

REVIEW ON QUALITY ASSURANCE FOR FOOD-BASED PRODUCTS IN MALAYSIA

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ABSTRACT

Quality assurance measures for food products have been widely applied by the food industry players due to an increase in the demand for good quality food-based products by consumers. The establishment of quality assurance requires that the food industry players provide safe and quality products at an early stage of the supply chain. This will reduce consumers' concerns on food safety and quality issues in the market. In order to meet the challenging requirements of quality assurance, sustainable agriculture practices such as the implementation of GAP have increasingly been applied in Malaysia. The Malaysian quality assurance schemes were established to strengthen the processes and requirements as compared to GLOBALGAP schemes. Thus, through the implementation of schemes, the market opportunity becomes open to the industry players. Besides, society will benefit from what they purchase and consume.

Keywords: Food, quality, safety, food-based industry, Good Agricultural Practices (GAP), sustainable agriculture

INTRODUCTION

Quality assurance is crucial for monitoring food processes and evaluating the final food products to ensure they are safe for human consumption and meet consumer requirements at a certain level by including organoleptic attributes and having a consistent quality (Chandrapalaa, Oliverb, Kentishc, & Ashokkumara, 2012). Food-based products can be expressed as processed food, which is made from food-based materials for human consumption. For example, tomato paste, tomato sauce, and tomato-based soups are food-based products from tomato (Tonucci et al., 1995).

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The establishment of quality assurance requires that the food industry players provide safe and quality products at an early stage of the supply chain. Consumers are now looking for more healthy foods as they are very concerned that the foods they consume need to be 'safe' for continuous consumption. Food safety is defined as "the assurance that the food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use" (FAO/WHO, 1997). Steps in quality assurance contribute solutions to producers in the food supply chain. It also creates value for businesses which can be achieved through compliance to sustainable agriculture approaches and safety approach such as the Good Agricultural Practices (GAP). Quality assurance is aimed at building trust, loyalty, and relationship between the players in the food industry. Quality assurance also helps to evaluate and consistently maintain the effectiveness of the total quality system in the food industry (Cichy, 1982).

The significance of the requirement of quality assurance for the Malaysian food-based product industry can be observed through the widening of the balance of trade (BOT) figures. Current trade figures of food-based products show that the industry has a good potential for market expansion in the future. In 2011, exported food-based products totalled RM20,500 million, whereas imports stood at RM34,449 million (Table 1). This shows that the balance of trade has a deficit of RM13,949 million. Thus, it indicates that import substitution strategies and promotion of exports that meet the market's food safety and quality standards need to be enhanced.

Table 1: Balance of Trade for Malaysian Food-Based Products, 2007-2011

Year	2007	2008	2009	2010	2011
	(RM million)				
Exports	13,776	17,772	15,714	18,098	20,500
Imports	23,440	27,894	26,680	30,191	34,449
Balance of Trade (BOT)	-9,664	-10,122	-10,966	-12,093	-13,949

Source: MOA (2011a)

Statistics have shown that imports of food-based products have increased faster than domestic production. For instance, vegetable consumption per capita, which was 40 kg in 2003, had increased to 47 kg in 2011 due to a rise in consumers' income, changing lifestyle, and growing concern for healthy food (Nurul Islam, Arshad, Radam, & Alias, 2012). In addition, after several food scandals were revealed and reported around the world, for instance, in China, where milk produced by this country was claimed to contain Melamine to manipulate the protein concentration, and also in Europe, where beef burger was affected by undeclared horse meat, consumers in general have now become more concerned about food safety (Chan, Griffiths, & Chan, 2008). Thus, the need for ensuring safe and quality food consumption has been strengthened to ensure that foods meet the prescribed quality standards. The objective of this paper is to review the development of quality assurance schemes for food-based products in Malaysia.

JUSTIFICATION AND IMPORTANCE OF QUALITY ASSURANCE

The quality assurance requirements are imposed by the government particularly on food chain players involved in the production, processing, and marketing of food-based products. Food safety and quality assurance systems can take many forms, for example, private voluntary international quality assurance standard, such as ISO 9000 (Holleran, Bredahl, & Zaibet, 1999). ISO 9000 is accepted in the global arena where procedures and guidelines are precisely initiated in order to maintain consistent quality (Zaibet, 1995). The players in food-based products supply chain include input providers, farmers, cooperatives, marketing organizations, packers, wholesalers, traders, processors, distributors, retailers, food service companies, and consumers. Other complementing food chain players, such as universities, institutions, environmental organizations, industry associations and media, are also actively promoting quality assurance awareness of food-based products and services. As the demand for quality food-based products increases, food production has to focus on food safety and traceability (Total Quality Assurance Services, 2009). The growers need to practise sustainable and environment-friendly farming activities so as to be accepted socially and ethically by the society. Food supply chain management, which is focused on quality, will generate more disposable income to the growers, processors, and marketers. This will also contribute in increasing the overall welfare of the players in the industry.

Appropriate agricultural activities and technologies, particularly on GAP, postharvest handling, food storage and packaging should be adopted by the players in the industry. The justification of quality assurance scheme is mainly for access to high valued markets, both international and domestic. The international market generally consists of large retailers; mainly supermarket and hypermarket that require stringent quality assurance from their suppliers. The standard is important for establishing product reputation and it is a symbol of pride of their retailing efforts. The standard will also provide a common platform to allow the growers to establish a good marketing relationship and networking with retailers.

Another justification for quality assurance is to find new methods and better ways to produce certified products. An example of this technology is improved seed quality that will lead to better yield and flavour. Producers should also reduce the utilization of pesticide and fertilizer inputs and practise more selective crop protection measures in order to promote food safety. The adoption of Integrated Crop Management (ICM) can help growers optimize the use of inputs for producing food under local conditions. Therefore, the challenge of producing food-based products in the future requires professional agricultural approaches in terms of farm management planning, record keeping, transparency of production, traceability, and independent verification. Nowadays, consumers are known to be more concerned about food safety and the quality of food-based products, and are more oriented towards preserving the natural habitat at the farm.

Aside from the issues from consumers and the producers' perspectives, local food-based product producers are also faced with challenges in implementing quality assurance

programmes. The competitiveness of food companies in national and international markets depends upon their ability to adopt production processes which meet food safety and quality requirements (Holleran et al., 1999). Such programmes may affect the cost of carrying out transactions which arise from uncertainty regarding food quality attributes. These transaction costs vary depending on factors such as product differentiation and firm size. Seddon, Davis, Loughran, and Murrell (1993) explained that larger firms lean to cost reduction as one of the extra profit compared to small firms. The resources for small-scale firms are narrower than those of larger firms. Small firms may not have a quality assurance scheme so staff resources may need to be diverted to quality assurance system adoption in order to complete the paperwork, implement, and maintain the system (Noteboom, 1993). Thus, the lack of training and knowledge was probably linked to the quality assurance implementation programme (Soon, Singh, & Baines, 2011). This will lead to the producers omitting the implementations without realizing its benefits.

SUSTAINABLE AGRICULTURE SYSTEM

Sustainability as applied to food production forms a basis to produce sufficient and affordable supplies of high-quality food and fiber to the community. Sustainable agriculture needs to be economically viable, environmentally sound, and socially acceptable. It means that the production must be able to create the economic viability of farming, protect the environment, optimize the use of natural resources, and apply the best available technologies. These approaches will enhance the quality of life of the growers, farmers, rural communities, and society at large. To achieve those objectives, the application of integrated farming is important in contributing to a sustainable agriculture environment at the farm level. Sustainable agriculture involves two main strategies. Firstly, Integrated Pest Management (IPM) emphasizes on the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms (Scarpa, Thiene, & Marangon, 2008). Secondly, IPM focuses on the whole farm strategy, which involves managing crop profitability in a way that suits local soil, climate, and economic conditions efficiently.

A COMPARISON OF QUALITY ASSURANCE IN MALAYSIA AND THE EUROPEAN UNION

Quality Assurance in Malaysia

Malaysia has successfully penetrated the export market for food-based products. Exported food-based products must meet the requirements of international standard for food safety and quality. Malaysia, through the respective agencies, has introduced several pre-farm standards known as Accreditation Production Schemes to ensure that food-based products comply with the Sanitary and PhytoSanitary (SPS) requirements of the global market (Malaysian Productivity Corporation, 2008). The quality assurance or accreditation scheme emphasizes the importance of proper farm management activities and the

implementation of GAP. Three accreditation assurances introduced by the Ministry of Agriculture and Agro-based Industry in 2002 are as follows: (1) Accreditation for crops referred to as SALM (Malaysian Farm Certification Scheme for Good Agriculture Practice/*Skim Amalan Ladang Baik Malaysia*); (2) Accreditation for livestock which is known as SALT (Livestock Farm Accreditation Scheme/*Skim Akreditasi Ladang Ternakan*); and (3) Accreditation for aquaculture production which is known as SPLAM (Malaysian Aquaculture Farm Certification Scheme/*Skim Persijilan Ladang Akuakultur Malaysia*) (Ministry of Agriculture and Agro-based Industry, 2011b). The final products must fulfil the quality that is required by the market. Apart from that, the products must also be reliable, consistent, and credible in terms of food safety and nutritional content, and should comply with the standard requirements of the international markets particularly Australia, Japan, the EU, and USA. Therefore, the implementation of accreditation schemes for food production should be promoted and strengthened so as to be widely applied among the growers.

Another important element in implementing quality assurance is the establishment of clear guidelines as well as dissemination of information, record keeping, and product traceability. Agencies under the Ministry of Agriculture and Agro-Based Industry (MOA) such as the Department of Agriculture (DOA), the Department of Veterinary Services (DVS) and the Department of Fishery (DOF) are responsible in providing the guidelines and the implementation of SALM, SALT, and SPLAM, respectively (MOA, 2011b). The core activities of the agencies are to facilitate the implementation of quality assurance of food products, to serve as legal owner of the normative documents, and to host the secretariat for the implementation of an accreditation scheme for the respective commodities. An accreditation scheme on quality assurance on food production in Malaysia is still in the process of benchmarking according to the standards of fulfilling the requirements of GLOBALGAP. Due to the strict guidelines of GLOBALGAP, producers in Malaysia had been given some 'relaxation' or 'harmonization' in terms of quality and farm management until 2010 (Abd Rahim & Kamarulzaman, 2011) for food items to be exported to the European market (GLOBALGAP, 2008). Studies have also shown that small farmers are not able to meet the strict quality requirements set by retail chains (Nurul Islam et al., 2012). For instance, Giant, which is one of the biggest retail stores in Malaysia, had 200 vegetable suppliers in 2001, but by 2003, this number was reduced to 30 suppliers (Shepherd, 2004). Despite their late entry into the Malaysian retail sector, the new store-based retailers accounted for as much as 60% of fruit sales and 35% of vegetable sales in Malaysia in 2002 (FAO, 2005).

The Ministry of Agriculture and Agro-Based Industry (MOA) introduced a programme known as "Malaysia's Best" for food-based products produced in Malaysia. The brand represents the seal of approval from MOA for food-based products in terms of safety and quality. The branding serves as a quality assurance guarantee for domestic and foreign consumers for Malaysia's agricultural products. The brand name and seal enhances the image of the country's agricultural products, which in turn enhances demand in the global market. The "Malaysia's Best" branding is issued by the Federal Agricultural Marketing Authority (FAMA) for agricultural produce that follows the highest safety and quality

standards set by the authority. Farmers participating in the Malaysia's Best program should also be SALM certified (Malaysia Government, 2011).

Growers interested in adopting quality assurance in their farms should apply to the respective agencies under the MOA. Other requirements for quality assurance are that an inspection should at least be carried out at least once a year and to monitor the procedures according to the license on the assurance granted. It means that the guidelines must be thoroughly followed by the growers in order to achieve full compliance of the accreditation scheme. To ensure its implementation, the MOA has appointed external and independent assurance bodies to assist the ministry in conducting technical assessment and getting feedback from the industry players in terms of quality assurance for food-based products (MOA, 2011b). The DOA and MOA become the prime bodies to create the awareness about the accreditation in the agriculture sector in Malaysia. These bodies are also providing special courses for those interested to obtain the accreditation for their firm and to assist the applicant in the application process as well.

Quality Assurance in the European Union

In September 2007, EurepGAP changed its name to GLOBALGAP to reflect its increasingly global scope (FAO, 2007). GLOBALGAP started in 1997 as an initiative of private retailers and it was then fully implemented in 2001 for the fresh food-based products industry (GLOBALGAP, 2008). GLOBALGAP is the internationally recognized standard for farm production. Their core product is the result of years of competitive research and cooperation with industry experts, producers, and retailers around the globe. Their goal is for a safe and sustainable agricultural production to benefit farmers, retailers, and consumers throughout the world. GLOBALGAP was established to reduce the risk of food safety lapses in agricultural production and to verify consistently the best agricultural practices throughout the world. GLOBALGAP is a private quality assurance of food-based products implementing in the European Union (EU) market. It is a set of normative documents for assurance of quality for the whole chain of food-based products. The aim of GLOBALGAP is to establish an agreement on standards and procedures among players within the entire food chain. The technical and standard committees consist of growers and retailers who are responsible in meeting the GLOBALGAP assurance to the other players in the market. The documents of GLOBALGAP have been accepted by the representatives at all stages in the food chain industry worldwide. The principle of GLOBALGAP is to promote the adoption of the available technologies to manage the farm and to produce food according to the principles of sustainable agriculture, namely, IPM and ICM. GLOBALGAP involves 14 protocol sections such as traceability, record keeping and internal audit, varieties and rootstocks, site history and management, soil and substrate management, fertilizer usage, irrigation, crop protection, harvesting method, post-harvest treatment, waste and pollution (recycle and reuse), worker health (safety and welfare), environment issues, and assessment of the assurance scheme at the farm level. Table 2 shows the module for each industry in the agriculture sector. A specific standard for each sub-industry was also well developed. For example, each sub-industry in livestock, such as cattle and sheep, dairy, calf and young beef, pigs, poultry and turkey, has their own

GLOBALGAP standards to be followed by producers. There are also specific standard procedures for Chain of Custody Standard, Plant Propagation Material and Compound Feed Manufacturing (GLOBALGAP, 2012). According to GLOBALGAP, there are 12 Malaysian producers that have been certified until 2008 (GLOBALGAP, 2008).

Table 2: The GLOBALGAP Module Implementation for Industry in the Agriculture Sector

No.	Industry	Module Covers
1.	Crops	<ul style="list-style-type: none"> • Traceability • Propagation material • Site history and site management • Soil management • Fertilizer application • Irrigation/Fertigation • Integrated pest management • Plant protection products • Equipment
2.	Aquaculture	<ul style="list-style-type: none"> • Site management • Reproduction • Chemicals • Occupational health and safety • Fish welfare, management and husbandry • Harvesting • Sampling and testing • Feed management • Pest control • Environmental and biodiversity management • Water usage and disposal • Post-harvest - mass balance and traceability • Post-harvest - operations • Social criteria
3.	Livestock	<ul style="list-style-type: none"> • Site • Worker health, safety and welfare • Livestock sourcing, identification and traceability • Livestock feed and water • Livestock housing and facilities • Livestock health medicines • Fallen stock disposal • Livestock dispatch

Source: GLOBALGAP (2012)

Table 3 shows a comparative summary of the quality assurance schemes between Malaysia and GlobalGAP.

Table 3: A Comparison of Quality Assurance between Malaysian GAP and GlobalGAP

Quality Assurance	Malaysian GAP	GLOBALGAP
1. Standard/Scheme	<ul style="list-style-type: none"> • Accreditation Production Schemes <ul style="list-style-type: none"> ○ Malaysian Farm Certification Scheme for Good Agriculture Practice (SALM) ○ Livestock Farm Accreditation Scheme (SALT) ○ Malaysian Aquaculture Farm Certification Scheme (SPLAM) 	<ul style="list-style-type: none"> • formerly known as EurepGAP
2. Year of Introduction	<ul style="list-style-type: none"> • 2002 	<ul style="list-style-type: none"> • 1997 (as an initiative of private retailers) • 2001 (full implementation)
3. Objectives/Aims	<ul style="list-style-type: none"> • SALM <ul style="list-style-type: none"> ○ To encourage and certify farms which adopt good agricultural practices (GAP), operate in an environmentally friendly way and yielding products that are of quality, safe and suitable for human consumption. • SALT <ul style="list-style-type: none"> ○ To produce good quality livestock and safe livestock products for consumption through inspection and farm certification. • SPLAM <ul style="list-style-type: none"> ○ To encourage good aquaculture practices (GAqP) including responsible and environmental friendly practices at the farm level 	<ul style="list-style-type: none"> • To reduce the risk of food safety lapses. • To verify the best agricultural practices. • To establish an agreement on standards and procedures among agriculture players within the entire food chain

Table 3 (continued)

Quality Assurance	Malaysian GAP	GLOBALGAP
4. Responsible Agency/ Organization	<ul style="list-style-type: none"> • SALM - Department of Agriculture Malaysia (DOA) • SALT - Department of Veterinary Services Malaysia (DVS) • SPLAM - Department of Fishery Malaysia (DOF) 	<ul style="list-style-type: none"> • GLOBALGAP Organization (Non-Governmental Organization)
5. Implementation	<ul style="list-style-type: none"> • Improvement being carried out in the schemes with respect to Sanitary and PhytoSanitary (SPS) measures in order to meet GLOBALGAP requirements 	<ul style="list-style-type: none"> • Some ‘relaxation’ or ‘harmonization’ were allowed in terms of quality until 2010 • Currently all improvement measures in quality have been implemented

Source: DOA (2012), DVS (2012), DOF (2012), GLOBALGAP (2008)

BENEFITS OF QUALITY ASSURANCE

Quality assurance for food-based products will enhance food traceability and will provide better and clear information on the sources of the foods (GLOBALGAP, 2008; Total Quality Assurance Services, 2009). The improvement of the quality system in food-based producers by adopting standards such as SALM or GLOBALGAP will significantly contribute to the improvement of the industry. The players will enjoy the benefits from the satisfaction of client’s requirements, internal norms’ requirements, expectations of the shareholders, and maintenance of an appropriate work environment (Jatib, 2003). It will increase consumers’ trust on food safety in the market. As a result, consumers will be fully satisfied in terms of quality, choice of varieties, taste, size, packaging, storage, and safety. By having the best farm management under quality assurance on the farm level, awareness among the growers in practicing and implementing more sustainable agriculture activities will increase. The growers have to follow the established guidelines on the implementation of conservation management at the farm level which will then assist in reducing the negative impacts on the environment.

Quality assurance will benefit the retailers as they would have a reliable control on food safety and quality, thus reducing risks on consumers’ health. It will increase the confidence among the consumers and enhance their positive purchasing attitude (Blaha, 2000). Moreover, a clear agreement on food-based products could be established between retailers and growers to meet the demand of the market. By having quality assurance, it

will be easy for the growers to access the market and also provide more opportunities to increase their products' competitiveness. Applications based on the guidelines of quality assurance will assist the growers to carry out better farm management activities. The issues of enhancement in quality will become the main objective of the growers in expanding the market for their products. The growers will be able to establish production and marketing contracts with the buyers on highly demanded products in the market.

The safety paradigm is that consumers are on high alert on food safety while producers are trying to ensure that the product is safe. In this changing environment, all respective agencies must work together to restore consumers' trust and enforce new regulations and a better communication platform on food safety issues. To cope with market needs and legal requirements, producers have to satisfy both safety and quality criteria for their products (Rotaru, Sava, Borda, & Stanciu, 2005). By having several options of quality and management systems, food producers should have the capacity to decide on the most appropriate systems for their activities and to implement effective systems for managing quality and safety (Van der Spiegel, Luning, Yiggers, & Jongen, 2003). Most importantly, the implementation of GAP by agriculture players has uplifted the agriculture sector into a better and competitive sector (Kamaruzaman, 2003). The accreditation has made farmers focus more on improving issues on food quality and safety in their production by following sustainable and healthy practices in their farm such as using only registered pesticides, using the recommended rates of pesticides as stated on the labels, and practicing more Preharvest Interval (PHI) and Integrated Pest Management (IPM).

CONCLUSIONS

This paper provides information on the implementation status of quality assurance in both Malaysian GAP and GlobalGAP. As a developing country with an agricultural-based economy, Malaysia needs to improve its GAP implementation in the sector in order to cope with the global market requirements. Vigorous changes in agriculture and food production practices are needed to fulfil the global requirements and quality assurance schemes on production. Besides, consumers are now more knowledgeable and have given considerable attention on food safety and quality issues. The implementation of quality assurance will reduce consumers' concerns on food safety and quality issues and will also provide an opportunity for the food industry players to improve food safety standards at an early stage of the food production. It will also enhance the competitiveness of Malaysian food-based products in the international market.

The Accreditation Production Schemes, which involve the crop, livestock, and fisheries sectors, augur well with the current global requirements on food safety standards. With that perspective, Malaysia supports and is actively implementing and adjusting its quality standard to GLOBALGAP requirements and standards in all the food production activities. Through sustainable agricultural practices, Malaysia can also play a role in contributing toward the reduction of global warming. Agriculture policies should be given greater attention in terms of implementing GAP, provision of quality assurance

guidelines and rules and regulations, which can improve food safety and quality aspects in the agriculture and food sector. Thus, only through the implementation of food safety standards throughout the food production supply chain can society benefit and be confident with what they purchase and consume.

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All references are to be placed in alphabetical order, in a list at the end of the paper entitled "References". Only cited works are to be included in the reference list. All citations should appear in the text and contain the author's name and date of publication and page numbers given when necessary. Citations are to be inserted parenthetically, e.g. (Hilmi, 1983).

The APA 6th edition system should be used. Examples are:

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TABLES

Tables should be numbered consecutively with Arabic numerals and headed with short titles. They should be inserted in the manuscript. Explanatory notes should be typed immediately below the table.

FIGURES

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UNIT OF MEASURE

Metric units are to be used for all measurement. In the instance where local units need to be used their metric equivalent should be indicated as a footnote. Also when local currencies are used the US dollar equivalent should be indicated.

ABBREVIATIONS

Any words to be abbreviated should be written in full when first mentioned followed by the abbreviation in parentheses.

ILLUSTRATIONS

All illustrations should be submitted as sequentially numbered figures. Illustrations should not be inserted in the manuscript but supplied either after the main body of text or uploaded as separate files.

ACKNOWLEDGEMENTS

Acknowledgements should appear at the end of the text before references.