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Creating New Market in Integrated Agriculture Development Area in Samarahan, Sarawak, Malaysia – Case Study in the Supply Chain of Cucurbita sp. (Pumpkin)

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Abstract

Cucurbita sp (yellow pumpkin) commonly grown in Malaysia. Being very easy to grow within two to three months and hold for as long as six months as fruit in the storage, it has been encouraged to be grown in Samarahan, which is considered a food belt in the northern region of Sarawak, Malaysia especially for Kuching. However, in reality, there is a limitation in the commercial production as the pumpkin is very much dependent on the market demand as the utilization has been limited to the consumption of fresh product. Thus this creates a bottleneck in the supply chain resulting in large stock being stored in the farmers' places. This study explored a diversified supply chain model from the traditional pumpkin supply chain in Samarahan which follows a simple supply chain that is short and linear linking the farmers who are the producer to the consumer through the middleman and the retailers. The research supply chain model adopted a three level chain which had the combination of level one and level two supply chains, characterized more by the producers-collector-processing industry-consumers. The diversification of the supply chain resulted in establishing an added value link from the producers to the consumers with the integration of the processing industry adopting low technology of processing raw pumpkin to dehydrated powder form with the reduction of the need of a storage space by 80% and extending the shelf-life. The research model adopted the concept of food added value supply chain or value-based chain in order to achieve effective solutions regarding the production, marketing, distribution and sale of their produce.

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1. Introduction

Malaysia has a rich growth of agriculture cash crops which are mainly grown in the small scale farming holdings ranging from one to ten acres. One such crop of great interest in this study is the pumpkin. The two species of pumpkin commonly grown in Malaysia are the *Cucurbita moschata* and *Cucurbita moschata* Duchesne. The pumpkin, being very easy and fast to grow, harvesting at about two to three months. It is also easy to hold being able to be stored for as long as six months, has been encouraged to be grown in Samarahan, considered a food belt in the northern region of Sarawak especially for Kuching. The pumpkin has even been considered to be exported abroad. In 2013, a total of eight villages around Kota Samarahan within the Integrated Agricultural Development Area (IADA) Samarahan was selected as the location for the pilot project planting pumpkins and subsequently additional villages were included due to the interest of the rural community. The pumpkin project has increased farmers' income to a higher level with an average yield of two tonnes per acre. However, in reality, there is a limitation in the commercial production as the pumpkin is very much dependent on the market demand as the utilization has been limited to the consumption of fresh product. Thus this creates a bottleneck in the supply chain resulting in large stock being stored in the farmers' places after each production which faces over supply and could be over two months. The next crop will depend on how fast the pumpkin is sold off. However, there is room for value adding by establishing downstream activities which can be introduced in the current short and linear supply chain as a service to the pumpkin producers. Therefore this paper reports on the diversification in the supply chain management between the farmers and the producers and the consumers by the development of an added value product of the pumpkin.

2. Literature review

The pumpkin is considered as a fruit vegetable, traditionally consumed as freshly boiled and steamed or as processed food items such as soup and curry in Thailand (Pongjanta et al. 2006) and in cuisine such as *masak lemak labu*, *labu sira* and *pengat labu* or serve as dessert in Malaysia (Norshazila et al., 2014). White seeds dried for 'kuaci' production and pumpkins preserved in sugar are some of the downstream products (Norshazil et al., 2014). Pumpkin is very rich in carbohydrate, pectin, mineral salts and vitamins (Wang and Zhao, 1998; Wang et al, 2002). In addition it has high carotenoid compounds (Azizah et al., 2009) consisting of β -carotene and lycopene (Ben-Amotz and Fishler, 1998) and lutein, zeaxanthin, β -cryptoxanthin, and β -carotene (Murkovic et al., 2002). Jun (2006) concluded that as pumpkin is a good source of carotene, pectin, mineral salts, vitamins and other substances it is beneficial to health.

Christopher (2005) defined that the supply chain of agri-foods is like any other supply chain, a network of organizations working together in different processes and activities in order to bring products and services to the market with the purpose of satisfying customers' demands. Aranyam et al. (2006) reviewed that agri-food supply chains has been coined to describe the activities from production to distribution that bring agricultural or horticultural products from the farm to the table. Matopoulos et al. (2005) and Sporleder & Boland (2011) indicated that the supply chain of perishable goods of food products is unique due to their seasonability of production, perishability and price fluctuation. Salin (1998) stated that there were four main functional areas in the context of agri-food supply chains: production, harvest, storage and distribution. Accordingly, decision made in the production included those related to cropping such as the land to allocate to each crop, timing of sowing and the determination of resources required for growing crop. In addition, during harvest, some of the decisions that needed to be made included the timing of collection of the crops from fields and the determination of the level of resources needed to perform this activity. While storage included inventory and when the products needed to be stored before or during distribution, amount to store and sell, distribution functions involved moving the product down the supply chains to deliver to the consumers.

Development of a downstream product from the pumpkin can add value. This can be approached by processing of food commodity to support small producers and add activities of the small medium enterprises (SMEs). Based on the definition of Mentzer et al. (2001), 'supply chain as a set of three or more entities, directly involved in the upstream and downstream flows of products, services, finances and/or information from a source to a customer. Bahinipati (2014) reviewed that supply chain planning dealing with short life products in a competitive marketplace,

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