

## RECOMMENDATIONS TO STRENGTHEN *HALAL* FOOD SUPPLY CHAIN FOR FOOD INDUSTRY IN MALAYSIA

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### ABSTRACT

*With the goal of modernising marketing infrastructure and operating systems of food commodity in Malaysia, FAMA can position itself in the development and building of halal food supply chain for poultry, meat and fishery in Malaysia. Since FAMA is one of the government agencies that is directly linked and is always dealing with players of food commodities, it is about time that it became the champion for this study. Industry players such as the feed millers, growers, slaughter houses, storages, transporters, producers, wholesalers and retailers will also benefit from the study by being able to participate in the development process. This study provides all of them with a channel to convey their views on the features of the halal practices and to train them with an appropriate training or motivation programme on halal issues. The industry members, therefore, can become more innovative in improving their operations and more competitive in the world food trade. This may enable Malaysia to penetrate and capture the vast local and international markets for halal food.*

**Keywords:** *Halal* product, food industry, supply chain management, syariah

### INTRODUCTION

It is widely known that even a very good product is not going to capture consumers' market if it is not properly distributed. Consumers need to be able to get the product easily and it should be at its highest quality. Thus, the concept of product supply chain was introduced. Supply-chain management refers to the management of the entire set of production, distribution, and marketing processes by which a consumer is supplied with a desired product. In many cases, the supply chain environment is established when few interdependent companies decided to manage the stream of products along the value added chain to ensure that high quality products are available at the lowest possible costs (Folkerts & Koehorst, 1998). In the area of agribusiness, interest towards the existence of

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supply chain management activities started to gain strong momentum during the 1990s, particularly in the US as well as Europe (Woods, 2004). This issue continued to attract attention of the academics for the next decade or so and the interest was further fuelled by the rapid changes experienced in the food and agribusiness sectors. On the other hand, from the consumers' perspectives, their greater awareness about quality, safety as well as the nutritional components of the agrifood may have hastened the changes within the supply chain environments.

More than often, consumers have responded by exercising their ability to choose, and have begun to exert greater power than previously over the food production and marketing systems. In turn, it is clear to food suppliers that market success depends on the level of responsiveness to consumer demands. The idea that focuses on consumer-driven chains was introduced to describe this reorientation. Such situation has given rise to the consumer's power, which also signals the end of the prevailing assumption that farming and agribusiness is simply to supply products without having to be concerned about consumers' requirements or the existence of a market for the product. In an attempt to make Malaysian agribusiness more responsive to these changes, the Ministry of Agriculture and Agro-based Industry has defined two core programmes for spearheading the national agricultural development, namely improving food security and enhancing the development of competitive, sustainable, people-centered and decentralized agribusinesses (Marhaini & Ridzwan, 2005).

The two core programmes require better understanding and implementation of a systems approach in identifying, analyzing and improving problematic situations in agricultural development. Therefore, the application of the supply-chain management (SCM) concept in agribusiness is quite in line with the current needs of the agricultural sector's decision-makers, such as FAMA and the practitioners. The six principles of SCM used to measure the success of a supply chain for agricultural products in Malaysia are: (1) understanding and meeting customers' and consumers' needs; (2) getting the products right; (3) creating and sharing values; (4) logistics and distribution; (5) information and communication; and (6) effective relationships among supply-chain members.

Overall, this study attempts to investigate the *halal* market practices of the major players, which include the feed millers, growers, slaughterhouses, storages, transporters, producers, wholesalers and retailers of some selected food commodities (poultry, meat and fisheries). It is, therefore, proposed that the supply chain of food commodities must be examined to identify: (i) the extent to which suppliers are able to fulfil the *halal* needs of their downstream customers; and also (ii) the constraints that can have adverse impacts on the suppliers' ability to meet customers' *halal* needs. To achieve these, the study first analysed the *halal* supply chain management practices. Later, the issues related to *halal* SCM in food product are critically reviewed. The model is tested by gathering data from two types of non-probability sampling. Data are analysed and their practical recommendations are discussed.

## **HALAL SUPPLY CHAIN MANAGEMENT**

*Halal* (حلال, ḥalāl, halaal) is an Arabic term meaning “permissible”. In the English language, it refers most frequently to food that is permissible according to Islamic laws. In the Arabic language, it refers to anything that is permissible under Islam (The Halal Journal, 2006). As Muslim consumers are becoming more concerned about the *halal* status of their food products, the concept of SCM has slowly taken the centre stage in *halal* food industry. In fact, the Malaysian Prime Minister has recently highlighted the importance of *halal* logistics concept that is gaining wide acceptance in several Muslim countries. He strongly believes that in line with the rapid development of *halal* market within and outside Malaysia, the *halal* food industry should put in place specific supply chain facilities to ensure that all *halal* consignments remain unadulterated throughout the distribution channel (“Every state”, 2007).

Apart from ensuring the *halal* status, *halal* supply chain is also considered important because it is estimated that out of the USD 600 billion worth of the market, around 5 to 10 percent of total spending will go to logistics (Catto-Smith, 2007; “Every state”, 2007). Furthermore, Catto-Smith (2007) stated that due to its inferior *halal* logistics facilities, Thailand has only managed to capture less than one percent market share in *halal* food industry even though it has huge potential to service the industry. The importance of setting up *halal* SCM was also acknowledged when the port of Rotterdam became the only European port capable of handling *halal* food products with its dedicated *halal* distribution park. At the same time, the initiative provides a gateway to 30 million Muslims in Europe, serving a market worth approximately USD 45 billion annually (Fourth Malaysian International Halal Showcase, 2007). In line with the current trend, MISC Berhad has launched the pioneer *Halal* Express Service, a dedicated weekly direct liner service that connects *halal* cargoes from Asean, the Far East and the Australasia regions to the Middle East markets via Jebel Ali and Dammam in Saudi Arabia (The Halal Journal, 2006). The focus of the *Halal* Express Service will be on providing the first end-to-end *halal* supply chain solution.

### **Issues Related to Halal SCM**

Malaysia is one of the world’s great food producing nations. Its very own *halal* food market is also able to contribute significantly to the nation’s economy as well as to the global economy. The meat, fruits and vegetables produce have a reputation for excellence throughout the world (Table 1). Each year Malaysia exports a variety of *halal* foods to more than 70 countries. As many of these countries have significant Muslim population, most products exported are *halal* products. In other words, the growing size of Muslim population around the world has generated strong economic opportunities for the business communities in Malaysia. One of the most prevalent opportunities is the *halal* food market. With an estimated 1.8 billion Muslims worldwide, this represents an important market for Malaysian *halal* food products; especially when the market value of global *halal* food is estimated at around USD 550 billion per year. This has enabled Muslim communities to demand for the provision of *halal* food from global business communities. In fact, with a

total Muslim population of 1.6 billion and an increasing demand for *halal* food by the non-Muslims; the market is becoming so huge that it is being coveted by everybody in the food industry - Muslim and non-Muslim producers alike. In order to ensure that the demands for *halal* food products are met both at the domestic and international levels; Malaysia must possess a *halal* supply chain system that supports its international credibility.

**Table 1: Value of Total Food Exports by Selected Country of Destinations**

<b>Country of Destination</b>	<b>1998-99</b>	<b>1999-00</b>	<b>2000-01</b>	<b>2001-02</b>
Bangladesh	214	226	220	188
Egypt	208	259	297	241
Indonesia	608	673	1008	1155
Malaysia	845	801	997	1069
Saudi Arabia	312	389	433	787
UAE	180	168	221	236
<b>Total Selected Countries</b>	<b>2,367</b>	<b>2,516</b>	<b>3,176</b>	<b>3,676</b>

Source: Wiggins Price and Associates 2003

Even though the movement towards *halal* SCM has already begun, the lack of clear standardisation of the concept of *halal* food products between the local livestock as well as fish growers and other marketing intermediaries still exist. As the SCM of food commodity dictates that each of the chain members acts as a supplier to an initial chain member and as a customer for another, any perceptual differences will contribute to inefficiency within the supply chain daily operations and the marketplace. Such inefficiencies are most likely in the form of the *halal* status, quality, quantity as well as costing. For an example, the producers of food commodities such as poultry, meat and freshwater fish need to ensure that the feed used are made of *halal* ingredients. This aspect is of utmost importance because any usage of non-*halal* ingredients will affect and taint the *halal* status of these animals (Manan & Mazlan, 2006). In addition, the slaughtering of livestock need to be in line with the syariah requirements in order to preserve the *halal* status, else the whole SC can be considered as non-*halal*. Another aspect of the SC that must be monitored as well is the post slaughter stage. Activities related to the transporting (via refrigerated or non-refrigerated vehicles), warehousing and storing also must follow the syariah requirements, especially to avoid issues such as mixed storages and cross contamination. Hence, many aspects of SCM (improved logistics, preservation of product quality, standards and integrity throughout the chain) are, in essence, part of the efforts required for the setting up of *halal* supply chain that will be able to provide assurance of the *halal* status of the food products. Unfortunately, the existence of such aspects within the Malaysian current *halal* industry's SC remains to be proven.

## METHODOLOGY

According to the Malaysian Veterinary Department and the Fishery Department, until May 2007, there were around 21,779 poultry, livestock as well as fish growers in Malaysia. The study has also decided that in order to gain better insights related to the current situation of the *halal* supply chain management in Malaysia, a non-probability sampling technique will be employed. Two types of non-probability sampling were used to ensure that the objectives can be achieved. The first technique is known as judgmental sampling, which allowed the study to identify homogeneous samples within the population. The other sampling technique used is the snowball sampling that guided the study to locate other samples that might exhibit the same characteristics. As such, a total of 400 poultry producers, 300 livestock and 100 fish growers were identified as samples for this study.

The scope of this study is from “farm to table” for the selected three types of food commodities. In other words, the study investigates complete supply chain, in which, main players are classified into eight categories e.g. feed millers, growers, slaughterhouses, producers, storages, transporters, wholesalers and retailers as depicted in Figure 1. Based on the preliminary interviews and literature review, the eight categories of players are identified to be the most important players in the chain and are highly involved with the supply chain activities as well as implementation of *halal* practices. This study, therefore, is confined to investigating the *halal* practices within these supply chains.

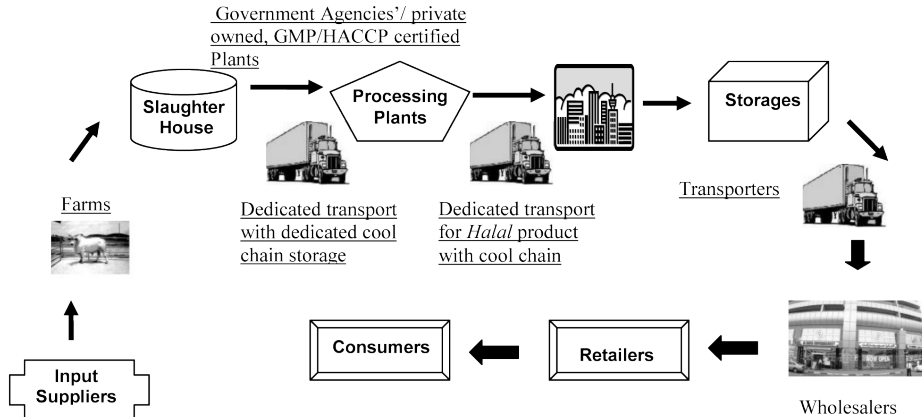


Figure 1: The Farm to Table *Halal* SCM Concept

Data for this study were collected using survey questionnaires that consisted of few closed ended as well as scaled questions. The questionnaire is divided into 4 main sections:

- Descriptive information about the respondents and companies;
- Part 1 the '*Halal Practices Profiles*' records how *halal* practices are oriented in the company;
- Part 2 the '*Customer Characteristics*' records information on customer characteristics, especially the customers' requirement and expectations on *halal* practices;

- Part 3 the '*Supplier Characteristics*' records information on supplier characteristics, especially the customers' requirement and expectations on *halal* practices;
- Part 4 the '*Training Details*' records information on what types of training and motivation in *halal* practices and implementation are required.

All survey questionnaires were pilot tested and the results indicated that the survey questionnaires have acceptable reliability values with all variables scoring at Cronbach's alpha of above 0.5. All of the data collected were analysed using the SPSS software.

## RESULTS AND DISCUSSION

A total of 731 samples were involved in this study, but only 715 of the questionnaires were further analysed as the other 16 questionnaires were incomplete. The highest number of samples came from Sarawak (70 samples) whereas the lowest number of samples were from Kuala Lumpur (11 samples). Majority of the other states contributed between 45 to 65 samples altogether. Out of these samples, 354 of them were from the poultry industry, 251 were from livestock and the remaining 103 from the freshwater fish industry. In relation to the categories of industrial players involved within the *halal* SCM, growers were the highest samples (239 samples), followed by transporters (110 samples) and slaughterhouse (95 samples). Feed millers were the lowest samples (26 samples) and so were the producers (28 samples). Details of the categories are given in Figure 2.

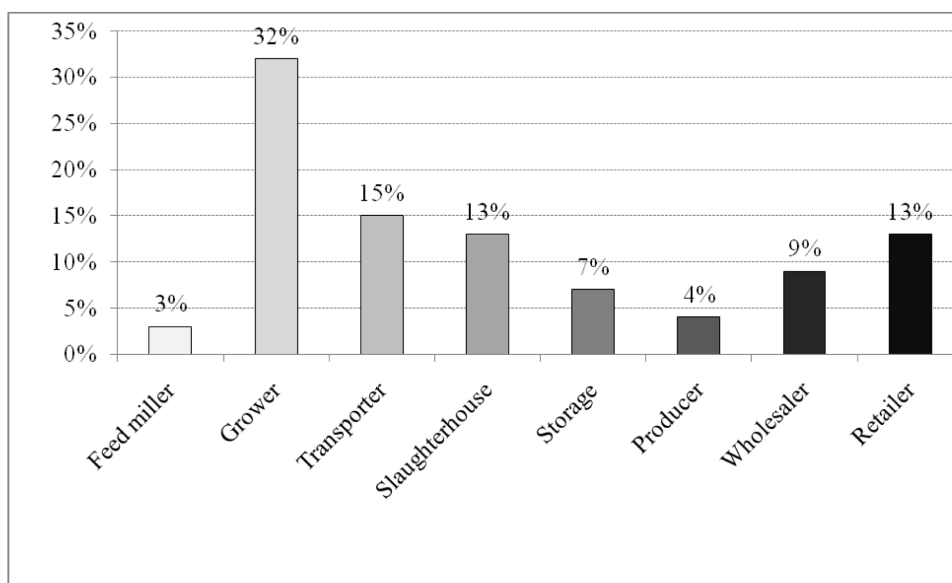
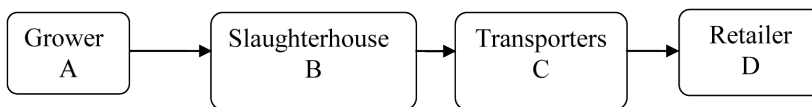


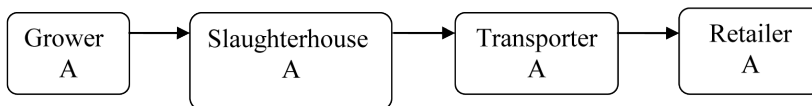
Figure 2: Distribution of the Samples According to Categories

The study also found that the market structure for the selected food commodities consisted of big integrator companies (30%), whereas small integrators as well as independent farmers made up the remaining (70%). Independent farmers posed the most challenging task in tracing the existence of *halal* SCM because most of these farmers were involved in small scale activities and did not have the financial capabilities to establish their own *halal* SCM as compared to the much bigger commercial farms. The study found that each structure has its own way of establishing the *halal* SCM with the big integrators having the clearest and well organised chains. The structures for each type of companies are given in Figure 3. Based on the samples, it is found that 8 samples for poultry are fully integrated big companies, another 49 samples are small integrated companies and 23 samples represent independent growers. Livestock companies on the other hand consisted of 11 fully-integrated big companies, and another 19 of the samples are small integrated companies. However, a total of 70 samples have been independent growers. Freshwater fishes in contrast, do not have fully integrated big companies. A total of 12 samples are small integrated companies and the remaining 20 samples are considered as independent growers.

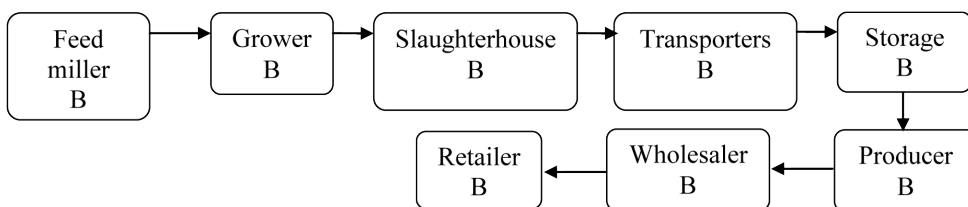
**Independent -**



**Small Integrator -**



**Big Integrator -**



**Figure 3: Structures of *Halal* SCM According to the Type of Company**

The supply chains depicted in Figure 3 indicate that as independent farmers, the study found these companies do not necessarily link to or depend on a particular contact along the supply chain. They are not restricted to a specific list of chain members and are free to source any companies that they feel provide them with the best deal. However, it was also found that not all contacts involved and contracted by the independent farmers are



*halal* certified. As such, it is difficult to ensure that the supply chains implemented by these companies are totally *halal*, as dictated by JAKIM<sup>1</sup>. These companies also have to source many critical services such as the feeds given to the animal. Due to their lack of resources, some of them failed to ensure that the ingredients used for the feed are *halal*. Many of them admitted that their main concern is the cost and to some extent, the extra services provided by the producers such as variety of packages, availability of the stocks and transporting the packages to their farms.

Another major concern related to the *halal* practices of the independent growers are the slaughtering activities. Although many of them claimed that they are either involved in live animal transactions or send the animal to the government slaughterhouses if the need arises, a few of them admitted that they are also willing to slaughter the animal themselves at the farm if requested by buyers. Some of these practices posed greater risks of tainting the *halal* status due to the lack of proper monitoring of *halal* food requirements. In fact, some independent growers that admitted to slaughtering the animal themselves did not have suitable facilities and equipment to perform the tasks.

Finally, another issue related to the supply chain practices of independent growers is the transportation aspect. Due to their small size, independent growers do not have their own fleet of refrigerated transport to service the industry. They either rely on transport companies or perform the tasks themselves. However, as the transport companies may not have a dedicated fleet to service *halal* food industry, the cleanliness of the refrigerated trucks is questionable. In fact, there are also cases where the same refrigerated trucks were used to transport *halal* as well as non-*halal* food products at the same time. This mixing of *halal* and non-*halal* raise even more concerns about the *halal* practices of the supply chain structures of the independent growers. Those who perform the tasks themselves also admitted that they are facing storage limitation when transporting the meat and to a certain extent, affecting the quality of the meat as well. Thus, due to the constraints faced by independent growers, the establishment of *halal* supply chain becomes more challenging, particularly when the existing supply chain cannot be converted easily to cater for *halal* food.

The small integrators on the other hand, demonstrated some forms of integration along their supply chain structures although not completely integrated to their operations. In some cases, the small integrated companies are also contract farmers for the fully integrated corporate companies. Examples of the small integrated companies are DBE Gurney and few other small enterprises all over Malaysia. Thus, they have the opportunities to benefit from the existing supply chain structures set up by the big corporations. As a result, these companies have better control over the efforts to ensure *halal* status of their products. Another structure existing within the Malaysian food industry is the fully integrated big corporations. Examples of such corporations are the Ayamas fully integrated system, TD Poultry in Selangor as well as Farm's Best Berhad. These corporations conduct all their activities in their own corporate business, in which, their operations are taken under one roof with a complete supply chain establishment already put in place.

<sup>1</sup> JAKIM is Jabatan Kemajuan Islam Malaysia



Integrated companies, whether they are fully or small and partially integrated, do have advantage over their independent counterparts. For a start, these companies usually have the necessary resources to set up their own supply chain structures that are dedicated to serve the *halal* food industry. They have their own fleet of dedicated refrigerated transport that service the whole chain and this has taken away the risks of cross contamination during transportation activities. Furthermore, they also have their own slaughtering facilities that are certified and monitored by JAKIM to conduct all the slaughtering activities. These facilities are also manned by qualified workers that have been well trained. Most importantly, they also ensure that all players that have been integrated into their supply chain are certified by JAKIM to maintain proper monitoring system of the *halal* practices implemented by these players. As a result, integrated companies appeared to have a better, more organised and properly certified *halal* supply chain. Therefore, even though Malaysia still has not established a comprehensive and dedicated *halal* supply chain for the industry, upgrading the existing integrated supply chain structure might just be the right solution for the *halal* food industry.

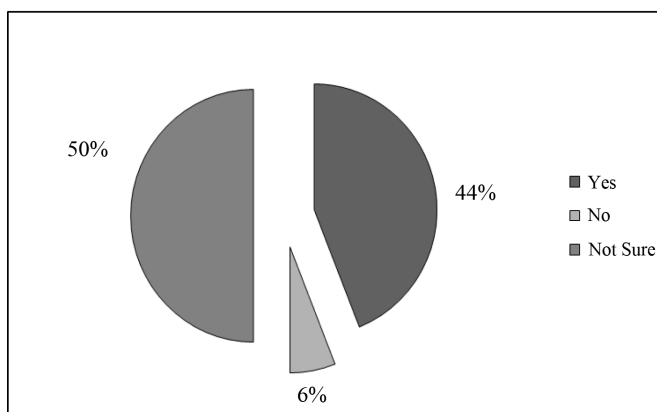
## DISCUSSION AND RECOMMENDATION

The discussion and recommendation on *halal* supply chain practices are discussed for each player.

**Feed Miller:** From the analysis, 62 percent of the feed millers used imported raw materials instead of using local raw materials (38 percent). Feed millers, however, use local raw materials if the material is easily obtained locally e.g. palm kernel cakes, palm oil waste and soybean waste; materials which are mostly plant based. Surprisingly, this study has discovered that there are a few feed millers who are using animal based materials like animal bones. Local materials account for 3 percent whereas 6 percent is imported from China. The majority of the feed production is plant based (63 percent). Animal based feed production accounts for 21 percent, and feed production that is both animal and plant based account for 5 percent.

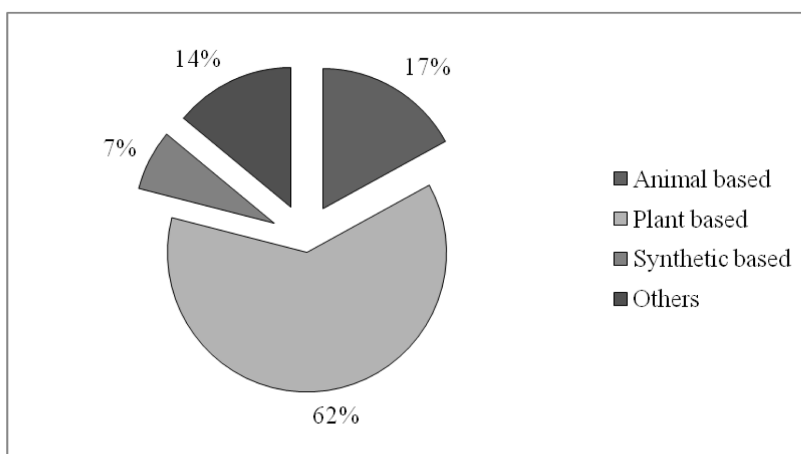
The type of animal, plant and synthetic based feed account for 11 percent. In relation to the feed millers that produce the animal feed, most of them (50 percent) said that they are well aware of the *halal* requirements for the preparation of the animal feed (Figure 4). However, the same percentage (44 percent) also claimed that they are not too sure of the requirements and they do not really have any clear guidelines on the preparation of the animal feed. Only a handful (6 percent) mentioned that they are not aware about any *halal* requirements that they have to abide by as they are only producing animal feed and are not involved with the production of *halal* food. They are also unaware of the concept of *halal* that stresses on practices from the farm to the table. As far as they are concerned, animal feed does not necessarily need to be certified as *halal* and as far as their practices go, they have not breached any regulations on the production of animal feed.

**Recommendation:** 1) Need to improve the surrounding area in terms of setting up the business not near to the non-*halal* area; 2) Need to comply more with the regulations from *Majlis Agama Islam*; and c) Company needs to get more advice services from *Jabatan Saliran dan Air* for drain problems.



**Figure 4: Awareness of Food Production from Feed Miller Based on Non-Halal Animals**

**Growers:** Figure 5 shows that most of the growers use plant-based feed for their animals (62 percent). 17 percent of growers use animal based feed, while 7 percent use synthetic based feeds. A 50 percent of the feed millers are aware that food production based on animals is not *halal*, while 44 percent are not very sure and only 6 percent are totally ignorant. Some of the growers claimed that they have no choice but to source some of the ingredients from sources that are not clear in terms of their *halalness*. However, they believe that they have done their best in maintaining *halal* practices because almost all of their ingredients are either plant based or synthetic based. In fact, most of them have stopped using animal-based feed because of the risks related to viruses as well as other infections.



**Figure 5: Types of Feed Given to the Animals**

**Recommendation:** 1) Company needs to understand the *halalness* of imported medication and vaccine given to animals; 2) Company and Jabatan Perkhidmatan Haiwan (JPH) should often inspect the animals for chemical residue, physical injury and disease; and 3) Instead of using dogs, the company can use other alternatives for farm security.

**Slaughterhouses:** The study is able to identify the *halal* practices implemented by the slaughterhouses in terms of MS 1500: 2004 Standard; specifically on the aspects of workers, cleanliness of animals, surrounding area, types of input handled, sanitation and sewerage system, cleanliness of farms and storages, transportation.

**Recommendation:** 1) Companies should make sure that they hire workers who are totally of sound mind, mature, and fully understand the Islamic procedures and conditions for slaughtering of animals; and 2) Slaughterhouses or facilities that are near to any residential area should make sure that the sanitation and sewerage system is satisfactory.

**Storages:** The number of *halal* and non-*halal* carcasses must be recorded at this point and be available for audit by JAKIM. Carcasses that are not *halal* must be stamped as non-*halal* and the stamping done under the supervision of the Muslim checker. Non-*halal* offal must not enter the same offal room as *halal* offal unless complete segregation of product can be achieved and is documented. *Halal* carcasses must be stored in separate chillers to non-*halal* carcasses or under controlled physical segregation. *Halal* carcasses must be boned and packed prior to any non-*halal* product entering the boning room. *Halal* product must be stored separately from non-*halal* product under controlled physical segregation. The number of *halal* and non-*halal* cartons moving into and out of the cold store must be recorded. There must be regular reconciliation of the production records to verify the eligibility of *halal* products. These records must be available for audit.

**Recommendation:** 1) Companies have to understand that the types of input handled must comply with all the *syariah* requirements; 2) Companies should emphasise more on the implementation of the Hazard Analysis and Critical Control Point (HACCP) or similar food safety system; 3) Storage needs to be improved in terms of providing a dedicated cold room for *halal* meat and compliance with *syariah* requirement; and 4) In order to prevent contamination, the company should be more aware that non-*halal* and *halal* goods must be kept separately in the storage.

**Transporters:** The analysis shows that most of the transporters involved in this study are transporting chicken (44 percent) and meat (37 percent). About 71 percent of the transporters are Muslims. The lack of specialist *halal* services offered by 3PL providers limit the potential of such activities from being outsourced.

**Recommendation:** 1) Transportation must be improved in terms of providing the dedicated transport for *halal* meat and comply with *syariah* requirement; and 2) Equal number of drivers and vehicles.

**Producers:** Some producers label meat products as *halal* when these products are in fact not *halal*. It is possible that they will innocently believe that they are following the “rules” to label the meat as *halal*. It is also possible that there is little concern other than marketing and sales driving these decisions. When a meat product is labeled as *halal* with no reference to the certifying organisation, the chances are high that the meat is mislabeled. A producer looking for *halal* meat as an ingredient must not assume that a meat item labeled as *halal* is indeed authentically *halal*. To be certain, request for a *halal* certificate for each lot of meat is a necessity. Since meat is the most critical ingredient, the supervising organisation must evaluate the supplier or recommend another supplier. Any producers wanting to buy *halal* meat as an ingredient must exercise extra care. For this study, it is indicated that most of the producers are producing or processing chickens (64 percent) into processed food.

Recommendation: 1) *Jabatan Persekitaran* should always supervise the company; 2) Company has to well understand that the gadgets used to pack non-*halal* food cannot be used to pack *halal* food; and 3) Company must emphasise on the implementation of the Hazard Analysis and Critical Control Point (HACCP) or similar food safety system.

**Wholesale:** The study is able to identify the *halal* practices among wholesalers in terms of MS 1500: 2004 Standard: specifically on the aspects of the surrounding area, workers, sanitation and sewerage system as well as cleanliness of equipment.

Recommendation: Need a higher level of compliance with the regulations from *Majlis Agama Islam*.

**Retailers:** From the analysis, the study is able to identify the *halal* practices among retailers in terms of MS 1500: 2004 Standard: specifically on the aspects of the surrounding area, workers, sanitation and sewerage system as well as cleanliness of equipment.

Recommendation: 1) Need to focus more on the types of input handled; and 2) Company must understand the usage of any chemical for cleaning.

With the goal of modernising marketing infrastructure and operating systems of food commodity in Malaysia, FAMA can position itself in the development and building of *halal* food supply chain for poultry, meat and fishery in Malaysia. In general, this study has proposed the ten recommendations to FAMA:

1. To develop *halal* vertical integration for better coordination from farm to table;
2. To establish and transform the *halal* marketing infrastructure for poultry, meat and fishery food products;
3. To promote *halal* farm training of the practices in the areas of feed mill, farm practices, transporting, striating, grading, packaging, labelling, sealing, producing and selling the food products;
4. To be the catalyst for the development of an efficient *halal* distribution, logistics and storages system for agro business to meet the specific

requirements of a wide variety of market users, including farmers and farmers' organisations, cooperatives, packing houses, specialty and general retailers, hypermarkets, supermarkets, as well as secondary wholesalers;

5. To create an efficient *halal* market intelligence through an effective pricing mechanism that can ensure fair and transparent competition among suppliers and wholesalers;
6. To establish the partnership and alliances towards a *halal* distribution link, and to facilitate feedback of information on changing consumer preferences to the producers.
7. To encourage companies to devise their own *Halal* control points for the slaughtering process and as well as incorporating the *halal* practices in their standard operating procedures as a self-compliance tool;
8. To create *halal* traceability system as a tool for communication, making information available along the supply chain;
9. To create awareness on the *halal* practices that do not only cover basic Syari'ah requirements, but also include other aspects such as food hygiene and safety; and
10. To establish a centre on new product development, food biotechnology, *halal* food ingredient, disease diagnostic as well as prevention and control on livestock.

## CONCLUSION

The establishment of *halal* supply chain in Malaysia is still at its infancy. In fact, a dedicated logistic solution provided for the *halal* food industry by MISC Berhad is available to importers and exporters only. Most of the players involved with the industry in Malaysia are still using existing supply chain structures. As the nature of the players is different, the structures used for establishing *halal* supply chain also vary accordingly. Integrated and independent growers have been observed to use different supply chain for distributing their products. Each of the structure has its own deficiencies that could significantly affect the *halal* status of the food products. The constraints faced by these companies need to be properly addressed in order to ensure better compliance towards *halal* food requirements.

The introduction of the state of *halal* all the way from farm to table requires a comprehensive review on the suitability of the existing supply chain. This is because every step within the supply chain must be able to preserve the *halal* status of the food products. There are many criteria set by JAKIM that need to be fulfilled and the study found that some of the existing supply chain structures adopted by industry players at worse, failed to ensure *halalness* of the food and, at best, are questionable. The independent growers are the most vulnerable group due to their lack of resources to establish dedicated *halal* supply chain. Results also indicated that this group of growers has to use either existing supply chain or perform the jobs themselves. This has made them more exposed to the risks of questionable practices.

On the other hand, other structures, the small integrators as well as the fully integrated big corporations have their very own dedicated *halal* supply chains. In most cases, those fully integrated have their own slaughtering facilities, fleet of transports and also processing plant for the food products' value added activities. These companies also have a proper system in place that effectively monitors the movement of food products from the beginning until they reach the consumers. The study also found that integration is by far the most suitable existing supply chain structures to cater for the *halal* food industry. A dedicated chain, like the one established by integrators is able to avoid any cross contamination as well as possible mishaps that could jeopardise the *halal* status.

Other important aspects in the *halal* food supply chain are the *halal* market intelligence and also *halal* awareness among the players as well as customers. Market intelligence is important because it will be able to provide relevant information required by the industry in order to serve the customers more effectively and efficiently. This is an important aspect in encouraging the industry players to be involved in *halal* food supply chain because it allows them to manage the operating costs and eventually creating acceptable profits for the companies. *Halal* awareness programmes are one of the backbones of the whole chain because everybody needs to be able to understand the true meaning of *halal* food and how it can be produced. Without proper knowledge, players might unknowingly be involved in activities that can make *halal* food products to be non-halal. This can again, jeopardise the government's aspiration to turn the country into a regional *halal* food hub. Moreover, ill-informed customers might also hurt the industry by not knowing what to expect in the production of *halal* food. They might not even know whether the products available in the market are *halal* or not. The customers should know what food is *halal* and in return make demands on the industry to provide them with genuine *halal* food products. This can be achieved if customers have an adequate level of awareness with regards to *halal* food.

Since FAMA is one of the government agencies that has direct linkages with players of food commodities, it is timely that FAMA should be the champion of this study. Industry players such as the feed millers, growers, slaughterhouses, storages, transporters, producers, wholesalers and retailers will also benefit from the study by being able to participate in the development process of implementing the *halal* concept. The study provides all of them with a channel to convey their views on the features of the *halal* practices. It uncovers the need of industry players to be provided with an appropriate training or motivation programme on *halal* issues. The industry members, therefore, can become more innovative in improving their operations and more competitive in the world food trade. This may enable Malaysia to penetrate and capture the vast local and international market on *halal* food.

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