

# Third National Agricultural Policy (1998 - 2010) Executive Summary

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## Introduction

**1** This document outlines the Third National Agricultural Policy (NAP3) which sets the strategic directions for agricultural and forestry development to the year 2010. This policy has been formulated to ensure that the capability of the agricultural sector's strategic role in national development is sustained and enhanced in light of new and emerging challenges facing agricultural development. Towards this end, NAP3 will focus on new approaches to increase productivity and competitiveness, deepen linkages with other sectors, venture into new frontier areas as well as conserve and utilise natural resources on a sustainable basis. The policy aims to set in place the enabling and supportive measures as well as a conducive environment to promote growth in the agricultural sector. The policies and strategies formulated will continue to emphasise productivity and market driven growth.

## Background

**2** The implementation of the previous two National Agricultural Policies since 1984 has enabled the agricultural sector to attain a growth rate of 3.2 per cent per annum for the 1985-1995 period. In absolute terms, the total value-added of the sector increased from RM11.9 billion in 1985 to RM16.2 billion in 1995. The relative contribution of the sector to employment generation and export earnings, however, declined from 31.3 per cent and 36.7 per cent in 1985 to 19 per cent and 19.2 per cent in 1995 respectively. Oil palm, sawlogs and fisheries remained as the major contributors to the sector's growth. The share of agricultural industrial commodities to total agricultural value-added declined from 72.1 per cent in 1985 to 71.6 per cent in 1995 while that of food commodities increased from 24.1 per cent to 26.7 per cent for the same period.

**3** Structural changes in the economy have brought forth new issues and challenges in the agricultural sector in particular acute labour shortage, limited availability of suitable land and increasing cost of production arising from intersectoral competition for resources as well as intense competition in the global market resulting from trade liberalisation.

**4** The recent financial crisis in the country and the region resulting from the further liberalisation of the financial market has made the currency market highly vulnerable to speculation. The volatility and resultant decline in the exchange rate of the Ringgit vis-à-vis major currencies has negatively affected the stability and security of the country's food supply. This instability and insecurity, if left unchecked, can have serious economic, social and political implications.

## Issues and Challenges

**5** The country's food import bill is continuously increasing. Total food imports has increased from RM3.5 billion in 1985 to RM7.7

billion in 1995 and RM 10.0 billion in 1997. The instability and volatility of the exchange rate has put a strain on Malaysia's foreign exchange reserves and has led to imported inflation.

**6** The high demand for food has led to increases in food prices. In 1997, increased prices of food accounted for 51.9 per cent of the increase in Consumer Price Index (CPI). This was 28 percentage points higher than in 1991, when increase in food prices only accounted for 38.4 per cent of the increase in CPI. In addition, increasing per capita income and awareness of a balanced diet and health consciousness of the populace will also bring about changing tastes and preferences for food. Thus, there is a need to ensure adequate supply and accessibility of safe, nutritious and high quality food at affordable prices.

**7** There is now acute shortage of labour leading to high employment of immigrant workers in agriculture and forestry sectors. Due to this shortage, it is estimated that about 300,000 hectares of rubber holdings are untapped and 30,000 hectares of oil palm are not fully harvested. Productivity gains in agriculture have also not matched up to increases in factor prices. Currently, labour productivity in agriculture is only about 60 per cent of the labour productivity in the manufacturing sector. This necessitates measures to reduce labour requirement in agriculture and increase labour productivity.

**8** The smallholder sector continues to experience problems of low productivity and uneconomic size of holdings. Labour shortages and low commodity prices have further led to substantial idle agricultural land and abandoned holdings. It is estimated that there are about 400,000 hectares of idle agricultural land. In addition, land for agricultural activities is becoming more limited owing to conversion for other uses such as industrial, residential and urban uses.

**9** The implementation of the agreements under the World Trade Organisation (WTO) and the Common Effective Preferential Tariff (CEPT) Scheme of the ASEAN Free Trade Area (AFTA) has created greater competition for Malaysian agriculture. Main export commodities such as rubber and palm oil face increasing competition from emerging lower cost producers and continue to face discriminatory tariff and non-tariff barriers.

**10** The development of high value-added resource-based products is still limited and exports mainly consist of primary and intermediate products. Seventy per cent of the total raw materials used in the food processing industries are imported. Lack of domestic production coupled with inconsistent supply resulted in many small and medium scale agro-based firms operating below capacity. There is a need to further strengthen inter and intra-sectoral linkages especially with support and downstream industries.

**11** Finally, concerns for the environment at both domestic and global levels require more innovative and efficient agricultural and forestry practices for the sustainable development of the sector.

## The Third National Agricultural Policy (NAP3)

**12** The growth of the agricultural sector requires that the nation address the challenge of efficient and optimal utilisation of existing

resources in order to further improve its competitiveness. Resource constraints and rapid changes in the global trading and investment environment necessitate the development of a resilient agricultural sector and the enhancement of its global competitiveness. In addition, the concern over the availability and stability of food supply requires that the nation to strengthen its competitive capabilities in food production. These challenges require new strategic approaches and policy thrusts to enhance the economic contribution and growth of the agricultural sector.

## Objectives

**13** The overriding objective of NAP3 is the **maximisation of income** through the optimal utilisation of resources in the sector. This includes maximising agriculture's contribution to national income and export earnings as well as maximising income of producers.

**14** Specifically, the objectives of the Policy are :

- i** to enhance food security;
- ii** to increase productivity and competitiveness of the sector;
- iii** to deepen linkages with other sectors;
- iv** to create new sources of growth for the sector; and
- v** to conserve and utilise natural resources on a sustainable basis.

## Macroeconomic Framework

**15** During the NAP3 period, the sector is expected to achieve a growth rate of 2.1 per cent per annum. The contribution of the agricultural sector to Gross Domestic Product (GDP) is expected to further decline from 13.5 per cent in 1995 to 7.2 per cent in 2010. Contributions to total agricultural value-added from rubber, cocoa and sawlogs are expected to decline while contributions from oil palm and food commodities are expected to increase. New sources of growth are expected to emerge in agriculture resulting from various initiatives to promote new products and emerging industries such as agroforestry, biotechnology products, specialty natural products, bamboo and rattan, floriculture and aquarium fish.

**16** Total workforce in agriculture will decline from 1,524,000 workers in 1995 to 980,000 workers in 2010. With the current land and labour shortages and increasing cost of production, it is envisaged that future expansion in hectarage would be limited during the plan period. Therefore, the increase in output will emanate mainly from increasing productivity. Labour productivity is expected to increase from RM10,650 per worker to RM22,780 per worker within the same period. This reflects the emphasis given to labour-saving technology, innovations and more efficient farm management practices.

**17** NAP3 will continue to pursue agricultural growth through moderate expansion of land and further intensification of land use. There will be substantial reduction in the rubber and cocoa areas. Rubber, paddy, coconut and cocoa holdings are expected to be reduced by 505,000, 220,000, 70,000 and 60,000 hectares respectively. Most of these areas will be replaced by agroforestry, oil palm, fruits and vegetable cultivation. In Sabah and Sarawak where there are substantial land area, new land development will be

undertaken. As such, land utilisation for agriculture during the plan period is expected to marginally increase by about 0.5 per cent per year from 5.8 million hectares to 6.2 million hectares.

## Strategic approaches and policy thrusts

**18** Increasingly scarce resources including land availability requires a strategy that optimises resource usage for agricultural and forestry development. Towards this end, an agroforestry strategy to integrate agriculture and forestry development outside Permanent Forest Estates (PFEs) is adopted for NAP3. This agroforestry approach views agriculture and forestry as mutually compatible and complementary and therefore provides a scope for joint development that can bring about mutual benefits. The approach will bring about a larger productive base for agriculture and forestry, allow for a wider range of agroforestry enterprise mix, optimise resource utilisation, particularly land outside the PFEs and enhance the income generating potential of agroforestry investments. The agroforestry approach will, thus, enable policy formulation to address resource constraints such as land and labour.

**19** Consumers world-wide are increasingly demanding products that are more specific to their needs and preferences. They are now accessible to information technology which supports their ability to seek, identify and procure these products. Current commodity-based strategies limit the effectiveness to serve markets that are of higher value and more segmented. This requires a new orientation for agricultural development to serve the needs of these markets and secure higher value-added production in agriculture and forestry. A product-based approach for commodity development will therefore be employed in the policy formulation of NAP3. In this approach, key products and markets are identified based on market demand, preferences and potential. These market demand and preferences are translated into strategies for upstream primary agricultural production to enhance production and marketing of the agricultural and forestry products. The product-based approach will enable a more effective formulation of policy thrusts to meet the challenges that have been identified. This approach is adopted to reinforce and complement the cluster-based agro industrial development as identified in the Second Industrial Master Plan (IMP2) 1996-2005 through strengthening both inter and intra-sectoral linkages including the development and expansion of intermediate and supporting industries.

**20** These approaches together with the policy thrusts will provide the enabling environment to sustain and enhance the growth of agricultural sector and become more globally competitive. The policy thrusts of the NAP3 are:

### **Meeting national food requirement**

**21** Domestic food production will be enhanced through large-scale food production by the private sector. This necessitates the strengthening of critical support services and institutional arrangements. Reverse and offshore investments for strategic sourcing will be encouraged and judiciously pursued.

### **Enhancing competitiveness and profitability in agriculture and forestry**

**22** Enhancing competitiveness and profitability in the agricultural

sector will require that focus be given to promoting globally competitive industries in agriculture and forestry. This requires the development of a world competitive outlook within the sector and an export culture with commitment to provide what the market wants at competitive prices. The competitiveness of the sector will be enhanced through productivity improvement, developing and strengthening markets, removal of market and trade distorting measures, formulation and implementation of high quality and safety standards and selective development of agricultural and forestry enterprises based on present and potential competitive strengths. Further strengthening of competitiveness and profitability will be achieved through the development of new and innovative products and capitalising on the product value chain that will generate sources of future growth and create new higher value-added industries. Reducing labour inputs in agriculture and forestry will also strengthen the competitiveness and profitability of the sector.

**23** Capitalising on the product value chain requires reorientation from commodity-based to product-based production and marketing. This approach, which aims at capturing higher margins and increasing farm incomes, will involve vertical integration and internalising of value-added activities at farm level. In addressing labour constraints, the thrust will be on capital and technology intensive agricultural production systems which will utilise labour-saving techniques. Agricultural and forestry development will also be geared towards less labour-intensive enterprises such as agroforestry and the cultivation of high-value crops and forest species that require less labour.

#### **Enhancing the integrated development of the food and industrial crop sub-sectors**

**24** There are resources within the industrial and food crop sub-sectors that can be exploited for an integrated development of both sectors. These resources include land, labour and waste as well as by-products that can be used to produce value-added products. An illustration of this integrated development is shown in Chart 1. This thrust requires further enhancement of research and development (R&D) in waste and by-product utilisation as well as increased efforts to commercialise research findings.



#### **Strengthening requisite economic foundation**

**25** A strong requisite economic foundation is necessary to support and sustain the development of existing core agricultural and forestry industries and to initiate the growth of new ones. These include continuous upgrading the quality of human resources, development of indigenous R&D capability and technology including information technology, adequate and modern physical infrastructure, efficient business support services, financing and incentives and an enabling institutional framework.

#### **Adopting sustainable development**

**26** Sustainable management and utilisation of resources will be the guiding principle in pursuing agricultural and forestry development. Rules, regulations and incentives will be strengthened to encourage environment-friendly agricultural and forestry practices and to minimise the negative impact of these activities on the environment.

Research and application of appropriate technologies and innovations for this purpose will be emphasised.

## POLICY DIRECTIONS FOR THE DEVELOPMENT OF PRODUCT GROUPS

### Food product group

27 This group which consists of rice, livestock, fisheries, fruits and vegetables primarily serves, though not exclusively, serves the domestic market. The production structure, except for poultry, comprises mainly of small and medium scale units. This agricultural industry group, however, is showing signs of consolidation to larger scale operations and is becoming increasingly more commercialised.

28 Local production of food has increased of about 4.2 per cent per annum during 1985-95 period. This increase however has not been able to match domestic demand and has resulted in increasing imports especially during 1990-95 period. The increasing deficit between domestic demand and local production is expected to continue. It is not in the long-term interest of the country to be increasingly dependent on external sourcing for food as there is uncertainty in its long-term international supply. However, economic factors limit Malaysia's capabilities in enhancing domestic supply to fully meet her total food requirements. Against this scenario, NAP3 will focus policy formulation on domestic production and strategic sourcing to ensure adequate supply and accessibility to safe, nutritious and high quality food at affordable prices. Measures will also be undertaken to position Malaysia as a global player in selected food products which have comparative advantages in the international market. A National Food Safety Initiative will be formulated to improve the safety of the nation's food supply.

29 During the 1995 - 2010 period, the value-added of the food sector is projected to grow at 3.5 per cent per annum. Better performance is expected to come from vegetables, fruits, livestock and fisheries. The share of food products to the agricultural GDP is expected to increase from 26.7 per cent in 1995 to 32.5 per cent in 2010. Production of major food commodities is projected to grow at 3.8 per cent per annum until 2010. The strategic directions for the major food commodities are:

### Paddy

30 29. The eight granary areas will be designated as permanent paddy producing areas to realise a minimum self-sufficiency level (SSL) for rice of 65 per cent. Efforts will be undertaken to enhance yield from 4.0 tonnes per hectare in 1995 to 5.5 tonnes per hectare in 2010 and increase cropping intensity from 177 per cent to 185 per cent in the eight granaries within the same period. Efficiency of paddy production will be enhanced by encouraging and supporting the development of large-scale commercial operation in the form of group farming and estate type production system. This will create larger and more viable production units. The involvement of the private sector in large-scale paddy production and support industries will be encouraged. Suitable areas especially in Sabah and Sarawak will be identified for large-scale commercial paddy production by the private sector. Unproductive paddy areas outside the granaries will be converted into other uses, in particular for agroforestry. A land

registry or information centre will be established to collect and disseminate information on idle paddy land for the purpose of acting as clearing house between landowners and entrepreneurial farmers. The Rice Order (Price and Grade Control) 1992 will be reviewed with the aim of deregulating the industry further, to allow market forces and preferences to determine price and quality. The price and fertiliser support programmes will be repackaged to allow for long-term structural adjustments of the industry in line with international obligations. Environment-friendly good farm practices such as precision agriculture, integrated pest management (IPM), soil and water conservation measures will be intensified. Reverse investment in paddy production in low cost rice producing countries will be encouraged.

### **Livestock**

**31** Efforts will be undertaken to ensure adequate supply of poultry and eggs for the domestic market and to capitalise on export markets. The production of fresh beef, mutton and milk will be increased for the domestic market. Private sector led commercial production will be actively encouraged to adopt modern approaches and farming on large-scale basis. Smallholder livestock activities with potential will continue to be transformed into larger commercial operations to improve efficiency. Efforts will be undertaken to strengthen the linkages of these operations with suppliers, processors and marketers to enhance further the vertical and horizontal integration of the industry. Livestock integration with the plantation crops will continue to be promoted. Efforts will be undertaken to develop and exploit Malaysia's potential as an International Halal Food Hub. Capability for inspection, monitoring, standardisation and certification for Malaysian Halal Standard for livestock products and industrial livestock-based inputs will be strengthened and this standard will be internationally promoted. The international marketing of branded halal livestock products and industrial livestock-based inputs will be undertaken.

### **Fisheries**

**32** The fisheries industry, particularly deep sea fishing and aquaculture, will be further developed on a commercial and integrated basis. The development will focus on conservation and utilisation of fisheries resources on a sustainable basis. It will be adequately supported with modern fisheries' infrastructure, processing, marketing network, comprehensive human resource development (HRD) and R&D programmes. Private sector participation in commercial fishing, aquaculture through large-scale open marine-cage culture, and feed and fry production will be further encouraged. Government will undertake efforts to unify individual entrepreneurs including small and medium enterprises (SMEs) engaged in processing, to form consortia led by corporate leaders to venture into commercial fishing and develop and manage integrated processing complexes and mega-fishing ports. This will secure economies of scale, modernise operations, enhance ventures into export markets and also attract foreign vessels to land their catches in Malaysia. It will also strengthen linkages among fishing, processing and supporting industries. Joint ventures between local and foreign private sector will be promoted under the Indonesia-Malaysia-Thailand Growth Triangle (IMT-GT), Brunei-Indonesia-Malaysia-Philippine-East ASEAN Growth Area (BIMP-EAGA) and the Indonesia-Malaysia-Singapore-Growth Triangle (IMS-GT) to engage in distant-water fishing.

## **Fruits**

**33** The fruit industry will continue to be developed to meet the expanding demand for fresh and processed tropical fruits in both the international and domestic markets. Fifteen fruits have been identified for development. These are banana, papaya, pineapple, watermelon, starfruit, mango, durian, jackfruit, rambutan, citrus, duku langsung/dokong, cempedak, guava, ciku and mangosteen. Special focus will be given to mangosteen to be developed extensively and aggressively marketed for the global market as the flagship of the Malaysian fruit industry. Institutional support, infrastructure and incentives will continue to be provided to encourage private sector to venture into large scale commercial production. New processed products such as minimally processed fruits, natural food ingredients, functional foods, modified food ingredient, convenience food, frozen fruits, beverages and high fibre products will be exploited to cater to the increasing demand in niche markets. To meet the requirements for raw materials for the processing industries and increasing domestic demand for temperate fruits, reverse investments will be encouraged. Emphasis will also be given to HRD to generate highly skilled and innovative manpower in new and emerging science such as food, genetic engineering and biotechnology.

## **Vegetables**

**34** 34. Vegetable production will be expanded to meet domestic and export demand. Existing production areas, suitable state land and non-granary areas near urban centres will be zoned as permanent vegetable areas and leased to the private sector. The Government will continue to provide institutional support, infrastructure and incentives to encourage the private sector to venture into large scale commercial production. New processed products such as minimally processed vegetables, flour-based products, natural food ingredients, functional food, vegetarian and reformulated vegetarian food products, modified food ingredients, high fibre products, convenience food and beverages, and by-product utilisation will be exploited to cater to the increasing demand in niche markets. High technology production of high value temperate vegetables in the lowlands, using controlled environment which includes rain shelters and netted structures, will be promoted. Quality will also be emphasised through product differentiation and product brand names such as pesticide-free vegetables and organic farm produce. R&D efforts on cost-effective production, post-harvest handling and processing will be intensified with particular emphasis on agricultural mechanisation and labour-saving techniques. The marketing system will be upgraded by improving efficiency of the existing marketing channels and further development of a parallel marketing channels. Off-shore investment will be encouraged to meet the requirement of raw materials for the processing industry.

## **Industrial crops, forestry and wood-based product group**

**35** This group consists of oil palm, rubber, cocoa and forestry and is the vital source of raw materials supply to the resource-based industries. It mainly serves the export market and is an important revenue earner for the country. The structure of production and marketing for most products of this group is highly organised with advanced managerial and technological practices.

**36** In consonance with the industrialisation strategies identified under the Second Industrial Master Plan (IMP2) 1996 - 2005, the development of the industrial crops, forestry and wood-based product group will continue to be encouraged and supported by appropriate incentives, infrastructure, R&D, supporting services and HRD. The thrust of development for this group will focus on restructuring and modernising the industry to enhance its global competitiveness. A long term action plan will be drawn out to ensure adequate supply of raw materials for the processing and manufacturing industries for the production of high value-added products for export. Malaysia's position as a renowned centre of excellence for R&D and product development will be strengthened. Forestry resources will be conserved, managed and utilised on a sustainable basis. Efforts will be undertaken to reduce labour inputs through mechanisation and use of appropriate labour- saving techniques. Agroforestry involving integration of forestry and agricultural activities will be promoted.

**37** During the 1995 - 2010 period, the value-added of this product group is expected to continue to grow from RM11.6 billion to RM13.3 billion. However, its share to agricultural GDP is expected to decrease from 71.6 per cent to 59.7 per cent mainly due to decrease in contribution from rubber and sawlogs. The strategic directions for the development of the commodities in this group are:

#### **Oil palm**

**38** The growth of the oil palm industry will be sustained through productivity improvements and development of new varieties for specific functional end-uses. Focus will also be given to productivity improvement in the downstream processing and manufacturing of higher value-added palm oil products such as oleochemicals. In line with the vision of making the oil palm industry as a sustainable 'zero-waste industry', exploitation of oil palm biomass will be further intensified. Future production and expansion of oil palm cultivation will be in Sabah and Sarawak or through reverse investment in neighbouring countries, the South Pacific Islands, Africa and Latin America. R&D in labour-saving technology, such as mechanisation and automation in harvesting operation, will be intensified to reduce labour inputs in oil palm cultivation so as to enhance the industry's competitiveness in the world's oils and fats market. Market research and surveillance will be intensified in line with the marketing strategy to strengthen traditional and existing markets as well as to develop and penetrate new ones. Integrated farming in oil palm plantations will continue to be encouraged to maximise returns from land.

#### **Rubber**

**39** The future development of the rubber industry will be based upon the integration of three distinct uses of natural rubber, namely latex, heveawood and rubber-based products into a single entity. The production of natural rubber will be sustained at about 750,000 million tonnes per year from 1.2 million hectares of rubber areas, to feed the downstream processing and manufacturing of higher value-added rubber-based products for exports. Uneconomic-sized smallholdings will be reorganised and consolidated into estate-type production units to achieve economies of scale. Replanting of rubber will also be undertaken as part of the reforestation programmes either solely for its latex or for both latex and heveawood which is gaining popularity among furniture industry. Hedge planting or intercropping rubber with other potential tree species will be

encouraged to obtain maximum returns. R&D efforts will be directed towards developing new forms and uses of rubber and rubber products, mechanisation in farming operations and propagating high yielding clones. Efforts to implement the transfer and assimilation of technology especially the labour-saving extraction techniques will be intensified and accelerated. Market research and surveillance will be enhanced in line with the marketing strategy to strengthen and penetrate traditional markets as well as developing new ones.

## **Cocoa**

**40** Efforts will be undertaken to increase productivity through improvement in farm management and the use of high yielding hybrid planting materials. Uneconomic size holdings will be consolidated into estate-type production units to achieve economies of scale. Unproductive holdings will be rehabilitated with new high yielding and pest and disease resistant clones to increase the average yield. R&D will be directed towards developing labour-saving technologies and new products for the high-end export markets. Initiatives to enhance the quality of cocoa beans and cocoa products to attain the desired quality and international standards will be undertaken. To penetrate traditional markets as well as developing new ones, market research and surveillance will be strengthened.

## **Forestry and wood-based products**

**41** Sustainable forest management will continue to remain as the underlying basis of forestry management. Efforts will be undertaken to increase the marketability of lesser-used species and small diameter logs, and to explore the prospects and value of non-timber products such as rattan and bamboo and eco-tourism. The PFEs will be maintained and where possible expanded through conversion of Stateland forest into PFEs. R&D will emphasise on applied forest management, resources survey and monitoring, silviculture, reforestation and rehabilitation, environmental studies and utilisation of forest resources. To reduce pressure on the natural forest for raw material supplies, forest plantations by the private sector will be actively promoted. The planting of tree species of high commercial values on idle land and conversion of existing abandoned plantations into plantation forests will be encouraged. The competitiveness of the wood-based industry will be further strengthened through product differentiation and innovative marketing in niche markets. This will involve the production of high-end products with superior technical qualities and unique product design through Malaysian Own Brand Manufacturing and Malaysian Original Design Manufacturing.

**42** The rattan and bamboo industry has the potential to be further developed to exploit the expanding international and domestic demand for rattan and bamboo-based products. The private sector will be encouraged to develop rattan and bamboo cultivation in degraded forests, idle as well as abandoned land. Integrating the cultivation of rattan and bamboo with other crops will be promoted in order to maximise land utilisation and returns. Improvement of planting materials, production and processing technologies will be undertaken through intensifying R&D efforts and the adoption of new technologies available in the market.

**43** It is estimated that about 30 million tonnes of oil palm biomass are available annually comprising of 8 million tonnes of trunks, 1.4 million tonnes of felled fronds, 18 million tonnes of pruned fronds and 3 million tonnes of empty fruit bunches. The private sector will be encouraged to utilise oil palm biomass for the production of

composite wood products, furniture, pulp and paper.

**44** Agroforestry, which is a land-use maximisation concept that involves the planting of agricultural crops and forest species on agriculture land and which also involves the cultivation of short term crops in forest plantations during the early phase of establishment, will be actively promoted and encouraged. Steps will be taken to support and encourage smallholders and farmers to venture into agroforestry involving the cultivation of forest trees, rattan, bamboo, medicinal plants, agricultural crops such as food crops, rubber and oil palm, the rearing of livestock and aquaculture. The private sector, particularly the plantation sector, will be encouraged to undertake agroforestry on a large scale basis through adopting mixed cropping as a system of cultivation in their plantations. Efforts will also be undertaken to strengthen R&D activities related to agroforestry to identify suitable crops and forest tree species that can be effectively integrated to yield maximum output.

#### **New products and future industry group**

**45** This group consists of new and emerging products in agriculture and forestry which have high potential to be further nurtured and developed. Based on demand prospects and expected high returns, this group has the potential to be an important source of growth for agriculture and forestry. Technology and product development will be the major driving force in enhancing industrial prospects. This group includes biotechnological products, specialty natural products, floricultural products, aquarium fish and aquatic plants, equine and exotic animals, sago and agrotourism products. For the development of the new products and future industries, the strategic directions are:

#### **Agri-biotechnology and specialty natural products**

**46** The economic foundation for the development of agri-biotechnology and speciality natural products industries will be strengthened. Government support and commitment for a strong R&D and HRD programmes will be intensified to build a pool of world-class researchers and technical personnel. The current incentive framework will be continued to accelerate establishment and development of these industries. This includes provision of new and additional funding for research facilities and the setting up of more incubation centres. More conservation activities will be undertaken to preserve and manage biological diversity and legislation introduced to regulate access to genetic resources. Programmes to domesticate and cultivate valuable species on large-scale commercial basis, as part of agroforestry, or plantation forests and community forests will be formulated and implemented. Facilities, equipment and personnel will be provided for scientific validation of health claims and toxicology studies to ensure their acceptance by and for the safety of consumers.

**47** Public sector-driven joint-venture programmes and projects involving the private sector will be intensified to commercialise research findings and new innovations. Agro-technology parks will be developed to facilitate private sector investments in these industries which employ the latest in frontier technology.

#### **Floricultural products and aquarium fish**

**48** Malaysia as the source and exporter of tropical floricultural

products, aquarium fish and related products will be extensively promoted. Government support and commitment will be directed to establish Malaysia as the global centre for these products. This includes the establishment of national and international logistics and marketing network. Potential areas for immediate establishment of large scale commercial production will be identified through zoning and alienation of land on longer-term leasehold basis. Large scale automated production and post-harvest handling will be encouraged so as to reduce cost and reliance on labour. R&D will be intensified to produce new species and varieties, and to develop cost-effective production and post-harvest handling technologies.

### **Sago**

**49** Starch is one of the most abundant natural materials that can be readily converted chemically, physically and biologically into chemicals which are traditionally derived from petroleum for synthesis into useful products. These new starch-based products include biodegradable plastics, biopolymer plastics, water absorbent polymer and starch medium for encapsulation. Sago starch is one of the starches that can be exploited commercially for these purposes. Sago cultivation will be encouraged in the peatland of Sarawak given the crop's adaptability to natural peat swamp conditions. Commercial planting on a large scale by the private sector will be encouraged to reduce cost and increase productivity. R&D on rapid propagation of high quality planting materials, farm management, processing technology, new product development and by-product utilisation will be given emphasis.

### **Roselle**

**50** The cultivation of roselle will be encouraged particularly on bris soil as an alternative crop to tobacco. Large scale production will be promoted to reduce cost of production and realise economies of scale.

### **Equine and exotic animals**

**51** Private sector participation in the development of the equine and exotic animals for sports and recreation, exotic meat and other animal products will also be encouraged. The development of this industry will focus on selected species which have high market value and demand.

### **Agrotourism**

**52** Agrotourism, an activity which maximises the use of farm settings and the environment with local hospitality will be promoted. In Malaysia, agricultural areas and activities have many tourist attractions which can form the basis of destination development for tourists. These areas will be developed into unique destinations for the enjoyment, relaxation and education of tourists. In addition, suitable marine areas and public water-bodies will be developed for sport fishing.

### **Other economic crops product group**

**53** This group consists of coconut, pepper, tobacco, and other miscellaneous crops such as sugar cane, cassava, sweet potato, maize, tea and coffee. This group is generally characterised by dwindling or stagnating output and relatively lower productivity.

Some of these commodities play an important socio-economic role in the welfare of the rural community. Under the NAP3, where viable, production of these commodities will be encouraged for import substitution and for supplying quality raw materials for the further development of downstream activities. R&D and necessary support will be provided to enhance the development of more high value-added products.

## Economic Foundation

**54** The realisation of the objectives of NAP3 requires a stronger economic foundation to further increase efficiency, productivity and competitiveness of Malaysian agriculture. This will involve the continuous development of key elements of economic foundation, including human resource, technology, physical infrastructure, finance and incentives, supporting industries and institutions.

### Human resource development

**55** Agricultural development will be geared towards using less labour in agriculture. The reduction in labour utilisation will be attained through the cultivation of new crops that require less labour inputs, mechanised and automated production systems and processes, the use of labour-saving technologies and the reduction of labour intensive agricultural enterprises. In addition, land-labour ratio will be improved through restructuring of production units to allow for larger scale operations.

**56** Human resource development will focus towards the supply of skilled manpower at the R&D, entrepreneurial, managerial, and operational or workforce levels for new and emerging areas. These areas include biotechnology, mechanisation and automation, production systems under modified environment, enforcement of sanitary and phytosanitary measures, standards and grades, resource conservation, and good farming and aquaculture practices. The shortage of human resources will be addressed through formal and non-formal training.

**57** Agricultural and forestry education will be strengthened and made more flexible to meet the technological and futuristic nature of agriculture. It will be geared to meet the ever changing demands of the job market and attract youth to the agricultural and forestry professions. Training will focus on the achievement of high productivity among the producers and workers by facilitating the absorption of new skills and knowledge to implement precision agriculture, mechanisation, IPM and controlled environment production system. Farmers and fishermen's training will be intensified to equip them with better managerial and entrepreneurial skills to undertake commercial mixed farming.

**58** As a transitional measure, the Government will continue to adopt a liberal policy on the recruitment of foreign workers for the agricultural sector. However, a comprehensive foreign labour policy will be formulated and producers will be given a specific timeframe to gradually phase-out the reliance on foreign labour.

### Technology

**59** Technology for agricultural development will focus on intensifying the use of existing conventional technologies as well as

prospecting and developing the potentials and applications of new and emerging technologies. Initiatives will be pursued in the development of indigenous technologies as well as blending the conventional technologies with frontier technologies. This is to harness the considerable benefits that exist in their utilisation while retaining some of the stronger characteristics of the traditional techniques to achieve higher productivity and quality and increase competitiveness of the sector.

**60** Among the strategic initiatives are:

 the use of plant cell and tissue culture techniques as well as genetic engineering to complement conventional plant breeding in developing new crop varieties;

 the use of plant cell cultures to enhance the development of new and innovative products including metabolites such as pharmaceuticals and food additives ;

 the application of embryo manipulation technology and the use of genetically engineered vaccines to strengthen existing technologies for increasing animal productivity;

 the incorporation of robotics and artificial intelligence as well as computer modelling and microprocessor control in machinery and automation equipment to reduce labour; and

 the application of advanced processing and packaging systems to strengthen and enhance conventional and traditional techniques for better post harvest handling and storage and longer shelf-life of agricultural products.

**61** Mastery of the use of information technologies will be emphasised to enhance the acquisition and dissemination of new knowledge and technologies and to motivate greater youth participation in technology development and transfer. Advance in “expert systems” or computer simulated scenario analysis will be exploited to enhance on-farm advice and information exchange to agriculture producers through extension. Technology transfer and commercialisation system of R&D findings will be further strengthened through incubators and contract R&D. Applied socio-economic research will be intensified to support technology development.

### **Infrastructural development**

**62** Infrastructure will be provided to promote Precision Agriculture or Precision Farming, an integrated management system for crop production that uses site-specific data to maximise yields, use inputs more efficiently, decrease environmental impacts and increase farmer’s profit margin. New strategies will be developed to reduce the Government’s financial burden of developing, managing, operating and maintaining the infrastructure system. A practical cost recovery system will be introduced to recover part of the Government’s expenditure in the provision of infrastructure and facilities.

**63** Agro-technology parks will be developed to promote high

technology agricultural production systems that will employ the latest or frontier technology in agriculture. Such production systems involve mechanised and automated operations, precision control of input and growing environment, production of quality and high value products and uses environment-friendly and sustainable technology. Incentives will be provided to encourage investors establish their operations in these parks.

### **Financing and incentives**

**64** The Government will continue to provide incentives for private sector R&D, provision of warehousing facilities, HRD and commercialisation of R&D outputs. Incentives will also be provided for the export of consultancy services, the provision of quality and safety testing services, and the development of agricultural information technology system. The current package of incentives for the promotion of investments in food production and the new emerging areas of agriculture and agriculture related activities will be continued. The list of promoted activities and products will also be reviewed in line with the new focus and direction of agricultural development. Soft loans will continue to be provided to critical areas such as food production, mechanisation and automation, commercialisation of agricultural R&D output, and bumiputra participation in commercial agriculture. Guidelines to promote foreign investment in agriculture will be formulated.

### **Input Industries**

**65** Competitive agricultural production depends on the efficient supply of external inputs such as fertilisers, agricultural chemicals, seeds, planting materials, feeds, and agricultural machinery and equipment. In recent years, the prices of these inputs have increased leading to higher cost of production and this has affected the competitiveness of the Malaysian agriculture. Efforts will be undertaken to improve efficiency of the input industries and to minimise the increase in prices of these inputs. Towards this end, the Government will continue to provide an attractive and conducive environment including incentives for the development, expansion and modernisation of these input industries.

### **Business support services**

**66** The capacity and quality of support services are vital in increasing the efficiency and strengthening the competitiveness of the agricultural sector. Efforts will be undertaken to further strengthen support services in the areas of agricultural marketing, extension, advisory and consultancy, credit, insurance, information and logistic services such as warehousing, distribution and transportation.

### **Institutions**

**67** A review and rationalisation of the existing institutional arrangements will be carried out to make them more effective in supporting agricultural development and facilitating commercialisation and growth of the sector. Currently, the Government plays a leading role in the sector's development through the provision of various support services and infrastructural facilities. Notwithstanding the Government's commitment, the private sector also contributes significantly towards the sector's development especially in the plantation sub-sector. Both the public and private

sector institutions involved in agricultural development need to further strengthen their collaboration and co-operation towards making the sector more resilient and competitive to meet the challenges of globalisation and the liberalisation of agricultural trade.

**68** The following institutional framework has been identified to strengthen the implementation of the NAP3.

#### **Public-private sector collaborative mechanism**

 The consultative and collaborative mechanism between the public and the private sector will be further strengthened through:

 establishment of a Private-Public Sector Co-ordination Council to oversee and co-ordinate the implementation of NAP3. The Co-ordination Council may establish various working groups to plan and implement the development of the sector and the key industries. Members of the Council would include representatives from the Federal and State Governments as well as from the private sector;

 the establishment of a dedicated secretariat in the Ministry of Agriculture and in the Ministry of Primary Industries to provide institutional support for the Council. The secretariat will develop a network with the private sector and the state governments;

 the establishment of a one-stop centre in the Ministry of Agriculture to serve the needs of the private sector. This centre will be electronically linked to other relevant focal points to allow for more efficient communication service; and

 strengthening the role of Agrolink and Integrated Commodity Information Services (ICIS) as efficient providers of local and global information, and as a tool for rapid communication for all parties involved in agricultural development.

#### **Federal-State co-operation**

 To facilitate the creation of a conducive environment and transform the agricultural sector into a highly competitive and capital-intensive industry, consultations between the Federal and State Governments will be improved through the establishment of:

 a high level Planning and Implementation Committee; and

 a dedicated Secretariat to follow through the decisions of the Committee.

#### **Role of farmers' organisation and fishermen's association**

 the role of farmers' organisations and fishermen's associations will be augmented through active participation of these organisations as business entities within the agricultural sector. An institutional framework will be established so that it will encourage greater linkages between the farmers' and fishermen's institutions and other