The study of Affordability of Vegetables in Malaysia

By

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LIST OF ABBREVIATIONS

FAMA	Federal Agriculture Marketing Authority
FAO	Food and Agricultural Association
FDI	Foreign Direct Investment
FMOLS	Fully Modified Ordinary Least Square
GDP	Gross Domestic Product
FEM	Field Effect Method
MARDI	Malaysian Agricultural Research and Development Institute
OLS	Ordinary Least Square
REM	Random Effect Method
USDA	United States Department of Agriculture

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ABSTRACT

The affordability of foods has become a major concern for global population due to its upward trend of prices in recent years. The affordability of foods is crucial in the development of a nation because proper diet is required to lead a healthy lifestyle that will spur the population to improve, innovate and develop ideas that should eventually result in the advancement of a nation. As vegetables are the source of multitude of nutrients and minerals that invigorates the body and the mind, the consumption of vegetable is therefore vital. Affordability is related to price, which then determines the willingness of a person to buy food, or more specifically, vegetable. Thus, research is henceforth done to study the factors affecting the pricing of vegetables. It was found that increase in acreage, yield rate and government expenditure positively contributed to the reduction of the prices of vegetables with acreage showing the biggest influence among the observed variables. Increase in Foreign Direct Investment causes the prices of the vegetables to increase marginally. Thus, the affordability of vegetables in Malaysia could be further improved by strategizing these four factors synergistically to the benefit of Malaysians as a whole.

ABSTRAK

Kemampuan untuk membeli makanan telah menjadi kebimbangan utama bagi penduduk dunia kerana aliran harga yang menaik sejak kebelakangan ini. Kemampuan untuk membeli makanan adalah penting dalam pembangunan sesebuah negara kerana diet yang betul diperlukan untuk kehidupan yang sihat yang akan menggalakkan penduduk untuk meningkat, membuat pembaharuan dan membina idea-idea yang akhirnya akan membantu dalam kemajuan sesebuah negara. Sayur-sayuran merupakan sumber pelbagai nutrien dan mineral yang membina badan dan minda, oleh itu, pengambilan sayur-sayuran adalah amat penting. Kemampuan yang berkaitan dengan harga, yang kemudiannya menentukan kesediaan orang untuk membeli makanan, atau lebih khusus lagi, sayur-sayuran. Oleh itu, penyelidikan selepas ini dilakukan untuk mengkaji faktor-faktor yang mempengaruhi penentuan harga sayur-sayuran. Kajian ini telah mendapati bahawa pertambahan keluasan, hasil Kerajaan dan kadar perbelanjaan yang menyumbang secara positif kepada pengurangan harga sayur-sayuran dengan keluasan yang menunjukkan pengaruh terbesar antara pembolehubah yang diperhatikan. Peningkatan dalam keluasan, hasil Kerajaan dan kadar perbelanjaan yang menyumbang secara positif kepada pengurangan harga sayur-sayuran dengan keluasan yang menunjukkan pengaruh terbesar antara pembolehubah yang diperhatikan. Peningkatan dalam pelaburan langsung asing menyebabkan harga sayur-sayuran akan meningkat secara langsung. Oleh itu, kemampuan sayur-sayuran di Malaysia boleh terus dipertingkatkan dengan menyusun strategi faktor-faktor ini empat agar bertindak secara sinergi untuk faedah rakyat Malaysia secara keseluruhannya.

CHAPTER 1:

INTRODUCTION

1.0 Background of Research

Agriculture is often considered as a vital sustaining segment in the foundation of a country's economy because of its role in feeding the population and also in determining the trade balance of a country. The role of agriculture in the Gross Domestic Product (GDP) of a nation varies according to the status of a nation. For developed countries like America, Germany and Japan, agriculture industry contributes around one to three per cent (deHoyos and Lessem, 2008). Agriculture sector is the main contributor in the GDP of developing countries, such as Cambodia and Laos with about one third of the country's GDP (Ivanic and Martin, 2008). For Malaysia, despite the decreasing contribution to the economy, this sector is still important based on the increased focus on agricultural activities in ninth and tenth Malaysian Plan. According to Department of Statistics, Malaysia, the agricultural sector contributed 28.8 per cent to the nation's GDP in 1970. However, this percentage declined steadily over the years to 7.0 per cent in 2014. Nevertheless, the yield and productivity of the agricultural industry have increased in value in spite of the reduced contribution to GDP.

On a rudimentary level, agricultural productivity can be defined as the ratio of agricultural outputs to agricultural inputs. The output value is then evaluated based on the different types of inputs such as yield and labor. In recent times, the role of innovation has become vital for agricultural growth and has contributed to improved productivity and economic growth throughout advanced and emerging economies. In addition to that, innovation also plays an important role in jobs creation, income generation, poverty alleviation and driving social development. Hence, for industries in the agriculture sector and nations to compete, cope and thrive in the midst of changes in agriculture and economy, continuous innovation is a must. Many studies have shown that, economic indicators have a positive impact on agricultural productivity (R. E. Evenson, 1990; L. Zepeda, 2001; Heady et al., 2010; Wang and Nair, 2013; Sepien, 1979).

When the agriculture industry of a nation that is dependent on its output is underdeveloped, the pricing of corps will not be optimal due to ineffectiveness of market utility. This will then cause affordability issues especially to the lower socio economic group that spends higher percentage of their earnings on essential food items such as rice or vegetables. As a result, excessive pricing of foods may cause them to go deeper into poverty, or compromise on their food intake that will eventually result in malnutrition state. This state of affairs will then require government intervention to remedy the situation. Researches done by Snell et al. (1997) and Schiff and Valdes (1998) found that macroeconomic factors such as Growth Domestic Product (GDP), Interest Rates and money supply play key factors that influences prices of foods in a country. A part of this research paper hopes to provide a conceptual model for the relationship between pricing of vegetable produce and productivity of agriculture

output in addition to the land used for the produce plantation. In addition to that, this study also hopes to propose how government policy enhances the relationship between economic indicators and agricultural productivity, which affects the price of vegetables. In a study cited by Mundlak et al. (1997), the author researched using a cross-country data to approximate a global production function. The results reveals that agricultural growth is constrained by physical capital, and the growth calculation are responsive to weight of land and the production function is dependent upon technology and prices that gave returns to scale constantly.

1.1 Food Prices

The rising of food prices in recent years have become a matter of great public concern, especially since the post-2004 global food price hike where commodity price increases exhibits a permanent character seen in 1960 -1970 food crisis (World Bank, 2007). Most commodity prices are now explicitly higher compared to the decade earlier. From 1997 to 2004 nominal prices of fertilizers, energy, and precious metals have tripled, with metal prices increased by almost 150 percent, and almost most prices of food have doubled (Berta, 2008). The increase in price, especially those related to food items, caused great concern to the governments and, led to extensive coordinated policy actions in reigning the price hike. It has been noted that while the Western world is relatively not affected by price fluctuations as the population there are price insensitive to food products, however, people in developing countries and poorer regions are less fortunate if prices rise. Small variations in basic food price, such as rice or vegetables, can result in the difference of having enough food for the day or going

hungry. The fact that prices of food has become increasingly expensive is reflected by the United Nations Food and Agricultural Organization (FAO) *Food Price Index.* The index peaked at an all-time high in 2011 with food prices having doubled since 2004 (FAO, 2011). These increase of agricultural prices has been a compelling reason that caused the cost food to rise, which brought upon the heightened concern on problems of hunger and food security, especially for developing countries.

The price spike could be attributed to an amalgamation of jointly underlining factors, for example, droughts in crucial crops producing area, increased feedstock for use in biofuels production, and rising of oil prices. Furthermore, prices of agricultural commodities were affected due to higher energy and chemical prices, adverse weather conditions, and the usage of food commodities in the production of biofuels. In addition to that, the price spike occurred in an era of volatile global economy that have led to a considerable increase in speculative activity in agriculture futures markets. These trends afflicts the well-being of a population which indirectly will affects the economic development of a nation due to focus on satiating basic need such as food.

1.2 Macroeconomic indicators

It is widely believed by researchers and economist that the global agriculture economy is impacted by policy changes in macroeconomic level. Studies by Bessler and Babula (1987), Orden, (2002) and Chambers (1981) found that prices of agricultural inputs and prices of commodity were influenced by interest rate and inflation fluctuations. Research by Intal (1985) found that viability of agriculture in

Philippines is influenced by its macroeconomic environments. This notion is further supported by Ukoha (1999) which stated that distortions in macroeconomic policy in Nigeria was reducing the performance of its agricultural sector. The same effect was also seen in South African's agriculture sector, where fluctuations in interest and exchange rates were identified as the factors that contributed to the contraction in the agricultural sector. However, with increasing supply of money, the worth of local would be diminish, causing the export of the nation to increase (Chambers and Just, 1981). The effects of policy on agricultural industry could be difficult to forecast nor predict, as the results from those policy implementation do not match the expected outcome due to scant contemplations and omission of key stakeholders during policy development phase (Fan and Pardey, 1998). Schiff and Valdes (1998) stated that reduced agricultural growth would be encountered by developing countries as a consequence of adopting price intervention strategy by its policymakers in commercial activities. The 2009 global recession which caused declination of commodity prices and global trade, badly affected the Malaysian economy with contraction in agricultural export and GDP. This trend is expected to continue in years to come (Asian Development Bank, 2009).

The currency depreciation would raise agricultural prices, increase interest rate and decrease credit availability (USDA Baseline Projection, 2000). Thus, macroeconomic indicators can be considered to be vital factor in affecting farm economy in Malaysia. For example, a weakened Malaysian Ringgit will be likely to cause increased Malaysian agricultural exports through a reduction in Malaysian agricultural prices. Similarly, reduced interest rates in Malaysia would enable increased

farm income and reduce costs associated with production. Thus, it becomes imperative to research the macro-agricultural industry associations to better understand both the reasons and the consequences associated with variations on Malaysian farm income. The outcome of this research would be useful to government and policy makers in developing guidelines, especially in creating effective policy framework and to plan for upcoming strategies for agricultural development and also for the population as food prices affects consumption of foods that cause a section of the population, especially the poorer group, to compromise on their daily intake, leading to a unbalanced and unhealthy choice of food. It is hoped that future strategies on development in the agricultural industry could be rationalized and implemented consistently for the benefit of the population as a whole. Among the aim of this research includes assessing the dynamic interactions of macroeconomic indicators with agricultural variables in Malaysia.

1.3 Importance of vegetables in a healthy diet

The consumption of sufficient amounts of fruits and vegetables is one of the key elements of a healthy diet. A wealth of information exists that supports the benefits of eating enough fruit and vegetables. Correlation studies have revealed links between both the antioxidant properties and fiber content of fruit and vegetables, and protection against development of many cancers, cerebrovascular disease (SOHHD, 1993), and coronary heart disease (Crombie et al., 1990; Tunstall-Pedoe et al., 1989). The studies proved that a diet rich in fruit and vegetables could reduce the risk of developing many cancers by between 25-50 per cent (SOHHD, 1993). With knowledge of these

beneficial health effects, the importance of consuming sufficient fruit and vegetables cannot be over- emphasized.

Food security is another concept that is similar to food affordability where it can be described as the means to financially obtain adequate food in a socially respectable way. The accessibility of healthy food with regard to population from lower socioeconomic group is often highlighted in research of food accessibility. Darmon (2002) postulated that financial limitations would result in people consuming lower cost foods that exhibit high calories and fats as compared to high nutrient content foods due to restrictions on food expense. Furthermore, he also stated that foods laden with fat but nutritionally low food tend to cost cheaper as compared to fresh vegetable produce. Hence, the preference of low nutrient food would gradually become the norm due to its low cost, thus adversely affecting the health of the people. Similar results were also observed in Europe. Brug et al (1995) stated that consumption of vegetable in Netherlands could be predicted by the health knowledge and attitudes of its people. Related to this, Girosis (2005) found that in countries like USA and Switzerland, health consciousness was associated with higher levels of education.

Diet that consists of minimal vegetables is often cited as the factor in causing obesity, which is also prevalent in population that exhibits lower socioeconomic level. This was proven by Milewicz et al (2005) which observed that areas that have the lowest disposable income in Poland also showed the highest obesity rate. Similar results were also observed in Spain by Martinez (2004) where areas with lowest GDP per capita has the most significant obesity rates in Spain, while Schokker et al (2007)

showed that in Netherlands, people with lower level of education have a higher chance of being obese.

Supporting the notion that obesity is linked to socioeconomic stand, Nelson et al (2007) observed from a study conducted in Britain that intake of vegetables are lower in parts of the country which are poor and have lower education levels shows a higher level of obesity as compared to the other parts of Britain with higher socioeconomic level. The study also found that financial constraints caused 22 percent of the surveyed people from households with lower income skipping meals due to affordability. It is interesting to note that the same study also found families would most probably consume higher levels of vegetables and fruits if their womenfolk shopped in large grocery stores. Leather (1996) observed that families where incomes are lower will first scrimp on purchase of vegetables and fruit when there is financial constraint.

Thus it can convincingly state that socioeconomic factor do affect the intake of vegetables, where the consumption of vegetables will be significantly higher in population from higher socioeconomic group as compared to population from lower socio economic group. In Malaysia, despite the lack of studies related to obesity socioeconomic link, it can be assumed that low income areas will have higher risk of obesity, will cost the government in treating those people affected by diseases.

1.4 PROBLEM STATEMENT

Generally, foods that are priced cheaper would be the preferred choice among the consumers. However, as shown in Figure 1, the price of food have considerably increased over the past decade. Though the average household income of Malaysian population increased over the same period, the growth for the lower 40% of the population is 80 percent as compared to 72 percent and 57 percent for middle and upper socio economic group of the population respectively as can be seen in Table 1. This shows that the inequality in wealth distribution is widening, indicating that the poor section of the socioeconomic group will have to allocate bigger percentage of their limited income to purchase of foods as compared to other groups due to the price increase of foods.

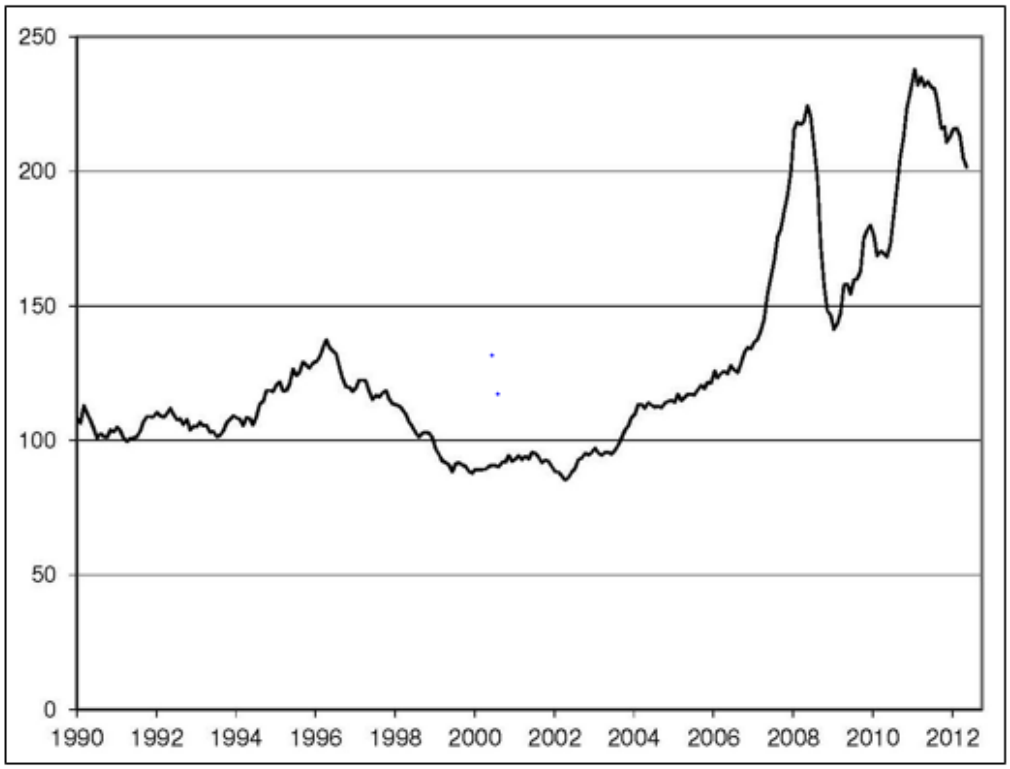

Figure 1: *World Food Price Index (1990 – 2012)* (Source: FAO)

As stated the preceding section, energy dense foods that are cheaper but nutritionally low has caused a marked shift in buying behavior of the consumers. It was found that prices of food in the past 50 years had significantly dropped as compared to other goods. However, the price drop does not encompass to all foods. It was stated that the price drop could be attributed to advances in food technology that made food processing cheaper. At the same time, in the past thirty years, the price of carbonated beverages rise twice as slower as fresh vegetables and fruits. This poses additional adverse effect on the poor socio economic group since by purchasing these packaged but nutritionally low foods, they are exposing themselves to health issues linked to those kind of foods.

Table 1: *Mean Monthly Gross Household Income of top 20%, middle 40% and bottom 40% of households 2002 - 2012, Malaysia*

Population / Year	2002	2004	2007	2009	2012
Top 20%	7,745	8,337	9,173	9,987	12,159
Middle 40%	2,660	2,875	3,282	3,631	4,573
Bottom 40%	1,019	1,101	1,345	1,440	1,847

The motivation to purchase vegetables would be affected if the prices of vegetables remain high or increases disproportionately with other foods, causing people, especially those from poorer family to consume foods that nutritionally low which would instigate diseases in later years. It has been suggested by analysts that low nutrient foods becoming the only affordable option to lower socio economic people. With low nutrient foods being associated with obesity, increase in health food will further aggravate this problem. Changes in price could be attributed to many reasons. Among them would be improved distribution and production technologies that makes it cheaper and economical to grow and cultivate foods.

Thus, price is the critical factor in determining the affordability of food. Researches into farm programs have resulted in varying degree of success in coming up with ways that could stabilize the prices of agriculture produce which altered decisions regarding production and inputs used for the growth of the produce. It is well established that the consumption of foods is dependent on the price. The relationship of fresh foods and low nutrient foods can be considered as substitute. Thus, consumption of fresh produce will increase when prices of those produce is reduced, which will then reduce the intake of low nutrient foods. Thus, the potential influence

on vegetable consumption by price of produce requires concern of the impact on how variations in subsidies and taxation policies could affect the patterns consumption.

There are many studies that link the price of crude Brent oil to the price of foods such as by Alghalith (2012), Burbridge and Harrison (1984), Chen (2009) and by Harri et al (2009). However, since the price of crude Brent oil is beyond the control of our borders, a pragmatic approach should be done to evaluate factors that affect the price of vegetables in Malaysia that can be influenced by domestic factors. Furthermore, a study done by Jongwanich and Park (2009) found oil price impact on food prices in Malaysia to be marginally significant. Studies by Choi and Helmberger (1993), Balmford et al (2010), Cassman (1999) found land acreage and subsequent yield to be significant factors in determining prices of agricultural output whereas studies by Gilbert (2010), Heady and Shenggen (2008), Mitchell (2008) and Fan et al (2000) found FDI and government expenditure to be among factors that determine the price of foods. Thus, land acreage and vegetable produce yield, in addition to FDI and government expenditure seems to be potential factors that could influence the variability of vegetable prices in a country.

According to Merriam Webster dictionary, the word affordability means to be able to bear the cost of something without causing harm and undue difficulty. On the other hand, price is defined as the amount that needs to be paid to obtain something. From context of this research, the usage of affordability is better suited than focusing on price because affordability covers a wide range issues pertinent to an individual that affects his choice on the purchase of foods. For example, as the price of vegetable goes higher, it affects the affordability of an individual or family because more money is

used to purchase the same amount of vegetable. This leaves with less money for other usages such as health visits, family outing and so on. From here, since it causes hardships to middle and lower income group, some sort of intervention is required to remedy the situation. As will be explained in the proceeding chapters, the rise in prices of foods affects affordability of the middle and lower income group that makes to scour for other types of food that are cheaper. However, these foods are usually of the low nutrient-high fat type. Prolong intake of these kinds of food will result in health issues that would cost the nation in terms of lost productivity and also in medical bills. All these factors will be ignored if the focus is solely on price, because the emphasis will be on factors that cause the rise or reduction in the price of foods. Thus the use of affordability in this research scope is justified.

The general purpose of this study is to understand the scenario of affordability of vegetables in the Malaysian market. Specifically, the objectives of this paper are to investigate factors that affect the affordability of vegetables in Malaysia in terms of pricing of vegetables and its contributing factors, such as crop yield, government expenditure on the development and improvement of the agricultural sector, the Foreign Direct Investment (FDI) that helps to develop the agriculture sector and to suggest ways of reducing price of vegetables in Malaysia.

1.5 Research Objectives

This research is designed to examine the affordability of vegetables to the Malaysian population in general. The following objectives will drive the research for its intended purpose.

1. To identify the link between yield of produce and price of vegetables in Malaysia
2. To determine relationship between amount of planted area and its effect of pricing.
3. To determine association between foreign direct investment and its effect on vegetable pricing
4. To explore the impact of government investment in agriculture sector on local produce price

1.6 Research questions

To achieve the objectives stated in Section 1.3, the research will address the following questions: -

1. Which is the effect of yield of produce on the price of vegetable?

2. What is the impact of the amount of planted area on price of conventionally grown produce?
3. How does foreign direct investments in agricultural sector affects the price market of local vegetables?
4. Does investment by the Government into the agriculture sector helps to reduce the local produce price?

1.7 Significance of research

The findings that are expected to be gathered from this research are aimed to guide the policy makers in strategizing investments in agriculture sector, especially for the vegetable produce sector, in supporting and becoming active players in making healthy produce affordable to all groups of people. The research will also contribute to increasing the knowledge about the acreage elasticity and price elasticity in the effort of making vegetable produce affordable to all. In addition, this research also hopes to support providers of vegetable produce in developing marketing strategies targeted to attract investments into their plantation. Furthermore, it is hoped that this research will help the decision-makers in the field of agricultural policy by showing data that will help them to developing adequate policy instruments to support vegetable farming that benefits all sections of the population.

1.8 Bridging the gap in research

As stated in the third paragraph of Section 1.0, many research on vegetable food pricing in Malaysia focus on macroeconomic factors such as Interest Rates, Money Supply and Gross Domestic Product (GDP) and also on consumer preferences through surveys. This research aims to close or narrow that gap by focusing on both microeconomic factors such as land used for agriculture purposes and crop yield, and also on macroeconomic factors such as government assistance in the form of development projects in agriculture sector and foreign direct investment (FDI), whereby the price of vegetable becomes affordable to all levels of socioeconomic groups through effective usage of land for agricultural purposes and smart investments by the government and foreign investors in the agriculture sector.

CHAPTER 2

LITERATURE REVIEW

2.0 Cost and benefit of growing vegetable and its effect on pricing

From a farmer's viewpoint, the reason for participating in agricultural related economy is as a form of sustenance. As long as the farmer's basic requirements are met, the motivation to pursue high yield or advanced technologies would seem weak. In addition to that, to minimize risk, it is highly probable that the cropping pattern chosen by the farmer may not be profit oriented, but more to sustenance based. For example, a farmer may choose to grow fruits instead of commodity crops such as pink guava instead of palm oil to minimize the failure of palm oil crop due to diseases. Furthermore, the farmer does not intend to purchase his staple food at increased market price, thus forgoing the opportunity of earning more from pink guava farming. Though the farmer's decision of cropping is reasonable from his viewpoint, it may not seem optimal from the viewpoint of the government and private firms whose aim is generally to optimize revenue and profit. However, the inherent trait to minimize risk is also apparent in government agencies and private firms they seek to reduce risk exposure to their investment through diversification of their planted crops.

Nevertheless, it is also possible that increase in production of crops could be the results of mitigating the risk. For example, irrigation canals affected by seepage through heavy irrigation and waterlogging caused salinization of parts in Pakistan. The soil is

surfaced with salt as the result of the capillary process was evaporates from the soil. This will affect the planted crop. Thus, the solution to the problem was through lining of the canals where seepages will be reduced and improved drainage along the irrigations. This solution led the production of crops to improve because through reduced salinization, water saved from seepage was used for the crops growth. Hence, what was started as a project to minimize losses resulted in the increased production for the same crop. A similar result was also noticed in Kemubu Irrigation Project, in Terengganu where the project allowed farmers to grow paddy during dry season. This was achieved through residual moisture from other crops and land that would otherwise be for livestock grazing. The project caused water to be available for water intensive crop and allowed paddy to be grown and harvested twice a year, increasing overall production twofold.

Generally, the cost associated with agricultural projects are usually discussed in the form on physical cost, such as land used, fertilizer and labor inputs. However, there are other types of cost that also pay a role in affecting the cost of agricultural projects. They are taxes, subsidies, loans, and debt service. Tax payment is considered as a cost. The act of paying taxes causes the farmer to reduce his net worth. When a farmer pays taxes, the income of the farmer shifts to government's coffer with the view of doing greater good to the population than to the farmer alone. Thus, as tax payment would not cause the income of a nation to reduce, it would not be considered as a cost from the population or government's view. As a result, taxes should be perceived as causing the nation's income to increase during project-cost analysis.

In contrast to taxes, subsidies benefits the farmer without net changes to society's resources. When a farmer procures fertilizers with subsidization, his overall

cost will be lessen and causes the farmer's net worth to rise. However, from the society's real resources viewpoint, amount of expenditure for the fertilizer stays the same. From the government's viewpoint, this subsidized fertilizer will lessen the nation's income due to the resources used to produce the fertilizer that would otherwise be open to be used by the society. In situations where subsidy is directly paid to the farmer by the government, this increases the net worth of the farmer, without altering the price dynamics of the market that the farmer usually trades. It is also possible to help the farmer without subsidizing directly. This is achieved through imposing levy or import taxes on goods that are relatively competing with the farmer's produce. The difference in prices affected by such taxes and the lower price of the local farmers would not prevail without such measures, and these methods could be assumed to be as an indirect transfer of benefits to the farmer. Apart from that, problems could arise in land valuation due to conditions of market dynamics that exists when transfer of land ownership.

In projects that will be funded through debt from foreign sources, the costs associated with the debt would not be considered as a direct costs, as it handled as handover of costs within the economy. This is applicable when the earnings from the agricultural project is assumed to be sourced from local funds or being a proxy to foreign funds and the total benefits is shared among local population. With this assumption, there is a distinct focus between financing of the projects and intended gains of the projects. Enhancement in the product quality could also attributed as a byproduct of an agricultural undertaking. For example, in Ecuador, it was observed

that projects associated with agricultural increased the quality and also production of cattle in a way that the price of the feedstock increased by almost 20%.

Another type of costs are the secondary costs from investments in project that results from the value enhancement that occurs beyond the scope of the undertaking such as opportunity costs that arises from decision made during the project. For example, should a project exhibits increased yield of the quantity produced, other farms would be capable to trade in imperfect markets and this could lead to gains or losses that are inaccurately accounted. The problem of dealing with secondary costs could be mitigated through usage of shadow price evaluated from opportunity costs. For example, improved production of farm can be considered as output of irrigation projects, due to difficulty in estimating the value of irrigation water. There is also the term called multiplier effect, which is assumed to arise from economies that has excess capacity. It is associated with secondary benefits where an increased prior investment causes increased income in tandem that results in benefits in other aspects related to the project.

In a perfect market, the condition will be that each farmer should have optimized his usage of fertilizer to a level where the price equals the marginal value of the produce. The price of each produce should be equal in value to the preceding input that used in the production. Resources will be assigned through price mechanism in a way that the most recent unit of each produce of the economy is in its best optimal state. There is no alternative way to further increase the output economically. In reality, however, markets are not in equilibrium and are seldom perfect. Prices reflect imperfect value. Thus, the marketplace price of the good is generally the best assessment of its marginal

price and its opportunity cost, which results in the effective price to use in cost or benefit valuation.

2.1 Agricultural productivity

Agricultural productivity is generally defined as percentage of agricultural outputs to agricultural inputs. In developed and emerging countries, the growth of agricultural productivity is related to innovation and could be attributed to productivity improvement and development of its economy. Innovation contributes to job creation, income generation, and poverty alleviation. Thus, for agricultural industry and also the nation to survive, innovation is an important characteristic and must be integrated into every aspect on agriculture and trade.

The studies on agricultural productivity have been a prominent feature in finding ways to improve agricultural sector. These studies analyzed the correlation of agricultural productivity with many other contributing factor with the aim if finding factor that considerably affect the productivity which will ultimately result in reduced prices for agricultural corps.

Recently, the researches on agricultural productivity are focused on impact on climate on corps' growth. It could not be argued that agriculture is reliant on climate as studies have found changes in climate to cause profound impact on productivity of agricultural corps and choice of crop to be grown (Mahmud et al., 1994). According to Mundlak et al. (1997), the inputs used in agricultural resources plays a significant determinant in agricultural production. Sidik (2004) found that auxilary elements

ranging from provision of agricultural inputs for rice production such as increased fertilizer supply, good quality seed, played an important role in providing basic support to increase productivity to improve quality and minimize losses in Indonesia. In addition, the production technique chosen and the combination of factors it required to have depended on factor prices, given the range of determinant, such as water supply, soil conditions, climate and rice varieties preferred by producers and consumers (Eng, 2004).

2.2 Land used for plantation (acreage)

Many researches have been done on acreage or allocation of land for agricultural purposes. Over the years, these include literatures have gone through significant modifications. The literature exploring effects of acreage on prices of corps generally emphases on certain crops in specific provinces. In addition to that, the majority of the studies are done in America. However, there exists some researches that determine acreage elasticity among countries such as Barr et al, (2010) and Hausman (2012). Price volatility effects are generally thought as a microeconomic issues for producers. Nevertheless, there exists a number of factors that makes agricultural production at the global and country scale to be similarly affected by volatilities in the prices at the farm level production. Another reason for the increased interest on research in the matter is due to the increasing of demand for biofuels and also due to the financialization of agricultural produce, which as a consequence, are assumed to have attributed to the high and volatile food prices that in reciprocal may alter land use dynamics.

The dynamics of increased prices of agricultural produce are conversely discussed. Upsurge in demand trend that continued from the past decade due to the global shift for alternate fuel and demand for more food variety as a result of increased affluence in emerging nations could have played a significant role in the price surge (Mitchell, 2008). In addition to that, increased import of soybean by China resulted in expansion of land used for soybean plantation in Latin America (Abbott et al, 2011). Though new land openings for vegetation are still significant foundations of changes in land allocation for the emerging and developing nations, in developed countries, lands are shifted to high- demand produce from low in demand produce. This caused an increase in significant agricultural investments by foreign firms in a host of developing nations, mainly concentrating on developing high-demand crops.

Agricultural producers have largely reacted to the upsurge in prices of food by cultivating additional land into vegetation. Nonetheless, in the past 6 years, approximately 30 percent of the land used for high-demand produce were sourced from displaced low-demand land. It can be expected that in the coming years, the supply of land shall be more inelastic due to increased population, migration of populace to urban society and also weather factors. This shows that land allocation for agricultural purposes that is geared to high and volatile prices shall be mainly done through land reallocations.

2.3 Foreign Direct Investment

In recent years, Foreign Direct Investment (FDI) played a significant factor in the progress and growth of developing countries. Countries such as Korea, Brazil and Malaysia that showed environments for attracting inflows of foreign capital such as stable political environment, large markets with suitable skilled manpower and regulations that encourage investments, were in place and these appealed to investors who saw golden opportunities with future market developments of those countries. FDI in agricultural industry of developing countries are mainly focused in the in the up-stream sub-sectors such as processing of corps into ready-made foods beverages.

The recent increase in foreign investments in agricultural industries could be attributed to the expansion of population in emerging countries that experienced rapid growth of economy, which resulted in incomes of individual to rise in a way that they are able to afford to have higher expenditure on foods. In addition to that, with increased wealth, taste buds are bound to shift to diets that are related to affluent lifestyle such as meals with additional meat, fish and vegetables. To meet these demands, countries have resorted to importing these food items which creates opportunities for investment in industries associated with these food items for investors, either local or foreign. Because of policies in developed countries that limit the use of land for agriculture, some of these investments are now favoring emerging countries like Malaysia that does not have constricting policies on land development.

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