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THE DEVELOPMENT OF AGRICULTURAL EXPORTS

IN MYANMAR (1988-2008)

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THE DEVELOPMENT OF AGRICULTURAL EXPORTS
IN MYANMAR (1988-2008)

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Ma Yi Aye

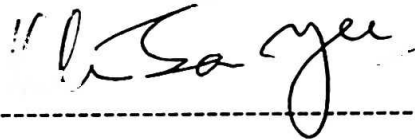
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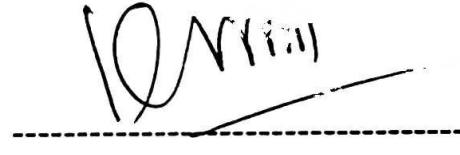
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CERTIFICATION

I hereby certify that content of this dissertation is wholly my own work unless otherwise referenced or acknowledged information from sources is referenced with original comments and ideas from the writer him/herself.

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Abstract

This study is made focusing on the development of agricultural export in Myanmar with special reference to two main agricultural exports rice, beans and pulses. The main objective is to conduct a result-oriented study on Myanmar's rice, beans and pulses for effective export promotion after 1988. A conceptual framework is constructed to know the determinants of Myanmar's agricultural exports. Agricultural export is determined by supply-side factors, demand-side factors and the government policies. Production instability index, export demand functions and export supply functions and the export similarity index are calculated to meet the objective within the framework.

From 1901 to 2008, Myanmar's rice export had passed through three phases of export performance. The largest volume of rice amounting to 2 to 3.0 million tons was exported during 1901/02 through 1928/29. During 1947/48 to 1961/62 it had gone down to 1 and 1.5 million tons, recording as the second largest volume. Between 1963/64 and 2008/09 it still went down to 0.5 to 0.1 million tons, recording the smallest volume of rice exported. Myanmar's rice export had the largest market share in the western developed countries during the 19th century. But in the 20th century Myanmar's rice export had diverted to Asia and Africa developing countries because of poor procurement system of quality rice, Myanmar could not sustain export demand and this went on until 2003. Government control over rice for more than 50 years was the major cause for poor export performance Myanmar's export position among world rice exporters have fallen to 21st place in 2008.

After 1988 with a high annual growth rate of 30.42 percent, pulses and beans became Myanmar's largest agricultural export item. This growth rate was achieved through significant increases in sown area and production. Myanmar's regular importers are India, Singapore, Indonesia, Korea, Pakistan, Malaysia, Japan, UAE, China and Thailand with India importing as much as 70% of the total. Under the SPDC Myanmar became the world's second largest exporter and a leading country in production and exporting of pulses and beans among the ASEAN.

Myanmar's demand and supply functions of rice for the period 1989-2008 indicated that rice export supply was determined by the coefficient of relative price (0.35), and the coefficient of domestic capacity (3.69) while export demand by the coefficient of world income (1.72). Beans and pulses export supply of Myanmar was determined only by the coefficient of the domestic production capacity (1.56) and export demand by the coefficient of the relative price (75.357) and the coefficient of the world income (0.001). Export similarity index for inter-regional trade indicates that in order of importance of Myanmar export potential for beans, pulses and rice market: China's market is the first, Malaysia's markets the second, and Singapore's the third. However, trade potential of pulses and beans as a whole would place India in the first position. Most successful agricultural export item of Myanmar is beans and pulses.

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Any remaining errors are the sole responsibility of the author. The finding, interpretations and conclusions expressed in this dissertation are entirely those of the author and should not be attributed to the others.

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Lists of Abbreviations

AFTA	Association of Southeast Asian Nations Free Trade Area
AMD	Agricultural Mechanization Department
ARI	Agricultural Research Institute
ASEAN	Association of Southeast Asian Nations
BSPP	The Burma Socialist Programme Party
EU	European Union
FAO	Food and Agriculture Organization
FDA	Food and Drug Authority
FE	Foreign Exchange
FTA	Free Trade Area
GDP	Gross Domestic Products
GMS	Greater Mekong Sub- region
HYVs	High Yield Varieties
LAN	Local Area Network
LC	Letter of Credit
LDCs	Less Developed Countries
MADB	Myanma Agricultural Development Bank
MAFPTC	Myanma Agriculture and Farm Produces Trade Corporation
MAPT	Myanma Agricultural Produce Trading
MAS	Myanma Agricultural Service
MEB	Myanma Economic Bank
MEIC	Myanma Export and Import Corporation
MFTB	Myanma Foreign Trade Bank
MICB	Myanma Investment and Commercial Bank
MOAI	Ministry of Agriculture and Irrigation
NGOs	Non – governmental Organizations
NIES	Newly Industrialized Economies
NMS	New Member States

OECD	Organization for Economic Co-Operation and Development
OPEC	Organization of Petroleum Exporting Countries
RCA	Revealed Comparative Advantage
SAB	State Agricultural Bank
SAMB	State Agricultural Marketing Board
SEE	State Economic Enterprise
SLORC	State Law and Order Restoration Council
SPDC	State Peace and Development Council
SPP	Summer Paddy Program
UMFCCI	Union of Myanmar Federation of Chambers of Commerce and Industry
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

Chapter 1

Introduction

Myanmar is the largest country in mainland Southeast Asia. It has a total land area of 261228 square miles. Geographically, Myanmar shares borders with Laos and Thailand in the East, Bangladesh in the West, China in the Northeast, India in the Northwest, and the Bay of Bengal in the Southwest. The Rakhine Yoma, the Bago Yoma, and Shan Plateau ranges run from North to South. These mountain chains divide the country into three major river systems; the Ayeyarwady, the Sittaung, and the Thanlwin. There are over 100 national races in Myanmar, mostly belonging to a Tibetan family of the Mongolian races and the majority of Myanmar's people are Myanmars, but Kachins, Kayahs, Kayins, Chins, Mons, Rakhines, and Shans also constitute a significant proportion of total population.

In 2008/09 the total population of Myanmar was estimated at 58.38 million, urban population is 17.835 million and rural population is 40.544 million. Since more than two thirds of Myanmar lives in rural areas, agriculture becomes the main source of livelihood for the people in Myanmar. According to the labour force survey of 1990, the agricultural labor force was 56.47 per cent of the total labor force (See Appendix Table 1.1).

In 1953/54 Myanmar's GDP share of agriculture was 44.73 per cent while it was 12.86 per cent in industry and 42.5 per cent in services. In 2008/09 the GDP share of agriculture was 40 per cent, industry was 22.7 per cent and services were 37.00 per cent (See Appendix Table 1-2). It indicates that the share of agriculture in GDP has not fallen much in Myanmar in the course of the past 55 years. Agricultural sector, industries and services contribution to GDP or production structure of Myanmar has not changed much during this period. There is lack of structural change in Myanmar and Myanmar's experience is somewhat unique in that, there was a rise in the share of agriculture and stagnation or decline in the shares of industry and services over the past 55 years.

The agriculture sector is the most important sector in Myanmar. More than 60 different crops are grown all over the country, owing to a wide range of favorable climatic and relevant growing conditions. There are nine crop groups such as cereals,

pulses, oil seeds, spices and condiments, tobacco and betel, beverages, vegetables and fruits, fibers and miscellaneous as classified in the statistical year book . According to the sown area, 48 per cent of the area was under cereal cultivation, the most important crop group, while 22 per cent of it was under beans and pulses cultivation which was the second most important crop group in 2008-09 (See Appendix Table 1.3). Among cereals products, 92.44 per cent of total cereals sown area was occupied by paddy. So, this study focuses on paddy, beans and pulses.

Shares in value of merchandize export of Myanmar from 1988/89 to 2008/09 are shown in Appendix Table (1.4). Traditionally the export items of Myanmar are rice and rice products, pulses and beans, teak, hardwood, rubber and fish and fish products. Among these items, rice and rice products export contribution to total export earnings was 2.8 per cent in 1988/89 and 3.6 per cent in 2008/09. Beans and pulses export contribution to total export earnings was 2.5 per cent in 1988/89 and 10.2 per cent in 2008/09. In 1988 rice, beans and pulses export level was within top five export items, but in 2008 beans and pulses was the first export item, teak became second and rice and rice products took in the third position among traditional exports. Teak export contribution decreased from 29.3 per cent in 1988/89 to 6.8 per cent in 2008/09. Among the traditional exports in 1988/89, teak's contribution became 29.3 per cent and it was the first export item. In 2008/09 export contribution of beans and pulses was 10.3 per cent which was the first export item. Rice and rice products exports' contribution to total export earnings was increasing, but beans and pulses contribution was increasing more than five times and teaks export was decreasing more than four times. Agriculture, including livestock, fisheries and forestry is the most important sector for Myanmar's economy. Agriculture products' contribution to total export earnings was decreasing seriously because of the fall in the earnings from teak and hard wood (See Appendix Table1.4).

In 2008, a new export item, natural gas was added to exports, so there were thirteen export items. Among these export items, agricultural export items were still important because of pulses and rice. In the top four export items, natural gas is a nonrenewable natural resource. Teak and hard wood are long term renewable natural resources and agricultural as well as fishery resources are reproducible resources. Such resources are better than export of other non-renewable natural resources for a country. So export promotion of agricultural products is one of the impacts on the

development of Myanmar. Moreover, two-thirds of the processing activities of the manufacturing sector are agro-based and exports are dominated by primary products so Myanmar has an agricultural economy based mainly on agricultural products and other primary products. Rice and pulses production plays a major role not only in the agricultural sector but also in the agricultural export, thus it is necessary to study these in detail for further enhancing its performance.

1.1 Overview on Development of Myanmar Agriculture

1. Pre - Independence Periods

In the 1800s, the Myanmar Kingdom consisted of a population of about 5 million, mostly living in the dry central part of the country. The economy was based almost entirely on agriculture with a domestic textile industry which was adequate for local needs. Rice, fish and salt were also supplied from the rich plains of lower Myanmar. Land in these plains was abundant, but cultivation was extended only to meet the needs of a slowly expanding population. At that time beans and pulses have been grown in Myanmar. The traditional cultivation method was used and farming was based on a mutual aid system as it was a family enterprise. Small scale farming was common and farms were individually owned and there was no landlordism. The position of Myanmar in the 1800s was a self-sufficient economy based on subsistence agriculture¹.

The Myanmar kings followed a mercantilist policy², that is, restriction of imports and accumulation of gold until the mid-nineteenth century. The Burmese ruler imposed many duties and restrictions on the merchants who traded in the country. The country was largely isolated from the world economy, except for a certain amount of overland trade with China and for an export trade in teak.

Rice development was initiated by the British after the second colonization stage. By putting the Ayeyarwady area under rice cultivation the British government encouraged production expansion in every possible way. Land, labor, and capital are the three main resources necessary for rice production. Favorable deltaic land was there. There was also an attractive land tenure system. A person who turned jungles

¹ . Binns, B O., *Agriculture Economy in Burma*, Supdt. Gov. Printing and stationary, Rangoon, Burma, 1948, P 21.

² Tun Wai, *Economic Development of Burma from 1800 to 1940* , University of Rangoon, Rangoon, 1961, p 21.

into paddy fields owned those fields and they obtained tax exemption for 12 years on newly cleared land and government loans for development in rice production. . The British government introduced an immigration scheme to induce the people from Upper Myanmar and India to move to Lower Myanmar. European banks, Indian money lenders and private money lenders made loans available to the farmers who wanted to turn jungles into paddy fields.

The major policies³ used to help develop the rice sector under British Colonial rule were as follows:

- (1) Setting specific grades and standards for rice to facilitate trade, e.g. standard varieties defined;
- (2) Assisting in the transmigration of settlers from Upper Myanmar to Lower Myanmar and in the immigration of Indians to settle in Lower Myanmar to develop the Ayeyarwady Delta for rice;
- (3) Improving river and rail transport to facilitate north-south movement between Upper Myanmar and the delta;
- (4) Providing tax exemption for 12 years on newly cleared land;
- (5) Providing government loans for development in the rice industry (not used much by farmers);
- (6) Providing Legal protection for private money lenders and other investors to support development of the rice sector;
- (7) Constructing embankments at government expense in tidal swamp areas to prevent flooding and encroachment of saline water;
- (8) Providing improved rice seeds to farmers, particularly to improve milling outturn (reduced variation in grain size);
- (9) Encouraging the rice milling industry and trade, both internal and external, by holding many commercial firms and private enterprises; and
- (10) Providing a secure ownership title to property owners; and providing a “laissez faire” competitive environment with minimal government intervention in production or trade except for maintaining basic law and order.

³Hla Kyaw, "Analysis of the New Rice Market Liberalization Policy in Myanmar", Unpublished Master of Public Administration thesis, Yangon Institute of Economics, December, 2004.p 26

The growth of the rice export was quite slow until the opening of the Suez Canal in 1869. With the opening of the Suez Canal, domestic agriculture gave place to commercial agriculture⁴. As soon as cultivators understood that more land could produce larger crops and gain more money, they began to take up all the land they could. They bought or cleared the land for cultivation. In Lower Myanmar there was a wide area of land available for occupation and this was rapidly taken up for rice cultivation. According to the crop sown area, rice was grown on the largest area, oil-seed on the second largest area and beans and pulses on the third largest area (See Appendix Table 1.5). Rice, beans and pulses sown areas were increasing. Rice sown area increased nearly twice. Farmers needed loan for farming. In 1939, about one third of all agricultural land in Myanmar and about half of the agricultural land in Lower Myanmar were transferred into the hands of non-agriculturalists or the money lenders because of the credit system (See Appendix Table 1.6). The socio-economic situation of the small landowners, tenants and agricultural laborers grew worse and worse while export earnings increased year by year. These social and economic inequalities led to the adoption of socialist policies after independence.

The earliest British administration in Myanmar adopted a policy called "*laissez faire*" policy or free trade policy. Myanmar was the "No. 1 Rice Exporter" and was called the "Rice Bowl of Asia" and the rice industry or agricultural sector became the leading sector. Export as percentage of production was increasing from 64 per cent in 1880 to 71 per cent in 1940 (See Appendix Table 1.7).

Agriculture was extremely and successfully commercialized during the British colonial rule and the rice industry was a major source of income in Myanmar's agricultural export. Other income sources came from forest products, petroleum, mineral products and beans and pulses were only a small portion of total exports. Under the British government, Myanmar's rice export was at the highest level, and the exported amount was roundabout 2.0 to 3.0 million metric tons before the Second World War (See Figure 1.1).

⁴ Furnivall. A. and J. Latham, *An Introduction to the Political Economy of Burma*, People's Literature Committee & House, Yangon, 1975, P-43.

Figure (1.1) Myanmar Rice Export from 1901/02 to 1987/88

Export (000 mt)



Source: Appendix Table (1.8)

Until the nineteenth century the western market was the chief source of Myanmar rice market. The Eastern market was monopolized by Bangkok and Saigon. Since then, the share of Myanmar's rice export in European markets dropped to 13 per cent, while India and Sri Lanka took 59 per cent of Myanmar's export in 1930-39. Unlike the European market, India and Sri Lanka gave preference to the cheaper bold-grain C type. Due to the nearness of India and Sri Lanka markets, Myanmar enjoyed a more favorable and competitive position than Thailand and Indochina. In 1941 over a million areas were sown with various kinds of beans and pulses, 244000 tons were produced and 102,000 tons were exported.⁵ During the British colonial era, Myanmar started to export beans and pulses to India market but not much. The economy achieved a great expansion of production in a number of sectors. The whole process of agricultural development was facilitated by enacting the necessary legislation and introducing various incentives by the government.

The factors in the development of agricultural export during the colonial period were rice area expansion, immigration to lower Myanmar, loans for cultivation, new businesses access of export to Europe market, facilitated by the opening of the Suez Canal and the abolishment of the prohibition of rice export by the British administration. The whole process of agricultural development was facilitated by enacting the necessary legislation and introducing various incentives.

⁵ Andrus, J. Russell., *Burmese Economic Life*, Oxford University Press, London, 1947, p-47.

During World War II (1942 to 1945), the agricultural infrastructure was seriously damaged, Myanmar farmers grew rice mainly to meet their own needs and most of the agricultural lands were already turned into jungles.

2. Post - Independence Periods

After the war and in the Post Independence period, in order to abolish landlordism and to bestow land ownership to the farmers, the Land Nationalization Act 1948 was reviewed and repealed and a new act was passed in 1953. The main objectives of the Land Nationalization plan was to abolish landlordism from its very foundation, to distribute the land to the cultivators and introduce a new rural economy and build a new order for the cultivators. The Government confiscated the agricultural lands within 1953/54 and 1957/58 and some lands were exempted and some were redistributed. The Government implemented the Land Nationalization Programme in 32 districts and a total of 3 million acres of agricultural land were exempted and redistributed in that period. But because of various political and administrative problems and constraints the Land Nationalization Programme was abandoned and ended in 1958. Actually only one sixth of the areas of holdings were nationalized and more than 16 million acres were remaining to be nationalized at that time. Food grain policy objectives adopted by the new independent country of Myanmar from 1948 to 1962 were as follows:

- (1) Maintaining food self sufficiency and foods security;
- (2) Improving consumer welfare by subsidized sales of basic food grains, particularly rice;
- (3) Expanding food grain production for promotion of export and raising government foreign exchange (FE) via implicit export laws for food grains;
- (4) Keeping domestic food grain prices low to maintain a low cost of living to contribute to socioeconomic stability;
- (5) Giving farmers a guaranteed minimum price to maintain stability of farm production and income; and
- (6) Stockpiling rice to stabilize the market and domestic price.

A central feature of Myanmar's rice sector policy since independence was government's control of exports while the distribution for domestic consumption was operated by free market agents. Domestic free trade prevailed at both the wholesale

and retail levels; farmers were completely free in their choice of crops and the markets in which they sell until 1962. However, there was also some intervention in domestic retail marketing to distribute subsidized rice to the poor. Other wholesaling and retailing of food grains continued to be conducted by private traders in a free trade environment.

There was unrest in rural areas due to the internal insurrections caused by various ethnic groups and armed rebellions of the communist party. Farm laborers engaged in rice production could no longer live in rural areas and most of them migrated to the towns. This situation caused labor scarcity in rice production and only (12) million acres of rice could be cultivated.

Under the Parliamentary Democracy Period, rice was the largest sown area, oil-seeds the second largest area and beans and pulses the third largest sown area (See Appendix Table 1.5). Rice sown area was increasing but beans and pulses sown area was decreasing because the demand for rice was very high due to Korean War and the government encouraged rice cultivation rather than beans and pulses. The changing structure of cropping areas was a clear reflection of the changing structure of incentives as well as the responsiveness of farmers to changes in relative price incentives of rice and beans and pulses.

In 1945/46, the State Agricultural Marketing Board (SAMB) was the main responsible organization of the government in rice production and export. Until 1961/62, the official procurement of rice by the government was for the purpose of export and for maintaining a stock for emergency use. SAMB tried to handle the following:

- (1) To assume all rice export marketing functions which had previously been performed by foreigners;
- (2) To provide revenue for development plans by profiting from the difference between the purchase price given to farmers and the export price received for rice;
- (3) To provide a guaranteed price and the stability necessary to encourage cultivators to expand their paddy acreage; and
- (4) To maintain price stability in the entire economy, and especially in urban wages, by holding down rice prices.

The state procurement system operated within an open market framework, where farmers could make their own decisions as to what to produce, how to produce, and who to sell. The SAMB bought rice from millers, middlemen, cooperatives, and farmers.

After independence in 1948, agricultural production had just reached the pre-war level in 1959/60 (See Appendix Table 1.8). At that time, rice export percentages of production was decreasing and half of that of before the Second World War. Export as percentage of production decreased from 71.5 per cent in 1940 to 35.9 per cent in 1950 (See Appendix Table 1.9). Between 1948/49 and 1960/61, the official procurement price of rice was kept constant and well below the export price. This system not only kept inflation rates at low levels but also contributed greatly to capital formation⁶. The official procurement by the government doubled from a little over 1 million tons to more than 2 million tons during 1948 and 1954, which was mainly due to increased demand for rice created by the Korean War. After the end of the Korean War in 1954, domestic procurement declined but still remained around 2 million tons per year for sixteen years from 1948/49 until 1962/63 (See Appendix Table 1.8).

Under the Parliamentary period, the SAMB exported rice either through government-to government sale or open sale through international tender. The first type commanded a price that was 10-15 per cent lower than that prevailing in the international market. Goodwill and other reciprocal measures characterized the transaction. Two-thirds of the rice exported was sold on a government-to government basis. Of the 30 importing countries, only 4 were major buyers: India, Indonesia, Sri Lanka, and Japan. During the early 1950s, a sellers' market prevailed and the rice trade posed no quality or transport problems. There was hardly any trade dispute. But with the passage of time, as major buyers became self-sufficient, rice trading became difficult. Under the parliamentary government, after the second World War, Myanmar's rice export was at the middle exporting level, and rice export fluctuated between 1.0 and 1.858 million metric tons and the maximum volume of rice export was 1.858 million metric tons in 1956/57 (See Appendix Table 1.8). At that time, Myanmar became the second largest rice exporter in the world market and under the free market economy rice export enjoyed impressive increasing trends.

⁶ Myanmar Agricultural Produce Trading , *History of Rice Marketing in Myanmar*, Ministry of Commerce, Swae Taw Press, No. 07053, Yangon, Myanmar, 2004, p-84.

The factors in the development of agricultural export during the Parliamentary period were as follows: the production could not meet the pre-war level and there was insufficiency of budget for paddy land development, instability of existing policies and insurgency of multi-ethnic' groups. The changing structure of cropping areas was a clear reflection of the changing structure of incentives as well as the responsiveness of Myanmar farmers to changes in relative price incentives of rice and beans and pulses.

After the Revolutionary Council came to power in March 1962, the Socialist Republic Government added two more new objectives to the earlier Parliamentary Democracy list of six and these were:

- (1) To encourage food grain production by subsidized sales of inputs, free provision of agricultural extension services and cheap agricultural credits; and
- (2) To introduce scientific methods and improved cultivation practices in agriculture to raise per-acre-yields and total output.

During the socialist period, agricultural policy implied the following two elements; first, food prices were repressed and wages kept low in order to promote industrialization and, second, export crops were purchased at below the international price, with the resulting revenues used to promote industrialization. The Revolutionary Council gave priority to agricultural Development. However, after 1964/65 this changed again to an emphasis on industrial development. Government intervention and controls were introduced to cover almost all activities of food grain production, procurement, distribution, milling storage, transportation and domestic wholesale and retail trade etc. The agricultural development programme, which aimed at abolishing landlordism and improving the social and economic conditions of the peasantry, was launched.

In 1963, the first Tenancy Law was decreed by which the right of tenancy of land was vested in Agrarian Committees composed of farmers at the village level. According to the Farmers' Rights Protection Law of 1963, the rights of all cultivators were protected. Beginning from 1964, all lands within the sovereign territory of Burma was declared to be owned by the state. Since all lands have been declared as state owned property, the farmers naturally became the state's tenants and were given only the tilling rights. Food grain growers became obligated to sell a fixed quota of

their food grains, the “Compulsory Delivery Quota” to the government at a fixed price. The policy emphasis of the socialist government was put on consumer welfare with extensive use of food subsidies and private marketing was limited. The government subsidized the sale of rice to consumers and distributed rice through the state economic enterprises (SEEs). The agricultural sector was relatively stagnant from 1962 to 1973 as there were no significant improvements in technology or institutions; the production level was determined mainly by the weather and the government procurement prices were not changed remarkably (See Table 1.10).

AFPTC opened many temporary procurement centers. From these centers, rice was transported to the mills by the State operation. Before the annual rice harvest, the Ministry of Trade would announce the procurement prices of different types and grades of rice. Prices were fixed for 100 baskets (or 2100 kg) in January and February, increasing by 10 Kyat from March to June, and again by 5 Kyat from July to December. The government procurement prices changed three times during 1962/63 and 1985/86 (See Appendix Table 1.10).

A new socialist government formed in 1971 established high growth targets for the agricultural sector. The cultivated lands of the country had been classified into the "planned areas" and "non-planned areas". That is, the farmers have no free choice of crops to be grown, and only the planned crops must be grown in the planned areas. There were 19 major planned crop varieties including paddy and a large majority of farmers and sown areas had unavoidably been included in the 'planned areas'. The quota of rice to be delivered to the government was determined mainly by the sown area and yield. Any residual above the compulsory delivery can be sold to the state procurement agency, which offers a price 33 per cent higher than the initial (procurement) quota price. Alternatively, farmers can sell the residual to the free market at prevailing market prices. For “non-planned” crops farmers were given a free choice to produce and sell. There were different prices; the black market prices were higher than the legal free market prices. The black market became eventually a dominant part of the economy.

The Burma Socialist Programme Party (BSPP) created the Peasant’s Asiayone (organizing committee) to give ordinary peasants easy access to the government. The Department of Agriculture had also established state-owned model farms at respective areas throughout the country to demonstrate the new scientific technologies in

agriculture. The rice technology package was introduced through the government extension service in a major campaign in 1973. Experiment stations were established to conduct location-specific research in all administrative regions by the early 1970s. Rice procurement prices were more than doubled from 1972 to 1974. Other inputs were also subsidized. From 1972/73 to 1986/87, the agricultural sector was improved because of the support of government institutions and technological change. The Green Revolution and Institutional Supporting Program (or) the Whole Township Paddy Production Program was introduced in Myanmar in 1977/78, and the Program was increased year by year. During the period from 1977/78 to 1982/83, Myanmar's yield of rice was significantly increased. After the 1983/84 to 1987/88 periods, sown acreage, production and yield of rice did not remarkably change.

Under the Socialist period, from 1977/78 to 1982/83, Myanmar's yield of rice and beans were significantly increased because of the Green Revolution. At that time, rice was the largest sown crop and beans & pulses was the third largest crop group (See Appendix Table 1.5). Rice and beans and pulses sown area was decreasing because of the government procurement price and quota system. Farmers changed to grow other crops which were more profitable and had more incentives. Rice, beans and pulses were planned crops and oilseeds and others were non planned crops.

At that time, Rice trade was handled by traders, millers, and the SAMB until 1963. The government took over the rice trade in 1964 and entrusted the business to Trade Corporation No. 1, (this was later called the Agriculture and Farm Produce Trade Corporation [AFPTC] in 1976) under the Ministry of Trade. The AFPTC was tasked with rice procurement and processing. Myanma Export and Import Corporation (MEIC) under the same Ministry was in charge of export. AFPTC and MEIC replaced SAMB in supervising the whole rice trade. Rice export was directly controlled by MEIC as the government's sole agent. In addition, private rice milling and intra-state transportation of rice were strictly controlled by the government. After internal distribution, the surplus rice procured by AFPTC was exported by MEIC. The volume of AFPTC-procured rice went down, leaving a small amount available for export after internal distribution.

Export as percentage of production was decreasing from 38 per cent in 1962 to 9 per cent in 1985 (See Appendix Table 1.11). Since then, the AFPTC rice procurement system has been modified many times but there has been no appreciable

result. At that time, paddy production was increasing but rice export was decreasing and official procurement in relation to production declined consistently and continually from 1964/65 until 1986/87 (See Appendix Table 1.11).

The growth rate of official procurement during 1963/64 to 1987/88 was 1.97 per cent per annum while population increased at the rate of more than 2 per cent per annum. Domestic utilization increased because of increases in population and also because the amount of rice available for domestic use was increasing. At that time, government price was lower than market price, so peasants did not want to sell to the government. However, the rate of growth in per capita consumption was lower than that of total domestic availability and production of rice was diverted to illegal exports to neighboring countries. Complete data on these illegal exports was not available. However, the combined effects of reduced exportable surplus because of an increase in domestic consumption, a decrease in official procurement, and the diversion of a considerable amount of rice to both the internal and external legal and illegal trade caused official exports to decline drastically after the mid-1960s (See Appendix Table 1.8 and Appendix Table 1.11.) The outcome was a chronic food shortage and the development of "Black Markets". The State had monopoly control on all internal and external trade in rice. Individual incentives for increasing productivity and output were minimal.

Under the Socialist regime, the reduction in rice export was mainly due to the priority given to distribution of rice for domestic consumption rather than export. Four selling practices were followed: government-to-government sale, direct sale, tender sale, and barter sale. Government-to-government sale fetched a price lower than the international market price, but goodwill and other reciprocity measures were considered in such transactions. Direct sale to private firms with a long business association with the country was also practiced. Part of the export was also made under the international tender system, while some followed the barter system.

India was the major importer of beans and pulses from Myanmar before 1962. However, the India market for Myanmar beans and pulses had collapsed because the Indian government wanted to save foreign exchange. At the same time, the Myanmar Exporters Association started marketing to international markets and achieved a market share in the Japan market. The volume of export of black gram and green gram from Myanmar had taken the share to reach 90 per cent of all Japanese's beans import in 1960s. Myanmar matpe (black-gram) was very popular during the decade of

1960s. After that the Japan market shifted to Thailand between 1970 and 1980 because of the joint research between Thailand and Japan Sprouting Bean Importers Association and also due to the lessened production under the socialist government. During the socialist era rice, beans and pulses were planned crops. The reduction in rice export was mainly due to the priority given to the distribution of rice for domestic consumption rather than for export. Rice export became uncompetitive due to the quality of rice, the quota delivery system and the fixed exchange rate system. Exporting countries were not constant and direction of export was changing from year to year. There was lack of a regular and assured market.

Government policy on production, procurement, distribution, milling, storage, transportation, domestic wholesale and retail trade and export were different under different administrative periods. Crops sown pattern were not changed, rice was the largest sown crop and beans & pulses was the third largest crop group but the reasons for decreasing and increasing of sown area were different under different governments and different profit and incentive situations. In other words, sown area or production were changed according to the different government, profit and incentive situations.

Under the different administration periods, the higher the degree of government control on export the lower the export percentage of production. Myanmar's export market was changing from European developed markets, to developing markets. Exporting countries were not constant and direction of exports was varying from year to year. There was lack of regular and assured markets because of macroeconomic policy, changing human consumption patterns, exchange rate system, product quality and also because some importing countries became self sufficient and/or exporting countries.

1.2 Rationale of the Study

Since colonial period successive Myanmar government has given priority to the development of the agricultural sector. The development in the national economy has now reached to a stage where industrialization efforts of the country should first get impetus from agricultural productivity via export promotion of the country. Hence, this study is intended to reach to that end after making a tracer-study on the successive agricultural events since the colonial period.

During the colonial period (1860s to 1940/41), Myanmar achieved its first agricultural development. From the state of a subsistence-economy before the annexation, Myanmar became the biggest exporter of rice and rice products. The main driving force was the area expansion. But the dynamic and educative effect was lacking. However the benefits of the agricultural development was channeled out of the country, leaving very little for the local agricultural sector, and there was no improvement socially and economically in the rural sector. The whole process of agricultural development was facilitated by enacting the necessary legislation and introducing various incentives. Most of the rice cultivators became landless and had only inadequate living standards. These social and economic inequalities led to increased government intervention, and the adoption of socialist policies after independence.

In the period from 1885 to 1948, the rice export market for Myanmar was the European market. Although Myanmar was under the British colony, the rice export volume of Myanmar was the highest in the history of Myanmar's rice export because the British government adopted a free trade policy at that time. In addition, the production of rice increased mainly due to the cultivated area expansion rather than to the technological advancement in crop cultivation. However, this unique achievement of highest rice export was followed by discouraging export scenarios.

The agricultural sector came across a static and stagnant period for more than one quarter of a century. The performance of rice production was so poor that there was no substantial increase in productivity or in volume. National unrest and the lack of adequate institutional factors such as land reform, credit system, pricing policy, and incentives along with no substantial change in technology, had substantial negative implications on the agricultural production at that time. This in turn led to the

situation where there was no significant change in the social and economic situations in rural areas. At that time, paddy sown area was decreasing, beans and pulses, sesames, ground-nut and sugarcane sown areas were increasing because of the changing structure of cropping areas and the responsiveness of Myanmar farmers to changes in relative price incentives.

In the Parliamentary Democracy Period from 1948 to 1962, there were low investments in the utilization of farm equipment and fertilizers, political instability and multi-insurgencies in Myanmar. Consequently, the sown area, yield, production and agricultural export decreased. But, at that time Myanmar could still manage to be the second largest rice exporter in the World market, because the government controlled only the external market and left the internal distribution for domestic consumption to the free market agents. In addition, farmers were allowed to make their own decisions in crop cultivation. Moreover, there was no black market at that time. Therefore the rice export volume of Myanmar was quite impressive although the export volume of this period was lower than that of the colonial period.

Between 1950 and 1952, the sown acreage of pulses decreased because the demand for rice was very high due to Korean War and the government encouragement to cultivate rice restrained beans and pulses output. The sown acreage of rice had been increasing gradually since then and it reached to 1.416 million acres in 1960/61, which was nearly the same as the sown area of 1936/41.

Under the Revolutionary Council and Socialist government from 1962 to 1988, as an agricultural revival a second agricultural development was observed after 1973. The decisive factors were the Green Revolution and Government's support programs. Although rice production increased, Myanmar rice export declined considerably.

According to the sown area, paddy was the largest crop, oilseed was the second largest, and beans and pulses was the third largest crop. The area under crop groups remained the same but participation of crop groups changed. Paddy, beans and pulses' participation decreased because of planned crops and quota system; however, oilseed and others' participation increased because these were non planned crops. Individual incentives for increasing productivity and output were minimal.

Being an agriculture-based economy; Myanmar development strategy to a large extent is dependent on agricultural productivity and agricultural export oriented development efforts. In the modern world economy the fastest growing Newly Industrialized Countries in South and South East Asia were once primary export led growth developing countries. Myanmar is now at a fortunate and advantageous position with economic and political reforms taking place very rapidly to go for unprecedented economic development through agricultural productivity. Therefore, it is assumed to be viable to go into a deep study supportive of the development of agricultural export in Myanmar that could be the root of comprehensive national economic development of the country.

It is intended to conduct a retrospective study of the background situations that existed in the successive eras since the colonial period and also by deploying a conceptual framework, a research and analysis will be made on the situation after 1988. Subsequently as regard with changes in exports of rice, pulses and beans, these resulted from government policies, cropping pattern, supply conditions and agricultural export. Determinants, statistical indicators and indices like production similarity index, export similarity index, export demand function and export supply function were calculated with the earnest hope of arriving at a policy conclusion in this thesis and be supportive to the development efforts which the country is making with speeded momentum.

1.3 Objectives of the Study

Myanmar's agricultural production and exports are changing remarkably. The main objective of the thesis is to conduct a result-oriented study on Myanmar's important export crop production like rice, beans and pulses for effective export promotion under varying strategies and policies of the Government after 1988.

1.4 Scope and Limitations of the study

This study focuses on the market-oriented economic system period covering from 1988 to 2008. Agriculture export development and policy changes are described for the period up to 2010 but for the econometric analysis the data used are taken from 1988 through 2008 because of the availability of data. The effect of economic reform on export promotion of rice, beans and pulses under varying constraints is examined. This is followed by analyses on production variation associated with internal trade

and food security, the determinants of exports and Myanmar trade potential in neighboring markets.

Agriculture consists of crops, livestock, agro forestry, and aquaculture but this study does not include livestock, agro forestry, and aquaculture because they require vastly different analyses. This study is designed to derive some conclusions concerning Myanmar's main agricultural exports such as rice, beans and pulses.

1.5 Research Methodology

In attempting to achieve the objectives, descriptive method and relevant econometric models are used based on secondary data. For internal trade for food security in Myanmar, rice, beans and pulses productions variability are tested by calculating production instability index for the Union level and the States and Regions (former Divisions) level. Export demand functions and export supply functions are analyzed for the determinants of export. Export similarity index of rice, beans and pulses are also measured with a view to assessing the potential for agricultural trade with neighboring countries.

This study uses secondary data which are from various issues of National Income of Burma, Report to the People which later became known as the Report to the Pyi Thu Hlut Taw in 1974 and then as Review on the Financial, Economic and Social Conditions in 1989, Statistical Yearbook, the Agricultural Statistics Department of the Ministry of Agriculture and FAO STAT, UNCTAD and WTO from internet websites. There is lack of reliable data on Myanmar's illegal trade.

1.6 Organization of the Study

This study focuses on the development of agricultural exports in Myanmar after 1988 and it is divided into six chapters.

Chapter 1 gives the general introduction to the study. It elucidates the introduction overview on development of Myanmar agriculture, rationale for the study, objectives of the study, scope and limitations of the study, research methodology and organization of the Study.

Chapter 2 elaborates the literature review for the research problem in support of the important characteristics of agricultural exports, agriculture export and

economic development, macroeconomic policy and agricultural development, brief review on agriculture and trade theories and conceptual framework for the analysis.

Chapter 3 gives Government policies on production, distribution and trade of agricultural products after 1988 including the State Law and Order Restoration Council period and the State Peace and Development Council Period with a focus on Myanmar's trade institutions and facilitation for export promotion and liberalization.

Chapter 4 contains an analysis on changes in patterns of agricultural crops, farm inputs and facilities and price, procurement and production. It also shows the instability situation in rice, beans and pulses production at the Union level and at the States and regions level.

Chapter 5 gives an analysis on changes in patterns of agricultural export in Myanmar after 1988. It deals with Myanmar's rice, beans and pulses export volume and markets, determinants of agricultural export and a comparative study of Myanmar, China, India, Thailand, Malaysia and Singapore's agricultural sector and agricultural export and potential for agricultural trade in neighboring markets.

Chapter 6 is a synthesis of findings from chapter three; four and five in light of the research study undertaken. It embodies the summary and policy implications of the study.

Chapter 2

Literature Review

2.1 Important characteristics of agricultural exports

Most LDCs trade in a large number of agricultural goods which have the following important characteristics.

Commodity Concentration in Trade: This feature implies that a large number of LDCs tend to export a limited number of agricultural goods. For instance, Brazil tends to depend considerably on exporting coffee; in the case of Ghana, the major export is cocoa; Zambia's chief export is copper; Bangladesh and India depend substantially on the export of jute; India, Sri Lanka and Kenya depend considerably on the export of tea; rubber is one of the few major exportable items for Malaysia; Argentina and Thailand depend very much upon exports of food grains. In other words, trade is heavily dependent upon the exports of a few major agricultural products.

Geographic or Market Concentration in Trade: Geographic or market concentration implies that most of the major exportable goods are usually sold in a few markets of the industrialized countries. Examples are the sale of tea, coffee, jute, and cocoa, rubber in the markets of Europe, North America, Australia and Japan. Such a geographic concentration has the implication that the economic fortunes of the LDCs are strongly related to the rise or fall of the domestic and economic activities of some industrialized countries. Let us assume that India and Sri Lanka depend significantly upon exports of tea to the British market. Now, if there is severe recession in Britain for any reason, then the market for Indian and Sri Lankan tea will also be adversely affected.

Fluctuations in primary commodity prices: It has been argued that the degree of fluctuations in trading of agriculture and primary goods is significantly high or at least higher than fluctuations in prices of manufactured goods which are traded in the world market. The figures for Brazilian coffee illustrate the point; monthly fluctuations in prices in the New York trading market are very considerable. Many other agricultural goods which are exported by the LDCs show similar fluctuations. Given such fluctuations, it is easy to understand why export earnings (i.e. price x quantity of exports) of LDCs will also fluctuate under certain assumptions. The point

has been made that such fluctuations in export earnings are detrimental to the economic growth of LDCs. The theory is quite easy to illustrate. Assume that the producers of Primary good are generally risk-averse. If risk can be approximated by an index of instability of export earnings, then a high degree of instability in such earnings will induce producers to withdraw resources from the production of such goods and, under such a circumstance, output and employment will fall. If the producers were planning to commit investible resource in the production of those goods whose earnings oscillate substantially, then again production plans may be cut back and an increase of employment will not take place, and once again, economic growth will be stifled. Primary commodity prices may also fluctuate in the export market due to demand factors, two of which deserve special emphasis:

- i. The income elasticity of the demand for agricultural products is usually less than unity. This implies that 10 per cent rise in the level of income will raise the demand for the product by less than 10 per cent. Hence with economic growth and a rise in per capita income the rise in the demand for agricultural products will tend to decline in proportional terms. This will have an adverse impact on the export earnings of the LDCs.
- ii. The price elasticity of the demand for agricultural product is usually less than unity. Thus an increase in supply of agricultural products in the international market will reduce the price. Once again, the LDCs will be hard hit if their combined effort to expand production (following the principle of comparative advantage) brings down the price by such an extent that total earnings will actually fall.

The income and price inelasticity of agricultural exportable seem to suggest that the LDCs cannot win! One argument that can be advanced to escape the impasse is to raise rather than to reduce prices of primary exports because if the demand is price-inelastic, then an increase in price will raise export revenue. Unfortunately, the LDCs are generally price takers rather than price makers in the international market and as such they cannot raise the price unless they can exercise monopolistic control on the supply of a particular primary product, like oil. One of the major reasons why the Organization of Petroleum Exporting Countries (OPEC) has been so successful in raising the export earnings from oil is that the cartel of oil producers has been able to collude in production and price planning to take full advantage of their monopoly

gains as a group. But as far as other LDCs can form such cartels to create such monopolies and 'exploit the market such as Organization of rice exporting countries, Organization of pulses and beans exporting countries, Organization of oil seed exporting countries...etc.

Foreign Exchange: Foreign exchange is needed for the import of key raw materials and capital goods. Also, with the collapse in borrowing from foreign private creditors during the 1980s, many less-developed countries have been forced to generate trade surpluses to pay off external debts. The agricultural sector is often called upon to make significant contributions to these foreign exchange needs.

Many LDCs have relied on exports of agricultural commodities as their major source of foreign exchange. Others have attempted to reduce their foreign exchange needs by increasing agricultural production to displace imports of food. Import displacement that occurs without protectionist policies can be a viable strategy, particularly for countries with rapidly expanding domestic demand for food. However, if that displacement occurs as a result of overvalued exchange rates or other trade restrictions, development may be slowed.

There are gains from specializing in the particular agricultural commodities for export, but there are dangers as well, such as cyclical price fluctuations and rising protectionism in international markets.

Market Demand: As incomes rise in agriculture, the potential is created for a substantial expansion of domestic demand for consumer goods and agricultural inputs. Even though agriculture requires relatively few inputs from industry, the consumption demand generated by growing agricultural productivity provides a strong linkage to the markets for the nonagricultural sector. These linkages cause multipliers whereby increased output in agriculture leads to increased incomes in the nonagricultural sector.

A study of the linkages between agriculture and the demand for nonfarm goods in India showed that each dollar of agricultural income creates \$ 70 of value added in the nonfarm economy. Agricultural development offers the potential for rapid growth in domestic demand for labor-intensive goods and services.

Macroeconomic and International Actions: Agricultural development is affected to a significant extent by macroeconomic and trade policies that arise outside the

agricultural sector. The levels and types of taxes, spending, and borrowing can dramatically influence farm prices and input costs. Exchange rates or the value of the country's currency relative to currencies of other countries can have major effects on agricultural prices and trade. In some countries, foreign debt repayments significantly constrain growth and reduce domestic consumption. Internationally influenced interest rates and prices vary substantially over short periods of time, adding an additional measure of unpredictability to debt levels and national incomes. Foreign aid is an important source of capital, land, and technical assistance for some countries, but is often unreliable and usually comes with strings attached. Developing countries must carefully design macroeconomic and trade policies that do not discriminate against their agricultural sectors if they expect those sectors to grow and contribute to overall development. In addition, there is a need for more enlightened international institutional changes.

2.2 Agriculture Export and Economic Development

The role of exports in contributing to economic growth and poverty reduction remains controversial. Exports can only make a positive contribution both to poverty reduction and human development if certain conditions are fulfilled. Agriculture plays a central role in most developing economies, mostly in terms of its contribution to food and rural livelihood security. Agriculture exports as a share of world trade and employment in agriculture remain high for many developing as well as least developed countries.

The export growth, especially for the LDCs is too highly dependent on commodity price fluctuations, preferential access to rich markets and even less reliable external finance. At the regional level, agricultural exports of South and Central America, Africa, and their share in world exports in this category has increased markedly between 2000 and 2004. Although Asia's agricultural exports have exceeded those of North America since 2003, as a matter of fact, particularly in Asia, only a few developing countries rely on agricultural trade for a significant portion of their export revenues. While countries such as Thailand (rice and poultry) and Vietnam (rice) can be regarded as natural exporters and China is among the world's biggest exporters of agricultural products, none of the successful economies in the region have achieved higher levels of economic and human development based solely or even primarily on building comparative advantage in agricultural exports.

While natural agricultural exporters, such as Thailand and Vietnam, seek greater liberalization of agricultural trade in certain products, so as to gain better access to export markets, diversification into the more productive industrial and some services sectors which have greater potential for significant value addition has been the route that all successful exporters in the region have adopted.

Given that agriculture remains the main source of livelihood for the majority of the population in most developing countries, the sensible policy for governments and other policy makers is to ensure that import liberalization takes a back seat when domestic livelihoods and food security are at stake. In fact, the availability of cheap imports will not ensure national food security if small-scale farmer livelihoods are threatened by imports of food or non-food crops and they have no access to an alternative source of livelihood. In such circumstances, it may be better for governments to restrict trade in such products rather than risk the loss of a large number of rural livelihoods. Indeed, given the importance of rural livelihoods and the difficulties marginalized farmers face in accessing local and international markets, the policy space to use both tariffs and quantitative restrictions should be retained by developing countries to ensure the interests of their small farmers who should also be provided access to domestic and regional markets. In the WTO context, such policy space should be assured through agreement on a category of self-determined “special products” and a special safeguard mechanism with both price and volume triggers which is made available only to developing countries. Governments should also provide farmers with a minimum support price to encourage production. State trading enterprises which can play an effective stabilizing and redistributive role should also be supported to play such roles. With agricultural export competition becoming stiffer also among developing countries, enhancing domestic production capacity is crucial and greater investment in education, training, research and infrastructure development will be required.

The importance of trade as a factor for development and growth is becoming more and more evident. If accompanied by the proper flanking policies and if used correctly, trade policies can provide opportunities for promoting economic development and tackling poverty reduction. Most of the exports of LDCs are primary products, especially agricultural products. It can play a significant role in promoting

economic development of LDCs. Trade in agricultural goods can be summarized as follows:

First, exports of agricultural goods can pay for imports of capital goods, technology, manufactured products and other essential commodities for a sustained economic growth of developing countries. It is important to stress that exports of agricultural goods from LDCs like Thailand and Malaysia have helped them considerable to earn valuable foreign exchange for their industrialization and economic growth.

Second, many LDCs have a comparative advantage in the production of agricultural goods. Given a trade regime which is relatively free from control and regulations, LDCs can use their comparative advantage in producing agricultural goods to raise their standard of living. Indeed, in an export-led growth model of trade, it would be to the advantage of many LDCs to specialize in the production of those goods where they have a comparative advantage and to export the surplus production. Such a policy will lead to the use of trade as an engine of growth apart from ensuring a 'rational' allocation of resources.

Third, even when a developing country successfully raises its standard of living, trade in agricultural goods could still remain an important policy for a number of key industries. Witness the case of Canada, New Zealand, Ireland, Denmark and even the United States of America-in these rich countries, agriculture still performs a very important role as a major export industry for stimulating economic growth.

Fourth, a growth of agricultural trade where LDCs can play an increasingly major role could also be of considerable advantage to the DCs. As the income in the LDCs grows with a rise in their exports of agricultural goods, there will be a corresponding rise of the demand for industrial goods and different types of services in these countries which would be imported from the DCs. In effect, the market for DCs in the LDCs will expand and trade in agricultural goods will be of mutual benefit to both DCs and LDCs. However, we are assuming a trade regime which is free from all types of controls and regulations. In practice, DCs try to protect their agricultural sector by the imposition of different types of controls for keeping out imports. Such controls usually take the form of quotas whereby only a fixed amount of goods from LDCs are allowed to be imported. Also on a number of occasions, DCs

(e.g. France and EEC) have imposed levies on the imports of agricultural goods. It may be pointed out that LDCs also use tariffs, quotas and other exchange control regulations to protect their 'infant' industries from foreign competition. Some argue that the imposition of these controls like tariffs and quotas work against the principles of free trade which is supposed to enhance economic welfare by providing goods at the cheapest price. Developing countries point out that while the DCs preach the virtues of the theory of free trade on the basis of comparative cost advantage in the production of industrial goods, they themselves do not obey these rules while they trade in agricultural goods with the LCDs.

2.3 Macroeconomic Policy and Agricultural Development

Macroeconomic policies have a strong influence on output prices, factor prices, marketing margins, and, hence, on incentives for agricultural producers, consumers, and marketing agents. Foreign exchange rates, for example, affect export and import prices and quantities and, thus, output and input prices.

The macroeconomic environment conditions the rate and structure of agricultural and urban-industrial growth. Job creation, income growth and income distribution are a function of macroeconomic policies and projects targeted at specific sectors. The short-run effects of macro policies on employment and income distribution can be quite different from their long term effects. Policymakers often must seek means of softening short-run income and nutritional consequences of needed long-term policy changes.

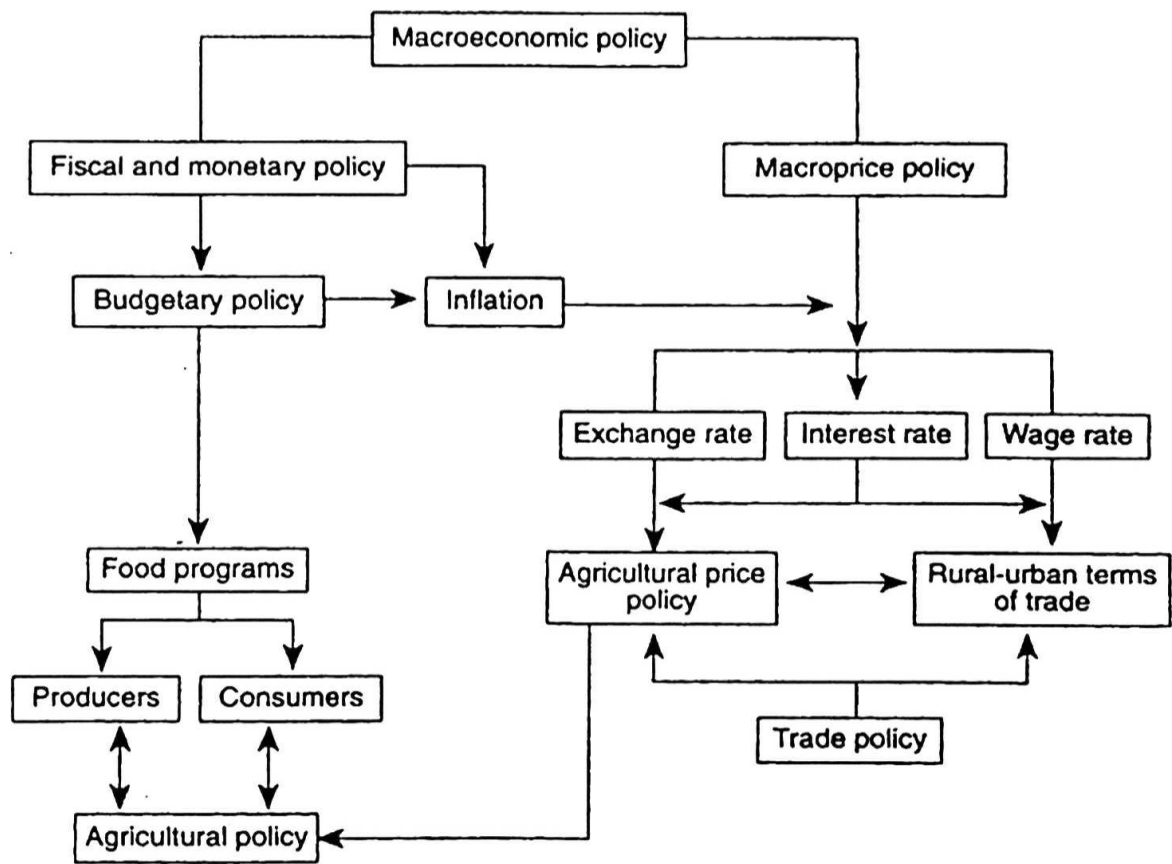
Understanding the effects of macroeconomic variables on agriculture and on food prices is important for designing economically and politically viable short-and long-run policies. When macro policies create distortions such as overvalued exchange rates, heavily subsidized interest rates, and inflationary fiscal and monetary policies, agriculture is usually discriminated against and long term prospects for development are compromised. Pressures build for major macro policy reforms that, even if unintentionally, usually help the rural sector by increasing farm incomes and rural employment.

Describing a Macroeconomy: A macroeconomy can be described in terms of demand, supply, or income. A country's gross domestic product (GDP), a measure of its domestically produced national income, will be identical regardless of whether it is calculated by summing demands, supplies, or incomes. Macroeconomic policies

in more-developed countries often focus on' managing the demand side of the economy. Governments in these countries implement policies to stimulate private consumption or investment, use public expenditures to create demand, and closely manage trade. Policies in less-developed countries frequently are more concerned with managing aggregate supply. Numerous LDCs have attempted to stimulate supply by involving the government directly in the production of goods and services.

The basic factors of production (land, labour and capital) together with management, earn incomes when they produce goods and services. These incomes are spent on the components of aggregate demand; hence, total income equals GDP. Developing countries are often very concerned about the distribution of total income among wages, interest, rents, and profits, and undertake policies to manage this distribution.

Figure (2.1) Major connection
between macroeconomic policies and food policy



Source: Norton, G. W., and J. Alwang, *Introduction to Economics of Agricultural Development*, Agriculture Series, McGraw-Hill International Editions, 1993. p324

The prices of goods and services are generally expressed in the country's currency units. The monetary value of a good or service can change due to inflation even when its real value has not changed. Many effects of inflation are unintended

results of fiscal and monetary policies. The major macroeconomic and agricultural policy connections are summarized in Figure 2-1.

Fiscal and Monetary Policy: Fiscal policy is the use of government spending and taxing power to stabilize the economy. Monetary policy is the deliberate action of the government to manage the money supply or the interest rate to achieve employment and income growth and distribution objectives. Both fiscal and monetary policies influence inflation and unemployment. Monetary and fiscal policy can influence aggregate demand; the government sometimes uses these policy instruments in an attempt to stabilize the economy. Governments differ substantially in their ability to tax the domestic economy to produce revenue and in their willingness to run and finance large budget deficits.

Governments in developing countries often go into debt because of their many pressing needs and limited tax revenues. Because agriculture is usually the largest sector in the economy, it generally provides more revenue to the government than it receives in return in the form of government programs. However, there are usually substantial budget allocations to the agricultural sector. Programs for producers include items such as irrigation systems, roads, agricultural research and extension, market information, and certain output or input subsidies. Programs for consumers include items such as targeted and non targeted food price subsidies. Many of the investments in agricultural research and extension, irrigation, roads, etc., also benefit consumers.

Inflation is an increase in the overall level of prices. Inflation is an economy-wide phenomenon that concerns the value of the economy's medium of exchange. When the overall levels of prices raises the value of money falls. Inflation often hurts agriculture because it increases the prices of inputs, usually by more than the rate of increase in output price. When inflation occurs, the foreign exchange rate should change to reflect the reduced value of the currency. Many developing countries do not allow this adjustment to take place completely. The resulting overvalued exchange rate increases the price of agricultural exports (thus reducing export demand) and makes food imports cheaper. The resulting increased supply of agricultural products on the domestic market reduces farm product prices. The foreign exchange rate policy is just one of the macro price policies that has significant impacts on agriculture.

Macro Prices and Agriculture: Governments use macroeconomic policies to influence inflation, provide incentives, and distribute income. Three prices, foreign

exchange rates, interest rates, and wage rates have major effects on the macro economy and can be manipulated by the government. These prices are all, in fact, determined by supply and demand conditions in their respective markets, so that if the government decides to set them by fiat, conditions of excess supply or demand can result. Two of these prices, interest rates and wage rates, signal the scarcity of basic factors of production, capital and labor. Governments often are tempted to set wage rates artificially high to directly raise incomes. Government policy can be used to affect those macro prices indirectly by intervening to change the underlying supply and/or demand conditions. Public works projects, for example, stimulate demand for labor and could be used to raise wages.

The foreign exchange rate is relatively easy to control, and governments often do control it. Two other prices with major effects on the macro economy, food prices and land prices, are influenced indirectly through exchange rate manipulations. These prices can also be affected directly by imposing tariffs, or by government interventions in their respective markets.

Exchange Rates: An exchange rate is the number of units of one currency that it takes to buy a unit of another currency, or the price of one currency in terms of another. For many relatively developed countries, the foreign exchange rate is determined in international money markets by the supply of and demand for a country's currency. The supply of, and demand for, dollars also are affected by international capital flows for investment or other purposes.

These same supply and demand factors exist in developing countries, but the exchange rates in these countries frequently are set by governments rather than determined in currency markets. Countries maintain overvalued exchange rates by controlling the movement of foreign exchange and foreign investment (See Box 2.1).

Devaluation can correct the problem, at least temporarily, but unless fiscal and monetary policies are changed to reduce either government expenditure; or aggregate demand, inflation will rather quickly result in a reoccurrence of the overvalued exchange rate. Food prices generally rise in response to currency devaluation, helping farmers and hurting urban consumers. Policies are often needed to protect the welfare of the very poor when a devaluation occurs, especially if the currency has been allowed to become substantially overvalued and a large adjustment is needed.

The price of capital investment is represented by the interest rate. The interest rate reflects, in part, the productivity of capital or the opportunity cost of using capital

for one purpose rather than another. Interest rates also reflect risk and the value of current as opposed to future consumption. Interest rates are determined by the interaction of the supply of investment funds, basically household savings, and the demand for these funds.

Wage Rates: The primary source of income for most people in the world is returns to their labor. Hence creating jobs at decent wages is essential to reductions in poverty and hunger. Governments recognize the importance of labor remuneration and often set minimum wages in an attempt to raise people out of poverty. Unfortunately, minimum-wage legislation is a relatively impotent tool for raising returns to labor and can have unintended effects that hurt labor.

Labour markets are complex because they are segmented by skill levels, occupations, and locations. In rural areas, labor arrangements may include payment in kind (e.g. food or other goods), may involve conditional access to a piece of land, or may depend on other special relationships between employers and workers that are determined by local customs or institutions. Wages for unskilled workers in these areas may be close to the average product of labor rather than the marginal product. This level in turn is close to a basic subsistence level.

Minimum-wage legislation is virtually unenforceable in rural areas in developing countries. In urban areas, minimum wage legislation has been successful in large industries and government organizations. In summary, wages are an important macro price, especially to the poor, but governments have little ability to raise people out of poverty by legislating wage levels.

Prices of Agricultural Products and Land: Agricultural prices are influenced by government interventions in output and input markets. Price supports, input subsidies, export taxes, etc., directly influence the terms of trade between the agricultural and nonagricultural sectors. Fiscal and monetary policies and macro prices, however, usually have even larger effects on the terms of trade between the sectors than do the more direct price policies. For example, the agricultural sector produces a high proportion of tradable commodities. Thus, an overvalued exchange rate that encourages imports and discourages exports typically has a strong negative effect on the agricultural sector.

When macro policies and prices discriminate against the agricultural sector so that agricultural prices are depressed, downward pressures are placed on land prices

as well. Incentives are reduced for improving the land base or for developing technologies to utilize land more efficiently.

In summary, macro prices reflect basic economic conditions in an economy. Unless agricultural productivity is increased, simply distorting these prices through government policies is likely to hinder the development process and create distributional effects that hurt the rural poor.

2.4 Brief Review of Agriculture and Trade Theories

The role of agricultural in the process of economic development is the one of the interrelations between economic history and economic theory. Agriculture is itself important in the development process and crucial for providing raw material for many industries and provides the considerable resources for trade so that it is the foundation of manufacture and commerce. Increase in World population was made possible by an increase in agricultural production. Moreover, the role of agriculture has been expanding by providing the resources of labour and capital needed for manpower and raw materials and funds for a growing industrial sector.

A sustainable and dynamic approach to agricultural development has remained of great concern to the government and priority for discourse in the policy arena. The traditional agricultural research and extension alone cannot sufficiently address the challenge of the new trends, innovation system approach offers a holistic and multi-disciplinary approach to innovation and processes, incorporating emerging reforms and approaches for agricultural development. Governments should encourage and facilitate farmers' and private sector's innovative strength by enacting favorable policies (patenting and reward system) that will act as incentives. Institutional context of any innovation should be sufficiently analyzed by policy makers as requested to promoting such innovation while extension workers should provide such information in technology packages to farmers (Earl Lauderdale (1759-1838)).

Thomas Robert Malthus (1766-1834) argued that the Corn Laws would guarantee British self-sufficiency in food by encouraging domestic production. His differential theory of rent had three facts: (1) that agricultural production yields a surplus; (2) that the wage-fertility dynamics guarantee that the price of corn would remain steadily above its cost of production; and (3) that fertile land is scarce.

David Ricardo (1772-1823) also introduced the differential theory of rent and the law of diminishing returns to land cultivation. His principle was revealed simultaneously and independently by Malthus, Robert Torrens and Edward West. Ricardo initiated his theory of distribution in a one-commodity ("corn") economy. Ricardo argued that rate of profit and rents were determined residually in the agricultural sector with wages at their "natural" level. The agricultural profit and wage rates would be equal to the counterparts in industrial sectors. With this theory, he could show that a rise in wages did not lead to higher prices, but merely lowered profits. Technical improvements would help push the marginal product of land cultivation upwards and thus allow for more growth. Ricardo suggested two things which might hold this law of diminishing returns at bay and keep accumulation going at least for a while: technical progress and foreign trade.

In a view of early classical theory, economic development is a growth process requiring the systematic reallocation of factors of production from a primary sector characterized by low productivity, traditional technology, and decreasing returns to a modern industrial sector with higher productivity and increasing returns. Agriculture was seen as a low-productivity, traditional sector that only passively contributed to development by providing food and employment. Classical economists discussed institutional change, innovation system, research, technical progress and government policy for agricultural development and foreign trade. Nevertheless, agricultural growth was still considered necessary for development and for a country's transformation from a traditional to a modern economy.

Agricultural economics includes a variety of applied areas, having considerable overlap with conventional economics.¹ Agronomics, or the application of economic methods to optimizing the decisions made by agricultural producers, grew to prominence around the turn of the 20th century.

The field of agricultural economics can be traced out to works on land economics. Agricultural economics arose in the late 19th century, combined the theory of the firm with marketing and organizational theory, and developed throughout the 20th century largely as an empirical branch of general economics. The discipline was closely linked to empirical applications of mathematical statistics and made early and

¹ Karl A. Fox (1987), "Agricultural Economics", *The New Palgrave: A Dictionary of Economics*, v.1, pp. 55-62.

significant contributions to econometric methods. In the 1960's and afterwards, as agricultural sectors in the OECD countries contracted, agricultural economists were drawn to the development problems of poor countries, to the trade and macroeconomic policy implications of agriculture in rich countries, and to a variety of production, consumption, and environmental and resource problems.²

Agricultural economists have made many well-known contributions to the economics field with such models as the cobweb model,³ hedonic regression pricing models,⁴ new technology and diffusion models (Zvi Griliches), multifactor productivity and efficiency theory and measurement,⁵ and the random coefficients regression.⁶

The farm sector is frequently cited as a prime example of perfect competition economic paradigm. The agricultural environment and resources; risk and uncertainty; consumption and food supply chains; prices and incomes; market structures; and trade and development.⁷ Agricultural economics has primarily focused on seven main topics: technical change and human capital; agricultural environment and resources; risk and uncertainty; consumption and food supply chains; prices and incomes; market structures and trade and development.⁸

Modern agriculture is not only the interplay between soil, solar energy, and labor but it is rather determined by a number of modern factors that originally lay outside agriculture. The success of a person's farm depends upon the extent to which his efforts are supported by social institutions that help him in the areas in which he reaches the limits of his own possibilities.

Food production is not only the result of activities in agriculture, but even to a larger extent of backward and forward linkages with the other sectors. Thus the

² Ford Runge, "Agricultural Economics: A Brief Intellectual History," page 1 (abstract), University of Minnesota Working Paper WP06-1, June 2006, <http://ageconsearch.umn.edu/bitstream/13649/1/wp06-01.pdf>, (Accessed: June 1, 2008)

³ Ezekiel, M. "The Cobweb Theorem," *Quarterly Journal of Economics*, 52(1938): 255-80 www.econ.pol.unisi.it/paolopin/Teachmaterial/Ezekiel/938.pdf, (Accessed: June 15, 2008)

⁴ Waugh, F.V., "Quality Factors Influencing Vegetable Prices," *American Farm Economics* 10(1928): 185-196 <ajae.oxfordjournals.org/content/10/2/185.full.pdf> (Accessed: May 8, 2008)

⁵ Farrell, M.J., "The Measurement of Productive Efficiency," *Journal of the Royal Statistical Society Series A, General* 125 Part 2(1957): 252-267. Farrell's frequently cited application involved an empirical application of state level agricultural data <www.jstor.org/stable/2343100> (Accessed: June 15, 2008)

⁶ Hildreth, H. and J. Houck, "Some Estimators for a Linear Model with Stochastic Coefficients," *Journal of the American Statistical Association*, 63(1968): 584-595 <www.jstor.org/stable/2284029>

⁷ Ford Runge, "Agricultural Economics: A Brief Intellectual History," pp. 15-16, University of Minnesota Working Paper WP06-1, June 2006 <purl.umn.edu/13649> (Accessed: June 1, 2008)

⁸ Ibid pp.15-16

agribusiness system consists of the farm supply sector (backward linkages), the farming sector (centre), the processing and marketing sector (forward linkage). Thus, agriculture is still the center of the agribusiness sector.

Next it has been turning to the international trade theories. Theoretical perspectives on the contribution of international trade to economic development can come from classical trade theory, neo-classical trade theory, and recent theories of international trade.

According to Mercantilism, the prosperity of a nation depends upon its supply of capital, and that the global volume of trade is unchangeable. The State held the economic assets which are represented by bullion (gold, silver, and trade value). And these economic assets are increased by a surplus from balance of payments. Therefore, the government should protect the national economy by encouraging exports and by discouraging imports through the use of tariffs. The economic policy based upon these ideas is often called the mercantile system.

Adam Smith argued that a nation's wealth is reflected in its productive capacity. Smith argued that international trade is a positive-sum game rather than a zero-sum game by demonstrating the fact that international trade benefits both parties. Moreover, according to Adam Smith, division of labour and specialization in production result in economies of scale. Adam Smith explained that if two countries have absolute advantage in their own individual resources, both countries can gain from trade.

On foreign trade, David Ricardo (1772-1823) set his famous theory of comparative advantage. Using his famous example of two nations and two commodities, Ricardo argued that trade would be beneficial even if a nation held an *absolute* cost advantage over another nation in both commodities. Ricardo's argument was that there are gains from trade if each nation specializes completely in the production of the good in which it has a "comparative" cost advantage in producing, and then trades with the other nation for the other good. Notice that the differences in initial position mean that the labor theory of value is not assumed to hold across countries as it should be, Ricardo argued, because factors, particularly labor, are not mobile across borders. As far as growth is concerned, foreign trade may promote further accumulation and growth if wage goods (not luxuries) are imported at a lower

price than they cost domestically thereby leading to a lowering of the real wage and a rise in profits. But the main effect, Ricardo noted, is that overall income levels would rise in both nations regardless. The welfare result, according to Ricardo, is that “the extension of foreign trade will very powerfully contribute to increase the mass of commodities, and therefore, the sum of enjoyments.”⁹ And these gains from trade will accrue to each trading nation: trade is systematically beneficial. David Ricardo offered an explanation of trade in terms of international differences in labor productivity.

If the Ricardian model is analyzed with actual international trade, first, as mentioned in our discussion of non-traded goods, the simple Ricardian model predicts an extreme degree of specialization that we do not observe in the real world. Second, the Ricardian model assumes away effects of international trade on the distribution of income within countries, and thus predicts that countries as a whole will always gain from trade; in practice, international trade has strong effects on income distribution. Third, the Ricardian model allows no role for differences in resources among countries as a cause of trade. Finally, the Ricardian model neglects the possible role of economies of scale as a cause of trade. Differences in labor productivity continue to play an important role in determining world trade patterns.

The Heckscher-Ohlin theory emphasizes the differences between the factor endowments of different countries and differences between commodities. The theory is different from the Ricardian model which specifies differences in technology between countries as the basis for trade. In the Heckscher-Ohlin theory, costs of production are endogenous in the sense that they are different in the trade and autarky situations, even when all countries have access to the same technology for purchasing each good. This model has been a main stream of international trade theory.

Both the Ricardian model and the Heckscher – Ohlin model of International trade can be used to explain the trade patterns of developing countries. These countries possess relatively abundant and hence cheaper labour and land resources which can be deployed in agricultural production which is relatively more labour and land intensive than industrial production.

⁹ Gerald M. Meier , Theoretical Issues Concerning The History of International Trade and Economic Development ,Research Paper No.992,The Free University, Berlin, May,1988 ,p3-4

Hence the emergence of the present day pattern of world trade with developing countries specializing in agriculture production and export and the relatively capital – abundant developed countries specializing in industrial production and export of industrial goods.

There have been a number of empirical studies in the world regarding import and export of agricultural products and their effective factors. Empirical studies of international trade flows have generally concentrated on the formulation and estimation of demand relationships for imports and exports, e.g., see the studies by Houthakker and Magee (1969), Taplin (1973), and Hickman and Lau (1973). Supply relationships have typically been handled by assumption, the usual practice being to assume that the export and import supply price elasticity facing any individual country are infinite. While the assumption of infinite price elasticity seems a reasonable a priori in the case of the world supply of imports to a single country, this assumption carries far less intuitive appeal when applied to the supply of exports of an individual country. That is, unless idle capacity exists in the export (or domestic) sector, or more generally, unless export production is subject to constant or increasing returns to scale, it is unlikely that an increase in the world demand for a country's exports can be satisfied without any increase in the price of its exports (at least in the short run).¹⁰

In the relatively few cases where a supply function for exports has actually been specified,¹¹ it has usually not been possible to obtain an estimate of the supply price elasticity either because the relevant structural parameters could not be recaptured from the reduced-form estimating equation, or because the structural supply equation itself did not posit a direct relationship between the quantity of exports supplied and export prices.¹² For example, the recent study by Amano (1974) on the export behavior of ten industrial countries contains explicit export demand and export supply functions but the over-identified nature of that model prevents one from obtaining estimates of either the demand or the supply-price elasticity. Similarly, the studies by Ball et al. (1966), Suss (1974), and Artus (1970) deal directly with the

¹⁰ Morris Goldstein and Mohsin S. Khan, "The Supply and Demand for Exports: A Simultaneous Approach," *The Review of Economics and Statistics*, Vol. 60, No. 2 (Apr., 1978), The MIT Press, pp.275.

¹¹ Ibid 275

¹² Ibid 275

supply of exports, or more precisely with the effect of domestic demand pressure on export behavior, but these are models of the short-run adjustment process that do not yield estimates of the price elasticity of export supply. The primary purpose of that study is to investigate the price responsiveness of both export demand and export supply using the aggregate exports of eight industrial countries for the period 1955-1970. Two relatively simple models of export demand and export supply are introduced and estimated simultaneously so as to eliminate any bias arising from the two-way relationship between export quantity and export prices.

Theoretical Specification of the Export Functions

In this analysis, two versions regarding the supply of export and the demand of export, a basic model of export quantity and price determination are considered.

The world demand for an individual country's exports is specified in log-linear form as follows:

$$\text{Ln } X^d = a_0 + a_1 \text{Ln } (PX/PXW)_t + a_2 \text{Ln } YW_t \quad (1)$$

where X^d = quantity of exports demanded

PX = price of exports

PXW = weighted average of the export prices of the country's trading partners

YW = weighted average of the real incomes of the country's trading partners.

Since equation (1) is specified in logarithms, a_1 and a_2 are the (relative) price and real income elasticity (of export demand), respectively. It is expected that a_1 will be negative and a_2 positive.¹³

The supply of exports is specified as a log-linear function of the relative price of exports (i.e., the ratio of export prices to domestic prices) and of an index of the productive capacity of the country:

$$\text{Ln } X^s = \beta_0 + \beta_1 \text{Ln } (PX / P) + \beta_2 Y^* \quad (2)$$

X^s : quantity of exports supplied

PX : price of exports

P : domestic price index

¹³ It should be noted that while the sign of the real income elasticity (a_2) is usually assumed to be positive, it need not necessarily be so. For example, if the exports of a country were simply a residual demand by the rest of the world, i.e., the difference between world production and consumption of importables, then a_2 could be negative if increases in world income were associated with faster growth in the production than in the consumption of importables. For a fuller treatment of this argument, see Magee (1975) and Khan and Ross (1975).

Y*: logarithm of an index of domestic capacity (or) Index of domestic capacity (production index)

Equation (2) embodies the hypothesis that as the price of exports rises relative to domestic prices, production for export becomes more profitable and, hence, exporters will supply more. In addition, exports are posited to rise, *ceteris paribus*, when there is an increase in the country's capacity to produce. The expected results of β_1 and β_2 can be positive. The equation can be normalized for the price of exports, PX, to yield.

This is the basic theory behind each of the models that are to be estimated. The demand for export function and the supply of export function are studies in this thesis for the determinations of export. This study is to investigate the price responsiveness of both export demand and export supply using yearly data on the rice, beans and pulses exports of Myanmar for the period 1988-2008.

Trade in agricultural products serves three functions. First, trade can contribute to stabilizing supply when regional (states and regions) fluctuations in production are greater than the fluctuations in the nation. Thus, free inter-regional trade among regions within a country could be an efficient substitute for national stockpiling and might be used to even-out fluctuations in national production. Johnson (1978, 1981) showed that worldwide free trade in grains would drastically reduce the need for holding carryover stocks, because fluctuations in world cereal production are minimal compared to fluctuations in national production. The same may hold true if variability in production in a state or region is greater than variability in production for the country. However, if production in all states and regions were perfectly correlated, interregional trade could not help stabilize national consumption. Second, trade in agricultural products may partly substitute for working stocks if the harvesting calendar differs somewhat among states and regions. Third, trade may allow states and regions to specialize in production in accordance with comparative advantage. Thus, trade would help to increase national income and improve food security.

The production variability is tested by calculating instability index of production. Instability index of production was used in the paper, aiming to quantifying the potentials of intra-regional agricultural trade in the COMESA region

(Imad Eldin Elfadil Abdel Karim^{1*} and Ibrahim Sulieman Ismail², August 2007) taking examples of Sudan, Egypt and Kenya.

The Production Similarity Index

Variability in area, output and yield of rice can be tested by the instability index. Instability indices have been measured for total production, area and yield of cereals, pulses and roots and tubers on the basis of data from 1961 - 2005 for the three countries (Sudan, Egypt and Kenya). The production variability is tested by calculating instability. This index is based on the coefficient of variation corrected by the fitness of trend function.

Instability is measured by the following index developed by Cuddy (1978).

$$I_x = C.V. \sqrt{(1 - \bar{R}^2)}$$

Where:

I_x = Instability index

C.V. = Coefficient of variation

\bar{R}^2 = Adjusted coefficient of determination

According to the above specification, the range of the instability index is 0 and C.V. inclusive. That is, if the value of \bar{R}^2 is 1 the value of instability index will be 0, and if the value of \bar{R}^2 is 0 the value of instability index will be equal to the value of C.V. To reach the final value of instability index, we have to calculate three measures.

Firstly, coefficient of variation (C.V.) for each time series is calculated.

Secondly, Adjusted coefficient of determination (\bar{R}^2) is obtained from the linear trend line estimated as $y_t = a + b_t + u_t$ and used to calculate instability index (I_1).

Thirdly, degree of freedom adjusted coefficient of determination (\bar{R}^2) is obtained from the log-linear trend line estimated as $y_t = a + b_t + u_t$ and used to calculate instability index (I_2).

Finally, out of the three different measures (C.V., I_1 , and I_2), the most appropriate value of instability index is chosen by the following selection criteria.

- (1). If both \bar{R}^2 from linear trend model and log-linear model are statistically significant at 1 per cent level, the higher value of \bar{R}^2 is chosen and used in calculating the instability index.

- (2). If either \bar{R}^2 from linear trend model or log-linear trend model is not statistically significant at 1 per cent level, then \bar{R}^2 from the statistically significant trend model is chosen and used in calculating the instability index.
- (3). If \bar{R}^2 from both models are not statistically significant at 1 per cent level, coefficient of variation (C.V.) is used as the instability index.

Sudan has the highest instability index of 31.6. This could be attributed to its highest variability in area and yield of cereal which have instability indices of about 19.2 and 18.4 respectively. Egypt and Kenya showed less variability in production comparing to Sudan (17.6 and 15.1 for Egypt and Kenya respectively). Regional integration could reduce the instability index to 12.1 that means the three countries would gain from intra-regional trade. In pulses production, Sudan again showed the highest instability index of 30.1 followed by Kenya with an index of 25.8, and Egypt the least with 16.7. Regional integration in pulses reduces fluctuation to 12.5. Production of roots and tubers showed less fluctuations in the three countries compared to cereal and pulses production with Sudan showing the minimum index of 12.7, followed by Kenya 13.2 and Egypt 16.6. Regional integration could reduce the instability to 10. Although the empirical results indicate that regional integration would be a reasonable strategy for achieving greater food security, the instability indices were higher for the sub region than for the rest of the world in all the three categories of food crops.

The results of production similarity index indicate differences in production patterns of the three countries. The instability indices of production in cereals, pulses, and roots and tubers were more stable at regional level than national one. The results showed a promising potential for intra- regional agricultural trade.

The Export Similarity Index

Export similarity index is used to assess the potential for agricultural trade in the selected region. Export similarity index is a measure which indicates the degree of the similarity of export pattern of two countries or two groups of countries to a particular market. Export similarity indices results show that countries are dissimilar in their export patterns. The revealed comparative advantage indices, considering each country separately, are generally higher for dominant export products. As dominant products differ among the countries, the pattern of specialization differs considerably

among these countries, and therefore, there is a potential for expanding intra-regional trade in the region.

The export similarity index is defined as follows:

$$S(ab,c) = \{\sum \text{Minimum } [X_i(ac), X_i(bc)]\} 100$$

where, 'S' = export similarity index;

'a' and 'b' = two exporting countries;

'c' = importing economy;

$X_i(ac)$ = export share of product 'i' to total export from country 'a' to market 'c';

$X_i(bc)$ = export share of product 'i' to total export from country 'b' to market 'c'.

Export similarity index is a measure which indicates the degree of the similarity of export pattern of two countries or two groups of countries to a particular market. The index measures the similarity of export patterns of countries a and b to market c. If the export patterns of countries a and b are the same it means that $x_i(ac) = x_i(bc)$ for each product i. In this case the export similarity is completely dissimilar; the index will be equal to zero. As dominant products differ among the countries the pattern of specialization differs considerably among these countries, and therefore, there is a potential for expanding intra-regional trade in the region. In this case the export similarity will be completely dissimilar; the index will be equal to zero.

The values of export similarity index can be from 'zero' to '100'. While export similarity index of 'zero' indicates that export patterns of two countries to a particular market are totally dissimilar, export similarity index of '100' show that there is a perfect similarity of export pattern of two countries to a market. Generally, the lower the value of export similarity index, the higher the potential for the two exporting countries to a particular market. As specified in the formula of export similarity index, there must be two countries which export the same products to the same market.

Export similarity indexes by pairing the three countries are dissimilar in their export patterns. Exports of Sudan and Kenya registered the highest index of 12.5, and Sudan and Egypt the minimum index of 4.9. These low indices indicate that there is a wide scope for trade within the region because the countries are relatively dissimilar.

Revealed Comparative Advantage

If the countries under study were really similar in production and trade patterns as indicated by the previous indices, coefficients for revealed comparative advantage (RCA) would be similar (Donges et al., 1982). The concept of revealed comparative advantage (Balassa 1965, 1977, 1979, 1986) pertains to the relative trade performance of individual countries in particular. The Balassa index tried to identify whether a country has a "revealed" comparative advantage rather than to determine the underlying sources of comparative advantage. A country is said to have a revealed comparative advantage if the value exceeds unity. If RCA value is greater than unity for commodity j , the country has a revealed comparative advantage in commodity j . If RCA is less than unity, the country has a revealed comparative disadvantage in the commodity concerned. Values above 1 indicate that the country is specialized in the sector under review, the higher the RCA index, the more successful is the country in exporting the given export product. The RCA index will be negative if the country is only importing the given product or if the ratio of export and import values for the product is smaller than the ratio of the total agricultural exports and imports.

The RCA indicator measures the country's revealed comparative advantage in exports according to the Balassa formula. The index compares the share of a given sector in national exports with the share of this sector in world exports. The RCA index is defined as the ratio of two shares. The numerator is the share of a country's total exports of the commodity of interest in its total exports. The denominator is the share of world exports of the same commodity in total world exports. The index compares the share of a given sector in national exports with the share of this sector in world exports.

The revealed comparative advantage is defined as follows (Balassa, 1965; Finger and Derose, 1978; Donges et al., 1982; Yilmaz, 2003):

$$RCA = \frac{X_{ij}/X_{wj}}{\sum X_{ij}/\sum X_{wj}}$$

Where X_{ij} = country i 's export of commodity ' j ';

X_{wj} = world's exports of commodity ' j ';

$\sum X_{ij}$ = country i 's total exports; and

$\sum X_{wy}$ = world's total exports.

RCA coefficients are generally higher for dominant export products. However, the pattern of specialization differs considerably among the selected countries, which means that there is potential for expanding intra-regional trade in the region. The higher the value of RCA index, the more successful the country is in exporting the product which has comparative advantage. A country should specialize in the sector where the country has revealed comparative advantage.

Some scholars of international trade emphasize that the effects of trade on economic performances can be derived: An analysis of trade potential between China and ASEAN within China-ASEAN-FTA (Tang Yihong, Wang Weiwei) applied export similarity index to examine China's export potential to the ASEAN market by comparing China with six main ASEAN member countries (ASEAN 6) and the other main trade partners of ASEAN. It shows that competition is severe on the industrial level in ASEAN market, and that bilateral trade potential is uncertain. China-ASEAN FTA had a significant positive effect on bilateral trade volume. It is undoubtedly that Chinese export products are facing stiff competition with foreign products in the ASEAN market. But there is still space for China to enhance its market share and increase trade flow.

Majkovic., D., Turk.,J., and Chevassus-Lozza.,E., (2006) carried out a comparative analysis of trade with agricultural and food products of ten EU new member states (NMS), with emphasis on Slovenia. For the purpose of assessing the similarities in their export structure, the export similarity index has been used. Slovenia has always been a net importer of agricultural and food products, and the same goes for the majority of ten NMS in the period analyzed. By its use, no significant overlap of export structures between NMS is revealed, but a slight increase in resemblance is observed from 1999 to 2003, indicating the simultaneous restructuring of NMS' agri-food sectors. Slovenia has the comparative advantage in comparison with the rest of new member states in the following groups of products: meat, dairy products, beverages and others.

Similarly, production similarity index , export similarity index and RCA are used in this studies to analyze the effects of economic reform on the production of rice, beans and pulses, the internal trade of these crops on food security and the effect of market liberalization policy on the export of rice, beans and pulses in Myanmar. Production similarity index is used to analyze production variation and internal trade

within states and regions associated with food security in Myanmar. Export similarity index and RCA were used to analyze Myanmar's trade potential for rice, beans and pulses in neighboring countries markets.

2.5 Conceptual Framework of the Study

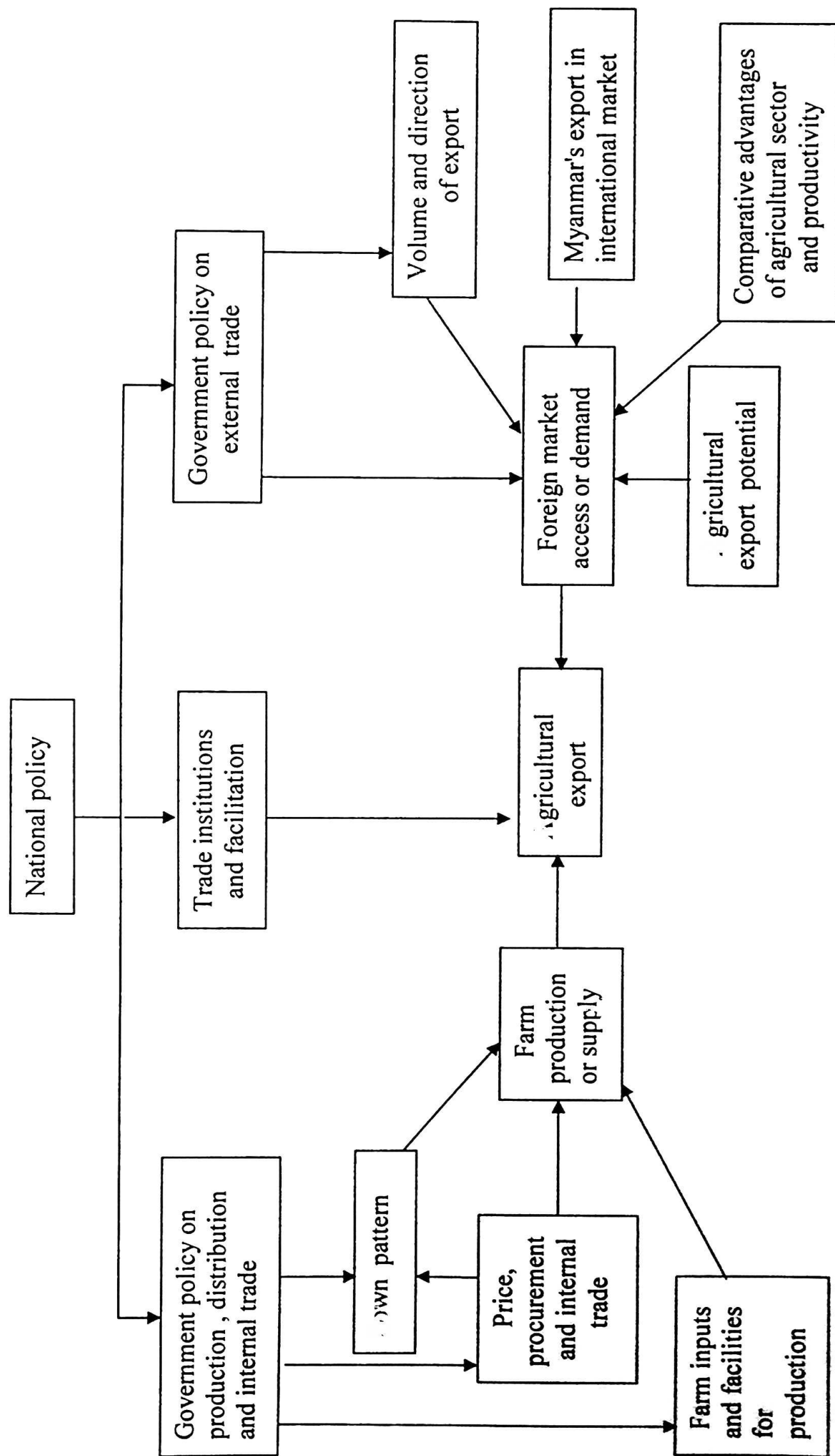
The conceptual framework of the study is shown in Figure 2.2. Agricultural export is determined by the national policies or government policies, supply-side factors and demand-side factors.

National policies: National policies or government policies simultaneously affect the twin issues of foreign market access or demand and supply capacity. Government policy on production, procurement, distribution, internal trade, external trade affect sown pattern, price, procurement, internal trade, farm inputs and facilities for production. Government policy on external trade affects volume and direction of export and foreign market access. Trade institutions and facilitation promote agricultural export. In other words, national policies affect supply, demand and export. The key agricultural export determinants of government policies are government policy on production, distribution, internal and external trade, trade institutions and facilitation.

Production or Supply-side Factors: Government policies, prices and crops production decisions affected rice, beans and pulses sown area and production. And production in turn depended on procurement, internal distribution and export. Agricultural production or supply was also affected by farm inputs and facilities for production. Production, procurement, prices and internal and external trading affected agricultural export. The key agricultural export determinants of supply-side factors are sown patterns, farm inputs and facilities for production, price, procurement and internal trading.

Foreign Market Access or Demand-Side Factors: Foreign market access is a critical determinant of export performance. Here, the term "foreign market access" is seen as respectively as the foreign market potential. It relates directly to the characteristics of the trading partner countries, such as the size of their market,

Figure (2.2) Conceptual framework of the analysis for agricultural export in Myanmar



population, agricultural production, agricultural export and import. Trade reform or trade adjustment and policy play an important role for foreign market access and hence for improving export. Regional economic cooperation and integration should pave the way to the foreign market access. Therefore foreign market access or demand side factors are very important determinants of agricultural export performance. The key agricultural export determinants of demand-side factors are government policies, export volume and directions of rice, beans and pulses, export to international market, comparative advantage of agricultural sector and agricultural productivity and potential of agricultural export.

The development of Myanmar agriculture before 1988 highlights the importance of government policy, demand and supply-side factors of agricultural export in Myanmar. According to the overview on development of Myanmar agriculture, government policies on production, procurement, distribution, milling, storage, transportation, domestic wholesales and retails and export are different under the different administration periods. The higher the degree of government control on production, procurement, internal trading and exports were, the lower the exports were under all periods. As for the supply-side, before 1988 Myanmar's sown patterns remained unchanged, rice was the largest sown crop and beans and pulses was the third largest crop. But there were changes in sown area under different government administrations because of profits and incentive situations of various natures.

As for the foreign market access or demand-side, Myanmar's rice export market shifted from European developed markets to developing markets because of macroeconomic policies, human consumption pattern changes, exchange rate systems, product qualities and importing countries' self sufficiency and/or transforming themselves into exporting countries. International market access played an important role in enhancing the export performance of a country. To be commercially meaningful, actions to improve market access for agriculture and non-agriculture products should be accompanied by measures to help developing countries gain actual market entry.

Based on the framework, the development of Myanmar agricultural export after 1988, the national macro agricultural policy on production, distribution, trading

and export of agricultural products, trade institutions and facilitation from 1988 to 2008 are initially mentioned.

This is followed by an analysis of supply-side factors: farm inputs and facilities for production, sown patterns after 1988, government's policies and influence on production, procurement and prices. Production instability index is used to analyze the sources of changes in production growth before and after the adoption of market liberalization policy and internal trading and its impact on food security in Myanmar.

Volume and directions of exports and export markets; the role of agricultural export in international trade, a comparative study on agricultural sector and agricultural export of neighbouring countries and the agricultural export potential are lastly taken up and analyzed for the demand and to know the situation of foreign market access. Export instability index or export similarity index and RCA are used in the study for identifying export potential of Myanmar. The export demand functions and export supply functions are analyzed since these are the critical determinants of exports.

Chapter 3

Government Policy on Production, Distribution and Trading of Agricultural Products after 1988

Market - oriented economic system period can be divided into two periods, these are State law and Order Restoration Council (SLORC)¹⁴ period (from 1988 to 1997) and the State Peace and Development Council (SPDC) period (from 1997 to 2007).

3.1 The State Law and Order Restoration Council Period

After 1988, the adoption of a market-oriented policy was a significant change in terms of overall policy framework and the SLORC continued with the economic reform in Myanmar. The four economic objectives of the SLORC are:

1. Development of agriculture as the base and all-round development of other sectors of the economy as well;
2. Proper evolution of the market-oriented economic system;
3. Development of the economy inviting participation in terms of technical know-how and investments from sources inside the country and abroad; and
4. The initiative to shape the national economy must be kept in the hands of the state and the state and the national people.

Major economic reforms directly affecting the macro-economy and the external sector may be summarized as follows:

1. Introduction of Foreign Investment Law: to enhance technical know-how and investments in all sectors except those reserved for the state;
2. Fiscal reforms: taxation reforms to restructure the tax and tariff systems and to streamline tax collection and customs procedures to be in line with market- oriented system and to tackle the problem of deficits; and stringent scrutiny of government expenditures.
3. Financial sector reforms: building legal framework; restructuring the financial sector; and allowing private sector participation in banking and insurance.

¹⁴ SLORC was renamed as State Peace and Development Council (SPDC) since 15 November 1997.

4. Legal systems reforms: The combination of Common Law and Civil Law Legal Systems which Myanmar already had and which had been kept intact during the past twenty-five years before 1988 were reactivated with some new legal injection and revocation of the Law of Establishment of Socialist Economic Systems;
5. Tourism sector reforms: allowing private sector participation in hotels and tourism business;
6. Trade sector reforms: liberalization of domestic and foreign trade, allowing private sector participation in the business previously under the monopoly of SEEs ; resumption of Myanmar's Chamber of Commerce and Industry, regularization of border trade; and
7. Reforms of frontier areas administration: pacification and promotion of development of minority races in frontier areas.

For the development of the agricultural sector, the Ministry of Agriculture as a focal ministry has adopted and implemented the following policies and strategies for the agriculture development:

1. To allow freedom of choice in agriculture production;
2. To expand land and to safeguard the rights of the farmers; and
3. To encourage the participation of private sector in the commercial production of seasonal crops and perennial crops and distribution of farm machineries and other inputs.

With a view to improve the agriculture sector and to uplift the national economy, an agriculture policy was established in 1992, which declares:

1. Production of food crops and industrial crops with no restriction;
2. To permit the production of industrial and plantation crops on commercial scale;
3. To allow private investors and farmers to expand agriculture production in cultivable waste land;
4. To encourage the participation of private sector in the distribution of farm machineries and other farm inputs; and
5. To utilize agriculturally unproductive land for other production purposes.

The official food grain policy objectives of the SLORC were:

1. To achieve surplus in paddy production (or) to produce surplus paddy for domestic food security and for promotion of exports;
2. To be self sufficient in edible oil production (or) to be self sufficient in vegetable oils; and
3. To increase the production and export of pulses and industrial crops (or) to expand production of beans pluses and industrial crops.

To achieve these goals in a more efficient manner, state-private harmonized approach and rural-welfare orientation approach are being carried out as a long-term process. With a view to accelerate land development, the Government has accorded strong administrative support to national companies, associations and local people by encouraging and granting rights for the cultivation of paddy, pulses, oil crops, and industrial crops.

In line with the SLORC's goal of developing a market-oriented economy the subsidized sale and rationing of food grains became limited to only government employees. The major policy change of the SLORC was to replace the former socialist government's "welfare first, import substitution, and inward- looking programs" with "growth- first, export-promotion, and outward-looking programs".

Specifically, Myanmar has five strategic approaches in implementing the policy, the methods of increasing the food supply defined by the SLORC include:

1. Development of new agricultural land (Transforming wasteland into cropland);
2. Provision and adoption of agricultural machineries (Encouraging the entrepreneurial skills and the innovative ability of farmers);
3. Provision of irrigation water (Expanding the capacity and sources of irrigation);
4. Development and adoption of modern agro-technology(Increasing the use of high-yielding seed varieties, modern inputs and improved an locally suitable practices and technologies); and
5. Development and utilization of modern crop varieties (Increasing the cropping intensity).

Until the SLORC administration, the food grain policy since 1989 has become more concerned with enhancing production rather than with enhancing consumption. The SLORC has also decontrolled agricultural commodity prices and increased the price of gasoline, electricity, telephone service and water. SLORC has been making visible progress in completing some infrastructural improvements including irrigation development, road construction and drainage. Since 1987, the twenty-one-year-old restrictions on the procurement and domestic trade of paddy and rice were eliminated. And then, further reforms followed, along with efforts to modernize the agricultural sector in the areas of production, trade and marketing, pricing, and institutions¹⁵.

During the market-oriented period, rice cultivation and production was increasing more than ever before because of land and agriculture sectors reforms such as the establishment of a land commission to ensure optimum use of land resources; abolishing price controls, reduction of compulsory delivery quota for paddy; reduction of subsidies; leasing of land for private investment as well as foreign direct investment; measures for production expansion. Even though these reforms improved producer's (farmers) incentives, productivity growth is still constrained because of restrictions imposed by macro-policies and centralized institutions. The government has tried to turn fallow and cultivable lands into paddy fields. The Paddy-Fish Farming system, Summer Paddy program, and also construction of embankments and canals in the deep water area were introduced to prevent the flooding of the paddy field and to divert water to the areas where it was needed.

During the time of the SLORC, Myanmar Agriculture and Farm Produces Trade Corporation (MAFTC) which was renamed in March 1989 as Myanmar Agricultural Produce Trading was responsible for marketing of rice and paddy up to now and carried out its undertaking with the following objectives:

1. To make arrangements for selling rice to the specific groups at reasonable prices;
2. To make arrangements to provide rice to victims of natural disasters free of charge; and
3. To set aside reserve rice that may be needed in times of military, political and economic emergencies; and

¹⁵ Myat Thein, *Economic Development of Myanmar*, ISEAS (Institute of Southeast Asian Studies), Singapore, 2004, p. 180.

4. To export the surplus rice to earn foreign exchange¹⁶.

While performing first liberalization in rice industry by MAPT, the SLORC permitted farmers, merchants and millers to purchase, transport, store, mill and sell 90 per cent of the total rice output freely. Only about 10 per cent of total national paddy outputs were purchased by the State at the fixed price. Under the prescription, the MAPT purchased paddy from farmers through contracts with advanced payment. Advanced payments were disbursed before harvest time during the period from 1988/89 to 1995/96 in the time of SLORC. But, in 1996/97, the State's paddy purchasing system was discontinued and paddy was purchased cash down at the harvest.

Food security, export promotion and enhancing incomes and welfare of the farmers are the three main components of national agricultural policy goals of Myanmar. The government continued the past procurement policy in which rice farmers were required to sell a compulsory quota of their production to the MAPT at prices well below the market prices. Initially, this quota was set at 10 per cent of the produce, but it changed later to 9 to 12 baskets of paddy per acre (455-607 kg/ha). The amount of compulsory quota to be sold to the MAPT was determined by two main factors; the areas under cultivation and yields per acre. The implication is simple: the higher the yields, the more will be the quota to be sold by farmers to MAPT approaching the upper ceiling of 12 baskets/acre, or about 15 per cent of the total production.

However, it should be mentioned here that monsoon paddy cultivation was discriminated against that of the summer paddy, which was exempted from compulsory delivery. The official explanation was that this policy aims to provide incentives to farmers to grow a second crop of rice in the irrigated areas. The official procurement price, although raised several times over the decades, was also still far too low from the market price: for example, the official procurement price of paddy until early 2003 was Kyat 320 per basket, while its market price ranged between Kyat 900 to 1,500 per basket. This low procurement price was justified on the ground that the government sold the fertilizers, pesticides and other inputs to the farmers at subsidized prices so that the farmers in return are obliged to sell at fixed, low

¹⁶ Myanmar Agricultural Produce Trading, *History of Rice Marketing in Myanmar*, Ministry of Commerce, Swae Taw Press, No.07053, Yangon, Myanmar, 2004, p. 233.

procurement prices. However, it was learned that the subsidized supplies of farm inputs especially chemical fertilizers, pesticides and fuel oil had met only about one-third of the needs in general, and even this meager subsidies on fertilizers and pesticides have already been removed by the government since 1993/94.

3.2 The State Peace and Development Council Period

In November 1997, the State Law and Order Restoration Council (SLORC) was dissolved and the State Peace and Development Council (SPDC) was formed. During this time, the rice production and distribution system was a little changed. Also, the Myanma Agricultural Produce Trading (MAPT) reorganized its functions with the following five objectives:

1. To pay advance loans to farmers at the time of cultivation to grow such agricultural produces as paddy and pulses;
2. To distribute rice to target groups with subsidized price fixed by the government;
3. To replenish foreign exchange income for the development of the national economy;
4. To support Myanmar citizens in their agricultural marketing business activities; and
5. To maintain national reserves of rice and paddy for immediate back-up assistance in the event of natural disasters such as fire and floods¹⁷.

In 1997/98, paddy was no longer purchased from farmers, and arrangements were made to purchase the crops from millers and merchants through tender system. In this situation, like other paddy purchasing systems, it did not succeed due to the lack of experience on the part of merchants and millers and price fluctuations. Therefore, since the first week of January 1998, paddy was again directly purchased from farmers at mutually agreed price¹⁸. Over the past ten years since 1990/91, the procured amount of paddy by the MAPT was about 10 per cent of the total milled rice production in the country. Of this amount, 670,000 MT on average is distributed

¹⁷ Myanmar Agricultural Produce Trading, *History of Rice Marketing in Myanmar*, Ministry of Commerce, Swae Taw Press, No.07053, Yangon, Myanmar, 2004, p. 257.

¹⁸ Ibid., p. 234.

domestically to the government employees and other target groups, and the balance exported.

Between 1998/99 and 2002/03, Government started to end direct purchase of paddy from farmers, and adopted the new rice marketing policy allowing free marketing of the crop in the interest of farmers and the entire people (private sector). Although the private rice marketing sector developed, there were also problems in the development process and these were closely bound with the official rationale of the rice marketing sector which was to maintain a stable rice supply at a low price. There are problems facing rice millers and problems facing rice traders. In April 2003, there were three policy changes in paddy production and rice export. One was to open rice export to the private sector, the second one was to abolish the paddy procurement system, and the third was to retain the rice rationing system for the Budget Group by procuring rice from traders instead of farmers. The government allowed private traders to export rice by issuing licenses. Now internal trading and export are in the hands of the UMFCCI and the Wholesalers' markets.

3.3 Myanmar trade Institutions and facilitation

A series of structural reforms in Myanmar had been introduced since the country has changed its economic path to a market oriented system. The new institutional framework was constituted to permit the private business firms, both domestic and foreign enterprises, in the external trade sector. The Imports and Exports Act (1947) was revived. Trade liberalization measures were introduced to be in line with the market oriented economy, the private individuals or enterprises are allowed to carry out the export import business which was previously monopolized by the state. Among government agencies involved in external trade transaction, the Directorate of Trade under the Ministry of Commerce is in the important position to facilitate external trade flow, but the Customs Department also appears to play an imperative role for trade facilitation activities in Myanmar. The Department of Border Trade under the Ministry of Commerce plays an important role in cross-border trade facilitation. Other agencies concerned are responsible for facilitation of trade transaction. The Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI) is the link between the government and the private sector for trade facilitation and other matters.

Border Trade was regularized to facilitate cross border trade with the five neighboring countries. The Department of Border Trade was established with its 13 branch offices, providing one-stop service for border trade matters in collaboration with various departments concerned. Muse Border Trade Commercial Zone has been constructed at China-Myanmar border area to smooth border trade transaction. The role of Chambers of Commerce and Industry was reactivated and reorganized as the Union of Myanmar Federation of Chambers of Commerce and Industry (UMFCCI) for the promotion of trade and industry of the private sector. Since the federation of Chambers of Commerce and Industry has a large network of chambers among the private sector, it provides an environment for discussion between the private and government agencies on various matters including international trade.¹⁹ Myanmar Foreign Trade Bank (MFTB) and Myanmar Investment and Commercial Bank (MICB) deal with the financial transactions for the overseas trade, and the branch offices of Myanmar Economic Bank (MEB) handle the financial transactions for border trade. MEB opens branch offices at the border checkpoints for the commercial transactions of overland trade with the neighboring countries.

Export and Import procedures were realigned. Then the technical barriers to trade were lowered and simplified export and import procedures were geared towards trade facilitation and promotion. The basic principle of export policy is to penetrate into the global market by using existing natural and human resources and to produce value added products more than normal export items. The basic principle of import policy is priority import of capital goods, construction materials, essential goods, hygienic materials for people's health, supporting products for export promotion and for import substitute production. Government laid down the "Export first import later" strategy. Import was initially allowed against the export earnings with a view to promote export and to overcome the balance of trade deficit problems. The customs procedures in Myanmar are provided in the Sea Customs Act and Land Customs Act. In 1988, risk management technique is initiated by the Customs to avoid 100 per cent physical checking of all exports and imports following WTO recommendations. A notification was issued to regulate the classification of imported goods and assessment of duties in accordance with the tariff law which was enacted to assist the market economic system on March 12, 1992. The Harmonized Commodity

¹⁹ Ministry of Commerce

Description and Coding System (HS) were introduced in April 1992 for modernization and standardization. Customs Value Declaration Form (CUSDEC 4) was prescribed to provide the implementation of the WTO Valuation Agreement in 1999. Transit duty was abolished in 2000.

Customs duty together with the commercial tax is collected at the point of entry and the time of clearance of imported goods. Commercial tax is levied according to the schedules appended to the Commercial Tax Act 1991, and the rates vary depending on the types of goods and services. Assessment of Import Duty is based on the assessable value, which is the sum of CIF value and the landing charges (0.5 per cent of the CIF value) for the goods imported. Customs Department is making efforts to establish Local Area Network (LAN) to be able to provide customs clearance through on-line service.²⁰ Since 2005, the new trade policy was introduced under which the importers can apply for license via account transfer even if they have no export earnings from exporting goods to foreign countries through normal trade. That mean that the importer are permitted to open letter of credit (LC) for applying import licenses through transferring account of the exporters who have already had export earnings.

As an introduction to the import or export process in Myanmar, a brief discussion is presented. Any exporter or importer needs to apply for license to obtain permission from Directorate of Trade and Department of Border Trade under the Ministry of Commerce. The necessary documents for applying for Import Licenses are as follows:

1. Import License application letter with company's letter head,
2. Import License application letter,
3. The original copy of Performa Invoice,
4. Sales contract,
5. Export earning recommendation, and
6. Recommendation from government departments concerned organizations concerned (if needed).

Before applying for import license, the importer is required to open foreign exchange account at a Bank. The import application form shall have attached the sales contract and/or invoice mentioning detailed specifications, mode of packing, and

²⁰ Customs Department

delivery phasing. An irrevocable letter of credit (L/C) has to be opened by the importer at the Bank. Some imported goods need to attach recommendation from other government departments concerned. For example, an importer who wants to import medicine is required to attach recommendations such as business license concerning drug importing, Drug wholesaler or retailer license and Drug Registration Certificate from Food and Drug Advisory (FDA) to apply for import license. Sometimes, it takes between 1 and 2 weeks to get recommendations from other government departments concerned. As most of transaction processes are paper based procedures, this undoubtedly creates a potentially longer processing time.

In the study of custom clearance situation in Myanmar, most of the import transactions went through the yellow lane and the red lane. Although the Green Lane System has been implemented in Myanmar, there were few importers who utilized their import transactions through the green lane. Under the existing rules and regulations all incoming consignments of goods must be cleared through the Customs Department under Import Declaration Form (CUSDEC-1). Importation required the Import Declaration Form which is to be accompanied by the following documents:²¹

1. Import license/permit,
2. Invoice,
3. Packing List, and
4. Other Certificates and Permits issued by the relevant Government Departments as a condition for Import.

In terms of exporting, exporters have to apply to get export license, in conformity with the rules and regulations laid down by the Directorate of Trade. The necessary documents for applying for Export Licenses are as follows:

1. Application Form with the company's Letter Head,
2. Online Export Application Form,
3. Invoice/Sales Contract,
4. Copy of Certificate of Exporter and Importer Registration,
5. Necessary documents to be submitted for the exported commodity, and
6. Recommendations from related ministries concerned.

An irrevocable Letter of Credit has to be opened at the Myanma Investment and Commercial Bank by the buyer through a correspondent or acceptable bank.

²¹ Customs Department

Myanma Port Authority has to be contacted for the shipment of cargo that is to be shipped on F.O.B. basis. Pre-shipment inspection, if required, will be conducted by Inspection and Agency Services with respect to specification, weight, quality and packing. Details of the cargo, such as shipping bills, other shipping documents and customs pass etc., must be presented to the Bank for transaction.²² On the shipment of export commodities, Export Declaration Form (CUSDEC-2) must be submitted to the Customs Department together with the required documents. They are export license/permit, invoice, packing list, sales contract, shipping instruction, letter of credit or general remittance exemption certificate, payment advice referring inward telegraphic transfer private No./ Inward Telegraphic Transfer Government No, sample of goods, forest pass for the shipment of forestry produce, health certificate for the export of live animals, forest permit for the export of wild live animals and other certificates and permits as required by the government agencies concerned.

Export and Import procedures and formalities are revived for trade facilitation and custom modernization. Export declaration can be initiated to submit electronically or via internet in September, 2011. Export taxes have been reduced from 10 per cent to 2 per cent for most products, which has given partial relief to exporters. In addition, the government has confirmed exemption of export taxes on such commodities as rice, pulses and beans, corn, sesame, rubber, fresh-water and salt-water products, and animals and animal products for a six-months period until 14 February 2012.

It is recommended to develop the usage of electronic filing of customs documentation. It is also recommended to accelerate the establishment of an IT system to support the process, consistent with the implementation of customs integration. Efficient risk management system, streamlining and harmonizing procedures should be adopted to facilitate trade performance.

Chapter 4

Analysis on Changes in Agricultural Production

4.1 Farm Inputs and Facilities

Farm Inputs are important in farming not only to increase the productivity and to improve the quality of output, but also to increase the income of farmers. Land, agricultural labour, High Yield Varieties (HYV), quality seeds, fertilizer, irrigation, farm machinery, pesticide, agriculture loans and modern agro-technologies can be classified as farm inputs. Farm inputs are taken into account as an indicator of agriculture development.

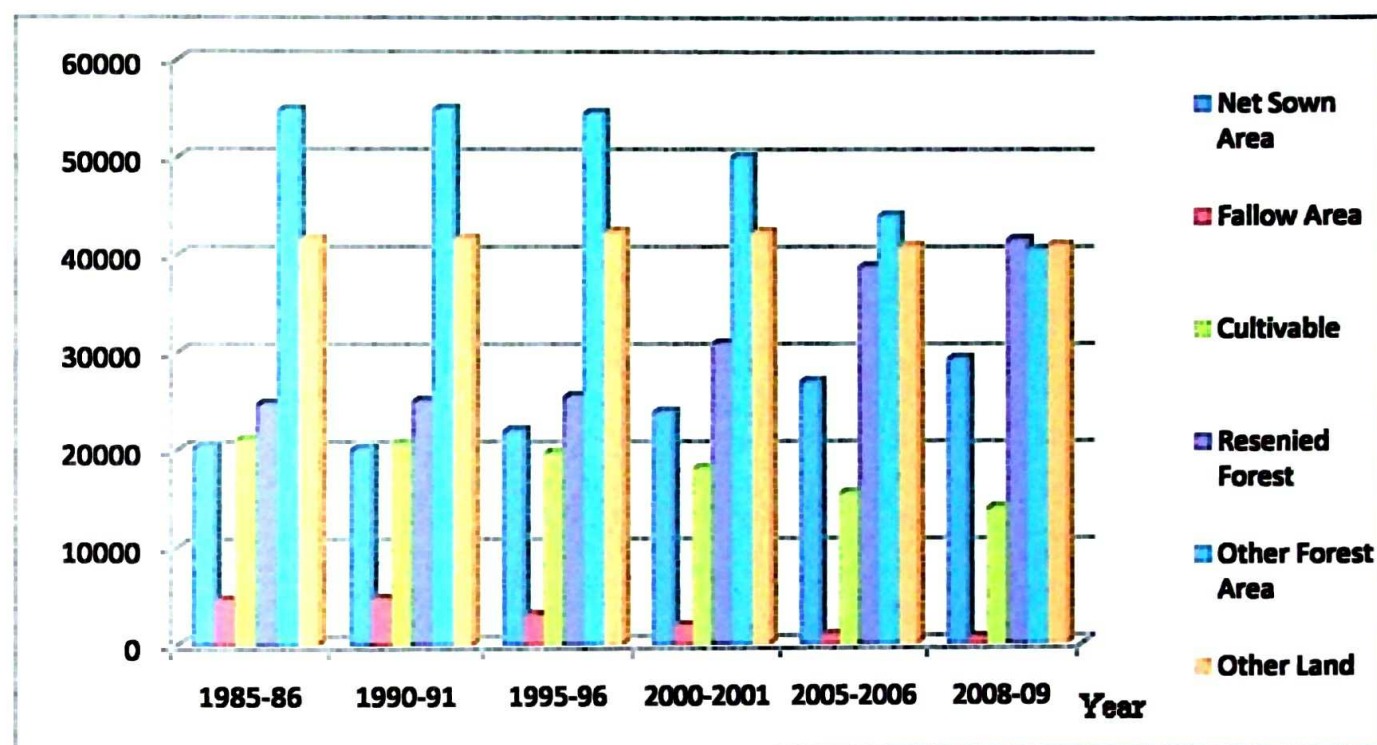
Land Utilization: Myanmar land utilization is classified into six parts, such as net area sown, fallow area, cultivable area, reserved forest, other forest area and other land. Net area sown is increasing, but cultivable land, fallow area and other land are decreasing. Reserved forest areas is increasing but other forest area is decreasing so Myanmar forest area is decreasing (See Figure 4.1). So, land use pattern is changing because of the development of industrialization, urbanization and increase in population.

The increase in sown area is due to the effect of the land reclamation by the government in Ayeyarwady and Tanintharyi Regions after 1991 and allocation of the fallow lands to the private sectors for commercial farming. The government with notification No. 44/91 of 13 November 1991 prescribed duties and rights of the Central Committee for the management of Cultivable Land, Fallow Land and Waste Land which has the authority to grant the right to cultivate, the right to utilize land by State owned, Joint Ventures, other organizations and private individuals for commercial use of cultivable land, fallow land and waste land for the purpose of carrying out agriculture, livestock breeding, aquaculture enterprise or other affiliated economic development enterprises. Under this arrangement, the private sector has also been given the opportunity to participate and develop large scale farming by granting large tracts of fallow lands and cultivable waste lands to the private investors, both local and foreign. The government has allocated about 0.7 million hectares (1.73 million acres) of land to some 216 private business groups, in holdings mostly of about 1,214 to 2,023 hectares (3,000 to 5,000 acres), though some are even larger. Large scale oil palm plantations and rubber estates are mostly in Tanintharyi

Region and other large scale farms are located in Kachin State, Sagaing, Magwe, and Ayeyarwady Regions.

Figure 4.1 Land Utilization of Myanmar

Unit- thousand Acres

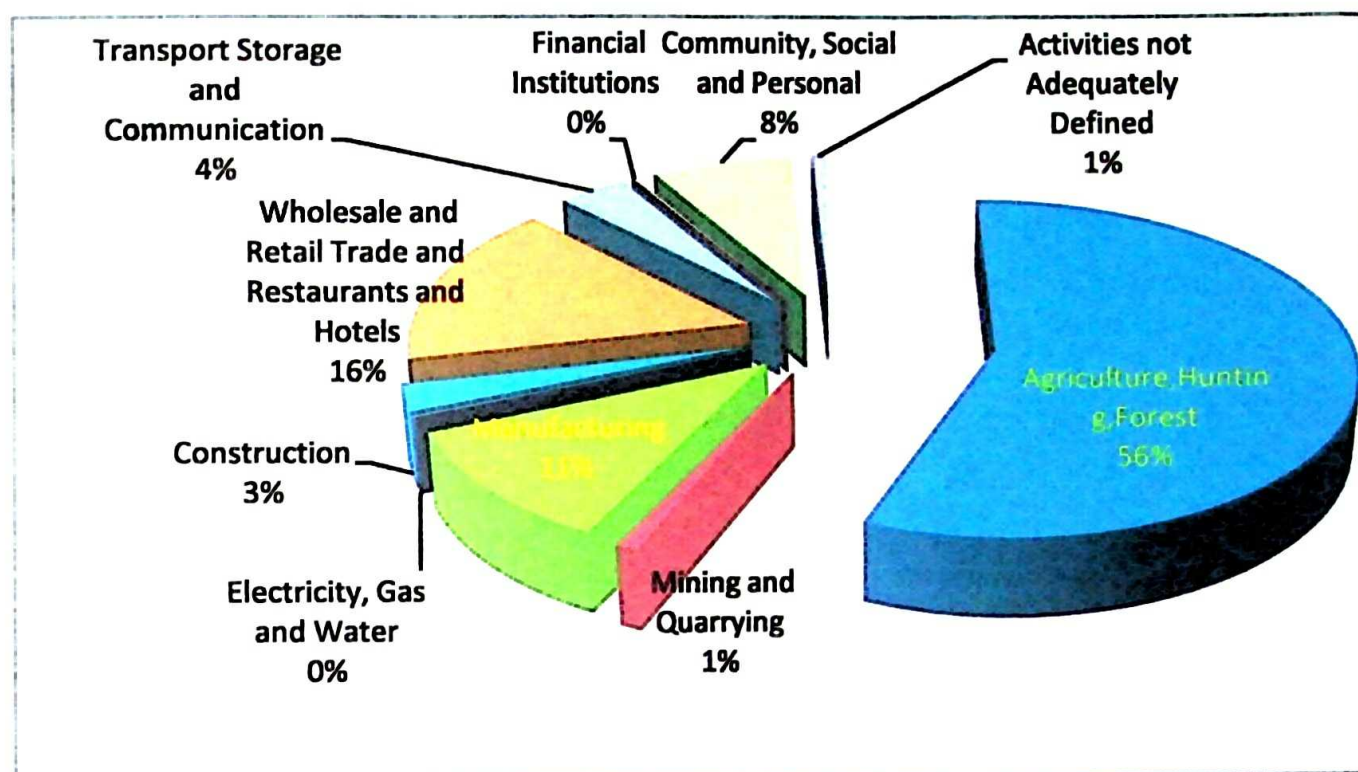


Source: Appendix Table 4.1

Land resources need to be utilized in an efficient and sustainable manner. Since there are many uses of land, agricultural production, fish and fishery production, forestry, mining and residential and urban use, it would be advisable to establish a "Land Use Coordination Committee" to oversee land utilization. This agency would have to include personnel from all land utilizing ministries and departments to enable close coordination and cooperation concerning the pattern of land utilization for efficient and sustainable land utilization.

Farm Labour: Labour is important for agricultural production. The Myanmar agricultural labour force is increasing because Myanmar's economic structure has not changed significantly and rural population is increasing (Figure 4.2). Income generation programme is needed for education, health and food security of the rural economy. Government should create the development of rural nonfarm sector for raising the standards of living of rural populations and communities.

Figure 4.2 Labour Force by Occupational Distribution (1990 Labour Survey)



Source: Appendix Table 1.1

Distribution of Quality Seeds: Distribution of quality seeds is one of the main functions of the Myanmar Agriculture Service (MAS). Breeding of High Yielding Variety (HYV) and upgrading the quality are important tasks of the research institutions under the Ministry of Agriculture and Irrigation. Improved quality seed is one of the major inputs to increase production and improve the quality of export. Quality seeds of paddy, beans and pulses were distributed by the Ministry of Agriculture and Irrigation; these are shown in Appendix Table 4.2. Paddy quality seed distribution was increasing from 1962 to 1994, after that period, distribution remained stable. After 2000/01, MOAI paddy quality seed distribution was decreasing because private quality seed distribution took place in the market according to the market liberalization, and farmers keep seeds by themselves. So preparation of a seed law is very important in order to legalize the activities such as importing seed, handling production and marketing. The Seed Law is now under process for notification¹.

Utilization of Fertilizer: Fertilizer is needed for High Yielding Variety (HYV) and relevant advanced new agricultural technologies. Since the 1980s farmers have come to realize the benefits of using fertilizer as the major inputs to increase production. Distribution of fertilizers by the Ministry of Agriculture and Irrigation is shown in

²³ Seed Division, MAS

Appendix Table 4.3. The supply of chemical fertilizers includes both imported and domestically produced fertilizer. The supply of domestic fertilizer declined because of the degradation of producing factories and the difficulty of obtaining raw materials for the fertilizer factories.

The government official price of fertilizer was kept low for 15 years until 1987/88, after market liberalization for agricultural products. In 1993, the subsidy on chemical fertilizer was removed so the official price of chemical fertilizer were higher than before, frequently rising in accordance with rises in the World market prices. After 2003, fertilizer import was decreasing because of decreasing demand for fertilizers by farmers since market prices of the fertilizers were not affordable price for most farmers due to insufficient investment on their farms.

Most of Myanmar's farm holdings were small and farmers were poor; they could not afford to buy chemical fertilizer for their farm. The private sector's ability and capacity to import and distribute locally is constrained by scarcity of foreign exchange and lack of distribution network. After the private sector participation, the data on private sector distribution was not included in the official data. Thus the trend of fertilizer distribution for rice and pulses by MOAI was falling while private sector participation was increasing in the market oriented period.

In fact, fertilizer is the most important component to improve crop productivity. So as to ensure adequate utilization of fertilizer at prices affordable for farmers, a subsidy programme should also be introduced by the State. Government should use tax cut policy on fertilizer imports for the development of agricultural production.

Pesticides used for Plant Protection: In order to meet the target yield and production, systematic plant protection practices are being undertaken. Utilization of pesticides for rice, beans and pulses were decreasing (See Appendix Table 4.4). The government official price of pesticides was kept low until 1987/88. After market liberalization for agricultural products, the subsidy on pesticides were removed so the official prices were higher than before, changing in accordance with the rise in the World market prices. After the private sector participation, the data of private sector distribution was not included in this figure. Thus, the distribution of pesticides for rice and pulses by MOAI was falling while private sector participation was increasing.

Since demand for food is increasing with growing population in the world, utilization of agrochemicals are increasing, including pesticides for plant protection. Heavy doses and wrong use of agrochemicals may produce adverse effects on the environment and food safety. In global trade, attention is being given more to quality and standard of the products and food safety which became requirements for obtaining premium prices for the products. Therefore, food safety and security was emphasized through introduction of Plant Pest Quarantine law (1993), Pesticide Law (1990) and Fertilizer Law (2002).

Farm Machinery and Equipment: Farm mechanization has benefited the farmers in terms of saving in time, labour and human energy. Under the market economic system, in addition to the State sector, private sector participation is increasing in utilization of farm machineries and equipments for various activities of agricultural production. The utilization of farm machinery and farm implements especially small machines and water pumps in Myanmar were increasing (See Appendix Table 4.5 and 4.6). In addition, there are also several small private manufacturing enterprises that are producing farm equipments, mainly Kyaukse Township have production the capacity of 10,000 power tillers and 5,000 power reapers annually.

There are 99 tractor stations (retail outlets), five farm machinery factories and one farm machinery plant under the Agricultural Mechanization Department (AMD) of MOAI. Until 1998/99, mechanized tillage acres by MAOI for rice, pulses and others were increasing; however, after 1999, this acreage has been decreasing due to increasing oil prices. Mechanized tillage acres of paddy, beans and pulses were decreasing significantly (See Appendix Table 4.7).

Many small scale private factories also produce assembled machineries and implements, but various machines mostly from China and Thailand have to be still imported. In fact, there is excess supply of local-made machineries in the country but the quality is not high enough for the farmers' needs. Most small farmers cannot afford to buy farm machineries and are employing their draft cattle for whole operation in crop production.

Increased cropping intensity has expanded the use of machineries in agriculture from land preparation to harvesting and drying. Government should arrange medium and long term credit to farmers to enable them to use medium and small machines. Government should encourage private sector participation in

production and distribution to enhance mechanization. A hire-purchase programme is required to allow farmers to acquire farm machinery.

Irrigation: Construction of irrigation works for crop cultivation historically started since the days of the Myanmar Kings. After 1988, the Government put forward continuous efforts in the construction of dams and reservoirs throughout the country by utilizing large capital investment, manpower and machineries. After 1988/89, total irrigated area has increased steadily from 2,463 thousand acres in 1987/88 to 5,561 thousand acres in 2007/08.

The government irrigated areas were the largest area, private irrigation was second largest and other sources of irrigated areas were the smallest in 1988-87. After 1993-94 other sources of irrigation were the largest area, government irrigation was the second largest and private irrigation was the smallest. Increases in these other sources of irrigation were due to the introduction of the summer paddy irrigation development program (See Appendix Table 4.8).

Other sources of irrigations include pump irrigation. It was achieved through (1) the construction of sluice gates by the Irrigation Department in order to adjust the water level of rivers and canals, (2) the construction of drainage channels (which are used for irrigation in the dry season) using the voluntary labor of village residents, and (3) farmers' private investment in water pumps. The government's financial support of pump irrigation remained relatively small. Some water pumps (especially large pumps that take water directly from the Ayeyarwady River) are owned and maintained by Water Resources Utilization Department.

Paddy and pulses irrigated area has increased steadily. Until 1999/2000, after paddy, other food crops and sesamum, pulses were the fourth largest crop under irrigation. Since 2000/01, after paddy and other food crops, pulses became the third largest crop under irrigation because pulses became cash crops (See Appendix Table 4.9). The sown acreage of summer paddy by region clearly shows that the increase in summer paddy acreage was prominent in the delta, especially in Ayeyarwady Region, where pump irrigation is dominant.

Water Users' Association should be formed by the volunteer farmers for the development of water management for reducing water wastage and ensuring the use of water at right time, place and amount. Those associations can monitor and supervise efficient and sustainable water utilization and water management for farmers. Restructuring of the cost sharing scheme of irrigation facility development

between the Union, State and Regional and the beneficiary groups is needed. Water tax should be collected for government revenue. Government needs to formulate and enact Water law.

Agriculture Loans: Myanma Agricultural Development Bank (MADB), established in 1953 as a State Agricultural Bank (SAB), is the only source of institutional credit for crop cultivation. The Bank has now 16 regional offices and 205 branches in 2005 out of 325 townships. The scale and impact of MADB loans to farmers are limited in comparison with the funding requirement. It is inadequate and ineffective for the purpose of productive investment. Cultivators have only tilling right, these rights are neither transferable nor allowed to be used as mortgage or taken in lieu of loan repayment, or used as collateral for getting loans. The seasonal loans must be repaid within one cropping season, and the loan size is not adequate for farmers. Agricultural loans for paddy and pulses are increasing (See Appendix Table 4.10). It is obvious that the agricultural loans of Paddy are 84 per cent of total loans. After Paddy and Ground nut, Pulses rank third in agricultural loans and it is round about 5 per cent of total loans. Myanmar peasants did not get sufficient loans for cultivation, so they used unorganized money market for cultivation. Thus farmers have to borrow from informal money lenders with high interest rates ranging from 5 to 20 per cent per month. The advantage is that if the crop fails because of drought and/or of other reasons, MADB allows farmers to postpone their repayment by about one year. Given the fact that most farmers have only land as their main asset, their inability to use land as collateral for bank loans has made it difficult for them to access formal credit with lower interest rate for large-scale investments in agriculture. Cultivators need sufficient loans for the development of agricultural production. Land ownership rights will enable them to get loans for high productivity and production. In 2012, farmers can use their ownership rights.

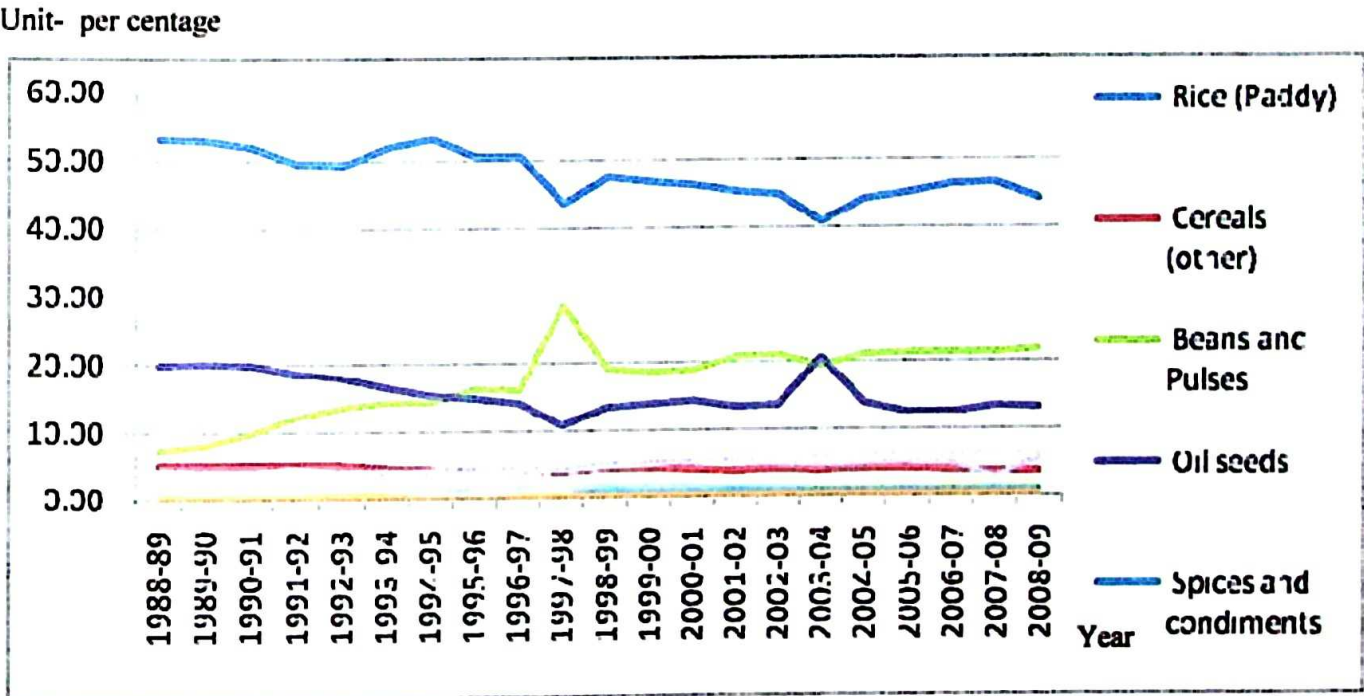
No private banks have yet undertaken the money lending function to the farmers, but there are a few NGOs giving microfinance to the rural people. However, their scope and scale of operation in terms of coverage of the number of rural people and of areas is still very limited. Now, NGOs give credit for crops and income generation activities in rural areas, but it is not sufficient for all population in rural areas. Government should create the development programmes for the arrangement of credit for agricultural development, credit for livestock breeding and credit for non farm sector development.

Research and Development: A strong research capacity is essential to sustain a dynamic growth of the agricultural sector and to provide the means to efficiently manage natural resource endowment in order to increase produce food availability and generate foreign exchange. Human resource development and expenditure in research activities are important components of the support system for research and development.

4.2 Sown pattern after 1988

Under the different administration periods until the end of the Socialist period, sown pattern showed no changes, rice was the largest sown crop, oil seed was second largest crop group and beans and pulses was the third largest crop group. Under the market oriented economic system period, these sown patterns remained unchanged until 1994/95. In 1995/96, increase in beans and pulses sown area was larger than that of oilseeds. Sown areas of other crops such as rice, other cereals, spices and condiments, tobacco, and vegetable and fruits were decreasing. According to the decisions of peasants, beans and pulses sown areas were increasing (See Appendix Table 4.11).

Figure 4.3 Sown Pattern by Crop Groups in Myanmar



Source: Appendix Table 4.11 and 4.12

Rice, beans and pulse price at harvest time were increasing. In 1997/98, paddy was no longer purchased from farmers by the Government and arrangements were made to purchase the crops from millers and merchants through tender system. In 1997/98 farmers had free choice to cultivate and to sell in the free market, beans and pulses sown area was increasing and rice and oil seed sown area were decreasing. In

April 2003, Government abolished the paddy procurement system, farmers do not need to sell rice to government, however, rice and beans and pulses sown area was decreasing and oilseeds sown area was increasing. These changes were dependent upon the interest and decisions of farmers. After that year, rice, beans and pulses sown area was increasing. 1997/98 and 2003 were periods of government policy changes and rice, oilseeds, beans and pulses sown areas were changed according to the profit and incentive factors of farmers (See Figure 4.3).

After 1996/97, sown pattern was changed, rice was the largest sown crop and beans and pulses was the second largest crop group but decreases and increases in sown area were the result of changes in government policy, and the profit and incentive factors of farmer.

4.3 Price, Procurement and Production

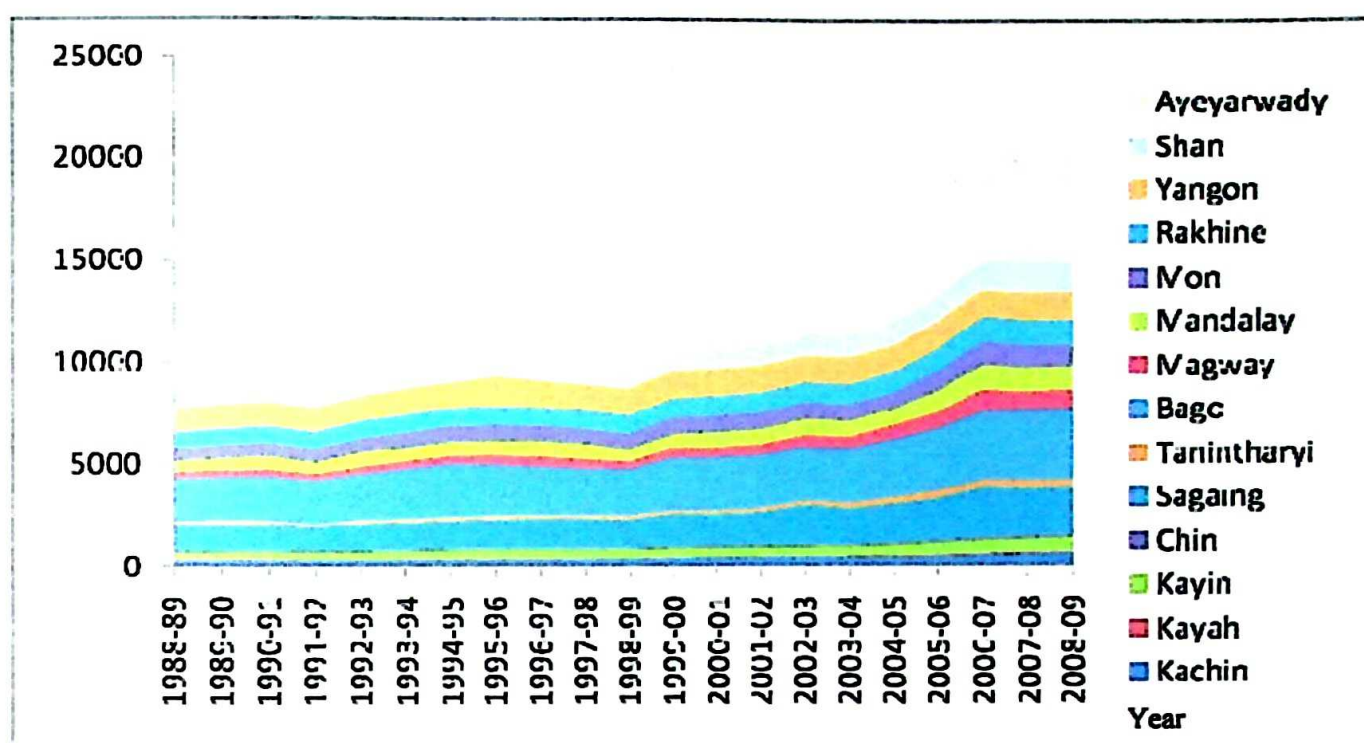
4.3.1. Price, Procurement and Production of Rice

The government introduced the Paddy-Fish Farming System which could undertake both paddy cultivation and fish and prawn farming simultaneously. In 1988/89 rice sown area was 11.80 million acres, after 1992/93 rice sown area was increasing dramatically (See Appendix Table 4.12). Area under summer paddy was increasing from 2.15 in 1993/94 to 3.135 in 2007/08. In 1992/93, the government tried to reclaim the land in the deep water areas in Yangon, Ayeyarwady and Bago Regions, and Mon and Kayin States. Furthermore, the government, in collaboration with local communities, constructed embankments and canals in the deep water area in Lower Myanmar to prevent the flooding of paddy fields and to divert water to the areas where it was needed. Rice mechanized tillage acres as percentage of total tillage acres in Myanmar were within 23 to 44 per cent (See Appendix Table 4.7).

Rice sown area by States and Regions were increasing proportionately (See Figure 4.4). The summer Paddy program was initiated in 1992/93, at that time farmers were compelled to grow summer paddy and many farmers embraced this, especially as chemical fertilizer and diesel fuel for pump irrigation were subsidized by the government in the initial years of the program. While the government was pushing for an expansion in paddy, peasants prefer to increase summer paddy because there was no quota requirement for summer paddy. Average retail prices of selected types of rice at harvest time in Yangon are increasing (See Appendix Table 4. 13).

Figure 4.4 Myanmar Rice Sown Area by States and Regions

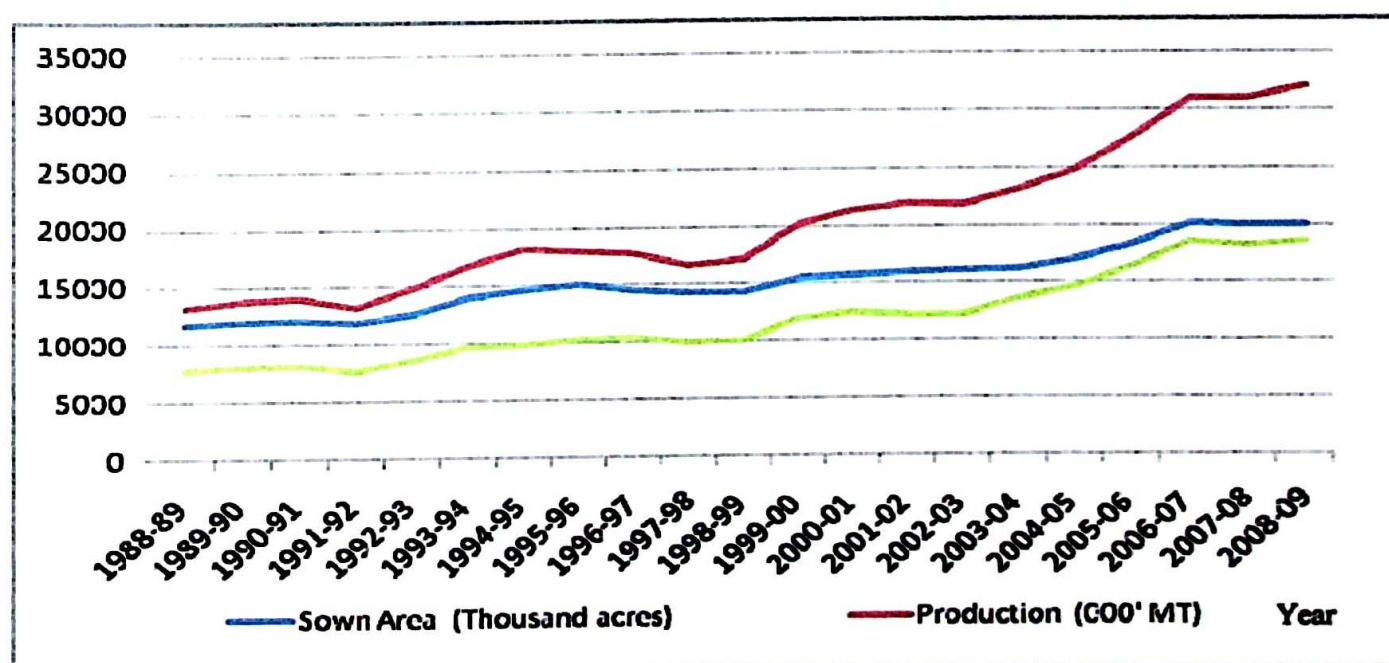
Unit- Acre(0,000)



Source: Appendix Table 4.16

After the mid 1990s, the policy also stressed self-sufficiency of rice in each locality, including rice deficit areas, such as the mountain areas and the dry zone. The promotion of production was based on profitability and it became unattractive for farmers after the mid 1990s, this was not only just because of low rice prices, but also because of high input prices. But after 2003, rice sown area, production and domestic use were increasing (See Figure 4.5).

Figure 4.5 Rice Sown Areas, Production and Domestic Use in Myanmar



Source: Appendix Table 4.15

Table 4.1 Annual Growth Rate of Myanmar's Rice

Unit – Average annual growth rate

Year	Sown area	Production	Yield	Procurement
1948/49-1963/64	1.67	2.82	Na	3.61
1964/65- 1986/87	- 0.05	3.57	3.59	1,97
1988/89- 2007/08	2.06	4.35	1,61	1.46
1948/49-2007/08	0.91	2.86	1.91	0.07

Source: Calculation of Table 4. 15

From 1988/89 to 2007/08 average annual growth rate of rice sown area was 2.60, average annual growth rate of rice production was 4.35 and average annual growth rate of rice yield was 1.61 (See Table 4. 1). This high average annual growth rate of area was because of the development of summer paddy (See Appendix Table 4.14).

Table 4.2 Rice Procurement and Domestic Use in Myanmar

(Unit – Per centage)

Year	Procurement per cent of Production	Domestic use per cent of production
1987/88	4.25	97.17
1988/89	12.70	99.40
1989/90	10.74	98.00
1990/91	13.25	98.42
1991/92	15.87	97.73
1992/93	14.98	97.76
1993/94	11.57	97.40
1994/95	11.18	90.46
1995/96	10.77	96.71
1996/97	8.61	99.12
1997/98	9.61	99.72
1998/99	12.88	98.83
1999/00	10.99	99.54
2000/01	9.97	98.04
2001/02	10.03	92.86
2002/03	9.48	93.94
2003/04	-	98.79
2004/05	-	98.77
2005/06	-	98.92
2006/07	-	99.92
2007/08	-	98.08
2008/09	-	96.54

Source: Appendix Table 4.15

Therefore, the development of the rice production during the period was achieved through the expansion of the sown acreage and slight improvements in land productivity. These developments occurred because of the utilization of effective irrigation systems, production of summer paddy, the consequences of implementing effectively the new rice policy, the farmers' decisions and the remarkable increase in rice price (See Appendix Table 4.13).

Rice procurement percentages of production and domestic use percentages of production in Myanmar are shown in Table 4.2. Production was increasing but procurement percentages of production were decreasing and domestic use percentages of production were increasing. Until 2002/03, rice was exported by the government and export was decreasing because of decreases in procurement. Domestic use was increasing because of increasing population in Myanmar.

4.3.2 Price and Production of Beans and Pulses

There are around 22 different beans and pulses grown in Myanmar, but matpe (blackgram), pedisein (green-gram), pesingon (pigeon pea), gram (chickpea) and bocate (cowpea) are the dominant species. Nearly 50 per cent of the total beans sown area is matpe and pedisein (black gram and green gram) in 2008/09 (See Table 4.3).

Table 4. 3 Importance of Beans and Pulse Sown Areas in Myanmar

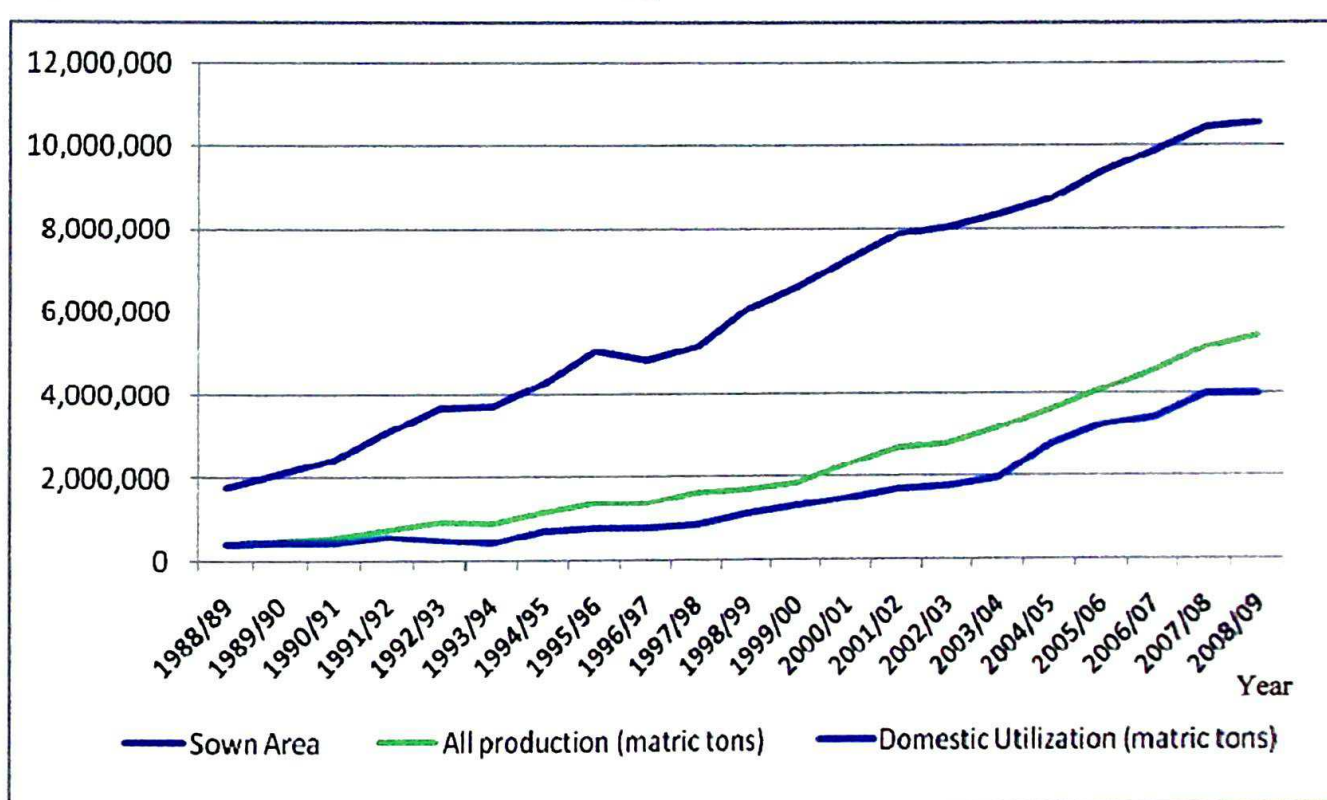
Position	1988/89 (%)	2008/09 (%)
1	Chick pea 19	Green gram 24
2	Blackgram 13	Blackgram 23
3	Pigeon pea, Pegyi 10	Pigeon pea 14
4	Green gram 7	Chick pea 7
5	Penauk, Soybean, Sultapya Bocate, Pelun 5	Penauk, Soybean, Bocate, Pelun 4
6	Pelun 3	Pegyim 3
7	Garden pea, Peyin 2	Sultapya, Butter bean 2
8	Others 41	Others 23

Source: Appendix Table 4.20

Growing season of pulses is different according to region and climate (See Appendix Table 4.18). Beans and pulses sown pattern were changing within the study period due to the farmers production decisions based on profitability (See Table 4.3). Following the twenty years of liberalization, the total area sown to beans and pulses has expanded rapidly from 1.8 million acres in 1988/89 to over 10.57 million acres in 2008/2009. Total production increased from 406,000 tons in 1988/89 to

5,332,500 tons in 2009 (See Figure 4.6). Since 1988/89, market liberalization policy and free choice of agricultural cultivation became more attractive to the farmers to grow more profitable crops. Due to the liberalization in cultivation of crops and trade of agricultural products, sown areas of beans and pulses, production, and yield were increasing year by year. Beans and pulses cultivation makes natural nitrogenous fertilizer for land and it can be grown in all kinds of land with easy cultivation method. Farmers can get net high profit with low cost cultivation costs and comparative advantage over other crops such as rice and maize. Cultivation of pulses requires less water resource and financial requirements.

Figure 4.6 Beans and Pulses sown area, production and domestic use in Myanmar



Source: Appendix Table 4.17

Only 20 per cent of the water resource required to grow one unit area of rice is necessary in order to grow one unit area of beans and pulses (Dr. Dolly Kyaw 2011). In line with changes of economic system and agriculture policies, beans and pulses were being emphasized to achieve self-sufficiency for domestic consumption and at the same time to be able to promote exports. Since 1988/89, total sown area for beans and pulses increased steadily but irrigated sown area for beans and pulses slightly decreased even though total irrigated sown area for all crops increased during 1988/89 and 1993/94 (See Appendix Table 4.9). The reason for decrease in irrigated sown area for beans and pulses might be the changes towards multiple cropping patterns. Those changes might be the result of the encouragement of summer paddy and other food

crops, oilseeds and sugarcane. After 1993/94, the irrigated area for beans and pulses sown area increased steadily. Beans and pulses mechanized tillage acres of total tillage acres in Myanmar were within 23 to 38 per cent of total tillage acres making it the second highest tillage acres (See Appendix Table 4.7).

With regard to the yield of beans and pulses, after 1989/90 all varieties of six major kinds increased gradually in yield per acre (See Appendix Table 4.20). Although high yield variety seeds were not used widely, other factors such as farm input and systematic cultivating methods were employed effectively in pulses and beans production.

Table 4.4 Average Annual Growth Rates of Beans and Pulse in Myanmar
(Unit – Average annual growth rate)

Year	Sown Area	Production
1964/65-1986/87	1.27	4.43
1988/89-2008/09	8.80	13.12
1964/65-2008/09	4.79	7.10

Source: Calculation using Appendix Table 4.17

In conclusion, pulses sown areas were increasing and the highest average annual compound growth rate of sown area was 8.80. That high growth was due to the market liberalization (there is no government regulation for exporting pulses from Myanmar, except for the 10 per cent export tax), it was broadly sown in various places according to the easy method of cultivation at any cropping pattern, being cash crops for farmers, good rising trend in prices and relatively less expensive cost of cultivation and the decreasing demand for domestic consumption and export. Therefore, rainy pulses and winter pulses increased quickly. Average annual growth rate of beans and pulse production was 13.12; the highest growth rate (See Table 4.4). That development was due to the increase in beans and pulse sown areas. It can be concluded that the development of the pulse production during that period was achieved through the rapid expansion of the sown area and slight improvements in land productivity (See Appendix Table 4. 20 and 4.21).

4.4 Instability in Agricultural Production

The study was conducted to measure the extent of instability, to analyze sources of changes in production of rice, beans and pulses grown in Myanmar before and after the adoption of market liberalization policy. The study used time series data covering the period before the adoption of market liberalization policy (1962/63 to

1987/88) and the period after the adoption of liberalization policy (1988/89 to 2008/09). The main crops included in the study were rice, beans and pulses and the instability of area, yield and production were measured. Variability in area, output and yield of rice can be tested by the instability index. The production variability is tested by calculating instability index of rice for the fourteen States and Regions in Myanmar. This index is based on the coefficient of variation corrected by the fitness of trend function. The index is used to measure instability at both the country level and States and Regions level.

The objective of this is to investigate the potential of Myanmar inter-regional trade in agricultural commodities specifically between the fourteen States and Regions. To realize this objective, the following indices and coefficients were computed: instability index was measured.

4.4.1 Instability in Rice Area, Yield and Production

The production variability is tested by calculating instability index of rice for the fourteen States and Regions in Myanmar. This index is based on the coefficient of variation corrected by the fitness of trend function. The index is used to measure instability at both the country and States and Regions level.

Table 4.5 Instability of Area, Yield, and Output for Rice at the States and Regions

Level and the Union Level

(Unit - Per cent)

State and Division	Area		Yield		Output	
	1962-1987	1988-2008	1962-1987	1988-2008	1962-1987	1988-2008
Kachin	5.29	10.60	11.11	2.86	12.20	12.21
Kayah	12.25	15.05	14.76	6.30	12.58	22.20
Kayin	4.22	8.15	20.20	3.69	19.79	9.61
Chin	5.19	3.81	10.69	1.67	14.56	4.40
Sagaing	9.73	8.62	12.86	4.78	21.42	16.18
Taninthayi	4.46	15.62	13.47	4.20	11.32	18.71
Bago	3.50	6.88	12.48	4.33	12.04	13.06
Magaway	11.87	13.39	10.41	3.01	21.22	15.02
Mandalay	11.87	12.21	12.71	4.75	20.94	16.78
Mon	3.78	7.87	11.99	2.24	12.07	8.76
Rakhine	3.61	5.07	14.12	3.32	15.30	8.30
Yangon	2.35	4.30	16.04	2.01	15.98	8.16
Shan	5.61	12.05	9.93	6.13	13.40	18.33
Ayeyarwady	4.57	9.35	11.82	4.98	12.77	7.15
Union	3.70	4.76	11.87	3.13	11.47	7.40

Source: Calculation using the annual time series data from the Ministry of Agriculture, Myanmar

Instability indices have been measured for total production, area and yield of rice on the basis of data from 1962 to 2008 for the fourteen regions (States and Regions). Annual time series data on area, output and yield for rice are taken from the Ministry of Agriculture and used to calculate the instability indices at the national level and States and Regions level for the two periods: 1962-1987 and 1988-2008.

The relationship between the region's instability index and those of individual regions and the rest of the regions indicates whether an individual region would be better-off by integrating regionally or with the rest of the regions. Rice was sown in all States and Regions in Myanmar. It is found that States and Regions integration reduce the Union instability index of area, yield and output. This means that the fourteen States and Regions would gain from inter-trade in rice production. The results indicate that free trade among States and Regions would be a reasonable strategy for achieving greater food security (See Table 4.5).

Kayin, Chin, Sagaing, Bago, Mon, Rakhine, Ayeyarwady and Yangon are low instability or stable areas of rice cultivation and Kayah, Tanintharyi, Magway, Mandalay and Shan are high instability areas of rice cultivation (See the Table 4.5). So, they have different cropping patterns or different production patterns.

The rice sown area shows very low instability with only one-digit number during 1962 to 1987, but it increase slightly within 1988/89 and 2008/09 because of market oriented economic system and market liberalization, changes in cropping pattern, increases in housing area and summer paddy programme.

The instability of rice yield was 11.82 two-digit numbers during 1962 to 1987, but later it fell to only 3.13 from 1988 to 2008. Except the Shan State, the instability of rice yield for all States and Regions were two-digit number during 1962 to 1987, but later the second period they all fell to one- digit. According to the twenty year plan, there was the Green revolution, Township High Yielding Production Programmes was introduced in Taik Kyi and Shwe Bo Townships in 1977/78 and that programme was extended to suitable townships every year to the national level. The more the extension in Township High Yielding programmes, the higher the yield. The increment of yield was remarkably. So, within the first period, from 1962 to 1987 there was two-digit instability rice yield. After 1988, this did not increase remarkably, so rice yield was stable in the second period.

Findings for Rice

Due to the contribution of the instability of area and yield, the values of instabilities of output were relatively very high during 1962 to 1987, but they declined sharply during 1988 to 2008. We can conclude that the development of rice production during the first period was achieved through high improvements in land productivity and the low expansion of the sown acreage. This was achieved in the second period through the higher expansion of the sown acreage and lower improvements in land productivity.

States and Regions integration reduced the Union instability index of area, yield and output. This means that the fourteen States and Regions would gain from inter-regional trade in rice production. The results indicate that free trade in rice among States and Regions would be a reasonable strategy for achieving greater food security.

4.4.2 Instability in Beans and Pulses Area, Yield and Production

The production variability is tested by calculating instability index for eight selected pulses for the fourteen States and Regions in Myanmar. This index is based on the coefficient of variation corrected by the fitness of trend function. The index is used to measure instability at both the country and States and Regions level.

Table 4.6 Instability of Area, Yield and Output for Eight Selected Beans and Pulses at National Level

Beans and Pulses	Area		Yield		Output	
	1962-1987	1988-2008	1962-1987	1988-2008	1962-1987	1988-2008
Black Gram	21.59	6.94	23.08	11.70	43.19	19.17
Green Gram	26.62	9.18	22.60	8.06	50.59	17.27
Butter Bean	18.33	7.21	21.45	10.51	28.07	14.63
Bocate	24.73	9.84	15.46	6.04	33.21	8.84
Sultani	49.70	11.27	14.14	7.78	56.23	6.64
Sultaphya	21.87	11.55	25.53	11.34	17.16	14.02
Soybean	5.62	8.71	7.54	7.21	11.25	10.53
Pigeon pea	19.29	11.93	17.97	13.55	28.48	20.16

Source: Own calculation using the annual time series data from the Ministry of Agriculture, Myanmar

Instability indices have been measured for total production, area and yield of beans and pulses on the basis of data from 1962 to 2008 for the fourteen States and Regions. In some cases, some States and Regions are not included in the analysis,

which does not necessarily mean that they do not grow pulses at all. For those States and Regions, the full set of required data for the whole period is not available, i.e., they grow in some years but not in other years.

Annual time series data on area, output, and yield for eight selected pulses namely black gram, green gram, butter bean, bocate, sultani, sultapya, soybean, and pigeonpea are taken from the Ministry of Agriculture and used to calculate the instability indices at the national level and the States and Regions level for the two periods: 1962/63 to 1987/88 and 1988/89 to 2007/08.

Instability indices of area, output, and yield of eight selected pulses at the national level are shown in Table 4.6. The area of all pulses, except soybean, showed very high instability with two-digit numbers during 1962-1987, ranging from 18.33 per cent for butter bean to 49.70 per cent for sultani. However, the area under soybean has the lowest instability of 5.62 per cent and increased to 8.71 per cent during the two periods. The instability of the area of the remaining pulses declined drastically during 1988-2008. The instability of yield also showed a similar pattern of area. During the 1962-1987 period, the instabilities of yield were very high, ranging from 7.54 per cent for soybean to 25.53 per cent for sultapya. But, they declined by more than half for almost all cases. Due to the contribution of the instability of area and yield, the instabilities of output were relatively very high but they declined sharply during 1988-2008.

Instability of Area, Yield, and Output for Eight Selected Pulses at States and Regions Level Analysis

The production variability is tested by calculating instability index for eight selected pulses for the fourteen States and Regions in Myanmar. Instability indices for area, yield, and output of each type of pulses are presented for individual States and Regions in Table 4.7 through to Table 4.15.

Black Gram (Mapte)

Black Gram is grown in Sagaing, Mandalay, Magway, Bago, Yangon, Kachin, Mon, and Rakhine every year. Among the States and Regions, instability of area is found to be very low in the delta and plane regions, and extremely high in mountainous regions. For instance, Ayeyarwady and Sagaing have low instability of 18.12 per cent and 20.61 per cent, respectively whereas Kachin, Rakhine, and Bago have extremely high instability of 119.23 per cent, 96.25 per cent, and 60.71 per cent, respectively. In other States and Regions, instabilities of area are within 33.85 per

cent and 49.25 per cent. However, during the second period, the areas of black gram across States and Regions become stable because of economies of scale or for being a cash crop for farmers. Black Gram was substituted in some areas of Green Gram and winter Soybean. Instability of yield is not very much different among States and Regions, ranging from 14.30 per cent in Rakhine to 28.90 per cent in Sagaing. And, it becomes more stable during the second period. Output is the most volatile as compared to area and yield.

Table 4.7 Instability of Area, Yield, and Output for Black Gram
at States and Regions Level

(Unit-Per cent)

State and Region	Area		Yield		Output	
	1962- 1987	1988- 2008	1962- 1987	1988- 2008	1962- 1987	1988- 2008
Sagaing	20.61	18.17	28.90	19.54	53.46	20.68
Mandalay	48.89	17.33	23.02	11.79	53.45	28.70
Magway	44.07	17.54	25.07	17.02	75.25	17.01
Bago	60.71	8.45	16.92	22.63	75.36	21.86
Yangon	33.85	30.74	23.41	23.87	44.82	35.53
Ayeyarwady	18.12	8.22	25.01	9.44	42.56	18.06
Kachin	119.23	19.74	22.28	5.75	49.84	19.23
Mon	49.25	22.79	15.99	5.88	52.68	19.39
Rakhine	96.25	24.72	14.30	8.92	64.47	23.35
Union	21.59	6.94	23.08	11.70	43.19	19.17

Source: Own calculation using the annual time series data from the Ministry of Agriculture, Myanmar

There are differences in instability of area and yield so they have different cropping patterns or different production patterns and thus, they have trade potential. The value of the instability of area output and yield is smaller in the second period than in the first period.

Green Gram (Pedisein)

Green Gram is grown in Sagaing, Mandalay, Magway, Bago, Yangon, Ayeyarwady, Kachin, Kayin, Mon, and Rakhine every year. As in the case of green gram, the instability of area for green bean (See Table 4.8) is found to be extremely very high in the mountainous regions like Rakhine and Bago and relatively very low in the plain regions like Sagaing and Magway. During the second period, instability of area becomes more stable and there are no big differences among the States and Regions. Monsoon Pesingon, peboke, Sadawpe, Mapte and Spices and Condiments were replaced in some pedisein areas of Sagaing, Yangon and Ayeyarwady.

Yields of green bean across the States and Regions are relatively more stable than area and output. The range of the instability of yield during the first period is from 15.58 per cent in Mon to 34.37 per cent in Magway while during the second period it is from 5.06 per cent in Mon to 16.87 per cent in Bago. Output is the most volatile, especially during the first period, as compared to area and yield.

Table 4.8 Instability of Area, Yield, and Output for Green Gram
at States and Regions Level

(Unit - Per cent)

State and Region	Area		Yield		Output	
	1962-1987	1988-2008	1962-1987	1988-2008	1962-1987	1988-2008
Sagaing	21.42	16.59	24.86	7.58	47.88	14.80
Mandalay	62.70	19.40	33.15	16.18	87.11	21.10
Magway	24.43	24.37	34.37	7.86	57.79	14.69
Bago	86.20	17.87	17.86	16.87	93.35	26.89
Yangon	50.64	14.02	23.40	12.46	72.37	19.40
Ayeyarwady	47.25	26.25	22.24	9.32	49.83	37.69
Kachin	56.33	29.71	19.24	9.87	63.91	33.08
Kayin	69.44	35.19	25.62	7.86	81.44	39.93
Mon	32.47	16.28	15.58	5.06	37.95	14.01
Rakhine	263.09	31.49	25.27	12.24	250.15	44.22
Union	26.62	9.18	22.60	8.06	50.59	17.27

Source: Own calculation using the annual time series data from the Ministry of Agriculture, Myanmar

During the second period, output becomes more stable. Sagaing, Magway, Yangon, and Mon show relative stability below 20 per cent while the remaining States and Regions show high stability above 20 per cent. So, during the second period, area, yield and output becomes more stable and instability of area is found to be extremely very high in the mountainous regions and relatively very low in the plain regions.

Butter Bean

It is found that butter bean is continuously grown only in five Regions, such as Sagaing, Mandalay, Magway, Bago, and Ayeyarwady over the period under study. In terms of area, Mandalay shows the lowest instability of 18.03 per cent while Bago and Ayeyarwady show the highest instabilities of 82.67 per cent and 79.12 per cent, respectively.

Yield is found to be relatively more stable than area and output among Regions. The range of yield during the first period is from 13 per cent in Bago to 26.10 per cent in Sagaing while during the second period it is from 6.71 per cent in

Bago to 19.72 per cent in Mandalay. Output is the most volatile as compared to area and yield.

Table 4.9 Instability of Area, Yield, and Output for Butter Bean
at States and Regions Level

(Unit - Per cent)

State and Region	Area		Yield		Output	
	1962-1987	1988-2008	1962-1987	1988-2008	1962-1987	1988-2008
Sagaing	37.74	15.02	26.10	15.84	50.80	21.35
Mandalay	18.03	12.21	33.77	19.72	34.16	26.97
Magway	25.36	10.68	13.03	7.99	32.71	9.39
Bago	82.67	11.94	13.00	6.71	91.56	22.89
Ayeyarwady	79.12	17.13	17.78	7.39	89.23	28.32
Union	18.33	7.21	21.45	10.51	28.07	14.63

Source: Own calculation using the annual time series data from the Ministry of Agriculture, Myanmar

During the first period, Bago, Ayeyarwady, and Sagaing have very high instability of 91.56 per cent, 89.23 per cent, and 50.80 per cent, respectively. Butter Beans were grown in kyone, yar and kine so it can be substituted for other cash crops. However, they declined by more than half during the second period. So, area, yield and production exhibit reduced instability. So, during the second period area, yield and output becomes more stable and Magway is the most stable region.

Bocate (Cow pea)

Bocate is grown in Mandalay, Magway, Bago, Yangon, Ayeyarwady, Kayin, Mon and Rakhine every year. In terms of area, Magway shows the highest instability of 60.16 per cent while Kayin shows the lowest instability of 19.49 per cent during the first period (See Table 4. 10). Instability of area becomes less during the second period and declines sharply for most of the States and Regions, except Yangon where instability increases from 24.97 per cent to 38.98 per cent. Bocate cultivation was chosen over other kine and kyone crops. Instability of yield is relatively low as compared to area and output and it decreases during the second period, except Bago where instability of yield increases from 16.57 per cent to 17.70 per cent. In spite of high volatility during the first period, output becomes more stable during the second period, except for Yangon and Ayeyarwady.

Table 4.10 Instability of Area, Yield, and Output for Bocate (Cow pea)
at States and Regions Level

(Unit - Per cent)

State and Region	Area		Yield		Output	
	1962-1987	1988-2008	1962-1987	1988-2008	1962-1987	1988-2008
Mandalay	30.60	24.72	24.74	13.43	49.81	24.15
Magway	60.16	13.50	25.23	6.36	59.63	12.32
Bago	35.62	23.71	16.57	17.70	44.44	16.85
Yangon	24.97	38.98	22.19	13.53	38.80	41.92
Ayeyarwady	25.22	11.49	16.00	7.63	32.27	11.67
Kachin	19.49	16.63	20.87	2.96	23.35	15.48
Mon	30.44	21.24	17.12	7.14	38.45	24.18
Rakhine	54.49	25.95	11.04	7.53	41.36	27.80
Union	24.73	9.84	15.46	6.04	33.21	8.84

Source: Own calculation using the annual time series data from the Ministry of Agriculture, Myanmar

Sultani

Sultani is grown only in five Regions every year. Although it becomes less severe during the second period, the volatility of area during the first period is very high and quite different among Regions. For instance, instability of the area of Ayeyarwady is 27.64 per cent while that of Sagaing is 89.64 per cent. For yield, only Ayeyarwady has the low instability of 7.35 per cent and 4.13 per cent in the first and second periods, respectively.

Table 4.11 Instability of Area, Yield, and Output for Sultani
at States and Regions Level

(Unit - Per cent)

State and Region	Area		Yield		Output	
	1962-1987	1988-2008	1962-1987	1988-2008	1962-1987	1988-2008
Sagaing	89.64	31.75	49.48	11.48	126.27	29.71
Mandalay	28.04	29.54	27.02	8.36	43.33	23.31
Magway	64.71	15.23	20.06	10.58	63.36	12.68
Bago	59.02	13.17	11.71	18.74	56.69	14.99
Ayeyarwady	27.64	25.41	7.35	4.17	25.70	26.20
Union	49.70	11.27	14.14	7.78	56.23	6.64

Source: Own calculation using the annual time series data from the Ministry of Agriculture, Myanmar

In other regions, the instability of yield is relatively high, ranging from 11.71 per cent to 49.48 per cent in the first period and from 8.36 per cent to 18.74 per cent in the second period. The interaction effects of the instabilities of area and yield make output fluctuate a lot, especially in Sagaing where output fluctuates about 126.27 per cent. However, output becomes stable and below 29.71 per cent during the second period. Area, yield and production showed reduce instability in the second period.

Sultapya

Sultapya is grown only in two Regions, namely Sagaing and Mandalay (See Table 4. 12). Between the two Regions, Sagaing is more stable than Mandalay in terms of area, yield, and output during the first period. During the second period, Sagaing is more stable only in area whereas Mandalay is more stable in both yield and output. By comparison between the two periods, it is found that the second period is more stable than the first period in terms of the instabilities of area, yield, and output.

Table 4.12 Instability of Area, Yield, and Output for Sultapya
at States and Regions Level

State and Region	(Unit - Per cent)					
	Area		Yield		Output	
	1962-1987	1988-2008	1962-1987	1988-2008	1962-1987	1988-2008
Sagaing	22.93	12.79	27.85	12.00	18.13	15.66
Mandalay	23.61	15.05	35.11	7.58	31.19	13.17
Union	21.87	11.55	25.53	11.34	17.16	14.02

Source: Own calculation using the annual time series data from the Ministry of Agriculture.

Soybean (Peboke)

Soybean is grown in almost all States and Regions, except Yangon, Tanintharyi, and Rakhine (See Table 4.13). For area, it is interesting to note that Bago has the highest instability of 67.64 per cent during the first period and it decreased to 28.76 per cent during the second period whereas Kayin shows the lowest instability of 7.46 per cent during the first period and it increased to 25.72 per cent during the second period. The other States and Regions have instabilities below 34.27 per cent in the first period and 28.76 per cent in the second period.

Table 4.13 Instability of Area, Yield, and Output for Soybean (Peboke)
at States and Regions Level

(Unit-Per cent)

State and Region	Area		Yield		Output	
	1962-1987	1988-2008	1962-1987	1988-2008	1962-1987	1988-2008
Sagaing	22.61	5.05	15.25	15.03	24.79	23.98
Mandalay	11.95	11.92	16.86	12.53	24.76	11.03
Magway	22.14	25.03	43.23	12.05	49.57	24.18
Bago	67.64	28.76	13.38	16.77	87.18	32.62
Ayeyarwady	34.27	17.93	17.84	10.52	37.63	17.85
Kachin	23.24	26.77	15.51	8.85	22.59	25.09
Chin	22.35	8.85	16.23	3.16	33.90	9.23
Shan	10.91	10.23	11.65	22.03	18.85	12.96
Kayah	26.71	14.35	8.71	9.76	32.05	15.18
Kayin	7.46	25.72	15.10	3.74	19.68	22.43
Mon	32.83	27.20	8.92	6.13	38.38	24.24
Union	5.62	8.71	7.54	7.21	11.25	10.53

Source: Calculation using the annual time series data from the Ministry of Agriculture, Myanmar

Yield is found to decline for most States and Regions. However, instabilities of yield increase from 13.38 per cent to 16.77 per cent, from 11.65 per cent to 22.03 per cent, and from 8.71 per cent to 9.76 per cent in Bago, Shan, and Kayah, respectively. For output, during the first period, Bago has the highest instability of 87.18 per cent whereas Shan has the lowest instability of 18.85 per cent. For most of the States and Regions, instability of output declined during the second period. However, Kachin increased from 22.59 per cent to 25.09 per cent and Kayin increased from 19.68 per cent to 22.43 per cent.

Pigeon pea (Pesingon)

Pigeonpea is grown only in Sagaing, Mandalay, Magway, and Bago. It could be noted that the situation of Sagaing is totally different from that of other States and Regions. In terms of area, yield, and output, the instabilities of other regions are relatively very low and declined in the second period whereas the instability of Bago has the highest and became more severe during the second period. For instance, Bago increased from 78.74 per cent to 100.24 per cent in area, from 41.81 per cent to 55.55 per cent in yield, and from 72.10 per cent to 115.12 per cent in output.

Table 4.14 Instability of Area, Yield, and Output for Pigeon pea (Pesingon)
at States and Regions Level

(Unit-Per cent)

State and Region	Area		Yield		Output	
	1962- 1987	1988- 2008	1962- 1987	1988- 2008	1962- 1987	1988- 2008
Sagaing	23.82	13.84	22.60	12.55	34.47	19.98
Mandalay	19.54	14.42	24.47	12.17	38.53	19.31
Magway	27.83	15.18	15.49	13.51	311.84	25.95
Bago	78.74	100.24	41.81	55.55	72.10	115.12
Union	19.29	11.93	17.97	13.55	28.48	20.16

Source: Own calculation using the annual time series data from the Ministry of Agriculture, Myanmar

Findings for Beans and Pulses

It is found that pulses are mainly grown in Sagaing, Mandalay, Magway, Bago, and Ayeyarwady whereas they are grown less in Yangon, Kachin, Chin, Shan, Kayah, Kayin, Mon and Rakhine. It is also found that Tanintharyi does not grow pulses every year. In some cases, some States and regions are not included in analysis, which does not necessarily mean that they do not grow pulses at all. In fact, we simply exclude those States and regions because the full set of required data for the whole period is not available, i.e., they grow in some years but not in other years. From the above analysis, the following significant facts can be noted.

- (1) Area, yield, and output of mountainous and highland areas more fluctuate more than those of the delta and plain regions where weather conditions and soil quality are suitable for cultivating pulses.
- (2) At the national analysis, among the eight pulses, soybean, bocate and sultani are the most stable in terms of area, yield, and output. At the States and Regions level, the lowest instability, in other words, most stable area and output regions are as follows:

Table 4.15 Stable Beans and Pulses Sown Area by States and Regions

Crops	Area (States and Regions)
Black Gram	Ayeyarwady, Magway, Bago
Green Gram	Yangon, Mon, Sagaing, Bago, Magway
Butter Bean	Magway, Bago
Bocate	Ayeyarwady, Magway
Sultani	Bago, Magway
Sultapya	Sagaing, Mandalay
Soybean	Chin, Mandalay, Shan,
Pigeon	Sagaing, Mandalay

Source: Table 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13 and 4.14

(3) Output is more volatile than area and yield because of the interaction effects of the area and yield.

(4) Area and output are, in most cases, more oscillating in the first period than in the second period. The reason may be the fact that during the socialist era (1962-1988) farmers have to cultivate planned crops in the areas designated by the government and also had to sell quota crops to the State at below market prices fixed by the government. During the second period (1989-2008) the market oriented system, and with trade liberalization of government and the initiatives of the private sector that changed Myanmar's cropping pattern, pulses became the important cash crops for farmers. Also the government has developed a number of supporting systems such as irrigation, research, loan, quality seed, throughout the nation, which reduced the instability of pulse sown area and output.

(5) Area, yield, and output are more stable at the national level than those at States and Regions level. The reason may be the fact that all the instabilities among States and Regions are cancelled out if they are considered at the national level. States and Regions integration reduce the Union instability index of area, yield and output. It means that the fourteen States and Regions would gain from inter- trade in pulses. The results indicate that regional integration (or) free trade among States and Regions would be a reasonable strategy for achieving greater food security in beans and pulses.

Chapter 5

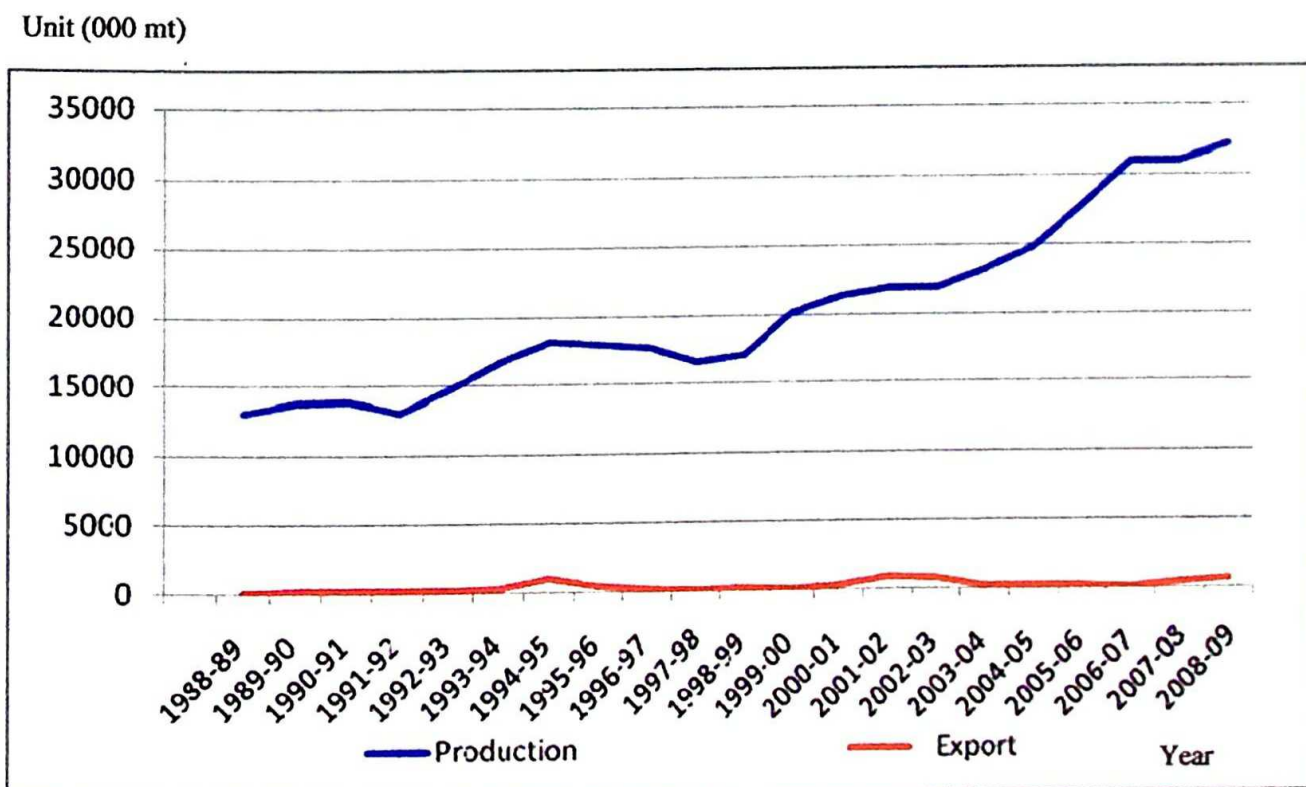
Agricultural Export Determinants and Potential Market

5.1 Volume of Exports and Markets after 1988

5.1.1 Volume and Direction of Rice Export

Private export of beans and pulses was permitted in 1988; rice exports remained the monopoly of MAPT. The government's priority was given to securing rice for rationing and the remainder was allowed for export. A further reason that the government wanted to maintain a monopoly over rice exports was that they provided a direct source of foreign exchange earnings. In order to monopolize exports; the government separated the domestic and international markets. This led to a huge disparity between the domestic and international price of rice. The international price of rice had been declining over the previous two decades, but paddy prices at harvest time were increasing in Myanmar (See Appendix Table 4.13). Myanmar government kept the price of domestic rice well below even the declining international level.

Figure 5.1 Rice Production and Export (1988 to 2009)



Source: Appendix table 5.1

Although rice production was increasing, the trend of Myanmar rice export was not changed (See Figure 5.1).

Table 5.1 Rice Procurement, Export and Domestic Use as Percentages of Production
(Unit – Percentage of production)

Year	Procurement	Export	Domestic use
1987/88	4.25	2.83	97.17
1988/89	12.70	0.60	99.40
1989/90	10.74	2.00	98.00
1990/91	13.25	1.58	98.42
1991/92	15.87	2.27	97.73
1992/93	14.98	2.24	97.76
1993/94	11.57	2.60	97.40
1994/95	11.18	9.54	90.46
1995/96	10.77	3.29	96.71
1996/97	8.61	0.88	99.12
1997/98	9.61	0.28	99.72
1998/99	12.88	1.17	98.83
1999/00	10.99	0.46	99.54
2000/01	9.97	1.96	98.04
2001/02	10.03	7.14	92.86
2002/03	9.48	6.06	93.94
2003/04	-	1.21	98.79
2004/05	-	1.23	98.77
2005/06	-	1.08	98.92
2006/07	-	0.08	99.92
2007/08	-	1.92	98.08
2008/09	-	3.46	96.54

Source: Appendix Table 5.1

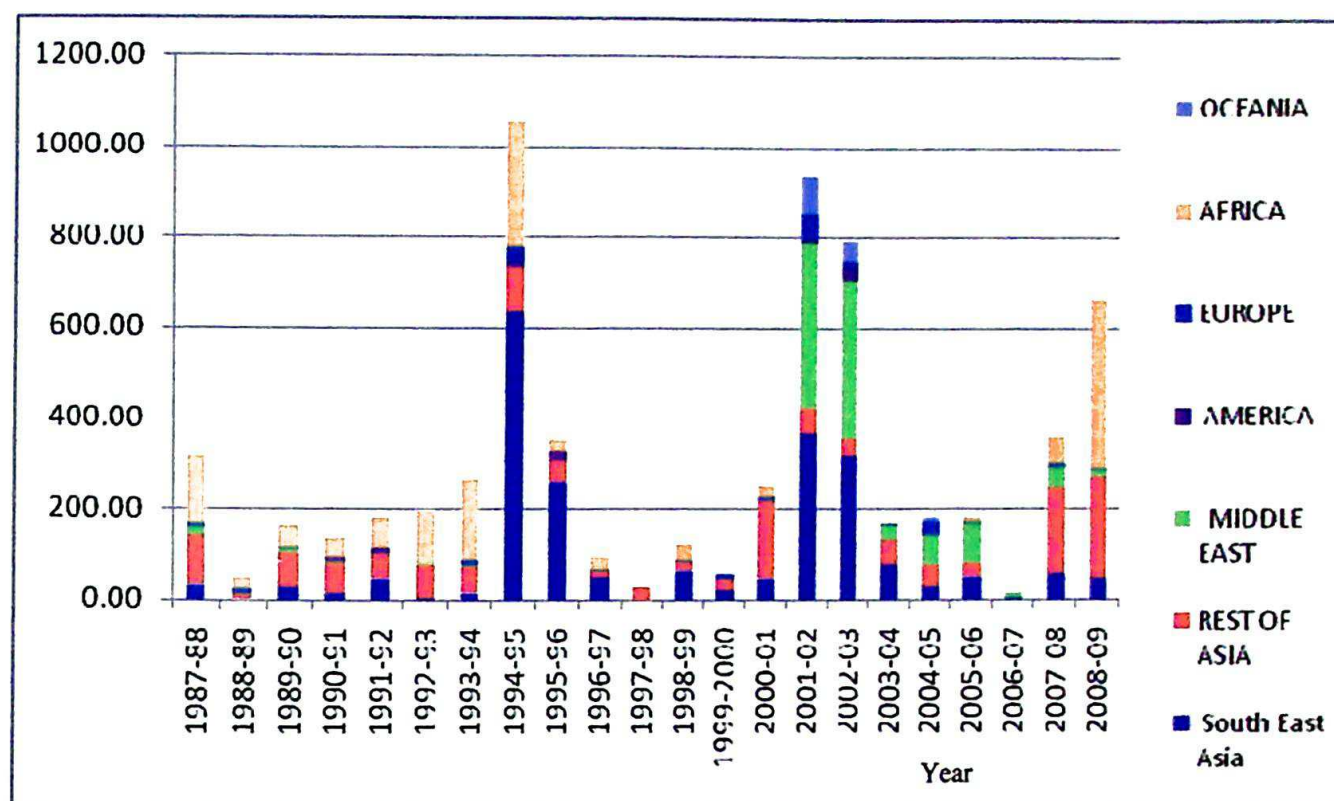
Export, procurement and domestic use percentage of production were not changed significantly (See Table 5.1).

Myanmar rice importers are grouped into seven and these are South East Asia, Rest of Asia, Middle East, AMERICA, Europe, Africa and Oceania (See Figure 5.2).

Malaysia, Indonesia, Singapore, Vietnam, Cambodia and others were importers from South East Asia markets and China, Srilanka, India, Maldives, Korea Republic, Bangladesh and others were importers from Rest of Asia market. Iran, Oman and others were importers from Middle East market. Brazil and others were importers from American markets. Belgium, Netherlands, Yugoslavia and others were importers from European markets. Sierra Leone, Mauritius, Gambia, Ivory Coast, Guinea and others were importers from Africa.

Figure 5.2 Direction of Myanmar's Rice Export

Unit- Ton



Source: Appendix Table 5.3

As Singapore imported Myanmar's rice every year, Singapore was only the one and regular customer between 1988 and 2008. Other countries did not import Myanmar's rice every year and all of them were not regular customers. For Myanmar, the highest importers groups are South East Asia, rest of Asia and Africa. South East Asia, rest of Asia countries imported Myanmar rice every year, but Africa countries imported every year until 1996/97. Exporting countries in the regional groups are changing every year. Export volumes fluctuated every year (See Appendix Table 5.2a and 5.2b). After 2003 total rice export decreased seriously, it decreased by more than four times in 2003/04 and decreased continuously and only 15 tons were exported in 2006/07, the lowest level. In 2007/08 and 2008/09, Myanmar rice export started recovering and continued increasing (See Appendix Table 5.3). After 2003, private individuals or enterprises were allowed to carry out the export business of rice but export percentages of production was decreasing due to the lack of experience in export marketing and poor contacts with the outside world. Most of Myanmar's rice importers were from low income developing countries and they demand poor quality rice.

Table 5.2 Annual Rate of Growth in Rice Industry

Unit- Average annual growth rate

Year	Sown area	Production	Yield	Procurement	Export
1948/49-1963/64	1.67	2.82	Na	3.61	2.95
1964/65- 1986/87	- 0.05	3.57	3.59	1.97	- 0.20
1988/89- 2007/08	2.06	4.35	1.61	1.46	0.61
1948/49-2007/08	0.91	2.86	1.91	0.07	- 4.25

Source: Calculation of Table 5.1

The growth rate of rice production was 4.35 per cent per annum but the growth rate of official procurement during these 20 years from 1987/88 to 2002/03 was 1.46 per cent per annum while population increased at the rate of more than 2 per cent per annum. Domestic consumption increased because of increases in population and the volume of rice available for domestic use was increasing. The growth rate of export was only 0.61 per cent per annum and thus the volume of export declined sharply. The inferior quality of paddy procured by the government was exported to limited destinations and developing countries that would accept Myanmar's rice. A breakdown of Myanmar's rice exports shows that most go to South Asia, Africa and Southeast Asia, low-income countries where there is demand for poor quality rice. Myanmar rice has failed to generate stable export demand because its export sector depended greatly on the State marketing system and the State attached importance to the quantity of rice rather than to quality until 2003. More than 50 years of Government control over rice marketing was the cause for inexperience in private marketing even after 2003 until 2007/08.

5.1.2 Myanmar Rice Export in the International Market

Before the Second World War, Myanmar was the World's largest rice exporter. By the end of the Parliamentary period, in 1961, Myanmar was ranked as the World second largest rice exporting country and Thailand was the world's largest rice exporting country. Under the socialist regime, Myanmar's position fell from the second to the seventh in 1985. It failed to maintain market competitiveness mainly due to the centrally controlled system and mismanagement and misallocation of productive resources between 1962 and 1988. During the market oriented period Myanmar's position is falling continuously and in 2008 it was at the 21st place in the list of the world rice exporters.

Table 5.3 Myanmar in the World Ranking of Rice Exporting Countries

Year	All Rice Exporting Countries Number	Myanmar's Position World Rank (Volume)
1961	59	2
1965	66	4
1970	69	5
1975	70	7
1980	75	6
1985	72	7
1995	95	12
2000	105	14
2005	118	15
2008	108	21

Source: Calculated from FAOSTAT

The number of rice exporting countries in the world market was increasing from 59 in 1961 to 108 in 2008 (See Table 5.3). Myanmar's rice market share in the world market was decreasing (See Table 5. 3). Export price of Myanmar's rice was lower than that of other countries because of its low-grade quality rice, which in turn was the result of government policy of rice and the quota system. In 2003, price controls and trading restrictions on agriculture products have been removed in Myanmar. However, much remains to be done to raise productivity in agriculture. Myanmar's export unit value of milled rice is the lowest in the World market. On the one hand, this indicates that Myanmar needs to improve not only quantity but also quality of its products to maximize benefits. Myanmar should produce quality rice for export. On the other hand, if Myanmar can export rice to United Arab Emirates, Iran, Saudi Arabia, Oman, United Kingdom, France, Kuwait and Qatar, Myanmar will earn more income from exports (See Appendix Table 5.4.a). According FAO STAT, Myanmar is an exporting country as well as an importing country. Before 1996 there was no import. In 1996 Myanmar started importing milled rice from China and Thai and it was increasing (See Appendix Table 5.4.b). There was rice export and import in the border area according to comparative quality and prices. Before Nargis, the volume of import was very little compared to export. China is also an exporting country as well as an importing country. According to 2008 export and import prices of China, export unit price was less than import unit price that means export and import quality are different. In 2008, Myanmar export value was 23,353 (000\$) and import value was 40,000 (000\$), trade balance of rice for Myanmar was deficit

because of Nargis, which destroyed Lower Myanmar, especially Delta, Yangon and Pago regions, so Myanmar rice sown areas were seriously destroyed in that year.

5.1.3 Volume and Direction of Beans and Pulses Exports

In accordance with the trade liberalization for beans and pulses, private companies were allowed to export beans and pulses directly to the international market. There were about 20 big exporters of pulses and oilseeds, handling over 10,000 tons per year. Wholesale markets for major beans and pulses are shown in Table (5. 4).

The wholesalers in Yangon market purchased pulses from both Lower Myanmar and Central Myanmar. Mandalay wholesalers collected the crop in the Crop Exchange Centre in Mandalay and also from traders from Monywa in Sagaing Region, Pakokku in Magway Region and the Kachin State. Wholesalers dealing export varieties supplied their goods to Yangon which is a big export shipping center. Other varieties of less important export items such as soybean, garden pea, penipya and bocate, were mainly sold to retailers from various regions of the whole nation.

Table 5.4 Major Pulses in Wholesale Markets

Markets	Name of Major Pulses
Yangon	Matpe, Pedisein, Pesingone, Bocate, Pegyi, Peboke
Mandalay	Matpe, Pedisein, Pesingon, Bocate, Pegyi, Peboke
Pyay	Matpe, Pedisein, Bocate, Pegyi,
Monywa	Pedisein, Pesingon, Gram pea, Sadawpe
Myainggyan	Pedisein, Pesingon, Gram pea, Sadawpe
Pakkoku	Pedisein, Pesingon, Gram pea, Sadawpe

Source: <https://qir.kyushu-u.ac.jp/dspace/bitstream/2324/10111/11p337.pdf> (Accessed 2.7.2009)

The domestic Market for beans and pulses was a large network including primary collectors and agents, small and medium size traders, wholesalers, retailers, and exporters. The market flow of pulses in Yangon and Mandalay markets can be seen in Table 5.5.

The purchased pulses were delivered to the exporters' warehouse. Before cleaning and grading, pulses are referred to as "raw". To be ready cargo for export, grains were treated with machine cleaning and grading. After cleaning and grading, pulses are packed in polyethylene bags for export. Most of the pulses were exported

as fresh produce, involving only limited grading and sorting. Export of all pulses and beans are increasing because all the prices of pulses are increasing and peasants can cultivate crops of their choice of production according to the market liberalization of the government (See Appendix Table 4. 13 and 5.5).

Table 5.5 Collection Channels of Beans and Pulses from Different Areas of Myanmar

Wholesaler	Pulses	Origin of Produce
Bayint Naung Market (Yangon)	Black gram	Ayeyarwady and Bago Regions
	Green gram	Magway, Ayeyarwady and Yangon Regions
	Pigeon pea	Magway, Mandalay and Bago Regions
	Cowpea (r, w)	Ayeyarwady, Mandalay, Magway and Bago Regions
	Chickpea (split)	Mandalay, Magway and Sagaing Regions
	Chickpea (y. w)	Ayeyarwady and Bago Regions
	Lablab bean	Ayeyarwady and Bago Regions
	Soybean	Ayeyarwady, Mandalay, Bago Regions and Shan State
	Garden pea	Mandalay, Magway and Sagaing Regions
	Penipya	Mandalay and Magway Regions
	Bocate	Mandalay, Magway, Sagaing, Ayeyarwady and Bago Regions
	Sultani	Mandalay, Sagaing, Ayeyarwady and Bago Regions
Mandalay Market	Kidney bean	Ayeyarwady and Bago Regions
	Pigeon pea (b, s)	Sagaing, M.C.E.C. and Mandalay Regions
	Green gram	Sagaing, M.C.E.C. and Mandalay Regions
	Black gram	Kachin State, Sagaing and Mandalay Regions
	Cowpea (w, b)	Mandalay and Sagaing Regions
	Chickpea	M.C.E.C., Mandalay and Magway Regions
	Lablab bean	Kachin State, Sagaing and Mandalay Regions
	Soybean	Mandalay and Sagaing Regions
	Garden pea	Kachin State, Sagaing and Mandalay Regions
	Penipya	Mandalay and Sagaing Regions
	Bocate	Mandalay and Magway Regions
	Kidney bean	Kachin, Sagaing and Mandalay Regions
	Pejar	Mandalay and Sagaing Regions
Note: r, w = red or white colour, b, s = Big size, w, b = white or blue colour, y,w = yellow and white, M.C.E.C = Mandalay Crop Exchange Centre.		

Source: Myanmar Working Paper 8, FAO

Export percentage of production was increasing. In 1993/94 exports percentages of production were the highest and it was round about 40 per cent until 1997/98. In 1997/98 farmers had free choice for production, from 1998/99 to 2003/04 export percentage of production was decreasing and it was about 30 per cent. Because beans and pulses production and export were increasing but the growth of production was greater than growth of export. From 2004/05 to 2008/09 growth of production increased more than twice but growth of export increased about one quarter so export percentage of production fell down to about 20 per cent. Beans and pulses export

share in production was increasing by six times from 4.09 per cent in 1988/89 to 26.74 per cent in 2008/09 (See Table 5.6).

Table 5.6 Export as a Percentage of Beans and Pulses Production

Year	Sown Area	All production (metric tons)	Exports (metric tons)	Export per centage
1988/89	1,802,961	418,060.83	17,104.00	4.09
1989/90	2,116,236	510,983.31	56,063.00	10.97
1990/91	2,470,507	613,931.45	194,500.00	31.68
1991/92	3,126,279	782,422.48	195,167.00	24.94
1992/93	3,699,971	951,968.84	449,000.00	47.17
1993/94	3,753,310	933,611.32	514,000.00	55.06
1994/95	4,314,335	1,171,987.69	425,000.00	36.26
1995/96	5,056,882	1,415,850.52	610,000.00	43.08
1996/97	4,850,805	1,411,117.68	595,000.00	42.17
1997/98	5,168,272	1,645,177.88	769,000.00	46.74
1998/99	6,076,277	1,735,168.77	621,000.00	35.79
1999/00	6,607,229	1,882,699.72	561,000.00	29.80
2000/01	7,250,459	2,330,760.91	831,000.00	35.65
2001/02	7,897,971	2,735,805.80	1,035,000.00	37.83
2002/03	8,083,009	2,841,743.83	1,038,000.00	36.53
2003/04	8,377,932	3,187,683.01	1,211,000.00	37.99
2004/05	8,751,429	3,634,945.41	873,000.00	24.02
2005/06	9,409,570	4,127,435.37	865,000.00	20.96
2006/07	9,890,334	4,575,438.90	1,156,000.00	25.27
2007/08	10,456,916	5,123,563.63	1,141,000.00	22.27
2008/09	10,567,453	5,426,203.40	1,451,000.00	26.74

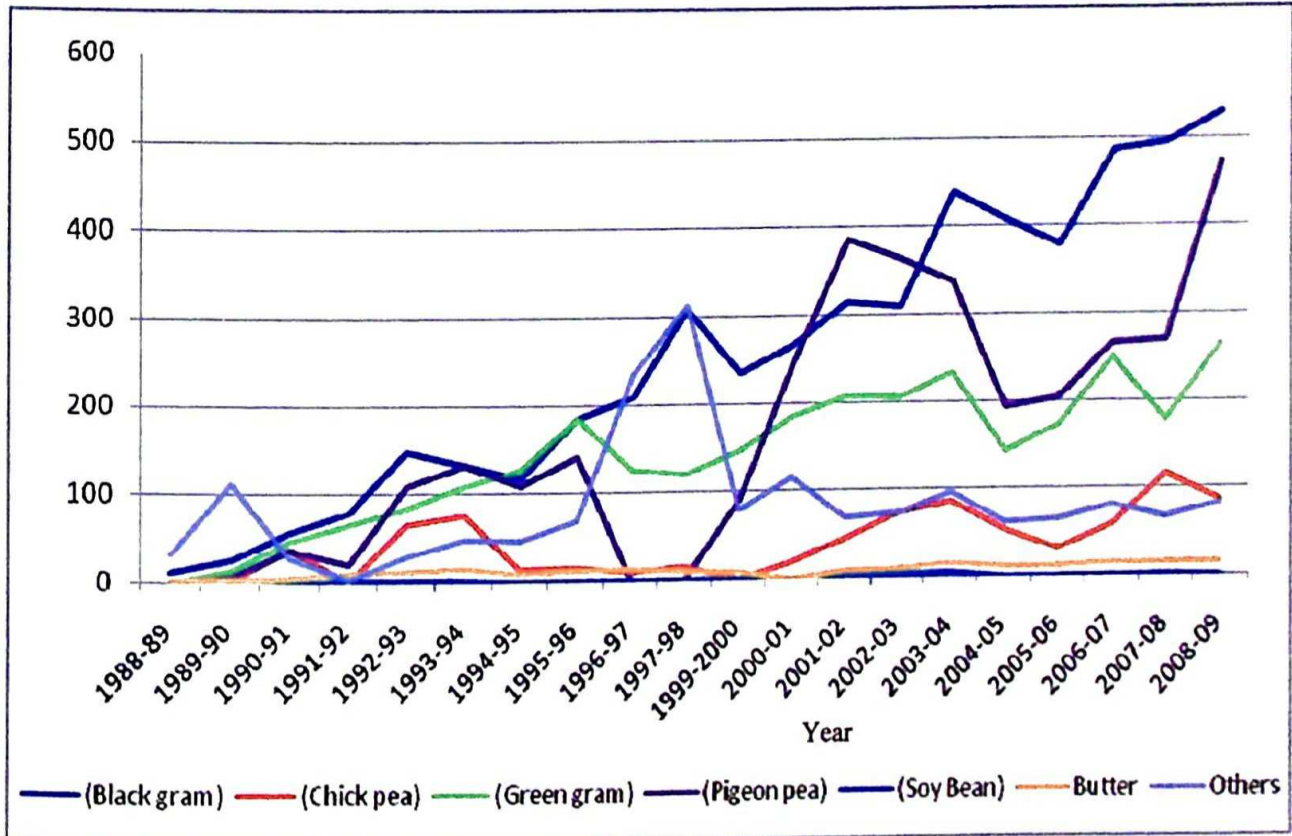
Source: Statistical Year Book, Various Issues

The residual from production minus exports could be taken as domestic consumption. Domestic consumption for all beans and pulses increased along with the improvement in production. Provision of sufficient food supplies for a growing population and for the increasing demand due to the higher per capita income and changing patterns of food culture is one of the contributions of agricultural development for the society. In this case, farmers can produce surplus for export of beans and pulses to finance the State budget including capital investment and other imports needed for economic development.

As the living standard of the people had improved, food consumption pattern and culture have changed. New items of food were produced from various types of beans and pulses. Various types of food items were produced based on beans and pulses along with the development of food processing technologies. Such

development of new food items in terms of quantity and quality for beans and pulses created more demand as raw materials for food manufacturing industries. Similarly, graded and processed beans and pulses rather than raw crops were increasingly demanded in domestic markets as well as in foreign markets. If food development was able to keep pace with demand rising from changes in population and the tastes of consumers, the demand will be still large for beans and pulses. Improvements in production of beans and pulses can stabilize food prices, resulting in more disposable income and higher saving rates of households. Thus, such development of production and export of beans and pulses has significant impacts on rural welfare and social development. Raising farm productivity through modern cultivation methods can increase benefits for farmers and also raise domestic consumption through the income generated from farm product sales. Therefore food production for the domestic market is one of the primary contributions of agriculture to overall economic development.

Figure 5.3 Major Beans and Pulses Exports



Source: Appendix Table 5.6

Export volume of beans and pulses comprised 42.8 per cent of agricultural exports in 2008-09. The export of beans and pulses increased from 72,995 metric tons in 2001-02 to 1,451,000 metric tons in 2008-09 and domestic use increased from 541,955 metric tons in 1988 to 3,975,203 metric tons in 2008. Likewise, the value of exports had increased over the same period. Such a promotion of export volume

means more foreign exchange earnings and higher domestic consumption, contributing to the welfare of the society. Improvement in production of beans and pulses can make food prices stable, which in turn would raise disposable income and saving rates of households. Thus in fact, agricultural productivity is the source of welfare gains and is also the driving force for the jump-start of national economic development.

Depending on the market demand for exports, there were six main kinds of beans namely; green gram, black gram, pigeon pea, chick pea, soy bean, and butter beans that were mainly exported. As for the ranking of importance of export items, Black gram comes first, pigeon pea second, green gram third, chick pea fourth, butter beans fifth and soy bean is sixth (See Figure 5.3).

Table 5.7 Average Annual Growth Rate of all Beans and Pulses in Myanmar

Unit - Average annual growth rate

Year	Sown Area	Production	Export
1964/65-1986/87	1.27	4.43	-0.35
1988/89-2008/09	8.80	13.12	30.42
1964/65-2008/09	4.79	7.10	7.08

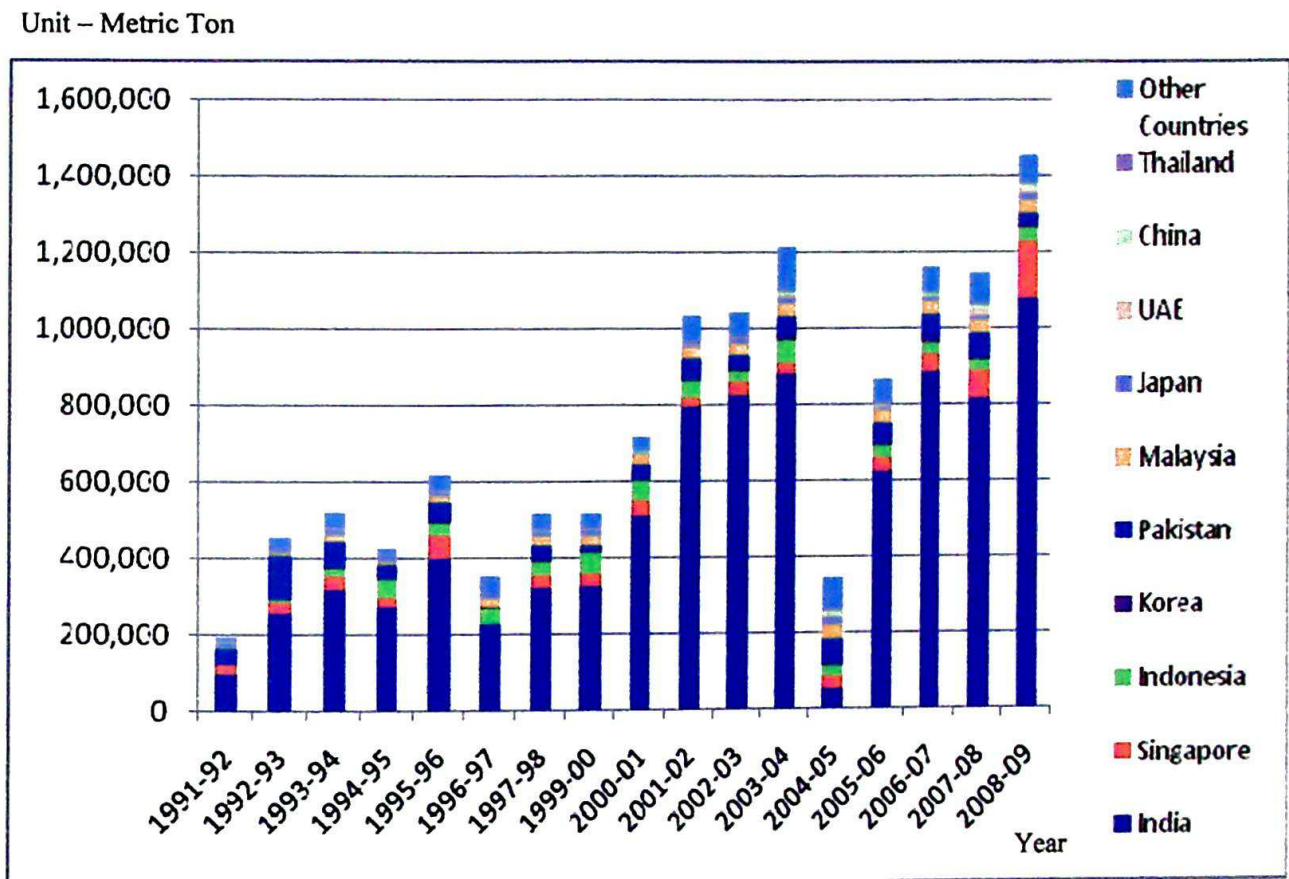
Source: Appendix Table 5.5

Pulse production and sown areas were increasing and Myanmar's beans and pulses export and total production showed increasing trends. During the study period from 1964/65 to 1986/87, annual growth rate of Myanmar beans and pulses export grew at a negative rate of (-0.35) per cent per annum during the Socialist period and with a positive rate of 30.42 per cent during the market oriented economy phase of the 1988-08 period. This high annual rate of export of 30.42 per cent was the consequence of high growth rates of sown area and production, which in turn was the result of the government's liberalization and the farmers' response to incentives.

After 1988 there was a remarkable increase in exports of pulses and beans, making it Myanmar's largest agricultural export item. Formerly the Japanese market shifted to Thailand and later again to China, but by the late 1990s nearly 80 per cent of market share of Japanese beans imports was from Myanmar. Now, India is the major importer of Myanmar's beans and pulses. Myanmar's major regular importers

are India, Singapore, Indonesia, Korea, Pakistan, Malaysia, Japan, UAE, China and Thailand.

Figure 5.4 Myanmar export destinations and volume of beans and pulse exports (1991-2009)



Source: Appendix Table (5.7 a and 5.7 b)

5.1.4 Myanmar Beans and Pulses Export in International Market

There were (56) beans and pulses exporting countries in the world and Myanmar was listed as the world’s second largest exporter of pulse and beans in 1961, at the end of the Parliamentary period. World ranking of Myanmar beans and pulses export had declined in the 1970s and the 1980s, under the socialist period because of planned crop and quota system. However, it still remained in the top ten lists of the world’s pulse and beans exporters until 1985. As a result of the economic reforms in line with trade liberalization and export promotion strategies under the SPDC administration, Myanmar was listed as a leading country in the production and export of pulses and beans in ASEAN (See Appendix Table 5. 8). It was recorded as the biggest exporter of pulse and beans since 2000 and kept up its role until 2005. In 2005, China took over the role; Myanmar became the second largest exporter until 2008. The number of beans and pulses exporting countries increased more than doubled from 56 in 1961 to 116 exporting countries in 2008 (See Table 5.8).

Table 5.8 Myanmar in the World Ranking of Beans and Pulses
and Exporting Countries

Year	Export of Pulse World Rank (Volume)	All Pulse Exporting countries (number)
1961	2	56
1965	2	60
1970	5	58
1975	9	60
1980	8	61
1985	5	57
1995	2	95
2000	1	114
2005	2	118
2008	2	116

Source: Calculated from FAOSTAT

However, unit price per tonne of Myanmar beans and pulses was the lowest price when compared with U.K and Kyrgyzstan. The main importers of Myanmar beans and pulse are India and China, which paid the lowest prices in the world market. Myanmar's export unit value of pulse and beans per ton was only about one fourth of the Netherlands's unit value. On the one hand, this indicates that Myanmar needs to improve not only quantity but also quality of its products to maximize benefits for its people. On the other hand, if Myanmar can export to Brazil, USA, Italy, Japan, Spain, Venezuela, France, Algeria, Turkey, Costa Rica, Angola, and Portugal, there is greater potential for foreign exchange earnings from its exports (See Appendix Table 5. 9).

5.2 Determinants of Agricultural Export

5.2.1 Data Source and Definitions

Real GDP and Export value index of China and Thailand, and CPI of Myanmar are taken from the online database of World Development Indicator (2012), World Bank. Data for other variables are obtained from the planning department under the Ministry of National Planning and Economic Development.

X = quantity of exports (metric ton in thousands)

PX = price of exports [export unit value index (2005=100)]

P = domestic price index [CPI (2005=100) * market exchange rate index (2005=1)]

PXW = weighted average of the export prices of Myanmar's trading partners (2005=100)

$$PXW = \alpha_1 PX_C + \alpha_2 PX_T$$

Where, PX_C and PX_T are export value indices (2005=100) of China and Thailand, respectively. α_1 and α_2 are average export shares of China and Thailand, respectively.

YW = weighted average of the real incomes of Myanmar's trading partners (in millions)

$$YW = \alpha_1 Y_C + \alpha_2 Y_T$$

Where, Y_C and Y_T are real gross domestic products of China and Thailand, respectively. α_1 and α_2 are the same as specified above.

Y = Index of domestic capacity [production index (2005=100)]

5.2.2 Estimating the Export Demand and Supply Functions of Rice

1.Export Supply Function of Rice

The supply of exports is specified as a log-linear function of the relative price of exports (i.e., the ratio of export prices to domestic prices) and of an index of the productive capacity of the country.

$$\begin{aligned} \ln X^s = & \beta_0 + \beta_{11} \ln(PX / P) + \beta_2 \ln Y + \beta_3 D94 + \beta_4 D9697 + \beta_5 D99 + \beta_6 D0102 + \\ & \beta_7 D06 \dots\dots\dots (1) \end{aligned}$$

Where

- X^s : quantity of exports supplied (000' MT)
- PX: price of exports [export unit value index (2005=100)]
- P: domestic price index [CPI (2005=100) * market exchange rate index (2005=1)]
- Y: Index of domestic capacity [production index (2005=100)]
- D94 : 1994=1 otherwise zero
- D9697 : 1996 ~ 1997 = 1 otherwise zero
- D99 : 1999 =1 otherwise zero
- D0102 : 2001 ~ 2002 =1 otherwise zero
- D06 : 2006 = 1 otherwise zero

The above supply function embodies the hypothesis that as the price of exports rises relative to domestic prices, production for export becomes more profitable and, hence exporters will supply more. In addition, exports are posited to rise, *ceteris paribus*, when there is an increase in the country's capacity to produce. Therefore, it is expected that both β_1 and β_2 to be positive in the results.

Table 5.9 Estimation Results for Equation (1) [Dependent variable: $\ln(X)$]

Independent Variables	Coefficients	t-statistics
Constant	-11.293*	-3.078
Ln(PX/P)	0.349*	3.726
Ln(Y)	3.689*	4.591
D94	1.199*	3.534
D9697	-1.273*	-5.362
D99	-1.252*	-3.890
D0102	1.780*	6.541
D06	-3.320*	-9.504
R-squared	0.95	
Adjusted R-squared	0.92	
F-statistic	32.407*	
Durbin-Watson Stat	1.89	
Sample period	1989-2008	
Note: * indicates statistical significance at 1% level.		

Source: Appendix Table 5.10

Table 5.9 shows the estimation results of export supply function specified in equation (1). The significance of F-statistic indicates the simultaneous significance of all coefficients in the model. The coefficient of relative price is statistically significant at 1 per cent level and carries an expected positive sign, implying that if export price increases compared to domestic price, then exporters will supply more. The magnitude of the coefficient of the relative price (0.35) implies that 1 per cent increase in relative price is associated with 0.35 per cent increase in export supply. The coefficient of domestic capacity is also statistically significant at 1 per cent level and carries an expected positive sign, implying that if domestic capacity increases, exporter will supply more. The magnitude of the coefficient of the domestic capacity (3.69) implies that 1 per cent increase in domestic capacity is associated with 3.69 per cent increase in export supply.

The dummy variables in the model are to capture the policy changes for the period under study. The dummy variables (D94 and D0102) carry positive signs, implying that when other things remain unchanged, each period of D94 and D0102 has higher export supply than any other periods under study. On the other hand, the dummy variables (D9697, D99, and D06) carry negative signs, implying that when

other things remain unchanged, each period of D9697, D99, and D0102 has lower export supply than any other periods under study.

By the value of R-squared (0.95), the model could explain about 95 per cent of the variation of the dependent variable. By the value of Durbin-Watson statistic (1.89), it seems that there is no first order serial correlation of regression residuals.

Findings

According to Table (1), rice export supply of Myanmar can be determined by relative price and domestic capacity for the period of 1989-2008. Out of the two significance variables, domestic capacity is more important than relative price as t-value for the coefficient of domestic capacity is higher than that of relative price.

2. Export Demand Function of Rice

The world demand for Myanmar’s export is specified as follows:

$$\ln X^d = a_0 + a_1 \ln (PX/PXW) + a_2 \ln (YW) + a_3D93 + a_4D94 + a_5D95 + a_6D96 + a_7D97 + a_8D98 + a_9D99 + a_{10}D00 + a_{11}D01 + a_{12}D02 + a_{13}D06.....(2)$$

Where

- X^d : quantity of exports demanded (000’ MT)
- PX : price of exports [export unit value index (2005=100)]
- PXW : weighted average of the export prices of Myanmar’s trading partners (2005=100)
- YW : weighted average of the real incomes of Myanmar’s trading partners (in millions)
- D93 : 1993=1 otherwise zero ; D94 : 1994=1 otherwise zero
- D95 : 1995=1 otherwise zero ; D96 : 1996=1 otherwise zero
- D97 : 1997=1 otherwise zero ; D98 : 1998=1 otherwise zero
- D99 : 1999=1 otherwise zero ; D00 : 2000=1 otherwise zero
- D01 : 2001=1 otherwise zero ; D02 : 2002=1 otherwise zero
- D06 : 2006=1 otherwise zero

It is expected that a_1 will be negative and a_2 positive.

Table 5.10 shows the estimation results of export demand function specified in equation (2). The significance of F-statistic indicates the simultaneous significance of all coefficients in the model. The coefficient of relative price is statistically significant at 1 per cent level but carries an unexpected positive sign. The coefficient of world income is also statistically significant at 1 per cent level and carries an expected positive sign, implying that if world income increases, demand for Myanmar export

Table 5.10 Estimation Results for Equation (2) [Dependent variable: X]

Independent Variables	Coefficients	t-statistics
Constant	-17.378*	-3.942
PX/PXW	0.962*	3.958
YW	1.723*	5.200
D93	0.690**	2.684
D94	1.792*	7.340
D95	0.780**	3.166
D96	-0.739**	-3.060
D97	-1.930*	-7.989
D98	-0.569***	-2.364
D99	-1.257*	-5.185
D00	0.692**	2.454
D01	1.924*	6.986
D02	1.675*	6.172
D06	-2.904*	-11.529
R-squared	0.99	
Adjusted R-squared	0.96	
F-statistic	32.840*	
Durbin-Watson Stat	1.796	
Sample period	1989-2008	
Note: *, **, and *** indicate statistical significance at 1%, 5%, and 10% level, respectively.		

Source: Appendix Table 5.11

products will increase. The magnitude of the coefficient of the world income (1.723) implies that 1 per cent increase in world income is associated with 1.723 per cent increase in export demand.

The dummy variables in the model are to capture the policy changes for the period under study. The dummy variables (D93, D94, D95, D00, D01, and D02) carry positive signs, implying that when other things remain unchanged, each period of D93, D94, D95, D00, D01, and D02 has higher export demand than any other periods under study. On the other hand, the dummy variables (D96, D97, D98, D99, and D06) carry negative signs, implying that when other things remain unchanged, each period of D96, D97, D98, D99, and D06 has lower export demand than any other periods under study.

By the value of R-squared (0.99), the model could explain about 99 per cent of the variation of the dependent variable. By the value of Durbin-Watson statistic (1.796), it seems that there is no first order serial correlation of regression residuals.

Findings

According to the Table (2), rice export demand of Myanmar can be determined by relative price and world income for the period of 1989-2008. However, care should be taken in the interpretation of relative price as it carries an unexpected sign.

5.2.3 Estimating the Export Demand and Supply Functions of Beans and Pulses

(A) Export Supply Function of Beans and Pulses

The supply of exports is specified as a log-linear function of the relative price of exports (i.e., the ratio of export prices to domestic prices) and of an index of the productive capacity of the country.

$$\text{Ln } X^s = \beta_0 + \beta_1 \text{Ln } (PX / P) + \beta_2 \text{Ln } Y + \beta_3 D_{9203} \dots \dots \dots (3)$$

Where

- X^s : quantity of exports supplied (000' MT)
- PX : price of exports [export unit value index (2005=100)]
- P : domestic price index [CPI (2005=100) * market exchange rate index (2005=1)]
- Y : Index of domestic capacity [production index (2005=100)]
- D9203 : 1992 ~ 2003 =1 otherwise zero

The above supply function embodies the hypothesis that as the price of exports rises relative to domestic prices, production for export becomes more profitable and, hence exporters will supply more. In addition, exports are posited to rise, when there is an increase in the country's capacity to produce. Therefore, it is expected both β₁ and β₂ to be positive in the results.

Table 5.11 Estimation Results for Equation (3) [Dependent variable: Ln(X)]

Independent Variables	Coefficients	t-statistics
Constant	-0.338	-0.208
Ln(PX/P)	0.164	1.538
Ln(Y)	1.559*	4.415
D9203	0.618*	5.604
R-squared	0.92	
Adjusted R-squared	0.91	
F-statistic	66.304*	
Durbin-Watson Stat	1.81	
Sample period	1989-2008	
Note: * indicates statistical significance at 1% level.		

Source: Appendix Table 5.12

Table 5.11 shows the estimation results of export supply function specified in equation (3). The significance of F-statistic indicates the simultaneous significance of all coefficients in the model. The coefficient of relative price is not statistically significant, but carries an expected positive sign, implying that if export price increases compared to domestic price, then exporters will supply more.

The magnitude of the coefficient of the relative price (0.16) implies that 1 per cent increase in relative price is associated with 0.16 per cent increase in export supply. However, the relationship between export supply and relative price is not certain because of the insignificance of the coefficient of relative price variable. The coefficient of domestic capacity is statistically significant at 1 per cent level and carries an expected positive sign, implying that if domestic capacity increases, exporters will supply more. The magnitude of the coefficient of the domestic capacity (1.56) implies that 1 per cent increase in domestic capacity is associated with 1.56 per cent increase in export supply.

The dummy variables in the model are to capture the policy changes for the period under study. The dummy variable (D9203) carries positive sign, implying that when other things remain unchanged, the period of 1992-2003 has higher export supply than any other periods under study. By the value of R-squared (0.92), the model could explain about 92 per cent of the variation of the dependent variable. By the value of Durbin-Watson statistic (1.81), it seems that there is no first order serial correlation of regression residuals.

Findings

According to Table 5.11, bean and pulses export supply of Myanmar can be determined only by domestic production capacity for the period of 1989-2008, that means 1 per cent increase in domestic capacity is associated with 1.56 per cent increase in export supply.

Export Demand Function of Beans and Pulses

The world demand for Myanmar’s export is specified as follows:

$$X^d = a_0 + a_1 (PX/PXW) + a_2 (YW).....(4)$$

Where

X^d = quantity of exports demanded (000’ MT)

PX = price of exports [export unit value index (2005=100)]

PXW = weighted average of the export prices of Myanmar’s trading partners (2005=100)

YW = weighted average of the real incomes of Myanmar’s trading partners (in millions)

It is expected that a_1 will be negative and a_2 positive.

Table 5.12 shows the estimation results of export demand function specified in equation (4). The significance of F-statistic indicates the simultaneous significance of all coefficients in the model. The coefficient of relative price is statistically significant at 5 per cent level and carries an expected negative sign, implying that if Myanmar export price increases are compared to world export price, then the demand for Myanmar export product will decrease. The magnitude of the coefficient of the relative price (75.357) implies that 1 unit increases in relative price is associated with 75.357 units decrease in export demand. The coefficient of world income is statistically significant at 1 per cent level and carries an expected positive sign, implying that if world income increases, demand for Myanmar export product will increase. The magnitude of the coefficient of the world income (0.001) implies that 1 unit increase in world income is associated with 0.001 unit increase in export demand.

Table 5.12 Estimation Results for Equation (4) [Dependent variable: X]

Independent Variables	Coefficients	t-statistics
Constant	345.502**	2.368
PX/PXW	-75.357**	-2.815
YW	0.001*	5.701
R-squared	0.88	
Adjusted R-squared	0.86	
F-statistic	60.611*	
Durbin-Watson Stat	1.77	
Sample period	1989-2008	
Note: * and ** indicate statistical significance at 1% and 5% level, respectively.		

Source: Appendix Table 5.13

Findings

Table 5.12 shows that beans and pulses export demand of Myanmar can be determined by relative price and world income for the period of 1989-2008. The result indicated that 1 unit increases in relative price is associated with 75.357 units decrease in export demand and 1 unit increase in world income is associated with 0.001 unit increase in export demand. Out of the two significance variables, world income is

more important than relative price as t-value of world income is higher than that of relative price.

Estimation of the export demand and supply functions of rice, pulses and beans are as followed:

1. Rice export supply of Myanmar can be determined by relative price and domestic capacity for the period of 1989-2008. Out of the two significance variables, domestic capacity is more important than relative price. Rice export demand of Myanmar can be determined by world income for the period 1989 to 2008.
2. Bean and pulses export supply of Myanmar can be determined only by domestic production capacity and export demand of Myanmar can be determined by relative price and world income for the period 1989 to 2008.

5.3 Comparative Study on agricultural sector and agricultural exports of Neighbouring Countries

Myanmar is in the process of instituting a series of policy and strategic reforms under the new government with the aim of achieving national development and catching up with the economic successes of neighbouring countries. As Myanmar is still a developing country, it is necessary to enhance economic cooperation not only with countries in the region but also with those beyond the region for greater economic development. There are also favourable circumstances for Myanmar: (1) membership in regional groupings such as ASEAN, GMS, BIMSTEC, (2) scheduled chairmanship of ASEAN in 2014, and (3) membership in the AFTA to be implemented beginning from 2015.

Myanmar has the highest per capita agricultural production index among five countries (See Appendix Table 5.14). The proportion of the population living in the rural areas of Myanmar 69 per cent is not very different from that of other countries, Thailand 67 per cent, India 71 per cent, but is higher than that of China 57 per cent, Malaysia 30 per cent and world average 51 per cent (See Appendix Table 5.15). A significant development was that China, Thailand and Malaysia saw a gradual decrease in their rural populations while India and Myanmar had the opposite trend. The slight increase in the rural population in those countries may be due to the stagnation in industrialization, and in the case of Myanmar, very slow growth rate or stagnated industrialization is widely viewed as the major cause.

The percentage of the economically active population in the agriculture sector is 68 per cent in Myanmar, 51 per cent in Thailand, 56 per cent in India, 63 per cent in China and 14 per cent in Malaysia (See Appendix Table 5.16). With the exception of Malaysia, all other countries studied have the majority of their populations living in the rural areas and are highly dependent on the agriculture sector and related activities (See Appendix Table 5.15 and 5.16). Rural population is greater than the economically active population of agriculture in India, Malaysia, Thailand and World economy. So all rural population are not in the farm sector, some are in the non-farm sector and it showed rural nonfarm sector development of India, Thailand and Malaysia. In China, rural population is less than economically active population in agriculture so all economically active population in agriculture does not live in rural area because of industrialization of urban sector. In Myanmar, rural population of 68 per cent is the same as economically active population in agriculture so there is disguised unemployment in rural areas and Myanmar need to generate nonfarm sector growth for rural development.

In agricultural foreign trade, agricultural export was greater than agricultural import in Thailand and Malaysia because they are agricultural countries; China's agricultural import was greater than agricultural export because of the structural change from agriculture to industry. In India agricultural export was less than agricultural import until 2006, in 2007 agricultural export was greater than agricultural import because of the development of agricultural production and now India is trying to increase agricultural export. In Myanmar agricultural export was greater than agricultural import until 1999-2001 and from 2005 agricultural import was greater than agricultural export because Myanmar's agricultural exports were decreasing and there was low quality rice from Myanmar with less competitiveness in the world Market (See Appendix Table 5.17).

The share of agricultural exports in total export was decreasing in all the countries and the share of agricultural imports in total imports was decreasing in all the countries under review (See Appendix table 5.18). But, there was highest decrease in Myanmar agricultural export in total export from 44.1 per cent in 1994/96 to 7.4 per cent in 2007. The falling share of agricultural exports in total exports in Myanmar was directly linked with the reduced contribution of agriculture to total GDP and also because Myanmar lost competitiveness in the world Market. There was net

agricultural trade surplus in India, Thailand and Malaysia and net agricultural trade deficit in China under the review period (See Appendix Table 5.19). In Myanmar, before 2005 there was net agricultural trade surplus but net total trade deficit occurred after 2005. There was net agricultural trade deficit but net total trade was in surplus and the surplus was increasing (See Appendix table 5.19). After 2005, net total trade surplus was growing because of increasing petroleum export. Myanmar net agricultural trade deficit was because of palm oil importing which was the largest import items, cereal import was greater than cereal export and rice was imported after 1996 (See Appendix Table 5.19, 5.20 and 5.21).

The above presentation portrays the situation concerning agricultural production, rural population, agricultural export and import or agricultural trade conditions of Myanmar and neighboring nations.

5.4 Potentiality of Myanmar's Rice, Beans & Pulses Trade in Neighboring Markets

Though many of the Asian countries have similar factor endowments and climatic conditions, the production patterns of those countries are found to be different. Differences in their production patterns can be seen in differences in their export patterns. By the theory of international trade, if two countries have dissimilar patterns of export to a particular market, there is a trade potential in that market for those two exporting countries. To analyze whether Myanmar can enjoy such trade potential in a particular market in competing with its neighbouring countries, an export similarity index is employed.

As specified in the formula of export similarity index, there must be two countries which export the same products to the same market. Since the shares of export products (in this case, only rice and pulses) out of total exports of a country to the market under study are used in the calculation of export similarity index, the number of export products should be at least two. If the number of export products is less than two, it is not applicable.

In calculating the similarity index of Myanmar to India market, the official data on Myanmar' pulse is available but Myanmar's rice export to India was not available. This does not necessarily mean that Myanmar does not export rice to India. Indian is the most important pulses market for Myanmar. Myanmar does export rice

to India through border trade but in FAO STAT this was not shown. Thus, the data on Myanmar's rice export to India was totally missing. Consequently, the lack of data on rice export makes it impossible to calculate export similarity index of Myanmar to India market.

As shown in the formula of export similarity index, there must be at least two export items so that the calculation of the share of a particular item to total export is possible. In this study, only two export items, rice and pulses, are incorporated into the calculation of export similarity index. The export similarity indices of Myanmar and its competitors, Thailand, Vietnam, and Philippines, to the three importing countries, China, Malaysia, and Singapore, are calculated for the periods of 1989-1998 and 1999-2008.

Table 5.13 Indices of Similarity of Exports; Various Exporters to Various Import Markets

Importing Countries	China		Malaysia		Singapore	
Exporting Countries	1989-98	1999-08	1989-98	1999-08	1989-98	1999-08
Myanmar vs. Thailand	18	2	4	12	7	31
Myanmar vs. Vietnam	17	4	3	10	20	30
Myanmar vs. Philippines	86	77	n.a	n.a	n.a	n.a

Source: calculated using the FAO database

The results are presented in Table 5.13. For China market, the values of export similarity indexes of all three pairs of Myanmar and Thailand, Myanmar and Vietnam, and Myanmar and Philippines are smaller in the second period than in the first period. This indicates that trade potential in China market is larger in the second period than in the first period. In contrast, for Malaysia and Singapore markets, export patterns between Myanmar and Thailand and between Myanmar and Vietnam are more similar in the second period than in the first period. This indicates that trade potential in Malaysia and Singapore markets becomes smaller in the second period, as compared to the first period.

Table 5.14 shows the results of RCA coefficients together with the export shares for the rice and pulses products for each country. In the second period, RCA value of rice and pulses is lower than in the first period in Myanmar. Myanmar's rice

is said to have a revealed comparative advantage because of the value that exceeds unity (4.31189) but comparative advantage is decreasing. There is the highest RCA index of beans in Myanmar compared with other countries, so that beans is the most successful exporting item .In the second period, RCA value of Myanmar's beans is less than in the first period, so Myanmar beans is the most successful exporting item but the success is decreasing (See Table 5.14).

Table 5.14 Revealed Comparative Advantage (RCA) for Selected crops in Myanmar, China, Thailand, Malaysia, Philippine, Singapore, Vietnam and Philippine

Country	Product	Period	Share in Agricultural export (%)	RCA
Myanmar	Rice	1989-1998	20.84722	15.5284
		1999-2008	9.705475	4.311898
	Beans	1989-1998	47.93507	772.6047
		1999-2008	67.29165	628.5139
Thailand	Rice	1989-1998	23.19421	8.362491
		1999-2008	21.2397	7.693027
	Beans	1989-1998	0.600555	3.580978
		1999-2008	0.196772	1.337887
China	Rice	1989-1998	2.251074	0.284684
		1999-2008	2.609833	0.155924
	Beans	1989-1998	2.173713	5.42
		1999-2008	2.09565	2.807017
India	Rice	1989-1998	15.17779	5.438297
		1999-2008	16.04649	4.680479
	Beans	1989-1998	0.767517	5.362924
		1999-2008	1.619163	8.209971
Malaysia	Paddy	1989-1998	0.003024	0.000789
		1999-2008	0.006405	0.001587
	Beans	1989-1998	0.017041	0.075238
		1999-2008	0.021159	0.106659

Source: calculated using the FAO database

In this case the export similarity is completely dissimilar and the index will be equal to zero. Some scholars of international trade emphasize that the effects of trade on economic performances is as follows: The potentials of intra-regional agricultural trade for Myanmar, Thailand, Vietnam, and Philippines and the three importing countries, China , Malaysia, and Singapore are very good and the export similarity indices results also show that these countries are dissimilar in their export patterns.

The study found that, based on the values of export similarity index and value of RCA and if ranked in order of importance for Myanmar's export potential for

pulses and rice market , China's market is the first, Malaysia's market the second and Singapore's the third. The most successful agricultural export item of Myanmar is beans and pulses it has highest comparative advantage compared with other neighboring countries.

In sum, according to the values of export similarity index study, if ranked in order of importance, Myanmar's export potentials for pulses and rice markets are: first, the China market, second, the Malaysian market and third, the Singapore market.

Chapter 6

Conclusion

This study has been carried out in an attempt to identify the effects of strategies and policies of the government on agricultural export markets of Myanmar, with special focus on rice, beans and pulses export. In fact, there were different degrees of strategies and policies under different governments in Myanmar that had different effects on rice, beans and pulses production, marketing and exporting activities.

The three critical issues are mainly analyzed in this study. The first issue is the supply- side issue arising from the effect of economic reform on agricultural production, associated with the impact of production variations and internal trade on food security of Myanmar. The second issue is the impact of strategies and policies on rice, beans and pulses exports and their determinants that were carefully assessed and analyzed. The third issue is the demand-side issue on which a concentrated comparative study was made on the agricultural sector and agricultural exports of neighbouring countries including Myanmar's trade potential for agricultural exports. Based on these studies, this chapter summarizes the main findings and proposes salient suggestions.

6.1 Findings

Since 1988, Myanmar has transformed economic system from a centrally controlled system to that of a market-oriented economic system. As a result, the government liberalized some economic activities including agriculture. Farm production responded to agricultural liberalization policy, procurement, prices and export policies.

The SLORC started the economic reform in Myanmar that began with the lifting of the twenty-one year old restriction on the procurement and domestic trade of rice and eight other major crops. There was no restriction on beans and pulses production, procurement and trade. The SLORC permitted farmers, merchants and millers to purchase, transport, store, mill and sell 90 per cent of the total rice output freely. Only about 10 per cent of total national paddy outputs were purchased by the

State at fixed prices. Under the system, the MAPT purchased paddy from farmers through contracts with advanced payments during the period from 1988/89 to 1995/96.

But, in 1996/97, the State's paddy purchasing system was discontinued and paddy was purchased cash down at harvest time. Initially, the quota was set at 10 per cent of the produce, but it was changed later to 9 to 12 baskets of paddy per acre (455-607 kg/ha). The amount of compulsory quota to be sold to the MAPT was determined by two main factors: the areas under cultivation and yields per acre. The implication is simple: the higher the yields, the more quotas will be sold by farmers to MAPT approaching the upper ceiling of 12 baskets/acre, or about 15 per cent of the total production. In 1997/98, paddy was no longer purchased from farmers and arrangements were made to purchase the crops from millers and merchants through tender system. But from 1998/99 to 2002/03, Government used the system of direct purchase of paddy from farmers. There were problems faced by rice millers and rice traders.

In April 2003, Government adopted the new rice marketing policy and there were three policy changes regarding, paddy production and rice export. One was to open rice export trade to the private sector, the second was to abolish the paddy procurement system, and the third was to retain the rice rationing system by procuring rice from traders instead of farmers. In order to implement this policy, the government provided supportive measures such as development of new agricultural land, provision of adequate irrigation water, supply of increased agricultural mechanization, and development and utilization of high yielding variety of seeds.

This study found that the farmers responded to agricultural price changes or profits from production. Due to the price liberalization of agricultural products, sown area and production of beans remarkably increased five-fold but there was slight increase in rice production because of compulsory procurement system and particularly because of summer paddy program. As a result, beans development was achieved through the expansion of the sown acreage and slight improvements in land productivity. These developments were because of the price effect of beans and pulses and the free cropping choice given to farmers under the strategies and policies of the government since per acre profit of beans was greater than that of rice, it

induced the peasants to grow more beans. Myanmar major macroeconomic reform included liberalization of trade, expansion the role of private sector of farmers and traders, upgrading the existing infrastructures and encouraging foreign trade and foreign investment.

Instability indices have been calculated for total production, area and yield of rice, beans and pulses on the basis of data from 1962 to 2008 for the national level and the fourteen States and Regions level. The results show that the instability indices of rice sown area in the economy are higher in the market oriented economic system period than those in the Socialist period because the implementation of market oriented economic system had resulted in increases in housing area, the industrial zones areas and in the introduction of the summer paddy programme. However, the instability indices of rice yield showed a high percentage in the first period due to the introduction of the Green Revolution and Township Wide High Yielding Rice Production Programme.

The development of rice production during the Socialist period was achieved through significant improvements in land productivity and the low expansion of sown acreage. Under the market oriented economic system it was also achieved through the higher expansion of the sown acreage under summer paddy programme although there was little improvement in land productivity. States and Regions would gain from intra regional trade in rice production. The results indicate that regional integration would be a reasonable strategy for achieving greater food security in Myanmar.

It was found that beans yield, and output of mountainous and highland areas are more fluctuating as compared to the delta and plain regions where weather conditions and soil quality are suitable for cultivating pulses.

Output is more volatile than area and yield because of the interaction effects of the area and yield. Area, yield, and output are more stable at national level than those at States and Regions level. The reason may be the fact that all the instabilities among States and Regions are cancelled out if they are considered at national level. States and Regions integration reduced the union instability index of area, yield and

output. It means that the fourteen States and Regions would gain from inter regional trade in pulses. The results indicated that regional integration (or) free trade within States and Regions would be a reasonable strategy for achieving greater food security.

The instability indices of beans and pulses compared to those of rice showed more stability in production depending on the extent of attractiveness of beans and pulses in the market, in other words beans and pulses production was more attractive than rice production. The results indicated that the instability indices of both rice and beans were higher for the States and Regions level than that for the whole national level. Therefore the production in the national level is more stable than that in individual States and Regions. It is found that trade integration among States and Region could efficiently substitute for regional stock piling since fluctuating in each State and Region could be evened out if trade flows within the nation are enhanced with the development of transport and communications infrastructure. Then the improvement of trade facilitation among States and Regions would help to increase national income and improve national food security. The effects of market liberalization policy on rice, beans and pulses export had some note-worthy significances.

Myanmar rice export had three phases of exporting levels assuming upward and downward trends. The period from 1901/02 to 1928/29 witnessed the highest exporting level with 2 million tons. During 1947/48 to 1961/62 it had gone down to the middle exporting level and exported 1 and 1.5 million tons. In the duration from 1963/64 to 2008/09 it still went down to the lowest exporting level and exported round about 0.5 million tons.

After 1988 rice export has decreased from three to two digits thousand metric tons. Myanmar rice export has failed because its export regime depended greatly on the State marketing sector and the State attached importance to the quantities and supplies rather than to quality and hence procured inferior quality until 2003. However, following this year, annual growth rate of rice production was increasing at 2.86 per cent but rice export percentage of total production was decreasing and

rice export annual growth rate grew at a negative rate of (-4.25) per cent per annum. The inferior quality of paddy was procured by the government and exported to limited destinations and developing countries that would accept Myanmar's rice. After 2003, private individuals or enterprises were allowed to carry out the export business of rice, but export as percentages of production was decreasing seriously. Thus it fell by more than four times in 2003/04 and decreased continuously and only 15 ton were exported in 2006/07, the lowest level because of inexperience in export marketing and poor contacts with the outside world. This situation remained unchanged in private marketing even after 2003 until 2007/08.

Until the nineteenth century the western countries were the chief market for Myanmar, but in the 20th century Myanmar could export to the eastern market of Asia, which are low-income countries. Myanmar's rice importers could be grouped as those from South East Asia, Rest of Asia, Middle East, America, Europe, Africa and Oceania. Only Singapore was a regular customer between 1988 and 2008 and other countries did not import every year and they all were not regular customers. For Myanmar, the highest importers groups are South East Asia, Rest of Asia and Africa. South East Asia and Rest of Asia countries imported Myanmar's rice every year but African countries imported every year only up to 1996/97. Exporting countries in the regional groups are changing every year and export volumes fluctuated significantly every year.

A breakdown of Myanmar's rice exports shows that most of the rice exports go to South Asia, Africa and Southeast Asia, low-income countries where there is demand for poor quality rice. Myanmar rice has failed to generate stable export demand because its export sector was faced with very poor procurement system and excessive dependence on the quantity of rice rather than quality until 2003. More than 50 years of Government control over rice marketing was the cause for inexperience in export marketing and poor relationship with the outside world. This situation remained unchanged in private marketing even after 2003 until 2007/08.

Before the Second World War, Myanmar became the World largest rice exporter. Myanmar's rice exports fluctuated widely over the past 47 years; falling from second

place in 1961 to 21st place in 2008. It failed to maintain market competitiveness mainly due to mismanagement and misallocation of productive resources. Rice exporting countries in the world market were increasing nearly two- fold and Myanmar's rice market share in world market was decreasing.

According to the FAO estimates, in 1996, Myanmar started exporting to Thailand and China and after that Myanmar became rice exporting as well as importing country. Now Myanmar not only needs to boost export promotion but also to try to increase food security. Export price of Myanmar's rice was lower than other countries because of low-grade quality rice. It was because of government policy of rice and quota delivery system. On the one hand, this indicates that Myanmar needs to improve not only quantity but also quality of its products to maximize benefits. Myanmar should adopt "cultivation for export". On the other hand, if Myanmar can export to United Arab Emirates, Iran, Saudi Arabia, Oman, United Kingdom, France, Kuwait and Qatar, Myanmar will earn more income from exports.

There was a remarkable increase in exports of pulses and beans, which became the largest export item in Myanmar. Depending on the market demand for exports, the ranking of importance of export items of beans includes six main kinds namely; green gram, black gram, pigeon pea, chick pea, soy bean, and butter beans that were mainly exported. Export of all pulses and beans are increasing. Annual compound growth rate of export was 30.42 per cent and it was the highest growth rate because of the unprecedented growth of sown area and production. However, it was mainly due to the government's liberalization policy and free choices of the farmers, that the highest export rate was achieved.

Formerly the Japanese market shifted to Thailand and later again to China, but by the late 1990s nearly 80 per cent of market share of Japanese beans imports was from Myanmar. Now, India is the major importer of Myanmar's beans and pulses and nearly two million metric tons or 74 per cent of exported beans and pulses were shipped to India. Although Singapore is standing at the second place, most of the volume of pulses is not for its domestic consumption but for transit trading in raw

form or value added after processing. Myanmar's major regular importers are India, Singapore, Indonesia, Korea, Pakistan, Malaysia, Japan, UAE, China and Thailand.

Once, India was a major importer of beans and pulses from Myanmar before 1962. Now, India is the largest producer as well as consumer of pulses in the world market and it became the major beans and pulses market for Myanmar. In 2008/09, about 74 per cent of pulse exports from Myanmar was imported by India which stood as a regular customer. Therefore, India market is an important market for Myanmar's beans and pulses.

Myanmar was listed as the second world largest exporter of pulse and beans in 1961, at the end of the Parliamentary period. World ranking of Myanmar beans and pulses export had declined in 1970s and 1980s, under the socialist period because of planned crop and quota system. However, it still remained in the top ten lists of the world pulse and beans exporters until 1985. As a result of the economic reforms in line with trade liberalization and export promotion strategies under the SPDC administration, Myanmar was listed again as a leading country in production and exporting of pulses and beans in ASEAN. It was recorded as the biggest exporter of pulse and beans since 2000 and in 2005 when China took over the role, Myanmar became the second largest exporter until 2008. Beans and pulses exporting countries increased more than two-fold from 56 in 1961 to 116 in 2008.

However, beans and pulses export unit price per tonne was the lowest after U.K and Kyrgyzstan. The main importers of Myanmar beans and pulses are India and China, which paid the lowest prices in the world market. Myanmar was not allowed to export to the western markets because of sanctions. If Myanmar can export to the West, more foreign exchanges will be earned. This indicates that Myanmar needs to cultivate for exports. On the other hand, if Myanmar can export to Brazil, USA, Italy, Japan, Spain, Venezuela, France, Algeria, Turkey, Costa Rica, Angola, and Portugal, there is greater potential for foreign exchange earnings from its exports.

Total export volume of beans and pulses had increased, so also its contribution to total export earnings. Improvements in production of beans and pulses can

stabilize food prices which in turn would render more disposable income and savings for the households. Thus, such a development of production and export of beans and pulses has significant impacts on rural welfare and social development. Therefore food production for the domestic market is one of the primary contributions of agriculture to overall economic development.

Estimation of demand and supply function of rice by using a basic model of export quantity and price determination with a log-linear function found that rice export supply of Myanmar can be determined by relative prices and domestic capacities for the period of 1989-2008. Out of the two significance variables, domestic capacity is more important than relative price. Rice export demand of Myanmar was determined by world income for the period 1989-2008.

The estimation of the demand and supply functions of beans and pulses by using a basic model of export quantity and price determination with a log-linear function found that beans and pulses export supply of Myanmar was determined only by domestic production capacity and export demand of Myanmar was determined by relative price and world income for the period of 1989-2008.

Myanmar is the sole land bridge between ASEAN, China and India and it becomes an important player in shaping the future economic, political and security environment in this region. Some problems and obstacles in Myanmar's economic relationships with the West since 1999/2000, have, led to closer economic inter-relation and cooperation with its neighbours and other ASEAN members. Myanmar has the highest per capita agricultural production index among the five countries. Rural population of 68 per cent is the same as economically active population in agriculture in Myanmar, which shows that there is disguised unemployment in rural areas and Myanmar needs to generate not only farm sector development but also non-farm sector development. In addition, according to the FAO STAT there is the agricultural trade deficit that keeps increasing. Myanmar needs to generate food security for oilseeds because it is the largest agricultural import item.

The potential for intra-regional trade could be measured by using export similarity index which indicates the degree of the similarity of export patterns of two

countries or two groups of countries to a particular market. According to the values of export similarity index study, in order of importance of Myanmar export potential for pulses and rice market; China's market is the first, Malaysia's market the second, and Singapore's the third.

Trade potentials of rice, beans and pulses markets for Myanmar are the Indian market, the China's market, the Malaysia's market and the Singapore's market. There is the highest RCA index of beans and pulses in Myanmar compared with other countries, so that beans and pulses are the most successful exporting item but its success is decreasing.

6.2 Suggestions

Major findings in this study have provided useful information both qualitatively and quantitatively that form a basis on which some suggestions are proposed. They are as follows:

- 1 Agricultural sector macroeconomic reform strategies and policies effects should be given more attention and these policy tools should be recognized as the engine of growth for agricultural development and export promotion.
- 2 Better technology and production techniques: Agricultural inputs such as water, fertilizer, seeds, machinery etc. should be made available adequately. Bio-technology and farming education should find its way down to the grass-roots level in agriculture.
- 3 Appropriate taxes that encourage the investment and growth in agriculture: Land taxes, water taxes, export taxes and foreign exchange related price depression taxes and government expenditure etc.
- 4 Based on the instability indices related to export similarity index and revealed comparative advantage index, a strategic agricultural export planning should be introduced to identify Myanmar agricultural export potentials and fulfil the target requirements with all-round support for a fast growth in agricultural productivity.
- 5 Recent reforms-success in Myanmar, motivated by trade liberalization and the result of the production similarity index indicate that there is a need for a structural change with more market integration and an opening up of the economy. A policy

designed to improve agricultural market efficiency and productivity will contribute to the development of the economy. For example free trade within the country and rice cultivation for export.

6 Agricultural infrastructure inclusive of an appropriate policy and strategies that encourage the investment and growth for agricultural production should be given a priority.

In sum, this study would serve as a significant support to the national endeavour for Myanmar agricultural export development.

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Appendix Table 1.1 Labour Force Participation Rate (Labour Survey 1990)

Unit- in thousand

Sector	Labour	Rate
1.Agriculture. Hunting Forestry and Fishing	6024.1	56.47
2. Mining and Quarrying	101.7	0.95
3. Manufacturing	1212.4	11.36
4. Electricity Gas and Water	18.9	0.18
5. Construction	281.1	2.64
6. Wholesale and Retail Trade and Restaurants and Hotels	1686.7	15.81
7. Transport Storage and Communication	403.3	3.78
8. Financial Institution	28.5	0.27
9. Community, Social and Personal	824.5	7.73
10. Activities not Adequately Defined	86.5	0.81
11. Total labour force	10667.70	100

Source: Statistical Year Book.2010.

Appendix Table 1.2 Agriculture, Industry and Services' Sectoral Contribution to GDP

Unit - Percentages

Year	Agriculture Sector	Industry Sector	Service Sector	Total
1953-54	44.73	12.86	42.5	100
1958-59	42.71	15.4	41.89	100
1960-61	40.94	15.52	43.33	100
1961-62	33.96	12.87	53.16	100
1964-65	25.28	35.11	39.61	100
1965-66	24.87	35.51	39.62	100
1966-67	27.04	35.39	37.57	100
1967-68	28.09	35.49	36.42	100
1968-69	27.53	36.23	36.24	100
1969-70	38	14.19	47.81	100
1970-71	27.39	35.6	37.01	100
1971-72	27.29	34.47	38.23	100
1972-73	38.6	12.99	48.5	100
1973-74	30.65	32.86	36.49	100
1974-75	33.75	30.79	35.46	100

Appendix Table 1.2 (Cont)

Year	Agriculture Sector	Industry Sector	Service Sector	Total
1976-77	33.47	34.03	32.49	100
1977-78	44.94	12.74	42.32	100
1978-79	31.03	36	32.97	100
1979-80	45.86	12.45	41.68	100
1980-81	46.54	12.67	40.78	100
1981-82	47.41	12.35	40.23	100
1982-83	47.68	12.59	39.73	100
1983-84	47.59	12.8	39.6	100
1984-85	48.13	13.12	38.75	100
1985-86	48.19	13.07	38.74	100
1986-87	50.2	12.19	37.6	100
1987-88	55.29	10.3	34.4	100
1988-89	57.37	9.67	32.94	100
1989-90	57	10.5	32.2	100
1990-91	58.8	9.8	31.4	100
1991-92	60.5	9.5	30	100
1992-93	63	8.9	28.1	100
1993-94	63	8.6	28.4	100
1994-95	63	8.6	28.4	100
1995-96	60	9.9	30.1	100
1996-97	60.1	10.4	29.5	100
1997-98	58.9	10.2	30.9	100
1998-99	59.1	9	31.1	100
1999-00	57.2	9.7	33.1	100
2000-01	57.1	10.6	32.3	100
2001-02	54.5	13	32.5	100
2002-03	50.6	14.3	35.1	100
2003-04	48.2	16.4	35.4	100
2004-05	46.7	17.5	35.8	100
2005-06	43.9	19.2	36.9	100
2006-07	46.7	17.5	35.8	100
2007-08	43.3	20.4	36.3	100
2008-09	40.3	22.7	37	100

Source: Calculation using Statistical Year book, various issue.

Appendix Table 1.3 Total Sown Area by Crop Groups (2008-09)

Crop Groups	Sown Area	
	000 acres	Percentages
Cereals	21636	48
Pulses	9905	22
Oil seeds	6014	13
Spices and condiments	554	1
Tobacco and betel	248	1
Beverages	756	2
Vegetable and Fruits	2854	6
Fibre	951	2
Miscellaneous	2503.6	5
Total	45421.6	100

Source: Statistical Year Book.2010.

Appendix Table 1-4 Share in Value of Merchandise Exports of Myanmar

Unit : Share in value of exports (percent)

Fiscal Year	88/89	90/91	94/95	95/96	96/97	97/98	98/99	99/00	90-99 (avg.)	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
Beans and Pulses	2.5	17.3	14.8	26.9	23.1	21.8	16.8	13	19	13	11.10	8.8	12	7.7	9.1	11.6	9.8	10.3
Teak	29.3	24.8	17.6	17.9	15.6	10.8	9.5	8.1	16.8	5.1	8.3	6.9	11	9	8.3	5.8	4.4	6.8
Rice and rice products	2.8	5.8	21.5	8.7	2.3	0.6	2.5	0.7	6.6	1.2	2.7	2.4	3.9	4.3	5	4	3.9	3.6
Hardwood	3.1	8.8	2	2.9	2.4	2.4	2.2	2.2	5.1	2.3	1.8	2.3	2.5	2.4	2.6	2.4	4.4	2.8
Fish and fish Products	3.1	1.3	3.9	3.1	4	4.7	4.9	2.6	3.6	2.5	1.7	1.4	2.4	3.3	3.1	2.1	1.3	2.1
Rubber	0.6	0.2	2.3	3.6	3.1	2.1	1.5	0.8	2.5	1.8	4.4	3.2	0.9	1.1	1	0.1	1.6	1.6
Base metals and ores	3.4	2.5	1.1	1.4	0.6	0.5	1.1	3.2	1.8	0.5	0.4	0.4	0.7	0.5	1	0.3	0.5	0.5
Animal feedstuffs	0.3	0.4	0.4	0.6	0.2	0	0.1	0	0.4	0	0	0	0.1	0	0	0	0	0
Subtotal: Traditional exports	45.2	61.2	63.7	65.1	51.3	42.8	38.5	31	55.7	27	30	25.5	33	28	30	26.3	26	27.8
Border trade	49.2	16.3	8.2	3.9	9.3	24.4	24.6	11	15	11	11.4	16.9	12	12	12	12.4	11.7	12.4
Traditional puls border trade	94.4	77.5	71.8	69	60.6	67.2	63	42	70.6	37	41.8	42.2	45	40	42	38.7	37.7	40.2
Other	5.2	22.3	21.8	25	32.1	26	29.9	27	21.9	25	16	13	16	17	20	17.1	18.5	17.7
Garments	0.4	0.3	6.3	6	7.3	6.8	7	30	7.4	30	17.4	14.9	14	7.4	7.6	5.3	4.4	10.2
Natural gas	n.a	n.a	n.a	n.a	n.a	n.a	0.1	0.3	0	8.7	24.7	29.7	25	35	30	38.9	39.4	31.9
Total exports	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

Source: Calculated using Statistical Year book, various issue, CSO.

Appendix Table 1.5 Sown Area by Crop Groups in Myanmar before 1988

Unit – Acres (thousand)

Crops	1894- 98(%)	1894- 98	1927- 28(%)	1927- 28	1936- 41(%)	1936- 41	1949- 50(%)	1949- 50	1961- 62(%)	1961- 62	1973- 74(%)	1973- 74	1988- 89(%)	1988- 89
Paddy	43	6326	72	11700	70	12398	66	9017	60	11359	54	12575	48	11531
Wheat	na	na	na	na	0	25	0	41	1	98	1	156	1	315
Pulses and bean	na	na	8	1348	12	2148	13	1769.9	8	1483	8	1906	9	2229
Oil-seeds	14	1987	9	1560	13	2196	15	2028	15	2926	18	4306	21	4905
Industrial crops	5	774	2	311	4	739.8	4	494.6	4	856	6	1374	4	891
Others	38	5481	9	1399	1	203.1	2	206.4	12	2291	13	2960	17	3931
Total Sown Area	100	14568	100	16318	100	17710	100	13556.9	100	19013	100	23277	100	23802

Source: Season and crop report, Maung Shein, “Burma Transport and foreign trade” (1885-1914), p40;
J.S Furnivall, “An introduction to the political economy of Burma,” 1975, p8 and Statistical Year Book, Various Issue.

Appendix Table 1-6 Agricultural land in the Hands of Non-agriculturalists in 1939

Location	Total Area	Occupied by Non-agriculturalists	Percentage
1	2	3	4
Lower Myanmar	11293092	5585150	48%
Upper Myanmar	8167666	1157944	14%
Total	19460758	6543094	38%

Source: Report on Land Nationalization, Office of Land Nationalization

Appendix Table 1.7 Rice Production and Exports in Selected Years, 1880-1940

Year	Production rice		Export	Export as percentages of production
	unhusked	Husked		
1880	1.989	1.253	0.807	64
1900	5.588	3.52	2.097	60
1910	6.502	4.096	2.381	58
1920	6.008	3.785	2.107	56
1930	7.295	4.596	2.839	62
1940	6.894	4.343	3.104	71

Source: Khin Win, "A Century of Rice Improvement in Burma",

International Rice Research Institute, Manila, 1991, P 32.

Appendix Table 1.8 Sown Area, Production, Yield per Hectare, Procurement, Export and Domestic Use of Rice in Myanmar, 1890-1987

Year	Sown Area (Thousand acres)	Production1/ (000' MT)	Yield per- acre (Basket)	Procurement (000'MT)	Export (000' MT)	Domestic use(000 MT)
1936-40	51939(hectare)	4904	944kg	1180	2894	2010
1945/46	2691(hectare)	1737	645kg			
1946/47	3404(hectare)	2454	721kg	1446	848	1606
1947/48	9265	5428	29.06	1285	1259	4165
1948/49	9796	5211	26.18	1260	1049	4162
1949/50	9017	4571	25.1	950	1066	3505
1950/51	9150	5391	28.9	1949	1284	4107
1951/52	9458	5589	29.28	2256	1070	4519
1952/53	9924	5829	29.48	2422	1038	4791
1953-54	9968	5566	28.33	2166	1155	4411
1954/55	9821	5639	28.85	1893	1505	4134
1955/56	10009	5702	28.71	1733	1721	3981
1956/57	10074	6267	30.76	1937	1858	4409
1957/58	9849	5092	26.36	1776	1283	3809
1958/59	11100	6571	32.8	2472	1458	5113
1959/60	10377	6878	32.9	2313	1832	5046
1960/61	10419	6820	32.61	2636	1435	5385
1961/62	11359	6833	32.16	2426	1676	5157
1962/63	11953	7663	31.94	2070	1521	6142
1963/64	12475	7782	30.95	2438	1445	6337
1964/65	12624	8506	33.16	2443	1175	7331
1965/66	12390	8055	32.22	1992	983	7072
1966/67	12328	6637	28.5	1294	655	5982
1967/68	12193	7769	32.02	1364	334	7435
1968/69	12402	8021	32.67	1908	345	7676
1969/70	12243	7984	33.15	1933	528	7456
1970/71	12294	8162	32.92	1442	635	7527
1971/72	12299	8174	33.28	1312	597	7577
1972/73	12014	7356	31.51	786	200	7156
1973/74	12575	8601	34.19	965	71	8530
1974/75	12793	8583	34.09	1684	165	8418
1975/76	12858	9207	35.91	1783	330	8877
1976/77	12547	9317	36.8	1878	537	8780
1977/78	12690	9461	37.73	1460	562	8899

Appendix Table 1.8 (Cont)

Year	Sown Area (Thousand acres)	Production1/ (000' MT)	Yield per- acre (Basket)	Procurement (000' MT)	Export (000' MT)	Domestic use(000 MT)
1978/79	12957	10527	40.75	2469	160	10367
1979/80	12420	10445	45.62	229	736	9709
1980/81	12668	13317	53.8	2738	631	12686
1981/82	12610	14145	57.06	2799	575	13570
1982/83	12064	14372	61.11	2639	590	13782
1983/84	11938	14372	59.84	2656	799	13573
1984/85	12151	14253	60.09	2385	549	13704
1985/86	12076	14464	60.09	3041	520	13944
1986/87	12193	14126	58.72	2344	442	13684
1987/88	11530	11548	59.8	491	196	11352

Sources: Statistical Yearbook, various issues, Central Statistical Organization; Agricultural and Farm Produce Trade Corporation, Yangon ; Report to the Pyithu Hluttaw (People's Assembly), Ministry of National Planning and Finance (MNPF), various issues.

Appendix Table 1.9 Rice Production and Exports of Myanmar under Parliamentary Period
Unit- Million ton

Year	Production of Unhusked rice	Production of Husked rice	Export	Export as percentage of production
1940	6.894	4.343	3.104	71.5
1950	5.403	3.404	1.184	35.9
1951	5.601	3.529	1.268	34.2
1952	5.579	3.68	1.26	27.6
1953	5.651	3.515	0.97	41.0
1954	6.025	3.56	1.461	43.2
1955	5.423	3.796	1.639	47.1
1956	7.183	3.958	1.864	51.3
1957	7.085	3.416	1.753	32.5
1958	5.842	4.336	1.41	37.4
1959	6.282	4.525	1.692	34.8
1960	6.882	4.464	1.722	38.6

Source: Calculation of Appendix Table 1.7

Appendix Table 1.10 Government Procurement Prices of Different Types of Rice.
Unit- (kyats per 100 baskets)

Year	Type of grain A	Type of grain B	Type of grain C	Type of grain D
1962/63 b to 1965/66	330	325	330	385
1966/67	360	355	340	415
1967/68 to 1971/72	378	373	358	433
1972/73	448	442	425	514
1973/74	634	625	600	726
1974/75 to 1985/86	955	940	900	1090

Source: MAS

Appendix Table 1.11 Annual Rice Production and Export under the Socialist Period.
Unit- million ton

Year	Production of Unhusked rice	Production of Husked rice	Export	Export as percentage of production
1960	7.085	4.251	1.749	41
1961	6.798	4.079	1.591	39
1962	7.55	4.53	1.718	38
1963	7.667	4.6	1.712	37
1964	8.373	5.024	1.413	28
1965	7.929	4.757	1.335	28
1966	6.531	3.919	1.128	29
1967	7.646	4.588	0.54	12
1968	7.896	4.738	0.352	7
1969	7.859	4.715	0.549	12
1970	8.033	4.82	0.64	13
1971	8.046	4.828	0.811	17
1972	7.24	4.344	0.524	12
1973	8.446	5.068	0.146	3
1974	8.448	5.069	0.214	4
1975	9.062	5.437	0.291	5
1976	9.172	5.503	0.628	11
1977	9.313	5.588	0.669	12
1978	10.362	6.217	0.351	6
1979	10.283	6.17	0.591	10
1980	13.107	7.864	0.653	8
1981	13.923	8.354	0.674	8
1982	14.146	8.488	0.701	8
1983	14.165	8.499	0.858	10
1984	14.255	8.553	0.721	8
1985	14.317	8.59	0.75	9

Source: Calculation of Appendix Table (1.8)

Appendix Ttable 4.1 Land Utilization in Myanmar

Unit- thousand Acres

Sr. no.	Year	1985-86	1990-91	1995-96	2000-2001	2005-2006	2008-09
1	Net Sown Area	20301	20127	22017	23902	26989	29351
2	Fallow Area	4589	4724	3042	1900	910	634
3	Cultivable	21053	20625	19697	18065	15516	14011
4	Resenied Forest	24774	25062	25503	30906	38813	41604
5	Other Forest Area	54863	54970	54557	50084	44055	40570
6	Other Land	41606	41678	42370	42329	40903	41016
	Total	167186	167186	167186	167186	167186	167186

Source : Statistical Year Book, various issue, CSO.

Appendix Table 4. 2 Distribution of Quality Seeds by MOAI

Unit-Paddy(000basket),-Others (basket)

Year	Paddy	Beans Total	Black Gram	Green Gram	Butter bean	Chickpea	Pigeonpea
1987/88	881	15117	1174	945	10519	1448	1031
1988/89	488	23245	5452	300	1468	15661	364
1989/90	409	11696	4747	1517	1586	3424	422
1990/91	601	20338	4869	3459	4244	6912	854
1991/92	689	43795	24557	9870	2618	4998	1752
1992/93	568	48193	19295	6052	4241	12189	6416
1993/94	623	17237	6205	5826	797	1799	2610
1994/95	566	50122	2024	6597	350	38170	2981
1995/96	567	7243	842	2648	-	3091	662
1996/97	579	11272	1568	2121	-	5552	2031
1997/98	579	42460	35743	5873	-	414	430
1998/99	579	16606	9490	6108	-	795	213
1999/00	576	16353	7067	8483	-	765	38
2000/01	573	17122	11692	3274	-	1544	612
2001/02	391	40336	7761	3064	-	29378	133
2002/03	59	2085	1254	62	-	605	164

Appendix Table 4. 4 Utilization of Pesticides by MOAI

Year	Paddy		Pulses	
	pounds	Gallons	pounds	Gallons
1987/88	162739	7426	4400	426
1988/89	61732	14712	1540	3960
1989/90	145039	198817	21912	2238
1990/91	105662	20232	20172	1549
1991/92	47524	36004	2178	1068
1992/93	24570	35871	968	1668
1993/94	109595	33724	2394	910
1994/95	66968	67845	7805	5158
1995/96	127670	71568	10890	12936
1996/97	95907	37064	2528	5682
1997/98	134653	41038	2200	9123
1998/99	92091	34110	29275	10519
1999/00	65559	70962	24869	23431
2000/01	-	8388	-	1242
2001/02	-	17758	2739	14497
2002/03	5764	16221	5981	15965
2003/04	1324	6445	242	2425
2004/05	8382	15688	-	11816
2005/06	110	3653	490	2346
2006/07	276	2989	374	12729
2007/08	-	31290	-	1090

Source: MOAL, Agricultural Mechanization Department

Appendix Table 4. 5 Utilization of Farm implements in Myanmar

Year	Harrow	Ploughshare	Mamooties and Spades	Implement
1987-88	2678	2563	3394	8635
1988-89	2706	2566	3419	8691
1989-90	2723	2599	3472	8794
1990-91	2762	2634	3524	8920
1991-92	2782	2646	3561	8989
1992-93	2792	2674	3600	9066
1993-94	2790	2687	3660	9137
1994-95	2810	2722	3717	9249
1995-96	2834	2758	3758	9350
1996-97	2841	2774	3802	9417
1997-98	2850	2780	3841	9471
1998-99	2904	2801	3910	9615
1999-00	2952	2836	3981	9769
2000-01	2987	2873	4092	9952
2001-02	3013	2900	4156	10069
2002-03	3032	2913	4205	10150
2003-04	3084	2956	4317	10357
2004-05	3110	2977	4385	10472
2005-06	3126	3018	4429	10573
2006-07	3158	3031	4524	10713
2007-08	3181	3073	4589	10843

Source: Agricultural Statistics Department, Ministry of Agriculture.

Appendix Table 4.6 Utilization of Farm Machines and Vehicle in Myanmar

Year	rotary harrow	Seed drill (harrow)	Seed drill (Plough)	Water Pump	Tractor	Machines	Vehicles or Cart
1987/88	381	63	12	46	12	514	1599
1988/89	392	64	12	46	13	527	1624
1989/90	395	67	12	46	13	533	1627
1990/91	399	69	12	46	10	536	1638
1991/92	408	70	14	45	10	547	1652
1992/93	409	70	14	46	11	550	1359
1993/94	421	71	14	52	11	569	1668
1994/95	430	71	14	62	8	585	1670
1995/96	435	71	14	72	9	601	1674
1996/97	445	80	14	85	8	632	1684
1997/98	457	81	14	97	9	658	1689
1998/99	478	80	14	108	10	690	1720
1999/00	514	80	15	123	10	742	1740
2000/01	518	83	17	142	11	771	1759
2001/02	529	88	19	155	10	801	1772
2002/03	536	90	19	160	11	816	1769
2003/04	557	89	19	167	11	843	1785
2004/05	565	89	19	174	11	858	1789
2005/06	571	93	21	179	11	875	1795
2006/07	582	94	21	186	12	895	1798
2007/08	586	95	21	194	11	907	1807

Source: MOAL, Agricultural Mechanization Department

Appendix Table (4. 7) Mechanized Tillage Acres in Myanmar (1988-1989 to 2008-2009)

Sr. No	Year	Paddy	% Paddy	Pulse and Beans	% Pulse and Beans	Others	% Others	Total
1	1988/89	255921	30.00	213267	25.00	383882	45.00	853070
2	1989/90	363606	30.00	303005	25.00	545409	45.00	1212020
3	1990/91	434768	30.00	362298	25.00	652138	45.00	1449194
4	1991/92	211640	30.00	176367	25.00	317461	45.00	705468
5	1992/93	430107	21.90	636952	32.44	896578	45.66	1963637
6	1993/94	1132821	35.75	738448	23.30	1297396	40.94	3168665
7	1994/95	1102260	26.63	1137118	27.47	1899515	45.89	4138893
8	1995/96	1158364	31.00	1385529	37.08	1193089	31.93	3736982
9	1996/97	1072360	36.70	733687	25.11	915680	31.34	2921727
10	1997/98	915411	36.86	677052	27.26	891222	35.88	2483685
11	1998/99	1358242	41.99	1096946	33.91	779303	24.09	3234491
12	1999/00	1006489	44.19	644195	28.29	626747	27.52	2277431
13	2000/01	412310	21.67	580017	30.48	910455	47.85	1902782
14	2001/02	417127	25.11	432611	26.04	811731	48.86	1661469
15	2002/03	534696	34.74	366389	23.81	637893	41.45	1538979
16	2003/04	378795	32.01	272282	23.01	532328	44.98	1183405
17	2004/05	235042	25.66	232432	25.37	448621	48.97	916096
18	2005/06	240690	34.81	189693	27.44	261026	37.75	691410
19	2006/07	218915	27.21	312713	38.87	272971	33.93	804599
20	2007/08	71598	23.92	96725	32.32	130943	43.75	299266
21	2008/09	135933	39.13	50819	14.63	160659	46.24	347411

Source: MOAL, Agricultural Mechanization Department

Appendix Table 4.8 Type of Irrigation in Myanmar

Period	Total irrigated		Government irrigation				Private irrigation				Wells		Other Sources	
	Area		Canals		Tanks		Canals		Tanks					
	Acreag e	%	Acreag e	%	Acreage	%	Acreag e	%	Acreage	%	Acreage	%	Acreage	%
1988-89	2517	100	610	24.3	380	15.1	640	25.4	78	3.1	5.6	2.2	753	29.9
1989-90	2483	100	614	24.7	394	15.9	664	26.7	82	3.3	53	2.1	676	27.2
1990-91	2479	100	613	24.7	388	15.6	665	26.8	92	3.8	53	2.1	668	26.9
1991-92	2467	100	593	24	378	15.3	651	26.4	82	3.3	65	2.7	698	28.3
1992-93	2743	100	637	23.2	416	15.2	645	23.5	95	3.5	69	2.5	880	32.1
1993-94	3303	100	651	19.7	418	12.6	601	18.2	70	2.1	75	2.3	1488	45
1994-95	3843	100	702	18.3	389	10.1	618	16.1	89	2.3	92	2.4	1953	50.8
1995-96	4341	100	685	15.8	350	8	608	14	94	2.2	99	2.3	2505	57.7
1996-97	3846	100	668	17.4	435	11.3	636	16.5	95	2.5	123	3.2	1889	49.1
1997-98	3933	100	726	18.5	455	11.6	634	16.1	74	1.9	135	3.4	1907	48.5
1998-99	4182	100	761	18.2	408	9.8	600	14.3	44	1.1	164	3.9	2205	52.7
1999-00	4550	100	806	17.7	462	10.2	611	13.4	34	0.7	199	4.4	2438	53.6
2000-01	4720	100	888	18.8	528	11.2	597	12.6	46	1	220	4.7	2441	51.7
2001-02	4906	100	868	17.7	547	11.2	601	12.3	48	0.9	243	4.9	2599	53
2002-03	4619	100	914	19.8	569	12.3	622	13.5	59	1.3	256	5.5	2199	47.6
2003-04	4843	100	936	19.3	634	13.1	591	12.2	91	1.9	241	5	2350	48.5
2004-05	4762	100	969	20.3	671	14	638	13.3	72	1.5	260	5.4	2150	45.1
2005-06	5278	100	1070	20.3	701	13.3	643	12.2	75	1.4	243	4.6	2545	48.2
2006-07	5545	100	1053	19	719	13	660	12	96	1.7	297	5.3	2720	49
2007-08	5561	100	980	17.6	675	12.1	651	11.7	128	2.3	359	6.5	2769	49.8

Source- Statistical Year Book(1997, 2003, 2008)

Appendix Table 4.9 Area of Crop under Irrigation in Myanmar

Period	Total irrigated Area	Paddy	Wheat	Maize	Ground nut	Sesamum	Pulses	Sugar-Cane	Other food Crops	Catton	Jute	Other non-food crops
1988-89	2878.13	2062.19	50.98	10.85	20.68	198.72	87.75	22.26	293.23	33.29	94.27	13.91
1989-90	2870.99	2105.27	43.7	10.67	8.2	196.05	83.88	20.21	283.71	37.36	65.18	16.76
1990-91	2871.05	2147.53	43.48	9.9	7.95	174.64	77.89	20.97	269.64	34.5	67.88	16.67
1991-92	2874.28	2062.98	63.95	14.21	7.7	186.69	104.08	19.7	294.35	36.74	62.53	21.35
1992-93	3231.13	2365.54	52.94	12.55	9.87	184.98	98.87	18	317.68	52.71	102.01	15.98
1993-94	4005.87	3307.39	47.98	8.94	10.42	145.56	79.64	17.4	277.85	36.46	56.88	17.35
1994-95	4722.42	3933.01	52.23	15.1	11.42	175.97	102.05	17.39	293.83	29.02	73.86	18.54
1995-96	5292.2	4365.24	42.61	13.66	13.4	264.32	102.35	15.72	313.63	42.21	99.61	19.45
1996-97	4609.8	3793.72	42.73	12.44	15.02	142.28	114.43	14.84	326.47	52.34	75.11	20.72
1997-98	4749.95	3847.78	44.58	22.78	26.94	147.76	147.20	14.18	343.18	53.54	67.14	34.89
1998-99	5140.46	3937.47	57.81	16.58	42.12	285.57	192.71	15.7	427.97	61.21	75.07	28.25
1999-2000	5799.06	4493.19	62.93	21.52	37	293.94	231.36	18.48	497.69	31.67	79.6	31.68
2000-01	6021.28	4608.61	63.15	29.89	41.41	232.19	290.49	19.79	570.11	39.57	94.6	31.47
2001-02	6238.71	4577.65	64.95	24.04	58.62	236.94	409.68	21.77	638.7	64.76	109.16	32.44
2002-03	6198.41	4558.69	71.9	75.49	51.34	184.98	331.57	22.92	674.85	97.3	98.33	31.04
2003-04	6352.5	4675.31	60.85	96.54	49.6	208.18	357.10	28.33	711.4	58.77	72.5	34.19
2004-05	6512.43	4643.52	92.75	93.44	54.48	246.46	397.09	24.91	816.76	42.03	60.29	40.7
2005-06	7108.19	5188.05	130.68	92.28	38.04	188.24	381.26	25.3	901.38	31.08	44.76	67.12
2006-07	7332.29	5424.72	68.9	87.31	53.79	186.08	465.17	25.67	910.42	35.67	25.38	49.18
2007-08	7122.57	5453.48	79.35	89.41	58.67	194.04	223.98	25.13	913.78	39.97	12.72	40.22

Source- Statistical Year Book(1997, 2003, 2008)

Appendix Table 4.10 Agricultural Loans by Crop (Kyat Million)

Year	Paddy	Pulses
1987/88	1029.17	18.57
1988/89	988.41	15.78
1989/90	1274.95	37.2
1990/91	1158.86	41.94
1991/92	1142.29	52.13
1992/93	1144.32	85.21
1993/94	1966.52	95.88
1994/95	2106.42	95.21
1995/96	6605.71	233.66
1996/97	7256.85	263.37
1997/98	8082.48	692.75
1998/99	8060.54	640.12
1999/00	8749.72	610.88
2000/01	9524.87	654.76
2001/02	9819.21	720.27
2002/03	9607.24	626.02
2003/04	16856.55	913.84
2004/05	22986.56	1260.82
2005/06	29292.05	1342.44
2006/07	38555.19	1964.38
2007/08	50092.96	3253.1

Source : Statistical Year Book, Various Issue, C S O.

Appendix Table 4.11 Sown Area by Crop Groups in Myanmar.

Unit - percentage

Crops Groups	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Rice (Paddy)	53.14	52.96	51.93	49.64	49.37	51.90	53.04	50.49	50.57	43.44	47.25	46.72	46.24	45.18	44.62	40.64	44.11	44.94	46.06	46.37	44.03
Cereals (other)	5.01	5.02	4.94	4.99	4.97	4.46	4.34	4.03	4.17	3.73	4.32	4.22	3.98	3.93	4.02	3.79	4.05	4.17	3.73	3.71	3
Beans and Pulses	7.39	8.06	9.69	12.25	13.62	14.26	14.37	16.29	15.97	28.47	19.07	18.68	18.81	20.90	21.03	19.44	21.08	21.32	21.27	21.23	21.8
Oil seeds	19.77	20.11	19.89	18.63	18.03	16.48	15.51	14.98	14.13	10.91	13.46	14.06	14.40	13.47	13.66	20.59	13.93	12.55	12.46	13.41	13.24
Spices and condiments	1.22	1.17	1.07	1.20	1.24	1.04	0.88	0.84	1.02	0.89	1.06	1.22	1.29	1.32	1.34	1.18	1.38	1.38	1.22	1.31	1.22
Tobacco and betel	0.78	0.69	0.71	0.79	0.73	0.66	0.61	0.53	0.60	0.55	0.55	0.56	0.57	0.54	0.50	0.48	0.55	0.59	0.53	0.54	0.55
Beverages	1.59	1.50	1.45	1.48	1.57	1.36	1.21	1.26	1.45	1.50	1.81	1.74	1.77	1.89	1.78	1.64	1.72	1.59	1.61	1.76	1.66
Vegetable and Fruits	4.23	4.23	4.15	4.71	4.14	4.00	4.09	3.91	4.37	4.08	4.70	4.86	5.23	5.36	5.69	5.60	6.24	6.21	6.08	6.44	6.28
Fibre	2.54	2.06	2.04	2.13	2.15	1.62	2.10	3.53	3.27	2.29	3.01	2.83	2.70	2.45	2.46	2.09	2.18	2.24	2.20	2.23	2.09
Miscellaneous	4.35	4.22	4.13	4.19	4.19	4.22	3.86	4.12	4.45	4.13	4.78	5.12	5.00	4.96	4.92	4.55	4.74	5.01	4.84	2.99	5.51
Total	100.00	100	100	100.00	100.00	100	100.00	100	100	100.00	100.00	100.00	100.00	100.00	100.00	100	100	100.00	100	100.00	100.00

Sources: Statistical Year Books, Various Issues.

Appendix Table 4.12 Sown Area by Crop Groups in Myanmar.

Unit – Acres (thousands)

Crops Groups	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
Rice (Paddy)	11807	12057	12220	11935	12684	14021	15194	15166	14518	14294	14230	15528	15713	15940	16032	16168	16946	18259	20076	19990	20001
Cereals (other)	1113	1144	1163	1199	1277	1204	1242	1211	1196	1227	1302	1401	1354	1385	1444	1509	1557	1696	1625	1601	1635
Beans and Pulses	1641	1834	2281	2945	3500	3853	4117	4894	4585	9369	5744	6207	6391	7372	7556	7734	8099	8662	9271	9153	9905
Oil seeds	4392	4578	4681	4479	4632	4451	4443	4500	4058	3591	4053	4674	4894	4752	4908	8190	5352	5101	5430	5782	6014
Spices and condiments	270	267	252	289	318	281	253	253	292	293	318	407	440	466	480	469	532	562	533	565	554
Tobacco and betel	173	156	166	190	187	179	175	159	171	182	165	186	194	189	179	190	210	241	230	231	248
Beverages	353	341	342	355	404	368	347	378	417	493	544	578	603	667	638	654	660	645	702	758	756
Vegetable and Fruits	940	962	976	1133	1063	1080	1171	1175	1254	1342	1414	1614	1778	1891	2043	2228	2397	2523	2648	2778	2854
Fibre	564.2	469.2	479.2	513.2	553.2	437.1	602.2	1061.1	940.04	754.1	905.6	939	917	864.8	884	832	839	911	961	961	951
Miscellaneous	966.2	959.8	972.8	1006.3	1076	1139.5	1104.5	1238.7	1279	1360	1439.7	1701.7	1700.2	1750.8	1766.4	1809	1821.4	2034	2107.7	1289.7	2503.6
Total	22219	22768	23533	24045	25694	27014	28649	30036	28710	32905.1	30115	33235.7	33984.2	35277.6	35930.4	39783	38413	40634	43584	43108.7	45421.6

Sources : Statistical Year Books, Various Issues.

Appendix Table 4.13 Crop Output and Prices at Harvest Time

Year	Paddy (Long grain)		Pulses(Mungbean)		Pulses (Greengram)		Pulses(Pigeonpea)	
	Output	Price	Output	Price	Output	Price	Output	Price
	(000'ton)	Ks/ton	(000'ton)	Ks/ton	(000'ton)	Ks./ton	(000'ton)	Ks/ton
1985	14,090	459	93	1,556	30	1,244	51	1089
1990	13,748	2,356	99	15,138	62	12,064	42	15,771
1995	17,669	4,086	365	43,556	332	35,778	142	37,402
1998	16,807	16,346	437	66,889	457	100,116	157	105,778
1999	19,808	16,346	421	112,680	471	98,136	182	132,002
2000	20,987	16,346	523	166,112	511	110,384	315	114,212
2001	21,569	16,346	625	155,555	569	202,222	458	132,222
2002	21,461	18,990	654	248,888	607	287,777	435	222,444
2003	22,770	62,500	728	217,777	662	228,666	478	256,666
2004	24,361	72,115	899	264,860	778	290,734	547	241,283
2005	27,683	110,400	1,021	395,111	945	406,528	584	269,111
2006	30,923	180,960	1,201	774,667	1,055	625,333	628	295,555
2007	31,450	168,000	1,381	590,333	1,197	538,222	700	470,400
2008	32,573	163,200	1,446	491,555	1,240	644,933	745	447,675

Source : MAS

Appendix Table 4.14 Rice Sown Area of Myanmar

Year	Total Sown Acreage (Thousand)	Rainy paddy Sown Acreage (Thousand)	Summer paddy Sown Acreage (Thousand)
1988-89	11807	11807	-
1989-90	12056	12056	-
1990-91	12219	12219	-
1991-92	11934	11934	-
1992-93	12684	11863	821
1993-94	14020	11870	2150
1994-95	14643	11981	2661
1995-96	15165	12148	3017
1996-97	14518	12413	2105
1997-98	14294	12103	2190
1998-99	14229	11928	2301
1999-2000	15527	12732	2795
2000-01	15713	12991	2721
2001-02	15940	13066	2874
2002-03	16032	13382	2649
2003-04	16167	13430	2736
2004-05	16945	14430	2553
2005-06	18259	15412	2847
2006-07	20075	17037	3038
2007-08	19989	16853	3135

Source : Settlement and Land Record Department.

Appendix Table 4.15 Sown area, Production, Procurement, Export and Domestic Utilization
of Rice in Myanmar

Year	Sown Area (Thousand acres)	Production1/ (000' MT)	Yield per- acre (Basket)	Procurement (000' MT)	Export (000' MT)	Domestic use(000 MT)
1936-40	51939(hater)	4904	944kg	1180	2894	2010
1945-46	2691(hater)	1737	645kg			
1946-47	3404(hater)	2454	721kg	1446	848	1606
1947-48	9265	5428	29.06	1285	1259	4165
1948-49	9796	5211	26.18	1260	1049	4162
1949-50	9017	4571	25.1	950	1066	3505
1950-51	9150	5391	28.9	1949	1284	4107
1951-52	9458	5589	29.28	2256	1070	4519
1952-53	9924	5829	29.48	2422	1038	4791
1953-54	9968	5566	28.33	2166	1155	4411
1954-55	9821	5639	28.85	1893	1505	4134
1955-56	10009	5702	28.71	1733	1721	3981
1956-57	10074	6267	30.76	1937	1858	4409
1957-58	9849	5092	26.36	1776	1283	3809
1958-59	11100	6571	32.8	2472	1458	5113
1959-60	10377	6878	32.9	2313	1832	5046
1960-61	10419	6820	32.61	2636	1435	5385
1961-62	11359	6833	32.16	2426	1676	5157
1962-63	11953	7663	31.94	2070	1521	6142
1963-64	12475	7782	30.95	2438	1445	6337
1964-65	12624	8506	33.16	2443	1175	7331
1965-66	12390	8055	32.22	1992	983	7072
1966-67	12328	6637	28.5	1294	655	5982
1967-68	12193	7769	32.02	1364	334	7435
1968-69	12402	8021	32.67	1908	345	7676
1969-70	12243	7984	33.15	1933	528	7456
1970-71	12294	8162	32.92	1442	635	7527
1971-72	12299	8174	33.28	1312	597	7577
1972-73	12014	7356	31.51	786	200	7156
1973-74	12575	8601	34.19	965	71	8530
1974-75	12793	8583	34.09	1684	165	8418
1975-76	12858	9207	35.91	1783	330	8877
1976-77	12547	9317	36.8	1878	537	8780

Appendix Table 4.15 (Contd.)

Year	Sown Area (Thousand acres)	Production I/ (000' MT)	Yield per- acre (Basket)	Procurement (000' MT)	Export (000' MT)	Domestic use(000 MT)
1977-78	12690	9461	37.73	1460	562	8899
1978-79	12957	10527	40.75	2469	160	10367
1979-80	12420	10445	45.62	229	736	9709
1980-81	12668	13317	53.8	2738	631	12686
1981-82	12610	14145	57.06	2799	575	13570
1982-83	12064	14372	61.11	2639	590	13782
1983-84	11938	14372	59.84	2656	799	13573
1984-85	12151	14253	60.09	2385	549	13704
1985-86	12076	14464	60.09	3041	520	13944
1986-87	12193	14126	58.72	2344	442	13684
1987-88	11530	11548	59.8	491	196	11352
1988-89	11807	13164	56	1672	47	13117
1989-90	12057	13803	57	1482	166	13637
1990-91	12220	13968	57	1851	132	13836
1991-92	11935	13201	56	2095	180	13021
1992-93	12684	14837	57	2222	199	14638
1993-94	14021	16759	59	1939	261	16498
1994-95	14643	18194	61	2034	1041	17153
1995-96	15166	17952	58	1934	354	17598
1996-97	14518	17675	59	1522	93	17582
1997-98	14294	16654	59	1601	28	16626
1998-99	14230	17077	61	2200	120	16957
1999-00	15528	20125	63	2212	55	20070
2000-01	15713	21323	66	2126	251	21072
2001-02	15940	21914	66	2199	939	20975
2002-03	16032	21804	66	2066	793	21011
2003-04	16168	23135	68	-	168	22967
2004-05	16946	24751	70	-	182	24569
2005-06	18259	27682	73	-	180	27502
2006-07	20076	30922	74	-	15	30907
2007-08	19989	30954	76.14	-	357	30597
2008-09	20001	32058	78.21	-	666	31392

Source : Settlement and Land Record Department

Table (5.17) Domestic Utilization and Exportable Surplus of Beans and Pulses

Year	Sown Area	All production (metric tons)	Exports (metric tons)	Domestic Utilization (metric tons)
1962/63	1,710,237	348,168.21	128,278.00	219,890.21
1963/64	1,855,191	381,477.91	74,995.00	306,482.91
1964/65	1,609,429	292,921.86	142,990.00	149,931.86
1965/66	1,706,721	301,355.52	76,507.00	224,848.52
1966/67	1,766,973	269,099.75	88,871.00	180,228.75
1967/68	1,615,757	277,430.92	64,860.00	212,570.92
1968/69	1,751,075	325,774.18	47,214.00	278,560.18
1969/70	1,630,677	283,382.12	55,180.00	228,202.12
1970/71	1,577,009	297,566.60	57,515.00	240,051.60
1971/72	1,854,457	342,373.05	64,102.00	278,271.05
1972/73	1,861,084	293,940.89	91,366.00	202,574.89
1973/74	1,688,996	291,405.92	33,228.00	258,177.92
1974/75	1,785,485	318,343.17	27,564.00	290,779.17
1975/76	1,655,879	288,665.04	37,174.00	251,491.04
1976/77	1,665,241	353,199.57	32,109.00	321,090.57
1977/78	1,749,242	397,767.12	30,667.00	367,100.12
1978/79	1,809,476	399,304.08	24,045.00	375,259.08
1979/80	1,720,607	404,566.46	62,320.00	342,246.46
1980/81	1,994,613	453,295.35	69,970.00	383,325.35
1981/82	2,112,637	563,748.69	84,769.00	478,979.69
1982/83	1,899,940	530,551.03	101,829.00	428,722.03
1983/84	2,164,014	670,623.37	64,259.00	606,364.37
1984/85	2,193,020	647,852.47	57,901.00	589,951.47
1985/86	2,249,231	670,748.06	87,477.00	583,271.06
1986/87	2,072,913	660,889.33	84,405.00	576,484.33
1987/88	2,022,193	614,950.61	72,995.00	541,955.61
1988/89	1,802,961	418,060.83	17,104.00	400,956.83
1989/90	2,116,236	510,983.31	56,063.00	454,920.31
1990/91	2,470,507	613,931.45	194,500.00	419,431.45
1991/92	3,126,279	782,422.48	195,167.00	587,255.48
1992/93	3,699,971	951,968.84	449,000.00	502,968.84
1993/94	3,753,310	933,611.32	514,000.00	419,611.32
1994/95	4,314,335	1,171,987.69	425,000.00	746,987.69
1995/96	5,056,882	1,415,850.52	610,000.00	805,850.52
1996/97	4,850,805	1,411,117.68	595,000.00	816,117.68

Table (5.17) Contd.)

Year	Sown Area	All production (metric tons)	Exports (metric tons)	Domestic Utilization (metric tons)
1997/98	5,168,272	1,645,177.88	769,000.00	876,177.88
1998/99	6,076,277	1,735,168.77	621,000.00	1,114,168.77
1999/00	6,607,229	1,882,699.72	561,000.00	1,321,699.72
2000/01	7,250,459	2,330,760.91	831,000.00	1,499,760.91
2001/02	7,897,971	2,735,805.80	1,035,000.00	1,700,805.80
2002/03	8,083,009	2,841,743.83	1,038,000.00	1,803,743.83
2003/04	8,377,932	3,187,683.01	1,211,000.00	1,976,683.02
2004/05	8,751,429	3,634,945.41	873,000.00	2,761,945.41
2005/06	9,409,570	4,127,435.37	865,000.00	3,262,435.37
2006/07	9,890,334	4,575,438.90	1,156,000.00	3,419,438.90
2007/08	10,456,916	5,123,563.63	1,141,000.00	3,982,563.63
2008/09	10,567,453	5,426,203.40	1,451,000.00	3,975,203.40

Source: Statistical Yearbook, Various Issue, CSO and Myanmar Agricultural Statistics, Various Issue Department of Agricultural Planning, Ministry of Agriculture and Irrigation

Appendix Table 4.18 Growing Seasons of Beans and Pulses in Myanmar

No	Season	Main Producing Area	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apri
1	Green gram													
	Rainy	Central Myanmar	S	s	g	h	h							
	Winter	Central Myanmar												
	Winter	Lower Myanmar							s	s	g/h	h	h	
2	Black gram								s	s	g/h	h	h	
	Winter	Lower Myanmar												
3	Pigeon pea								s	s	g/h	h	H	
	Rainy	Central Myanmar	s	s	g	g	g	g	g	g	H	h		
4	Soy bean													
	Rainy	Shan State	S	s	g	h	h							
	Winter	Central Myanmar												
	Winter	Ayeyawady							s	s	g/h	h	H	
5	Chick Pea								s	s	g/h	h	H	
	Winter	Central Myanmar												
	Winter	Bago						s	s	s/g	H	h	H	
	s = -							s	s	s/g	H	h	H	
	sowing		h =											
			harvesting											

Source : Settlement and land Record Department, MAS, Myanmar.

Appendix Table 4.19 Myanmar Beans and Pulses production

Year	Black gram	Green gram	Butter bean	Bocate	Sultani	Sultapya	Soybean	Chick Pea	Pelun	Pigeon Pea	Peyin	Pebyugale	Pegyi	Pegya	Garden Pea	Peyaza	Penauk	Other
1988-89	1772431	676295	1096188	706671	63153	667762	825120	2253179	346410	1270439	140936	31624	948962	140657	263924	5142	358338	1217504
1989-90	1953473	1344217	1253467	686336	94405	689430	781403	3229560	356701	1136178	164665	39658	1160448	163078	423512	7492	663010	1479368
1990-91	3070067	1925946	1503788	870147	130086	945463	788744	3310388	446161	1296470	186765	40245	1298455	202293	424510	10478	773804	1550852
1991-92	6011442	3034518	1480404	1132170	117475	883220	825865	3564495	571731	1931456	144344	49738	1065795	205825	463520	17418	868842	1559035
1992-93	6910971	4604826	1337780	1280689	124324	813519	927940	3211492	608119	4257816	210449	86878	1164028	180956	619340	32121	1122646	1618303
1993-94	5878507	5224275	1214154	1241168	143446	743337	1045278	1923830	669800	4369009	223301	58111	1344385	189555	635835	29068	1933689	1684057
1994-95	8735879	8325437	995736	1528662	167535	800831	1522723	2466286	1079493	4447555	305207	57880	1254882	222558	764241	26948	1527746	1611003
1995-96	11367513	10331976	1105514	1947925	174458	954659	2011906	2967385	1490971	4425923	255217	69603	1444448	206385	736797	34003	1710613	2062885
1996-97	10055739	10201848	1177276	1592028	184810	992651	1913519	2887290	1493568	5722271	329373	73630	1462575	184462	740784	34306	1936630	2170686
1997-98	12847931	13737855	1299141	1795657	233770	1116811	2282956	2887000	1818262	5396823	377256	117212	1396098	178339	844635	32678	1877040	2071786
1998-99	13598035	14212078	1359652	2080604	251444	1411135	2611659	2168365	1992859	4885839	526134	165275	1633388	203407	800318	25238	2062476	3075359
1999-00	13088783	14648702	1546536	2484427	287690	1571598	3029870	2692767	2376906	5650604	691519	169796	1765182	237079	878631	60796	2549562	3844467
2000-01	16279464	15899300	1603439	3124552	293853	1812921	3376521	3810739	3207752	9810703	804733	153259	2044735	275991	948548	66387	2642277	5121918
2001-02	19460951	17690916	1634858	3531016	282489	1587812	3693265	6190211	3183280	14269211	812537	165829	2018570	333607	1028261	46165	2553217	5181591
2002-03	20350762	18892502	1695248	3315132	291949	1850365	3796145	6767525	3270464	13532536	908824	207635	2206176	338843	1177389	30508	2669414	5602064
2003-04	22652984	20599729	1851424	3978724	331780	2149206	4560706	7281670	3780537	14857678	899806	241636	2426925	365861	1382315	35443	2775240	7310997
2004-05	27974674	24196466	1863447	4252551	352904	2304357	5123676	7638283	4055629	17012913	971028	222607	2556938	358996	1352454	41531	2962240	7919716
2005-06	31263159	28933752	2013760	4790397	378555	2922288	5782941	8452077	4627423	18654006	1040180	250040	2940961	389656	1410561	38181	3293828	9039500
2006-07	36769035	32294864	2273457	5081156	405634	3074301	6247298	10703993	4677522	20069766	1102815	295544	3027188	446798	1739859	66924	3158855	8486670
2007-08	42289480	36643892	2370093	6255523	431011	3359178	6644933	11296161	5473498	22372915	1305438	291105	3553506	468402	1862248	47510	3595826	8423184
2008-09	44278335	37955854	2536302	6511060	450901	3516324	7468008	12906507	5831500	23801605	1535421	309187	4020100	492329	1790101	44968	3858834	8611606

Source :Settlement and Land Record Department

Appendix Table 4.20 Myanmar Pulse Sown Area

Year	Black gram	Green gram	Butter bean	Bocate	Sultani	Sultapya	Soybean	Chick pea	Pelun	Pigeon pea	Peyin	Pebyugale	Pegyi	Pegya	Garden pea	Peyaza	Penauk	Other pulses	Union
1988-89	226954	122686	83282	84813	8649	86467	85150	341529	62996	172167	28176	3967	173388	21759	45048	2551	91968	161411	1802961
1989-90	254512	226809	87819	82880	11062	93905	82818	391781	65124	154763	28154	4569	182657	24345	63378	2449	175551	183660	2116236
1990-91	362078	288297	112409	104409	12784	117312	80680	442225	75353	174934	28506	4935	188816	30042	70318	3061	186179	188169	2470507
1991-92	724709	434272	101566	127357	12233	113491	85158	458818	83411	280169	29193	6248	165479	31605	68500	4843	217552	181675	3126279
1992-93	803365	627668	95570	139876	13681	98167	94414	415854	92246	530223	31543	11531	165764	25013	87758	8800	256657	201841	3699971
1993-94	692758	721353	87576	145996	15256	100282	113543	328736	94886	571004	33238	7732	196907	26332	91107	9956	316351	200297	3753310
1994-95	895783	947355	98390	167329	17914	103149	150297	321698	139780	637336	41396	6497	177113	36834	91215	6644	279870	195735	4314335
1995-96	1171993	1137114	108266	208171	21242	119059	176948	410288	184389	617384	36497	8528	189113	34701	90348	7507	289165	246169	5056882
1996-97	1013178	1111095	107429	161675	19442	118167	169408	344287	180110	704547	45201	10916	179087	23482	90119	7318	302170	263174	4850805
1997-98	1214579	1349183	109795	173503	23664	117664	194599	297327	192807	622309	45267	14837	166800	22355	91943	6357	269850	255433	5168272
1998-99	1306247	1746531	116386	209698	25328	177866	257856	279416	225022	665957	59187	21901	198560	27102	92658	4804	329403	332355	6076277
1999-00	1371085	1839419	129976	249256	28776	165787	266918	323250	261778	761448	76507	21313	195647	30266	92015	9445	384729	399614	6607229
2000-01	1532459	1834285	129058	275367	26781	170434	281616	410513	332565	894775	88970	19126	218565	31123	97892	10247	371203	525480	7250459
2001-02	1785074	1844610	125420	340206	23170	140351	291256	484758	319542	1197115	86541	20533	210833	35836	104363	6916	354607	526840	7897971
2002-03	1870007	1918343	123209	316680	23795	147371	286874	476050	320057	1269236	89694	24030	206384	35707	101506	4505	341832	527729	8083009
2003-04	1809500	1902201	132163	364609	25725	162930	334579	512203	345614	1295850	86632	25245	230945	38088	116586	6464	346306	642292	8377932
2004-05	1933146	2033879	133150	366915	26243	164223	358791	505510	348718	1365695	90659	22523	233941	35972	111609	6441	360084	653930	8751429
2005-06	2014453	2345008	141837	394412	27780	206813	385572	553386	370557	1319026	94716	24179	245439	38820	110395	5533	386898	744746	9409570
2006-07	2219257	2484753	160840	395676	29404	204829	388869	663767	360134	1400161	100206	26317	245300	41942	130434	8694	360865	668886	9890334
2007-08	2422289	2635180	162035	446432	29801	220467	391126	690986	388315	1455204	110829	25781	266249	42320	135155	5037	376387	653323	10456916
2008-09	2441363	2566509	164074	452661	29975	228140	411378	738674	393189	1511453	119631	26121	270866	43214	124291	4628	379322	661964	10567453

Source :Settlement and Land Record Department

Appendix Table 4.21 Myanmar; Selected Pulses Yield (1962-63 to 2008-09)

Year	Black gram	Green gram	Butter bean	Bocate	Sultani	Sultapya	Soybean	Pigeon Pea	Union
1988/89	9.81	6.28	14.48	8.94	7.79	8.59	9.96	8.29	8.00
1989/90	8.86	6.42	15.16	8.65	9.13	8.07	10.01	8.06	8.28
1990/91	9.12	7.15	13.68	8.82	10.41	8.59	10.05	7.63	8.53
1991/92	9.33	7.59	14.91	9.40	9.94	8.34	10.09	7.52	8.83
1992/93	9.05	7.58	14.43	9.38	9.14	8.73	10.09	8.35	8.19
1993/94	8.90	7.46	14.25	8.62	9.44	7.79	9.70	7.89	8.58
1994/95	9.77	8.94	10.51	9.16	9.44	7.86	10.32	7.70	7.79
1995/96	9.72	9.16	10.86	9.39	8.72	8.07	11.39	7.47	8.42
1996/97	9.95	9.30	12.00	9.90	9.58	8.40	11.30	8.32	8.41
1997/98	10.78	10.24	12.10	10.50	10.00	9.50	11.90	9.00	8.04
1998/99	10.54	8.55	11.82	10.04	9.94	8.11	10.37	7.69	9.46
1999/00	9.86	8.35	12.00	10.05	10.00	9.48	11.37	7.65	8.64
2000/01	10.78	9.12	12.60	11.41	10.98	10.64	11.99	11.10	9.77
2001/02	10.96	9.65	13.05	10.39	12.19	11.31	12.68	11.95	9.89
2002/03	10.90	9.91	13.78	10.47	12.27	12.56	13.23	10.67	10.62
2003/04	12.53	10.84	14.01	10.92	12.90	13.19	13.63	11.47	11.38
2004/05	14.47	11.91	14.00	11.59	13.45	14.03	14.29	12.47	12.11
2005/06	15.52	12.36	14.20	12.15	13.63	14.13	15.00	14.14	12.14
2006/07	16.57	13.00	14.13	12.84	13.80	15.01	16.07	14.33	12.69
2007/08	17.46	13.91	14.63	14.01	14.46	15.24	16.99	15.37	12.89
2008/09	18.14	14.79	15.46	14.38	15.04	15.41	18.15	15.75	13.01

Source :Settlement and Land Record Department

Appendix table 5.1 Production, Procurement, Export and Domestic

Utilization of Rice in Myanmar

Year	Sown Area (Thousand acres)	Production (000' MT)	Yield per- acre (Basket)	Procurement (000'MT)	Export (000' MT)	Domestic Use Husked rice (000 MT)
1987-88	11530	11548	59.8	491	196	6732.8
1988-89	11807	13164	56	1672	47	7851.4
1989-90	12057	13803	57	1482	166	8115.8
1990-91	12220	13968	57	1851	132	8248.8
1991-92	11935	13201	56	2095	180	7740.6
1992-93	12684	14837	57	2222	199	8703.2
1993-94	14021	16759	59	1939	261	9794.4
1994-95	14643	18194	61	2034	1041	9875.4
1995-96	15166	17952	58	1934	354	10417.2
1996-97	14518	17675	59	1522	93	10512
1997-98	14294	16654	59	1601	28	9964.4
1998-99	14230	17077	61	2200	120	10126.2
1999-00	15528	20125	63	2212	55	12020
2000-01	15713	21323	66	2126	251	12542.8
2001-02	15940	21914	66	2199	939	12209.4
2002-03	16032	21804	66	2066	793	12289.4
2003-04	16168	23135	68	-	168	13713
2004-05	16946	24751	70	-	182	14668.6
2005-06	18259	27682	73	-	180	16429.2
2006-07	20076	30922	74	-	15	18538.2
2007-08	19989	30954	76.14	-	357	18215.4
2008-09	20001	32058	78.21	-	666	18568.8

Source : Settlement and Land record department

Appendix Table 5.2.a Direction of Myanmar Rice Export

S.N	Country of Destination	Unit(3)	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
1	South East Asia	K	25.1	1.91	45.51	17.07	69.92	5.07	14.13	743.86	323.36	63.27	2.08
	Malaysia	Ton	32	2	28	15	46	4	16	635	261	47	1
		k	15.81			10.46							
	Indonesia	Ton	17			10							
		K											
		Ton					50.42			717.45	204.03	15.95	
	Singapore	K	9.29	1.91	27.09	6.61	34			613	169	12	
		Ton	15	2	17	5	5.86	5.07	12.81	26.41	0.25	17.44	2.08
	Vietnam	K					4	4	14	22		12	1
		Ton											
	Canbodia	K			18.42		10.41						
		Ton			11		6						
	Philippines	K											
		Ton									119.08	29.88	
	Others	K									92	23	
		Ton					3.23		1.32				
							2		2				
2	REST OF ASIA	K	83.28	10.23	120.41	18.12	75.7	92.36	63.93	107.99	54.65	28.79	35.34
		Ton	109	11	77	66	56	74	57	99	44	20	27
	China,People"s	K	61.23	7.34	54.31								
		Ton	73	9	39						23.56		
	Sri lanka	K	2.61		49.38	66.98	54.22	79.68	38.88	66.44	18		
		Ton	3		28	55	40	64	35	59			14.61
	India	K	3.55						4.33				11
		Ton	16						4				

Appendix Table 5.2.a Direction of Myanmar Rice Export (Contd.)

S.N	Country of Destination	Unit(3)	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
	Maldives	K	7.7	2.89	16.72	14.14	9.67	12.68	11.99	8.06	6.86	28.79	4.99
		Ton	7	2	10	10	7	10	10	7	6	20	4
	Korea , Republic	K					11.81						
		Ton					9						
	Bangladesh	K											
		Ton								33.49	24.23		15.69
	Others	K	8.19							33	20		12
		Ton	10						8.73				0.05
3	MIDDLE EAST	K	24.34										
		Ton	21		9.89	5.49		9.46	3.63			0.64	
	Iran	K			5	3		6	3				
		Ton											
	Oman	K	11.25			5.49						0.52	
		Ton	10			3		8.54					
	Others	K	13.09		9.89			5					
		Ton	11		5			0.92	3.63			0.12	
4	AMERICA	K						1	3				
		Ton				14.59	19.9				33.76		
	United States	K				10	11			15	26		
		Ton								13.68			
										15			

Appendix Table 5.2.a Direction of Myanmar Rice Export (Contd.)

S.N	Country of Destination	Unit(3)	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
	Brazil	K											
		Ton											
	Others	K				14.59	19.9				33.76		
		Ton				10	11				26		
5	EUROPE	K	6.45	9.83	9.97				7.3	25.12		1.98	0.09
		Ton	6	10	5				11	30		1	
	Belgium	K		9.83									
		Ton		10									
	Netherlands	K	6.45									0.04	0.09
		Ton	6										
	Yugoslavia	K			9.97								
		Ton			5								
	Others	K							7.3	25.12		1.94	
		Ton							11	30		1	
6	AFRICA	K	114.81	31.9	80.48	53.89	85.45	142.32	178.67	288.82	28.03	31.1	0.2
		Ton	152	24	51	40	67	112	178	277	23	25	
	Sierra Leone	K	3.13				16.73						
		Ton	3				12						
	Mauritius	K		15.08	29.96		13.29	27.04					
		Ton		10	20		10	22			12.6	12.88	
	Canbia	K	25.16		13.04		6.36	0.75			10	10	
		Ton	43		10		5	1					

Appendix Table 5.2.a Direction of Myanmar Rice Export (Contd.)

S.N	Country of Destination	Unit(3)	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
	Ivory Coast	K	11.25				2.25	34.51	28.42	9.95			
		Ton	12				2	27	25	10			
	G uinea	K	6.13	5.1				5.06	10.17				
		Ton	7	5				4	12				
	Others	K	69.14	11.72	37.48	53.89	46.82	74.96	140.08	278.87	15.43	18.22	0.2
		Ton	87	9	21	40	38	58	141	267	13	15	
7	OCEANIA	K											
		Ton											
	Total	K	253.98	53.87	266.26	172.16	250.97	249.21	267.66	1165.79	439.8	125.78	37.71
		Ton	320	47	166	134	180	196	265	1041	354	93	28

Source: Myanmar Agriculture Produce Trading, Custom Department and Statical Year Book, Various Issue.

Appendix Table 5.2.b Direction of Myanmar's Rice Export

S.N	Country of Destination	Unit(3)	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
1	South East Asia	K	97.94	23.62	31.23	298.18	259.32	60.63	27.13	58.02	3.05	82.33	72.48
		Ton	66	20	46	367	321	78	28	49	3	55	43
	Malaysia	k	0.09	0.49	5.41	39.57	46.33	21.97	2.19	36.71			28.48
		Ton			7	48	58	27	3	31			17
	Indonesia	K	76.89	14.88	22.03	168.32	169.54	15.65	1.66	0.54			
		Ton	52	12	33	201	203	18	1	1			
	Singapore	K	20.96	8.25	3.78	76.98	33.29	22.71	23.28	20.77	3.05	82.33	41.07
		Ton	14	8	6	94	40	32	24	17	3	55	24
	Vietnam	K			0.01		3.52	0.3					
		Ton					12	1					
	Canbodia	K											
		Ton											
	Philippines	K				2.98	6.64						
		Ton				11							
	Others	K				10.42	6.64						1.68
		Ton				13	8						1

Appendix Table 5.2.b Direction of Myanmar's Rice Export (Contd.)

S.N	Country of Destination	Unit(3)	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
2	REST OF ASIA	K	28.32	14.06	156	44.99	29.95	42.28	53.21	35.8		299.86	385.77
		Ton	20	23	174	55	35	53	48	31		194	230
	China, People's	K		0.29		1.27							6.06
		Ton				1							4
	Sri Lanka	K											16.95
		Ton											8
	India	K		3.51		3.8	4.83	0.15		21.27		2.5	22.58
		Ton		6		3	6	*		17		1	14
	Maldives	K	12.42										
		Ton	8										
	Korea, Republic	K						11.65	8.25				3.58
		Ton						14	8				2
	Bangladesh	K	15.27	10.26	156	35.86	24.69	30.48	33.7	12.15		297.36	336.6
		Ton	11	17	174	47	29	39	39	12		193	202
	Others	K	0.63			4.06	0.43		1.26	2.38			
		Ton	1			4			1	2			
3	MIDDLE EAST	K			0.12	291.71	272.61	24.26	69.4	107.84	14.99	64.74	20.48
		Ton				367	350	33	66	90	12	44	12

Appendix Table 5.2.b Direction of Myanmar's Rice Export (Contd.)

S.N	Country of Destination	Unit(3)	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
	Iran	K								16.85			
		Ton								13			
	Oman	K											
		Ton											
	Others	K				291.71	272.61	24.26	69.4	90.99	14.99	64.74	20.48
		Ton				367	350	33	66	77	12	44	12
4	AMERICA	K	0.05			6.52	25.93	0.04					
		Ton				8	31	*					
	United States	K				6.52	25.93						
		Ton				8	31						
	Brazil	K											
		Ton											
	Others	K	0.05					0.04					
		Ton						*					
5	EUROPE	K	5.13	27.26	2.06	44.38	8.39	3.23	31.19	1.37		10.77	8.4
		Ton	3	12	6	57	14	4	31	1		7	4
	Belgium	K			2.05		5.11						8.08
		Ton			6		10						4
	Netherlands	K											
		Ton											

Appendix Table 5.2.b Direction of Myanmar's Rice Export (Contd.)

S.N	Country of Destination	Unit(3)	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
	Yugoslavia	K											
		Ton											
	Others	K	5.13	27.26	0.01	44.38	3.28	3.23	31.19	1.37		10.77	3.32
		Ton	3	12		57	4	4	31	1		7	*
6	AFRICA	K	35.35		18.2					11		94.8	624.8
		Ton	31		25					9		58	377
	Sierra Leone	K											
		Ton											
	Mauritius	K											
		Ton											
	Cambodia	K											
		Ton											
	Ivory Coast	K											290.43
		Ton											178
	G uinea	K											
		Ton											
	Others	K	35.35		18.2					11		94.8	334.37
		Ton	31		25					9		58	199
7	OCEANIA	K				68.36	36.45		9.3				
		Ton				85	42		9				
	Total	K	166.79	64.94	207.64	754.14	632.65	130.44	180.23	214.03	18.04	552.5	1111.93
		Ton	120	55	251	939	793	168	182	180	15	358	666

Source: Myanmar Agriculture Produce Trading, Custom Department and Statistical Year Book, Various Issue.

Appendix table 5.3 Regional Direction of Myanmar's Rice Export.

S.N	Country of Destination	Unit	1987- 88	1988- 89	1989- 90	1990- 91	1991- 92	1992- 93	1993- 94	1994- 95	1995- 96	1996- 97	1997- 98	1998- 99	1999- 2000	2000- 01	2001- 02	2002- 03	2003- 04	2004- 05	2005- 06	2006- 07	2007- 08	2008-09
1	South East Asia	K	25.10	1.91	45.51	17.07	69.92	5.07	14.13	743.86	323.36	63.27	2.08	97.94	23.62	31.23	298.18	259.32	60.63	27.13	58.02	3.05	82.33	72.48
		Ton	32.00	2.00	28.00	15.00	46.00	4.00	16.00	635.00	261.00	47.00	1.00	66.00	20.00	46.00	367.00	321.00	78.00	28.00	49.00	3.00	55.00	43.00
2	REST OF ASIA	K	83.28	10.23	120.41	18.12	75.70	92.36	63.93	107.99	54.65	28.79	35.34	28.32	14.06	156.00	44.99	29.95	42.28	53.21	35.80		299.86	385.77
		Ton	109.00	11.00	77.00	66.00	56.00	74.00	57.00	99.00	44.00	20.00	27.00	20.00	23.00	174.00	55.00	35.00	53.00	48.00	31.00		194.00	230.00
3	MIDDLE EAST	K	24.34		9.89	5.49		9.46	3.63			0.64				0.12	291.71	272.61	24.26	69.40	107.84	14.99	64.74	20.48
		Ton	21.00		5.00	3.00		6.00	3.00								367.00	350.00	33.00	66.00	90.00	12.00	44.00	12.00
4	AMERICA	K				14.59	19.90				33.76			0.05			6.52	25.93	0.04					
		Ton				10.00	11.00			15.00	26.00						8.00	31.00	*					
5	EUROPE	K	6.45	9.83	9.97				7.30	25.12		1.98	0.09	5.13	27.26	2.06	44.38	8.39	3.23	31.19	1.37		10.77	8.40
		Ton	6.00	10.00	5.00				11.00	30.00		1.00		3.00	12.00	6.00	57.00	14.00	4.00	31.00	1.00		7.00	4.00
6	AFRICA	K	114.81	31.90	80.48	53.89	85.45	142.32	178.67	288.82	28.03	31.10	0.20	35.35		18.20					11.00		94.80	624.80
		Ton	152.00	24.00	51.00	40.00	67.00	112.00	178.00	277.00	23.00	25.00		31.00		25.00					9.00		58.00	377.00
7	OCEANIA	K															68.36	36.45		9.30				
		Ton															85.00	42.00		9.00				
8	Total	K	253.98	53.87	266.26	172.16	250.97	249.21	267.66	1165.79	439.80	125.78	37.71	166.79	64.94	207.64	754.14	632.65	130.44	180.23	214.03	18.04	552.50	1111.93
		Ton	320.00	47.00	166.00	134.00	180.00	196.00	265.00	1041.00	354.00	93.00	28.00	120.00	55.00	251.00	939.00	793.00	168.00	182.00	180.00	15.00	358.00	666.00

Source: Statistical Year Book , Various Issue.

Appendix Table 5.4a Top export and import countries in the world for Rice Milled Price in 2008

Export Rank	countries	Export unit value (\$/tonne)	Import Rank	Countries	Import Unit value (\$/tonne)
1	Thailand	618	1	Philippines	215.71
2	Viet Nam	611.58	2	United Arab Emirates	1172.68
3	Pakistan	618.58	3	Iran (Islamic Republic of)	1015.49
4	India	1041.69	4	Saudi Arabia	1250.59
5	United States of America	710.78	5	Malaysia	741.56
6	China	464.3	6	Bangladesh	346.51
7	Italy	1083.12	7	Iraq	556.61
8	United Arab Emirates	987.85	8	South Africa	727.22
9	Uruguay	635.45	9	Côte d'Ivoire	611.42
10	Brazil	686.44	10	United States of America	911.53
11	Argentina	596.76	11	China, Hong Kong SAR	747.73
12	Egypt	511.69	12	China	641.87
13	Guyana	543.43	13	Oman	1131.15
14	Spain	1091.56	14	Yemen	764.84
15	Greece	788.71	15	Haiti	742.94
16	Paraguay	600.59	16	Canada	833.12
17	France	1327.58	17	Brazil	548.3
18	Australia	1114.78	18	Singapore	810.32
19	Myanmar	570.64	19	United Kingdom	1070.92
20	Oman	816.99	20	France	1290.34
21	United Kingdom	1886.58	49	Myanmar	493.83

Source: Calculated from FAOSTAT

Appendix Table 5.4b Myanmar Export and Import of Rice

Year	Import Value (1000 \$)	Export Value (1000 \$)
1988	0	8324
1989	0	38619
1990	0	53000
1991	0	39654
1992	0	40868
1993	0	43286
1994	0	209000
1995	0	77370
1996	245	20879
1997	560	6032
1998	295	26354
1999	1720	10319
2000	2680	31970
2001	2000	111607
2002	2000	95523
2003	1700	55000
2004	3600	31378
2005	559	37329
2006	3547	17306
2007	1076	91079
2008	40000	23920
2009	11500	23353

Source: FAOSTAT

Appendix table 5.5. Domestic Utilization and Exportable Surplus of Beans and Pulses

Year	Sown Area	All production (metric tons)	Exports (metric tons)	Domestic Utilization (metric tons)
1962/63	1,710,237	348,168.21	128,278.00	219,890.21
1963/64	1,855,191	381,477.91	74,995.00	306,482.91
1964/65	1,609,429	292,921.86	142,990.00	149,931.86
1965/66	1,706,721	301,355.52	76,507.00	224,848.52
1966/67	1,766,973	269,099.75	88,871.00	180,228.75
1967/68	1,615,757	277,430.92	64,860.00	212,570.92
1968/69	1,751,075	325,774.18	47,214.00	278,560.18
1969/70	1,630,677	283,382.12	55,180.00	228,202.12
1970/71	1,577,009	297,566.60	57,515.00	240,051.60
1971/72	1,854,457	342,373.05	64,102.00	278,271.05
1972/73	1,861,084	293,940.89	91,366.00	202,574.89
1973/74	1,688,996	291,405.92	33,228.00	258,177.92
1974/75	1,785,485	318,343.17	27,564.00	290,779.17
1975/76	1,655,879	288,665.04	37,174.00	251,491.04
1976/77	1,665,241	353,199.57	32,109.00	321,090.57
1977/78	1,749,242	397,767.12	30,667.00	367,100.12
1978/79	1,809,476	399,304.08	24,045.00	375,259.08
1979/80	1,720,607	404,566.46	62,320.00	342,246.46
1980/81	1,994,613	453,295.35	69,970.00	383,325.35
1981/82	2,112,637	563,748.69	84,769.00	478,979.69
1982/83	1,899,940	530,551.03	101,829.00	428,722.03
1983/84	2,164,014	670,623.37	64,259.00	606,364.37
1984/85	2,193,020	647,852.47	57,901.00	589,951.47
1985/86	2,249,231	670,748.06	87,477.00	583,271.06
1986/87	2,072,913	660,889.33	84,405.00	576,484.33
1987/88	2,022,193	614,950.61	72,995.00	541,955.61
1988/89	1,802,961	418,060.83	17,104.00	400,956.83
1989/90	2,116,236	510,983.31	56,063.00	454,920.31
1990/91	2,470,507	613,931.45	194,500.00	419,431.45
1991/92	3,126,279	782,422.48	195,167.00	587,255.48
1992/93	3,699,971	951,968.84	449,000.00	502,968.84
1993/94	3,753,310	933,611.32	514,000.00	419,611.32
1994/95	4,314,335	1,171,987.69	425,000.00	746,987.69
1995/96	5,056,882	1,415,850.52	610,000.00	805,850.52
1996/97	4,850,805	1,411,117.68	595,000.00	816,117.68

Appendix table (5.5.) Domestic Utilization and Exportable
Surplus of Beans and Pulses (Contd.)

Year	Sown Area	All production (metric tons)	Exports (metric tons)	Domestic Utilization (metric tons)
1997/98	5,168,272	1,645,177.88	769,000.00	876,177.88
1998/99	6,076,277	1,735,168.77	621,000.00	1,114,168.77
1999/00	6,607,229	1,882,699.72	561,000.00	1,321,699.72
2000/01	7,250,459	2,330,760.91	831,000.00	1,499,760.91
2001/02	7,897,971	2,735,805.80	1,035,000.00	1,700,805.80
2002/03	8,083,009	2,841,743.83	1,038,000.00	1,803,743.83
2003/04	8,377,932	3,187,683.01	1,211,000.00	1,976,683.02
2004/05	8,751,429	3,634,945.41	873,000.00	2,761,945.41
2005/06	9,409,570	4,127,435.37	865,000.00	3,262,435.37
2006/07	9,890,334	4,575,438.90	1,156,000.00	3,419,438.90
2007/08	10,456,916	5,123,563.63	1,141,000.00	3,982,563.63
2008/09	10,567,453	5,426,203.40	1,451,000.00	3,975,203.40

Source: Statistical Yearbook, Various Issue, CSO and Myanmar Agricultural Statistics, Various Issue Department of Agricultural Planning ,Ministry of Agriculture and Irrigation

Appendix table 5.6 Important Beans and Pulses Export

Unit- MT (000)

	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09
(Black gram)	12.2	26.5	58	79.8	148.1	133	117.4	185	209.2	307.6	n.a	235	267.1	314.4	310.4	439	407.2	379.6	487.1	494.4	529.8
(Chick pea)	0.9	2.4	38.1	0	64.5	74.9	13.5	14.8	9.6	15.8	n.a	0.4	18.8	45	73.1	86	53.7	31	58.5	114.8	85.6
(Green gram)	0.5	14.5	47.2	66.5	85.8	108.7	128.2	185.9	127.4	120.7	n.a	147.6	186	207.3	205.4	232.9	143.6	174	248.5	178.9	264.8
(Pigeon pea)	-	6.5	35.5	20.2	108.8	132.8	109.6	142.3	-	-	n.a	89.1	244.3	386.2	362.3	336.9	193.9	203.2	266.7	269.9	471.8
(Soy Bean)	-	-	-	1.3	1.3	1.6	0.2	0.5	0.2	0.3	n.a	0.3	-	4.7	2.5	4.8	0.6	0.7	0	1.4	0.6
Butter	2.2	3.6	5.8	9.8	12.1	15.4	9.7	12.5	13.3	11.4	n.a	9.2	-	8.3	11.3	15.3	12.2	11.5	15.4	15.1	15.9
Others	31.2	112.4	26	2.4	28.5	47.7	46.4	69	235.4	313.3	n.a	79.5	114.7	69.2	73	96.1	61.9	65	79.7	66.6	82.9
All Beans	47	166	210.6	180	449	514	425	610	595	769	622	561	831	1,035.00	1,038.00	1,211.00	873	865	1,156.00	1,141.00	1,451.40

Source: 1) Statistical Yearbook, 1993; 2009 CSO,

2) Myanmar Agricultural Statistics (1987-88 to 1997-98), CSO and DAP

3) Myanmar Agricultural Statistics (1992-93 to 2004-05), CSO and DAP

4) Myanmar Agricultural Statistics (1997-98 to 2009-10), CSO and DAP

Appendix Table 5.7a Export Destinations and total Volume and Value of Beans and Pulses

(Kyat in Thousands)

Importing Countries	1991-92		1992-93		1993-94		1994-95		1995-96		1996-97		1997-98		1999-00	
	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat
India	93,421	209,205	250,044	360,441	314,546	422,467	267,530	487,775	395,492	872,835	225,247	462,442	320,159	581,681	322,920	713,673
Singapore	28,231	65,896	32,758	57,691	34,523	58,422	27,918	56,260	58,934	135,265	432,39	92,895	29,008	67,076	31,035	62,299
Indonesia	735	1,337	5,094	9,021	21,150	37,299	44,502	87,245	33,114	67,655	37,880	80,650	39,085	75,899	58,324	119,633
Korea	1,796	3,398	4,698	7,774	6,231	11,382	5,616	11,381	11,399	24,459	6,921	13,216	7,773	14,890	4,723	9,321
Malaysia	31,563	60,431	113,683	161,996	61,527	81,674	32,339	64,819	41,121	96,128	-	77,452	34,687	65,453	14,341	22,785
Japan	5,968	11,244	6,707	11,211	16,819	25,614	10,352	21,539	17,235	43,812	20,320	51,013	22,398	51,256	20,819	43,291
UAE	18,567	48,012	16,132	28,756	21,836	32,821	15,575	31,556	17,052	45,495	14,566	41,518	13,647	32,740	14,501	31,180
China	0	0	1,906	3,332	100	241	720	1,553	19	39	0	0	533	888	10,154	17,643
Thailand	168	371	0	0	0	0	505	1,119	0	0	660	1,734	840	2,530	273	431
Other Countries	2,316	4,404	20	31	0	0	100	192	0	0	100	270	2,417	4,056	992	2,181
Total Export	10,730	28,433	19,341	27,574	41,801	60,107	21,969	42,876	44,326	97,901	42,535	97,704	44,512	92,567	36,854	70,130
	193,495	432,731	450,383	667,827	518,533	730,027	427,126	806,315	618,692	1,383,589	427,540	918,894	515,059	989,036	514,936	1,092,567

Source: 1) Statistical Yearbook, 1993; 2009 CSO,
2) Myanmar Agricultural Statistics (1987-88 to 1997-98), CSO and DAP
3) Myanmar Agricultural Statistics (1992-93 to 2004-05), CSO and DAP
4) Myanmar Agricultural Statistics (1997-98 to 2009-10), CSO and DAP

Appendix Table 5.7b Export Destinations and total Volume and Value of Beans and Pulses

(Kyat in Thousands)

Exporting Country	2000-01		2001-02		2002-03		2003-04		2004-05		2005-06		2006-07		2007-08		2008-09		2008-09	
	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat	MT	Kyat
India	507,255	980,161	791,352	1,404,065	823,053	1,359,694	877,588	1,214,910	###	800,939	623,094	1,332,521	879,543	2,604,836	813,894	2,412,897	1,072,480	2,959,021		
Singapore	36,686	75,847	27,093	55,675	30,919	56,675	28,239	43,608	34,207	54,310	34,322	76,541	52,675	166,918	71,267	233,653	154,235	455,796		
Indonesia	54,578	106,930	41,289	81,283	30,329	48,909	61,176	91,108	32,426	50,108	31,892	74,328	26,771	88,991	31,005	99,530	33,116	93,010		
Korea																				
Pakistan	5,864	14,352	6,147	12,328	7,509	16,079	10,221	18,655	8,730	15,472	8,736	20,006	9,955	31,822	8,284	27,692	7,676	24,758		
Malaysia	32,438	76,260	52,781	103,271	36,813	61,086	50,660	66,341	58,320	88,591	48,211	102,342	65,394	215,865	58,627	175,431	31,288	88,345		
Japan	24,936	59,303	24,521	56,553	23,095	45,809	31,853	48,637	37,713	63,378	31,192	75,886	29,457	106,759	31,964	108,985	34,472	102,930		
UAE	6,785	24,417	9,372	21,347	20,322	18,406	18,946	49,648	17,059	18,296	11,848	23,397	13,012	36,055	14,154	41,752	15,888	43,652		
China	6,508	12,967	7,234	14,664	6,892	12,667	7,138	11,025	4,745	7,133	4,198	8,269	5,465	17,367	16,195	57,403	14,639	49,579		
Thailand	848	2,006	656	1,299	979	1,718	6,507	11,058	12,142	20,328	4,314	8,549	8,706	21,842	9,383	31,208	12,856	34,455		
Other Countries	0	0	424	853	620	1,014	3,618	5,455	7,160	12,626	6,274	14,326	2,367	7,907	6,741	22,549	3,633	11,088		
Total Export	40,353	88,034	74,940	147,227	57,656	138,603	115,373	171,084	80,868	912,482	60,925	140,663	62,718	199,840	80,457	252,069	71,207	205,966		
	716,251	1,440,277	1,035,809	1,898,565	1,038,187	1,760,660	1,211,319	1,731,529	873,123	1,283,936	865,006	1,876,828	1,156,063	3,498,202	1,141,971	3,463,169	1,451,490	4,068,600		

Source: 1) Statistical Yearbook, 1993; 2009 CSO,

2) Myanmar Agricultural Statistics (1987-88 to 1997-98), CSO and DAP

3) Myanmar Agricultural Statistics (1992-93 to 2004-05), CSO and DAP

4) Myanmar Agricultural Statistics (1997-98 to 2009-10), CSO and DAP

Appendix Table 5.8 Production of Beans and Pulses among ASEAN Countries

(Unit: Thousand MT)

	1997	1998	2004	2005	2006	2007	2008
Cambodia	15.3	9.2	45.3	45.0	59.9	54.5	38.6
Indonesia	263.2	307.6	311.4	322.0	328.4	321.0	326.0
Lao PDR	14.5	14.7	16.1	17.9	17.7	16.9	18.3
Myanmar	1,297.7	1,429.9	2,778.4	3,124.6	3,549.8	3,551.4	3,551.4
Philippines	58.0	58.0	56.3	56.7	55.6	59.4	62.0
Thailand	247.9	275.9	214.9	213.0	192.5	193.3	193.3
Timor-Leste	6.1	4.4	4.5	4.5	4.5	4.5	4.5
Viet Nam	230.0	245.1	252.8	255.0	255.0	255.0	255.0

Source: Selected Indicators of Food and Agricultural Development in the Asia-Pacific Region
1999-2009, FAO, 2010

Appendix Table 5.9 Top importing and exporting countries and unit prices in the world for Bean (dry) in 2008.

Ranks	countries	Import Unit value (\$/tonne)	Ranks	countries	Export Unit value (\$/tonne)
1	India	660	1	China	811
2	Brazil	1009	2	Myanmar	615
3	United States of America	1012	3	United States of America	827
4	Italy	1225	4	Argentina	1154
5	United Kingdom	868	5	Canada	875
6	Japan	1073	6	Nicaragua	1382
7	Mexico	978	7	Colombia	1330
8	Spain	1424	8	Ethiopia	667
9	Venezuela (Bolivarian Republic of)	1156	9	Netherlands	2390
10	France	1283	10	Bolivia (Plurinational State of)	1210
11	Algeria	1107	11	Thailand	787
12	Turkey	1093	12	Peru	1046
13	China	537	13	Mexico	1323
14	Cuba	775	14	United Kingdom	444
15	Costa Rica	1032	15	Egypt	691
16	Angola	1014	16	Belgium	1020
17	Canada	986	17	United Arab Emirates	804
18	Portugal	1070	18	Kyrgyzstan	596
19	South Africa	636	19	Australia	834
20	United Arab Emirates	812	20	Portugal	1373

The data import of Algeria, Cuba and Angola is estimated data using trading partners database. The Export data of Myanmar and Egypt is estimated data using trading partners database.

Source: Calculated from FAOSTAT

Appendix Table 5.10 Export Supply Function of Rice

Year	Export (000' MT)	Production1/ (000' MT)	Production Index (2005=100)	Unit value (\$/tonne, Export Price)	Export Unit Value Index (2005=100)	Mkt Ex rate (from Prof DYE)	Ex Rate Index	CPI (2005=100)	Domestic Price (in US\$)	Relative Price
1989-90	166	13803	49.86	229.6017	110.9306	61	0.057656	3.207019	0.184904	599.94
1990-91	132	13968	50.46	248.1273	119.8812	63	0.059546	3.772313	0.224627	533.69
1991-92	180	13201	47.69	221.5685	107.0494	83	0.07845	4.989716	0.391443	273.47
1992-93	199	14837	53.60	205.5734	99.3215	108	0.102079	6.083122	0.620961	159.95
1993-94	261	16759	60.54	164.899	79.66993	118	0.111531	8.019478	0.894422	89.07
1994-95	1041	18194	65.73	223.8135	108.1341	116	0.109641	9.952075	1.091154	99.10
1995-96	354	17952	64.85	218.6829	105.6552	114	0.10775	12.45947	1.342514	78.70
1996-97	93	17675	63.85	226.128	109.2523	147	0.138941	14.4873	2.012886	54.28
1997-98	28	16654	60.16	213.1449	102.9796	209	0.197543	18.78963	3.711751	27.74
1998-99	120	17077	61.69	218.887	105.7539	318	0.300567	28.46395	8.555326	12.36
1999-00	55	20125	72.70	189.9704	91.78297	344	0.325142	33.70161	10.9578	8.38
2000-01	251	21323	77.03	127.1679	61.44034	373	0.352552	33.66482	11.8686	5.18
2001-02	939	21914	79.16	118.8446	57.41903	624	0.589792	40.76853	24.04496	2.39
2002-03	793	21804	78.77	120.3819	58.16173	933	0.881853	64.03698	56.47117	1.03
2003-04	168	23135	83.57	141.7526	68.48686	977	0.92344	87.46792	80.77142	0.85
2004-05	182	24751	89.41	172.1844	83.18981	910	0.860113	91.43391	78.64353	1.06
2005-06	180	27682	100.00	206.9778	100	1058	1	100	100	1.00
2006-07	15	30922	111.70	242.8351	117.3242	1282	1.21172	119.9965	145.4022	0.81
2007-08	357	30954	111.82	253.9749	122.7064	1301	1.229679	162.0248	199.2384	0.62
2008-09	666	32058	115.81	570.6431	275.7026	1197	1.13138	205.4467	232.4382	1.19

Source : Own calculation

continued

Appendix Table 5.10 Export Supply Function of Rice (continued)

Off Ex Rate	Off Ex Rate Index (2005=1)	Domestic Price (in US\$)	Relative Price	Year	X Export (000' MT)	PX Relative Price	Y Production Index (2005=100)
6.639521	1.152496	3.696076	30.01307	1989-90	166	599.94	49.86273
6.275535	1.089315	4.109237	29.17358	1990-91	132	533.69	50.45878
6.221266	1.079895	5.388367	19.86677	1991-92	180	273.47	47.68803
6.042793	1.048915	6.38068	15.56597	1992-93	199	159.95	53.59801
6.09383	1.057774	8.482797	9.391941	1993-94	261	89.07	60.54115
5.944558	1.031863	10.26918	10.52996	1994-95	1041	99.10	65.72502
5.610609	0.973896	12.13423	8.707205	1995-96	354	78.70	64.85081
5.860917	1.017345	14.73858	7.412674	1996-97	93	54.28	63.85016
6.183836	1.073398	20.16874	5.105901	1997-98	28	27.74	60.16184
6.273847	1.089022	30.99786	3.411651	1998-99	120	12.36	61.68991
6.223347	1.080256	36.40636	2.52107	1999-00	55	8.38	72.70067
6.425719	1.115384	37.5492	1.636263	2000-01	251	5.18	77.02839
6.68407	1.160229	47.30083	1.213912	2001-02	939	2.39	79.16336
6.573417	1.141022	73.06757	0.795999	2002-03	793	1.03	78.76599
6.076379	1.054745	92.25636	0.742354	2003-04	168	0.85	83.57416
5.74594	0.997387	91.195	0.912219	2004-05	182	1.06	89.41189
5.760993	1	100	1	2005-06	180	1.00	100
5.783831	1.003964	120.4722	0.97387	2006-07	15	0.81	111.7044
5.559682	0.965056	156.363	0.784753	2007-08	357	0.62	111.82
5.387509	0.93517	192.1276	1.434998	2008-09	666	1.19	115.8081

Source : Own calculation.

Appendix Table 5.11 Export Demand Function of Rice

Year	X Rice Export (000' MT)	PX Myanmar Export Unit Value Index for Rice (2005=100)	PXW World Weighted Export Value Index (2005=100)	YW World Income (US\$ in Million)	Year	X	PX/PXW	YW
1989-90	166	110.93	16.05	161015.6	1989-90	166	6.911145	161015.6
1990-91	132	119.88	18.48	171907.8	1990-91	132	6.485548	171907.8
1991-92	180	107.05	22.66	187261	1991-92	180	4.723267	187261
1992-93	199	99.32	25.96	209069.3	1992-93	199	3.826191	209069.3
1993-94	261	79.67	29.43	233480.4	1993-94	261	2.707147	233480.4
1994-95	1041	108.13	36.25	260303.5	1994-95	1041	2.983272	260303.5
1995-96	354	105.66	45.20	287019.1	1995-96	354	2.337363	287019.1
1996-97	93	109.25	44.73	311256.6	1996-97	93	2.442433	311256.6
1997-98	28	102.98	46.72	327894.4	1997-98	28	2.204352	327894.4
1998-99	120	105.75	44.63	332639.2	1998-99	120	2.369511	332639.2
1999-00	55	91.78	47.85	354710.2	1999-00	55	1.918201	354710.2
2000-01	251	61.44	56.91	380624.6	2000-01	251	1.079538	380624.6
2001-02	939	57.42	54.36	405386.9	2001-02	939	1.056235	405386.9
2002-03	793	58.16	58.19	437971.9	2002-03	793	0.999507	437971.9
2003-04	168	68.49	69.98	478342.1	2003-04	168	0.978671	478342.1
2004-05	182	83.19	85.55	521830.6	2004-05	182	0.972363	521830.6
2005-06	180	100.00	100.00	571656	2005-06	180	1	571656
2006-07	15	117.32	120.34	633388.5	2006-07	15	0.974977	633388.5
2007-08	357	122.71	143.48	709585.1	2007-08	357	0.855221	709585.1
2008-09	666	275.70	164.94	766484.2	2008-09	666	1.671534	766484.2

Source : Own calculation.

Appendix Table 5.12 Export Supply Function of beans and pulses

Year	Beans and Pulses Exports (000' MT)	Unit Value Index of Bean Export 2005=100	CPI (2005=100)	Mkt Ex Rate (2005=1)	Domestic Price	Relative Price	Production Index (2005=100)
1989	56.06	91.61	3.21	0.0577	0.1849	495.4352	12.38
1990	194.50	130.61	3.77	0.0595	0.2246	581.4300	14.87
1991	195.17	94.41	4.99	0.0784	0.3914	241.1814	18.96
1992	449.00	67.86	6.08	0.1021	0.6210	109.2810	23.06
1993	514.00	59.68	8.02	0.1115	0.8944	66.7244	22.62
1994	425.00	83.46	9.95	0.1096	1.0912	76.4900	28.40
1995	610.00	102.91	12.46	0.1078	1.3425	76.6555	34.30
1996	595.00	93.76	14.49	0.1389	2.0129	46.5775	34.19
1997	769.00	76.65	18.79	0.1975	3.7118	20.6515	39.86
1998	621.00	75.76	28.46	0.3006	8.5553	8.8551	42.04
1999	561.00	87.73	33.70	0.3251	10.9578	8.0058	45.61
2000	831.00	80.63	33.66	0.3526	11.8686	6.7933	56.47
2001	1035.00	71.25	40.77	0.5898	24.0450	2.9633	66.28
2002	1038.00	68.55	64.04	0.8819	56.4712	1.2139	68.85
2003	1211.00	71.40	87.47	0.9234	80.7714	0.8840	77.23
2004	873.00	66.98	91.43	0.8601	78.6435	0.8517	88.07
2005	865.00	100.00	100.00	1.0000	100.0000	1.0000	100.00
2006	1156.00	149.51	120.00	1.2117	145.4022	1.0283	110.85
2007	1141.00	143.71	162.02	1.2297	199.2384	0.7213	124.13
2008	1451.00	161.55	205.45	1.1314	232.4382	0.6950	131.47

Source : Own calculation

continued

Appendix Table 5.12 Export Supply Function of beans and pulses (continued)

Year	X	PX	P	PX/P	Y
1989	56.06	91.60782	0.18490	495.4352	12.38
1990	194.50	130.6051	0.22463	581.4300	14.87
1991	195.17	94.40872	0.39144	241.1814	18.96
1992	449.00	67.8593	0.62096	109.2810	23.06
1993	514.00	59.67975	0.89442	66.7244	22.62
1994	425.00	83.4624	1.09115	76.4900	28.40
1995	610.00	102.9111	1.34251	76.6555	34.30
1996	595.00	93.75509	2.01289	46.5775	34.19
1997	769.00	76.6531	3.71175	20.6515	39.86
1998	621.00	75.75797	8.55533	8.8551	42.04
1999	561.00	87.72542	10.95780	8.0058	45.61
2000	831.00	80.62738	11.86860	6.7933	56.47
2001	1035.00	71.25345	24.04496	2.9633	66.28
2002	1038.00	68.5523	56.47117	1.2139	68.85
2003	1211.00	71.40045	80.77142	0.8840	77.23
2004	873.00	66.97729	78.64353	0.8517	88.07
2005	865.00	100	100.00000	1.0000	100.00
2006	1156.00	149.5131	145.40217	1.0283	110.85
2007	1141.00	143.7065	199.23840	0.7213	124.13
2008	1451.00	161.5461	232.43824	0.6950	131.47

Source : Own calculation

Appendix Table 5.13 Export Demand Function of beans and pulses

Year	X Beans and Pulses Exports (000' MT)	PX Myanmar Export Unit Value Index for Bean (2005=100)	PXW World Weighted Export Value Index (2005=100)	YW World Income (US\$ in Million)	Year	X	PX/PXW	YW
1989	56.06	91.61	16.05097	161015.6	1989	56.063	5.707307	161015.6
1990	194.50	130.61	18.48435	171907.8	1990	194.5	7.06571	171907.8
1991	195.17	94.41	22.66428	187261	1991	195.167	4.16553	187261
1992	449	67.86	25.95832	209069.3	1992	449	2.614164	209069.3
1993	514	59.68	29.42948	233480.4	1993	514	2.02789	233480.4
1994	425	83.46	36.24681	260303.5	1994	425	2.302613	260303.5
1995	610	102.91	45.20275	287019.1	1995	610	2.276657	287019.1
1996	595	93.76	44.73093	311256.6	1996	595	2.095979	311256.6
1997	769	76.65	46.71649	327894.4	1997	769	1.640815	327894.4
1998	621	75.76	44.6311	332639.2	1998	621	1.697426	332639.2
1999	561	87.73	47.84847	354710.2	1999	561	1.833401	354710.2
2000	831	80.63	56.91354	380624.6	2000	831	1.416664	380624.6
2001	1035	71.25	54.36201	405386.9	2001	1035	1.310721	405386.9
2002	1038	68.55	58.19041	437971.9	2002	1038	1.178069	437971.9
2003	1211	71.40	69.97944	478342.1	2003	1211	1.020306	478342.1
2004	873	66.98	85.5543	521830.6	2004	873	0.782863	521830.6
2005	865	100.00	100	571656	2005	865	1	571656
2006	1156	149.51	120.3353	633388.5	2006	1156	1.24247	633388.5
2007	1141	143.71	143.4791	709585.1	2007	1141	1.001585	709585.1
2008	1451	161.55	164.9399	766484.2	2008	1451	0.979425	766484.2

Source : Own calculation

Appendix Table 5.14 Per capital Agricultural production Index.

COUNTRIES	1994-1996	1999-2001	2003	2004	2005	2006	2007
China	83	100	106	113	116	119	120
India	96	100	99	96	99	103	108
Malaysia	97	100	106	110	114	117	115
Myanmar	86	100	118	124	127	139	147
Thailand	96	100	108	108	106	109	114

Source: FAO Statistical Year Book 2009.

Appendix Table 5.15 Rural Population and Rural Population percent in total Population.

Country	Rural Population (,000)					Rural Population (%)				
	1994-1996	1999-2001	2005	2006	2007	1994-1996	1999-2001	2005	2006	2007
China	831 084	813 466	781 893	774	767 642	68	64	59	58	57
India	699 615	754 150	806 142	815	824 691	73	72	71	71	71
Malaysia	9 124	8 844	8 301	8 191	8 083	44	38	32	31	30
Myanmar	32 399	33 525	33 529	33 490	33 449	74	72	69	69	68
Thailand	41 909	42 953	44 643	44 829	44 940	70	69	68	67	67
World	3 158 026	3 264	3 347 767	3 362	3 375	55	53	51	51	51

Source: FAO Statistical Year Book 2009.

Appendix Table 5.16 Economically active population in agriculture and agricultural share in total Population

Country	Thousand (,000)					Share in Total Population (%)				
	1994-1996	1999-2001	2005	2006	2007	1994-1996	1999-2001	2005	2006	2007
China	488 711	495 416	498 770	498 514	499 018	69	67	64	63	63
India	223 812	237 402	252 901	256 519	258 642	61	59	57	56	56
Malaysia	1 867	1 829	1 715	1 687	1 663	23	19	15	15	14
Myanmar	16 371	17 753	18 723	18 859	19 119	72	70	69	68	68
Thailand	20 181	19 825	19 964	19 759	19 594	60	56	52	52	51
World	1186796	1228742	1 271 989	1 279 575	1 287 200	46	44	42	41	41

Source FAO Statistical Year Book 2009

Appendix Table 5.17 Value of Agricultural import and Agricultural Export

FAO Statistical Yearbook	IMPORTS (US\$ million)				EXPORTS (US\$ million)					
	1994-1996	1999-2001	2005	2006	2007	1994- 1996	1999-2001	2005	2006	2007
COUNTRIES										
China	26 710	23 544	42 454	47 495	59 236	20 293	16 648	23 833	26 190	32 161
India	2 212	3 590	5 360	7 067	7 774	4 861	4 942	9 020	11 258	16 748
Malaysia	3 814	3 851	5 982	7 005	8 932	7 539	6 153	10 779	12 867	17 673
Myanmar	394	329	493	539	686	400	390	285	513	471
Thailand	2 849	2 644	4 243	4 331	5 165	8 553	7 285	12 277	15 072	17 904
World	448 253	439 487	673 681	746 631	903 431	432 434	414 400	654 361	722 065	876 410

Source: FAO Statistical Year Book 2009

Appendix Table 5.18 Share of Agricultural import and export in total import and total export

(Unit-Percentage)

	Agricultural Imports / Total Imports (%)					Agricultural Exports / Total Exports (%)				
	1994-1996	1999-2001	2005	2006	2007	1994-1996	1999-2001	2005	2006	2007
China	6,5	4,5	3,7	3,6	3,8	4,9	3,0	1,9	1,7	1,8
India	6,5	7,0	3,6	3,9	3,6	15,5	11,8	8,7	9,0	11,4
Malaysia	5,3	5,3	5,2	5,3	6,1	10,8	6,9	7,6	8,0	10,0
Myanmar	22,7	15,6	28,2	21,0	20,7	44,1	19,7	9,8	11,2	7,4
Thailand	4,3	4,6	3,6	3,4	3,7	16,2	11,5	11,2	11,8	11,8
World	9,1	7,1	6,4	6,2	6,4	8,8	6,9	6,3	6,0	6,3

Source: FAO Statistical Year Book 2009

Appendix Table 5.19 Net total trade value and Net Agricultural trade Value (Export and Import)

Unit – (US \$ Million)

FAO Statistical Yearbook	NET TOTAL TRADE					NET AGRICULTURAL TRADE				
COUNTRIES	1994- 1996	1999- 2001	2005	2006	2007	1994-1996	1999- 2001	2005	2006	2007
China	5 427	29 652	106 173	183 825	266 541	-6 417	-6 896	-18 621	-21 306	-27 075
India	-4 057	-8 891	-46 265	-56 695	-69 725	2 649	1 352	3 659	4 191	8 974
Malaysia	-1 532	16 574	26 347	29 500	29 229	3 725	2 302	4 797	5 862	8 740
Myanmar	-826	-164	1 152	2 025	3 026	6	61	-208	-26	-215
Thailand	-13 571	5 349	-8 410	2 107	12 132	5 705	4 641	8 034	10 741	12 739

Source: FAO Statistical Year Book 2009

Appendix Table 5.20 Value of Export and Import of Pulses

Unit- US \$ '000

COUNTRIES	IMPORTS					EXPORTS				
	1994- 1996	1999- 2001	2005	2006	2007	1994- 1996	1999- 2001	2005	2006	2007
China	54 154	56 973	104 654	131 428	145 482	357 643	266 127	389 885	407 388	543 547
India	227 628	313 036	633 712	1 007 029	1 368 887	35 549	99 936	255 104	174 431	133 024
Malaysia	26 288	27 475	39 609	46 723	55 247	1 036	1 175	3 287	2 996	2 779
Myanmar		272	24	24	48	195 510	246 095	136 797	405 087	344 179
Thailand	2 164	2 276	8 072	7 340	11 265	29 754	18 555	16 933	29 937	
World	2953251	2891363	3974296	4581143	5584441	2703345	2760415	3424590	4083240	4822210

Source: FAO Statistical Year Book 2009

Appendix Table 5.21 Value of Export and Import of Cereals

Unit- US \$ '000

	IMPORTS						EXPORTS				
	1994-1996	(US\$ '000)	1999-2001	2005	2006	2007	(US\$ '000)	1999-2001	2005	2006	2007
COUNTRIES	1994-1996		1999-2001	2005	2006	2007					
China	4 002 428	1 627 810	2 711 536	2 150 668	2 234 188	2 234 188	734 600	1 357 460	1 516 362	1 154 114	2 200 912
India	40 046	74 976	14 022	1 296 344	649 347	649 347	1 101 658	863 586	1 652 097	1 706 548	3 588 086
Malaysia	755 212	625 803	863 566	975 821	1 315 944	1 315 944	24 239	30 086	20 294	20 119	23 128
Myanmar	12 086	20 676	27 751	24 933	32 528	32 528	114 735	61 882	44 711	26 299	25 870
Thailand	197 283	154 619	282 707	273 948	344 574	344 574	1 869 915	1 758 140	2 368 681	2 659 945	3 597 937
World	47248430	40413760	52232138	58298199	82985491	82985491	42219430	36009287	45995245	51917758	79087885

Source: FAO Statistical Year Book 2009