

The Modernized and Higher Technology Agriculture of Malaysia: Development of Livestock Industry

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by:

Noraida Ismail

University of Malaya

Mohd Khusahry Mohamed Yusuff

MARDITECH, Malaysia

ABSTRACT

The Ministry of Agriculture is responsible for the modernization of the food subsector and most of the programs focused on training, marketing, credit, skills

development and dissemination of knowledge on modern agriculture to farmers, as well as programs to develop entrepreneur farmers in the agro-based industries. Agriculture can be schematically identified into the modernized and traditional agriculture whereby the former is characterized by agricultural techniques of production pervaded by industrial or modernized elements and values. Types of farms, both modernized and traditional, are extremely diversified and they are characterized from several local styles of farming. Technology for agricultural development is focusing on intensifying the use of existing conventional technologies as well as prospecting and developing the potentials and applications of new and emerging technologies. Initiatives were 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 utilization while retaining some of the stronger characteristics of the traditional techniques to achieve higher productivity and quality and increase competitiveness of the sector. Biotechnology application is one of the best means to accelerate the development of modern agriculture. The thrust is to intensify Research & Development and HRD program to build pool of world class researchers and technical personnel. Government has given provision of new and additional funding for research facilities, incubation centers and designation of research universities to give equal emphasize in teaching and research. Furthermore, it is intensified joint venture program with public sectors to commercialize research finding and innovations

Outline of traditional and modernized agriculture as well as the government strategies to improve the livestock industry in Malaysia is described. Examples on the application of modern technology for livestock improvement and to increase farmer's involvement and income will be presented.

Introduction

Increased in private sectors contribution in large scale food production and agro-based industry towards economic growth and export earnings was achieved during the 8th Malaysian plan period, which lead to a higher than targeted rate of growth in the agriculture sectors. The development of agriculture sectors is intensified during the 9th Malaysian plan period to serve as the third engine of growth. More emphasize was undertaken on new agriculture which involved large-scale commercial farming and participation in high quality and value added activities which can improve productivity and increase income. Specific policies and strategies are implemented to accelerate or to speed up the process of transforming the agriculture sector into a modern, dynamic and competitive sector with respect to agro-based processing and agriculture entrepreneur development.

The transformation of agriculture sector into a modern, viable and dynamic venture is lead by the Ministry of Agriculture (MoA), the Ministry of Plantation Industries and commodities (MPIC) and the Ministry of Rural and Regional Development (MRRD). The MoA is responsible for the modernization of the food subsector and most of the programs focused on training, marketing, credit, skills development and dissemination of knowledge on modern agriculture to farmers, as well as programs to develop entrepreneur farmers in the agro-based industries. The MPIC on the other hand facilitates the development of agriculture industrial commodities through the transfer of new technologies to smallholders, and R& D on product diversification. While the MRRD focused mainly on capacity building, in efforts to develop the smallholders and farmers, improving the standard of living of rural population as well as conducting poverty eradication programs.

This paper will present what is meant by modernized agriculture and how Malaysia participated in the development of the modernized agriculture through the livestock industry with the main aim of eradicating poverty over the rural farmers.

What is agriculture

Agriculture was defined as ‘food and fiber system’ by the Americans, ‘agriculture and food related industry’ by the Japanese and as ‘Agriculture and farm produce industry’ by the Canadians. Agriculture has therefore has become one member of modern industry in modern developed countries. In the second half of the 20th century, development of biological and informative technologies has endowed agriculture with features of modern industry.

Agriculture can be schematically identified into the modernized and traditional agriculture. Modernized agriculture is characterized by agricultural techniques of production pervaded by industrial or modernized elements and

values. It is based on the most fertile soils of the rural areas. The modernized agriculture has reached elevated levels of productivity but it lacks in socio-environmental terms (*i.e.* biodiversity losses). Types of farms, both modernized and traditional, are extremely diversified and they are characterized from several local styles of farming.

The typologies of styles of farming depend on different combinations of three elements: a) the technological level (product oriented farms)

- b) The high integrations with national or global markets (market oriented farms) and
- c) The attitude to follow the public policies to catch greater government supports (policymaker's oriented farms).

The demand of industrial revolution on raw materials of agricultural products was highly increased in the late 1600s, which promoted the transition and transformation of traditional agriculture into modern agriculture.

Modernized Agriculture

The Academician of Chinese Academy of Sciences Shi Yuanchun defines modern agriculture as a modern enterprise that is forerun by biological and informative technologies, and that is aimed at the global economy and integration of agriculture, industry and trade. In review of features of agricultural development, modern agriculture is a commercialized and marketed enterprise-type agriculture which has been gradually shaped since the industrial revolution. Modernized local styles of farming are characterized by an elevated technological level and by a strong integration with domestic and international markets and are also strongly policymakers oriented.

On the other hand, traditional type of farming is characterized by a limited access to the domestic markets and by a very low level of technology. The common defect of traditional agricultural civilization lies in the fact that, its productivity is low, and farmers are defined as “autarkic agricultural producers”.

Compared with traditional agriculture, modern agriculture has its own special features in production target, production means, and operation system and production modes:

A. Production target (of farmers in modern agriculture)

The production target for farmers in Modern Agriculture is for “use of others” and is not for “self-use”, which means that the farmers should target their production for supplying commodities to the market and not just focus on their own consumption and agricultural production per se. Attention should be given on the changes in supply and demand relationship on the market to ensure the centre of their production.

In terms of market economy, farmers are expected to be the active participants of market economy, with the realization that market competition should pursue their own interest to the maximum. Farmers are encouraged to take an initiative to cooperate with other market factors, and enjoy socialized agricultural production service in order to obtain maximum benefits with limited resources. In modernized agriculture, farmers not only play the role of producers, but also as proprietors, which is not applicable for traditional farmers.

B. Production means

Modern agriculture has qualitative difference from traditional agriculture with respect to dynamic means or technical means.

Dynamic means

In the dynamic means, man and livestock dynamic power and handwork tools are replaced by electric power and machines.

Recently, automatization facilities, combination of agricultural machines and computers, satellite remote sensing are applied into agricultural production. Networking on farmland adequate irrigation, farmland gardening, agricultural facility, traffic transportation, energy sources convey, and information communications etc, has enabled modern agricultural dynamic power to have a feature of diversified drive. Non-natural power in modern agriculture has replaced the natural power that been relied on by traditional agriculture.

Thus, with the fast advancement on the features of science, agriculture is becoming more and more as an industry to man when compared to the original and primary traditional occupation for human beings in the traditional agriculture.

Technical means

Biological and informative technologies are also gradually deepening into various aspects, such as agricultural seed quality resources, propagation breeding, soil improvement and plant protection, etc. Depth and extent of agriculture is continually expanding, which has made unclear bound between agriculture and non-agriculture. Control on agriculture is greatly enhanced.

Changes in agricultural production means have initiated new requirements for farmers. In the modernized agriculture, the farmers should have definite operation and management making as well as essential cultural making.

C. Operation system

Market economy is the system foundation in modern agriculture. In this system, agriculture is placed as a modern industry that is applicable in market economy that supplies the market with agricultural products, and participates in market competition. Agriculture is therefore no longer considered as smallholder industry.

Perfect industrial system is needed in modern agriculture. Industrial system of modern agriculture is applicable in the huge market, organized, and has large-scale production. Within this system, development of modern agriculture has broken through disjoining of production, processing and sale, mutual separation between branches, and obvious town and rural circumscription in traditional agriculture. There appears a tendency of mutual penetration and mutual amalgamation between agriculture and some various fields, such as industry, commerce, finance, science and technology, etc.. Town and rural economic development has had no obvious regional and industrial limitations. Agricultural chain and radius of agricultural product market have been greatly extended. Specialized production of agriculture, entrepreneurial operation, and socialized service has gradually come into being. Even the consumption of farmers has gradually transferred from self-support into commercialized consumption.

Modern agriculture has developed from self-support agriculture into market agriculture. In such operation system background, farmers are no more agricultural laborers, but proprietors of agriculture.

D. Operation mode

In modern agriculture, modern enterprise operation mode with definite economic scope and organizational structure has replaced production mode with a family as a unit in traditional agriculture. This is determined by property of modern agriculture and national situation.

Generally, modern agricultural operation mode adopts intensive operation in the national situation with a small area but large population whereby:

- Relatively much capital (including material capital and human capital) is launched into limited land
- New scientific technology is adopted, and
- Agricultural operation mode of industrialized operation is implemented through certain organizational carrier.

Intensive operation is a kind of internal quality centralization development mode when compared with extensive mode traditional agriculture, which is an external quantity expansion development mode. Centralization types can be classified into industrial centralization, enterprise centralization and garden centralization.

Changes of modern agricultural operation mode have also proposed new requirements for farmers as principal part of agriculture. If farmers are still positioned as “agricultural producers”, then they cannot assume the task of building modern agriculture.

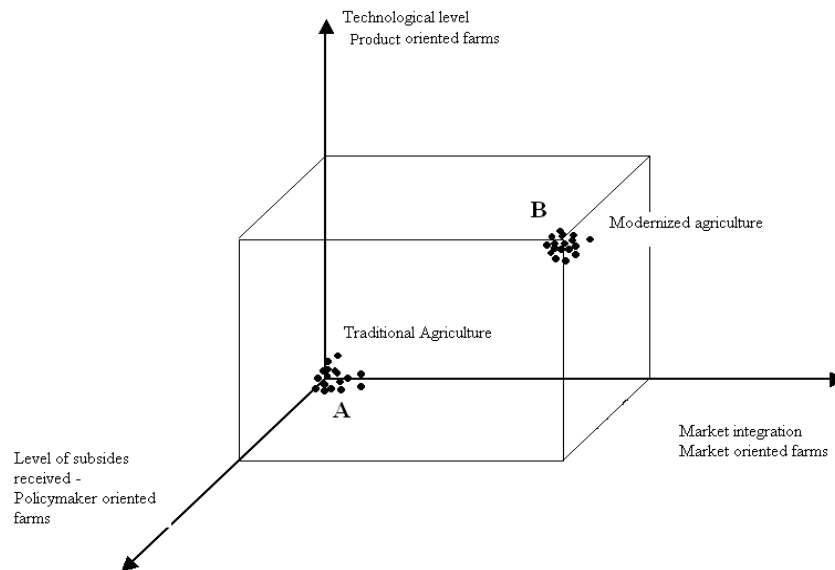


Figure 1 Traditional and Modernized styles of farming (Yue, 2009)
Government initiatives and policy

1. Allocation for development and allocation for agriculture

A total allocation of RM 11.4 billion is provided to implement various agriculture programs and projects and to emphasize on agriculture and its contribution to economic growth. It represents an additional amount of RM 4.7 billion or 70% higher than allocation provided in the Eight Malaysian Plan (Table 1). Modernization of agriculture has the highest allocation, amounting to RM 4.4 billion while another RM 2.6 billion is allocated for support services and RM 1.5 billion for agriculture irrigation programs. The expenditure for the modernization of agriculture is mainly for projects in the regional development areas, replanting and land consolidation and rehabilitation programs.

There are 62.44%, 156.31%, 95.90%, 21.69% and 65.57% increased in the expenditure and allocation for modernization of agriculture, livestock, support services, integrated Agriculture development Project and project under RDAs respectively. Obviously, the expenditure and allocation reflects the needs in modernization and utilization of the current technology, parallel to the growth of agriculture in Malaysia. The allocation was channeled to Government and also private sectors to implement the development program planned.

A few entrepreneurship schemes were set up to promote the entrepreneurship among the citizen. In these schemes, the citizens will be offered and provided with loan and financial grant for them to begin their projects as well as to expand their agriculture programs into a larger scales or commercial levels.

Table 1: Development Expenditure and Allocation for Agriculture, 2001-2010 (RM Million)

Program	8 th MP Expenditure	9 th MP Allocation
Modernization of agriculture	2,689.6	4,368.6
Integrated Agriculture Development Project	497.4	605.3
Replanting Scheme	650.2	1,150.8
Land consolidation and rehabilitation program	482.1	857.6
Project under RDAs	1,059.9	1754.9

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Forestry	199.6	251.5
Fishery	663.8	798.8
Livestock	202.8	519.8
Support Services	1,305.8	2,558.0
- R&D	529.7	614.0
- Marketing	172.1	392.7
- Training	480.9	551.3
- Credit	123.1	1,000.0
Irrigation for agriculture	780.0	1,458.1
Entrepreneur Development	-	511.9
Agro-based Development	-	361.8
Others	366.3	606.5
Total	6207.9	11,435.0

Source:

2. Involvement of Ministries

Millions have been utilized to generate and facilitate researchers and companies to enhance the scientific knowledge and innovation for the betterment of the agriculture industries. The policy is also focusing on the method to increase productivity and competitiveness, deepen linkages with all sectors, ventures into frontier areas and conserve and utilize natural resources on sustainable basis.

Some of the efforts being implemented are:

- The involvement of Ministries like MOSTI, MOA, Agrobank and also privatized bodies likes Malaysian Biotech Corp has become important as loan and grant provider for agriculture research and development.
- MARDI has advantage from the allocation for its research and development program as well as for Advanced Reproductive Biotechnology (ARB) Project, a spearhead for the Enhancement of

Commercial Production of Quality Beef Cattle and Goat in the nation. The impact would be the total transformation in the general agriculture industry and specifically in livestock industry.

- Sciences fund and Techno fund have been awarded for the noble purpose.

3. National Agricultural Policy

The NAP-3 (1998-2010) is a framework to drive Malaysian agriculture industry aligns with the current technology and modernization. The transformation will be high technology driven and emphasis given to labour-saving technology achievable by automated mechanization, innovation and more efficient farm management practices via application of RFID system which would ease in general farm management as well as a tool for global traceability technology.

Technology for Agricultural Development

Technology for agricultural development is focusing on intensifying the use of existing conventional technologies as well as prospecting and developing the potentials and applications of new and emerging technologies. Initiatives were 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 utilization while retaining some of the stronger characteristics of the traditional techniques to achieve higher productivity and quality and increase competitiveness of the sector.

4. Livestock Sector

Focusing on livestock sectors, the direction is towards private sector led commercialization of technology which actively adopting modern approach and farming on large-scale basis. Effort is also generated to strengthen vertical and horizontal integration and linkages within the entire value chain which involving the agro bazaar, online marketing and networking. Livestock integration with plantation crops is encouraging by strategic partnership between government and private sectors. The system of rearing livestock is transformed by systematic approach of animal management and breeding system incorporate with the traceability technology.

Table X: Beef Plan Policy and Goat Plan Policy (courtesy of DVS, Malaysia)

Commodity	cattle	Goat
Self Sufficiency level (SSL) by 2010	37%	10%
GR per annum	9.6%	8.9%
Population in 2010	1.15 million heads	1.1 million heads

Biotechnology application is one of the best means to accelerate the development of modern agriculture. The thrust is to intensify Research & Development and HRD program to build pool of world class researchers and technical personnel. Government has given provision of new and additional funding for research facilities, incubation centers and designation of research universities to give equal emphasize in teaching and research. Furthermore, it is intensified joint venture program with public sectors to commercialize research finding and innovations. Among the initiatives in genetic biotechnology were the application of embryo manipulation technology and the use of genetically engineered vaccines to strengthen existing technologies for increasing animal productivity.

Halal Hub

Among the objectives of the Third Industrial Master Plan (IMP3) 2006 – 2020, is to make Malaysia the “Global Halal Hub” for the production and trade in Halal products and services. There is great potential for developing and promoting Halal products and services in the global market as the global value in trade for Halal food and non-food products is estimated at USD1.2 trillion annually. This market has created interest among food producing countries, both Muslim and non-Muslim. Efforts was undertaken to develop and exploit Malaysia’s potential as an International Halal Food Hub. Capability for inspection, monitoring, standardization and certification for Malaysian Halal Standard for livestock products and industrial livestock-based inputs is strengthened and this standard is internationally promoted. The

international marketing of branded halal livestock products and industrial livestock-based inputs was undertaken.

The growing interest in the potential market has hastened the move towards the development of global standards as well as expanded the coverage of standards to include activities such as logistics and packaging. Malaysia has the edge in the development of the Halal industry as it is a modern Islamic country with an open economy and a well developed physical and institutional infrastructure, capable of supporting initiatives and programs to develop and promote the industry. More over, Malaysia has organized international forum and trade fair to promote the halal industry. World Halal Forum and Malaysia International Halal Showcase (MIHAS) has become successful annual trade event to promote Malaysia as International Halal Hub.

Corridor development

Northern Corridor Development Region (NCER)

Modernization of agriculture has been the key economic development in all corridor development including Northern Corridor development region (NCER). A key to realizing these visions for the region is by improving the technologies used in agriculture and adopting new practices concerning agricultural activities. By introducing new technologies and adopting new practices while capitalizing on existing advantages in the industry, the goal of Northern Corridor becomes clearer.

Introducing World-Class Agricultural Technologies. One of the innovations of world-class agricultural technologies that are currently being introduced is improving planting materials which are developed and disseminated in the Northern Corridor to boost efficiencies, productiveness and enhance the quality of agricultural produces.

This was done by

1. Stepping up the pace of R&D
2. Using a private sector-led R&D Centre to make the R&D more market-driven. Promoting compliance with international standards such as GAP and HACCP
3. Selectively pursuing higher-end downstream research, e.g. discovery of active ingredients.

One example would be using biotechnology to develop paddy seeds that have roots and stems suitable for the soil in the area, improving yield and higher resistance to diseases and pests

The same prospect is emphasized in East Coast Economic Region (ECER), to implement modernized agriculture within the region, ECER Master Plan proposes the expansion of large-scale commercial farming, wider application of modern technology, development of value-added activities, improving supply chain management, the participation of private sector as anchor companies and increasing non-farm opportunities.

Agriculture is a mainstay economic activity in the ECER. So naturally, the agriculture sector will be improved in order to increase household incomes and reduce poverty. The ECER's agricultural sector strategy also looks at reducing the reliance on agriculture imports, thus improving the Balance of Trade (BOT).

The ECER's social thrust identified Agropolitan projects as a key poverty eliminator that will benefit the local and remote populace by introducing a structured approach towards higher-yield agricultural activities. Livestock production has become one of its major development focus, Initiatives to develop the complete strategic breeding structure has been made for cattle, goat as well as sheep within the agropolitan project.

The agriculture sector in Sabah Development Corridor is focusing on increasing overall food self-sufficiency, planting high-value crops for export and assisting in poverty eradication. Programs to be launched will increase participation from rural communities and Agropreneurs in the global supply chain, where productivity is driven via better agronomy practices, application of ICT and biotechnology, and state-sponsored R&D.

Organized planting presently occurs only for key industrial crops such as oil palm, rubber and cocoa while other agricultural activities remain largely fragmented. Therefore, the immediate imperative is to enhance the scale and productivity of other crops, namely commercial and food crops.

Promoted agriculture sub-sectors include aquaculture, deep sea fishing, livestock and horticulture Collection centre with professional management will be formed to enable the distribution and flow of agricultural produce to

end customers and processing centre. Anchor projects include Sabah Agro-Industrial Precinct (SAIP), National Marine Aquaculture Centre, Keningau Integrated Livestock Centre, Seafood Terminal, Permanent Food Production Parks, and upgrading of fish landing sites.

Conclusion

Modernization and higher technology agriculture in Malaysia mainly focused on the strategies laid out during the eighth and ninth Malaysian Plan to improve the agriculture from the traditional to the modernized form of Agriculture, in line with the advanced in industry, technology and ICT. The livestock industry is being integrated with commercialization of technology which actively adopting modern approach and farming on large-scale basis.

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