# The Malaysian Agricultural Industry in the New Millennium – Issues and Challenges

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**Abstract** Malaysian agriculture is characterized by dualism, *viz.* smallholder's sector with an average farm size of 1 - 2 ha, and the plantation-based estate sector with farm sizes in excess of 500 ha. This dichotomy in agricultural industry placed great economic emphasis on cash crops, namely oil palm, rubber, and cocoa although sizeable acreages of the arable lands are planted with food crops like rice, pepper, fruit orchards, vegetables, and herbs. The industry has evolved from a stereotypic Third World peasantry economic entity to the vibrant third engine of economic growth contributing no less than US$5.63, 6.34, 7.75, and 8.48 billion to the national GDP in 2003, 2005, 2007 and 2008, respectively. Agriculture remains an important part of the national economy in the new millennium for the increasingly burgeoning populace with the challenge to provide both food security and safety, and sustainable development and wealth creation. The primary issues besieging Malaysian agriculture in the new millennium include ensuring food security and food safety for the populace with parallel and determined effort to sustain, and where possible, increase exports of agricultural produce. Albeit the apparent decline of agricultural sector to the Malaysian national economy, agricultural development in Malaysia, faces three major challenges in new millennium, *viz.* (i) Persistence of poverty among the rural farming community; (ii) Food insecurity for the traditional agricultural systems; (iii) Continuing and perennial pressure on the deterioration of the natural resource base; (iv) Labour-intensive plantation agriculture which faces the valgary of foreign labour; (v) Low returns from agricultural investment; (vi) Stagnating prices of commodities; (vii) High costs of land, and (viii) Often volatile market forces. The Malaysian government re-emphasis and renewed interest in agriculture especially for food production principally to off-set the unhealthy trend of steady increase in food imports augurs well in promoting agricultural development in the country. This coupled with the opening of new economic zones in Peninsular Malaysia, Sabah and Sarawak supported by the fledging government-based administrative, research, technical and extension services, and augmented by those in the private sector call for new strategize plans from the view point of natural resources sustainability and environmental safety. The already-in-place New Agricultural Policies serve as the framework for agricultural development in the country in the new millennium. These NAPs were promulgated with the principal thrusts areas: (a) Meeting national food requirements – through large food production by the private sector; (b) Enhancing competitiveness and profitability in agriculture and forestry promoting globally competitive industries in agriculture and forestry, developing world competitive outlook and an export culture; (c) Capitalizing on the product value-chain by reorientation from commodity-based to product-based production and marketing, capital and technology intensive agricultural production system and less labour intensive enterprises as well as cultivation of high-value

crops and forest species; (d) Enhancing the integrated development of the food and industrial crop; (e) Strengthening requisite economic foundation, upgrading quality of human resources, development of indigenous R&D capabilities and technology, namely modern infrastructure, business support services, financing and incentives and an enabling institutional framework; and (f) Adopting and emphasizing sustainable development rules and regulations, and strengthening incentives.

***Keywords***: Malaysian agriculture, food security and safety, export oriented agricultural produce.

*"If there is no man,*
*there will be no woman,*
*if there is no agriculture,*
*there will be no mankind"*
(Baki B. Bakar 2006a)

## THE MALAYSIAN AGRICULTURAL LANDSCAPES

Agriculture and ago-based industry have been the mainstay of the Malaysian economy until the early 1980's when the then Premier, Dr Mahathir Mohammed with his Vision 2020, envisaged Malaysia as a developed industrialized country comes the year 2020. With that vision, agriculture was then labeled as the "sunset industry", sidelined in favour of industrialization. However, agriculture remains an important part of the national economy in the new millennium for the increasingly burgeoning populace with the challenge to provide both food security and safety, and sustainable development and wealth creation. With increasingly burgeoning economy and populace, agriculture then took the backstage roles in the economic development agenda, unparallel even in the industrialized countries of Europe, Japan, and North America. The Mahathir era witnessed the rising of import food bills to the tune and in excess of US$5 billion/year. Such monumental increase in food import bills saw policy makers making u-turns in agricultural development policy *vis-à-vis* industrialization in the post Mahathir era, when the government led by Abdullah Badawi put great emphasis on agricultural development focusing principally on food production in the country to off-set imports.

With this re-emphasis, agriculture and agro-based industry has evolved from a stereotypic Third World peasantry economic entity into the vibrant third engine of economic growth contributing no less than US$5.63, 6.34, 7.75, and 8.48 billion to the national GDP in 2003, 2005, 2007 and 2008, respectively **(Table 1, Figs. 1 & 2).** These were translated as merely 10.3, 8.7 and 9.7% of the GNP in 200, 2005 and 2008, respectively. In the same vein came the repackaging of the New Agricultural Policy (NAP1, NAP2 and NAP3)(Anon ). These NAPs are fine-tuned towards self-sufficiency in food along with parallel increase in cash crops production for export and downstream agro-industrial activities. The dualism in characters of Malaysian agriculture*, viz.* smallholder's

sector with an average farm size of 1 - 2 ha, and the plantation-based estate sector with farm sizes in excess of 500 ha calls for dichotomy in policies of agricultural industry. While the estate-based agriculture placed great economic

**Table 1.** Malaysian agricultural GDP *vis-à-vis* the national GDP (RM billion at constant 1978 prices) (1980 – 2008)*

| Year | GDP | | Agricultural share of National GDP (%) |
|---|---|---|---|
| | National | Agricultural | |
| 1980 | 44.514 | 10.190 | 22.9 |
| 1985 | 57.093 | 11.854 | 20.8 |
| 1990 | 79.329 | 14.826 | 20.4 |
| 1995 | 120.489 | 17.115 | 13.9 |
| 2000 | 143.566 | 18.154 | 10.3 |
| 2005 | 231.034 | 20.018 | 8.7 |
| 2008 | 287.098 | 27.892 | 9.7 |

*** Economic Reports (1980/81, 1990/91; 1994/95; 1999/2000; 2002/2003, 2004/2005; 2005/2006; 2007/2008 Ministry of Finance, Malaysia**

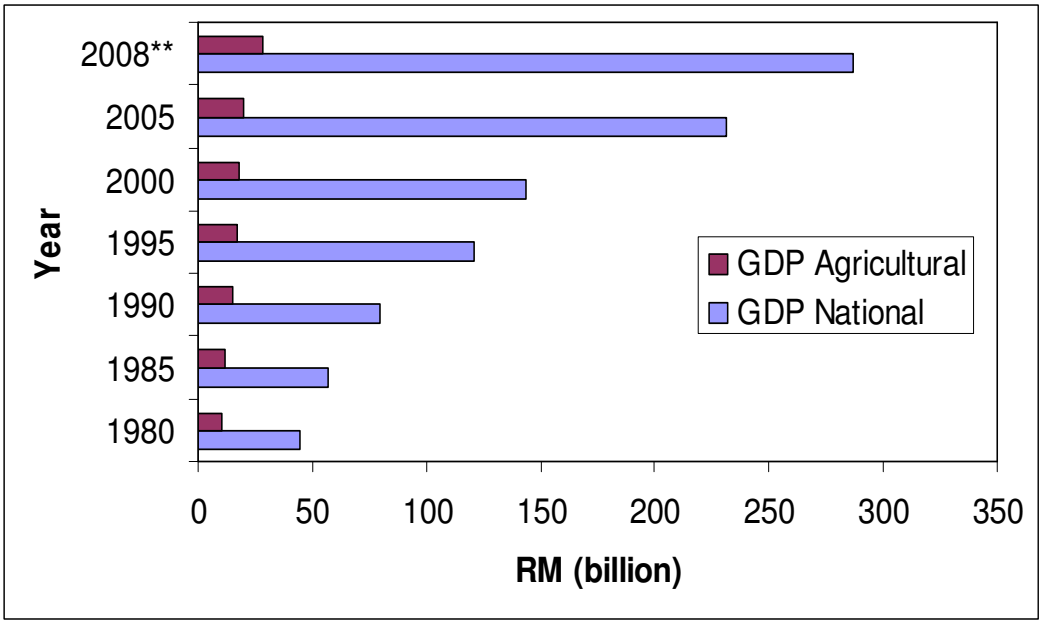


**Fig. 1**. The Malaysian agricultural GDP *vis-à-vis* the national GDP.

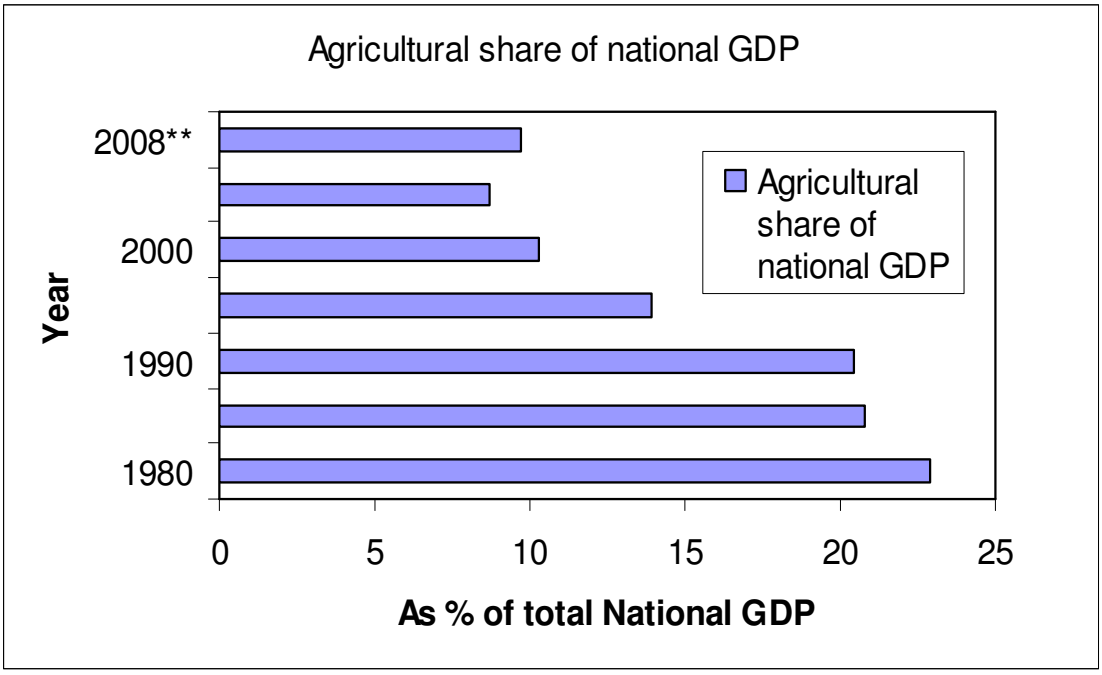


**Fig. 2.** The Malaysian agricultural GDP (%) *vis-à-vis* the % of national GDP.

emphasis on cash crops, namely oil palm, rubber, and cocoa, the small-scale farmers focused principally on sizeable acreages of the arable lands are planted with food crops like rice, pepper, fruit orchards, vegetables, and herbs. The notable exception to this dualistic nature of farming activities that farmers under the Federal Land Development Authority (FELDA) and Rubber Small Industry Development Authority (RISDA) are engaged with a blend of both estate-based agriculture and food production pursuits. Large estates are always at risk from the vagaries of labour supply, while small farms faced the problems of economy of scale in production and profitability. The estates and small-scale farms account for more than 98.5% or 5.78 million ha of agricultural land in the country. The Malaysian farming sector is faced with perennial scarcity of domestic human labour brought about by rural-urban migration and increasingly burgeoning population, and demand by industrial sector for skilled/semi-skilled labour. Such scarcity is augmented by the importation of foreign labour principally from Indonesia, the Philippines, Vietnam, and Bangladesh.

**Table 2 and Fig. 3** show the acreages of major crop commodities in Malaysian agriculture over the years. Invariably, there were gradual increase in areas planted with oil palm, fruits, often at the expense of rubber and cocoa principally, and other crops as well. Changes in the acreages of these major crop commodities were translated into parallel decline in production. For example, in 1990, rubber production was *ca.* 1,292K tonnes valued at RM3,028 million, while the estimated parallel figures for 2008 were 567K tones valued at RM9236 million. The opposite trends were registered for oil palm with production figures

of *ca*. 6,094.6 K and 17,667.1 K tonnes valued at RM4,272 million and RM 31,223 for 1990 and 2008, respectively **(Table 3).**

**Table 2.** Acreages under rubber, oil palm, cocoa, rice, vegetables and fruit orchards ('000 ha) in Malaysia (1990 – 2008)**.

| Year | Rubber | Oil Palm | Cocoa | Rice | Vegetables | Fruit |
|---|---|---|---|---|---|---|
| 1980 | n/a* | 1,000.0 | 123.8 | n/a | n/a | n/a |
| 1985 | n/a | 1,567.0 | 303.9 | n/a | n/a | n/a |
| 1990 | 1,837.0 | 2,029.5 | 393.5 | 400.0 | 26.3 | 167.9 |
| 1995 | 1,727.0 | 2,507.6 | 234.5 | 690.9 | 42.0 | 253.5 |
| 2000 | 1,430.7 | 3,460.0 | 105.0 | 674.4 | 51.4 | 307.6 |
| 2005 | 1,301.5 | 3,100.0 | 105.0 | 611.0 | 77.3 | 385.6 |
| 2008 | 1,211.3 | 3,433.6 | 108.7 | 566.78 | 89.6 | 392.2 |

*n/a – Data not available,
**** Economic Reports (1980/81, 1990/91; 1994/95; 1999/2000; 2002/2003, 2004/2005; 2005/2006; 2007/2008 Ministry of Finance, Malaysia**

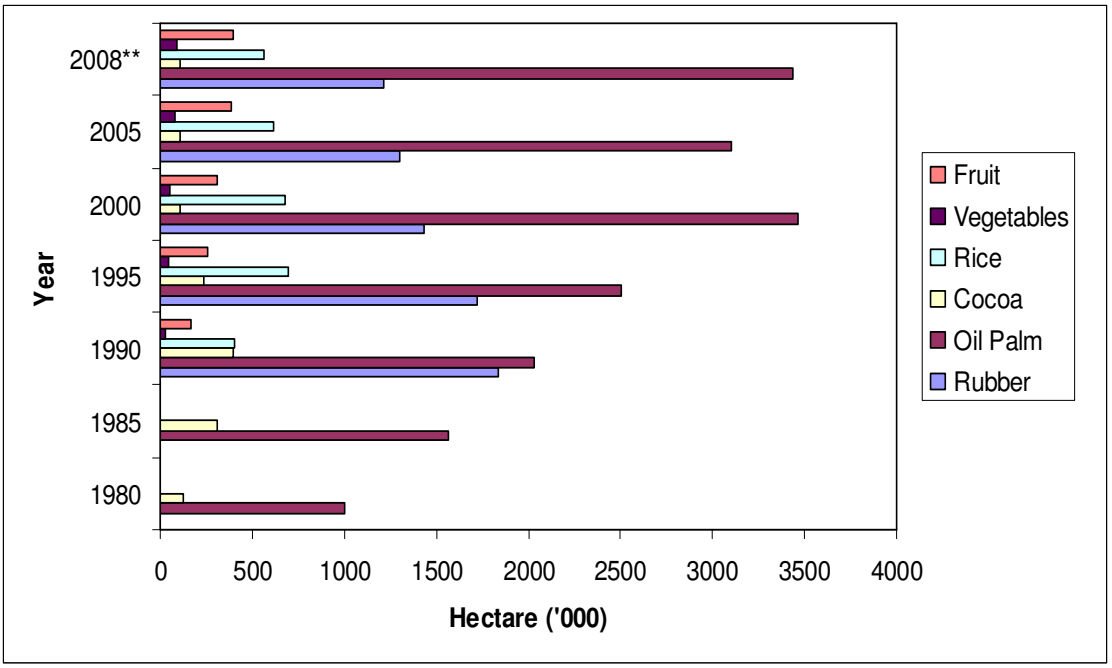


**Fig. 3**. Areas under different major crops in Malaysia (1980 – 2008)

Pesticide use in Malaysia increased from RM289 million in 1995 to RM403 million in 2008 **(Table 4).** Herbicides capture >76% of the total market. This indicates the relative importance of weeds as dominant pests in the Malaysian agriculture as well as reflecting the dependence on herbicides in the country for weed management, principally in estates for the past three to four decades in oil palm, rubber, cocoa, and rice and cereals, vegetable farms and fruit orchards. Such trends of increasing dependence on pesticides for pest management in the Malaysia is a common cause for environmental concern, and with records of parallel increase in incidences of pesticide resistance pests and millennial weeds, while the rightful fear for the possible loss of beneficial organisms, and almost total disappearance of fresh water fish in the rice granaries, and increased environmental pollutions of rivers and waterways (Baki 2006, 2008). The challenge to produce agricultural products that are relatively free from pesticides, especially the use of environmentally-benign pesticides and agrichemicals is part of the concern among policy makers, environmentalists, agriculturalists and agriculturists alike in light of the scarcity of domestic labour supply and increasing dependence on foreign labour.

**Table 3.** Production ('000 tonnes) and export value (RM million) (in brackets) of natural rubber, oil palm, cocoa, and rice (1985– 2008).

| Year | Rubber | Oil Palm | Cocoa | Rice * |
|---|---|---|---|---|
| 1985 | n/a | n/a | 108.0 (600) | 1,626.7 (1,180.7) |
| 1990 | 1,292 (3,028) | 6,094.6 (4,272) | 247.0 (756) | 1,926.4 (1,690.0) |
| 1995 | 1,089 (4,045) | 7,810.5 (11,505) | 131.5 (626) | 2,127.3 (1,755.2) |
| 2000 | 750 (2,100) | 10,553.9 (17,692) | 90.0 (769) | 1,940.0 (1,600.7) |
| 2005 | 556 (8,885) | 15,550.2 (28,673) | 95.2 (989) | 2,122.4 (1,745.1) |
| 2008 | 567 (9236) | 17,667.1 (31,223) | 96.3 (923) | 2,118.9 (3,178.4) |

* Including the government subsidy of RM185/tonnes, net import.

**Table 4.** Pesticides use in Malaysia in RM million (1995 –2008)*

| Year | Herbicides | Insecticides | Fungicides | Rodenticides | Total |
|---|---|---|---|---|---|
| 1995 | 220 | 43 | 15 | 11 | 289 |
| 2000 | 275 | 76 | 25 | 18 | 394 |
| 2005 | 256 | 75 | 23 | 18 | 372 |
| 2008 | 278 | 82 | 26 | 17 | 403 |

* Malaysian Crop Care & Public Health Association (MCPA).

The ensuing discussion focuses on contemporary issues that shaped Malaysian agriculture and agro-based industry in the new millennium. The discussion also focused on New Agricultural Policy (NAP1, NAP2, and NAP3), the education and R & D in Malaysian agriculture. This communication ends with a note on the challenges faced by the industry, and steps taken to overcome such challenges in the new millennium.

## WHAT SHAPES THE FUTURE OF MALAYSIAN AGRICULTURE

Malaysian agriculture, like those in many countries is shaped by several factors, *viz.* (i) Status of the natural resource base, (ii) Climate change, (iii) Extent of land degradation, (iv) Advances in science and technology, (v) Urbanization, (vi) Trade liberalization and commercialization, and (vii) Strategic alliances and international agreements and conventions. These factors would influence agricultural development in the country in a holistic manner, although the effect and intensity of influence of each factor may vary accordingly. Invariably, agricultural development faces three major global challenges in the new millennium: (i) Persistence of poverty and food insecurity; (ii) Globalization and its impact on the eventual transformation of traditional agricultural systems, and (iii) Continuing and perennial pressure on the deterioration of the natural resource base. The agricultural production capacity in Malaysia, in effect, will be tapping three principal sources of growth, *viz.* (i) Expanding the arable land area; (ii) Increasing cropping intensity (mostly through irrigation); and (iii) Boosting yields. This is made possible as Malaysian agricultural landscapes are yet to approach the ceiling for all the three sources at the local scale. However, the intrinsic geopolitical unevenly distribution of available land in Sabah, Sarawak and Peninsular Malaysia coupled with the equally unequal population concentrations in these regions, and locally-mediated consumer demands for agricultural produce and inputs reflect the present state of agricultural development in the country. This present state is echoed by Anon (2003) where enough unused potential farmland at the regional scale, of which only *ca.* 11% (5.78 million ha) of all land is used in crop production. Out of this, *ca.* 36% of the arable land to some degree are suitable for crop production and *ca.* 18.92 million ha of arable land remains with crop production *potential*.

Reflections of the regional- or population-mediated pressure needing the arable land may not have it. This is especially true in the Klang Valley of Selangor and Federal Territories. In several situations, much of the land also suffers from (a) ecological fragility and in hilly areas of steep terrain of Sarawak and Sabah; (b) low fertility in acid sulphate, peat and heavy clay soils; (c) coastal areas prone to flooding and seepage of saline water; (d) toxicity in ex-tin mining land, acid sulphate soils; (e) high incidence of disease as exemplified by ex-pepper land prone to root disease and nematodes; (f) lack of infrastructure in the rural areas of Sabah, Sarawak, Pahang, and Kelantan. Any attempt to ameliorate these problem soils requires high investments to be made accessible or disease-free.

In Malaysia and elsewhere, the general trend in agriculture production is usually towards sustainable intensification, as opposed to dependence on land expansion. Baki (2006a) argued that 80% of increments in crop production in Malaysia come from intensification mediated through higher crop yields, increased multiple cropping and shorter fallow period. The agricultural production programme through intensification is intimately linked with the availability of labour and fertilizer-use efficiency. Labour is a central issue pertaining to the future of agriculture and its ensuing sustainable development. The general trend in Malaysia and elsewhere is towards increasing farm labour scarcities due to rapid migration to urban areas, and increasingly burgeoning populace, demanding better pay and competition for labour by industrial sectors. Invariably it follows that intensification of agriculture adds to labour demand and scarcity. This calls for growing demand for labour-saving technologies.

Baki (2006) suggested three areas that are particularly critical in shapiung the future of Malaysian agriculture, and these include biotechnology, technologies capable of supporting sustainable agriculture, and directions of future research and opportunities for increasing the competitiveness of agriculture in the country *vis-à-vis* the neighbouring countries in the ASEAN in particular and in Asia in general. The employment of a biotechnology tool of genetic engineering (GE) - a technique which allows genes to be transferred from one species to another leading to the production of genetically modified organisms (GMOs) calls for big investments in manpower training and acquiring the technology through innovative research by the locals. The potential GM crops in Malaysia include oil palm (Basta® tolerance), papaya and banana (virus resistance) and rice (IMI Rice)(imidazolinone resistance). In 2003, scientists at the Malaysian Palm Oil Board has successfully produced a GM oil palm using the microprojectile bormbardment method which made it possible to produce oil palm with value added fatty acids and novel metabolites through genetic engineering (Kadir 2003). The rice breeders in the Malaysian Agricultural Research Institute (MARDI) through conventional breeding have produced five imidazolinone tolerant lines purification and evaluation for resistance against the major pests and diseases. The locally developed herbicide tolerant rice (HTR) cultivars are expected to be released to rice farmers in the off-season 2009 or 2010. Further evaluations on yield, agronomic performances and physical and chemical properties of the grain, including nutritive constituents are being made. Our immediate concern is the possible introgression of undesirable genes from HTR cultivars to weedy rices, making the later resistant to imidazolinone herbicides. If this happens, then our weedy rices will become “super-weeds” and the insurmountable problems associated with them are likely to prevail.

Of course the production of GM crops needs to overcome the species barrier and utilization of genetic tools giving GE tremendous power but so controversial not only to consumers but also to the unknown and untold effects to the environment. Moreover, there is a continuous debate and general concern and implications on health, environment, socio-economic, and ethics. Again the Malaysian initiatives on these crops have not to date overcome the socio-economic and ethical barrier that may influence the local and overseas markets for these products.

There are emerging issues associated with GM crops that Malaysia either as an importing consumer nation or a potential producer need to address or be concerned of. These include (i) Coexistence: cultivation of conventional, organic agriculture and GM crops; (ii) Labeling: detection limits and traceability of adventitious presence of GM materials; (iii) Liability and redress: the needs to consider their legal system and relevant international agreements; and (iv) Pharming: production of pharmaceutical products in plants, e.g. vaccines in bananas. In effect, the welfare of farming community together with the consumers at large in Malaysia are affected by the way policy makers and advisors, and funding agencies conduct themselves and their policies with respect to the adherence of an integrated multi-disciplinary research approach in biological sciences including genetic engineering along side conventional breeding and agronomy, but also the socio-economic context where farming occurs. This is where the societal goals of agriculture would have the greatest impact on the society.

Regardless of the emerging technologies and issues associated with sustainable agricultural development in the country hinges very much on future trends and expansion of conservation technologies comprising (i) Good Agricultural Practices (GAP); (ii) Integrated Production Systems; (iii) Integrated Pest Management (IPM); (iv) Integrated Plant Nutrient System (IPNS); (iv) No Till/Conservation Agriculture (NT/CA); (v) Organic Agriculture; and (vi) Urban and Peri-Urban Agriculture.

Two other central factors that may shape the future of agricultural development in Malaysia include irrigation and water availability. These are especially crucial to food production and supplies in Malaysia. The National Water Board envisaged that the states of Perlis, Penang, Selangor, Federal Territory K. Lumpur, Malacca, and Negeri Sembilan may face water shortage in 2030, and this calls for greater efficiency in water use. This is echoed by Baki (2006) who argued that access to water and food security are dramatically linked. In the Klang Valley in Selangor and the Federal Territories, population pressure aggravates the water situation further.

Other important factors that may also shape the future of agricultural development in Malaysia*, inter-alia*, include the continuing urbanization, trade liberalization, and commercialization of agriculture-related activities in the country. The increasingly burgeoning, affluent and urbanized Malaysians require rapid growth in urban food demand; diversification of diets towards high-value food products; transformation of food production and delivery systems, and increased resource competition and conflict for land, water, and labour. Further, trade liberation in world trade hinges very much on binding international agreements, *viz.* WTO Agreement on Globalization and Trade Liberalization; International Treaty on Plant Genetic Resources for Food and Agriculture; International Plant Protection Convention; Rotterdam Convention; Agreement on the Application of Sanitary and Phytosanitary Measures; the Cartagena Protocol on Bio-safety; the Codex Alimentarius, and the Code of Conduct for Distribution and Use of Pesticides. These international agreements would have consequential effects on the way agricultural activities/industries are conducted, including (i) access to, and transfer of plant genetic materials and technologies;

(ii) prevention on spread and introduction and control of pests of plants and plant products; (iii) export and import of hazardous substances; (iv) protection of human or animal life or health from risks arising from additives, contaminants, toxins or disease-causing organisms in foods, beverages or feedstuffs; (v) precautionary approach to protect Malaysia for their biodiversity resources; (vi) protecting the health of consumers and ensuring fair practices in the food trade; and (vii) establishment of Code of Conduct with strict adherence of protocols on the distribution and use of pesticide; although these are already adopted by some pesticide companies. One way to overcome these binding international agreements is to develop a win-win strategic alliances and international agreements and conventions either bilaterally or with trading partners within the contexts of (i) World Trade Organization (WTO); (ii) United Nations Conventions on Biological Diversity (UNCBD);(iii) Climate Change and Combating Diversification (CCCD); (iv) International Plant Protection Convention (IPPC); (v) Rotterdam Convention; and (vi) International Treaty of Plant Genetic Resources for Food and Agriculture.

## NEW AGRICULTURAL POLICY (NAP1, NAP2, NAP3) REVISITED

The New Agricultural Policy (NAP1, NAP2 and NAP3)(1984 – 2010)(Anon 1984, Anon 1992, Anon 1998) inherits its policy framework and development plan from the Green Book Programme (GBP) (1974-1983) (later on renamed as Green Earth Plan) (GEP) launched by Tun Abdul Razak Hussein, the then Prime Minister of Malaysia in 1974. The core objectives of GBP-GEP include increase food production enough for national needs, maximization of land use through estate farming; encourage full participation by farmers in planting short-term food crops, alternated with maize, sorghum, ground nuts, other food crops; encourage rearing of chickens, ducks, cattle, goats, sheep & fresh water aquaculture; and national saving of US$200 million/year of vegetable imports. These objectives are met through several steps of implementation, *viz*. (i) activity focus on land use, crops planted and target production/yields; (ii) coordinated effort at village level through Department of Agriculture, FAMA, Small holders Rubber Industry Development Authority (RISDA), and Farmers Association Authority (FAA); (iii) upgrading marketing strategies through the Federal Agricultural Marketing Agency (FAMA), and other agricultural agencies; (iv) progress and implementation monitored by District Action Committee up to the state level; and (v) National Green Book Secretariat to monitor progress at national level.

Principally, the NAPs are the guiding principles for Malaysia to stay competitive in the agriculture and agro-based industry while providing food security at affordable price for the populace, albeit burgeoning in their socio-economic status.

**NAPs – Focus.** While NAP1 focuses on (i) commercialization of farming activities; (ii) greater emphasis on food sufficiency; (iii) restructuring of Agricultural Bank, FAMA, and Farmers Association Authority, MARDI; (iv) opening up more Integrated Agricultural Development Projects (IADP); and (v) opening up new land & *in-situ* rehabilitation of existing farm lands, the NAP2 and

NAP3 focus on (i) food security and food safety (food scarcity) (FSFS); (ii) increase efficiency of food & commercial cash crops productivity; (iii) growth and development of downstream agro-based industries and job creation to augment inter-sectorial growth; and (iv) liberalization policy for equity investment by foreign investors. It is imperative to highlight here that the NAPs were meant to complement and to be implemented in tandem with the other development policies such as *The National Development Policy, The Second Industrial Master Plan, The Science and Technology Policy,* and the *National Biodiversity Policy* in the national economic development for global competitiveness and better quality of life towards its developed status in 2020.

**NAPs – Aims and Objectives.** The principal aims of the NAPs are multi-facets with the provision of sustainable good forestry and agriculture practices, human resource development including in new and emerging areas of agricultural sciences as well as professional farm managers for large-scale farming enterprises. These NAPs are private-sector driven while the public-sector would facilitate and enhance the delivery of support services required. Further, the NAPs also aimed at maximization of income through the optimal utilization of resources in the sector including maximizing agriculture's contribution to national income and export earnings as well as maximizing income of producers. Among the objectives of the NAPs include the (i) development of new agricultural industries and products from primary commodities and natural resources through R&D; (ii) development of new high value products from agricultural commodities as well as agricultural waste and by-products, creating new markets; (iii) increase in export earnings; (iv) integration of agro-forestry development; (iv) increase in the production of major food products to enhance food security and better food quality at affordable prices; (v) enhancement of food security for the populace and the nation; (vi) increase productivity and competitiveness of the sector, while at the same time (vii) deepen linkages with other sectors; (viii) create new sources of growth for the sector, and (ix) conserve and utilize natural resources on a sustainable basis.

**NAPs – Policy Thrusts and Approaches**. In the formulation of the NAPs, several key policy thrusts were highlighted so as not to deviate from the main targets as envisaged by policy makers in the government. These policy thrusts include, *inter-alia*, include (a) meeting national food requirements or food security through large food production by the private sector; (b) enhancing competitiveness and profitability in agriculture and forestry promoting globally competitive industries in agriculture and forestry, developing world competitive outlook and an export- oriented culture; (c) capitalizing on the product value-chain by reorientation from commodity-based to product-based production and marketing, capital and technology intensive agricultural production system and less labour intensive enterprises as well as cultivation of high-value crops and forest species; (d) enhancing the integrated development of the food and industrial crop subsectors-resources such as land, labour and waste as well as by-products can be exploited. Need enhancement of R&D in waste and by-product utilization and commercialization of these R&D findings; (e) strengthening requisite economic foundation- up-grading quality of human resources, development of indigenous R&D capabilities and technology such as

IT, modern infrastructure, business support services, financing and incentives and an enabling institutional framework; and (f) adopting sustainable development-rules, regulations and incentives to be strengthened with emphasis on R&D on appropriate technologies.

The approaches outlined in the NAPs must be in tandem with meeting the aims and objectives. As such the agro-forestry approach aimed at addressing scarce resources like land and raw materials, and at the same time the product-based approach to support and compliment the cluster- based agro-industrial development as identified by the Second Industrial Master Plan, strengthening inter- and intra-sectorial linkages including development and expansion of intermediate and supporting industries.

## AGRICULTURE-RELATED MINISTRIES AND AGENCIES

There are four minisries at the federal level that deal with agricultural developement in the country. These include the Ministry of Agriculture and Agro-based Industry, Ministry of Plantation Industry, Ministry of Regional and Rutrla Development, and Ministry of Natural Resources nad Environment. These ministries are supported by the Miniitry of Science, Technolgy and Innovation for research and development while the Ministry of International Trade and Industry are involved in the international marketing of the agro-produce. Each ministry has several agencies that deals with the implementation of government development programmes and policies from research to extension activities. For example, the Malaysian Agricutural Research and Development Institute (MARDI) deals with all aspects of research and development for all crops and animals except, rubber, oil palm, pepper and cocoa. The Malaysian Palm Oil Board copncentrates on research and developement of the oil palm industry in the country. On top of these the government link companies and public-funded agencies also deal with on-going crop-based development of the industry. The former is best exemplified by Sime Darby Plantation, while the later by the Federal Land Developement Authority (FELDA) or the Federal Land Rehabilitation and Comsodilation Autority (FELCRA).

## AGRICULTURAL EDUCATION, GAP, AND R & D IN THE MALAYSIAN AGRICULTURE

Agricultural development in Malaysia started long before the coming of European colonizers. For example, Wan Mat Saman started the initial irrigation and drainage networks for rice planting in early 1800's in northern state of Kedah. The irrigation and drainage canals serve dual purposes for agricultural activities and transport. The ensuing progress in agricultural development was due to proper planning by the ruling government since independence in 1957. This planning and execution of the development plans, otherwise known as Malaysian Development Plan 1 through Malaysian Development Plan 9 (RM1 – RM9). The initial development plans focused on opening up new lands for the landless, known as the Federal Land Development Authority (FELDA), soon to be followed

by the setting up of other land development agencies such as FELCRA, RISDA, SELCRA, SALCRA, etc.

Serious scientific research in agriculture started in late 1900's with the planting of rubber by R. N. Ridley ad his team, and the planting of oil palm in big scale in early 1970's. Research on food crops focused initially with the development of new rice varieties by Dept. of Agriculture in 1960s, and by MARDI from 1970s onwards. Planters in Harrison and Crosfield, Sime Darby, Golden Hope, Guthrie, etc. started agronomic research and development of high yielding rubber clones in Chemara Research Station and Prang Besar Research Station, among others. The Rubber Research Institute of Malaysia (RRIM) and Palm Oil Research Institute of Malaysia (PORIM) played pivotal roles in the scientific development of rubber and oil palm as leading cash crop commodities in the country .Research on food crops focused initially with the development of new rice varieties by Dept. of Agriculture in 1960s, and by MARDI from 1970s onwards. Research activities on other crops like cocoa, coconut, pepper, vegetables and fruits follow suit

**Agricultural Education.** There are 24 public and government-funded private universities and university colleges in Malaysia but only a handful of them offer courses related to agriculture, forestry food science, and veterinary medicine, while 6 Agriculture institutes and 78 Secondary Agricultural Vocational Schools Offering certificate courses in agriculture, food science, and veterinary medicine. The public universities offering forestry, agricultural engineering, agriculture- and food-science related courses at the diploma, BSc, MSc, PhD levels include Universiti Malaya, Universiti Sains Malaysia, Universiti Putra Malaysia, Universiti Kebangsaan Malaysia, Universiti Malaysia Sabah, Universiti Malaysia Sarawak, Universiti Malaysia Trengganu, Universiti Malaysia Kelantan, and Universiti Teknologi MARA.

**Good Agricultural Practice (GAP).** A central issue in the chartered development of agriculture in Malaysia is the need for sound scientific research programme from basic agronomic and horticultural levels to state-of-the-art technological advancement in biotechnology and engineering. This is only made possible through research and with the implementation of the Good Agricultural Practice (GAP) (Fig. 4) by the agriculturalists and agriculturists, policy makers and extension agents. This is especially crucial for export-oriented crops meeting not only the standards of importing countries and their consumers but also for the local populace in terms of food safety and food security in line with the need to preserve the environment for sustainable development of the agriculture and agro-based industry.

A strong commitment to the GAP both in concept and in practice in the overall development in Malaysia is exemplified by a government link agency, the Sime Darby Plantation. This commitment is manifested by strong adherence to safety standards to ensure sustainable development and environmental safety by the way its plantation business is run by Sime Darby Plantation. To ensure sustainability of its business, Sime Darby Plantation implements good agricultural practices covering all aspects of (i) Land Management; (ii) Water Management; (iii) Zero Burning Replanting Technique; (iv) Integrated Pest

Management; (v) Palm Oil Mill Effluent Treatment System; (vi) High Conservation Value Forests In The Estates; (vii) Biodiversity; and (viii) Quality Assurance.

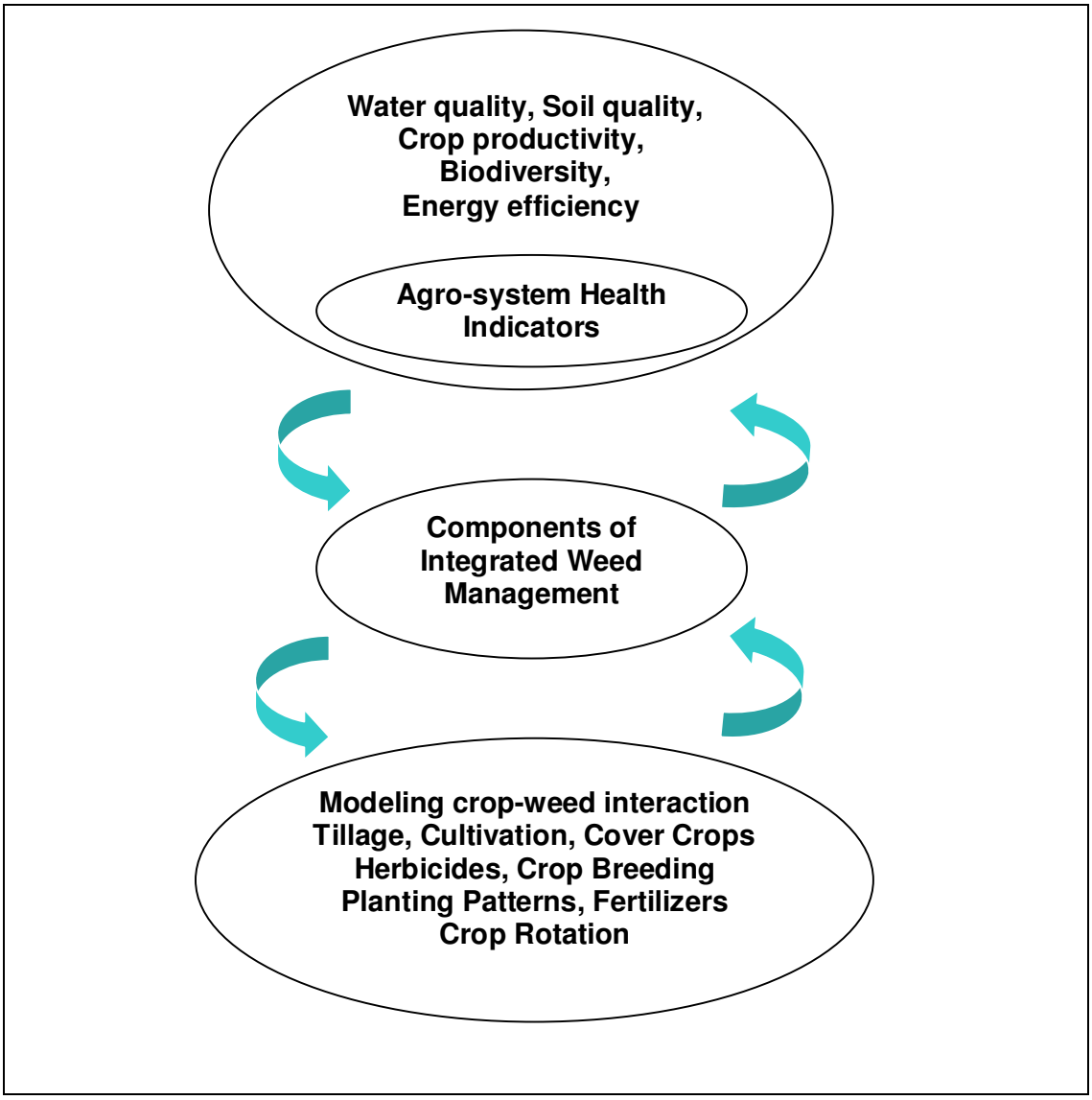


**Fig. 4.** Components of Good Agricultural Practice in modern agriculture (Baki 2006b)

**Agricultural development Under Malaysian Development Plans.** Interestingly agriculture gets a reasonable amount of developmental budget since the First Malaysian Developmental Plan (MDP1)(1966-1970). For example, in MDP2 and MDP 3, the allocation for agricultural development amounted to RM RM8,747.68 million of which RM4,849.30 was for land development, irrigation and drainage, replanting of tree crops like rubber, oil palm, cocoa, etc. Research

activities and funding were principally parked at MARDI (RM500 million), Palm Oil Research Institute (PORIM, RM220 million), and Rubber Research Institute of Malaysia (RRIM) with RM275 million allocation.

Measurable progress was recorded for the MDP2 and MDP3 with value-added growth of *ca*. 4.3% p.a. contributing no less than 22.2% to GDP in 1980, and 35.5% of GDP from the export of agricultural produce. About ew Jobs: 352,300 new jobs were created or 20.8% new employment opportunities for the decade, mostly from FELDA, FELCRA and State land Development Schemes. Replanting of rubber and other crops amounted to *ca.* 302,900 ha with rubber by RISDA, Sabah Rubber Fund Board and the Sarawak Land Consolidation and Rehabilitation Authority (SALCRA). About 8,000 ha replanted with coconut and 7,000 ha with pineapple, while FELCRA rehabilitated 10,3000 ha of rubber and padi. For the same period 31 palm oil mills were commissioned by FELDA and FELCRA.

With almost similar budget allocation in the MDP4, ensuing progress in agricultural development were recorded in the country. These were exemplified by 1,427,500 ha was developed for mixed cropping and diversified farm activities for 445,045 families; 141,500 ha for replanting by RISDA; 8,300 ha for cocoa and coffee, FELCRA and SALCRA rehabilitated 60,700 ha for oil palm and cocoa. The sate land development schemes developed no less than 240,00 ha for oil palm & rubber, cocoa and other crops.

The MDP5 saw a slightly bigger allocation of RM7,807 million for agricultural development was given. The parallel figures for MDP6, MDP7 and MDP8, and MDP9 were RM8,894.3 million, RM8,286.9 million, RM7,860.0 million and RM11,435 million, respectively. In terms of growth performance or expected growth performance, the MDP8 registered valued-added growth increase of the agricultural sector by 1.2% p.a., principally from oil palm at 7.9% with contribution to NGDP by 10.3% (1995) and 8.7% (2000) valued at RM11.7 billion (1995) and RM10 billion (2000), respectively. The sector contributed about RM21.6 billion (1995) to RM22.9 billion (2000) principally from oil palm in export. The sector also consumed labour by 1.5 million (1995) with a slight drop in 1.4 million (2000). The land use increased from 5.7 million ha (1995) to 6.0 million ha (2000) principally for oil palm , rubber, pepper, tobacco, vegetables, fruits in Sabah and Sarawak. Land conversion *ca.* 430, 000 ha rubber/cocoa farms converted to oil palm and other uses. The discrepancy in export versus import of food items widens with export increasing marginally by 8.7% from RM4.4 billion (1995) RM6.6 billion (2000), while imports increased from RM7.8 billion (1995) RM13 billion (2000).

In MDP9, the expected growth of the agricultural sector in terms of value-added growth, contribution to national GDP and exports are as follow: the valued-added growth of agricultural sector increased 3.0% p.a. with contribution to NGDP at 8.7% (RM16.9 billion) in 2000 and 8.2%(RM38.7 billion) in 2005. The export value increased by 8.7% p.a. at RM45.58 billion (2000) to RM115.65 billion by the end of MDP9 in 2005.

Tables 5 and 6 show the budget allocations and value-added growth of the agricultural sector for the MDP8 and MDP9 in Malaysia. The progress and

expected progress in land development and consolidation and rehabilitation in MDP8 and MDP9 of Malaysia is shown in Table 7.

**Table 5**. Budget allocations and NGDP to consumers in the Agricultural and Agricultural-based Industries in MDP8 and MDP9 of Malaysia*.

| Commodity | Allocations (RM million) | | |
|---|---|---|---|
| | 2000 | 2005 | 2010 |
| Agriculture | 16,662 | 21,585 | 27,517 |
| Agro-based industry | 13,584 | 16,928 | 22,221 |
| Total | 30,246 | 38,513 | 49,738 |
| NGDP to Consumers | 210,558 | 262,029 | 351,297 |

* Agricultural Statistics, Min. of Agric & Agro-based Industry, Malaysia (2007)

**Table 6.** Value-added growth from the agricultural and agricultural-based industries in MDP8 and MDP9 of Malaysia.

| Commodity | Export value (RM million) | | |
|---|---|---|---|
| | 2000 | 2005 | 2010 |
| Agricultural export | 22,892 | 37,421 | 54,992 |
| Agro-based industry export | 24,086 | 37,442 | 60,060 |
| Total (agric & agro-based) | 46,978 | 74,863 | 115,052 |
| Total export | 373,270 | 533,790 | 803,163 |

* Agricultural Statistics, Min. of Agric & Agro-based Industry, Malaysia (2007)

**Table 7**. Progress and expected progress in land development and consolidation and rehabilitation in MDP8 and MDP9 of Malaysia*.

| Programme | 8MP | | | 9MP | |
|---|---|---|---|---|---|
| | Target** | Achievement** | % | Target | % |
| Replanting | 306,010 | 237,603 | 77.6 | 383,010 | 78.9 |
| Consolidation & Rehabilitation | 50,640 | 31,332 | 61.9 | 102,663 | 21.1 |
| Total | 356,650 | 288,935 | 75.4 | 485,673 | 100.0 |

* Agricultural Statistics, Min. of Agric & Agro-based Industry, Malaysia (2007)
** In hectares.

## ISSUES IN MODERN MALAYSIAN AGRICULTURE

Malaysian agriculture is at the crossroads. While there is the need to modernise agriculture, the prevailing dualism in Malaysian agriculture, where the needs for small holders' agriculture may differ from those large-scale farming of the estates, the government-promulgated NAPs need to cater for both. Despite facing with the vagaries of labour supply, agriculture remains an important part of the national economy in the new millennium for the increasingly burgeoning populace with the challenge to provide both food security and safety, and sustainable development and wealth creation. The primary issues besieging Malaysian agriculture in the new millennium include ensuring food security and food safety for the populace with parallel and determined effort to sustain, and where possible, increase exports of agricultural produce. Albeit the apparent decline in contribution of agricultural sector to the Malaysian national economy, the development of agriculture in Malaysia, faces three major challenges in new millennium (i) Food Scarcity and Food Security (FSFS); (ii) Agricultural Sustainability; and (iii) Environmental Health. More importantly, the apparently perennial overriding concern of prime importance arising from the above include (i) How do we feed the increasingly burgeoning populace from domestic sources of food yet attaining sustainability in production and maintaining environmental health? (ii) How does Malaysia divorce itself from increasingly dependent on food

imports? To the producers and farmers, the relevant question would be: How do we increase productivity and profit without incurring extra production cost? The environmentalists and nature lovers, they would pose question such as "How does sustainability in food production affect environmental health?" The answers to these questions and related issues may impact the ensuing development and progress in agriculture in Malaysia.

**Specific and Underlying Issues - Trends and Reality.** For many emerging industrialized nations like Malaysia, it is disturbing to note that food scarcity and food security are synonymous with 21st century agriculture. This notion is fortified by Malaysia's monumental import food bills in excess of RM15 billion annually, and is synonymous with the lingering concern for FSFS to feed the growing populace. The need for intensification of agriculture due to increasingly limited arable land is growing with parallel population growth. With intensification come the continuing pressure on, and the deterioration of natural resource-base. Some of the current issues facing Malaysian agriculture in general and pest management practices in particular include increased (i) problems environmental pollutions due to wide spread use of agrichemicals; (ii) incidences of the herbicide-resistant and noxious millennial weeds; (iii) water shortage; (iv) technology divide between the plantation-based sector and the small farmers. Together these disturbing trends will have lasting impact on the socio-economic well-being of the farming community and consumers alike.

As a trading nation, Malaysia imports no less than RM15 billion worth of food annually and this of course impacts negatively on the balance of trade. Insufficient and inconsistent production of the food items is construed as a primary reason for this high import food bills. Another teething issue facing Malaysian agriculture especially on food items meant for the export markets such aquaculture and animal products, vegetable and fruits, is the need to meet quality standard for international markets. At the local fronts, the increasingly burgeoning population with the parallel increase in per capita income and awareness of a balance diet and health consciousness of people changing taste and food preferences would mean the need for adequate supply of safe, nutritious and high quality food at affordable prices, and this high demand may lead to high food prices. Moreover, with the intensification in agriculture comes the need for affordable labour. Malaysia faces acute labour shortage leading to employment of and to certain extent dependent on foreign workers, another indirect way of loss of foreign exchange. The low labour productivity of only 60% compared to the manufacturing sector is another disadvantage of the agricultural sector. This is very real among smallholders' sector which experienced low labour productivity and uneconomic farm sizes. Because of this lack of domestic production plus inconsistent supply caused small and medium scale agro-based firms operating below capacity, there is a need to strengthen inter- and intra-sectorial linkages with the support of downstream industries. If this scenario of the economic scale and low labour productivity of small- and medium-size farms can be improved, augmented by the strengthened inter- and intra-sector linkages with the support of downstream industries, the present exports consisting mainly of primary and intermediate products and high import of raw materials for food

processing industries, and limited development of high value-added resource-based products can be turned into highly profitable agriculture inline with the as echoed by Baki (2006a) that “Agriculture is business, and it is profitable”. As with any business marketing promotion of Malaysian products both for domestic and foreign markets is a continuous process.

Diminishing suitable agricultural lands is inevitable. This is even so pressing with increasing population growth competition for land is a common phenomenon worldwide including Malaysia. While we have the common scene of agricultural lands being converted to industrial, residential and urban uses, there is this perennial problem of idle agricultural land and abandon holdings in the country. Land in Malaysia is under the jurisdiction of the state. Under the present political climate and essentially bipartition politics or real politic, there is always this political innuendos when comes to land issues between the federal government at one end, and the sate governments on another. For those intending to acquire land for agricultural venture at commercial scale, the slow process in acquiring land is antithesis to this effort, not forgetting the financial constraints of such acquisition may pose. The environmental concerns and the need for more efficient agricultural and forestry practices for sustainable development of the sector are no less important.

At the global scale, the very existence of WTO and AFTA, for which Malaysia is a signatory to both free trade frameworks among trading nations of today, greater competition for increasingly competitive markets are the rules of the game that Malaysian farmers are subjected to. Disguised as preferential tariff schemes coupled with the discriminatory tariff and non-tariff barriers among trading blocs worldwide, Malaysian farmers are at a disadvantage unless the government pump in funds to help small- and medium-scale farmers to compete to market their produce at competitive prices.

**Intrigues and Challenges.** In a democratic dominion like Malaysia, the most appropriate question being asked by man in the street is the context of FSFS, “Is there a choice for the hungry and destitute”? In the same vein, “Does the responsible government of increasingly globalized world channel enough funds to upgrade and modernize agriculture to produce not just enough but surplus food so that hunger and famine will no longer haunt our populace despite signs of prosperity and burgeoning economy in Malaysia”? Encountering FSFS in Malaysia over the next two decades will depend on (i) Emphasis placed on agricultural research; (ii) Dynamics of change and advances and development made in science and technology; and (iii) Economic policy reforms. It is only expedient that policy makers, agriculturalists and research scientists both in the government and private sectors should set research directions in agricultural science in the country so as to generate knowledge-based and systems approach-based decision, at least in principal economic crops, and most importantly on security food crops like rice and other cereals, vegetables, animal and aquaculture so as to meet the needs of FSFS. It is equally important that those in the corridors of power and influence and the technocrats realize soon enough of the sheer need to strategize the development of effective agricultural management entails full understanding of the fundamental relationships between agronomic practices, water management and crop care, and management of

pests, weeds in Malaysian agricultural systems. These endeavours require strong will among policy makers and agricultural scientists by strategizing action plans by ensuring food security for the populace.

## REFERENCES


Anon (1984*). National Agricultural Policy 1*. Ministry of Agriculture, Malaysia.

Anon (1992*). National Agricultural Policy 2*. Ministry of Agriculture, Malaysia.

Anon (1998). National Agricultural Policy 3. Ministry of Agriculture, Malaysia.

Anon (1980/81). *Economic Reports.* Ministry of Finance, Malaysia.

Anon (1990/91). *Economic Reports.* Ministry of Finance, Malaysia.

Anon (1994/95). *Economic Reports.* Ministry of Finance, Malaysia.

Anon (1999/2000). *Economic Reports.* Ministry of Finance, Malaysia.

Anon (2002/03). *Economic Reports.* Ministry of Finance, Malaysia.

Anon (2004/05). *Economic Reports.* Ministry of Finance, Malaysia.

Anon (2007/08). *Economic Reports.* Ministry of Finance, Malaysia.

Anon (2007).*Agricultural Statistics*, Ministry of Agriculture & Agro-based Industry, Malaysia.

Anon 2008. Malaysian Crop Care & Public Health Association (MCPA) Annual Report.

Baki B. Bakar (2006a). *Shaping the Future of Agriculture and Weed Science to Serve Humanity.* Inaugural Professorial Lecture, University of Malaya 2006.

Baki, B. Bakar (2006b). *Shaping the Future of Weed Science to Serve Humanity.* University of Malaya Press, Kuala Lumpur, 183 p.