garden crops in the open and under glass, and used almost exclusively for food'. Usually the edible parts of these plants include tuber, leaf, fruit, cole, stem, bulb, seeds and sometimes flowers. Besides that, vegetable is one of the dietary component that composing an individual's ideal diet intake. Consistent availability of it plays an important role for nourishment of an individual's physical health as vegetables contain mainly fibre and vitamins as well as little amount of protein. Therefore, vegetable production is an important agricultural industry that has always contributed much in national and social development.

The common categories used in vegetable produce are leafy, fruit and root vegetables. Leafy vegetable refers to plants which are cultivated for mainly leaves part, while fruit vegetable is that which are cultivated mainly for their seeds-containing pod and fleshy parts. Root vegetables refer to plants where their enlarged fleshy root part is mainly cultivated and consumed.

The significance of vegetable production in national economic growth and citizens' consumption has been noted by past researchers and agronomists. According to Chiew (2007), the vegetable industry in Malaysia could be described as an industry with various crops; over 50 types of vegetables were grown for consumption or materials in further processing sector. He also stated that a minute share of vegetable produce is used for manufacturing industry while most of these produce are consumed directly in mostly fresh form. At the same moment, considerable amount of vegetables including choy sum, cabbage, cucumber, long bean, red chilli and tomato were exported to foreign countries, such as, Singapore as the primary export market

destination, China, Indonesia, Thailand and Brunei (Chiew, 2007). Besides that, he also noted that Malaysians' demands on vegetables had shifted substantially; it was mainly due to the urbanisation, changes in consumers' preferences and market development.

In Malaysia, there are two types of vegetables grown commercially: temperate and lowland vegetable crops. The former one is widely cultivated in Cameron Highland in Pahang, Lojing Highland in Kelantan and Ranau in Sabah, whereas the latter one has been commonly cultivated in any plain farmland, especially in rural and semi-rural zones.

Besides that, there is another categorisation of vegetable crops in Malaysia. The best example was enlisted by Department of Agriculture of Peninsular Malaysia (DAPM) (2012). It was categorised into two categories: main and other vegetables. The former one included 27 vegetables, namely spinach, okra, chilli, hot chilli, sweet shoot (or sweat leaf bush), spring onion, celery, French bean, long bean, Chinese kale, water spinach or *kangkung*, cabbage, four-angled bean, wax gourd, pumpkin, carrot, radish, bitter gourd, angled loofah (*petola*), lettuce, mustard (*sawi)*, brinjal or eggplant, cucumber and tomato. Meanwhile the latter one consists of 17 vegetables, namely asparagus, broccoli, Chinese parsley, *jagung sayur*, pea, Chinese box thorn, sweet pea, cauliflower, sweet pepper (*lada Bengali*), *lekoi*, *maman*, *meranti*, Chinese spinach (*Poh Choy)*, *pucuk paku*, watercress, *rebung buluh* and *rebung madu*.

From 'Vegetable and Cash Crops Statistics' released by DAPM (2012), among the major vegetables, mustard was the largest vegetable crop that grown in 9,171.58 hectares of land, the largest hectareage in 2011. It was followed by water spinach and cabbage which were grown in hectareage of 6,014.92 hectares and 5,654.95 hectares respectively. Apart from that, there is a little difference present in the ranging of production amount; cabbage production with 179,322.92 tonnes was the highest in the same year. It was followed by the tomato and mustard where their production amount achieved 137,128.40 tonnes and 128,647.14 tonnes respectively. Meanwhile, among the other vegetables, cauliflower was cultivated in 593.14 hectares of land, the largest hectareage one. It was followed by broccoli and watercress which were cultivated in 96.00 hectares and 77.52 hectares of land respectively. The highest production amount was achieved in cauliflower production, which was 3,269.73 tonnes in the same year. It was followed by Chinese box thorn (3,181.61 tonnes) and watercress (1,258.93 tonnes). Besides that, in term of production value among overall vegetable

crops, tomato was ranked at the top place as around RM390,816,000 was generated. Cabbage with production value of RM371,198,400 and mustard with production value of RM340,914,900 were placed on 2nd and 3rd places of the ranging in the same year.

In 2011, 5,288.5 hectares of land with the productive land of around 49,077 hectares were used for vegetable production. In the same time, 938,610 tonnes of vegetable produce with the production value of around RM2,610,101,800 were contributed. In term of vegetable hectareage by state, Pahang with 16,899.2 hectares of vegetable production land was placed in top place of the ranging. Johor and Sarawak that had 10,147.7 hectares and 4,394.6 hectares of vegetable hectareage respectively were placed on 2nd and 3rd places of that ranging.

2.2 Vegetable Production in Sabah

In Sabah, the main production areas of vegetable crops are Ranau, Papar and Lahad Datu districts. Notably, Kundasang located at the foot of Mount Kinabalu is well-known for intensive production of temperate or highland vegetables which is rarely practiced in the rest of that state. Apart from that, according to DAPM (2012), production of some vegetable crops such as leaf mustard, long bean, brinjal and cucumber are present in all districts in Sabah. Certain vegetable crops, such as, spring onion, cabbage, Chinese cabbage, lettuce, French bean, four-angled bean, bottle gourd, radish and water cress are cultivated in very few districts. Only few types of vegetables are cultivated in a specific district; celery, Chinese chives, carrot, asparagus, broccoli, Chinese parsley, pea, cauliflower and Pak Choy are planted in Ranau district only, whereas *pucuk paku* is cultivated in Kunak district only.

Besides that, vegetable production in Sabah can be examined internally in terms of provisional territory. According to Department of Agriculture Sabah (2015), there were 4058.4 hectares of land used for vegetable cultivation and production in Sabah. At the same time, West Coast Residency was the largest vegetable production area in Sabah where 3102.1 hectares of land in that territory had been used for vegetable cultivation in 2013. The ranging is followed by the Residency of Interior Area (431.2 hectares), Tawau (360.5 hectares), Sandakan (105.0 hectares) and Kudat (59.6 hectares). Both leafy and fruit vegetable productions exist in all Residencies, but root

vegetable production presents only in the three Residency territories namely Tawau, West Coast and Interior Residencies.

There is also vegetable production present in Sandakan district along with other districts in Sabah. According to DAPM (2012), there were 17 vegetable crops cultivated totalling about 145.60 hectares in 2011 in the district. Around 1456.8 tonnes of vegetables were produced with the production value of around RM3,966,970. The most widely cultivated vegetable crop in that district is mustard where its planted area reached 59.50 hectares producing 486.50 tonnes with the production value of RM1,289,230 in 2011. The other popularly-cultivated vegetable crops included spinach, water spinach, angled loofah, eggplant, cucumber, long bean and okra.

2.3 Agricultural Productivity

In agricultural geography and economics, agricultural productivity is defined as 'the ratio of the value of total farm outputs to the value of total inputs used in farm production' (Olayide and Heady, 1982). Other expertises like Fulginiti and Perrin (1998) have defined that concept as 'the output produced by a given level of input(s) in the agricultural sector of a given economy'. Similar with measures of agricultural efficiency, profitability, it helps to give a general picture about the spatial organisation and pattern of agriculture (Dharmasiri, 2011) in a country or region. In global perspective, agricultural productivity has been always focused and emphasised in agricultural development planning so that to help avoiding a recurring Malthusian crisis, a situation 'where the needs of a growing population outstrip the ability of humanity to supply food' (Fuglie and Rada, 2013).

In the past, numerous agricultural economists had tried to measure agricultural productivity in various types. Generally the measures could either be partial or total type depending on the number of inputs under consideration (Liverpool-Tasie *et.al.*, 2012). Firstly, Single Factor Productivity (SFP) is that which the ratio of output quantity to the quantity of a single input used (Diewert and Nakamura, 2005). This type of measure included yield per planted area (land productivity) and output per worker (labour productivity). Apart from that, Total factor productivity (TFP) is another measure that had been used widely to inspect how a country or region's agricultural productivity is going on from time to time in a relatively broader sense. Output from

crop or livestock production is compared with any inputs such as land, labour, capital and material resources that are involved in that production. Besides that, Average Productivity Index that was used by Dharmasiri (2011) in his research applied its major components, the average yield and the harvested area of a country or state level, to identify the spatial distribution pattern of productivity of that particular region (Ibid).

2.4 Socio-economic Factors and Productivity of Crops

Past studies and researches had studied how an agricultural practice and output is affected by any factor. They have found out some discovery that indicating how these social and economic factors combine together to exert various level of impacts on productivity in various types of crops. The socio-economic factors that had been noted and studied mostly by past researchers and agriculturists in productivity of crops include age, access of credit, literacy or education level, landholding status, farm size, extension service, labour force composition, and farming technologies.

Tan (2009) noted that low productivity in paddy farm was due to presence of aging farmers and few newcomers. Whereas Obasi *et.al.* (2013) found out that age was one of the factors that were inversely related to agricultural productivity of arable crop in Imo State, Nigeria. They stated that productivity would decrease significantly if aged and weak farmers were involved in agricultural production.

Xaba and Masuku (2013) who carried out their research in Swaziland found out that access to credit was the only factor that significantly affected the productivity of farmers in cabbage production. He explained that access to credit 'would enhance the financial capacity of the farmer to purchase necessary inputs' which exert a positive impact on productivity in cabbage.

Literacy is defined as 'the ability to read and write' (Oxford Dictionary, 2015), while education level is the degree in attainment of education from pre-schooling, primary, secondary to tertiary level. In agriculture, farmer's literacy and education level determines how far he/she able to receive the latest information and advancement in farming practices or to put these into their daily practice. For examples, Nwaru (2004) once stated that education can help to 'unlock the natural talents of the vegetable farmers and inherent enterprising qualities'. Das (2012) who examined the relationship between educational level of farmers and agricultural productivity in Odisha, India

found that there was a positive relationship and stressed the importance of education in agricultural development in rural area. Rachmina *et.al.* (2013) found that farmers' formal education was one of the determinants of that significantly influenced vegetable farms' total factor productivity in Pangalengan, Indonesia. Omoregbee and Onemolease (2013) in their study on factors affecting productivity among Fadama farmers in Nigeria found out that fadama-related productivity was significantly related to education besides degree of participation, and suggested that improvement should be achieved by 'upgrading educational status through adult literacy classes'. In addition, Okpachu *et.al.* (2014) found that 'education positively impacted on the agricultural productivity of small scale female maize farmer' after they compared between the output of educated and non-educated categories of these female maize farmers as respondents in rural Yobe state, Nigeria.

Landholding status and farm size were also studied by a number of researchers of agricultural and agroeconomics field. For example, Tenaw *et.al.* (2009) studied the effects of land tenure and property rights on agricultural productivity in Ethiopia, Namibia and Bangladesh found out that proper land tenure should be available for sustaining land productivity and output from small-scale farming. Besides that, Randela *et.al.* (2000) have mentioned in their research paper that land-less farmers could be reluctant to develop and maintain their land as they would experience loss of their occupied farm land due to its illegal landholding status. Apart from that, farm size will also affect productivity in agricultural production. Teryomenko (2008) found out that 'the relationship between farm size and productivity is non-linear' in Ukraine. In the same research also, she found out that 'Ukrainian farms were found to be highly unproductive due to inefficient use of land resources'. However, Mahesh (2000) found out that there was 'no firm relationship exists between farm size and productivity' when studied in Kerala.

Extension service plays an important in the crop productivity from time to time. In Gazipur district, Bangladesh, Haq (2011) found that the yield and productivity of rice was improved significantly with the presence of strong influence from extension programs and the number of contacts between paddy farmers and extension agents. Besides that, as noted by Elias *et.al.* (2013), a positive effect was induced by extension program on smallholders' farm productivity in Ethiopian highlands even though 'the observed overall farm productivity was less by about half than the target set by the extension program'.

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