Transformation of the Global Plantations Through Productivity Improvement, Education and Networking

Nasuddin Othman
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All Praise to Allah SWT whose assistance and guidance has enabled me to complete this book that emphasizes on global plantation. The plantation sector is a strategic sector because of its dominant role in the economic and social development not only of a particular country but also as a global player in the provision of food, source of employment, economic returns through international trade and political stability.

This sector stresses the strong bondage among the players in the industry comprising the workforce, plantation corporations, the unions as well as the states. The management of the plantations right from the selection of the appropriate agricultural crops, its agronomic and management practices, the risks and uncertainties involved and finally, meeting the ever changing consumers’ needs requires a very strong commitment and total involvement on the part of these players as a team to face the insurmountable challenges. The sense of belonging to the company must be instilled forever as the company belongs to them.

This book highlights the significance of the various plantations crops normally cultivated in Asia, Africa and the Latin American countries. The companies involved are mostly multi-national in
nature and they control the export market of some of these products globally.

To address the pressing problems surrounding the global plantation, there is need to establish a strong collaboration among the players and to focus on producing the right expertise to propel the industry to a greater height.
ACKNOWLEDGEMENT

To,

Allah, the Al-Mighty
My Family: Datin Kamariah Hussin, Azizi, Adzhar,
Khairul Afifi, my daughter – in – law, Juliana
and my beautiful grand-daughter, Azalia.
Vice Chancellor and Deputy Vice Chancellors,
Universiti Teknologi MARA
Dean and Staff of the Faculty of Plantation and Agrotechnology,
UiTM Press, UiTM Printing Centre
Postgraduate Students and Final Year Project Students
Thank you for your support.
The plantation agriculture is regarded as one of the main drivers for the development of the developing countries in the 21st century and beyond. The challenges that this sector are currently confronting and the rapid and uncertain global changes that arise, demand a collaborative effort and a strong commitment on the part of all players related to the industry to strategise and come out with a bold action plan to address these critical issues especially pertaining to the productivity status of the plantation crops in question. The creation and the availability of competent workforce through proper education and training to shape the future landscape of the plantation industry is the responsibility of the educational institutions, research organizations and the entities involved in the production of the plantation commodities. The establishment of regional training centers related to each specific plantation crop and the monitoring of the qualities of the academic programs as well as the manpower produced are vital for the success and the growth of this industry. Educational institutions offering the plantation agricultural programs have to review the hard and soft infrastructures required. Running these programs are capital intensive and as such the support from external donors are necessary as the financial implications are huge. Sharing of the resources and the active collaboration in research related to the plantations are necessary in order to bring this sector to a greater height.
TRANSFORMATION OF THE GLOBAL PLANTATIONS THROUGH PRODUCTIVITY IMPROVEMENT, EDUCATION AND NETWORKING

INTRODUCTION

Agriculture is undergoing a dramatic change and is regarded as a powerful engine of growth especially in the developing countries. This sector is undergoing a technological revolution as manifested by the introduction of biotechnology and the advancement of precision technology. It contributes to the structural transformation of the economies of these countries by supplying foodstuffs and raw materials to other expanding sectors, by expanding the exports of agricultural commodities as a means of increasing income and foreign exchange earnings, by increasing the labor force and the income of the farm population as a stimulus to industrial expansion.

Agriculture is the world's largest producer of employment and it employs over 1.3 billion people throughout the world that is about 40% of the global workforce, and in the developing countries about 60 percent of the workforce is employed in this sector. Table 1 highlights the data pertaining to the labor force engaged in agricultural and forestry activities for the year 2011/2012. India has the highest percentage of 53 percent which gives an indication that half of her total population is engaged with agriculture. This is followed by Vietnam (48 percent) and Indonesia (38.9 percent). The least is the United States where less than 1 percent is involved in these activities.
Table 1: Labour Force Engaged in Agriculture/Forestry (2011/2012)

<table>
<thead>
<tr>
<th>Country</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>38.2%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>38.9%</td>
</tr>
<tr>
<td>Philippines</td>
<td>32.0%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>11.1%</td>
</tr>
<tr>
<td>India</td>
<td>53.0%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>48.0%</td>
</tr>
<tr>
<td>China</td>
<td>34.8%</td>
</tr>
<tr>
<td>United States</td>
<td>0.7%</td>
</tr>
</tbody>
</table>


As shown in Table 2, the contribution of the agricultural sector to the Gross Domestic Product varies from one country to another. In the ASEAN region, the agricultural sector plays a dominant role especially in Vietnam as manifested by the GDP figure of 22 percent. This is followed by India with 17.2 percent and for the remaining countries the figures are between 10 percent to 14.7 percent.

Table 2: Contribution of Agricultural Sector to Total GDP (Estimated 2011)

<table>
<thead>
<tr>
<th>Country</th>
<th>Contributions</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>10.0%</td>
</tr>
<tr>
<td>India</td>
<td>17.2%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>14.7%</td>
</tr>
<tr>
<td>Malaysia</td>
<td>11.9%</td>
</tr>
<tr>
<td>Philippines</td>
<td>12.8%</td>
</tr>
<tr>
<td>Thailand</td>
<td>13.3%</td>
</tr>
<tr>
<td>Vietnam</td>
<td>22.0%</td>
</tr>
</tbody>
</table>


The role of the agricultural sector is in fact of such key importance in the early stage of development that without it, nothing can be done or initiated. Apart from countries which can hope for
large earnings from petroleum or mineral exports, the only source of investment for almost all less developed countries is agriculture. The importance of this source of capital remains so long as the industrial sector remains small.

According to Nicholls (1964) agriculture, especially the agriculture of the less developed countries, can be turned into a potential engine of growth through agricultural surplus. One of the approaches that can be adopted for the development of agricultural surplus is through an increase in agricultural productivity. It has been revealed that the increase in agricultural productivity brought about by increased efficiency in production within the agricultural sector has in fact set the pace for economic development of most of the less developed countries (Hayami and Yamada, 1970).

In most Asian countries, the agricultural sector is characterized by the existence of non-commercial, commercial, small and large-scale production units. The non-commercial units grow crops mainly for domestic production while the commercial production units produce commodities such as rubber, oil palm, cocoa, pepper, tea, banana, coffee, pineapple, rice and coconut, which mostly are meant for export.

Small-scale units of less than 40 to 50 hectares are normally considered as smallholdings, while those larger than this size are referred to as estates or plantations. There are however differences in the definitions of these production units especially pertaining to the size of the holdings. This is debatable when other indicators are used.

The plantations normally employ hired labor, modern technology and are capital intensive compared to the small holdings. The crops are cultivated on an extensive scale in a large area which is owned and managed by individuals, companies both local and foreign as well as being run by the states or government agencies. Crops grown are of high economic value and mainly for the export markets. They are actively managed for commercial production.
The main plantation crops are:

1. Oil Palm
2. Rubber
3. Cocoa
4. Coffee
5. Tea
6. Sugar cane
7. Banana
8. Coconut
9. Pineapple
10. Pepper

The forest plantation that is mainly planted with tree species on a large scale is also included under this definition. They are actively managed for commercial production.

OVERVIEW OF THE PLANTATION CROPS

Oil Palm

In the case of oil palm (see Table 3), this crop is simple to produce and the profit margin derived is extremely significant. There is a large and increasing demand in the international markets for this product because of its versatility. It also has higher rate of productivity as compared to other edible oil products. One hectare of oil palm plantation is capable to produce up to 10 times more oil than other leading oilseed crops. Most of the efficient producers in certain producing countries manage to achieve as high as 8 tonnes of oil per hectare. Indonesia and Malaysia account about 85 percent of the world's palm oil. Other major producers include Thailand, Columbia and Nigeria. For the year 2013-2014, output is expected to increase by 4.8 per cent to 58.5 million tonnes (Bloomberg, 2013).
Palm oil has a crop specific sustainable certification standard, the Roundtable on Sustainable Palm Oil (RSPO). The RSPO is an organization established in 2004 to promote growth and the use of certified palm oil (CSPO). In 2012 it had more than 1000 members from 50 countries (RSPO n.d.). It unites several sectors of the palm oil industry to develop and implement global standard for sustainable palm oil. The sectors involved are:

1. Oil palm producers
2. Palm oil processors or traders
3. Consumer goods manufacturers
4. Retailers
5. Banks and investors
6. Environmental or nature conservation NGOs and social or developmental NGOs

Although some big plantation companies are contented with the voluntary RSPO certification to gain access to the European and Western markets, other companies are not willing to comply with the RSPO principles simply because of costly certification charges and evolving criteria. Indonesia has established another organization, i.e. Indonesian Sustainable Palm Oil (ISPO) in 2011 while Malaysia also followed suit whereby in 2013 the Malaysian Sustainable Palm Oil was incepted.

Palm oil is competitively priced against soybean, rapeseed and sunflower oil in the world’s market for oils and fats. Weather pattern, import policies of importing countries and changes in taxation and import duty may affect the prices of the Crude Palm Oil (CPO). The average price of CPO in Malaysia in 2009 was MYR2,465 per metric tonne and increased to MYR3,620 for the year 2010. Prices however, increase to 14 percent in 2014 to average MYR2,700 due to increased demand from the biofuel industry (Anonymous, 2014). China, India and Europe are among the largest importers of CPO. Any crisis that arises like global economic downturn, slowing food demand in these countries will decrease the demand thus leading to the surplus in the producers countries.
Transformation of The Global Plantations Through Productivity Improvement

Table 3: Major Producers of Palm Oil 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Amount (MT)</th>
<th>% of World Total*</th>
<th>Productivity MT/ha**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>31,000,000</td>
<td>51</td>
<td>1.0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>19,200,000</td>
<td>33</td>
<td>1.5</td>
</tr>
<tr>
<td>Thailand</td>
<td>2,100,000</td>
<td>3.4</td>
<td>1.5</td>
</tr>
<tr>
<td>Columbia</td>
<td>966,900</td>
<td>1.7</td>
<td>n.a</td>
</tr>
<tr>
<td>Nigeria</td>
<td>930,000</td>
<td>1.6</td>
<td>n.a</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan. 2014.  
* and ** are based on computations

Natural Rubber

Indonesia, Thailand and Malaysia together account about 66 per cent of global natural rubber output (see Table 4). Indonesia has the largest area of rubber plantation and the major sites are found in Sumatra, Riau, Lampung and Java. The targeted area is 1.3 million hectares with a production of 3.6 million tonnes in 2015. Although Indonesia has the largest area of rubber plantation, productivity is very low with an average yield of 870kg -1000kg per hectare compared with up to 1700kg for Thailand (Global Business Guide Indonesia, 2012.). The natural rubber industry is labour intensive and globally it involves the utilisation of millions of farmers who are mostly women. This is in contrast to its main competitor, the synthetic rubber which is capital intensive.

Rubber consumption and prices are mainly dependent on the global economic growth which at present is not encouraging. Consumption in the importing countries such as China, European Union, USA, Japan and South Korea is declining. Tyre companies are cutting down on natural rubber purchase because of slowdown in the automobile industry. It is forecast that consumption will reach 19.1 million tonnes by 2025 exceeding the normal output at 18.4 million tonnes. Thailand, Malaysia and Indonesia reduced exports by 300,000 tonnes in 2013 to boost price. This year’s El Nino will cause production to decrease thus pushing up the price of this crop.
The supply will be greatly affected in the upcoming months. Rubber prices at MYR 2.80 to MYR 3.00 a kilogram is an appropriate level for the producers in Malaysia (International Rubber Consortium Ltd., 2014).

Table 4: Production of Natural Rubber 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Amount (MT)</th>
<th>% of World Total*</th>
<th>Productivity MT/Ha**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>3,500,000</td>
<td>29.6</td>
<td>1.71</td>
</tr>
<tr>
<td>Indonesia</td>
<td>3,040,400</td>
<td>27.3</td>
<td>0.872</td>
</tr>
<tr>
<td>Malaysia</td>
<td>970,000</td>
<td>8.8</td>
<td>0.808</td>
</tr>
<tr>
<td>Vietnam</td>
<td>863,773</td>
<td>7.9</td>
<td>1.71</td>
</tr>
<tr>
<td>India</td>
<td>805,000</td>
<td>7.0</td>
<td>1.82</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan. 2014
* and ** are based on computations

Cocoa

Cocoa is another major plantation crop of great significance to the African and Asian as well as the Latin American countries as more than 40 million people depend on this crop for their livelihood. It was estimated that there were 5 to 6 million farmers worldwide who were engaged in the production of this crop. Nearly 70 percent of world production comes from West Africa while the remainder is from Asia, Oceania and the Americas. Indonesia ranks second with 936 thousand tonnes and contributes 15.5 percent of world production (see Table 5). Malaysia which at one time in the late eighties and the early nineties was a major global player in terms of production and export only produced 30 thousands tonnes in 2011 which represented 0.9 percent of global production. The annual world production is estimated around 3 million tonnes. About 10 percent of cocoa production comes mainly from the plantation sector and the rest is undertaken by the smallholders. The productivity status of this crop is very low ranging from 223kg for Malaysia to 660 kg in the case of Ivory Coast (Malaysian Cocoa Board, n.d)
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Table 5: Major Cocoa Producers 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (MT)</th>
<th>% of World Total*</th>
<th>Productivity (MT/Ha)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ivory Coast</td>
<td>1,650,000</td>
<td>33.8</td>
<td>0.660</td>
</tr>
<tr>
<td>Indonesia</td>
<td>936300</td>
<td>15.5</td>
<td>0.540</td>
</tr>
<tr>
<td>Ghana</td>
<td>879348</td>
<td>15.2</td>
<td>0.550</td>
</tr>
<tr>
<td>Nigeria</td>
<td>383000</td>
<td>8.7</td>
<td>0.320</td>
</tr>
<tr>
<td>Cameroon</td>
<td>256,000</td>
<td>5.9</td>
<td>0.382</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan. 2014
* and ** are based on computations

Criollo is the most well known cocoa variety because it has the highest quality beans and is considered as a delicacy. The consumption of food rich in cocoa products is said to bring health benefits which some said that it can help to reduce blood pressure and in fact the chocolate drinks are popular among the sportsmen and athletes because of the provision of carbohydrates and protein to maintain their level of play.

Coffee

Coffee is another major global plantation crop which is being consumed by millions of people throughout the globe due to its unique aroma and taste. It was reported that over 2.5 billion cups of coffee are consumed in the world everyday. Over 90 percent of this crop is produced in the developing countries. As shown in Table 6, the major producing country is Brazil which produces one-third of the world’s production. Vietnam is ranked second with a market share of 14.6 percent. This is followed by Indonesia, while Colombia is in the fourth place. It is said that the quality of the Colombian coffee is unmatchable throughout the world. India is in the fifth rank where 80 percent of the produce is meant for the export market.

There are two main varieties of coffee beans that are popularly produced by the coffee growers, that is, the arabica and the robusta. The former, however, is more superior and fetches a higher price compared to the latter. More than 60 percent of the coffee
beans are of the arabica variety. The global coffee production is estimated to increase marginally to 145 million bags in the ongoing period 2013-2014 compared to 145.1 million bags in 2012-2013. (1 bag = 60kg) (Mahesh, 2014).

Table 6: Major Coffee Producers 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (MT)</th>
<th>% of World Total*</th>
<th>Productivity (MT/Ha)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>3,037,534</td>
<td>34.4</td>
<td>1.430</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1,292,389</td>
<td>14.6</td>
<td>0.597</td>
</tr>
<tr>
<td>Indonesia</td>
<td>657,200</td>
<td>7.4</td>
<td>0.533</td>
</tr>
<tr>
<td>Columbia</td>
<td>464,640</td>
<td>5.3</td>
<td>0.597</td>
</tr>
<tr>
<td>India</td>
<td>314,000</td>
<td>3.6</td>
<td>0.852</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan, 2014
* and ** are based on computations

Tea

Another plantation crop which is the most popular in the world is tea. It is the cheapest beverage next to water. The global consumption of this produce is estimated to be 3 billion cups per day. India is the largest tea drinking nation in the world. Being a labour intensive industry, this crop is mainly grown in developing countries where a large pool of low-cost labour is available. It is said that labour cost accounts 50-60 percent of the total production cost. This industry contributes significantly to the economies of these countries in terms of the provision of employment.

Table 7: Major Producers of Tea 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (MT)</th>
<th>% of World Total*</th>
<th>Productivity (MT/Ha)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1,700,000</td>
<td>39.3</td>
<td>1.13</td>
</tr>
<tr>
<td>India</td>
<td>1,000,000</td>
<td>23.1</td>
<td>1.65</td>
</tr>
<tr>
<td>Kenya</td>
<td>369,400</td>
<td>8.5</td>
<td>1.94</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>330,000</td>
<td>7.6</td>
<td>1.49</td>
</tr>
<tr>
<td>Turkey</td>
<td>225,000</td>
<td>5.2</td>
<td>2.97</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan, 2014
* and ** are based on computations
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As shown in Table 7, the largest producer of tea is China which contributes more than 39 percent of the global production of 4,321,011 tonnes. India which ranks second place produces about 23.1 percent of the world’s supply. The remainder comes from other major players comprising Kenya, Sri Lanka and Turkey. Productivity status ranges from 1.1 to 2.9 tonnes per hectare.

Numerous varieties of tea are being produced in these countries. The popular ones are the green, black, yellow and white tea. Kenya is the largest exporter of black tea in the world. Besides being a major export crop, tea also contributes significantly to human health such as in reducing cardiovascular disease and some form of cancer, weight loss and decrease in the blood pressure.

Sugar Cane

Sugar cane is the world’s largest crop with a cultivation areas of 23.8 million hectares. More than 90 countries both in the tropical and subtropical regions are involved in the production of this crop with a worldwide harvest of 1.69 billion tonnes (FAO, 2014) Brazil is the largest producer contributing about 37.8 percent of the global production followed by India 19.6 percent, China 6.9 percent where as Thailand and Pakistan both produce 5.4 percent and 3.2 percent respectively (see Table 8). The average yield of sugarcane crops in 2011 was 70.5 tonnes per hectare. While the most productive farm in the world is Ethiopia with an average of 127 tonnes per hectare.

Table 8: Major Producers of Sugar Cane 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (MT)</th>
<th>% of World Total*</th>
<th>Productivity MT/ Ha**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>670,757,958</td>
<td>37.8</td>
<td>74.3</td>
</tr>
<tr>
<td>India</td>
<td>347,870,000</td>
<td>19.6</td>
<td>68.3</td>
</tr>
<tr>
<td>China</td>
<td>123,460,500</td>
<td>6.9</td>
<td>68.8</td>
</tr>
<tr>
<td>Thailand</td>
<td>96,500,000</td>
<td>5.4</td>
<td>74.2</td>
</tr>
<tr>
<td>Pakistan</td>
<td>58,038,000</td>
<td>3.2</td>
<td>55.8</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan.2014
* and ** are based on computations
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Banana

Banana is considered as one of the most important plantation crops in the world trade. It is a very popular crop owing to its high nutritive value, long shelf life and low price. It is a commodity of world’s importance which provides a source of foreign exchange and a source of employment of hundreds of thousands of people especially in the Latin America and the Caribbean regions as well as the Asian countries. It is also the backbone of the economies of these countries. It is grown in more than 135 countries throughout the tropics and sub-tropics. The most popular variety is the Cavendish. Approximately 13 percent of the global production is meant for the export market worth approximately USD 1 billion annually. Large scale production and export of bananas in Ecuador, Columbia, Costa Rica, Guatemala and in other producing countries are controlled by large multinational companies such Chiquita, Del Monte and Dole. Ecuador was the largest exporter of the commodity in 2011 with a volume of 5.2 million tonnes representing about 29 percent of the world’s total export and the largest importer is the United States. With the merging of Fyffes, an Irish fruit and produce distributor, with Chiquita which is expected to be materialised by the end of 2014, the combined company will become the world’s largest producer and distributor of banana which can generate an annual revenue USD4.6 billion (Boston Globe, 2014).

As shown in Table 9, India is the major producer of banana in the world producing more than 20 percent of the global production. In this country, the productivity recorded is 34.5 tonnes per hectare which is the highest among the producing countries.
Table 9: Major Producers of Banana 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (MT)</th>
<th>% of World Total*</th>
<th>Productivity MT/Ha**</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>24,869,490</td>
<td>24.4</td>
<td>34.5</td>
</tr>
<tr>
<td>China</td>
<td>10,550,000</td>
<td>10.3</td>
<td>26.3</td>
</tr>
<tr>
<td>Philippines</td>
<td>9,225,998</td>
<td>9.1</td>
<td>20.3</td>
</tr>
<tr>
<td>Ecuador</td>
<td>7,012,244</td>
<td>6.9</td>
<td>33.3</td>
</tr>
<tr>
<td>Brazil</td>
<td>6,902,184</td>
<td>6.8</td>
<td>14.3</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan. 2014
* and ** are based on computations

Banana provides health benefits to the consumers in terms of reducing the heart disease when consumed on a regular basis. It is also recommended for patients suffering from high blood pressure, arthritis, ulcer and kidney disorder. It is said that people suffering from depression feel much better after eating banana.

Coconut

Coconut is a member of the palm family and is grown in more than 92 countries especially in Asia, Africa, Latin America, the Caribbean and the Pacific region with a total world production of about 61.7 million tonnes. The total acreage devoted to this crop is 11.8 million hectares with an average yield of 5.2 tons per hectare (FAO 2014). This major tree crop contributes significantly to the economies of these countries in terms of providing employment opportunities and a source of income for the farmers.

The term coconut refers to the entire coconut palm, the seed or the fruit. It is called the “Tree of Life” because it provides almost everything needed for life ranging from medicine, food, drink, oil and other usage. This crop has a diversified range of applications covering the domestic, industrial and commercial usage. There are two sub-groups i.e. the Tall and the Dwarf cultivars. The former is grown commercially because it has a longer life span of 70 - 100 years and produces higher yield averaging 25000 - 30000 nuts per hectare per year compared to the Dwarf. This crop grows very
well in sandy soils in areas where there are abundant sunlight and regular rainfall.

### Table 10: Major Producers of Coconut 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (MT)</th>
<th>% of World total*</th>
<th>Productivity MT/Ha**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>18,000,000</td>
<td>30.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Philippines</td>
<td>15,862,386</td>
<td>26.4</td>
<td>4.4</td>
</tr>
<tr>
<td>India</td>
<td>10,560,000</td>
<td>17.0</td>
<td>4.9</td>
</tr>
<tr>
<td>Brazil</td>
<td>2,888,532</td>
<td>4.8</td>
<td>11.2</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>2,000,000</td>
<td>3.3</td>
<td>5.1</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan. 2014
* and ** are based on computations

As shown in Table 10, Indonesia is the largest producer and contributes 30 percent of world production. The Philippines ranks second with a contribution of 26.4 percent. India, Brazil and Sri Lanka as a whole represent about 25 percent of world production.

Coconut is the fourth important plantation crop after oil palm, rubber, and paddy in Malaysia. In 2012 the total production in the country was 35,000 tonnes. Based on the price of MYR2,600 per tonne, this sector contributed RM91 million to the Malaysian economy (Chen, 2013).

There are several varieties of coconuts found in this country. However, MATAG and MAWA are the two most prominent varieties cultivated beside the West African Tall, Malayan Tall and Malayan Red Dwarf. The MATAG variety is fleshy and thicker compared to the MAWAR. Malaysia manage to produce an average yield of 5.4 tonnes per hectare per year.

The annual production of coconut is 3.5 million tonnes and it accounts for 2.5 percent of the world vegetable oil production. The most important form of consumption of coconut is the oil derived from this crop where greater attention is used for energy generation which is either mixed with diesel or as a substitute for diesel. The
market for coconuts is worldwide and takes the form of fresh and copra. Because of its multifarious usage, this industry has a bright outlook.

**Pineapples**

Pineapple is indigenous to South America and is one of the most important tropical crops in the world. As it is now, there are about 2000 varieties cultivated in more than 82 countries worldwide spanning across Asia and South Central America. As shown in Table 11.0, Thailand is the major producer in the world followed by Costa Rica, Brazil, Philippines and Indonesia. However, a third of the world’s pineapples are produced in Hawaii and South East Asia. The world acreage in 2010 was 909,840 hectares with a production of 19,412,910 tonnes. The crop contributes over 20 percent of world production of tropical crops. This particular crop is drought tolerant and grows well in sandy loam soil but it also can be cultivated on a different range of soils and it is grown all the year round (Indian Horticulture Data base, 2011).

The most outstanding cultivar is the Smooth Cayenne which is famous for its flavour, seedless and the leaves possess a unique characteristic of having few spines. In Malaysia, it is called ‘nanas’ Sarawak. There are five varieties in Malaysia, the popular ones are the Mauritius (nanas Moris), Josapine which belongs to the Spanish group and the Sarawak variety.

**Table 11: Major Producers of Pineapple 2012**

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (MT)</th>
<th>% of World Total*</th>
<th>Productivity MT/ha**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>2,650,000</td>
<td>11.4</td>
<td>25.23</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>2,484,729</td>
<td>10.6</td>
<td>59.16</td>
</tr>
<tr>
<td>Brazil</td>
<td>2,478,178</td>
<td>10.5</td>
<td>40.85</td>
</tr>
<tr>
<td>Philippines</td>
<td>2,397,628</td>
<td>10.3</td>
<td>41.03</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1,780,889</td>
<td>7.6</td>
<td>124.54</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan. 2014
* and ** are based on computations
In international trade, the crop is placed in four groups i.e. Smooth Cayenne, Queen, Red Spanish and Abacaxi. In Malaysia, there are two commercial varieties, for canning, it is known as red pineapples while for eating fresh the Sarawak and the Moris pineapples are used. The latter is small with a bright yellow flesh. This crop is graded according to its quality and weight. The Extra Class is the highest quality grade and this is followed by Class One and Class Two. Total production in 2013 was 376,704 tonnes and main importing countries were China, Japan and Korea which prefer the MD2 variety. Total volume exported last year was 30,593 metric tonnes valued at MYR86.3 million (Utusan Malaysia, 2014).

It is estimated that over 80 percent of the import by the European countries are the MD2 cultivar which is known for its sweetness, high vitamin C content and long shelf life. About 70 percent of the production is consumed in the country in which it was produced (UNCTAD, 2012).

This crop is well known for its health benefits. The vitamin C found in the juice is a great remedy for oral health, fight against bacteria and toxins that invade human gum tissue. It benefits the skin and the collagen assists in the formation of cartilage and strengthens the human bone. It also acts as an anti-inflammatory agent and used in treating sore throat.

### Pepper

Pepper also known as King of Spices and Master Spice, is an important commodity traded globally since ancient times. It accounts for one-fourth of the world’s spice trade. India was the largest producer and exporter of pepper in the world until 1990’s. However Vietnam’s entry into the world market has resulted in a crash in the price of pepper globally. As shown in Table 12.0, Vietnam produced 33 percent of the world’s total, followed by Indonesia, India, Brazil and China. Malaysia produced 26,000 tonnes or 5.2 percent of the global market. In 2014 Malaysia has 14,000 hectares of pepper plantation.
There are three well-known varieties of pepper: black, green and white pepper. Black pepper is cultivated for its fruits and is used as a spice. Black pepper is cultivated widely in India and it is also grown in other tropical regions. It is used as medicine and also for its flavour.

India is rated as the highest pepper consuming country in the world. In fact, Indian pepper is at a premium against all the international grade. The export price of black pepper is USD 4,456 per tonne while white pepper is traded at USD 7,000 per tonne. The increase in price is partly due to the shortage of supply in the world market. The global of pepper grew at an average of 4.8 percent per annum during the period 2001-2013 compared to 0.3 percent increase in the average yearly production. Kuching Grade 1 white pepper increases to MYR29,000 per tonne while black pepper hits MYR 19,600 per tonne in December 2013 (Star online, 2014).

In spite of the dominant role that these plantation crops play in terms of the economic development of the respective countries, from the analysis made from Tables 3 through 12.0 there are wide variations in the productivity status across countries. It seems that there are stagnation in the productivities of these crops. For some crops, particularly cocoa, the productivity level is very low.

Low productivity is brought about both by the controlled and uncontrolled variables. The latter may comprise climatic factors

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Table 12: Major Producers of Pepper 2012

<table>
<thead>
<tr>
<th>Country</th>
<th>Production (MT)</th>
<th>% of World Total *</th>
<th>Productivity (MT/Ha)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vietnam</td>
<td>152,300</td>
<td>33.0</td>
<td>3.2</td>
</tr>
<tr>
<td>Indonesia</td>
<td>88,200</td>
<td>19.1</td>
<td>0.5</td>
</tr>
<tr>
<td>India</td>
<td>54,000</td>
<td>11.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Brazil</td>
<td>43,345</td>
<td>9.4</td>
<td>2.2</td>
</tr>
<tr>
<td>China</td>
<td>31,000</td>
<td>6.7</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Source: FAOSTAT, Jan. 2014
* and ** are based on computations
and prices of both the commodity and the agricultural inputs used in the production process. Under such situations producers should focus more on the resources which are under their control. Efforts should focus on reducing the cost of production and efficiency in the use of the agricultural inputs with improved management practices.

While suitable agricultural land is limited in supply in most of the countries, particularly, in the case of Malaysia, there are no best policy actions for the producing countries except to make a bold move to increase productivity in the home countries. Low productivity will not only affect the global supply but also the returns of the plantation companies and the states.

PLANTATION PLAYERS

There are four major players in the plantation industry, namely: the workforce, the plantation corporations, the states and the trade unions. A situational analysis of all these players will be highlighted in this text.

Workforce

In terms of the workforce, there are various categories that are employed in the plantation sector. At the lower rung is the workers or the labourers who are responsible to execute the daily operations in the plantations such as field maintenance, tapping, harvesting and plucking activities, to mention a few. These workers are either local or foreign, skilled or unskilled, permanent or on contract and are either males or females. Basically their levels of education are not that high and their opportunities to seek employment elsewhere are limited more so where the plantations are in the remote areas.

Most of the plantation companies are facing a very acute problem i.e. labour shortage. In fact this shortage of the workforce is a universal phenomenon. Canada, India, Chile, Bahamas and the United States are some of the countries that face this situation.
Transformation of The Global Plantations Through Productivity Improvement

The Chilean agriculture, for instance, has experienced a decline of the labour force since the middle of the 1980s, mainly because of the competition with other sectors of the economy which provided higher wages (Aguirre et. al., 2013).

Malaysia also is not an exception. In this country most of the locals are not interested to work as labourers. Basically the plausible reasons are the low wages, long hours of back-breaking job, poor working conditions, unconducive living environment and locations which are far away from the cities. For the locals, it is quite tough for them to work at 6:00 a.m. and they appear to be not strong enough both mentally and physically to undertake the jobs especially as harvesters. Most of the locals are not young and their age is 42 years and above.

The main focus of the Malaysian economy in late eighties and early nineties was on manufacturing and services. The policy of adopting the capital intensive technology, however, did not work very well. Most of the industries still rely on cheap and unskilled labour for their economic activities. This has led to the exodus of the rural population to the urban areas where the demand for manpower in these sectors are great. As a consequence, those involved in agriculture and plantation activities are decreasing. To address this problem, Malaysia has to rely on foreign workers in the early nineties right up to the present moment.

In Malaysia oil palm is the most critical sector which is heavily dependent on foreign workers especially for harvesting activities. The plantation companies employ more than 580,000 workers of which around 350,000 are foreigners. The majority of these foreign workers are from Indonesia. In the state of Sabah, for example, about 90 percent of the foreign workers are from Indonesia while the rest are from the Philippines, Bangladesh, Nepal, Myanmar and Vietnam. It was reported that Sime Darby plantation alone in Sabah employed around 5523 foreign workers the majority of which comes from Indonesia and the Philippines on its 45482 hectares (New Straits Times, 2013).
Transformation of The Global Plantations Through Productivity Improvement

Indonesian workers are more preferable by the plantation companies compared to their counterparts from other countries because of their physical toughness, are more hardworking and productive, no communication problem and possess the necessary skills required by the estates. In many cases, the workers are placed in a harsh and isolated environment with minimal shelter and most of them left the plantations to get a construction job where they can earn between MYR50-MYR60 a day compared to MYR25-MYR40 in the plantation. Although a minimum wage policy has been enforced by the Government, the implementation is not fully undertaken by the employers.

One major social problem existing in the plantation now is the social integration between locals and foreigners. The former tend to feel uncomfortable living in the midst of the foreigners especially when the population of the latter is greater than the locals.

The labour force is an important asset in the plantation industry for without their presence the plantations will come to a standstill since most of the estate operations are manually handled and the companies’ primary objective of maximizing profit will not be attained. However, it is sad to note that the welfare, safety and the provision of proper working conditions of these workers are not the top priority of most of the plantation companies. The wage issue remains unresolved in most of the plantation companies until today.

Most of the plantation workers are paid daily. This can lead the employees to feel less secure in their jobs and financial situation. In Liberia, it was reported that the wages paid to the workers were so low that child labour is rampant. To meet the daily quota imposed workers had to work more than 21 hours. Living conditions were so bad and the workers were placed in dwellings without proper basic amenities such as water and electricity. Educational and health facilities were lacking. As such the workers could not provide proper schooling to their children. Health hazards were not tackled properly and protection against toxic pesticides were not implemented (IRIN, 2006).
A recent report from the Columbian Law School (2014) revealed that based on their three years study on workers in 24 tea plantations in the state of Assam, the wage paid by the major plantation company was less than 2 pounds per day. From this amount, excessive deductions were made for fringe benefits. They lived in inhumane condition and each dwelling often housed family of several workers. Quality of lives were miserable. The report alleged that workers were ill-treated over sick leave and denied free health care.

In the Philippines and Costa Rica, workers working in the pineapple plantations had to work long hours for a duration of six days a week often in the hot sun. No overtime pay was given to them and the wage system was based on the piece rate basis. Although the cost of living had increased, the income of the workers remained stagnant. There were no freedom of associations and rights to collective bargaining. The role of the trade union is reduced due to the employment of contract labour.

In some major banana producing countries, working conditions and the health of the workers have been rather poor due to the exposure of large quantities of chemicals such as pesticides, fungicides, herbicides and nematicides used in the cultivation of this crop. The workers were paid between USD5-15 a day depending on the weather condition and crop density. The workers rarely remain at one plantation for longer than three months. After that period they are entitled to severance pay and other benefits. However, their services are usually terminated before the completion of that duration.

In spite of the dominant role of Malawi as the second largest producer of tea in Africa, it was reported that the 50000 workers employed to work in 11 international companies covering an area of 18,799 hectares were on seasonal basis. They were poorly paid with a daily minimum wage of USD 2 per day which is hardly sufficient to meet end needs. Although there are trade unions to represent them
but they are very weak and as a consequence the estate owners are able to dictate the wage rate. The workers are not provided with accommodation and proper health facilities. Due to meagre income, most of the workers have to work as part timers and are engaged in other activities to support the families (Madalitso, 2013).

There were also the issues of some oil palm plantation companies in some producing countries even though are members of Roundtable on Sustainable Palm Oil (RSPO) violate the rights of the workers. They still use child labour, provide inadequate protection of female workers, unsafe working conditions and the wages paid were too low to meet the decent standard of living.

**Plantation Corporations**

The majority of the plantations are owned by corporations which vary in terms of the scale of operation, the plantation activities and the crops involved. Some of these entities are multinational in nature and operate across regions because of economic reasons while others are run by local companies or state owned.

In Indonesia, there are quite a number of big players in the plantation industry and among the major plantation corporations are:

1. PT Sampoerna Agro
2. Bakrie Sumatra Plantations
3. PT Perusahaan Perkebunan London Sumatra (LONSUM)
4. PT Astra Agro Lestari
5. Golden Agricultural Resources
6. PT Perkebunan Nusantara 111

PT Sampoerna Agro is one of Indonesia’s leading producers of palm oil and palm kernel oil. This company produces diversified products such as palm kernel products, palm products, germinated oil palm seeds and also non-palm products such as slab rubber and sago products. This company is owned by the rich Sampoerna family and the plantation businesses are focused in the province of South
Sumatra as well as in Central and West Kalimantan. The company has a total of 108,543 hectares of oil palm plantation and owns six palm oil mills (Sampoerna Agro Annual Report, 2011).

Another plantation company operating in Indonesia is the Bakrie Sumatra Plantations. The areas focused are in the regions of North and West Sumatera, Riau and Jambi, covering an area of 122,024 hectares out of which 91,850 hectares are under oil palm and the remainder under rubber. In 2012, the company has operated six palm oil mills with a total capacity of 285 tonnes of Fresh Fruit Bunches per hour. On top of that it also has four natural rubber processing factories which produces a wide range of rubber products such as the RSS-1 and the SIR10/20 (Bakrie Sumatera Plantations Annual Report, 2012).

PT Perusahaan Perkebunan London Sumatera Indonesia or Lonsum which is owned by the Salim Group is one of the oldest plantation companies involved in the production of oil palm, rubber, cocoa and tea in Indonesia. It has estates located in the islands of Sumatra, Java, Kalimantan and Sulawesi. Covering an area of 98,032 hectares. A total of 80,732 hectares are devoted for oil palm plantations and the remainder of 17,300 hectares are under rubber plantations. As for the cocoa plantations, the areas involved are East Java, North Sulawesi and North Sumatra, and as for tea the plantations are in East Java. It has 11 palm oil mills with an annual total processing capacity reaching more than 2 million tonnes of FFB by the end of 2011 (PT PP London Sumatra Annual Report, 2012).

The biggest agribusiness company by value in Indonesia is PT Astra Agro Lestari which is under Astra International. This company is engaged in palm oil and rubber plantations. It now manages a total plantation area of 272,994 hectares in Sumatra, Kalimantan and Sulawesi with an average tree age of 14 years. However, an area of 234,430 hectares is under mature plantation. About 80 percent of the company sales revenue comes from the crude palm oil and about 90 to 95 percent of the crude palm oil is for domestic consumption and the remainder is exported (Astra Agro Lestari Annual Report, 2012).
Golden Agricultural Resources (GAR) in Indonesia is the world’s second largest oil palm plantation with a total planted area of 467,000 hectares as at September 2013. This company focuses in the production of palm-based edible oils and fats. It is listed on the Singapore Exchange with a market capitalisation of USD 5.5 billion as at December 2013 (GAR. Annual Report, 2013).

In Indonesia a new plantation firm will be established that combines the assets of state-owned rubber and palm oil companies under the parent company PT Perkebunan Nusantara 111 with an asset worth USD 5.6 billion. It will own about 1 million hectares of oil palm and rubber plantations rivaling Malaysia’s Sime Darby and Wilmar of Singapore (www. Mongabay.com/2012).

Like Indonesia, Malaysia too has quite a big number of corporations involved with the plantation sector. Some of these companies have ventured outside the country mainly because of the constraints faced locally such as limited land suitable for the cultivation of oil palm and rubber, and the shortage of workforce to work in the plantations. Some may have the aspirations to become the major producer of either rubber or oil palm or the combination of both commodities in the world. Below are the major corporations engaged in the plantation of either rubber or oil palm or the combination of both:

1. Felda Global Ventures (FGV)
2. Sime Darby
3. United Plantations
4. IOI Corp
5. KL Kepong
6. Genting Plantations
7. Sarawak Oil Palm
8. TSH Resources
9. TH Plantation
Felda Global Ventures Bhd. is an agricultural and agricommodity company which is primarily involved in oil palm and rubber cultivation, and to a lesser extent sugarcane in the northern part of Peninsular Malaysia. It is the third largest oil palm operator in the world operating both in Malaysia as well as overseas. The company has 343,521 hectares of land in Malaysia and 77,000 hectares in Indonesia. It manages 424,995 hectares of plantation estates mainly oil palm and 10,308 hectares of rubber estates. In Indonesia, FGV has invested in Trurich that owns 42,000 hectares of oil palm plantation in East and Central Kalimantan. It owns 71 palm oil mills and the total production was 4.91 million tonnes in 2012. The company is also venturing into Myanmar and Africa to enlarge its scale of operations (Utusan Malaysia, 2014).

Sime Darby Plantation Bhd.'s main focus is on oil palm covering a land size of 312,795 hectares in Peninsular Malaysia, Sarawak and Sabah. As of June 2013, the company has 36 oil palm mills and the productivity ranges from 18.9 to 24.1 metric tonnes per hectare. The company has signed a 63 years concession with the Government of Liberia for 220,000 hectares of land to be planted with oil palm and rubber. In Indonesia, it operates through its subsidiary Minamas Plantation operating in 8 provinces with a total land bank of 289,422 hectares which is cultivated with oil palm. The focus areas are in Sumatra, Kalimantan and Sulawasi with a total of 71 estates producing 3.95 million metric tonnes of FFB in the financial year 2012/2013. The total workforce employed by the company is 38,000 people (www.sime darby plantation com/2013).

United Plantations Bhd. is a plantation company managed by the two Danish brothers. It is recognized as the best managed estate by the Ministry of Plantation Industries and Commodities, Malaysia. It operates the most efficient oil palm plantation in this country with a total area of 33,000 hectares. In addition, the company has also planted 10,000 hectares of new oil palm plantations in Indonesia and owns another 10,000 hectares with further plantation potential. About 10 per cent of its total areas are devoted with coconuts and
today the company is the major producer of coconuts in the country. Banana cultivation is also carried out but on a minimal scale. The most outstanding characteristics of this company is its ability to produce more than 50 per cent of its area yield when compared with other estates in the country. Its plantations have used less fertilisers compared to other plantation companies in the country. Surprisingly enough United Plantations has managed to reduce its cost of production at MYR 800 per tonne compared to other companies where the cost ranges from MYR1000 to MYR1500. The company's main customers are the global food companies among others are the Nestle, Unilever, Cargill and Kraft (UP Annual Report, 2012).

IOI Plantation Sdn. Bhd. is one of the leading and efficient plantation companies in Malaysia. The Company has 152,000 hectares of oil palm plantation in Malaysia which is mostly in Sabah and 83,000 hectares in Indonesia. It has 12 palm oil mills with a milling capacity of 4.1 million tonnes per year. In Malaysia, it operates with 80 estates with a productivity level of 6 tonnes per hectare compared with the national average of 4 tonnes per hectare (www.ioigroup.com).

KLK Bhd. is a multinational company which also is involved in the cultivation of oil palm, rubber and cocoa. The size of the plantation land now is around 250,000 hectares in Malaysia and Indonesia especially in Sumatra and Kalimantan. Indonesia takes 56 percent of the total cultivated areas while Peninsular Malaysia represents 28 percent and Sabah 16 percent. The annual production of Fresh Fruit Bunch (FFB) is 3.1 million tonnes (www.KLK.com.my/corporate - info/com).

Genting Plantation Bhd. owns over 80,000 hectares of oil palm plantation located in Peninsular Malaysia (covering the Northern, Central and Southern Regions) and Sabah. Previously the name of this company was Asiatic Development Bhd. Its land bank is around 71,000 hectares with a workforce of 7,300 people. It has 6 palm oil mills producing about 708,000 tonnes of FFB (www.rspo.org/en/member/2/genting-plantation).
Sarawak Oil Palm Bhd is a Sarawakian plantation company which is primarily involved in the cultivation of oil palm and the operation of palm oil mills. It owns 36 estates with a total planted area of 58,940 hectares of oil palm of which 33,877 were mature and the remainder immature palms producing about 238,204 tonnes of crude palm oil in 2010 (Sarawak Oil Palm Bhd Annual Report, 2012).

TSH Resources is a Sabah company primarily engaged in the cultivation, processing and refining of oil palm. It has a planted area of 50,000 hectares across Sabah, Kalimantan and Sumatra and an unplanted land bank of 65,000 hectares. The company has targeted to plant rubber for a total land size of 10,000 hectares (TSH Annual Report, 2012).

TH Plantation Bhd is a subsidiary company of Lembaga Tabung Haji Malaysia which is primarily engaged in the cultivation of oil palm and rubber. As at December 2012, the company was operating with 37 estates across Peninsular Malaysia, Sabah and Sarawak. Total acreage under oil palm was 53,805 hectares and under rubber was 2,818 hectares. It owns 91,078 hectares of plantation land banks. The group average FFB production was 21.5 metric tonne per hectare (TH Plantation Annual Report, 2012).

Most of the state governments in the country are also engaged in the cultivation of plantation crops mainly rubber and oil palm. They are subsidiary companies under the state corporations and managed by agents such as Boustead or employed their own workforce to run the plantations.

There are also a number of medium size companies involved in the plantation business in Malaysia. Among them are:

1. Far East Holdings
2. Hap Seng Plantation
3. Kretam Plantation Holdings
4. Rimbunan Sawit
5. United Malacca Bhd
6. TDM Bhd., and
7. QL Resource

In case of Tea in India, the multinational company involved is The Tata Global Beverage (formerly known as Tata Tea Limited). This company is the second largest manufacturer and distributor of tea and the major producer of coffee in the world. It controls 54 tea estates with a workforce of 59,000 people and manufactured 70 million kg of tea in India, Sri Lanka especially in Assam, West Bengal and Kerala (Wikipedia.org/wiki/Tea_Global_Beverages).

Rubber in Liberia is controlled by the Firestone Natural Rubber Company (headquartered in Indianapolis) which is a subsidiary of Firestone Tire and Rubber Company. The company has operated the world’s largest plantation by signing an agreement with the Liberian government to lease over one million acres of land at the rate of 50 cents per acre (Wikipedia.org/wiki/Firestone_Natural_Rubber_Co.).

In the case of banana, the three main corporations involved are Chiquita, Del Monte and Dole which grow their own bananas in Ecuador, Columbia, Costa Rica, Guatemala and Honduras. These are multinational corporations which are not only engaged in the production but also the distribution of the commodity especially in Europe.

The world trade in pineapple is dominated by four large agribusiness corporations; Dole Food Company, Del Monte Foods, Fyffes and Chiquita. These entities retain large land holdings in Latin America and South East Asia for pineapple production. Dole is the second largest global producer of fresh pineapple worldwide. This company is vertically integrated which controls production, packaging, export, shipping and import.

Wilmar Group Plantation is a major oil palm plantation owner with plantations in both Sumatra and Kalimantan in Indonesia. In
Malaysia the areas involved are Sarawak and Sabah. It also has a significant stake in plantations in Uganda and has ventured into West Africa through a joint venture. The group has 222,000 hectares of oil palm in 2008 (www.Wilmar-international.com/our-business/plantation).

Role of the States

The role of the state is to govern and ensure the efficient production and distribution of the agricultural commodities. It will formulate policies, legislations and regulations which serve as guidelines for the plantation companies to operate in a proper setting. The state has the right to impose tax and to fix the prices on the produce as a source of income to the government. With regards to the workforce, the plantation companies have to observe the Limbourg law, the recruitment procedures especially for foreign workers, the minimum wage, housing act, industrial relation act, the social security schemes, safety procedures, contributions to the provident fund, workers insurance and the trade union act. Resources in the plantation must be properly conserved and issues on sustainability, environment, land acquisition and utilisation, energy conservation, the use of hazardous chemicals, quarantine and carbon emission must be seriously adhered to. The noncompliance of these rules and regulations will have a negative bearing on the produce especially when they are meant for overseas markets where strict stipulations are imposed before the products can be accepted. A classic example is in the case of oil palm where the external pressures particularly from the consuming countries in Europe and the United States are so intense that producers of this commodity cannot afford to have a lackadaisical attitude in producing this crop.

Trade Unions

Trade Unions are social movement built on the idea that workers have as much rights as employers to participate in any decision making affecting the destiny of the plantations. The trade unions in the plantation sector represent the workforce employed
by the plantation companies and its main purpose is to protect and improve the conditions of employment and the wages received by the workers. The trade unions, however, can perform these functions effectively if the membership is strong.

Basically, in the plantations, the union roles are:

1. Collective bargaining with the management to settle terms and conditions of employment
2. Advise the management on personnel policies and practices
3. Taking up individual and collective grievances of the workers with the management
4. Work for achieving better say of the workers in the management of affairs of the plantation companies which influence the lives of the workers directly
5. Organizing demonstration or strikes to press demand of the workers
6. Welfare and recreational activities of the workers
7. Representing the workers in international and national forum
8. Securing legislative protection for the workers from the respective authorities.

In Malaysia, The National Union of Plantations Workers (NUPW) that was established in 1954 is the largest trade union not only in the country but also in Asia. It represents the manual and semiskilled labour in all of Peninsular Malaysia. The majority of its membership are the Indians who form the majority of the workforce during the sixties and it is very active among the Indian estate workers. NUPW is also engaged in business activities like
multipurpose cooperatives, small businesses and property acquisition of several buildings. The union, however, is plagued with internal problems that make it less effective in addressing the needs and the problems of its members.

In some countries, temporary and contract workers including foreign labour can become members of the trade union. However, there is a reluctance on the part of the majority to become members for fear that their contracts might not be renewed or work permit cancelled, thus making it difficult for the union to represent them.

At present, there is only one registered union in Indonesia that is recognised by the plantation employers, that is, Serikan Pekerja Seluruh Indonesia (SPSI) which is the All Indonesia Labour Union. While in India there is the Indian National Plantation Workers Federation to look after the welfare especially of the tea plantation workers. However, at present the position of the trade union is rather weak since there is a heavy dependence on the part of the workers on the employers which prevent them from speaking out. The labourers were ignorant of their rights and the owners had no difficulty of ‘excluding’ the trouble makers.

To transform the global plantations into a dynamic and profitable production entity, all the parties or the players in the industry must understand the importance of working together as a team and not to belittle the role especially of the subordinates. From the analysis made, it seems that the labourers are at the loosing ends. Their welfare and living conditions are not properly addressed by the plantation companies in spite of the substantial profits obtained. The trade unions have lost their claws because of the employment of contract labour and internal bickering.

There are no pull factors to work in the plantations. Those who are involved is because there is no other career for them to pursue because of their low level of academic achievements. The management must relook at the incentives and the living conditions
as well as the facilities that are provided to them as to whether it is adequate and attractive enough for them to stay in the plantations. Everybody that is employed must have a sense of responsibility and a strong commitment to contribute to the companies. Whatever gains obtained must be shared and not to be dominated by certain management group at the expense of the workforce. Some of the management principles such as lean management should be exposed to all the players in order to manage the industry effectively.

**CHALLENGES**

At present the plantation sector is beset with the problems of low productivity, land scarcity, climatic change and global warming, water shortage, crop loss, environmental and quality issues, labor productivity and labour shortage, pressures from the international non-governmental organisations, escalating cost of production, depressed product prices, market uncertainties and trade policy reforms.

A critical issue which indicates that future palm oil production growth may slow is the recent stagnation of the yields (low productivity), despite the availability of ample financing, crop inputs, and agronomic knowledge provided. A number of factors have reportedly led to the sharp fall off in average yields over the past 4 years, including adverse weather (El Nino - drought, La Nina - heavy rains), declining fertilizer use, and low replanting rates. It is estimated that 25-30 percent of Malaysian oil palm trees are 20-30 years old (past the peak period of yields), and that high international prices have suppressed normal replanting rates (MPOB, n.d).

It is a known fact that issues of land scarcity and degradation are critical and they have become a major global issue. The productivity of some lands has reduced to 50% due to soil erosion and desertification.
The effects of global warming on agricultural production are very alarming. There is a significant increase in temperature and extreme weather events which may affect plant growth and crop yield, and hence the uncertainties in the global supply. This will lead to the fluctuation in the prices of the commodities which is of great concern not only to the producers but also to the government of the producing countries. The financial and political implications that emerge from this scenario is great. This sector requires professionals and expertise possessing the appropriate financial, marketing and the entrepreneurial knowledge and skills to manage the vagaries that emerge.

**Water Shortage**

Water management is one of the most critical aspects in oil palm cultivation. Oil palm trees need a lot of water, hence an unstable supply can create unnecessary stress to the trees and adversely affect their productivity. A sustainable method of managing water supply needs to be put in place in order to allow the trees to reach their optimum growth.

**Crop Loss**

Constraints on higher yields have been identified as:

1. **Deficiencies in good agronomic practices to enhance input utilization** and minimize losses

2. **Soil erosion**

3. **Pest and diseases**—The main problems in oil palm estates arise from disease and pests including *Ganoderma* basal stem rot, bagworms, rats, elephants and others. An uncontrolled rat population can result in at least 5% crop loss, according to the American Palm Oil Council.
4. Weed- Tropical climates with ample sunshine, heat and moisture mean that weeds thrive and may compete with crops for space, water and nutrients, and shade crop plants, especially when they are young. A large number of weeds, both annuals and perennials, infest oil palm plantations.

Environmental Issues

In “World Agriculture and the Environment”, Clay (2004) identified the main environmental problems arising from production of palm oil as habitat conversion, threats to critical habitats for endangered species, burning and air pollution, soil erosion, use of pesticides and use of fertilizers. While environmental NGOs generally share these concerns, the main challenges that are frequently featured in campaigns and programmes are deforestation and loss of biodiversity through conversion for oil palm cultivation and timber plantations.

Deforestation has significant environmental impacts, including:

1. loss of biodiversity - The reduced and fragmented habitat structure provides fewer niches for flora and fauna. There has been considerable attention focused on charismatic endangered species such as the Sumatran tiger, Asian elephants and the orangutan. These and other charismatic species are particularly vulnerable when forest areas are cleared, as the increased access leads to increased hunting pressure as well as opening the area to other human settlement.

2. changes in climate both at the local, broader landscape and global scales (especially when burning is used to clear forest land). It has been estimated that deforestation contributes to about 18 percent of the global greenhouse gas emissions (Stern, 2006).

3. hydrological changes due to alteration in precipitation retention and rainfall rates.
Labour Issues

The industry currently depends very much on foreign labour. More than 80 per cent of plantation labour reportedly consists of immigrant workers from Indonesia. If one day all decide to return to work in the expanding oil palm plantations in Indonesia, Malaysian palm oil will face problems harvesting the oil palm fruits. At the rate wages in the Indonesian oil palm plantations are rising, there is a real possibility that many will return. Apparently, by law in Indonesia, plantation wages have to increase by about 10 per cent annually. It is just a matter of time. This explains the urgency to develop a reliable mechanized harvesting technology for the industry.

Of the country’s total plantation labour force, the oil palm sector has the highest number at about 577,900 workers comprising some 350,000 foreigners. This is not surprising. As Malaysia aggressively expands its oil palm plantations, there is a huge dependency, about 50% to 90%, on foreign labour in the upstream side which is well known for being labour intensive (MPOB, n.d). The pressing issue now is the acute shortage of foreign labourers who work as oil palm fruit harvesters in the local plantations given the dwindling labour supply from neighbouring countries and also tightening regulations on foreign labour by the Government due to the rising social and security problems.

International Trade

One of the biggest challenges is stemming from the international trade. Trade barriers and protectionist agricultural policies will continue to shield agriculture from reforms in many countries, distorting the free market and institutionalizing market defects and inefficiencies. Unfavourable non-trade and trade barriers imposed by importing countries for example 80% and 90% import duties on palm oil versus 45% on soybean oil in India will give a real challenge to the industry and producers (MPOB, n.d)
The rising cost of production coupled with the fluctuations in the commodity prices and the changing customers demand and habits through the imposition of various quality standards are issues of significant importance that need to be addressed by the players in the industry. For example, the demand for sustainable palm oil is rising especially by the consumers of the developed economies. Apart from countries where land is abundant and labour is cheap, the majority of the countries is experiencing a high cost of production mainly contributed by the increase in the price of fertilizer and the demand for a wage increase by the workforce. The majority of the agricultural inputs used in the production of the plantation crops is imported and their prices are determined by the forces of demand and supply. In addition, there are many intermediaries involved in the supply chain of each commodity. In the case of rubber in Malaysia the average output cost for ribbed smoke sheet is around MYR 6.27 or US$1.90 a kilogram.

It has been shown that that palm oil prices have declined by about 2.3 percent annually since 1950, from about USD1600 (in 2007 terms) to a long-term average of about USD400 per tonne of oil currently. Meanwhile, costs of inputs have escalated over time, particularly for fertilizers which now constitute more than 50 percent of the total production cost of palm oil. Prices of fertilizers fluctuate considerably with the price of fossil fuel, and exorbitant increases were recorded recently for example when prices of commonly used fertilizers such as muriate of potash has increased by 3 times. It has been estimated that oil palm productivity needs to increase by 1.0 to 1.5 percent annually to keep pace with rising production costs (about 2-3 percent increase annually) and the declining real price of palm oil (about 2-3 percent decline annually) (Fry, 2009).

A stronger US dollar is believed to have also contributed to falling commodities prices, from energy to agricultural products. A stronger dollar makes commodities more expensive to investors. When buyers have to pay more, the demand for the products decreases and that forces the prices to come down.
Externally, the price of agriculture commodities will continue to be exposed to swings and shifts in demand due to the interplay of substitutionary and complementary products. Supply and output of commodities as from time immemorial continue to be subjected to the vagaries of climate, pestilence and seasonality.

Finally, future changes in agricultural policies in many regions and the outcome of the current round of trade negotiations could have an important impact on markets. As the effects of agricultural trade liberalization begin to trickle down and starting to affect the agricultural producers, many governments now realize that they may have to go through painful adjustment programs that can be politically unpopular. The agreement is also constraining the choice of policy instruments that can be used in pursuing their respective socio-economic and political agendas. In developed countries and more so in developing countries, governments are grappling with ‘acceptable’ plans to restructure the sub-sectors affected by liberalization. For many countries, agricultural trade liberalization is expected to affect the country not only in the economic and social fronts but also in the political front.

As such new strategies are, therefore, required to address these challenges. The production of high value-added downstream products, use of nanotechnology, sensor technology, mechanization and post harvest innovations, genetically modified crops and green technologies are some of the major areas that the plantation sector should be focusing in order to sustain its role in the national economic development.

The use of nanotechnology, for example, will assist in the rapid detection of the crop disease and enhance the plants to absorb the nutrients. The use of field robots in the plantation is an area of interest that should be explored. The use of GPS guided tractors and unmanned aircraft system will provide positive financial implications through reduced cost of labour and less wastage thus reducing the cost of production in the long run.
The producers must be always on the move to explore new markets as the number of competitor increases. The downstream activities have to be aggressively pursued to add values to the commodities.

With the rapid expansion of the plantation industry especially in the case of oil palm the majority of the multinational corporations in Malaysia because of the scarcity of suitable agricultural land are now embarking on a new footing by establishing plantations outside the country especially in Indonesia and certain parts of Africa. Managing these plantations of course will require a blended workforce comprising Malaysians, Indonesians and Africans, especially at the managerial positions.

In Malaysia it is rather difficult to attract young graduates to pursue a career as a professional planter. It has been reported that these graduates would not be staying long in the plantation because of the working conditions and the poor social networking. The demand for graduates in this discipline is more critical especially in countries such as Indonesia, Africa, Vietnam and South America where oil palm is aggressively being planted on a large scale by multinational corporations and the government of the respective countries.

In Malaysia, it was reported that in the year 2020 as a result of the increase in the demand of palm oil worldwide seven million hectares of land are required for the cultivation of this crop compared to the present situation as shown in Table 13.

This expansion has resulted in the increase of 1.19 million new workers, 14,200 supervisory staff, 3,550 plantation workers, 7,110 assistant managers and 3,550 cadet planters. It was further highlighted that about 90% of the top plantation executives in Malaysia are aged 52 years and above. To attract the younger generation to become professional planter is a formidable challenge (Ramesh, 2012).
Possessing talented and creative workforce will determine the success or the growth of the plantation sector. Retaining the best people to work in the plantation is rather challenging taking into account the type of social life that they have to face, the location of the plantations, working conditions and the financial incentives received. Because of the lack of interests among the younger generation to be engaged as planters many retired planters are rehired in Malaysia and abroad because of the shortage faced. Young planters seldom stay that long and they will leave the plantation industry if they manage to find a greener pasture elsewhere.

The plantation sector requires global players to meet the challenges of the future. They must be able to think globally, technology savvy, understanding of other cultures, the legal and political implications and possess the interpersonal skills to work in an international environment. In other words, they must be constantly responsive to changes in the physical, economic, and social environments surrounding the plantation agriculture. Since the latter is affected by both controlled and uncontrolled variables, the players must be prepared to react, adapt and think ahead. The pertinent question that arises is that are the human capital developed prepared to address the increasing and ever-changing demands on the agricultural systems? How should the various types of workforce be trained and educated to meet these needs?
In spite of the existence of hundreds of post secondary institutions and universities in these regions (see Table 14), nevertheless the issue of providing the right type of workforce remains unresolved. There is still a problem of mismatch and in some countries it has resulted in the employers to hire skilled and qualified workforce from other countries.

A key step to this end is to reform the institutional systems, curricula and the pedagogy related to agricultural education at all levels of education. The design of the curriculum must take into account not only involving the technical and the non-technical knowledge about the discipline but also the role of the candidates as a responsible citizenship who can play a major role in the society at large.

<table>
<thead>
<tr>
<th>Country</th>
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<tbody>
<tr>
<td>Malaysia</td>
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<tr>
<td>Indonesia</td>
<td>120</td>
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<tr>
<td>Philippines</td>
<td>9</td>
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<td>Thailand</td>
<td>5</td>
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<td>Vietnam</td>
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The involvement of all parties is required in the formulation of the curriculum. The use of the outcome-based education or the capstone approach which is normally used in the design of the agricultural program can be used as a basis for the formulation. Active involvement of the stakeholders is a requirement and the curriculum must be continually being reviewed to meet the needs of the changing situations.
Academics and other supporting staff must be well versed with the needs of the plantations. They should not be working in isolation. Attachment for a specific duration has to be implemented by the policy makers of the institutions they are attached to. Total reliance on the textbooks as teaching materials should not be the order of the day. Good teachers should be able to relate theory and practice and must be able to serve as a resource person in their respective disciplines. In most institutions, team teaching involving partners from the industry has been adopted to provide a comprehensive knowledge of the subject matters to the students. Teachers also should become members of the professional bodies and to be actively involved in the activities of these bodies.

Students should be exposed to the actual plantation needs while they are pursuing the academic programs at their institutions. This will allow them to relate theory and practice. Various mechanisms should be devised by the universities to achieve this target.

Student mobility is a good platform that can be implemented by all the institutions involved in conducting the plantation program either it is at the undergraduate or at the postgraduate levels. This mechanism will allow them to broaden and enhance their knowledge related to the discipline besides establishing a good networking with their counterparts in other institutions both locally and abroad.

One of the major constraints encountered in implementing this activity is the question of funding especially when it involves sending students abroad. University funding is limited and as such external donors especially the major players of the industry in the region should come forward and assist the educational institutions to facilitate the smooth running of this program. Under the present situations, only a small number of students are involved and the duration too is very short. Employees' financial support is crucial to sustain this activity.
Students must be encouraged to do their internship programs related to the plantation abroad. For example, students from Malaysia who wish to be exposed to the new environment how the oil palm plantation is being managed can go either to Indonesia or Africa where they can spend one or more semesters in these countries to explore the relevant technical and non-technical knowledge in a different setting which they may not find in Malaysia. This could be more helpful if the logistic and other issues related to their academic and financial matters can be resolved by the parties involved.

The establishment of regional training centers related to the relevant disciplines based on the crops planted will further enhance the knowledge of the plantation workforce. In the case of oil palm, for example, the crop management is a highly specialized activity. The harvesting of the crop requires the acquisition of necessary skills and knowledge on the part of the harvesters which has a bearing on the wages paid. Knowledge on good agricultural practices has to be constantly updated to keep abreast with current and future development in the plantation sector. The use of ICT will facilitate the transfer of knowledge to the target group.

Many large corporations are establishing their own training institutions to supply the relevant workforce either at the certificate or diploma level tailor made to serve their manpower needs. Some are also aspiring to run courses at the undergraduate levels. While taking this course of actions is laudable nevertheless duplicating the role of the academic institutions is an issue that needs to be addressed because its bearing on the financial resources and the taxpayers monies. There is a possibility that the employment opportunities for graduates from the academic institutions will be greatly affected thus causing a disruption in the labour market. There should be a clear demarcation in terms of the role of the academic institutions and the corporations or agencies involved in training and supplying the human capital for the needs of the industry. Employers or policy makers of the plantation industry should devote their resources in the provision of in-house training designed to increase the productivity
Transformation of The Global Plantations Through Productivity Improvement

of their workforce rather than to duplicate the programs that the academic institutions are supposed to play. The establishment of a professional body either at the national or international level to monitor the conduct of the courses offered will be the best options to ensure that the right workforce are supplied to the labour market.

The availability of the educational resources and infrastructures to support the curriculum is crucial for effective learning. Conducting courses in plantation agriculture are capital intensive and as such adequate financial resources must be made available before conducting the program. Sharing of the resources at the national as well as at the regional level will lighten the financial responsibilities of the affected parties.

RESEARCH COLLABORATION

Active collaborations to enhance research and development activities related to the plantations are vital for this sector to move forward. Steps must be taken to improve the global sharing of the research results. Under the present scenario, although there are numerous players involved in executing these activities, communication is lacking among them. As a consequence we lack knowledge of what others are doing either at the domestic or at the international levels. The outcomes must be disseminated and shared among the users.

There is a need for the research institutions and the universities to strategize the types of research that should be implemented to avoid duplications. Priority research areas must be established. Formulation of policies at the national level through the formation of a research council will set the direction of research to be undertaken at the respective organizations.

The needs of the end users must be given top priority. It was frequently reported that some of the agricultural innovations which are meant to increase work efficiency and productivity for example, are not widely adopted by the end users due to the financial and other
constraints. Representatives of the research council must therefore, incorporate all relevant stakeholders in order to ensure that any new products or findings are feasibly utilized.

With the aging and the declining in the number of the workforce in most of the plantations in Asia and the need to increase efficiency and productivity, employers should therefore, be seriously focusing upon the role of agricultural mechanization and automation to increase agricultural production. Heavy reliance on human labour to execute most of the field operations has to be reviewed because of the scarcity of this resource now and in the future in most countries.

The plantation sector should be treated as technology intensive and not labor intensive. Their perceptions have to be changed in line with the current scenario. New tools and devices must be continuously developed and upgraded and the existing ones replaced to ensure its effectiveness and economic viability because at the end of the day the financial factors are the key determinants for any investment. Research activities are closely related to the financial capabilities of the producers. In the plantation sector the financial allocation apportioned for research is very marginal compared to the returns.

New harvesting tools, tapping device and post-harvest technologies are some of the important areas where the plantations and the institutions of higher learning should be looking at. The expertise of the agricultural engineers, agronomists and the agricultural economists at the universities should be tapped and utilized for this purpose.

Consumers nowadays are very concerned about their health and the environmental issues. Any development and expansion of the plantations through land suitable for cultivation must take note of the possible effects of soil degradation and the environment. The issues of global warming are of great concern to the producers as they may affect the yield and hence the income derived from the
plantation. To address the issue of climatic change there is a need to develop new technologies through the collaborative efforts of the universities and the players in the industry.

The production of plantation crops is mainly affected by the climatic factors, soil types, physical nature of planted area, its variety and the agricultural practices. Unfavourable weather occurrence has become unpredictable, which is a cause for concern. For the majority of the crops especially oil palm not much varietal improvement has been done. Research especially related to breeding is not extensively being undertaken because of the lack of expertise and the same goes for rubber. Till now there is no new variety of oil palm with a shorter plant height that can resolve the issue of harvesting especially in hilly terrain. The continuous search for resistant crop varieties must also be the main agenda on the part of the producers. Again in the case of oil palm for example, no effective control has been devised and formulated to control the outbreak of the Ganoderma disease in spite of its long years of existence.

An international networking of all players involved in the plantation sector is essential to improve global sharing of basic and applied research results. As it is now the private sector is the dominant player that invests in large amounts of R and D that leads to innovations and increased agricultural productivity and sustainable agricultural system. Both the medium and long term solutions must be undertaken to ease the technology transfer and the funding involved. Working together and not competition will enable to identify which policy performance should be improved.

CONCLUSION

The global plantation industry will still play a significant role towards the development of the global economy in the next decades. With the increase in world population, the demand for the plantation commodities and their downstream products will change to meet the changing consumption patterns of the market.
New developments that will occur such as the implementation of the green energy will alter the landscape of the plantation sector. Although the challenges are insurmountable, the issues confronted have to be addressed with the concerted efforts of all the players involved in the industry.

Issues pertaining to productivity improvement, the supply of competent workforce must be the main agenda of the agricultural universities, research organizations and the producers of the plantation commodities. Their commitments will shape the future of the industry. It is the time for them to act now to meet the rapid changes that occur.

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Transformation of The Global Plantations Through Productivity Improvement


Transformation of The Global Plantations Through Productivity Improvement


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His first administrative post was as a Course Tutor in 1978. Thereafter, he was given the responsibilities of holding the posts of Deputy Rector UiTM Perlis, Rector of UiTM Pahang, Rector of UiTM Sabah, Assistant Vice Chancellor of Students Affairs, Deputy Vice Chancellor of Students Affairs and the founding dean of the Faculty of Plantation and Agrotechnology. He was instrumental in the establishment of the International Institute of Plantation Management (IIPM) and served as its first Executive Director when
it was first incepted. He was responsible in the formulations of both the undergraduate and postgraduate programmes in plantation management of the faculty. At present, he is a council member of IIPM, editorial committee of the Incorporated Society of Planters (ISP), a member of MARDI research council and also as a member of the National Council of Professor for the Agricultural Cluster.

His research interest is on the efficiency and productivity of agricultural production. He has published numerous articles and proceedings in seminars and conferences both at the national and international levels. Currently he is involved in the supervision of both the undergraduate and postgraduate levels on top of lecturing at the faculty.
This book provides a brief overview of the global plantations. It highlights the significance and the productivity status of major plantation crops cultivated across the producing countries worldwide. The low crop productivity necessitates the undertaking of positive measures on the part of the producers to increase efficiency in crop production. To run the plantations effectively demands an interplay of all the plantation players comprising the workforce, the plantation companies, trade unions as well as the states. The majority of the corporations involved with the plantation operations are multinational in nature and they control the production and supply chain activities both at the domestic and global markets.

The challenges faced are insurmountable, and to propel the global plantation sector to a greater height, greater collaboration among the producers is a necessity. They should not work in isolation but to work closely for the betterment of the industry. The educational and training institutions must continuously review the curriculum to produce the right product to meet the increasing manpower needs of the global plantations.