Challenges in implementation of MyGAP among paddy farmers

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Received: 11 March 2021; Accepted: 06 September 2021; Published: 30 November 2021

Abstract

Good agricultural practice (MyGAP) has been introduced as a guide in implementing sustainable agriculture, which concerns the economy, environment, and society in producing high-quality food that is safe to be consumed. The number of paddy farming areas that have been certified with MyGAP is still low. Hence, this study aimed to investigate the challenges of implementing MyGAP among the paddy farmers and proposing relevant actions, using the Sekinchan paddy field as a case study. Qualitative techniques were conducted by observations in the fieldwork and the interviews with eight paddy farmers and two officers from the technical department. By using qualitative content analysis, six challenges associated with the implementation of MyGAP were identified such as (1) complexity of MyGAP certification system, (2) inadequate knowledge, (3) lack of pro-environment behaviour among paddy farmer, (4) ineffective communication, (5) lack of technology and (6) lack of monitoring and enforcement. This paper's suggested relevant recommendation to provide a platform for developing and improving policy and guidelines in MyGAP. From the findings, some recommendations are put forward in the pursuit of MyGAP in Sekinchan. The findings contributed to a better understanding of where attention should be directed, and which recommendations would better impact the implementation of MyGAP among the paddy farmers.

Keywords: Agricultural practices, challenges, MyGAP, paddy farmers, paddy field management, sustainable agriculture

Introduction

Conventional agriculture is an intensive farming system, which uses genetically modified crop seeds, chemical fertiliser and synthetic chemicals to control weeds, pests and diseases which depends on fertilisers and pesticides that will adversely affect the ecosystem and human health (Singh et al., 2021). The conventional agricultural method does not consider the importance of biodiversity and long term sustainable agriculture's ecological dynamics change (Mohd Ali et al., 2020). Reay et al. (2012) reported that conventional agriculture is a significant contributor to climate change which releases between 40 and 60 per cent of nitrous oxide from chemical fertilisers. Uncontrolled logging and open burning activities for agriculture activities worldwide contribute significantly to climate change and greenhouse gas emissions.

The agriculture industry system worldwide is now shifting from conventional agriculture practices to sustainable agriculture methods (Mohd Ali et al., 2020). Sustainable agriculture methods are an alternative agriculture system that can provide food security, especially in feeding the world's growing population by producing safe and high-quality agriculture products. Sustainable agriculture uses minimum agrochemicals to increase rice productivity and protect the environment, and various species can be conserved. According to (Singh et al., 2021), sustainable agriculture requires lower production costs and long-term higher income return for farmers than conventional agriculture. Gliessman (2014) highlights that farmer must be able to produce high-quality agriculture products by using non-synthetic chemicals (such as chemical fertilisers and pesticides) to achieve sustainable agriculture status. Even though sustainable agriculture's productivity can be slightly lower than conventional agriculture (Meier et al., 2015), it is more concerned about conserving and preserving the environment than conventional agriculture (Zikeli, 2014). There has been an increased emphasis on sustainable agriculture, where the Food and Agriculture Organization of the United Nations (FAO) has introduced Good Agricultural Practices (GAP). Besides that, GAP can also promote sustainable agriculture, social development, and appropriate environmental practices in on-farm operations. GAP able to improve integrated production and pest management in striving to cope with increased yield and production paddy and at the same time protect the health and safety of workers.

GAP can be defined as a set of practices; system; or protocol related to the management of agriculture activities to produce safe and high-quality food products without neglecting the aspects of the environmental, economic and social (FOA, 2003) To date, the GAP is increasingly being accepted by worldwide farmers to be implemented in their agricultural activities. In Malaysia, the Good Agricultural Practices certification scheme (MyGAP) was launched by the Ministry of Agriculture and Agro-based Industry (MOA) on 28 August 2013 to encourage high-quality and safe agriculture products for domestic consumption and export markets. Besides, the MyGAP certification schemes improved the competitiveness of Malaysian agriculture products internationally. The MyGAP is benchmarked against international GAP certification schemes such as ASEAN GAP and GLOBAL GAP (MOA, n.d.).

Rice is a staple food for people in Malaysia and Southeast Asia. It is an essential commodity to maintain food security and sustain the needs of safe and high-quality foods for the growing population (Soh et al., 2017). The current agricultural practices carried out along the paddy production need to be changed towards sustainable and environmentally friendly to ensure the crop produced is high in quality and create rice heathier. Hence, MOA and the Muda Agriculture Development Authority (MADA) introduced the Rice Checklist concept as a guideline for managing rice paddy fields set in line with MyGAP (MADA, 2015). In 2017, Rice Check was

updated and improved by MOA. It is now available in the form of a free downloadable mobile application through the Google Play application under Rice Check Padi (Rice Check Padi, 2017).

In Malaysia, the government implemented free of charge the Good Agricultural Practices (GAP) certification program. However, the number of paddy farming areas that have been certified with MyGAP is still low. For example, in 2014, the number of farmers certified under MyGAP is still small and only increased about 0.3%, which 746 out of a total of 278,628 farmers (Mohamed, et al., 2016). Simultaneously, the farm certification scheme is not a new scheme (IADA Barat Laut Selangor, n.d.; Standard Department of Malaysia, 2016). Instead, the concept of MyGAP is a re-branding of the previous certification schemes such as the Malaysian Farm Certification Scheme for Good Agriculture Practice (SALM). In the 11th Malaysia Plan (2015-2020), it is reported that until 2014, only 4.6% (3585 farms out of 77191 farms) complied with MyGAP (RMK-11, 2015). Most of the previous GAP study focuses mainly on GAP's implementation and effectiveness without discussing the challenges or reasons behind the poor implementation of MyGAP among farmers (Amekawa et al., 2017). Hence, this study investigates the challenges of implementing good agriculture practices (MyGAP) among the paddy farmers and proposing relevant actions, using Sekinchan as a case study. This study's practical contribution is a set of guidelines that have been compiled to identify where attention should be directed, and which recommendations would have a better impact on the implementation of MyGAP certification among the paddy farmers.

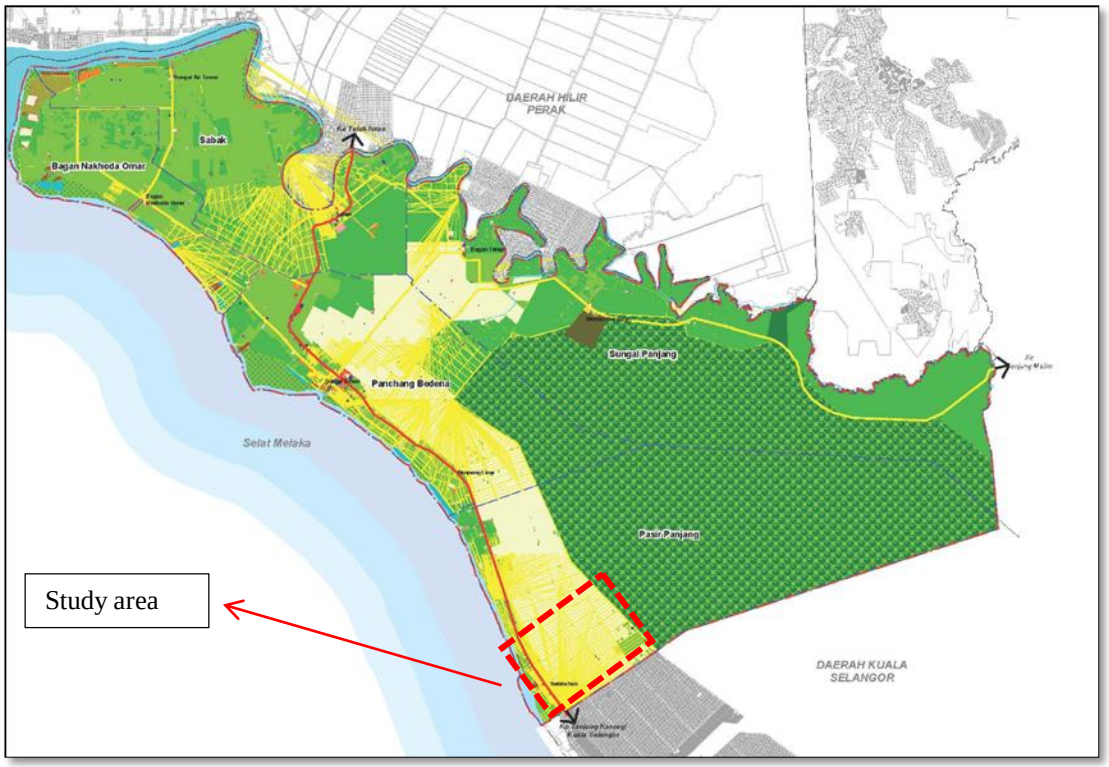
Research approach

Study area

Sekinchan is a small town located Pasir Panjang in Sabak Bernam district in Selangor (Figure 1). The majority of the population are Chinese (60%), followed by Malays (30%) and other races (10%) (Mohd Hafizi, 2014). The main economic activity in Sekinchan is agriculture where, 76.52% or 6541.52 hectares of land area have been used as agricultural land, mainly for paddy cultivation (IADA Barat Laut Selangor., n.d.). Sekinchan is also considered the second largest paddy granary in Malaysia after the State of Kedah, which can produce paddy more than 10 tonnes per hectare per season (Tan, 2016). Usually, paddy cultivation activities in this area are conducted twice a year. The primary season of rice cultivation begins in September and ends in December. While off-season planting is carried out starting in March and ending in June.

Method

In this study, the qualitative investigations were conducted by observations in the fieldwork and from the interviews. The flow chart of the processes involves is shown in figure 2. A purposive sampling method was used for the selection of informants for a semi-structured interview. Three groups of subjects were interviewed: four paddy farmers with MyGAP certification, four paddy farmers who do not have MyGAP certification, and two officers from the technical department (support informants).



Source: Adaptation from Selangor Town and Country Planning Department (2013)

Figure 1. Map of the study area in Sekinchan, Selangor.

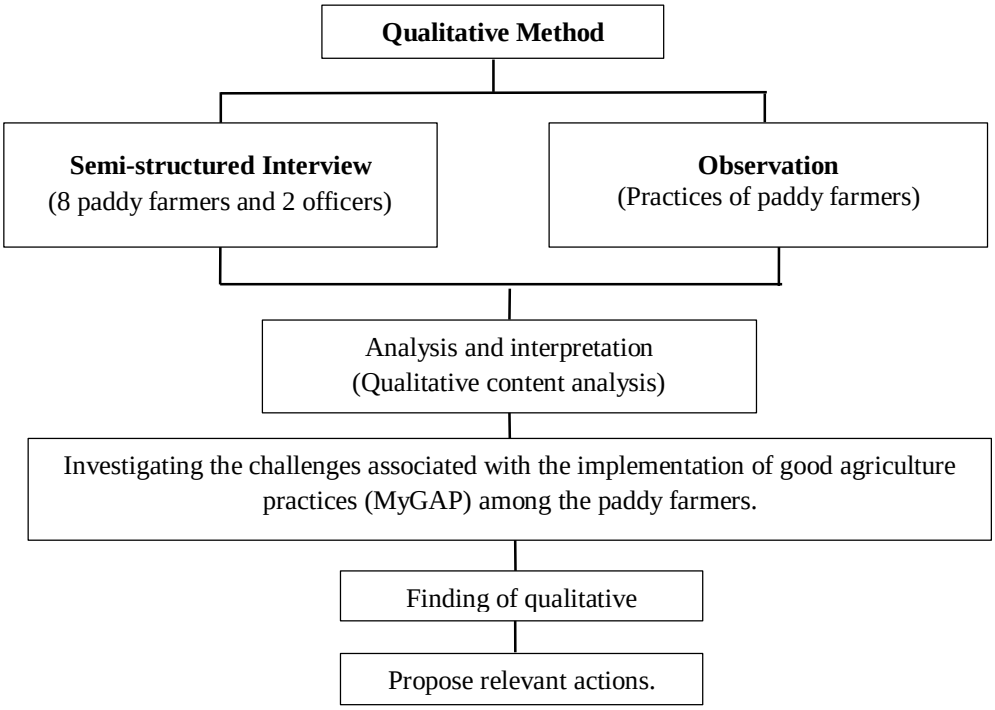


Figure 2. Process of analysis.

Researchers conducted a semi-structured interviews based on a general script that was adapted from previous studies regarding on good agriculture practices (Amekawa, Chuck, et al., 2017). There is no general criterion about size samples (Cooper, D.R & Schindler, 2001). In other words, the sample size cannot be determined from the beginning of this qualitative study. Sample selection and data analysis are continuous until it reaches a saturated level. The saturation level means a new piece of information or overlapping information is not found throughout data collection. Researchers choose sample size for the interview until reaching the saturation level. However, the concept of saturation needs to be balanced with time, financial and other factors influencing the research process. According to Sekaran (2000), in a study qualitative, the sample must be small to allow a detailed investigation to be made. In this study, semi-structured interviews and observations were made concurrently to save time and cost and avoid biased (biased) information. This study has reached a saturation level after done observation and interviews with ten informants (8 farmers and 2 technical officers). Also, researchers observed the practices of informants (farmers) during agriculture activities in the fieldwork and recorded the information into the observation note form. All observations were carried out in the main places that comply with the MyGAP procedures, such as paddy field, store fertiliser and pesticides, and store rice productivity. The observations allowed the researchers to observe the good agricultural practices at the Sekinchan Selangor. The study uses Qualitative Content Analysis (QCA) to gain insights into a systematic description of the data collected by semi-structured interviews and observations. This results from the interview was recorded and then transcribed using systematic coded and analysis.

QCA method is more flexible for analysing data (verbal and visual) of unstructured phenomena and focusing the analysis on relevant aspects of the material through a systematic classification process of coding and identifying themes (Heikkilä et al., 2016). In this study, a summative approach of QCA was used by defining the codes during data analysis, and the results were discussed and compared with findings from other studies.

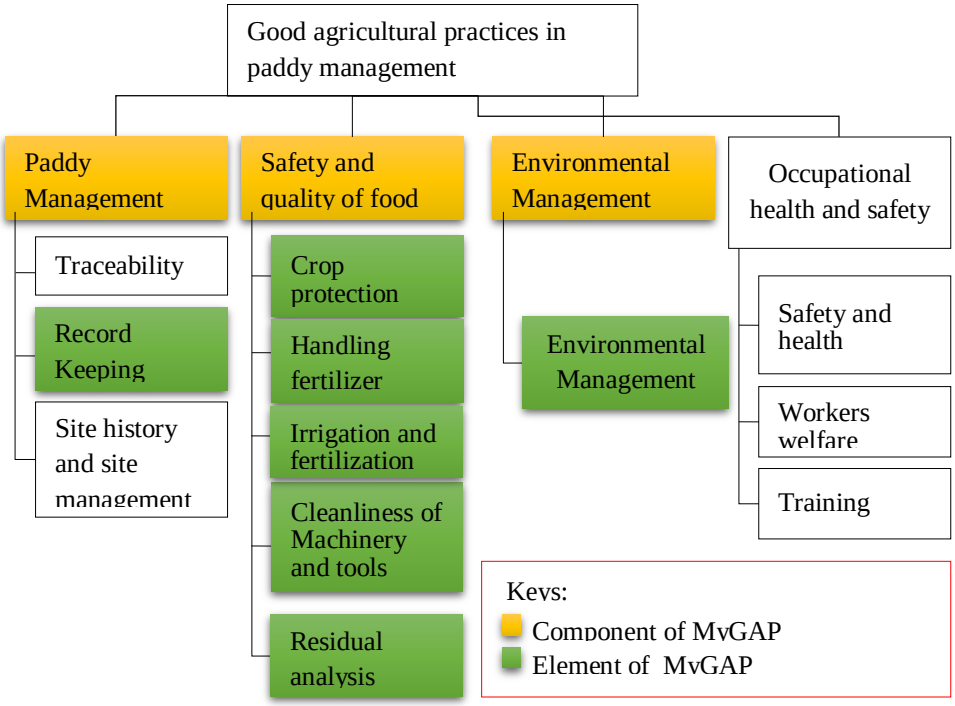
Results and discussion

The complexity of the MyGAP certification system

The benefits of MyGAP is to produce higher yield production and to increase the income of the farmers. One of the technical department officers said that rice yield through MyGAP certification could generate high income compared to conventional methods. MyGAP also reduced the cost of using chemical fertilisers and fulfilled the high demand of rice yield through MyGAP among customers concerned with environmental and health awareness. However, most farmers who did not have MyGAP certification described the MyGAP certification system's complexity, which burdened the farmers to apply MyGAP in their agricultural practices. A common view amongst farmers stated that it can drive up the production costs due to the many changes that need to be made in terms of farm management towards GAP.

Indeed, individual rice farmers or a group of rice farmers can submit an application form of interest for MyGAP certification to a Department of Agriculture (DOA) to review the basic requirements. After registering for MyGAP, farmers must comply with the requirements for MyGAP certification (Mohamed Mohd. Salleh et al., 2006). In general, there are 4 components in GAP which cover 13 elements to be considered for MyGAP certification for the crop sector, each

consisting of specific rules or requirements based on Good Agricultural Practice (GAP)-Crop Commodities (Second Revision) (MS 1784:2016) (Jabatan Standard Malaysia, 2016) as shown figure 3.



Figures 3. Component and element of MyGAP

Usually, the certification approval period was between 6 until 24 months. Registered farmers receive training and consulting from officer DOA based on the criteria of MyGAP to ensure the farm is operating correctly in MyGAP. Record keeping of each farm activity (such as yield production, profit, and information about workers) is essential for field verification. Officer DOA needs to comply with site inspection regarding soil preparation, water management, type of fertilisers used, and handling pesticides to help farmers reduce production costs.

Afterwards, DOA will send an audit team to conduct pre-audit at the district level and follow-up audits. During the pre-audit session, crop samples and water samples will be taken to analyse pesticide residues and heavy metals. Samples were taken three times during the harvest season, and all three samples could not exceed the Maximum Residue Limit (MRL) set. If any sample is found to contain residues above the MRL, three other samples will be taken (Leong et al., 2020). The certificate of MyGAP was issued every two years for each plot paddy registered, and the farmers can apply for re-certification after taking one sample for residual analysis. Participants are required to record their farm practices (e.g., yield production, profit, types of chemical inputs, seeds, and labour). It is submitted to the audit for evaluation and review by DOA. The cost of field inspection and residual analysis is entirely borne by the government (Valk & Roest, 2009). Surprisingly, most key informants who did not have MyGAP certificate stated that they were not interested in applying MyGAP due to the MyGAP certification system's complexity. They feel that they do not have enough time and knowledge for record-keeping of each farm

activity via proper documentation and have to go through the lengthy process to approve and follow a set of practices listed in MyGAP. (Please refer the quotes below)

> *"If you use MyGAP, there are many procedures to follow. To apply for MyGAP, the officer must continuously monitor the crop dan record every agricultural activity. Better use our usual way"...* (Informant 6: farmer)

Inadequate of knowledge

Perceptions and knowledge of farmers may influence their decision towards the effectiveness of the implementation of MyGAP (Joshi et al., 2019). According to the observations, farmers lacked knowledge of sustainable technique in (for) paddy production, particularly on fertiliser management, crop protection, record-keeping, and site management (Terano et al., 2015). Indeed, the paddy farmers are less interested in following all requirement of MyGAP. Most informants of paddy farmers stated that they were confused between current conventional agriculture practices and those proposed by the GAP model. For instance, the farmers did not know the exact knowledge in rice production management, especially to recognise insect and pathogen interaction density and it was difficult to manage sustainably.

Besides that, one informant of paddy farmer reported that the implementation of MyGAP required higher costs for input purchases in their agricultural activities. Others, paddy farmers, commented, "MyGAP is just only for the high-income farmer and not suitable for the small-scale farmer" (informant 8: farmer). These findings are consistent with Lastra-Bravo et al., (2015), where mostly high-income farmers are more interested in participating in MyGAP than low-income farmers (small-scale farmers). Hence, the policymaker and government need to convince the farmers to comply with the MyGAP standards in their paddy production, which will generate higher income and productivity of paddy for the small scale farmers.

Lack of pro-environmental behaviour among paddy farmers

In this study, it was observed that most of the farmers depend on contract workers to prepare the land, planting, fertilisation and use machinery. This fact emphasised that paddy farmers lack concern about occupational safety and health (Please refer to the quotes below). According to Mohamed et al. (2016), the paddy crop needs heavy doses of pesticides to keep it healthy and productive compared to other food crops such as wheat, corn and soybean. However, applying MyGAP in agriculture will reduce the amount of pesticide and chemical fertiliser in rice farming, produce good quality food products, and reduce environmental pollution. Consequently, proper training on the use of chemical pesticides among the farmers is required to reduce the adverse effects on human health, environment and sustainability of paddy farming practices at the field. The study conducted by Oluwole and Cheke (2009), in Ekiti State, Nigeria, provided empirical evidence that farmers were facing health risks such as eye irritation (91.3 per cent), skin problems (87.3 per cent), nausea (86.0 per cent), headache (83.3 per cent) and vomiting (58.0 per cent) due to the improper training on the use of the pesticide. This condition clearly shows that occupational safety and health are vital for reducing the risk of health and impacts on the environment. Another study by Damalas & Khan (2016) in Punjab, Pakistan and Plianbangchang et al. (2009) in Thailand found that most of the farmers did not consider safety precautions during usage, storage, and disposal of pesticides.

> *"We use different insecticides to control insects, fungi, rodents, and snails because we do not want to destroy our paddy. Insecticides for control siput gondang (golden apple snail) contain the heavy hazardous chemical. However, everyone here uses those illegal insecticides to control those kinds of snails."….*(Informant 1: farmer)

> *"Using insecticides to control snails does not affect human health when eating our rice. We are just using that insecticide during the transplanting process, not used that insecticides during harvesting."* ….(Informant 2: farmer)

Besides that, several farmers interviewed in this study also agreed that they burned rice straw after harvest activities to clear the paddy field (Please refer to the quotes below). The burning of straws was a cheap and faster method to prepare the paddy field for the next crop seasons. However, open burning can cause air pollution (haze), and it also contributed to human health risks. Rice straw can produce some valuable products, increase side income for farmers, and reduce environmental pollution. MyGAP recommends zero burnings as the best solution for soil improvement and a friendly environment. However, the paddy farmers are still not concerned about zero burnings and use traditional methods to clear the field before starting paddy plantation for the next crop season. A study conducted at MADA in Kedah and Sekinchan, Zainol et al. (2014), identified that farmers have some knowledge regarding rice straw such as animal feed, compost, vermicompost, crafts, nursery mats, and paper-making. Still, they do not utilise the rice straw wisely. This paper highlights the importance of the fact that environmental quality was strongly dependent on pro-environmental behaviour among paddy farmers, which creates the intention to implement MyGAP practically towards conservation and preservation of the environment.

> *"Before the ploughing process, we will burn the rice straw. We are using the burning method to save budget and able to clear the paddy field quickly"…..* (informant 3: farmer)

Ineffective communication

Communication is the process of conveying information from one party to another or sharing information. One significant challenge to implement MyGAP in Sekinchan was the lack of effective communication with the officer in charge of the management of MyGAP and with the paddy farmer. The researcher also observed that paddy farmers in Sekinchan are mainly Chinese, who are above 50 years old and cannot speak or understand the Malay's language. One officer from the technical department said they face difficulties sharing any information about MyGAP, mainly due to farmers who cannot understand the Malay's language (Please refer to the quotes below). There are similarities between the issues expressed by Mohd Desa Hassim et al. (2013), who reported that only 50 per cent of paddy farmers in Mukim Bagan Serai, Perak, had understood the basics of the MyGAP principle; as a result, lack of communication between the paddy farmer and the officer from DOA. The government should find an alternative way to share any information about MyGAP with farmers of all levels. DOA (2016) pointed out that the area of paddy fields in Sekinchan, which has been certified with MyGAP, is only 31.2 hectares (1.68%) of the total area of 1857 hectares of paddy fields. There were 26 farmers (7.20%) involved in MyGAP certification

from a total of 361 farmers. Together, these results provide important insight into effective communication contributed to the significant relationship with the successful implementation of MyGAP among the paddy farmers in Sekinchan.

> *"Some farmers can understand the instructions and guidelines of MyGAP. We are also facing communication problems during briefing MyGAP information among farmers, although using the Malay language. We difficult to communicate with Chinese farmers who cannot understand the Malay language."…. (informant 9: technical officers)*

> *"The DOA also presented a briefing of MyGAP, which started from registration until getting the MyGAP certificate. Some farmers who have a myGAP certificate invite their friends to join this briefing. However, we took a long time to explain MyGAP for them to understand."….. (informant 10: technical officers)*

Inadequate infrastructure

Rice is the essential staple food in Malaysia, and it is vital for the nation's food security (Baharudin, 2021). However, Malaysia's rice production sector only achieved self-sufficiency at about 65-70% for the local consumption (Arshad et al., 2011). Technology and incentives play an essential role in increasing rice productivity to meet the demand for staple food for local people and boost low-income farmers' economy. Besides that, agricultural technologies that help farmers use their production factors (such as chemical inputs, seeds, land and labour) more effectively thrust the agricultural sector towards competitiveness. It was observed that there are four main components of MyGAP in using rice production technology such as integrated land and water management, integrated rice crop management, integrated rice pest management, and integrated harvest management (refer figures 3). Implementing integrated rice pest management contains many obstacles due to the lack of technology to detect contamination especially in chemical pesticides'overuse during rice crop growth and post-production stages of rice product.

To fulfil this requirement, the MyGAP should have two main traceability elements, such as tracing and tracking system, which help develop sustainable agriculture practices among the farmers and ensure the production of food products is safe for consumption. This tracing system allows the detection of contamination sources to safeguard agricultural products free from pollution and are safe to eat (Bosona & Gebresenbet, 2013). A tracking system is a handy tool to detect transparency of food product contamination from land to consumers quickly and accurately (Irsyaputra et al., 2018). When the informants (paddy farmers) were asked about the traceability system element, they stated that this element does not comply with detecting pollution during the cultivation up to consumption. This result provided a vital insight where paddy farmers are not concerned about the safety and health of their paddy production due to a lack of technology in detecting and tracking the contamination of the paddy production.

> *"This paddy field area has no problem with polluted water even we use chemical fertiliser. I have never heard have contamination in our production rice. So, my paddy production is safe."* (Informant 4: farmer)

> *"We think the water in the rice field here will never be polluted; there is no problem. If there is any contamination in rice production, the Health Department should take action*

> *when rice products enter the market. It is not the farmers' responsibility*" …. (Informant 5: farmer)

> *"We do not have any tools to check the effects of pesticide use in paddy fields. We never heard of a tool for tracing system. The important thing for us is to be able to produce rice for sale. It is not our responsibility to check pesticide in our paddy fields" ….* (Informant 7: farmer)

Lack of monitoring and enforcement

One technical officer expressed their views that cordial cooperation should be encouraged between the paddy farmers and the stakeholders (MOA, IADA, rice miller) for the effective implementation of MyGAP certification. The most striking result to emerge from the data is that the overall implementation of MyGAP in Sekinchan is still at a moderate level, and more importantly, the lack of concern about the aspect of occupational safety and health. Occupational safety and health (OSH) is an essential element for the worker (farmers) who are easily exposed to various risks while working, such as accidents while using machinery and chemicals pesticides. The researchers found that MyGAP certificates were approved by the MOA even though farmers did not meet the standard of OSH on the aspects of agricultural practices.

Surprisingly, three out of four farmers who do not have MyGAP certification stated that they never heard of the existence of MyGAP in paddy cultivation. These results reflect those of Amekawa et al. (2017), who also found that 74% of durian farmers in Pahang responded that they never heard of MyGAP. In contrast, in this study, one officer from the technical department stated that promoting MyGAP had been made solemnly among the farmers in Sekinchan by providing training. The main goal of the MyGAP standard is to produce quality fresh products that are safe to eat. However, the MyGAP awareness program did not meet the overall objective, and only a few farmers understand the purpose and basic concept of MyGAP. Amekawa et al. (2017) has successfully promoted the GAP system to many farmers via education and training and registered their name on Thailand's GAP program list. This explains why effective monitoring and comprehensive enforcement are crucial in increasing the farmers' awareness of the GAP system.

> *"We usually give the contract to foreigners (Bangladesh workers) for insecticide services. Meanwhile, for PPE equipment such as gloves and masks, it is up to him to use them. Personal safety during insecticide is the responsibility of the employee, and it not our job"* …… (Informant 4: farmer)

Conclusion and recommendations

The current study aimed to determine the challenges in implementing good agriculture practices among paddy farmers and propose relevant actions towards implementing MyGAP in Sekinchan. The research has identified six main challenges associated with the performance of MyGAP. The implementation of MyGAP in the agriculture activities among the paddy farmers were at moderate levels and barely exceeded the minimum qualification for MyGAP certification. However, it is a good sign for industrial paddy to minimise environmental pollution and sustain food security and food safety in Malaysia. These recommendations provided the platform for improving the policy

and guidelines in MyGAP and help to create a better understanding of where attention should be directed to implement MyGAP among the paddy farmers especially in Sekinchan.

- The policy and government must increase the enforcement and strengthening the safety management system of agriculture products and health among the paddy farmers. Implementing the safety system at the workplace can minimise the risk of human health and accident. For example, by providing hands-on training and demonstrations plots, the paddy farmers can handle and operate dangerous or sophisticated equipment such as machines, pesticides and checking seed germination and personal protection equipment correctly.
- The government should implement a sharing session or roundtable discussion with MyGAP experts, researchers and farmers to discuss the problem and transfer of technology. It helps to develop communication and increase self-esteem as well as find a way to improve the application of MyGAP in Malaysia.
- The evaluation criteria for the application to obtain the MyGAp certificate mainly focus on three contsructs based on (1) site inspection, (2) yield analysis for pesticide residues, heavy metals and microbial and (3) audit of farm practices. However, this evaluation process takes time, between 6-24 months for the approval. This complexity led to the refusal to apply for MyGAP certificate among farmers. Therefore, the DOA needs to shorten the time for the approval process and conduct regular monitoring to avoid complexity factor in the MyGAP application process among farmers.
- The industry and the government should develop a traceability system to ensure good and healthy food security. Traceability system (such as tracking and tracing) is an essential element in MyGAP to detect product contamination such as overuse of chemical pesticides during rice crop growth and post-production. Besides that, the industry also should provide and develop a web-based traceability system such as the Quick Response Code (QR Code). Implementing the QR Code on each product of MyGAP can provide details and quick information for the customers.
- The government and non-governmental organisations should promote the benefits of MyGAP products to human health. The promotion with more programmes will help the paddy farmers to market their product such as marketing products in hypermarket (local) and international market, television programs, exhibitions, and play the role of mediator to increase paddy farmers' income.
- The government institutions play an essential role in the sustainable development of the paddy industry in Malaysia. The structure of MyGAP should give more incentive to paddy farmers, such as the expansion of irrigation, the supply of water pump, subsidies of fertiliser and pesticide and training to motivate and encourage them to apply for MyGAP certification.
- The government and private sectors should create a new program such as “mentoring youth in agriculture program”. In other words, the paddy industry needs to empower young people in Malaysia to be innovative, develop sustainable agriculture and transfer knowledge about MyGAP among the family members.

Acknowledgements

The authors would like to thank Universiti Kebangsaan Malaysia for providing financial assistance through Geran Galakan Penyelidikan research grant (GGP-2017-016). Thank you to the Department of Agriculture Selangor and Extension Service Centre of Sekinchan, especially Puan Aini Wiznati Bt Lasuan (Agricultural Officer of Sabak Bernam) and Puan Nurul Inani Bt Shahadan (Agricultural Officer of Sekinchan) for providing information and permission granted to conduct research. Thank you to all paddy farmers in Sekinchan for the support and cooperation offered during the research.

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