Food Security: Where Are We Heading?

Chua Kim Aik¹, Fakhrul Anwar Zainol² and Nalini Arumugam³

2. Faculty of Economics and Management Sciences, Universiti Sultan Zainal Abidin, 21300 Kuala Terengganu, Terengganu, Malaysia
3. Faculty of Bioresources and Food Industry, Universiti Sultan Zainal Abidin, 21300 Kuala Terengganu, Terengganu, Malaysia

Abstract: The issues of food security are an important aspect of every country for its social and economic growth and the eradication of poverty. It is particularly crucial for satisfying the needs of the ever-growing population in developing countries. Agriculture is the backbone of the people and the economy for developing countries, particularly in highly populated countries such as India, China and South East Asia. The world population is anticipated to rise to 8.3 billion by 2030 and to 9.2 billion by 2050. By that time, to feed the growing population, food production must double to keep pace with the escalating food demand. Agricultural commodities showed increases of 58.9% in import dependency ratio (IDR) as compared to 32.2% in 2013. Thus, this study attempts to review and explore the challenges of food security as well as the opportunities of the seed industry in Malaysia.

Key words: Food security, seed industry, challenges, opportunities, Malaysia.

1. Introduction

Agriculture has remained an important sector of our national and global economy. It provides the ultimate source of essential food and fiber for the population [1]. No industrial substitutes have yet been found to replace food requirements. Thus, the long-term survival of mankind will depend on the sustainability of the agricultural sector. The Malaysian government wants to modernize the agriculture sector with the objective of increasing food production. This is important for stabilizing the economy and reducing the yearly food import bill which stood at RM13 billion in the year 2014 [2]. Consequently, agriculture has been identified as the third engine of economic growth in Malaysia, resulting in large scale farming projects being implemented throughout the country. In order to increase productivity, the various inputs (seeds and planting materials, labor, fertilizer, irrigation, crop protection and others) must be utilized effectively.

Seeds are considered the primary and essential starting point of any agricultural project. This concept holds well for any scale of production, whether it is in a small garden or large scale crop production. Lately, the Ministry of Agriculture and Agro-Based Industry (MOA) have given special focus on strengthening the local seed industry by formulating strategies to increase the supply of good-quality seeds and planting materials. Unfortunately, this focus is still insufficient as the demand for seeds will increase with the implementation of many commercial agriculture projects by the government and private sectors.

The agriculture sector in Malaysia initially played a dominant role by emphasizing plantation crops. In 1970, the Malaysian government, in recognition of the importance of food crops launched the Green Book Project. With this project, the government hoped to further enhance local food production while reducing the food import bill. This policy also increased awareness of the importance and benefits of high quality seeds.

Efforts to modernize the Malaysian seed industry were initiated in 1979 with the implementation of the National Seed Project (NSP) which received partial funding in the form of a loan from the World Bank.

Corresponding author: Fakhrul Anwar Zainol, associate professor, research fields: entrepreneurship, business strategies, family business and strategic management.
The crops identified under the Project included rice, maize and groundnut. The Project’s main activities led to the establishment of five seed processing plants, as well as, the purchase of agricultural machinery and equipment for seed production.

Food production could be increased by increasing the area under production or on the improvement of existing farmland. However, the development of the agriculture sector has to be viewed realistically [3]. It is clear that there is a reduction of agricultural land all over the world due to growing population and urbanization. This becomes a formidable challenge. There is a need to produce more and more food from less and less land. To achieve this, the best option is to have quality input, better management of natural resources, and greater access to technical assistance, capacity building and markets [4]. It was clearly recognized that, better agro-input on agriculture activities is inevitable. The complicated agricultural activities, involve planting, processing and distribution. These are all affected by natural conditions, social demand and technology in the total food supply value chain [5].

The total food supply value chain involves seeds, planting, processing and distribution. However, seeds are the most important fundamental input of the total food supply chain. Seeds play a major role in contributing to the success of farm productivity [6]. High quality seeds alone play an important role in increasing the agricultural output and are capable of improving productivity as much as 20% [7]. In view of this, the focus should be on developing quality seeds. A robust seed system to guarantee the sustainability of agriculture and to ensure that products of modern plant breeding are widely available. This eventually will lead to the achievement of self-sufficiency in agricultural produces and improve food quality and food security.

2. Problem Statement

The world population will rise to 8.3 billion by 2030 and to 9.2 billion by 2050 as claimed by a study from the International Institute for Applied Systems Analysis, 2014 and the Wittgenstein Centre for Demography and Global Human Capital, 2014. By that time, to feed the growing population, food production must double to keep pace with the escalating food demand. The issues of agricultural development are an important aspect of every country for its social and economic growth and for the eradication of poverty. It is particularly crucial to satisfy the needs of the ever-growing population in developing countries. Agriculture is the backbone of the people and of the economy in developing countries, particularly in highly populated countries such as India, China and South East Asia [8].

Food security is becoming an issue of great importance in, not only, developing countries but also, the developed world. There is an intimate relationship between food security and poverty. Food insecurity is a common problem among low-income households in developing countries including Malaysia. Poverty is the principal cause of food insecurity [9]. These households usually suffer from food insecurity because of their lower income level and vulnerability to food shortages which may affect the households’ allocation of resources, particularly food, to household members [6]. According to Shariff and Khor [10], in Malaysia, a study was conducted to assess household food insecurity among low-income rural communities and examined its association with demographic and socioeconomic factors. The study revealed that the majority of food insecure households lived below the poverty line, had a larger household size, more children, particularly school-aged children and mothers as housewives.

Analyses of the drivers that will influence the food system over the next few decades have persuaded many people that we are entering a new period where rapidly rising demand and supply-side stressors threaten to increase food prices to levels that will increase hunger and malnutrition and may cause...
politico-economic disruption. What is the appropriate supply-side response to these challenges, and what role should research, in the natural and social sciences, play? One response to these challenges is often called sustainable intensification. It argues first, that increased production must play at least some role in meeting the food security challenge of the next fifty years; second, that the vast majority of this increase must come from existing agricultural land; third, that increasing the sustainability of food production is of equal importance; and fourth, that we must consider a broad range of tools and production methods to achieve these goals [11].

The seed industry in Malaysia is at an early phase of development [6]. Furthermore, due to a lack of participation in developing the seed industry in Malaysia [12], the seed industry is lagging behind and is not well developed. The agriculture sectors played a dominant role by emphasizing on plantation crops. According to the Department of Statistics Malaysia [2], in 2014 agriculture commodities showed an increase of 58.9% in the import dependency ratio (IDR) as compared to 32.2% in 2013. IDR explains a country’s dependence on imports of agricultural commodities to meet domestic needs. The higher IDR shows the greater supply of agricultural commodities needed to be imported. It supplies 76% of the total seed demand that includes flowers and cover crops are imports, which is nearly 95% of its are vegetable seeds. It is recognized that seeds are the most important fundamental input of the total food supply chain. They play a major role in contributing to the success of farm productivity. High quality seeds alone are capable of improving productivity as much as 20 percent. However, in view of this, farmers indicated that good seeds are not easily available in Malaysia. Given the favorable weather conditions and consistent demand, why has the vegetable seed sector not been growing? Why does Malaysia import nearly 95% of its seed supply? This has brought to be focused, to explore the challenges of food security and the opportunities of the seed industry in Malaysia, with the aim of providing insight and understanding of the industry, to the policy makers in formulating the right policy. At the same time, to attract investors to support the seed industry so that Malaysia can produce enough food to be self-sufficient and attain food security.

3. Literature Review

3.1 Food Security: The Challenges

The world has faced dramatic increases to basic food prices in the last few years. Prices started to increase sharply in 2010 and 2012 and continued to rise even further in early 2013 [4]. The rapid rise in food prices has been a burden on poor, vulnerable groups in developing countries who spend roughly half of their household income on food. In Malaysia, 90% of households find it hard to cope with the increase in food prices [13].

The situation has led to serious problems, affecting nearly 3 billion people, particularly those earning less than US $2 per day [14]. Hundreds of millions of people in developing countries will go hungry and be undernourished. The Food and Agriculture Organization of the United Nations most recent estimates indicate that, globally, 842 million people, or approximately 12% of the global population were unable to meet their dietary energy requirements in the years 2011 to 2013, down from 868 million reported for the years 2010 to 2012 in last year’s report. Thus, around one in eight people in the world are likely to have suffered from chronic hunger, not having enough food for an active and healthy life. The vast majority of hungry people, about 827 million of them, live in developing regions, where the prevalence of undernourishment was estimated at 14.3 per cent in years 2011 to 2013 [15]. The on-going financial crisis may further deteriorate, and might further affect the economy which could tip even more people into hunger and poverty, FAO warned.

Food security being a widely debated issue, encompasses many issues, mainly built on four
dimensions, food availability, food stability, food accessibility and food utilization. The world summit of 1996 held in Rome, Italy, defined food security like this: “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary need and food preferences for an active and healthy lifestyle”. The challenge of food security must be addressed immediately. Achieving a sufficient food supply is a global challenge and a complex sustainable development issue for most of the developing countries.

The current difficulties that emerged were accelerated by the growing world population, speculation in food source commodities and the growing affluent society. In addition, the conversion of farmland into urban real estate has resulted in an unmatched supply and demand, further leading to food shortages. As a result, riots and civil disturbances have taken place in many developing countries [16].

A crisis of this nature has triggered a wide variety of policy responses around the world [16]. This has been brought to the attention of all nations, to realize the importance of agriculture and the vulnerability of food supply and price. Food should not be treated the same as other commodities. In addressing the current situation, it was recognized that immediate action was needed. The crisis has also brought a renewed emphasis on domestic food production. Many countries, including Malaysia, have declared food self-sufficiency as their strategy [3]. As a result, many countries initiated an initial short term action to ensure an adequate food supply locally, keeping the prices low and protecting the most vulnerable people by providing support to reduce poverty and hunger [17].

There is evidence of United Nation concern within food supplies by its committing US $20 billion over the next three years as a comprehensive strategy focused on sustainable agriculture development [18]. Food Security achieved in responding to these challenges relies on dynamic agriculture. The agriculture sectors are gaining momentum to be a commercially modern sector, a new agricultural approach highly depends on technology, the extensive use of modern technology helps to address the issues of low yield and increase productivity. Seeds are the most important input component of productive agriculture [7], as a result, every country needs a robust seed system in order to achieve sustainability of its agricultural activities.

The Food and Agriculture Organization (FOA) defined food security as a situation “when people, at all times, have physical and economic access, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”. According to this definition, there are three important interlinked components of food security: availability, access and utilization. Therefore, a household is food secure in a given time period if it has enough food to provide its members all the usual meals in a day, for the entire period. Otherwise, the household is food insecure. The ability to ensure adequate food security hinges on the ability to identify vulnerable households. The degree of vulnerability of an individual, household or group of persons is determined by their exposure to the risk factors and their ability to cope with or withstand stressful situations.

Since the initial 1974 World Food Conference there have been several high-level meetings concerning food security, however the number of people facing hunger globally has continued to rise. The 2008 Food Crisis Summit convened following a sharp rise in food prices but has fallen short in addressing a number of underlying causes and challenges contributing to global food insecurity. While the summit highlighted the link between food security and climate change, the debate linking the production of biofuel to the rising price of food was effectively stifled. The role of governments or armed groups in diverting food aid was largely ignored at the summit, while NGOs remained on the periphery of discussions.
Additionally, the 2008 declaration provided a single (token) point concerning the importance of agricultural trade liberalisation. Indeed, the African Regional Conference following the Food Crisis Summit was more successful in terms of the elements discussed and their impact on food security. This failure of the 2008 summit to consider the food crisis as a multidimensional, multilevel issue, will affect state and broader international efforts in attaining food security negatively.

3.2 Seed Industry: The Opportunities

The seed industry comprises all the complex interlocking operations necessary to ensure a regular supply of uniform high-quality seeds to farmers. It is one of the groups of industries, which make up the primary industry of agriculture. It relates to the general agriculture situation and to the socio-economic-political structure in a particular country. The seed industry has developed to varying levels, in different countries, in tandem with the general agricultural development. The world’s seed market is expanding, especially in the Asia and Pacific region. The most important characteristic, if it can be called that, of the seed industry is its heterogeneity in many dimensions. A seed is a basic agricultural input and it is an embryo, embedded in the food storage tissue. A seed is also defined as a mature ovule which consists of an embryonic plant with food storage surrounded by a protective seed coat [19]. The product segments correspond to all the major field crops and vegetables. With respect to product type, a major distinction is made between hybrids and open-pollinated varieties. Seeds of varieties can be reproduced for many generations with little deterioration in quality. As a result, beyond the initial purchase, farmers can multiply their own seeds. This is not a viable strategy with hybrids because they suffer a noticeable decline in yield in subsequent generations. As a result, hybrid seeds tend to be repeatedly purchased.

The seed industry plays a major role in the dissemination of the latest agriculture technology to the farmers through quality seeds. In the past, most farmers depended on farm saved seeds and did not purchase significant quantities of seeds from commercial sources. Later in the 19th century, commercial seed supply companies offered seeds that showed a clear advantage over farm saved seeds, hence farmers began to change. Over the past century, this has changed dramatically as more farmers purchased their seeds from commercial suppliers instead of using farm saved seed from the previous harvest.

In the early 20th century, most commercial seed companies were small and mostly family-owned private businesses. They lacked the financial means necessary to pursue their own research and development (R&D) activities. Their primary role was to multiply and sell seeds of varieties developed in the public domain [19, 20]. Hence, these small seed companies’ weaknesses opened up the opportunity and gave way to larger enterprises that integrated plant breeding, seed production, seed processing and marketing functions.

The seed industry over the past decade has been radically transformed, it began the transformation as a traditional commodity business but formed into a differentiated products business. With merger and acquisition, the seed industry has been further shaped dramatically toward end of the decade. It has transformed from a competitive sector of agribusiness, composed primarily of small, family-owned firms, into an industry dominated by a small number of multinational chemical corporations. They also entered the industry through mergers and acquisition. These multinational corporations, within the last 30 years have focused actively on R&D. The rapid growth in private research and development has shifted the roles of public and private R & D, causing a coming of age in agricultural biotechnology. The changes in this business landscape will have a strong
impact on business decisions as well as the success or failure of the firm depending on its strategy [21].

4. Discussion

4.1 The Development of the Seed Industry in Malaysia

In the past, Malaysia did not emphasize on the production of seeds other than for rubber, palm oil and rice. Currently, Malaysia relies on imported seeds for vegetables (90%), corn (95%) and melon (100%). According to Malaysian Agricultural Research and Development Institute Malaysia, 2013, there are five major constraints that Malaysia is facing in developing the seed industry as follows; lack of new local varieties, lack of a mandatory seed quality control system, unorganized information within the seed industry, an inadequate number of trained personnel in the seed industry and a lack of private sector involvement.

The Ministry of Agriculture and Agro-based Industry is a focal point and responsible for strengthening the integrated seed sector in Malaysia to ensure a secure food supply for the country. Its focus is namely; increasing local seed production and reducing seed importation; producing superior varieties that are able to compete with varieties in the global seed market; and increasing the availability of quality seeds and planting materials in the market.

4.2 Seed Production

The production of seeds should enable growers to access healthy seeds which are genetically pure, with high seed vigour and good germination percentage. The timely availability of good quality seeds at reasonable prices ensures good yield and profit to the farmers. The seeds play a vital role in agriculture and act as a carrier of the genetic potential of varieties. Quality seed production which follows efficient certification procedures plays a major role in the increase of food production of our country. To ensure this, the Government has prescribed quality standards and has enhanced in seed production techniques, testing, certification and marketing procedures through the Seeds Act, 1966. The main objective of seed production is to produce good quality and genetically pure seeds. But, during the process of seed production, due to certain reasons the genetic purity of the seed may be lost, this is said to be deterioration of a particular crop variety.

4.3 Seed Market

Seeds are the basic and most critical input for sustainable agriculture. The response of all other inputs depends on the quality of seeds to a large extent. According to the Global Seeds Market Report [22], it is estimated that the direct contribution of quality seeds alone, in the total crop production, is about 15 to 20%. Thus, seeds are the most vital input for crop production. The global seed market is bifurcated into two major sectors: the Commercial seeds sector and the Non-commercial seeds sector. Commercial seeds are the seeds sown for production of an intended crop or used as animal feed or industrial raw material. Based on type, commercial seeds can be classified as conventional seeds and genetically modified (GM) seeds which is the fastest growing area within the commercial seed sector and the growth in non-commercial remained unchanged. The ever growing population, coupled with the reduction of arable land is expected to boost the demand for GM seeds which are superior to conventional seeds.

The key factors which are anticipated to drive market growth include our increasing global population, growing insect resistance problem and reduction of arable land and the rapid adoption of biotech crops. Some of the noteworthy industry trends include the merger and acquisition among seed companies and growers preference of GM crops over others. However, the industry remains threatened by certain challenges which include asynchronous GM approval timelines, a seed quality certification system and a decline in international fruit and vegetable seed trade among others.
5. Conclusions

There is still a wide gap between supply and demand in the seed and planting material industry in Malaysia. The importation of seeds, in large amounts, would be detrimental to the nation’s economy. However, the seed industry sub-sector has a very bright future by contributing to the transformation of agriculture. Nevertheless, it faces many challenges in the seed supply chain and in overall agricultural development. Special priority must be given to plant breeding to enhance the seeds capacity building in seed multiplication activities. The growing population and scarcity of land has changed the business landscape. It has driven food demand, causing the price to surge higher each day, which has negatively affected many people. This global challenge has called for a better agricultural approach and better quality seeds to increase productivity as well as to stabilize prices. It was clearly indicated that seeds could play a major role in addressing the problem [7]. This pivotal role that seeds play is a strong indication of the need to developing the seed industry in Malaysia.

Developing seeds requires multi-dimensional resources and it has been clear that intangible resources such as reputation, networking and human capital, stand a better chance to sustain a competitive advantage which could lead to the growth of the seed industry in Malaysia. However, it has not been clear to what extend the intangible resources influence the sustainable development of the seed industry in Malaysia. It implied that to develop sustainable growth of the seed industry in Malaysia companies should focus on intangible resources. These findings will be useful information for policy makers and investors in planning and decision making.

References


