

EXECUTIVE SUMMARY

Sustainable Challenges in the Agrifood Sector and Management was a program book that aimed to contribute in SDG number 2 Zero Hunger and terms of food security. It is according to participant's experience and knowledge expertise on 10 days sustainable agrifood management in Indonesia (SAMI) summer course with inputs from IPB University experts in collaboration with international universities and multinational food and technology copanies with multidisciplinary approach that integrates agricultural, food technology and management science in a systematic manner.

The Program Book consisted of several essays selected from dozens essays sent by the youths from Indonesia, Germany, Cambodia, Vietnam, Philippines, Malaysia, and Singapore.

This program book captured the participant's ideas, inputs, sharing knowledge and experiences with the theme "Creating Better World with Sustainable Agrifood Management". The essays on this book were arranged by three categories:

1. Agrifood and Rural Development
2. Socio Environmental Sustainability
3. Partnership, Technology & Innovation in Agrifood Sector

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Sustainability Challenges in the Agrifood Sector and Management

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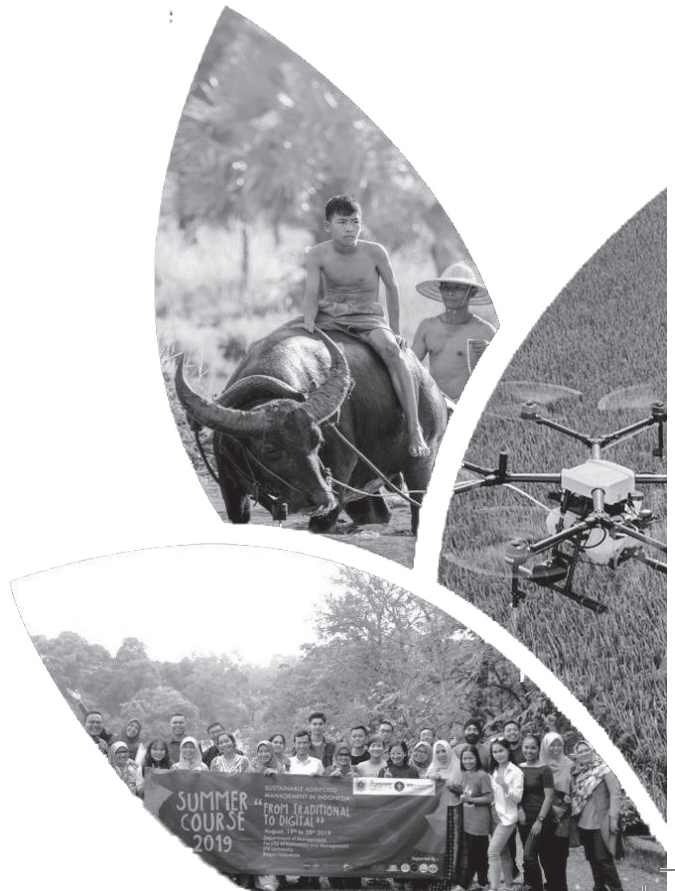


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Musa Hubeis
Eko Ruddy Cahyadi
Rindah F. Suryawati
Lindawati Kartika

SAMI 2019

Sustainability Challenges in the Agrifood Sector and Management





SAMI 2019

Sustainability Challenges in the Agrifood Sector and Management

Writers :

SAMI Summer Course Participants
(Cambodia, Germany, Indonesia, India, Malaysia, Singapore,
Thailand, Vietnam)

Department of Management of Faculty Economics and Management,
IPB University



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Dr. Ir. R. Nunung Nuryartono, M.Si



I would like to thank and express my sincere gratefulness to the following institution who has dedicated their time and contribution for the Sustainable Agrifood Management in Indonesia 2019 (SAMI 2019) – Summer Course. They consist of Bogor District Government, TaniHub, The Assessment Institute for Foods, Drugs and Cosmetics - Majelis Ulama Indonesia (LPPOM MUI), Bogor Life Science and Technology (BLST), Bukalapak, HARA Technology, FAO Representation in Indonesia, and Bank Rakyat Indonesia. Along with these, we wish to thank our local colleagues from Directorate of International Program, Directorate of Student Affairs and Career Development, Bureau of Communication, Directorate of Educational Administration and Admission Management, Department of Food Science and Technology, Department of Chemistry, Department of Management, - for their professionalism, and students organizer for timely supports, superb and production services, dedication and kind wishes.

It is our pleasure to present this book consisting of selected essays based on Essay Competition, held on August 2019. Department of Management, -Faculty of Economics and Management, - IPB University had initiated to host the third Summer Course on “Sustainable Agrifood Management in Indonesia (SAMI 2019): from traditional to digital” and had been held at IPB University - Indonesia, on 19 until 28 August 2019. The purpose of this summer course was to provide better understanding on sustainable agrifood management and its development from traditional

view to digital in 4.0 revolution era. Indonesia would be an interesting lesson learnt where the food demand is huge and growing up while food supply is confronted too many challenges, from climate changes, agricultural land conversion to disrupting new technologies. This course had composed a multidisciplinary approach that integrated agri-food, chemistry and management science in a systematic manner approach. This approach allowed us to comprehensively learn integrated agifood value chain from upstream to downstream and from traditional to digital in Indonesia.

We would like to take this opportunity to sincere gratitude once again to all of the participants in the SAMI2019 Summer Course, invited speakers, presenters, committee, and the sponsors. We would also like to extend our gratefulness to the following reviewers of the Essays submitted for this consideration in this volume for having so generously shared their time and expertise: Prof. Dr. Ir. Musa Hubeis, M.S, Dipl. Ing. DEA; Dr. Eko Ruddy Cahyadi, S.Hut.; M.M., Rindah F. Suryawati, S.E., Ak., M.Acc., CA; and Lindawati Kartika, S.E., M.Si. Finally, we wish to thank the IPB Press for supporting us publish this Book of SAMI #1 : Sustainability Challenges in the Agrifood Sector and Management 2019.

Bogor, August 2019

Dean of Faculty of Economics and Management
IPB University

Preface from Head of Editorial Board of Sustainable Agrifood Management In Indonesia (SAMI) 2019

Prof. Dr. Ir. Musa Hubeis, Dipl. Ing. DEA



This issue of Sustainable Challenges in the Agrifood Sector and Management is the first to appear under my editorship. This Program book is organized by Department of Management, Faculty of Economics and Management and its Authors represents region ASEAN and Europe in particularly from Germany, Malaysia, Singapore, Cambodia, Vietnam and Indonesia. The publisher, IPB Press, SAMI Chairman Mrs. Lindawati Kartika and the committee of SAMI 2019, have also made outstanding contributions to the growing of this Book.

Agriculture is one of the most important sectors for humankind, but today's agriculture still facing many problems to fulfil the needs of people. Although technological development has been improving rapidly, but it is also cannot be implemented fully in agricultural sector due to the lack of some resources. As stated in United Nations about Sustainable Development Goals (SDGs) for its 193 member countries, it explicitly set a goal about Responsible Consumption and Production in SDG number 12 that support the sustainable development including in agricultural sector by producing more and minimizing the cost and emission produced. SDG number 2 Zero Hunger also set the purpose to rethink how we grow, share and consume our food. If done right, agriculture, forestry and fisheries can provide nutritious food for all and generate decent incomes, while supporting people-centered rural development and protecting the environment. This meaningful purpose is the key to

be able to keep innovating for better agriculture development in all over the world. It also the aim of this book of sustainable agrifood sector and management to participate in giving solutions and ideas for Sustainable Agrifood Management in Indonesia and further be implemented for other countries

The contribution of the authors are classified into three categorize which are agrifood and rural development, socio environmental sustainability and partnership, technology and innovation in agrifood sector. The importance of the agri-food industry to all three pillars of sustainable effectiveness and predictions about the inability to feed future populations gives the discussion a certain urgency. Findings: Sustainability oriented innovations in the agri-food supply chain are different from traditional innovations. We develop propositions regarding the driving motivations, their nature and scope (i.e., more radical and systemic than incremental and focused), and the importance of a multi-stakeholder approach. The ten cases presented in the volume are summarized.

Finally, on behalf of myself, the Head of editorial Board, the editorial board, Dean of Faculty of Economics and Management IPB University, Head of Department of Management, the Committee of SAMI Summer course, and IPB Press, I want to convey our general thanks to the authors and reviewers. It is they who have primary responsibility for the actual content and the success of Sustainable Challenges in the Agrifood Sector and Management book.

Bogor, August 23rd 2019

Head of Editorial Board

Preface from Chairman Of Sustainable Agrifood Management In Indonesia (SAMI) 2019

Lindawati Kartika, S.E, M.Si



I would like to express my gratitude to Department of Management as an organizer and also to all the committees who has dedicated their time and contribution for Sustainable Agrifood Management in Indonesia (SAMI) summer course 2019 and SAMI ESSAY CONTEST 2019. I would extend my sincere gratefulness to our international lecturer, local lecturer, practitioners on agrifood business , Dean of FEM IPB University, Dr Nunung Nuryartono, M.Si, Deputy Dean of FEM Dr Tanti Noviyanti, M.Si, Head of Department of Management Dr Wita Juwita Ermawati MM, Secretary of Department of Management FEM IPB M Syaefudin Andrianto, M. Si, The Lecturer and Staff Committee and the students committee as well.

It is our pleasure to present this Book consisting of selected papers based on Essay Competitions, held August 19th - 28th 2019. The SAMI 2019 summer course is designed as 10 days sustainable agrifood management course with input from Bogor Agricultural University experts in collaboration with international universities and multinational food companies. Relevant issues in the field of sustainable agrifood management have been presented and discussed in the plenary presentations. The topic of this summer course is “From traditional to digital”.

The industrial revolution 4.0 has changed the way of doing business and managing the organization. The concept of Industry 4.0 describes the increasing digitization of the entire value chain and the resulting

interconnection of people, objects and systems through real time data exchange. The development of industry 4.0 era should have positive impact on agriculture, in the case of the supply chain of agriculture as a whole. However, in Indonesia, there are still many obstacles faced, especially the inefficient distribution chain, limited market access as the farmers rarely able to sell to large retailers, and payment conditions that burden buyers. Solutions to improve the agricultural sector in Indonesia are very important in order to improve the welfare of farmers, business people and to fulfill community needs for good quality agricultural products. This is closely related to the future goals of the SDGs regarding welfare and food security in the future. Through this summer course we could learn about integrated agrifood value chain from upstream to downstream and from traditional mechanism to digital transformation in agricultural sector.

We would like to take this opportunity to extend our gratefulness to the following reviewers of the Essays submitted for consideration in this edition for having so generously shared their time and expertise: Head of Editorial Team Prof Dr Musa Hubeis, Dipl Ing DEA, Dr. Eko Ruddy, Mrs. Rindah F Suryawati, M.Acc and content designer Manggala Putra Halim and Nabilah Karim. Finally, we wish to thank the IPB Press for supporting us to Publish this Book of SAMI.

Bogor, August 23rd 2019

Chairman of SAMI 2019

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agrifood & rural development

“Most things, except agriculture, can wait.”

Jawaharlal Nehru



NO. Registration : SAMI/ARD/001

Creating a Better World with Sustainable Agrifood Management: From Traditional to Digital

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Introduction

Agrifood is one of the food industry that can be emphasized in the developing of the country. In Asia, these sectors face challenges beyond food products such as, changing lifestyle and climate change that affects the rate of nutrition and obesity (Corben, 2019). Nowadays the majority of this area was controlled by small farmers whereby contributes to the industry development. However, small farmers faced the managerial problem in order to manage their basis operational (Inam et al.

2015). Many studies mentioned a farmers or food producer does not the produce of the large scale of production, not has high standards to penetrate the global market and produce in a small scale (Gillespie & van den Bold, 2017). Moreover, the quality of the production is not in good quality (Bojnec & Ferto, 2016) and logistics is not really good (Verdouw et al. 2018; Paciarotti & Torregiani, 2018).

The insufficient supply chain management in agrifood is the important issues should be taken into account in order to create

sustainable management in this discipline. Thus, stakeholders in the supply chain must understand holistically the managerial of agrifood to fulfill the universal of sustainable discipline in order to maintain to spread benefit along and across the supply chain in fair and positive ways. The management process of agrifood is a chain of events from production to processing, trading, distribution, and consumption. The concept of supply chain management was covered sustainability concept in agrifood for improving the competitiveness and responsibility towards the players. The understanding the universal concept of sustainability which is economic, environmental and social should be digested by the stakeholders to lead them obtaining valuable opportunities along the supply chain.

Context of the study

Farmers play a crucial role in providing the basis for all of the food needs. They can change the landscape of the economy in the home country. Thus, the collective

of the small farmers can transform the moribund rural area into a better economy in the district such as generate profits from the farms. The developing economy transforms by the farmers create a strong economy, it's resulted in high demand for local products. Therefore, leads to growth to other business surrounding such as services and small scale processing.

By adopting technology in supply chain management is a critical part in order to give a new ecosystem in these sectors. Due to a problem in supply chain management in this area, it is necessary to adopt technology to contribute competitiveness for operational basis. Many scholars in this discipline discuss the advantages of technology adoption in agrifood management. It can help in terms of financial flow, material flow, and information flow in the supply chain. That flow is important in order to maintain their positions in the marketplace.

Financial is a monetary factor in operating their business, the material is a factor to manufacture

the product, and information is a connecting all factors and stakeholders in the supply chain. In the marketing perspectives, the farmers or industrial players can access the market easily in the local and global. In human resource management, the players can manage appropriately the workers to produce more effectively of the products, and also the safety of the workers might be safer to practice the task in the operation. The ecosystem impact also will be secure by adopting the technology. In supply chain management system can include green technology in parallel with the operation of the business. Figure 1 in appendix shows the framework of the study can be adopted in order to create sustainable agrifood management in the local industry.

Thus, the adoption of technology to strengthen the capability of the food manufacturer is most important due to the dynamics of the food industry nowadays. This industry highly creative in technology innovation to satisfy the requirements of the consumer. By adopting technology

innovation, the manufacturers can diversify their products to create more profits from their sources of the product. For example, fruit can create much product such as food for humans and their waste can become biomass product. Thus, the awareness of product innovation should be learned by the agrifood players in order to create more profitability in the industry.

Conclusion

By integrating the supply network among stakeholders can create sustainable management in this sector. The chain starts from farmers until the consuming products should be well managed to achieve sustainability in the supply chain. Involving in technology such as big data in this sector can create an integrated network system among the actors of the chain. All the contexts of sustainable which is economic, social and environmental can create the greatest ecosystem in agrifood.

However, the acceptance of technology towards small farmers should be studied empirically

due to their lack of capability in the managerial. According to Venkatesh et al. (2003), the unified theory of acceptance and use of technology (UTAUT) explain user intentions to use an information system and subsequent usage behavior. The theory holds that there are four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions. Those construct can be tested towards small farmers to explain users intend to use the technology. Moreover, the characteristics of innovation should be tested also in order to explain how extent the small farmers in terms of diffusion of innovation. The further study can test by using Roger's characteristic (Roger, 2003) of innovation which is a relative advantage, its compatibility with the pre-existing system, its complexity or difficulty to learn, its trialability or testability, its potential for reinvention (using the tool for initially unintended purposes), and its observed effects of technology adoption.

The study will contribute to the body of knowledge specifically in

technology acceptance in small farmers. The study may know the performance expectancy, effort expectancy, social influence and facilitating conditions before the real implementation technology. The study also may know the characteristic of small farmers by adopting the technology.

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Appendix

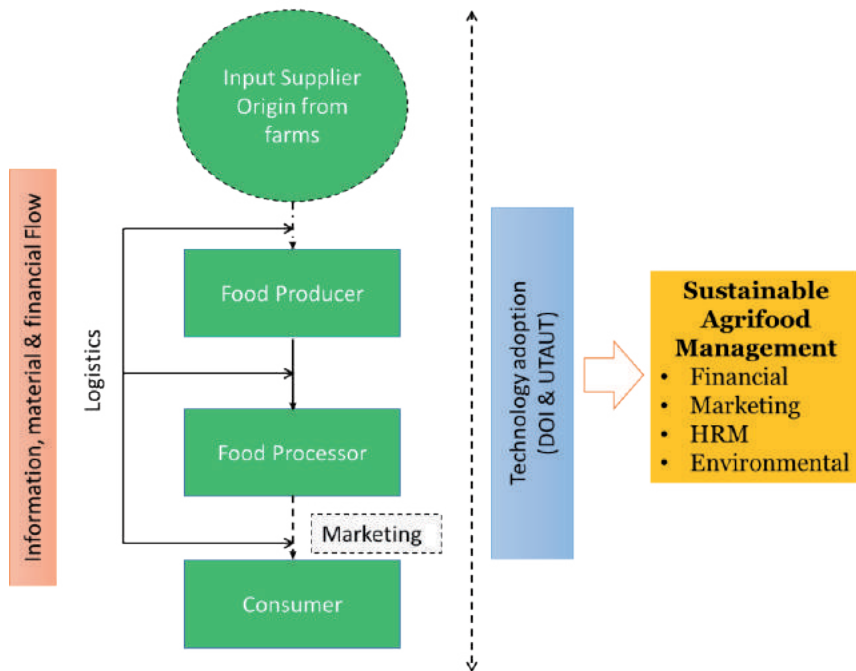


Figure 1: Conceptual framework of sustainable agrifood management in the local industry

Note: Source original from authors

NO. Registration : SAMI/ARD/002

Achieving Sustainability in Food Management with Help of Analytics

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As a research scholar working in the area of Agriculture Analytics, I strongly believe that agriculture will be the top priority for the future generations. With increase in the population but stagnant resources, like land, water, labor, etc optimization in this sector has been the current focus point by the scientists and the tech community. According to the Food and Agriculture Organization of the United Nations, the world population will reach 9.1 billion by 2050, and to feed that number of people, global food production will need to grow by 70%. In short we need to achieve/design a sustainable agri-food management for humanity to thrive in future.

To achieve a sustainable agri-food management the following needs to be focused:

1. More produce from limited resources.
2. Design of low cost sustainable crop to table cycles.
3. Reduce food waste and irregular price fluctuations by application of Analytics.
4. Easy to use and cheap warehousing and distribution system.
5. Cultivation of organic produce.

“Reducing food waste and irregular price fluctuations in the agri-markets” is the central theme

of this essay which would be discussed in detail. Hailing from a farmer's family (who has given up on farming because of the problems in the sector) and having worked in an Agri-startup, ECOFARM for 1 year as Business Analyst, I have a fair idea of problems in this sector. Field trips and farmer interactions have widened my views and opinions. Not only I identified the problems in this area, but also have

few ideas to address those. Some of the problems and ideas were discussed elaborately in a working research paper titled "Harnessing power of Digital and Analytics for agriculture sector in Indian Markets", published in ASMA 2018 edited book by FMA in 2018. In order to convert my theoretical ideas into practical solutions, I have chosen research in this area.

A typical agriculture supply chain in India would be as follows:

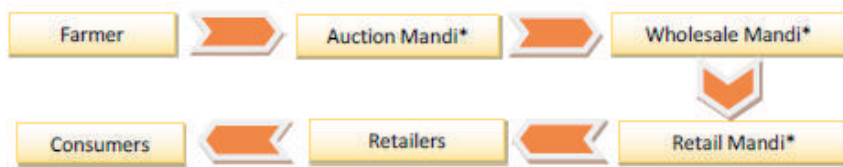


Figure 1: Agri- Supply chain in India

*Mandi in Hindi language means market place, for food and agri commodities

My research in School of Management Studies, Hyderabad Central University, India, targets on "Forecasting price trends of a vegetable so that an Indian farmer can decide with the crop type before the sowing period". Demand and supply mismatch is quite a common scene in Indian agriculture sector, thereby leading to irregular price fluctuations. The

Farmer to Consumer chain has so many intermediaries (Figure 1) that information in the process is lost

or not tracked. For example, taking the case of an Indian tomato farmer. Irrespective of demand and supply seasons, the wholesale prices fluctuated from Rs 2 to Rs 40 within a span of 3

months (Example: August-November, 2016). Figure 2 to 4 are the price trends of tomato pan Farmer Auction Mandi* Wholesale Mandi* Consumers Retailers Retail Mandi* India from 2015-17. (Source - Open Government Data website). On careful observation, it

is evident that there is not trend in any of the graphs, on comparison. There were cases when farmers dumped tones of tomato produce in market yards because they couldn't recover the cost for return logistics nor cold storage costs (**Few articles for proof are attached at the end of the essay).

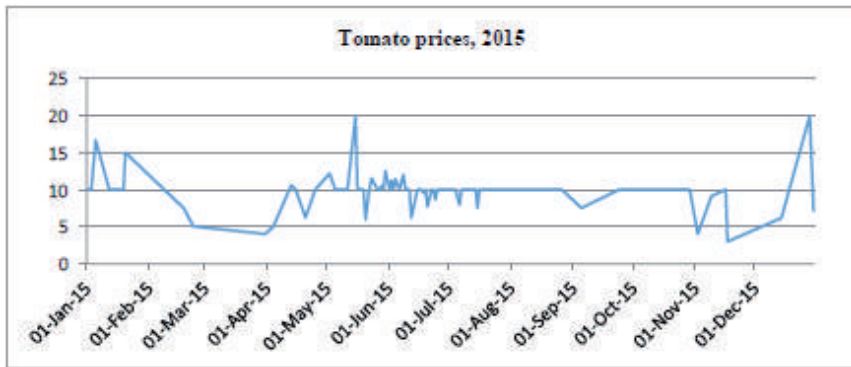


Figure 2: Prices of tomato in India, 2015

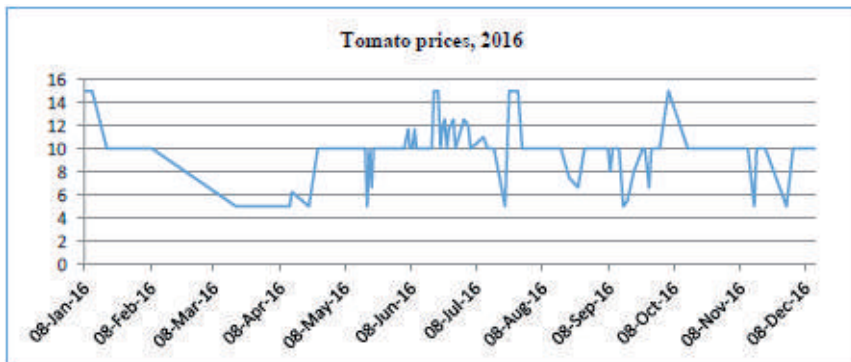


Figure 3: Prices of tomato in India, 2016

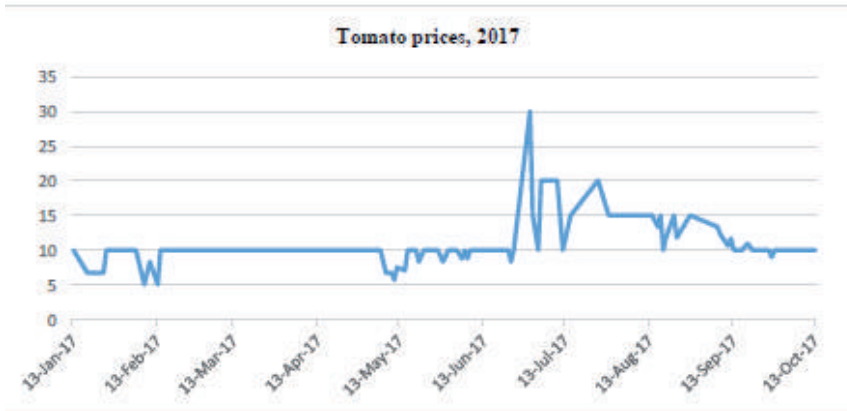


Figure 4: Prices of tomato in India, 2016

Information asymmetry is a major contributor for irregular fluctuations. Data should be captured, at every step of the supply chain, from the sowing time itself by use of IOT and ICT devices and later that data should be used for addressing the problems.

A deeper understanding of the traditional farming methods is a must, before we try to optimize the

processes. The entire supply chain from sowing period to consumer purchase phase has to be studied in depth. This gives an idea of what are the independent factors which would affect the dependent factor i.e Price of a vegetable. In common the independent factors would usually be demand, supply, area of land, weather conditions, soil type, etc. (Figure 5)

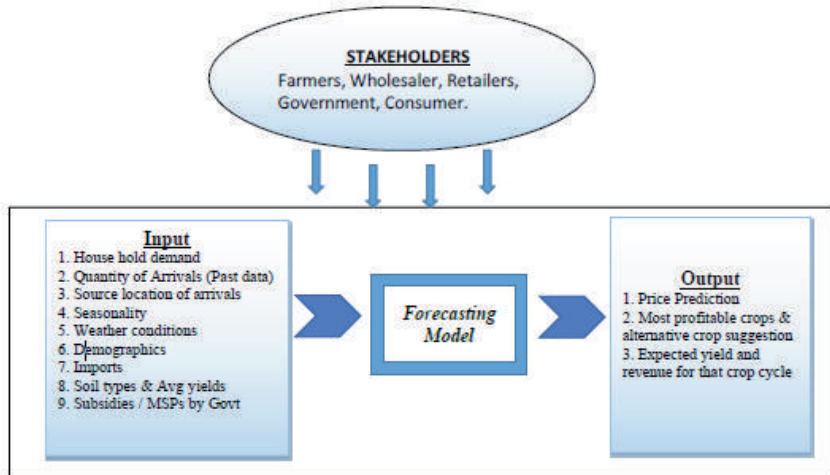


Figure 5: Proposed model for price prediction

With the captured data, predictive analytics should be applied to simulate a model that would give us the desired output. Analytics in agriculture has been applied for quite some time now around the world, especially in Africa (small land holdings) and Australia (large land holdings).

An extensive study on those analytics techniques and customizing them to a particular agrienvironment could optimize the produce supply-demand.

With a right forecast model, a **farmer** would be enabled to plan the quantity to be cultivated

according to the forecasted demand. Like-wise approximate supply information availability would also help him plan the crop type, thereby reducing the food wastage at **whole-sale** and **retail** level and smoothing the price trends at **consumer** end.

Few Indian startups like Crofarm and NinjaCart have already been assisting large scale farms with such data. The **government** can implement this on a national scale where the small land holding farmers would also benefit. The green revolution of 1950s which has happened in India has helped to achieve better produce and there

by saved us from mass starvation. Similar way a digital revolution in agriculture sector is much needed, so as to save our future generations.

A rapid technological transformation should happen on a national and international scale, to address the critical gap between production and procurement of produce. It's the only way we can achieve sustainability in agri-food production. The data collected in the due process can be used to manage the food supply, storage and development, thereby achieving the ultimate 360 degree sustainability in the farm to table circle. Only then farmer communities like my family, where agriculture has been an ancestral occupation, need not give up on farming.

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NO. Registration : SAMI/ARD/003

Sustainable Agrifood Management in Collaboration with Smallholders Farmers in Indonesia

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Food is the most important basic human need and is a human right especially for people in Indonesia, moreover Indonesia is an agrarian country where the country's economy is located. This can be shown from people who live or work in the agricultural and product sectors national origin of agriculture (Mubyarto, 1989). The 2010 National Statistics Agency (BPS) report shows that Indonesia has reached 237,641,326 people, an increase of 15.21% from the previous year, this condition requires adequate food availability.

However, in line with population growth in Indonesia, land tenure and use has become disrupted and is starting to be considered problematic. This raises the complexity of the problem due to the explosion in population growth, the discovery and use of technology, and the dynamics of development. The land that originally functioned as a farming medium (agriculture), slowly turned into multifunctional use. Specific changes from use for agriculture to non-agricultural uses, known as land conversion (conversion),

are increasingly rising, and this is what is happening in Indonesia, especially in the village of Ciapus, Bogor Regency. Where this village is one of the producers of cassava and tuber commodities, but it has been drastically reduced because cassava and tubers that they sell to middlemen are bought at a fairly low price and cause losses, so they prefer to build settlements or even sell agricultural land they are.

As I mentioned above that the high rate of growth in Indonesia is one of the causes of shifting the function of agricultural land, the climate is also greatly affecting the process of agricultural production in Indonesia which also causes disruption to the sustainable agricultural food management system. That is why an agricultural food management is needed through cooperation with small farmers through the development of food security. Meanwhile, the development of food security must be able to guarantee the availability, distribution and consumption of adequate, safe, quality and nutritious and equitable food. The development of sustainable

agricultural food management is carried out both at the regional, household and individual levels, and must be realized evenly throughout the region at all times by utilizing local resources, institutions, and wisdom

In this essay I apply sustainable agricultural food management through collaboration with small farmers through the development of food security in the village of Ciapus, Bogor Regency, West Java province, Indonesia, by maximizing the 3 main factors that must be considered in, namely: aspects of production, distribution and consumption.

In the aspect of production, Ciapus Village wishes to remain a producer of cassava and tuber commodities to increase its production, especially cassava and taro. And to achieve this, collaboration and third parties who support the management and management of their products are needed appropriately and sustainably are needed. Therefore, until now I have approached and assisted in the management of agricultural food production

in Ciapus village, especially in cassava and taro through the Ciapus Village Government itself, namely the activities of the Community Food Distribution Institution (LDPM), the Rural Economic Business Institute (LUEP), Village Development Mandiri Foods, Desa-Mapan, village-owned companies (BUMDES), joint farmer groups (GAPOKTAN) and food barns in the villages where all of these institutions involve collaboration with small farmers in the village of Ciapus both those who have their own farming land or not. And in this aspect of production, me and the village government team not only focus on increasing production but also on how to manage food reserves through food diversification, one of which is by making cassava into Modified Casava Flour (mocas flour) which is currently used as raw material for making peanut brittle umkm ciapus village is a substitute for flour which has been used so far. Because we are well aware that managing food reserves is also part of sustainable agricultural food management, besides managing

food reserves also to fill the gap between production and needs it also aims to address food insecurity and community nutrition and reduce poverty levels at least one percent per year according to the MDGs (Millennium Development Goals) at the World Food Summit in Rome, Italy in 1996. And to date, more than 14 farmers have joined the management of agricultural agriculture that we established in the village of Ciapus. And able to supply 30% more cassava than before in the market, and able to supply mocas flour as ingredients for cakes and snacks that were established in the village of Ciapus itself.

In the aspect of distribution, fluency in the distribution of agricultural products in Ciapus is absolutely necessary in maintaining food security because cassava and taro have characteristics that require time in their supply, so that good food distribution arrangements are needed in the aspect of food distribution. This is intended to realize or ensure that all consumers can obtain cassava and taro with the best quality at any

time at affordable prices, through effective and efficient agricultural food management in the distribution system. Considering that the majority of the population are farmers living in rural areas, the aspect of distribution to access food is carried out with the optimal use of the Community Food Production Distribution Institute (LDPM) in the Farmers Group Association (GAPOKTAN). The approach in developing LDPM is by empowering the community / farmer groups to be able to develop productive economic activities in a sustainable and independent manner. The development of LDPM is to improve food security at the household level, especially for farmers in production centers to support farmers to get better prices for production, strengthen management of food reserves, thereby facilitating access to food and developing farmers and the ability to get value added from the product. In addition, the development of the technological age also has a positive impact on Ciapus village farmers, namely being able to use social services

in terms of product promotion, cutting the cost of product distribution in small quantities through online goods delivery services and monitoring and monitoring through social media and electronic messages. This is one of the surpluses and benefits that must be optimized for sustainable agricultural food management in the aspect of distribution.

In the aspect of consumption, the ciapus village government and the community must work together in mobilizing so that the pattern of food utilization can meet the conditions of quality, diversity, nutritional content, safety and halal. In this aspect, sustainable agricultural food management The pattern of food use or what is called a food consumption pattern aims to have a balance between food supply and consumption level. This is because given the number of agricultural lands that have changed functions so that the pattern of consumption of the community's food consumption is monitored through 2 (two) indicators namely Widya Karya's National Food and Nutrition (WKNPG), namely

the Energy / Nutrition Adequacy Level (AKE / AKG) and Protein Level Adequacy (PPA). Whereas to monitor the level of diversity in food consumption is the Hope Food Pattern (PPH).

As a student, my management plays two roles, one is an individual who consumes food in a wise way and the second is making an analysis of sustainable agricultural food management and increasing food security and increasing the economic growth rate of rural communities through several social work programs that I undertake in collaboration with the village of Ciapus, Bogor Regency, Indonesia.

First, by establishing a Millennial Young Farmer movement that accompanies and provides education on agricultural food management and agricultural food security as I explained above, the agricultural sector with land that has changed functions and is very vulnerable to climate change affects cropping patterns, planting time, production, and the quality of the results. One effort that can be done is to address sustainable

agricultural food management and through the adaptation of food crops, by managing land and water resources optimally and sustainably, managing plants and plants that are adapted to local climate conditions, using effective and efficient agricultural production facilities, and implementing appropriate technology adaptive agriculture. In this case the management of appropriate use of technology is highly prioritized such as the development of harvest and postharvest machinery and machinery, especially the drying and grinding of grain systems and information on integrated agriculture. considering that Indonesia entered the industrial era 4.0.

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The Importance of Cooperatives in Linking Small-Scale Farmers to High Value Markets

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Indonesia has large numbers of small-scale farmers having financial problems to support their daily life. Since they only have a small land size for production, they earn low income from cultivating rice. Additionally, the extended distribution pattern of rice has limited their power to offer a better selling price of rice. An agricultural cooperative, as a farmer-owned business, is a promising institution for farmers to support them selling the rice to a high-value market with competitive price. The essay starts with the explanation of cost structure in cultivating rice. Then, it discusses the distribution of rice

from producers to consumers. Next, it proposes the inclusion of farmers in an agricultural value chain. Also, it argues that cooperatives could function as intermediaries between farmers and consumers in the agricultural value chain.

Finally, the essay notes possible obstacles in forming cooperatives to achieve sustainable agricultural value chain.

Based on the cost structure, the amount of income in cultivating rice is not enough to fund all consumption expenditure of the households. In 2018, more than half of the total number of farming

households in 2018 (15.8 out of 27.2 million) were “*gurem*” farmers who own at most 0.5 hectares of land [1]. As of 2017, the production cost to grow rice per hectare was Rp13.5 million [2]. If farmers can sell the rice at Rp4000 per kg with the level of productivity 4.6 ton per hectare, then the total revenue is Rp18.5 million [2] and the profit is Rp5 million per planting season per hectare. Suppose that there are two planting seasons in a year, then “*gurem*” farmers could only obtain income roughly Rp0.4 million per month. However, with Rp0.8 million of monthly expenditure per capita [3], a household with five members (in 2018, 80% of 27.6 million agriculture households had 2 to 5 members [1]) needs at least Rp4 million per month to cover all their expenditures. At minimum, they should have 5 hectares of farm to meet this number. In current condition, farmers have a problematic situation to support their family needs from the income of cultivating rice only.

As for rice distribution, the general pattern of the distribution in Indonesia seems also to contribute

a lower profit that farmers earn from selling rice. For a comparison, consumers spend for more than as twice as the amount of rice price sold by farmers (Rp11300 per kg of rice was consumers level price on average in 2018 [4], and the selling price of farmers was at Rp4800 [5]). In general, there are six stakeholders involved in rice distribution (except farmers and consumers) [6]. The middlemen and wholesalers obtain a significant profit than other stakeholders in the chain.

With an unattractive profit from planting rice on the small size of land, one solution is to provide high-quality rice and reach consumers in the high-value market with a minimum number of stakeholders in distribution as possible. With high quality rice being sold in the high-value market, farmers should earn a higher profit than current condition. There are three stakeholders required for this solution by developing an agricultural value chain (Figure 1). A value chain in agriculture as the set of linked stakeholders along the chain that each is responsible

for adding value to the product (for this essay – rice) [7]. Then, the first stakeholder is farmers who could provide high-quality rice as demanded by consumers. The

second is an institution that acts as distributors between producers and consumers. After that, there are consumers who demand such high-quality rice.

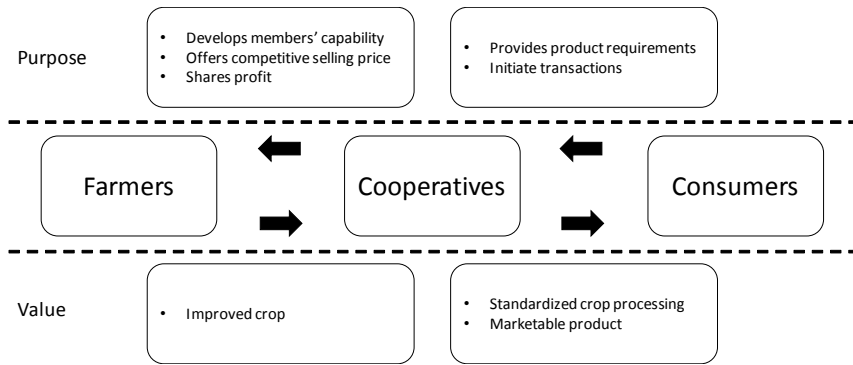


Figure 1. Agricultural value chain with cooperatives as intermediaries

By gathering small-scale farmers in an institution such as agricultural cooperatives, small-scale farmers should have positions to bargain collectively with other parties for better prices or transactions [8]. In Cambodia, brokers have made some farmers stop producing rice because farmers have to pay the loan and unreasonably high interest to repay even if there is crop failure [9]. If cooperatives could help farmers by offering financial supports, farmers would be able to sustain their

farming activities from the bad intention of brokers. The farmers, with the help of strong institutions such as cooperatives, could report this problem to the authorities and suggest a law to ban the practices of brokers in agricultures. Also, cooperatives could act as intermediaries easing the burden of consumers creating contracts for the products according to their needs. It will be easier if those (large-size) consumers establish such contracts to cooperatives rather than directly to many small-scale farmers [8].

However, there are several challenges to build a sustainable system of agricultural value chain involving cooperatives. The successful delivery of high-quality rice from producers until consumers are the results from adding expected value to each stakeholder in the value chain. Therefore, effective coordination among the stakeholders in the chain is required to sustain. For example, the required quality by consumers, the capability of producers to meet the expectation of consumers, and the distribution concerns maintained by cooperatives (packaging, processing, marketing, etc.) should be informed adequately to all stakeholders. Cooperatives should also be able to subsidize farmers a certain level of price if market prices drop during the main harvest seasons. This rice insurance scheme is a proven strategy in Thailand in 2018 to stabilize rice prices [10].

To conclude, this essay gives reasons that agricultural cooperatives are essential in establishing a link between small-scale farmers as producers and

consumers in the high-value market. As intermediaries, cooperatives could not only eliminate the long step of distribution but also accommodate adding value to rice as demanded by consumers. Moreover, farmers could sell the rice with competitive price in high-value markets through cooperatives. However, several challenges exist. A key to obtaining such a sustainable agricultural value chain is to have excellent coordination among the stakeholders (producers, cooperatives, and consumers) to agree on the quality of food (value) delivered from producers to consumers and the strong position of cooperatives to protect farmers from possible risks.

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socio environmental sustainability

The key lies in empowering the millions of smallholder producers and landless workers who form the backbone of rural economies in most developing countries to grow their incomes and improve their livelihoods by raising agricultural productivity and engaging in markets.

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Joint FAO/IAEA
Division of Nuclear Techniques in Food and Agriculture*



NO. Registration : SAMI/SES/001

Analytical of Marketing Mix Proximity to Various Downstream Product Derived from Crude Palm Oil

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The economic development of a country can be measured by economic growth. Indonesia's economy in 2018 grew by 5.17%, which was originally in 2017 at 5.07% (BPS 2019). Agriculture is one of Indonesia's great potentials to improve the economy. This can be seen from the contribution of agriculture to the Gross Domestic Product (GDP) which is quite large, which is around 12.81% in Quarter IV of 2018 or is third after the Wholesale Trade sector (BPS 2019).

In the agriculture sector, the plantation sub-sector has considerable potential (BPS 2018). Palm oil is one of the plantation sub-

sectors that is the largest foreign exchange earner (BPS 2018). The growth of palm oil production in Indonesia has increased until in 2018 palm oil production in Indonesia reached 47.61 million tons (GAPKI 2018).

However, an increase in Indonesia's palm oil production caused the accumulation of CPO (Crude Palm Oil) as a result of processed palm oil production from palm fruit pulp. This buildup causes a decrease in CPO prices in the market. The average CPO price for 2018 was recorded to decrease by 17% or US \$ 595.5 per metric ton compared to 2017, an average of US \$ 714.3 per metric ton (GAPKI

2018). Also, CPO exports declined. Based on GAPKI data (2018) the volume of CPO exports in 2017 amounted to 7.16 million tons and in 2018 export values declined to 6.56 million tons. Several factors cause this to happen, namely the European Union black campaign,

changes in tax policies and export/import levies, demand volumes that are still undersupplied, other vegetable oil price movements, and climate change as a global problem (Kurniawan 2019).

The accumulation of CPO will certainly have an unfavorable effect on palm oil entrepreneurs. Processing and developing CPO into downstream products is needed to reduce the buildup of national CPO stock. This is in line with the plan to be carried out by the government. The government through the Ministry of Industry said that downstreaming of oil palm products as part of downstream agro-based natural resource industries is in line with the 2015-2019 National Industrial Policy (KIN) as the implementation of the mandate of Law No. 3 of 2014 concerning Industry and PP No. 14

of 2015 concerning the 2015-2035 National Industrial Development Master Plan (RIPIN) (Ministry of Industry 2017).

According to Mangoensoekarjo and Semangun (2008), downstream products from CPO include cooking oil, margarine, cookies, sweetened condensed milk, bath soap, detergents, pharmaceuticals, cosmetics, candles, and biodiesel. Therefore, to reduce the accumulation of vegetable oil, especially CPO and its derivatives, it is necessary to study the marketing mix contained in palm fruit derivative products so that the process of hirilization can run effectively to reduce the accumulation of CPO stock. This effective marketing mix will then become a strategy that needs to be increased so that the demand for CPO and its derivative products will increase again so that it will reduce the buildup of national CPO stock.

Methods

This research data uses primary data and secondary data that are both qualitative and quantitative. The research diagram can be seen in Figure 1.

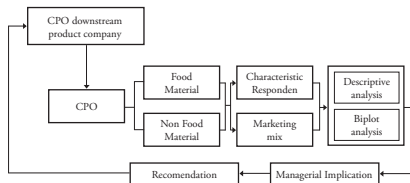


Figure 1 Research diagram

This research was conducted in the middle of marketing management consumers, specifically examining consumers in Bogor, Bekasi, Depok, Jakarta, and Tangerang, with 150 respondents drawn based on the Slovin method. Data processing and analysis is done using descriptive analysis tools and biplot analysis. Descriptive analysis to see the characteristics of consumers. Biplot analysis was carried out to see the closeness of the marketing mix to processed palm fruit meat products. Previously tested the validity and reliability testing with the help of the SPSS (Statistical Package for Social Sciences) program to perfect data processing and analysis.

Results and discussions

Characteristics of respondents obtained in this study include 64%

of respondents residing in Bogor, respondents are dominated by the age of 20-24 years with high school education and the status of unmarried, and most have income with a range of Rp 1,000,000 - Rp2,500,000 with an expenditure range of 90.1% - 100%.

Biplot analysis shows that in the product mix, consumers of frying oil, margarine, condensed milk, bath soap, detergents, pharmaceuticals, cosmetics, candles and biodiesel (gasoline) are more concerned with variety, brand, quality and eco-friendly. In the price mix, all processed products of palm oil, consumers consider price lists, discounts, and discounts. Whereas in the place mix the consumer will consider the place mix in the ease of transportation, strategic location and the availability of a lot of stock when buying cooking oil products, margarine, cookies, sweetened condensed milk, bath soap, detergents, pharmaceuticals, candles and biodiesel (gasoline). Whereas in cosmetics, consumers are more considering the availability of official outlets in purchasing products. Companies have used

their respective promotional tools to attract consumers. In palm oil derivative products, consumers also consider promotions carried out by companies, both conventional and digital.

Solution

Strategies that can be carried out for the processed palm meat products are planning (planning), organizing (organizing), actuating (implementing), controlling (controlling). In the planning strategy, the company can determine the right location, determine the price, make products with good quality and also determine the right promotional tools to use. In organizing the company can improve the product in terms of quality, brand, way of promotion and also the determination of the right location. As for the implementation, the company can pay attention to the final product made, whether it is suitable for marketing or not. And for control, companies can conduct an evaluation process of the strategies

that have been implemented so far. whether it has been effective or not the strategy that has been implemented so far.

In general, palm oil processing product companies can carry out ongoing evaluations of the strategies that have so far been carried out. Companies can also maximize the marketing mix strategy. Building loyalty, and improving consumer complaints can also facilitate the application of marketing mix strategies owned by the company. Also, making the company superior to other companies will also make it easier to improve the marketing mix strategy.

Conclusions

The variables of each marketing mix, namely variations, brands, quality, eco-friendly, price lists, discounts, price discounts, ease of transportation, strategic location and availability of large stocks, availability of official outlets, and conventional and digital promotions affect the CPO products and its derivatives.

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Factors Affecting the Decision of Purchasing Buffalo Meat and the Marketing Mix Implementation (Case Study: BULOG Regional Division of DKI Jakarta and Banten)

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Introduction and Background

Livestock is one of the important sectors for national development to fulfill the need of animal protein that the Indonesia citizen's need (DITJENNAK 2018). Indonesian citizen's consumption on animal food in 2015-2017 had increase to 292.07% (DPKP 2018).

Beef is one of the types of food that the citizen chooses to fulfill their need on animal protein. Consumption level on beef had increase in 2016 to 2017 from 6.46% to 7.11%. The citizen's need on beef caused a high demand

on meat in the market therefore at 2017, its price reached Rp115 932 per kilogram. Other than that, domestic beef production in 2018 was only 403 668 ton, meanwhile the need is 663 290 ton so that the need of beef only fulfilled at 60.9% (DITJENNAK 2018).

The high price and need towards beef lead to government to issue a policy regarding import of buffalo meat. This import is an effort in anticipating and resolve the shortage of stock and also the uncontrollable spring of meat price especially when the religious holiday is approaching.

The price of imported buffalo meat is quite affordable, Rp80 000 per kilogram. Undang-Undang Nomor 41 Tahun 2014 tentang Peternakan dan Kesehatan Hewan become the basis for the government to import buffalo meat as an alternative choice of meat that's more affordable.

Ministry of Agriculture (2018) stated that in 2019 the need of meat has reached 620 000 ton, while the domestic production of meat is only 450 000 ton. Therefore, procurement of 100 000 ton imported buffalo meat had been set and Public Company BULOG is appointed to duty so that the government is in control on the (Anggraeni 2019).

Public Company BULOG is a Government Business Entity (BUMN) that active in food logistic field. Other than functioning as public service, the company is also carry out commercial activities. One of the company's job is to manage the procurement of primary food either domestic or foreign commodity which one of them is low fat frozen buffalo meat through Regional Division (Divre) DKI Jakarta and Banten office.

In 2018, stock supply of buffalo meat that BULOG Regional Division of DKI Jakarta and Banten have is 79 205 ton while the release is only reached 60 553 ton. This shows the sales has not yet absorb all available stock. The focus of this research is to use company's distribution channel that conducted by final and intermediate consumer. Final consumer is everyone who uses goods or service product to fulfill their own, family, or household needs and do not use it for sale. Meanwhile intermediate consumer is everyone who gets goods or service product to make another product or to sell it (Kristiyanti 2009).

Based on BULOG Regional Division of DKI Jakarta and Banten (2019), the number of final consumers that purchased frozen buffalo meat in the past year from March 2018 – February 2019 is lower than intermediate consumer. The lack of information regarding *product knowledge* of buffalo meat is creating a not-so-well perception thus making the sale on final consumer nonoptimal. Decision

on purchase is affected by many factors, one of them is consumer's perception. Consumer's perception is the result of information processing that become the first impression on a product. A good perception can lead a consumer to use a particular product (Sumarwan 2011).

Buffalo meat in people's perception is considered less tasteful when cooked, the texture of its meat that is also harder and smell compared to beef (*Cattle Buffalo Club* 2018). These are because usually buffalo meat is obtained from buffalo that is no longer used. However according to Chef Chandra Yudassawara, those perceptions are incorrect (Miftahudin 2016). Buffalo meat does not have strong smell when it is cooked more so if using herbs and Indonesian seasonings. Meat's physical characteristics such as color, tenderness, texture, chewiness, and dampness are very important that they become reference for consumer to select a meat and can affecting consumer's perception towards buffalo meat.

Regarding the mentioned problem, company must understand consumer's needs and wants so consumer can accept the product well using a proper marketing. The marketing effort that can be done is by analyzing factors that affect purchase decision through consumer behavior such as consumer's characteristics, and purchased decision process. Research of factors that affect consumer decision making can be used as effective alternative of buffalo meat marketing mix implementation in BULOG Regional Division of DKI Jakarta and Banten. According to Schiffman and Kanuk (2018), marketing mix is a component from consumer decision making model. Marketing mix that executed accordingly can hopefully stabilize the company and thus profited by attracting potential consumer and maintain the current consumer. Considering the importance of identifying factors that affect consumer decision making and its implementation on frozen buffalo meat marketing mix on BULOG Regional Division of DKI Jakarta and Banten made it necessary to do a further study.

Methods

This research was conducted by questionnaire to final consumer of frozen buffalo meat that made a purchase in BULOG Regional Division of DKI Jakarta and Banten. Data gathering is done with survey method and literature review. Survey method is through interview and filling out questionnaires directly in order to identify respondent's characteristics, decision making process, and factors that affect purchase decision. Literature review was obtained from previous researches, journals, books, and other relevant literature.

Method used for sampling is nonprobability sampling, using convenience sampling technique. The number of samples is determined using Slovin theory (Sugiyono 2011) with the number of populations that is consumer in the past year from March 2018 - February 2019 is 1 356 people thus respondent in this research is 93 people with criteria have purchased frozen buffalo beef at BULOG Regional Division of DKI Jakarta and Banten at

least once. This research is using several methods for data analysis such as descriptive and factor analysis. Factor analysis used to reduce overall decision-making factors into several ne factors that affect purchase decision. Tool that used for analyzing data is SPSS (*Statistical Product and Service Solutions*) and Microsoft Excel.

Result and Discussion

Respondent Characteristics

Respondent in this research is final consumer that purchased frozen buffalo meat at BULOG Regional Division of DKI Jakarta and Banten that is 93 people. The characteristics of respondent is 81.7% of Jakarta citizen. The gender is balanced between male and female at percentage 52.7% and 47.3%. Age mostly in range 22–26 years old with percentage 28% and marital status as married 63.4%. Final education level mostly undergraduate (S1) 37.6% and high school graduate 33.3% with job status BUMN workers 30%. Respondents monthly average income mostly in range Rp4 000 000 – Rp8 000 000 in total 47.3%.

Decision Making Process

Decision making process is divided into five steps. The first step is problem recognition, the main reason of purchase is mostly because an affordable price. The second step is information search, the initial source of information is from family, friends, and neighbor, and time span on information search regarding product is more or less a day. The third step is evaluation of alternative it is attribute evaluation before purchase which is price, the product's attributes that became the focus of attention. According to information the answers are dominated by price and consumer characterize a good buffalo meat by its freshness. The fourth step is purchase decision, consumer come to a decision based on their needs, the most affecting in purchase is family, friends, and neighbor, the average consumption of product in a month is once the most visit is on weekdays in the noon. The final step is the fifth step that is post-purchase evaluation. Consumers admitted to be satisfied after consuming the buffalo meat, agreed to make repurchases and

recommending product to others, also if product is unavailable then consumer will not buy and if the product is to increased its price then most of the consumer will still buy the product.

Factors Affecting the Decision of Purchasing

There are eight factors that affect consumer purchase decision on buffalo meat at BULOG Regional Division of DKI Jakarta and Banten which are product quality, product access, environmental influence, consumer perception, consumer culture and demography, promotion, product information, and product consumption needs. The main factor that most influencing is product quality.

Marketing Mix Implementation

Marketing mix implementation that could be recommend for company to run the business are: to maintain the quality of buffalo meat product, give product knowledge in the package, and do an act of socialization about

processed meat product to create good impression for consumer; the price that should be affordable; provide payment method using EDC (*Electronic Data Capture*) machine and cashier machine to facilitate the transaction either for consumer and seller in the outlet alike; other than promotion in the form of price, promotion through workshop and bazaar is also necessary to introducing product directly to people.

Solution

For policy holders, namely the government, the results of this study are expected to be an input for creating a more conducive business climate. One of them is by increasing the licensing and capital loan services from banks to the public which are easier, faster, and transparent. This can be achieved through increased coordination and cooperation with banking institutions to obtain good services for the community. It is hoped that the community will be able to play an active and competitive role in business in the field of animal husbandry.

For the Public Company BULOG, especially Regional Division of DKI Jakarta and Banten, it should be necessary to maintain and improve the quality of low-fat buffalo meat products sustainably because according to the results of research prove that the quality of buffalo meat products is the most influencing consumers in purchasing decisions. In addition, companies also need to pay attention to product knowledge received by consumers, one of which can be through packaging and direct socialization to the public.

Conclusion

Based on the result of this research regarding consumer characteristics, purchase decision process and factors that affect consumer in purchasing frozen buffalo meat at BULOG Regional Division of DKI Jakarta and Banten also its implementation on marketing mix, there are eight factors that give effect and must be put to attention by BULOG Regional Division of DKI Jakarta and Banten. Those factors are

product quality, product access, environmental influence, consumer perception, consumer culture and demography, promotion, product information, and product consumption needs. The main factor that most influencing is product quality.

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NO. Registration : SAMI/SES/003

Effect of Green Attribute in Company: The Role of Attract Millennial Generation in Indonesia and Malaysia

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Introduction and Background

With the rising concern of environmental issues in recent years, the concept of “go green” has been a focus that needs to be worked through closely by companies, organizations and even countries. This is actually in line with The Sustainable Development Goals (SDGs) program, or what is well known as a global aim, to eradicate poverty, save the earth and to make sure that all people could enjoy peace and prosperity. Furthermore, in order to attain “go green” status, a few companies in

Indonesia and Malaysia has taken initiatives in particular to implement green marketing policies, green supply chain, and green human resource management (GHRM). Among these practices that carry the theme of “go green” and being sustainable in the companies, GHRM has reached an increasing attention. GHRM is aware of environmental affairs, also stand for the social as well as economic well-being of both the organization and employee (Chaudhary 2018). The activities of GHRM start from green recruitment, green selection, green job analysis,

green training, green reward and green performance appraisal. This is part of attribute activities from the company. Currently, millennial generation is the highest population in workforce. Different with the previous generation, millennial generation not only focus on personal benefit from the company, but also, they considered with what company provided for the environment. This is line with Person-Fit concept from Kristof (1996) stated that someone will

choose the company to work conform with their value. Based on the survey results from Central Statistical Board (Badan Pusat Statistik – BPS) of Indonesia and Statistical Board Malaysia (Badan Statistik Malaysia – BSM), in 2020 the millennial generation are projected to be the generation with the most numbers in the workforce as compared to the baby boomers or the Gen-X because by the time we reach 2020, the majority of the millennial generation are in their productive age as seen in Figure

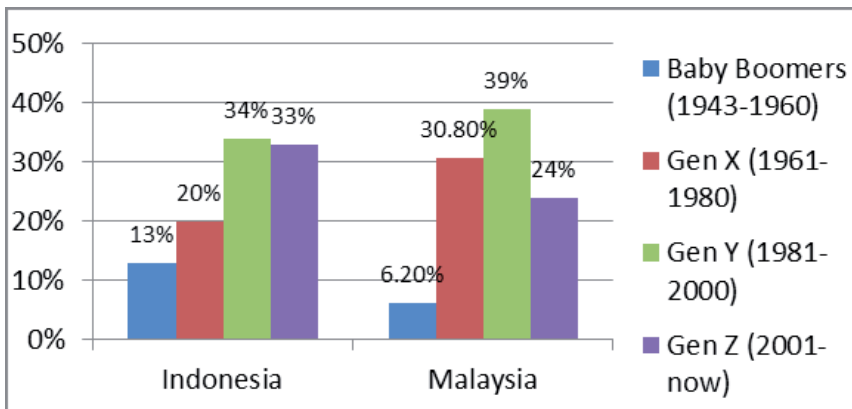


Figure 1 Inter-generation the population projection comparison in Indonesia and Malaysia 2020

Source: Data processed from BPS and BSM 2018

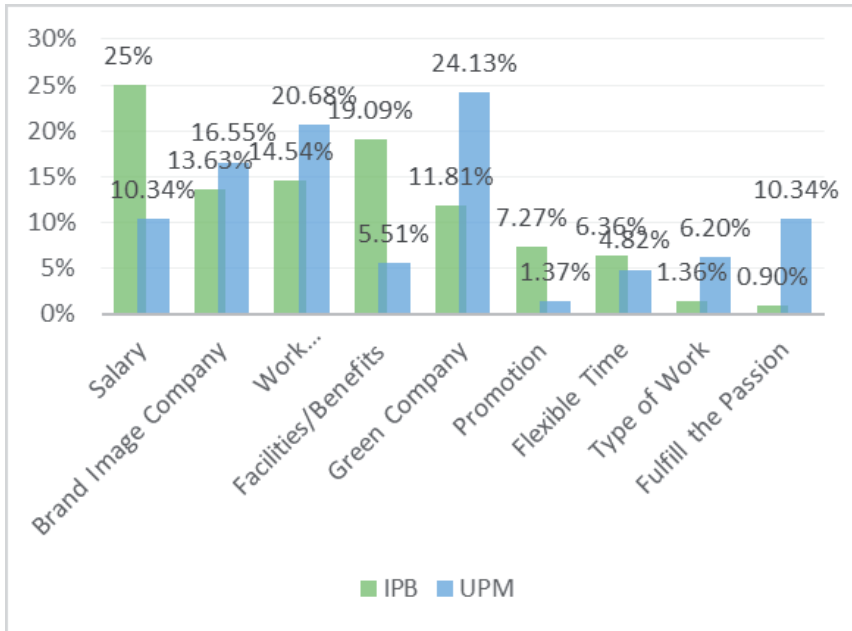
In Figure 1, we could see that within a short period, the millennial generation will occupy the most proportion of people in the workforce. The majority of the job seekers in companies are the Gen-Y or the millennial who are the graduating students in the universities. As a case in point, to be a company that is attractive to their potential employees, the company needs to understand the important values held by those future employees of the company. In the light of this, the researcher considers this as a pertinent issue to study this topic, whether the implementation of GHRM in a company will influence the motivation to apply the job for the potential employee of that company.

Method

This study using the analysis descriptive with the mode methods. To measure about tendency and deeper identification from the millennial perception about green attribute in company. The participant of this study are 200 final year student from IPB University and Universiti Putra Malaysia.

Result and Discussion

As general, this study wants to know what the factor that millennial generation considered when they choose the company to work. Figure 2 presented the perception from the participant.



From the picture, can sum up that as big as 24,13% participant from UPM considered about green attribute from the company, meanwhile in Indonesia as big as 11,81% participant from IPB also considered about green policy or activity from the company when they choose the job.

Green Human Resource Management

This study also measures the perception of participant about green attribute in company especially GHRM. The frequency distribution of respondents' statements of GHRM can be seen in Table 1.

Table 1 The frequency distribution of respondents' statement on the green human resource management

No	Statement	Respondents' Response					Mode (%) (4,5)	Explanation
		1	2	3	4	5		
Ghrm1	Good place to work	0	0.5	10	6	33.5	89	Strongly agree
Ghrm2	First choice company	0	0.5	20.5	57.5	21.5	79	Agree
Ghrm3	Attractive company	0	0.5	15	63.5	21	84.5	Strongly agree
Ghrm4	Learning about this company	0.5	1	16.5	54	28	82	Strongly agree
Ghrm5	Company is very appealing	0	0	19.5	63.5	17.5	81	Strongly agree

Source: Questionnaire (Data Processed 2019)

Based on Table 6, it is obtained by the descriptive results in which most participants demonstrated that strongly agree with GHRM practice in the company. From the results of data collection, all respondents agreed if the company begin to pay attention to the environmental impact in the production process and its operations supported by human resources working in it.

Conclusion

From the simple survey about the perception millennial generation in Indonesia and Malaysia, to sum up that millennial generation provides positive responses to companies that adopt green practices in their companies. Even this attribute makes it interesting for millennials to join the organization because of the similarity of values they have with the company.

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Environmental Sustainability Throughout Students' Environmental Knowledge and Green Behavior (Case Study: Students in Malaysia and Indonesia)

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Many countries around the world are adopting sustainability practices. This is evident in new sustainable country that are springing up. The reason for this new frontier in country planning may be linked to renewed appreciation of human capital development, healthy living standards and concerns for the environment (Aquilani et al., 2018; Szopik-Depczyńska et al., 2018a; Szopik-Depczyńska et al., 2018b). For a country to be considered sustainable however, certain important elements must be present. These elements (sustainable

education, renewable energy, energy efficiency, sustainable transportation, sustainable buildings, waste management, etc.), when combined with informed and willing inhabitants, dividends of sustainability may be realized.

Accelerating globalization and technologies were in line with the increasing environmental damage caused by human activities which impact on the environmental performance of each country. Rapidly degradation of natural resources created by human activities has been the fundamental

debate in modern community and by global consumers with the concept of environmental commitment (Nisbet & Myers, 2007). This consciousness around environmental problem aligned pressure the part that each subject and community in prevalent holds for the prescription of the ongoing and unfolding environment conjuncture (Paço & Lavrador, 2017). Environmental performance of a country could be observed from the Environmental Performance Index score that organized by Yale University. They consist of the protection of environmental health and the protection of ecosystems. According to (Jay, Esty, & Levy, 2010; Hsu et al., 2014; Index, 2016; Yale Centre for Environmental Law & Policy, 2018) The EPI score had been published in 2006 and it passed the analysis environmental performance of 133 countries, it was increased to 178 countries in 2014 and 180 countries in 2016 until 2018. Based on the EPI assessment, countries are trying to improve environmental performance to increase the EPI score assessment sort of Malaysia

and Indonesia. Malaysia and Indonesia are the two Southeast Asian countries that support environmental sustainability.

To perceive the environment performance of Malaysia and Indonesia, it could refer to the assessment by Yale University. The latest EPI score of Malaysia and Indonesia have decreased from the previous year. The results indicated a decline in the aspects of the ecosystem vitality and environmental health from 9 issues of EPI score assessment, namely health impact, air quality, water and sanitation, water resources, agriculture, forest, fisheries, biodiversity, and habitat, also climate and energy. According to these 9 issues, water sanitations and heavy metals are the lowest scores from the environmental health aspect, and forest issue is the lowest score from ecosystem validity of both countries. These results indicate that environmental performance needs to be improved in all aspects of life in Malaysia and Indonesia, especially for the bottom three issues of EPI score Malaysia and Indonesia.

To improve environmental performance, each country would establish cooperation with various sectors in particular formal and informal institution. One of the collaboration could be conducted is with the university as higher educational institutions. Many Higher Education Institutions (HEI) have been performing efforts in the implementation of sustainable development as a whole, and in their operations in particular, with the aim of reducing the environmental impacts of their operations. The literature has documented the various ways HEIs have been integrating sustainability in the different dimensions of their activities (e.g. Wals, 2014; Tilbury, 2012; Disterheft et al., 2013; Leal Filho, 2011; Leal Filho, 2012). These tertiary institutions will play a big role as a party that could promote and solve environmental problems. In the last few decades, universities have shown an increase in the implementation of a sustainable environmental principle (Vizek Vidovic, 2008). Basically, in 1972, the Stockholm Declaration stated that the continuous declaration

related to tertiary institutions has been developed with the admission need of the tertiary institutions' contributions in environmental education (Wals Bob Jickling, 2002). Despite the broad focus of sustainability at HEIs, two approaches seem to be more predominant in the recent literature, namely campus operations and institutional initiatives (Vaughter et al., 2013; Wals, 2014; Wals and Blewitt, 2010; Lambrechts et al., 2018). In this context, the term campus greening often refers to technical issues such as environmental management, sustainable buildings, renewable energies or carbon footprint and reporting.

University's contribution to the environmental performance could be seen from the UI-Green Metric assessment initiated by the University of Indonesia. This system is a genuine measure to evaluate campus in terms of sustainability (Suwartha & Sari, 2013). Various universities in Malaysia and Indonesia participate in this program to recognize the extent of the university's

contribution to the environment, among them are UPM and IPB University as agricultural campuses in these two countries. According to UI Green Metric, UPM and IPB University became the top 5 green campuses in Malaysia and Indonesia. This assessment was obtained from 6 aspects of UI-Green Metric assessments, they are setting and infrastructure, energy and climate change, water, waste, education and research, and transportation. Besides as top 5 UI-Green Metric in Malaysia and Indonesia, UPM and IPB University have other similarities, in particular (1) agriculture campus, (2) top 100 QS World University Ranking by Subject Agriculture and Forestry from 2016-2018, and (3) having Faculty Economics and Management to encourage the development of agriculture in the downstream sector. A “greener campus” or a more sustainable campus estate, characterized by improved energy and resource efficiency, is not only beneficial from an environment point of view, but can also deliver visible cost savings for institutions.

There are investment costs, but these are usually a mortised over time, when the cost-saving elements of the facilities start to be calculated. While campus greening is sometimes considered being a first step towards a sustainable university, it is a complex endeavor that faces many challenges (Leal Filho et al., 2017). In order to be effective, it is necessary to embed all activities in an institutional-ized framework, be it sustainability management system or a taskforce or other suitable strategies (Ferrer-Balas et al., 2009; Spira et al., 2013; Baker-Shelley et al., 2017; Leal Filho et al., 2018). Recent research studies and policymaking have been emphasizing the adoption of “green” strategies, such as reducing carbon emissions (Li et al., 2018; Sun et al., 2018), improving the efficiency of new energy investments (Zeng et al., 2018), and promoting sustainable water management (Baudoin and Arenas, 2018)

Although a transformation to a more sustainable university cannot be forced, among other issues also due to the premise of academic

freedom, it is argued, that a whole-institution approach is essential (Moore et al., 2005, Mader et al., 2013; Lozano et al. 2013, 2015; Lozano, 2006; Littleadyke et al., 2013; Hoover and Harder, 2015). The whole institution approach and the attempt to make sustainable development an integral part of research, teaching, and operation needs to be accompanied by transformative environments, organizational learning practices and effective leadership for sustainability (Mader et al., 2013). As an educational institution, there are many stakeholders in UPM and IPB University like Rector, Dean, and staff academic who acts as a policymaker, lecturers who provide knowledge through formal education and students who are knowledgeable and develop creativity through various activities at the university. As agriculture university, UPM and IPB University established Faculty of Economics and Management to create graduates in the downstream sector of agriculture. One of the objectives IPB University established Faculty of Economics

and Management is to achieve the management system and higher education institution in the field economic and management to create a quality human resource as an excellent actor and so as the asset to sustainability the development economic and human (social) welfare (FEM IPB University, 2019). Also, UPM established Faculty of economics and management to produce business graduates who meet the needs of the business community and to develop innovative and socially responsible leaders who are capable of dealing with changes in the global environment (FEM UPM, 2019). Based on this purpose, Students of Faculty of Economics and Management FEM and IPB University expected to become policymakers and future leaders in the economic and management sectors in the future. Therefore, to successfully realize this goal, FEM students must be equipped with sufficient knowledge to be able to create the right decisions in the future. As organizations, universities contribute most to the student's

personal identity, worldview, and values. By compiling and formulating appropriate curricula and course plans, the university can shape student personality with certain provisions, in this case, sustainability, and be an example to other institutions. Thus, the importance of universities as such and their future transformations for the creation of sustainable society are acknowledged and envisioned (Beynaghi et al., 2016).

Faculty of Economics and Management UPM and IPB University could organize students through knowledge acquired by students during the education process. (Lozano, 2006) suggest that more highly educated individuals are more concerned about environmental quality and are more motivated to engage in environmentally responsible behavior since they are better aware of the potential damage. More highly educated individuals seem to possess a higher level of environmental knowledge, that is translated into green behavior (Schlegelmilch, Bohlen, & Diamantopoulos, 1996).

Students could be parties who could encourage improvement in environmental quality since students are one of the biggest groups of stakeholders in the universities and could make a significant impact on sustainability (Dagiliūtė, Liobikienė, & Minelgaitė, 2018). Furthermore, they express a willingness to contribute to and support the sustainability of campuses and beyond (Emanuel and Adams, 2011). In addition, a large number of studies have analysed the determinants of pro-environmental student behavior (e.g., Vincente-Molina et al., 2013; Cotton et al., 2016; Rodríguez-Barreiro et al., 2013; Ting and Cheng, 2017). Relatively few studies speak in greater detail about the involvement of students in policy formation and implementation regarding sustainability. The policies initiated by policymakers at the university could make changes, but at universities, students have the power as agents of change. Hence, bottom-up initiatives, especially student-led ones, could be important drivers for change

in university policy and operation (Brinkhurst, Rose, Maurice, & Ackerman, 2011).

Many works of literature studied the correlation between environmental education and the actual behavior and the lifestyles of the university (Zsóka, Szerényi, Széchy, & Kocsis, 2013). Environmental knowledge is important in producing ecological behaviors because an individual must know what type of actions to take. Thus, environmental knowledge is an intellectual prerequisite to performing ecological behavior (Frick et al., 2004; Gardner and Stern, 2002; Otto and Kaiser, 2014). Although participation in environmental education programs commonly has positive effects on environmental knowledge (Rickinson, 2001; Liefänder et al., 2015), the relation between environmental knowledge and ecological behavior has been disputed (e.g., Geiger et al., 2014; Frick et al., 2004), and may be influenced by several factors, such as motivational components in the form of personal values and attitudes (e.g., Gatersleben

et al., 2002). Previous research investigating the relationship between environmental knowledge and ecological behavior shows that environmental knowledge, more often than not, fails to directly influence ecological behavior (e.g., Kals et al., 1999; Hines et al., 1986/87, Steg and Vlek, 2009), or does so only weakly (e.g., Frick et al., 2004). In fact, fostering singular knowledge, even directly related to a specific ecological behavior, seems to have—if at all—one of the lowest effects (e.g., Abrahamse et al., 2005; Otto et al., 2016).

According to (Polonsky, Vocino, Grau, Garma, & Ferdous, 2012) observed that behavior could change positively along with increasing environmental knowledge, which encourages the purchase of environmentally friendly products. Environmental knowledge helps consumers evaluate themselves for things that already do and encourages their improvement (Polonsky et al., 2012). Environmental knowledge could be interpreted as a person's ability to analyze environmental concepts and behavior patterns

(Laroche, Bergeron, & Barbaro-Forleo, 2001). In line with that research, (Pavliukh, 2014) also stated that high environmental knowledge has an impact on green behavior for environmental sustainability. Green behavior refers to a behavior or action of someone toward the environment in which that behavior or action leads to a positive impact on the environment (Gottman et al., 1998). In the conclusion, that is an important thing to encourage sustainability through higher education institutions which are reflected through the contribution of students with the attitude of green behavior and support a sustainable environment.

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Factors Affecting Awareness on Halal Food Products in Bogor Area

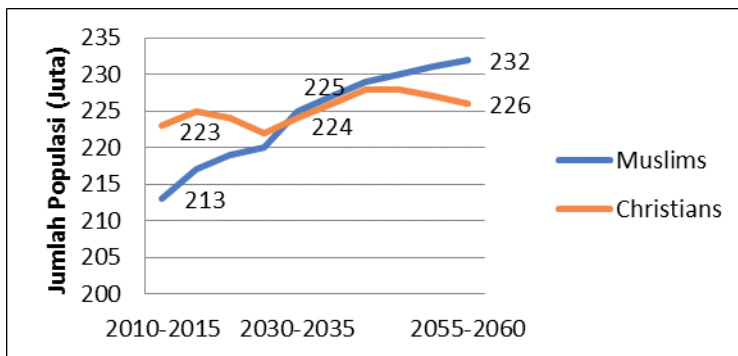
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The world's population is around 7.5 billion with the beliefs held in accordance with each country. According to The Big Religion Chart 2016, the world's population is dominated by Christians with a total of 2.2 billion or 33% of the world's population and Islam with a total of 1.6 billion

or 21% of the world's population. One study conducted by the 2010 Pew Research Center demographic projections stated that the growth of the Muslim population in the world had increased markedly and was predicted to rival the growth of the Christian population. This is contained in Figure 1.



Source: *Pew Research Center demographic projections 2010*

Figure 1 Graph of Growth Prediction for Christians and Muslims

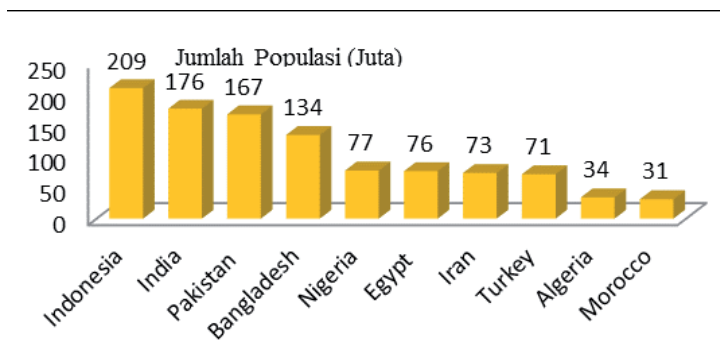
The growth of the Muslim population in the world has implications for the increase in the global halal market, for example, beginning in 2017 the BRF (the largest meat packaging company in the world) based in Brazil launched a special subsidiary to handle the whole process of halal meat operation, which was named One foods as a halal meat company the largest in the world and based in the UAE (United Arab Emirates). Halal according to the Indonesian Ulema Council (MUI) means “justified”, whereas Muslims must consume food according to the Shari ‘a, it is quality and does not endanger health. However, up to now there is still no global halal standard which is a challenge for halal product companies, so halal certificates are usually obtained from countries that are the target market of each company.

Based on Pew Research Center Religion and Public Life research, Indonesia is the largest Muslim population in the world with 209 million people (Figure 2) which has increased to 224 million according to the US Commission

on International Religious Freedom (USCIRF). This has an impact on halal food expenditure reaching 170 billion US dollars according to data released by the Global Islamic Economy Report 2018/2019 and occupies the first position (Table 1). In addition, Indonesia is also ranked first in the world halal tourism version of the Mastercard-Crescent Rating

Global Muslim Travel Index 2019. The award assessment adopted four criteria including access, communication, environment and service where halal food is included. At present, for all halal regulations and policies refer to the implementation rules of Law (Law) Number 33 of 2014 concerning Halal Product Guarantee. Indonesia has a halal product policy-making institution namely the MUI with core authority as halal fatwa provider, authorizing auditors or people who have the qualifications to inspect halal matters and giving authority to halal examiners. According to MUI data it is noted that there are 11 249 companies, 17 398 halal certificates in circulation, and 204

222 products that have been halal certified at the end of 2017 where this has increased every year which can be seen in Figure 3.



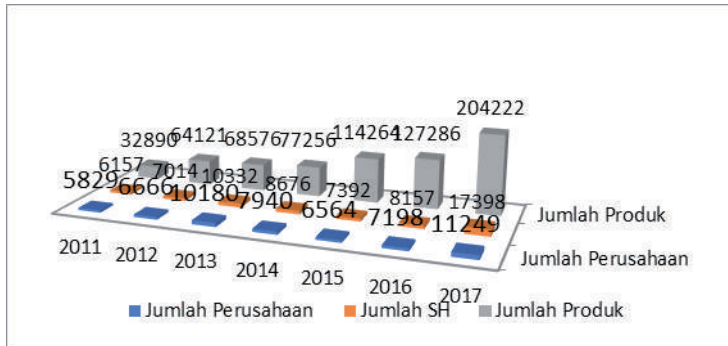
Source: *Pew Research Center demographic projections 2010*

Figure 2 Graph of Number of Islamic Population in Ten Countries

Table 1 Largest Halal Food Expenditures 2018/2019

Negara	Jumlah Pengeluaran (Milliar Dollar AS)
Indonesia	170
Turki	127
Pakistan	118
Mesir	86
Bangladesh	76
Iran	63
Arab Saudi	51
Nigeria	47
Rusia	41
India	38

Source : *Global Islamic Economy Report 2018/2019*



Source: LPPOM MUI 2018

Figure 3 LPPOM MUI Halal Certification Data for 2011-2018 Period

In 2018, a coordination meeting was held by the Bogor City government on the City of Bogor towards halal tourism (jabarprov.go.id). In this concept one of them makes it easy for Muslim communities to consume halal food and other goods as well as issuing regulations that do not conflict with Islamic law. One of the efforts to succeed in the design is to facilitate food businesses to get halal certificates in collaboration with Bogor City MUI, besides that the Bogor City government hopes that community cooperation will be carried out by caring for halal products, especially food and even plans to hold a “SMS

Restaurant Movement Not Yet Halal “massively to sellers whose products have not been halal certified. On the other hand, Bogor Regency was awarded as the Best Halal Region at the Halal Award event in the 2016 International Islamic Fair series organized by the Indonesian Food and Drug Administration and the Indonesian Ulema Council (LPPOMMUI). The award was given to stakeholders in the halal sector where the basis for the assessment was seen in terms of providing education, information, advocacy and facilitating halal certification. The Department of Cooperatives, Industry and Trade (DISKOPERINDAG)

provides guidance and support to the businesses of Micro, Small and Medium Enterprises (SMEs) of Bogor Regency in improving product quality and in obtaining halal certification in the form of funds and facilities for MSME products. Based on the data and

information above, it becomes the background to conduct research analyzing the factors that influence the level of consumer awareness of the City, Regency and Bogor Region towards halal food products.

NO. Registration : SAMI/SES/006

Sustainable Strategy for Digital Banking Promotion (Case Study: University Students in Greater Jakarta Area)

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Today, the conventional banking dominates the financial sector up to 70% and digital banking has very small amount of market share (Bank Indonesia 2018). It does not even categorized independently and classified with other financial institutions as big as 1.90%. In the other hand, the domination of banking sector is aligned with the connectivity growth of modern electronic devices that is growing more popular in the society of Indonesia. Based on Association of Internet Service Provider in Indonesia or APJII (2018) explains that internet users until 2017 have reached 143.26 million people, it grows almost 8% from 2016 with

the total of 132.7 million users. In addition, based on the Ministry of Communication and Informatics of the Republic of Indonesia (2015) also explains that the penetration of smart phones in Indonesia is one of the highest in the world.

The rapid development of current society understanding technology and the importance of financial system effectiveness, make people demand more efficiency in financial services which is in line with the current modernization process. It makes a challenge for conventional banking corporations to provide banking services that are suitable with

current consumers' demand and integrated with modern technology which is Digital Banking.

One of the regions in Indonesia with rapid technological growth and the highest use of digital financial facilities is the capital of Indonesia that is Jakarta with more than 80% internet penetration (APJII 2018). It is also supported by the surrounding cities or commonly called the Greater Jakarta area consisting of 13 cities/regencies with more than 20 million population and one of the most densely populated areas in Indonesia based on Statistics Indonesia or BPS (2019). Based on OJK (2014), there are 142 bank corporations in Indonesia and 91 of those banks or 64% build their headquarters in the area of Greater Jakarta. This creates high opportunity for digital banking business model to develop bigger in terms of market share and technological development.

Digital banking has superiority in digital integration using application and minimize the use of physical facility, such as branch office. In long term, this efficiency can minimize the physical costs

of banking to provide facility for customers. It will be a huge burden for conventional banking in the future if they do not have the strategy to enter digital banking business model.

Digital banking has superiority in digital integration using application and minimize the use of physical facility, such as branch office. In long term, this efficiency can minimize the physical costs of banking to provide facility for customers and it will be a huge burden for conventional banking if they do not have the strategy to enter digital banking business model.

According to the data of National Development Planning Ministry of Indonesia (2019), total population of Indonesia is about 267 million people with proportion of productive age people and young generation are bigger than older generation. One of young generation groups is university students that have high potential to be the early customer for digital banking companies. Currently, the number of university students in Indonesia reaches more

than 5 million (PDDikti 2018). University students have higher thinking standard compared to regular students, mainly because of the level of education pursued is higher. University students as productive age people have great energy and will. They also have high interest in technological development that occur. However, not all students will feel and get the same benefits in using digital banking. Different backgrounds also form different risk appetite in using it. University students as young people sometimes still have underdeveloped psychological characteristics, where the ease of digital financial facilities have the possibility to increase the level of consumerism and can plunge university students into the hedonism lifestyle (Anggraini and Santhoso 2017). Overall it indicates that Indonesia has huge potential in terms of its future human resource and market. It creates a great opportunity for digital banking corporations to invest and develop more their business and services in Indonesia market.

Therefore, the author has an idea to conduct research about the financial literacy and risk appetite of university students to create sustainable strategic promotion for digital banking in Greater Jakarta area.

Methods

This research data sources use primary data which are taken using questionnaire and secondary data that are taken from credible literature. Data types used are qualitative and quantitative. It is conducted in 13 cities/regencies included in Greater Jakarta area with 2 month of research timeframe from April until June 2019. Sample is selected using Non-Probability Sampling with Purposive Sampling as specified technique. Data analyzation methods used in this research are multiple regression analysis (Suliyanto 2011) and descriptive analysis (Sugiyono 2012).

Results and Discussions

Characteristics of respondents are selected equally in terms of study program and respondents'

residential city area to minimize the bias of the research. University students in Greater Jakarta area is dominated by female student up to more than 66% and male student is only 34%. They mostly have income more than Rp 1 million until Rp 2.5 million.

In terms of financial literacy, they have sufficient literacy level with 73.8%. It means that they have knowledge and confidence about financial service institutions and financial services and products, including features, benefits and risks, rights and obligations related to financial products and services, but they lack of skills for using it. In this study financial literacy is divided into 3 more categories which are financial knowledge, financial behavior, and financial attitude (Chaiphath 2019). Financial knowledge and attitude of university students in Greater Jakarta Area are 77.6% and 78.4%. Both categories are classified as well literate in literacy level. Financial knowledge of university students in Greater Jakarta area is superior in interest rate knowledge and for financial attitude, they tend to think that digitalization and

internet can make their life easier. Meanwhile, the level of financial behavior is in one level lower, which is sufficient literate with the value of 65.4%. Financial behavior of university students in Greater Jakarta area shows that they have a good attitude in paying bills on time (tuition fee, administration fee, etc.)

According to Laroche et al. (2004) and Wulandari (2012), risk appetite is categorized into 4 types, there are social risk, performance risk, financial risk, and time risk (. Social risk and performance risk of university students in Greater Jakarta are moderate with the value of 50.2% and 50.6%. Meanwhile, they have lower level of financial risk with 44% value. It indicates that university students in Greater Jakarta area still afraid with financial activity, products, services, and understanding of financial matters that have high risk level. For the time risk, they have quite high value, which is 65%. It means that they have higher acceptance in terms of time management and efficiency for doing and choosing something. Overall, the risk appetite level

of university students in Greater Jakarta area is classified as moderate with the value of 52.4% which indicates that their risk acceptance level is moderate and prefer to avoid high risk products and services, so digital banking corporations must consider this result to provide the best digital banking facilities and services for them.

Digital banking services has been developing for only 2 years in Indonesia. The various channels offer different service facilities, but it will become a superior thing if they are integrated into digital banking with today's modern electronics (Mbama et al. 2018). The use of digital banking among university students in Greater Jakarta area is not that significant. Mostly respondents use digital banking services 0 until 3 times a month. Popular services that they use are transfer, debit, e-commerce payment, and savings.

Multiple linier regression shows the result that financial attitude, financial behavior, and risk appetite have a positive effect towards the use of digital banking

among university students in Greater Jakarta area. In the other hand, financial knowledge has no effect towards it. Based on Margaretha and Sari (2016) stating that income has a significant effect towards credit card users' financial literacy, so there is a possibility that income has a higher effect towards the use of digital banking compared to financial knowledge. This presumption is proven to be right by Pearson's Correlation Test and personal income of university students in Greater Jakarta area has more significant correlation to all variables, except financial knowledge.

Managerial Implication

Digital banking has been growing rapidly and is becoming popular now. In the near future, digital banking may become something big that makes our life easier in using banking services. Because of that early integration with early stage customers is definitely needed. One of the early customers that also become the sample of this research is university students.

Strategic program that can be suggested by the researcher for digital banking corporations is to provide digital banking application and services that is suitable for university students in Greater Jakarta area. Based on the financial literacy, respondents are superior in interest rate knowledge, for behavior, they really use technology and internet to make their life easier, for attitude, they mostly pay bills on time, and for risk perception, they have moderate level. In this case, digital banking corporations can collaborate with university and popular merchants among university students to facilitate easiness in bill payment system. Digital banking company can also create saving program for university students, since they understand very well in interest rate knowledge. Corporation should also focus more in popular services that used by university students, such as transfer, debit, e-commerce payment, and savings.

Conclusion

Respondent characteristic is divided equally in terms of study program and residential city distribution. Respondents obtained are dominated by female students and mostly have income around Rp1 million to Rp 2.5 million. Financial literacy consists of financial knowledge and financial attitude that are classified as well literate and financial behavior that is classified as sufficient literate. Risk appetite of respondents are classified as moderate. Digital banking services that they use mostly are transfer, debit, e-commerce payment, and savings

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NO. Registration : SAMI/PTI/001

Robosnake For Creating A Better World with Sustainable Agrifood Management

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Agriculture is the life and death of a nation, says Indonesia's first president, Bung Karno. As we know agriculture is the most important aspect in life. Coupled with an increase in human population will make new problems in agriculture.

Agriculture from year to year will experience development, from traditional agriculture to agriculture that applies the use of technology and information. because we are already in the era of the industrial revolution 4.0, a lot of technology was created to overcome problems in agriculture. The problems to be overcome are irrigation channels, land selection, environmental impact, human

resource management directly related to agriculture.

Based on FAO research, the agricultural sector as one of the sectors that contribute emissions because it can increase air temperatures between 1 to 2 degrees Celsius. Emission reduction has also become a global agreement, as agreed at the climate change summit set in Paris agreement (mongabay.co.id).

But the big problem that we are facing right now coincides with the industrial revolution 4.0, which is sustainable agriculture and limited natural resources to meet the world's food needs. With the limited resources or agricultural

products to feed all the population in the world eating will cause food insecurity. Food insecurity is directly defined as the availability of adequate and nutritionally safe or limited or uncertain food or limited or uncertain ability to obtain acceptable food in a socially acceptable way. (<https://asi.ucdavis.edu>).

Sustainable agriculture itself is every principle, method, practice and philosophy that aims to make agriculture economically feasible, ecologically accountable, socially acceptable, equitable, and culturally appropriate to local conditions, and implemented based on a holistic approach (FAO, 1990).

The principle of sustainable agriculture which consists of many things including: conserving and improving the quality of chemical, physical and biological soil. Furthermore, it preserves biodiversity, maintains soil fertility and water purity. Furthermore, sustainable agriculture applies the principle of recycling natural resources and conserving energy, producing a variety of high-quality foods, fiber and medicines. And

it also establishes local, national, regional and global farming communities.

However, sustainable agriculture has obstacles including national government policy constraints, research policy constraints that are still oriented to the short term, constraints on the application of technology due to low human resources, economic incentive constraints that are less precise, constraints of partnership between stakeholders, constraints on global cooperation. (www.slideshare.net).

For this reason, FAO must act immediately to address the issue of sustainable agriculture. FAO can support countries that have the potential to create world food barns. Such as Indonesia, Thailand, Brazil and others. Particularly in Indonesia, it is well-known for the majority of the people who make a living as farmers, so FAO can work together to develop sustainable agriculture in Indonesia.

And now the Indonesian government and farmers must try to find new methods to support sustainable agriculture. Among

them farmers can be able to use methods to improve soil health, minimize water use, and reduce pollution levels in agriculture.

And in 2019 researchers in the world of agriculture researchers have discovered methods of organic farming. Organic farming is the practice of planting, growing, or processing goods using methods that avoid the use of most synthetic pesticides and fertilizers, biotechnology, ionizing radiation and sewage sludge.

(<http://asi.ucdavis.edu>).

Despite the many benefits of organic farming, there are also challenges and obstacles, namely how farmers can maintain certification through the national organic standards

council. In addition, the issue of initial certification costs is time consuming.

With this cost problem, many world researchers have also found new ideas in order to be able to manage agriculture so that it can continue and maximize the rice produced.

Besides the weather and climate also affect the agricultural sector in Indonesia. The last few years the earth has experienced global warming and its effects can change climate. The impact of climate change causes an increase in air temperature, sea level rise, changes in rainfall patterns that change due to seasons, also patterns of climate change such as El Nino which is marked by the dry season and La Nina, where the rainy season.



For this reason, the Indonesian government must be able to create solutions for sustainable agriculture even if it is constrained by weather, land area, human resources and so on. The Indonesian government can apply information and data-based technology to simplify supply chains, expenditure on agriculture. As well as providing training to farmers to improve existing human resources.

The government must continue to maintain sustainable agriculture even though Indonesia's territory is vast and there are hectares of agricultural land. The government can implement drone technology to control the extent of agricultural land and improve irrigation systems by spreading various plant watering drones. The irrigation system is an important aspect for the growth of agricultural crops for that the government can make a rain reservoir, a reservoir for water storage and an artificial rain system to overcome the drought during El Nino.



Besides agriculture in Indonesia can develop more rapidly when applying technology and ideal planting patterns. Indonesia can imitate the model of growing agricultural plants in buildings such as Japan. And also plant agricultural crops on the building, because it goes hand in hand with technology and science. with the increase in years means the population is also increasing, the need for food is also increasing, the land is getting narrower for that the government must continue to innovate to manage sustainable agriculture in Indonesia so that it can become a food barn in the world later.

In addition to using drones, the government can implement artificial robotic for agricultural pest predators. For example, snake robots that must be able to detect, repel and even prey on agricultural pests. Some of these solutions are expected to increase the productivity of agricultural products in Indonesia and the world so as to create a sustainable agricultural management system that is very good.



NO. Registration : SAMI/PTI/002

The Urgency of Implementing Warehouse Receipt System to Support the Sustainability of Rice Supply in Indonesia

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By the increase of population, the demand of food will also be affected proportionally. In Indonesian case, the primary food was rice. Based on the result of Indonesia Population Census 2010, done by Statistics Indonesia (2013), Indonesia population projected to be increased continuously, from 238 billion people in 2010 to 305 billion people in 2035. This projection shows the urgency for Indonesia to plan the supply of food needed.

According to the annual report of Food and Agriculture Organization (2018), Indonesia was reported as the biggest three of rice producers worldwide, following China and

India. In addition, Indonesia also became the biggest rice producers in ASEAN. But this annual report also stated Indonesia as a major rice importer. This contradiction indicates the imbalance between rice production and consumption in Indonesia. This condition happened as a consequence of land conversion. Besides that, most of farmers in Indonesia were smallholders in term of land and capital ownership. In addition, those main actors of agriculture, who had been putting the greatest effort, usually suffer due to losses. It was caused by the price fluctuation. The selling price of rice were dropping during the harvest

season. As the result, smallholders who need cash immediately, have no other options except to sell their crop cheaply. Later on, agriculture always associated with poverty which make it worse that could not attract youth's interest anymore. With this situation, doesn't it make sense to welcome 2035 with worries, does it?

To overcome this problem, Ministry of Trade of The Republic of Indonesia propose a program called warehouse receipt system (WRS) in 2006 followed by the implementation in 2008. WRS in Indonesia had approved seventeen commodities but we will be focused at rice as its role

as primary food. Through this program, smallholders are allowed to postpone the rice sale until the selling price become normal. These rice were kept in a storage validated by Commodity Futures Trading Regulatory Agency of Ministry of Trade of The Republic of Indonesia (CoFTRA), the highest authorization of Indonesia WRS. During this postponement period, the smallholders still have a chance to hold cash [in form of credit] by utilize the warehouse receipt financing scheme, the ultimate benefit of WRS (Figure 1). Thus, it can reduce the dependence of smallholders to the brokers or middlemen as their one and only alternative source of cash.

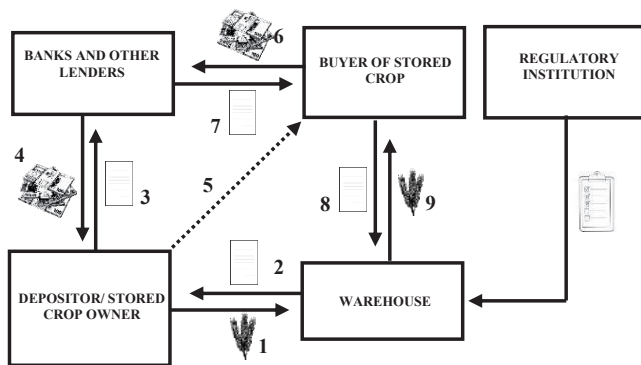


Figure 1 The warehouse receipt financing scheme

Source: FAO (2015)

In Indonesia, the rice WRS was mainly operated in Java Island as the largest contributor to Indonesia rice production, especially West Java Province as its status as the 2nd largest rice producer nationwide. But in fact, most of those WRS were not optimally functioned yet. This issue can be seen from some perspectives: the readiness of warehouse (facility), commodities, and institutions. All of those components were both important and could not be replaced each other. But, if we had to prioritize them, the readiness of institutions will be the highest rank in term of urgency because of its role as WRS's brain or processor. By the active institutions, the remain components will be activated too. Unfortunately, in some cases in Indonesia, the established institutions were not complete. In

Bogor Regency for example (note: Bogor Regency is part of West Java Province), the absence of warehouse manager became the main reason of Bogor WRS stoppage. At the end, smallholders will be the most negatively

affected by that state. Then, if those smallholders decided to switch their occupation it is certain that the domestic rice production will be increasingly deficit. Furthermore, it could force us to increase the rice import to meet its demand. It is what we call irony, is not it? Which country called themselves as agrarian but keep importing their main primary food?

I think the most suitable solution for now to save "the agrarian country's pride" is WRS. This program could motivate the smallholders to keep their productivity up with less worries. If carried out seriously, we will certainly become more optimistic about the rice supply sustainability. To be able to run this program smoothly, Indonesia needs to learn from the best practices. Learning from Ghana, for example, implementation of WSR will be successful if associated costs were reduced, such as cost of storing, transporting, certifying, etc. or the rice must be sold at premium price (Miranda *et al.* 2017;2018). Therefore, the warehouse should

be built near to the rice production centers because transportation cost was likely being the most expensive.

India was also categorized as the successful WRS adopter. India planned the WRS implementation thoroughly and in detailed, started from location selection, layout setting, infrastructure in order to improve the customer service (Pillai 2010). In addition, an up-to-date price information was also needed to help smallholders determined the right time whether to store or to take their crops out of storage (Asokan and Arya 2011). Therefore, the government of Indonesia should consider about building a system that help the SRG users to make decision whether to sell or to buy crops stored in the warehouse at the best price. In order to ensure this system run optimally, the government should empower the databases, later called big data of historical prices to help forecasting commodities price in the future.

Mr. Soekarno, the first President of Republic of Indonesia once said, “The food matter is about

the nation’s life and death” so that it needed to be planned carefully. Food were agricultural outputs done by the smallholders. So remember, if the smallholders are wealthy, so do the state.

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NO. Registration : SAMI/PTI/003

Indonesian Food Security with The Application of Agriculture Continues

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Food is an important and strategic commodity for the Indonesian people considering that food is a basic human need that must be fulfilled by the government and society together as mandated by Law Number 7 of 1996 concerning food. The Law states that the Government organizes regulations, guidance, control and supervision, while the community organizes production and supply, trade, distribution and acts as consumers who are entitled to obtain sufficient quantities and quality, safe, nutritious, diverse, even and affordable food. by their purchasing power.

To meet consumption needs that continue to grow from time to time, efforts to provide food are carried out by developing a food production system based on local resources, institutions, and culture, developing food business system efficiency, developing food production technology, developing food production facilities and infrastructure and maintain and develop productive land. Then in the context of equitable distribution of food availability to all regions, food distribution is carried out through efforts to develop a food distribution system efficiently, can maintain food security, quality and nutrition and ensure the safety of food distribution.

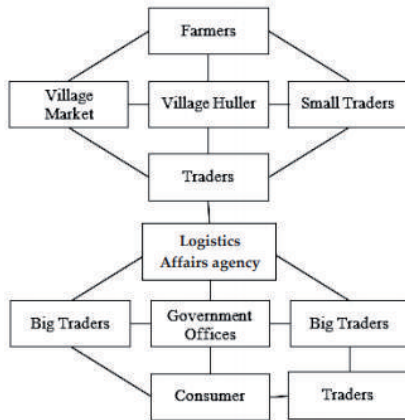
Besides that, to improve food security, food diversification is carried out by taking into account local resources, institutions and culture through improving processing technology and food products and increasing public awareness to consume a variety of foods with balanced nutrition. That is what underlines the realization of food security must be carried out in the development of human resources which include education and training in the field of food, dissemination of science and technology in the field of food and counseling in the food sector. In addition, international cooperation is also carried out in the fields of production, trade and food distribution, food reserves, prevention and overcoming food problems as well as food research and technology.

From the description above, it can be seen that food security has a very wide dimension and involves many development sectors. The success of developing food security is determined not only by the performance of one sector but also by other sectors. Thus the synergy

between sectors, the synergy of government and society (including the business world) is the key to the success of the development of food security. Because when the country is able to deal with the issue of food security, the country can be said to be a prosperous country and can improve the welfare of the country in the eyes of the world.

Food sector resilience faces a serious threat due to government policies that are biased and ignore the potential of local food. BPS noted, of the poor population of 28.59 million people, in March 2016, 62.75% lived in villages that were mostly farmers. As food producers, farmers become the most threatened group of food insecurity. Ironically, agriculture is now shunned because it does not promise prosperity and the future. According to BPS, farm household income from business in the agricultural sector averaged IDR 12.4 million / year or IDR 1 million / month. This income only supports one third of the needs, the rest is contributed from off-farm activities. This fact shows that there are no more “farming

communities”, namely those who work in the agricultural sector and most of their livelihood needs are provided for by this activity. Agriculture is also shunned by educated young workers



The village is expected to be able to independently develop potential in the agricultural sector to improve the welfare of its citizens and contribute to national development. It is time to make the villages as centers of development and make this area the main motor driving the economy, especially through the agricultural sector.² But of course village development will face its own challenges that must be overcome. Challenges such as

lack of capital and technology are still a classic problem in developing villages.

With the advancement of technology, the world of agriculture today is not separated from the touch of technology. With the term industrialization in the agricultural sector by utilizing existing technological results, it is predicted that it can save Indonesia from the problem of food security.

There are many methods that developed countries have applied in industrializing their agricultural sector. The following are methods that might help Indonesian farmers in maintaining national food security.

The first is financial problems, the Bank in this case the public fund provider can be more friendly with farmers, so that limited funds can be overcome with the help of banks as providers of funds with small interest.

Secondly, higher education is very important for conducting extensive research and can be applied directly to increase agricultural productivity.

Third, the private sector is expected to be able to invest their capital in making processing plants for our agricultural products so that when we want to market them outside (export) we will be able to generate more income (due to higher value).

Fourth, of course the people (farmers) as subjects can really be serious in carrying out every program given by the government (assuming the programs made by the government are in accordance with the needs needed by farmers).

In addition, there is another method proposed by Rowland P. B. Pasaribu, that industrialization is considered as the key that can bring people towards prosperity, or as an engine of growth for the economy. Industrialization is expected to overcome the problem of less attractive employment opportunities in the agricultural sector.

Compared to the agricultural sector, the industrial sector is considered more urgent and needs to be developed, because:

(1) Investment in the agricultural sector is less attractive because the additional marginal rate of return is considered inadequate, with the enactment of the law of diminishing return.

(2) The growth of the agricultural sector is slower because of social and institutional barriers that are difficult to change. To achieve a strong industry must be supported by resilient agriculture. This means that agricultural development must first be directed towards creating an advanced, efficient and resilient agricultural sector.

Some of the reasons for the need for robust agricultural development include:

(1) To market products from factories that must meet the minimum production scale (economies of scale), purchasing power is needed from the community. Most of the people who are market potential, are farmers who do not have purchasing power on average. Therefore, agricultural development is needed so that farmers income can be increased.

(2) In order for the industry to carry out efficiency, costs from production factors are needed which can be reduced as low as possible. Wages and salaries of workers can be reduced in such a way, if the wages and salaries can meet the needs of labor drinks, especially the need for food. With agricultural development, food production can be increased at prices that can be reached by industrial workers.

(3) With agricultural development, and the creation of an advanced, efficient and resilient agricultural sector, it is possible to link and integrate business between the agricultural sector and the industrial sector. Equipment needs and processing of products in the sub-sectors of food crops, forestry, fisheries, livestock, and plantations can be built processing industries of agricultural equipment and agricultural products processing industries (agroindustry). The industrial industry is a basic agricultural industry.

(4) The agricultural sector consisting of food crops, forestry, fisheries, livestock and plantation

sub-sectors can provide factors of production which become raw materials needed by the advanced agricultural industry, in a sustainable manner and at a stable price, so that the industrial sector can be strong because it is supported by an advanced, efficient and resilient agricultural sector.

(5) With agricultural development the production process can be carried out more efficiently with the use of technology and new skills in the agricultural sector. Some labor in the agricultural sector can shift to the industrial sector. This means additional labor supply for the sector in the labor market. With the availability of sufficient labor, the industry can produce wages and salaries that are relatively cheap but within the limits of liability, and this means that the industry can carry out efficiently.

For Indonesia, the agricultural sector still remains important even though the choice requires falling in the industrial sector as an engine of growth. This is due to the intense competition in international trade, requiring agricultural commodities

to be processed first in the industries (agroindustry) before being exported.

For this reason, it is necessary to examine how developed countries use agricultural technology to improve the efficiency and productivity of their agricultural sector. However, the problem can be the transformation process that has taken place in the developed countries. In this case, it must be seen that the basic condition between the conditions in developed countries and the conditions found in developed countries when the transformation takes place, agricultural land can still be expanded (extensified) and the population growth can still be controlled. In addition to agricultural development, industrialization was carried out so that the development of the workforce could be accommodated in the industrial sector.

In Indonesia, especially in the densely populated islands of Java and Bali, the availability of very limited agricultural land has even diminished due to the growth of settlements and industrial

development. The application of agricultural technology in areas with limited land is with an intensification system with Bimas (mass guidance) and Inmas (problem intensification) programs. In addition, the transfer of farmers from Java and Bali to areas outside Java and Bali was carried out through the transmigration program, in addition to increasing agricultural development outside of Java and Bali.

When this goes well, we can increase our agricultural products in line with the increase in the manufacturing industry that requires the raw materials we produce from our farmers. Therefore, increasing the income of farmers will be positively correlated with increasing farmers' welfare and increasing economic growth.

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NO. Registration : SAMI/PTI/004

Creating a Better World with Sustainable Agrifood Management

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What does “sustainable agrifood management” mean to you? How do you think you can create a sustainable agrifood management?

The world population is expected to grow from day by day and recently foods are unsustainable. The global population grow is main issue to the world’s food security and food safely because all of those people need settle to live, food to eat, water to drink and resource to product material to support our living. For some resource will be rebuild and for some not, so the more you use the more you face with unsustainable issue will be. In fact, people rely on natural resource to support of their living. Some part of the world

like African continent are facing with hunger and no safely food to consume. So how Creating a better world with sustainable agrifood management?

What does “sustainable agrifood management” mean to you? How do you think you can create a sustainable agrifood management?

In fact, sustainable Agrifood management is sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Brundtland Commission, 1987 and Agrifood Management. In the daily life we do need food to consume and it

had a long history that our energy and our growing up was supported by food. The most favorite food in Asia country is rice and mix with tropical plant. Land nutrient was loss decrease in every single day and the climate have been changed.

Firstly, the new technology is necessary to move the world's agriculture to a more productive path, a rising global population will put great pressure on food system. Some technology can faster produce amount of food to help the people all around the world. Since the first day of planting until harvesting. In Agricultural Sector, we cannot use human-being power to work in the field because it will take time and cannot enough to help the hunger. In some countries they have been using modern machinery in order to product food in time and easy to control some any problem through the season in planting. For example, Israel is country that rich in Agriculture and import to European countries. Because they

use modern technology to replace human being power even some part of Agricultural activities needs it.

Secondly, Strong Collaboration between farmers are one of the most sustainable Agrifood Management. In a long year ago some of the farmer worked together to do Agriculture and product the food together and sharing some to help community with enough food. They will gain more profit working as farmer community because all the amount of Agriculture product supports only the community and more secure to consume.

Thirdly, Environmental Friendly. Population have been growing, food must be enough to be consumed and used. One thing that can support agriculture activities is taking a good care of environment include soil for planting crop, water for watering the crop and help to food processing, fertilizers to improve the crop growing and more that can be related to growing crop and product food. Environment is the breath of our live without it how can we survive even we rely on it.

All in all, creating a better world with sustainable agrifood management. It must base on technology, farmer community, and environmental caring. Those of this stuff must be supported by our Human-being.

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The Role of Digital Technology and Food Safety in Sustainable Agrifood Management (ASEAN)

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Providing food for all is a primary problem that humanity continues to face. Without food security, societies have a great difficulty to progress in most other aspects of their well-being, particularly a healthy relationship with the environment. In the next generation biotechnologies will re-engineer plants and animals. Increasing the productivity and Food Safety. New techniques should be used in place of traditional farming to increase efficiency. Smart farming using

the digital technology, Internet of things (IOT) and automation will help farmers address challenges of the future.

As human population in the world increases, the demand for food outweighs supply. Sustainable agri-food management are strategies and solutions. In the past, people use traditional tools and equipment for farming which may not yield as much supply to meet the demands and the income of the farmers will be directly

affected. Hence, farmers start to look into modern ways of farming to help cope with the demands and increase productivity.

In order to increase productivity, farmers will use chemical fertilizers and also pesticide to protect their crops in order to increase productivity from pests and the chemical fertilizers will enhance the growth of crops. That is why; it is starting to be a food safety problem as the crops contain chemical and toxins which may be unsafe and harmful for consumption and affecting the health of consumers. Farmers can use environmentally friendly ways of farming instead of using chemical fertilizers. Environmentally friendly technologies for food production include integrated pest management (IPM) that promotes protecting crops by using organic plant based

pesticides and thus promoting a healthy environment and people and natural resource management (NRM) approaches, such as using organic soil nutrients and pest management (to minimize fertilizers and chemicals) and

alternate wetting and drying methods to save irrigation water. Farmers can also use hydroponics and aeroponics to cultivate crops which can be grown in large amounts in smaller spaces and using natural fertilizer. Farmers can also use plant cell and tissue culture. This method involves taking any part of the plant to re-culture *in vitro*. **Plant Cell and Tissue Culture.** This method involves using raw material extracted from any part of plant where we can clone or make into multi product by doing it *in vitro*, after it becomes a multi-product, we can release it to plant *in vivo*. So, farmers can always use the “Mother plant” to cultivate several plants for production and reducing the time taken to grow and harvest the crops. Farmers can be educated on food safety by introducing ways based on training and research conducted by large companies or farming association (Food Safety Group, Cambodia). Farmers can also be educated further by joining ASEAN Food Policy, ASEAN’s Farmers’ Organizations Support Program (AFOSP) and

Asian Farmers' Association for Sustainable Rural Development (AFA) we also need to consider about food safety consumption for the consumers from first stage to the final stage of the processing line. For the manufacturing and food production, factories can work on food safety standards to reduce cross contamination during processing, packaging using standards like Good Manufacturing Practices (GMP), and Hazard Analysis and Critical Control Point (HACCP). We can also train the retail staff on food safety and storage handling where they will learn to store and retail food based on different safe temperatures, incubation time, levels of hygiene, water quality and self-life of a product. For the consumers, we can also educate them based on the information on the packaging of the product on the right temperature, self-life of the product they are consuming.

Digital technologies—including the Internet, mobile technologies and devices, data analytics, artificial intelligence, digitally-delivered services and apps—are changing agriculture and the food system.

Examples abound at different stages of the agri-food value chain: farm machinery automation allows fine-tuning of inputs and reduces demand for manual labor; remote satellite data and in-situ sensors improve the accuracy and reduce the cost of monitoring crop growth and quality of land or water; and traceability technologies and digital logistics services offer the potential to streamline agri-food supply chains, while also providing trusted information for consumers. Data analytics can be used in predicting the environment, temperature and condition for crop growth so farmers will have real time information and learn to grow different crops based on seasons hence increasing efficiently. In urban areas where there is land scarcity, crops can be grow indoors using hydroponic technology and LED diodes can be used as direct light 24/7 to grow crops.

Currently, most farmers face the lack of resources and finances to implement smart farming technology and automation. There maybe be lack of resources and funding to conduct training and

further education for farmers and that farmers might be hesitant to go for further training as they might have done traditional agricultural farming for several years and may not be accepting to learn about new farming techniques. We could get multi-national companies to work hand in hand with farmers to conduct free training as well as work together with researchers and universities in the farm to implement smart farming technology and organic farming methods.

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Agri-Tech Inclusive and Exclusive for Sustainable Management

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With each passing year, the current global changes occurring in the climate have adversely affected many people, businesses but more importantly mother - nature herself. Over a period of time, many nations have come together to collaborate in creating a better holistic world to prevent catastrophic and dire outcomes. However, this responsibility does not solely fall on the shoulders of corporations or countries. We as common folk should step forward

and contribute ideas and initiatives that could further magnify the impact of the national level efforts.

The growing generation today depends on the psychological needs of this world, one of them is food. The food consumption in this world faces upstream challenges to produce quantity and quality supply in this modern-day agri-food industry. Hunger is being a crisis as food shortage in many poor countries, which also adds

to undernourishment suffering in developing nations across the globe.

As we focus on sustainability, what does sustainability mean to each of us? The general approaches of sustainability in today's world comprises of three aspects, economy, environment and social. However, technology can and will play a major part in the management of food when the gap between traditional methods are adaptable in the fast-paced digital world. Inclusive and exclusive measures are the alignment to take across bridging the food and technology industry. Agri-food technology can help to repair many of these aspects, making the agri-food industry more sustainable, transparent, agile and able to respond more quickly to the changing demands of consumers. Creating an eco-system of smallholder farmers to meet market needs in collaborative approach is one of the inclusive measures that are required in sustainable agri-food management. The eco-system benefits the smallholders; in reducing competition in same region where they can have various

food management productions thus it prevents oversupply of food, which leads to wastages.

According to Food and Agriculture Organization of United Nations almost one third of the food produced in the world for human consumption and every year about 1.3 billion tons gets lost or wasted. This wastage of food cost approximately one trillion USD\$ in industrialized and developing countries combined. The value that digital innovation can bring in exclusive measure to benefit the sustainable agri-food management is sourcing people with technology to reduce the wastage and channeling the food to alternative channels. Bringing the consumer to consumer (C2C) concept can help to reduce food wastage as people can donate their excess food to people who needs. Foods from supermarkets, which are thrown out, could go into supplying the zoo or the near expiry food can be release out to community development centers. The consumer-to-consumer concept also helps the small agripreneurs to market their business by developing

a community prosumer platform. This platform creates a supply and demand in the agri-food industry which can be accessed through mobile applications or well access website to allow agripreneur to know where to sell their produce product.

Today however, you cannot talk about agriculture without incorporating other sector of industry and related services. Nowadays the industrial agri-food sector of today is largely inefficient, which makes the need for agri-food technology and innovation increasingly important. To comfort the great technological challenges of the agri-food sector, technology is without doubt a space with high growth potential to create enhancement with agri-tech.

Developing a global interface platform app “PETANI TECH”, this has the power to impact the world. “PETANI TECH” is a smart farming based on center - intensive and high-tech methods of growing food cleanly and sustainable for the multitudes. With this we are able to create agriculture through ICT (Information and Communication

Technologies) established on IoT (Internet of Things) technologies that will enable agronomists and smallholders to reduce waste and enhance productivity. With this agri-tech technology, we are able to generate systems, which are built to monitor the crop grounds, with the assistance of sensor and automating the irrigation systems. Farmers can now monitor the field’s condition from anywhere, and these exclusive methods make a better supply chain for the industry.

“PETANI TECH” grows largely to support the small stakeholders to create friendly eco-systems for C2C and also the B2B (Business to Business) solution services. This platform of IoT-based smart farming not only target conventional, large farming operations, but could also be new levers to uplift other growing or common trends in agricultural like organic farming, family farming and improve highly transparent farming.

In conclusion, building a better world requires modern solutions. Sustainable agri-food management

innovation and approaches will be constantly evolved to the human needs and environmental arrangements. There should not be limitation on how we can shape or enable the development of the agri-food management industry. With the population growing rapidly, the demand can be successfully met if the ranchers, as well as small farmers, implement agricultural IoT solutions in a prosperous manner. However, we can increase the production of food in more compatible ways to provide the people with cycle of quality food. Every person on this world is responsible on what they consume and what they produce to ensure that we avoid the failures to our coming generations.

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