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DEVELOPMENT OF NATIONAL FOOD INDUSTRY AS A STRATEGY FOR FOOD DIVERSIFICATION IN INDONESIA

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ABSTRACT

The World Food Summit of 1996 defined food security as a condition when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life. Food security should be developed utilizing local resources, having strong backward-linkages with local food industry systems. Considering the abundant natural resources, food security program should be directed toward establishing food diversification to reduce dependency on only one (or two) food commodities – especially rice in the case of Indonesia. Food diversifiaction by development of food industry has a big potential impact in improving food security. This impact is closely associated with capability and competences of food industry in developing and operating food business to ensure better value and more diversified food, leading to better food availability, food accessibility, food utilization. For better food security, consequenty, promotion of food diversification thru partnership in the development of food industry is needed.

INTRODUCTION

World Food Summits 1996 has defined food security as a condition when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The outcome of food security is the acheivment of each individual of population to have an active and healthy life. There are three main essential components of food security, namely food availability, food accessability and food utilization or food consumption. Food availability stresses the essential nature of sufficiency of variety of foods which are safe and good quality. Second component, food accessibility, recognizes the importance of sufficient resources for individu to obtain appropriate foods for a nutritious diet. Third componet is food utilization; which stresses the critical aspect of appropriate handlings and uses of food with resepct to nutrition, hygiene and sanitation. Provided that those three components of food security can be maintained sustainably; at every time and at

every location, then this condition will eventually leads to the achievement of criteria of healthy and active of individuals. In more detail, several indicators for food securility based on its main components are presented in Table 1.

Table 1. Food Security Aspects and Their Indicators

Aspects of Food Security	Immediate Indicators	Sustainability Indicators	Outcome indicators
Food availability	• Quantity • Safety • Quality (nutrition) • Variety	Food availability, accesability, and utilization at every time, and in every location	Active and healthy life of Individual
Food Accessibility	• Physical, economic and social accessibility • Agreement to preferences/food habit and culture • Compliance to belief and religion		
Food Utilization	• Intake sufficiency • Quality of household food processing • Quality of household sanitation and hygiene • Quality of drinking water • Quality of child care		

Food availability will be achieved when sufficient quantities of food are consistently available to all individuals within a country. Such food can be supplied through household production, other domestic output, commercial imports, or food assistance. Government usually implements strategy to increase their capacity to produce food for the people. Food availability for consumption is not only in term of quantity but also nutrition adequacy, quality, variety, and safety. Having food availability for all people is necessary, but not sufficient for ensuring that households have adequate access to food. Therefore food accessibility is also an important factor.

Food access is ensured when households and all individuals within them have adequate resources to obtain appropriate foods for a nutritious diet. Access to food availability in the wider perspective here not merely due to physical, economical and social access, but also consider several important aspects such as: compliance to the preferences, compliance to belief and religion, compliance to food habit and culture. Indonesia comprises of many regions and belief, with different preferences of its. Availability of food with its variety of preferences will provide better access to food itself.

Food consumption refers to the quantity and quality of food intake by individual, and it will determine their nutritional status. Single food cannot provide all of the nutrients, so we need to consume diversify diet consumption to achieve active and

healthy life. Food quality on household processing is also an important factor, due to nutrition loss during processing, since it somehow will reduce the nutrition value. Food intake is not a single factor that determines a good nutritional status, but it's also influenced by health factor e.g. : quality household sanitation, quality drinking water, quality of child care, which may reduce the bodies' abilities to absorb and utilize ingested nutrients.

Consequently, no country is said to be food secured if there are still some individuals who unable to meet their needs to stay healthy and actively participate in various economic activities. In other words, the level of food security (or insecurity) of a country is actually manifested by the nutrition status of the people (Hariyadi et al., 2006). It is importance to be stated here that malnutrition that may prevent the achievment of individu with active and healthy life is not only associated with undernutrition, but also very well correlated with over nutrition. Obesity is another alarming fact associated with poor food utilization aspect of food security. Johnson et al (2010) has indicated that obisity is on the increase in both developed and developing economies. This condition underlined the importance of the third component of food security; which is food utilization or food consumption. Eventhouh food is available and accessable; but if it is not utilized properly then it may generate over nutrition, leading the development of idnividu with anhealthy and/or inactive life.

FOOD DIVERSIFICATION

Strategy in fulfilling food security should be developed by considering many factors that suits the conditions of the available resources, in terms of its environment (including natural, social and cultural environment), technology (including daily habits and other practices) and human resources (Hariyadi et al. 2006). National food systems developed utilizing local resources will have strong backward-linkages with local farming systems, improve food diversification, and have less dependency on only one (or two) food commodities – such as rice in the case of Indonesia.

Take Indonesia as an illustration – a rice-based food policy has resulted in many non-ideal conditions for food security in Indonesia. Those unfavorable conditions are : (i) consumption per capita of rice is very high 130-139 kg, and consequently (ii) rice is the dominant feature of consumers' nutrient intake, i.e. rice contributes as much as 53 % of the total calorie needs and about 47 % of the protein needs, thus the Indonesian food system has a high dependency on rice; (iii) rice as not only a trade commodity but also a political one; (iv) trade of rice has become a very sensitive issue, even though in terms of proportion, rice imports are relatively low. The worst effect of the rice-based policy for Indonesia is that it has caused a reduced development of local food resources, less research investment into non-rice-based foods. Consequently, consumer friendly and convinience technologies of handling and preparation for non-rice based food are not developed; making even more difficult for non-rice (local and traditional) foods to enter the market and menus of the people.

To equate food security with one or two food items is strategically wrong. Taking into consideration its characteristics and potentials, countries such as Indonesia

ROLE OF FOOD INDUSTRY

Applying approriate food technology, food industry has to play an important role in developing food diversification based on local resources, especially at the industrial level. Several critical issues of food diversification need to be addressed, including: (i) efforts in exploration and using the potential of the best local material, (ii) improvement and application of cultivation technology, processing and packaging, and (iii) application of the food industrialisation concept. Industrialisation of local-based foods should be conducted by creating added value in such a way that the local food product has a better value than or at least the same as that of rice-based food products (and wheat) which are currently dominating traditional Indonesian menus. Creating added value is a challenge for the food technologist and food industry. Research to explore the unique characteristics and functionalities of local foods, to identify and map local preferences and consumers habits, for example, should be conducted intensively.

Food Industry certainly has important role in diversifying food choices for better food security based on local resources, all the way from production (farm) to consumption. Food industry has specific competeneces to promote food diversification. Food industry not only has the capability to develope new products; but also to produce, market and promote them in a very effiecient way.

Considering that most agricultural products are of seasonal in nature with various qualities, perishable and specific to location, then there is an obvious need for appropriate handling based on types of products and its specific characteristics. In relation to food availability -for example, food indusrty potentially has important role to play; especially in managing the new product development, continue to their production, marketing, distribution and promotion (Hariyadi, P. 2003).

Food Industry has specific competences in developing and operating food business to ensure better value of foods. Value of foods can be formulated into a simple model that can be used by industries to determine the value of a product they desired; then perform a standardized production; based on various relevant criteria. The simple model of value of foods is depicted on Figure 1.

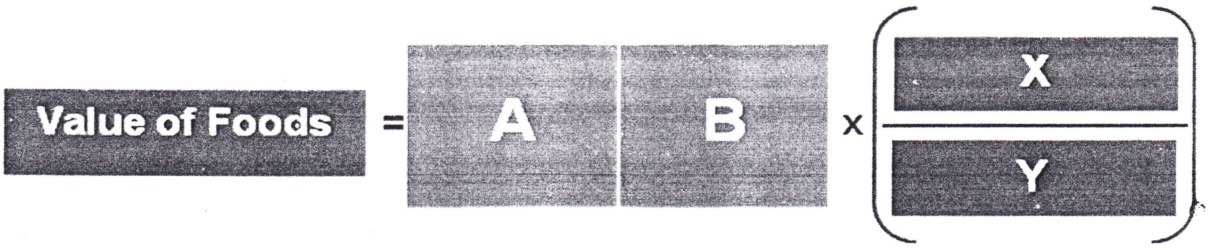

Figure 1. Simple formula of value of foods

By this simple model; food industries may easily identify the unique characteristics of food the developed to provide better value of food for their targeted consumers. Xs are quality factors directly associated with consumer's satisfaction, and consequently, food indusrty will put lots of efforts to improve (maximize) it in order to improve value of food. Ys are quality factor of food products that have negative correlation to satisfaction; thus it needs to be minimized. Meanwhile, A and B are constants; respresenting safety factors of food. Food industries have applied may

techniques amnd tools to optimize the process to produce better value of foods. Quality factors of foods (Xs and Ys) can be identified in more detail; in accordance to the product concept and targeted consumers; as illustrated at Figure 2.

For the Xs quality factors of food; consumers initially evaluate value of food based on size (portion) of the product; meanwhile for Ys factor, consumers particularly concern with the price. With the same price (Y factor), greater size (X factor) of the product will provide better value of food for the consumer. However, by the development of socio-economic status of consumers, the Xs factor are then developed more complicated; where consumers demand on better aspect of food flavour, nutrition, sensory, and also a range of choices.

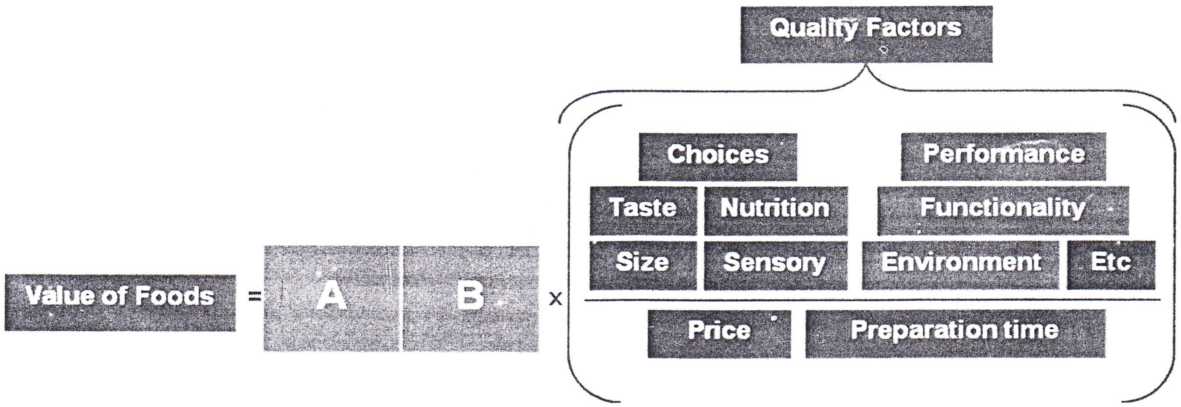

Figure 2. Elaboration of X and Y as quality factors that are closely related to value of foods

With the increasing consumer's awareness on the critical relation between food, nutrition and health; demand on food has shifted not only on asapect of nutrition, toward more on other functions that can be obtained from a food product; beyond its nutritional aspect. This demand has given rise another quality characteristic, i.e. functionality; mainly that related to health. The characteristics of food product that can increase immune system, reduce the risk of cancer, and reduce the risk of heart attack- are example of other food product characteristics that searched by consumers. Not only that, with the development of nutrition and food science and technology; consumers also demand food products that can help physical performance; such as improving physical fitness, help to build muscle, strengthen bones, or able to replace fluid lost during physical activities (sport).

No less important is characteristics of product that indicate its environmental friendliness. With the increasing awareness on the importance of environmental conservation, consumers has become interested to know whether a production process of a food product is carried out based on environment friendly principles. Questions on whether the food packaging materials used were biodegradable packaging materials, or whether the food products were produced by burning the forest land, whether the production of food product was carried out by industry that

causes environmental pollution, - for example- are important aspects to be answered for these 'green' consumers.

This quality characteristic –X factors- can further be explored by food industy to put their products in a competitive position; and better valued by its targeted consumers. Hence, there are other aspects that can be expressed and developed by industry; to provide more value for food product developed.

Besides price, another important Y factor of food product for consumers is preparation time. With the increasing on consumers busyness and number of working women, the higher the consumers needs on practicality and convenience of food products; which manifested by the short time of preparation. The convenience demanded by consumers is also escalating; covers convenience to achieve, carry, open, prepare/cook, consume the product, as well as convenience to clean and take out the trash. In an effort to win the competition, food industry needs to carefully and precisely define the X and Y factors; thus it is obtained the most competitive division result of X/Y of its food product. It is required science and technology; as well as creativity and innovation to define X/Y competitively.

For value of foods, X and Y factors only are not enough. The pre-requsite aspect for value of food is safety; which comprise of the psychological or spiritual safety factors (A) and physiological and physical safety factors (B). With that, overall aspect of value of foods is illustrated at Figure 3.

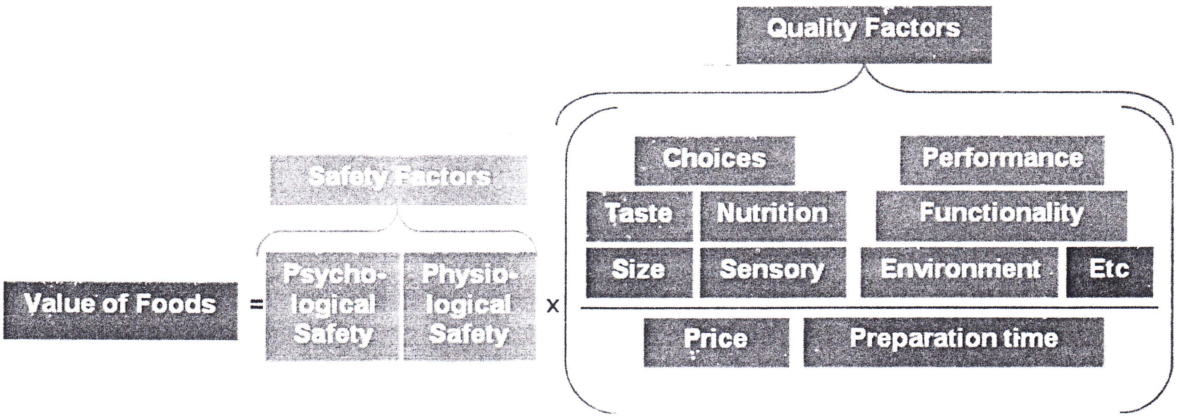

Figure 3. Safety factor is the pre-requisite aspect of value of food

Psychological or spiritual aspect food safety is a sense of "safe" valued by consumers because of the food product consumed was suitable with their background of culture, social, conviction, religion; or any other life styles. For most of Indonesian Muslim consumers, "halal" (legally permitted) factor is a prerequisite that cannot be negotiable. For the food industries in Indonesia, when they realize that most of their consumers is Muslim, thus it is very logic if the food products offered are products that meet the "halal" requirement. It is in line with Food Act No. 18/2012; which stated that "food safety is a condition and effort that is required to prevent food from the possibility of biological, chemical and other pollution that can interfere, harm and endanger the human health as well as not conflicting with

religion, belief and culture of the society so that it is safe for consumption". For Muslim consumers, food products containing "haram" (not "halal") substances are definitely make those of food products have no value. Also, for consumers of other community groups, due to the conviction or life styles chosen are not consuming animal material (the vegetarian) –for example- the presence of substances of animal origin in food product will make the food product unsitable to be consumed; which means that the value of such food become zero (0). Consequetly; psychological or spritual safety factors (A) are "either/or" factor; either suitable or unsuitable. Thus, as a constant factor in the formula of value of food (Figure 1); then the value of A is either 0 or 1. No matter how good its nutritional value; or how cheap the product is; if value of A = 0; then the total value of the food is 0 to that of particular consumers.

The second factor of safety is physiological or physical safety (B); i.e. a condition and effort that is required to prevent food from the possibility of biological, chemical and other pollution that can interfere, harm and endanger the human health. Those hazardous substances are chemical contaminants (such as toxin, residue of pesticides, herbicides, insecticides, fertilizers, antibiotics and growth hormones, heavy metals, dioxin, etc), physical contaminants (pieces of glass, wood, stones/pebbles, parts of nails, parts of stapler, parts of insects, bones, plastics, etc), and microbiological contaminants (virus, bacteria, protozoa, parasites, prion, and allergens). Some examples of those hazardous substances are pathogens that cause people get sick or intoxication, chemical contaminations that can cause acute or chronic illnesses, as well as foreign objects that physically can harm consumers.

DEVELOPMENT OF FOOD INDUSTRY AS FOOD DIVERSIFICATION STRATEGY

It has been described that food industry has a critical role in developing better value and more diversified foods. These potential from food industry should be incorporated into national food system toward better food security. The role of food industry is even more apparent when we consider their contribution in minimizing post harvest loses, improving food safety, and increasing nutritional values. Food industry has the capability to develop better and more efficient logistics and distribution resulting in more affordable food to consumer. Cosequenlty; development of food industry may be directed as a strategy for food diversification toward better food security.

According to law No 9, 2005, enterprises in Indonesia can be classified into 4 categories: micro, small, medium, and large. The classification is based on the number of worker involved, and their capital. Industry can be categorized into micro enterprises, when it has 1-4 workers, and the capital less than 200 million. While small, medium and large have the criteria respectively : 5 – 19 workers and capital 200 million – 1 billion, 20 – 99 worker and capital 2 billion – 5 billion, worker > 100 and capital > 5 billion.

Indonesian Central Bureau of Statistics shows that large enterprises only small part in Indonesian food industry. It is only 0.1% of the total enterprises. While the

rest of 99.9% is micro-small, medium enterprises (M-SMEs). Large enterprises contribute to 46.72% of GDP, meanwhile M-SMEs contribute 53.28% of GDP. In term of employment; even tough every M-SME absorbs less employments than that of big enterprises; in total –however- Indonesian M-SMEs absorb more employments (about 85%) as compared to that of big enterprises which only absorb about 3.8 percent of employments (CBS, 2006). This number indicates not only that M-SMEs are the backbone of Indonesia economies, but they are also the main provider for job market and income generation for the population.

Furthermore; CBS (2006) also indicated that about 53.57% of all M-SMEs are doing bussiness in food & agriculture sectors. This suggests that M-SMEs are also main provider for foods in Indonesia. Cosequently, M-SMEs of food and agriculture sectors can be strategically positioned as a driving force for food diversification. However, strategic plan has to be formulated to develop the capabilities of M-SMEs. This is especially true due to the increasing competition brought about by rapid advances in technology and globalization, so that there is growing concern how M-SMEs will meet these challenges.

Indonesia is rich in unique local and/or regional foods. Many of those regional foods are loacally unique and indigenous in nature. Furthermore, many of them have been traditionally produced by local M-SMEs. It is apparent that food M-SMEs throughout Indonesia is naturally a driving force for food diversification. However; to be more widely accepted, input of appropriate technology is needed to provide batter value of foods for the consumers. Furthermore, due to the total industrial structure; at which at the bottom of the industrial pyramid is dominated by micro-enterprises; then it is only logical for the government to developed support program for the M-SMEs; if the whole structue of food industry is expected to contribute more toward food diversification.

In general, M-SMEs have several obstacles, especially in the area of (i) implementation of good hygienic and manufacturing practices, (ii) infrastructure and facility, (iii) human resources, (iv) capital resource, (v) information and knowledge; and (vi) intellectual property protection. Due to the magnitude of the problem, coupled with limited government resources, to improve the competitiveness of M-SMEs, there is a need to develop partnership among all stakeholders. Partnership between government, university and M-SMEs need to be developed with specific objective to provide empowerment and technology transfer to M-SMEs. Especially for technology transfer; MSMEs have their own set of issues including the need for capital resources, difficulty in finding the right technologies, and managing their implementation. Consequently, specific mechanism needs to be developed to overcome some traditional barriers of technology transfer.

Hariyadi (2010) suggested that technology transfer alone is not enough to improve its capacity od M-SMEs for food diversification. Overall; consistent and concerted policy and strategic plan; supported by political will and legal protection, is needed for the development of M-SMEs in Indonesia toward food diversification. This includes (i) access to capital and (ii) intellectual property protection. First, access to capital is a major obstacle for technology transfer, universities and research centers –with support from professional organization and government development agencies- need to actively communicate the partnership and

technology transfer to financial agency to promote capital investment. Second, special government regulation in the area of indigenous intellectual property protection is needed. The purpose of the regulation is to protect the reputation of the Indonesian traditional foods.

These new approaches of partnership should be capable of increasing the capacity of M-SMEs; not only to (i) assure the quality and safety of the food produced, (ii) ensure of more speedy food diversification, but also (iii) ensures that many traditional and local food products genuinely originating in Indonesia are developed and intellectually protected.

CONCLUSIONS

Indonesia has abundant local food resources to support food diversification to achieve food security. Those resources need to explore toward uniqueness, competitiveness, and functionality as well. Food industry will play an important role on food diversification due to their capability and competences to design, process, and also to market product. Food industry will provide variety of food in term availability, accessibility as well as consumption diversification.

Government policy toward industrialisation of many variety local-based foods should involve food industry, for value creation of local food product. Special policy need to be directed to improve M-SMEs capacity for the development of better value and more diversified foods. Food diversification strategy thru food industry development need to be developed; to include (i) promoting local foods/ingredients, (ii) research to explore the uniqueness/competitiveness/functionaliy of local food/ingredients, (iii) insentive scheme for food industry to develop local food or local ingredients, (iv) development of program/ initiative to support local movemnet. Above all; success of food diversification also need a strong leadership having long term comitment for food diversification. Futhermore, strengthening food industri to support food diversification need mutual partnership between government, industry and research institution as well.

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