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**A STUDY ON PADDY PRODUCTION IN BAGO REGION
(2005-2016)**

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A STUDY ON PADDY PRODUCTION IN BAGO REGION

(2005 -2016)

A thesis submitted as a partial fulfillment towards the requirements for the degree of
Master of Economics (Economics)

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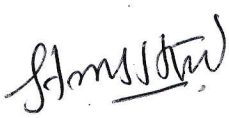
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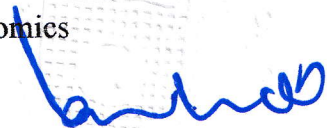
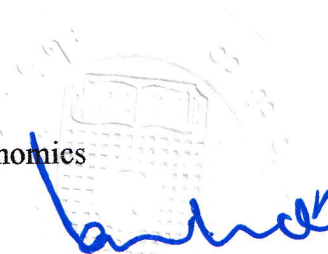


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ABSTRACT

The study on Paddy Production in Bago Region explores the land-use, own area, yield per area and production of selected major crops and describes the related policies. The objective of the study is to analyze the situation of paddy production in Bago region. This paper focuses on paddy production in Bago Region for the period 2005-2006 to 2016-2017. It found that agricultural lands had increased during the study period. Department of mechanical farming is presenting educate presentation to farmers such as agricultural demonstrations as the farmers' desire. Some of farmers are transformed for cultivation system and utilizing machines. The total baskets of paddy produced had increased during the study period .In Bago region, Bago district and Tharyarwaddy district are producing paddy at most and there is a growth in cultivated area and the total baskets of paddy produced. Since rice is the main source of foreign exchange for importing capital goods. Bago region plays an important role in Myanmar economy.

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A Study on Paddy Production in Bago Region

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CHAPTER I

Introduction

1.1 The Rationale of the Study

In general, agriculture is playing an important role to develop the economy in most developing countries. Myanmar is a developing country. Myanmar is rich in natural resources. Getting water resources and nice and fair weather help the soil in agriculture. Rice is the essential consumer good. All people uses rice as the main food in Myanmar. Therefore, rice is the most important crop for Myanmar farmers. Rice is the staple food and also a leading earner of foreign exchange. Thus it is designated as national crop to highlight its great importance. The government has given a high priority to the expansion of paddy production because it believe that a stable of rice is a requirement for political and economic stability. The government has been undertaking to expand the paddy areas through irrigation investment and to increase the yield per acre in order to promote rice production. Myanmar 'paddy fields can be found mostly in the delta and central dry zone areas. Paddy is planted in upper and lower Myanmar. The regions that plant paddy most are Ayeyarwady region and Bago region.

Bago Region is Located in southern central Myanmar, Bago Region is bordered by Mandalay and Magway Regions and the Union Territory of Nay Pyi Taw to the north, Mon and Kayin States and the Andaman Sea to the east, Yangon Region to the south and Ayeyarwaddy Region and Rakhine Region to the west. Bago region is one of the core regions of central Myanmar, home to almost 10 percent of its population and it is the second largest producer of rice among all States and Regions contributing substantially to Myanmar's GDP and economic growth. It is endowed with significant reserves of natural resources (teak and petroleum) and highly favorable conditions for paddy cultivation. Bago region is located in lower Myanmar and it is an economic hub region. The local people from Bago region mainly work the business such as farming, breeding, trading and industrializations. Bago region is located on the road that is the junction of waterway and road, the main product is rice and other products are exported the most to Yangon Division, Mandalay Division of Upper Myanmar and Magway Division. There are 4 districts in Bago region. They are Bago District, Taunggu District, Pyay District and Tharyarwady District. Bago region

is a vast agricultural area which specializes in paddy farming. The functions of paddy production are studied in details because this region is mainly depends on agriculture. The major crop is paddy, which occupies over two-thirds of the available agricultural land. Agricultural sector is essential for the development of economy. It is studied by aiming for the development of paddy production.

1.2 Objective of the Study

The objective of the study is to analyze the situation of paddy production in Bago region.

1.3 Method of Study

The method of study is descriptive, based on secondary data from statistical years-books and information from the Local Department of Agriculture and General Administration Department of Bago region.

1.4 Scope and Limitations of the Study

This study focuses on Paddy Production in Bago region between 2005/2006 to 2016/2017. The data used in this paper are secondary data.

1.5 Organization of the Study

This paper is organized into five chapters. Chapter one is Introduction. It includes the rationale, objective, method, scope and limitations; and organization of the study. Chapter two contains the Literature Review. Chapter three gives the Historical Background of Bago Region. Chapter four describes Agricultural Inputs and Paddy Production in Bago Region. Chapter five discusses the findings of this study and some suggestions as conclusion.

CHAPTER II

Review on Agricultural Sector in Myanmar

2.1 History of Agriculture

The history of agriculture records the domestication of plants and animals and the development and dissemination of techniques for raising them productively. Agriculture began independently in different parts of the globe, and included a diverse range of taxa. At least eleven separate regions of the Old and New World were involved as independent centers of origin. Wild grains were collected and eaten from at least 20,000 BC. Rye was cultivated by at least 11,050 BC in Mesopotamia. Rice was domesticated in China by 6,200 BC with earliest known cultivation from 5,700 BC, followed by mung, soy and azuki beans. Pigs were domesticated in Mesopotamia around 11,000 BC, followed by sheep between 11,000 and 9,000 BC. Cattle were domesticated from the wild aurochs in the areas of modern Turkey and Pakistan around 8,500 BC. Sugarcane and some root vegetables were domesticated in New Guinea around 7,000 BC. Sorghum was domesticated in the Sahel region of Africa by 5,000 BC. In the Andes of South America, the potato was domesticated between 8,000 and 5,000 BC, along with beans, coca, llamas, alpacas, and guinea pigs. Bananas were cultivated and hybridized in the same period in Papua New Guinea. In Mesoamerica, wild teosinte was domesticated to maize by 4,000 BC. Cotton was domesticated in Peru by 3,600 BC.

In the Middle Ages, both in the Islamic world and in Europe, agriculture was transformed with improved techniques and the diffusion of crop plants, including the introduction of sugar, rice, cotton and fruit trees such as the orange to Europe by way of Al-Andalus. Irrigation, crop rotation, and fertilizers were introduced soon after the Neolithic Revolution and developed much further in the past 200 years, starting with the British Agricultural Revolution. Since 1900, agriculture in the developed nations, and to a lesser extent in the developing world, has seen large rises in productivity as human labor has been replaced by mechanization, and assisted by synthetic fertilizers, pesticides, and selective breeding. The Haber-Bosch process allowed the synthesis of ammonium nitrate fertilizer on an industrial scale, greatly increasing crop yields. Modern agriculture has raised social, political, and

environmental issues including water pollution, biofuels, genetically modified organisms, tariffs and farm subsidies. In response, organic farming developed in the twentieth century as an alternative to the use of synthetic pesticides.

(i) Roman agriculture was highly regarded in Roman culture, built on techniques pioneered by the Sumerians, with a specific emphasis on the cultivation of crops for trade and export. Romans laid the groundwork for the manorial economic system involving serfdom, which flourished in the middle Ages. By the fifth century Greece had started using crop rotation methods and had large estates while farms in Rome were small and family owned. Rome's contact with Carthage, Greece, and the Hellenistic East in the third and second centuries improved Rome's agricultural methods. Roman agriculture reached its height of productivity and efficiency during the late republic and early empire. There was massive amount of commerce between the provinces of the empire; all the regions of the empire became interdependent with one another, some provinces specialized in the production of grain, others in wine and others in olive oil, depending on the soil type. In addition to knowledge of different soil categories, the Romans also took interest in what type of manure was best for the soil. The best was poultry manure, and cow manure one of the worst. Sheep and goat manure were also good. The Romans also used animals extensively. Cows provided milk while oxen and mules did the heavy work on the farm. Sheep and goats were cheese producers, but were prized even more for their hides. Horses were not important to Roman farmers; most were raised by the rich for racing or war. Sugar production centered on beekeeping. Some Romans raised snails as luxury items. Roman law placed high priorities on agriculture since it was the livelihood of the people in early Rome. A Roman farmer had a legal right to protect his property from unauthorized entry and could even use force to do so. The vast majority of Romans were not wealthy farmers with vast estates farmed for a profit. Since the average farm family size was 3.2 persons, ownership of animals and size of land determined production quantities, and often there was little surplus of crops.

(ii) Chinese agriculture

The unique tradition of Chinese agriculture has been traced to the pre-historic Yangshao culture (c. 5000 B.C.E.-3000 B.C.E.) and Long shan culture (c. 3000 B.C.E.-2000 B.C.E.). Chinese historical and governmental records of the

Warring States (481 B.C.E.-221 B.C.E.), Qin Dynasty (221 B.C.E.-207 B.C.E.), and Han Dynasty (202 B.C.E.-220 C.E.) eras allude to the use of complex agricultural practices, such as a nationwide granary system and widespread use of sericulture.

The Chinese also innovated the square-pallet chain pump by the first century C.E., powered by a waterwheel or an oxen pulling a system of mechanical wheels. Although the chain pump found use in public works of providing water for urban and palatial pipe systems, it was used largely to lift water from a lower to higher elevation in filling irrigation canals and channels for farmland. During the Eastern Jin (317-420) and the Northern and Southern Dynasties (420-589), the Silk Road and other international trade further spread farming technology throughout China. Political stability and a growing labor force led to economic growth, and people opened up large areas of wasteland and built irrigation works for expanded agricultural use. As land-use became more intensive and efficient, rice was grown twice a year and cattle began to be used for plowing and fertilization. By the Tang Dynasty (618-907), China had become a unified feudal agricultural society. Improvements in farming machinery during this era included the moldboard plow and watermill. Later during the Yuan Dynasty (1271-1368), cotton planting and weaving technology were extensively adopted and improved.

(iii) Indian agriculture

Evidence of the presence of wheat and some legumes in the sixth millennium B.C.E. have been found in the Indus Valley. Oranges were cultivated in the same millennium. The crops grown in the valley around 4000 B.C.E. were typically wheat, peas, sesame seed, barley, dates, and mangoes. By 3500 B.C.E. cotton growing and cotton textiles were quite advanced in the valley. By 3000 B.C.E. farming of rice had started. Another monsoon crop of importance at that time was cane sugar. By 2500 B.C.E., rice was an important component of the staple diet in Mohenjodaro near the Arabian Sea. The Indus Plain had rich alluvial deposits which came down the Indus River in annual floods. This helped sustain farming that formed basis of the Indus Valley Civilization at Harappa. The people built dams and drainage systems for the crops. By 2000 B.C.E. tea, bananas, and apples were being cultivated in India. There was coconut trade with East Africa in 200 B.C.E. By 500 C.E., eggplants were being cultivated.

(iv) History of Agricultural Sector in Myanmar

The first of these was the Restored Toungoo dynasty. This was followed in 1752 by the Konbaung dynasty, which retained control until the early nineteenth century. In the central lowland areas the king appointed his allies as leaders, but further away from his capital he had less control. Agriculture was the stable foundation of this entire society. During this entire period, through wars and changes in government, the peasant remained the backbone of the nation. Farmers worked small parcels with handmade tools and family labor. Many communities held traditional lands in common where local people could graze their livestock. Most people lived at a subsistence level, using what little they grew to feed their family.

The British also reformed the system of agriculture that had been in place for centuries. Whereas before laws had been geared towards collecting tribute to support the Burmese king, the British goal was to maximize the economic production of the country and profits of individual farms in order to maximize the profits for the empire. They no longer needed the tight controls on ownership and transfer of property favored by the previous monarchy. Instead they required a free market that would run without much interference.

They began this process by transitioning to a system of commercialized peasant agriculture. First the state took control of all land. Farmers could then gain permanent title to the land after working it for 12 years and paying the appropriate taxes. The British accompanied this change of tenure with policies that promoted the clearing of new lands. The land area devoted to cultivation grew dramatically. Exports increased proportionately.

A new system of railroads connected the various regions and allowed for internal migration and immigration. Upland workers from the ethnic minorities flooded into lower Burma to work on the larger farms and help with massive harvests. They began this process by transitioning to a system of commercialized peasant agriculture. First the state took control of all land. Farmers could then gain permanent title to the land after working it for 12 years and paying the appropriate taxes.

The British accompanied this change of tenure with policies that promoted the clearing of new lands. The land area devoted to cultivation grew dramatically. In 1830 an estimated 27,000 hectares were being tilled. By 1932 this had ballooned to 4.9 million. Exports increased proportionately.

A new system of railroads connected the various regions and allowed for internal migration and immigration. In 1883 the colony exported 2 million metric tons of rice annually. By 1910 this had risen to 6 million metric tons. Every subsequent year until 1936 recorded exports between 5.4 and 7.6 million metric tons. By 1939 Burma accounted for 47% of rice exports worldwide. Burma had become the rice bowl of the world.

2.2 Agricultural Policies in Myanmar

As agriculture plays a crucial role in the economy of Myanmar, sustainable agriculture is a prerequisite for achieving sustainable development objectives. Sustainable agriculture requires the integration of environmental considerations with agricultural policy analysis and planning. Myanmar is a favorable agrarian structure with high potential for development of small holder and large scale farming with average farm size of 2.5 ha accounting for the second largest in South East Asia after Thailand which is about 3.1 ha. Myanmar has a relatively high land/population ratio and half the arable land is still fallow. But development of the sector has been constrained by macroeconomic instability, infrastructure constraints, marketing and financial issues, and farmers' lack of access to quality research and extension support. Relatively weak agricultural performance has also impacted negatively on the overall development of the rural sector.

The agricultural sector in 2015 provided 32% of Myanmar's GDP, 17% of exports, about 50% of employment, and 0.45% of foreign direct investment for crops and 0.79% for livestock and fisheries (DOP, 2015). For all agricultural country like Myanmar which relies rather heavily on the monsoon rains, climate changes and the economic environment affecting agriculture are very important since agriculture is the major source of income and employment for the majority of its population. Reform measures in Myanmar may be said to have taken off which the lifting of the twenty-one year old restrictions on the procurement and domestic trade of rice and eight other crops such as wheat, maize, pulses, cotton, rubber, and sugarcane in September 1987. After the State Law and Order Restoration Council (SLORC) took over the reins of government in September 1988, one reform measure quickly followed another.

Of the many policy reform measures mentioned above, the decontrol of prices of major agricultural products, the removal of restrictions on private sector participation in domestic and foreign trade and regularization of border trade have,

more than any other, changed the way the agricultural sector operates. Unlike in the past and except on paddy land, farmers can now freely choose the crops they grow and can also process them and sell them freely. Distribution of farm inputs like chemical fertilizer, pesticides and seeds, formerly handled solely by the Myanmar Agriculture Service (MAS), is also being gradually transferred to the private sector, and subsidies on farm inputs such as fertilizer are being scaled down. Finally, except for rice and some industrial crops, private exports of agricultural produce have also been permitted.

Thus, the modus operandi in the agricultural sector has certainly changed. But, it is as yet neither fish nor fowl. On the one hand, market mechanism and the price signals would determine many of the decisions made by individual farmers. On the other, the objectives of the government and its intervention in the market to achieve them would also be an important determinant in the choices made by farmers. This means that straightforward evaluation of the agricultural sector either on the basis of market mechanism alone or on a centrally-planned model is not yet possible. It is necessary, therefore, to mention also the main economic objectives of the government and of the Ministry of Agriculture at the very outset.

The four main economic objectives of the government, as reported daily in the mass media, 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.
4. The initiative to shape the national economy must be kept in the hands of the State and the national peoples.

While all the above mentioned objectives have a direct bearing on the agricultural sector, the first one in particular clearly states that agriculture development is to be the base of all-round development of the economy. This has been interpreted more specifically by the Ministry of Agriculture in three basic objectives and five principles. The three basic objectives are:

1. To achieve surplus paddy production
2. To achieve self-sufficiency in edible oil
3. To step up the cultivation and export of pulses and industrial crops

And the five principles to enhance agricultural development are:

1. The development of new agricultural land
2. The provision of adequate irrigation water
3. The provision and support for increased agricultural mechanization
4. The acceleration of technology transfer
5. The development and utilization of high yielding quality seeds

As an economist, one immediately feels the need to examine whether the above three basic objectives are mutually consistent with each other. For example, if Myanmar has a comparative advantage in the production of food, it could more efficiently import edible oil by exporting food. In other words, even assuming surplus land, the second objective to achieve self-sufficiency in edible oil will be unnecessary unless the surplus land is unsuitable for the cultivation of cereals.

The ministry of Agriculture laid down a policy to encourage the expansion of agricultural area. In terms of agriculture policy, although there have been periodic policy pronouncements and statements of objectives as already been mentioned.

To achieve these agricultural objectives, some of the policies are stated as below:

- To allow freedom of choice in agricultural production.
- To expand agricultural land and to safeguard the rights of farmers.
- To encourage the participation of private sector in the commercial production of seasonal and perennial crops, and distribution of farm machineries and other inputs.
- Encouraging the research and development activities for the improved quality and increase the production of agricultural crops.

Some agricultural policies related to the important industrial crops were previously changed for the better performance of producers and development of the local market activities as mentioned below:

- Removal of state procurement policy on cotton, sugarcane and rubber crops were previously changed for the better performance of producers and development of the local market activities as mentioned below:
- Encouragement in area expansion of rubber, oil palm and other potential crops for export
- Pricing at market rate to purchase raw cotton, sugarcane and rubber for the consumption of state-owned factories and mills

- Permission to the producers and exporters for the export of surplus rubber after the payment of taxes
- Permission to state-own factories and mills for the area expansion of cotton, sugarcane and rubber to meet the needs of annual requirements

International communities indicated that Myanmar's agriculture development had unsatisfactory achievement despite Myanmar laid down agricultural reform measures and policy for private sector participation since it adopted the market oriented policy in 1988. However, agricultural development is still existing in key role for rural development and poverty alleviation, and sustainable economic development of Myanmar.

Therefore, the President of Myanmar has declared the following reform area in agricultural, which needs to undertake seriously:

- Create the incentives for active participation and cooperation by the farmers along with the new mind-set in their farming activities.
- Replacing the traditional varieties with improved quality and high yielding seeds.
- Application of modern Pre-Harvested technologies in place of conventional farming methods.
- Transforming the rain-fed farming into systematic irrigated farming.
- Converting conventional small-scale farms into mechanized farms in the form of acre- or hectare-plots in order to change manual farming into mechanized farming.

2.3 Agricultural Policy of Rice in Myanmar

The government evaluated previous rice trade and pricing policy and abolished its monopoly of rice export and allowed to private sector for rice export by launching the new national rice policy of marketing in April 2003. According to new rice trading policy, starting from the harvest of 2003 monsoon season rice, the government did not buy paddy directly from farmers with fixed price, to ensure free trade of the crop in the interest of the entire peasantry and helping develop the market-oriented economy.

As policy framework for crop production is central to food security and economic growth, the pursuit of increased paddy production is the most dominant theme and the one demanding most investment and effort of Ministry of agriculture

and irrigation (MOAI). The new rice policy has multiple objectives. Many measures are to be implemented under its provisions. Some of the important ones among them are listed below;

- Price and market incentives would be provided for farmers to encourage them to produce more and, thereby to improve their incomes and welfare
- To enable consumers to buy rice at a fair price
- To increase rice exports and earn more foreign exchange
- To enhance efficiency of private traders
- No involvement of state organizations in the sale and purchase of rice
- All nations can trade rice freely at the prevailing market price
- Although not stated explicitly, the government intends to extract substantial revenue from the rice trade
- To improve rice production methods, and to upgrade the quality of rice
- Monopoly on rice trade will not be permitted to any one person/company of organization
- To assist in the establishment of a market-oriented economic system
- To maintain food self-sufficient and food security
- To improve consumer welfare by subsidized sale of basic food grains, particularly rice
- To expand food grain production for promotion of export and raising government foreign exchange (FE) via implicit export laws for food grains
- To keep domestic food grain prices low to maintain a low cost of living to contribute to socioeconomic stability
- To give farmers a guaranteed minimum price to maintain stability of farm production and income
- To stockpile rice to stabilize the market and domestic price
- To encourage food grain production by subsidized sales of inputs, free provision of agricultural extension services and heap agricultural credits
- To introduce scientific methods and improve cultivation practices in agriculture to raise per-acre yields and total output.

Myanmar Rice Policy is to ensure the food security of the national people. Myanmar adopts both extensive and intensive means to boost the productivity and to meet the growing demands for higher quality rice. Myanmar rice policies are set in the frame of markets economic practices and are in line with national objective of

restoring Myanmar as the major rice exporter in global market place. About 70% of the population of Myanmar reside in rural areas and are closely connected with rice industry. Therefore, Myanmar Rice Policies are formulated to enhance the socio-economic development of rural rice farming families.

2.4 Agricultural Policy of other crops in Myanmar

Agriculture policy after 1988 was, in fact, based not only on rice alone but also on other three main pillar crops namely pulses and beans, cotton and sugarcane. In order to increase needed foreign exchange earnings, concerted efforts were initiated by state to increase the production of other three main crops. The category of pluses and beans include soybean, chickpeas, butter beans, green gram, pigeon, black gram, kidney beans, cowpeas, labella beans, sultana and sultapya.

The needed inputs supply and cultivation of cotton and sugarcane were supervised and controlled by two state enterprises under the Ministry of Agriculture and Irrigation, namely the Myanmar Cotton Enterprise and Myanmar Sugarcane Enterprise. It must be said that there limited success despite the assigning of the two Enterprises of their respective crops. Pulses and beans on the other hand, with no state enterprises support must be said to have achieve better performance in terms of area expansion and production as well as exports .The better performance of pulses and beans sector could also be explained by an increased demand in the international market.

Although one of the state policies is to achieve self-sufficiency in edible oil, oilseeds particularly those of groundnut and sesame were not on the list of main pillar crops. The major role of oilseeds in agricultural production is substantially high and yet there is no policy initiatives placed on these important crops. Yearly, there are substantial amounts of foreign exchange on importing planed oil. An effective self-sufficient policy on edible oil would drastically reduce plan oil imports and could ever lead to exportable surplus.

The climates and topography in Myanmar is favorable suitable for a wide of crops, fruits as well as vegetable. A small percentage of private growers and farmers and already are taken initiative steps in growing horticulture crops. There is still room for program support or policy initiative from production to marketing of such crops. This new culture will not only contributes toward modernized agriculture but will also provide income as well as employment.

Along with policies on agriculture crops, the government also placed certain policies on livestock and fisheries. The livestock sector focused on following priorities:

1. Integrated development in livestock sector
2. Self-sufficiency in livestock products and production for exportable surplus
3. Socio- economics development of rural household in the livestock sector.

These are, in fact, guidelines to what the whole livestock and fisheries sector is about to head for. Total responsibility for the development of this sector simply falls into the hands of the private sector. There is little information on extent of possible catches particularly in the coastal regions since some of these areas are on lease to private companies. A number of private firms are currently fishing in the coastal zones of Rakhine, Ayeyarwaddy and Tanniatharyi states. As a consequence, marine fishers have expanded and marine exports also have gained prominence.

It is believed that very little statistical information is extended to the state on amount of the extent of possible unreported catches. On the other hand, more attention is needed to be paid to conflicts of interest which may potentially arise between small private fishing activities and large-scale commercial activities. Inland fish and shrimp farming is also encouraged by the state especially in the neighboring areas of Yangon and the Delta region. In recent years, both inland fish and shrimp exports increased quite steadily benefit must to the wealthy private firms. It must be said that only few benefits are accrued to these local inhabitants involved in this sub-sector.

To ensure effective implementation of all agricultural priorities and guideline, the Ministry of Agriculture and Irrigation has delegated authority and responsibility to the departments concerned. The Myanmar Agriculture Services (MAS), for example, further delegation of responsibility and implementation to personnel at division, state, district, township, and village tract and village levels. Myanmar Cotton and Sugar Enterprises also staled their personnel in specific regions where the mandate crops are largely- sown. The MAS people are more or less involved in the agriculture extension services.

Agricultural plans and programs are drawn at the central level and intensively monitored by the respective against. Very importantly, agricultural personnel are also under the close supervision of Peace and Development Councils at various levels.

Much of these implementation usages are tend to be more target- oriented rather than putting much emphasis on the impact of these plans and programs. In realizing performance targets, the impact should also be targeted towards these in the rural communities.

2.5 Role of Agricultural Sector in Economic Development

The development of any poor and backward economy can be brought by promoting its agriculture sector. It is evident from the following arguments:

(1) Availability of food

In case of Under Developed Countries (UDCs), the production of food stuff plays an important role. As a result of land reforms or increase in productivity due to better use of inputs etc the incomes of the farmers may increase. The incomes of the farmers result in increasing the demand for foodstuff. It so happens that in case of UDCs the income elasticity of demand for foodstuff is very high (ranging between 0.6 to 0.8%). Moreover, due to the provision of public health services in UDC, the death rate declines while birth rate does not fall. With this the demand for foodstuff goes on to increase. Again, due to industrialization, the mobility to labor to cities increase leading to increase the incomes of people. As a result, they increase the demand for consumables. In such state of affairs, if agriculture sector remains passive and agriculture production fails to respond the prices of food stuff will increase. Therefore, they will have to be imported from other countries having a pressure on the foreign exchange reserves the country. Hence, to avoid such cell, agriculture, sector will have to pay it role by enhancing food products.

(2) Increase in Demand for Industrial Products

When surplus is generated in agricultural sector, the purchasing power of the farmers will increase which will lead to increase the demand for industrial goods. In case of UDCS the market is limited as the incomes of farmers and the labor are limited. Therefore, the demand for manufactured goods remains limited. But, when the agriculture productivity increases the incomes of farmers etc., with increase leading to expand the demand for manufactured goods. In this way, the market will be extended. The manufactured sector will gain momentum. Moreover, in such situation the demand for agricultural inputs like fertilizers, tractors and harvesters will increase. This will also provide a stimulus to industrial sector. The expansion of industrial sector will have the effects on the means of transportation and communication.

Following Prof. Harischman, so many forward and backward effects will come into being so many sectors of the economy will grow and producers' profits will increase leading to enhance capital formation. This is the contribution of agricultural sector to the other sectors of the economy when it trades with other sectors, according to Prof. Kuznets.

(3) Foreign Exchange Earnings

The developing countries specialize in certain products which are to be exported. As the production and productivity of these goods increases their exports increase. With this the foreign exchange earnings of such countries increase which can be utilized to import the capital goods. Such capital goods can be used for industrialization. In this way, the domestic use of raw material will increase leading to reduce the export surplus. But the domestic industrialization will become helpful in the production of import substitutes. In this way, the foreign exchange could be saved. Thus, it is the agricultural development which results in Foreign exchange easing. The capital goods could be imported and industrialization process will be started. In this way, not only Foreign exchange will be saved, but Foreign exchange will be saved, but foreign exchange will also be eased when the manufactured exports increase. This is called 'Production Contribution' of agriculture sector according to Prof. Kuznets. As a result of this effect, in the first phase the production of the economy increase while in the second phase the per capita output rises.

(4) Employment Opportunities:

It is the agricultural sector which not only provides employment opportunities, but it also gives rise to diversification in such job opportunities. Whenever, the agriculture productivity and incomes increase the demand in the rural sector increases. For example, the demands for small farmers, weavers, cobblers, carpenters, plumbers, masons, black smiths and machines etc will increase. In this way, the agricultural development will promote the development of other sectors.

(5) Increase in the Welfare of the Rural People

When agriculture surplus increases the welfare of rural people will increase. On the basis of increased income the peasants will be able to consume those goods which have more calories like eggs, fish, ghee, butter and meat etc. They will improve

their standard of living, will build good house, and will acquire luxuries of life like radio, television, dish antenna, motor- cycles, readymade garments, shoes and even cosmetics. Thus, we simply say that growth of agri. Sector will lead to uplift the life-standard of the people.

CHAPTER III

Historical Background of Study Area

3.1 Historical Background of Bago Region

In the past, there are six Districts in Bago Division — Bago District, Hantharwady District, Tharyarwady District, Insein District, Pyay District and Taunggu District. Bago Division is still with those districts when States/Divisions and Districts are formed as the National Security Administration Project of 1962. Hmawbi, Hlekuu, Tikekyi and Htantapin Townships are removed from Insein District, formed in Bago Division as Hmawbi District and headquartered in Hmawbi District on 29 September 1965. Hmawbi District is formed with 4 Townships on 26 October, 1965, Taunggu District is formed with 6 Townships, on November, 4, 1965, Pyay District is formed with 6 Townships, Bago District is formed with 8 Townships, Hantharwady District is formed with 7 Townships, Tharyarwady District is formed with 8 Townships by the Department of Home Affairs and named as Bago Division, so, Bago Division has 6 districts and 39 townships. As Hmawbi District and Hantharwady District from Bago Division are formed in Yangon Division, Bago Division has only 4 districts and 20 townships on 20 June, 1972. Then, Districts, Sub-Districts and Sub Townships are cancelled by Ministry of Interior and Religious Affairs on August 3, 1972. In the period of National Councils, as 1974, section 31 of the Constitution, Bago Division still exists as the National Division. During the days of the State Law and Order Restoration in 18 November, 1989, there are 4 Sub-townships as Bago Sub-township, Pyay Sub-township, Taunggu Township and Tharyarwady Sub-township in Bago Division and with (7.10.1992) Date Announcement of Ministry of Interior; the name of District is changed into Sub-townships. The current Bago Division is made up of 4 districts, 28 townships, 51 sub-townships, 325 quarters, 1410 village groups and 644 villages. The total population of Bago Division is 4,904,988.

3.2 Location, Area and Boundary

Bago Region is located between 16°47'N and 19°20'N, 94°35'E and 97°10'E, and the area is 15 214.13 sq. mi. It is 148.23 miles from east to west, and 167.26 miles from south to north. It is bordered by Mon State and Kayin State to the east and Yangon Division and Ayeyarwady Division to the south. Also Rakhine State,

Ayeyarwady Division and Magway Division to the West, and Nay Pyi Daw and Magway Division to the north.

3.3 Water Resources

Bago Division has plenty of streams and rivers, and famous rivers are Sittaung River, Ayeyarwady River, Myitmakha River and Bago River. There is Bago Yoma Mountain Range between Ayeyarwady River and Sittaung River. There are Yamethin District, Taunggu and Bago District at the east, and Magway, Thayat, Pyay and Tharyarwady at the west of Bago Yoma Mountain. Sittaung Small River and Bago River come of and flow from eastern slopes. Pin Stream, Yin Stream and Nawin Stream flow to the Ayeyarwady at the western slopes and at the southern slopes, the streams that flow to the Myitmakha River or Hlaing River come out of the western ranges of Bago Yoma Mountain. It rains a lot in South than the North, so there are evergreen forests in the South and monsoon forests in the North in summer. Everywhere of Bago Mountain is covered by precious forests. It is also the most valuable teak region. The upper part of Sittaung River and Bago River are fresh water, so it is also used as the water for agriculture.

3.4 Climate and Soil

(i) Climate

Bago Division is hot and humid, and the highest temperature is 42.40°C and the lowest temperature is 10.8°C. The rainfall is 84.86 inches.

(ii) Soil

The condition of soil is formed depending on the underneath rock layer of the region. Gawon Soil can be found in Bago Yoma that is almost straightened from south to north and located in the middle of Bago Division. Gawon soil has bronze color because it contains iron. The soil like that is suitable for perennial garden plantation agriculture. It is delta lowland along the Ayeyarwady River Valley and Sittaung River Valley, and there are two types of silt soils by estimating. They are loam and clay. Loam can be found under the streaming river-beds and flood plains of that river. Clay can be found the higher part of flood plains i.e. the part that is not flooded when the river floods. Sandy silts can be found at a bit higher ground of Bago Division. Silt soil

can keep the water in time so water-flavored plants can be planted at the base of the plants.

3.5 Population

Population sector is an important factor, which should be taken into account when studying the development of either a region or a country because all development planning and data collecting strategies are based on the population. Bago region is organized with 28 townships namely, Taunggu Township, Yetashe Township, Kyaukgyi Township, Phyu Township, Oaktwin Township, Htantapin Township, Bago Township, Tanatpin Township, Kawa Township, Waw Township, Nyaunglaypin Township, Gyopinkauk Township, Zegine Township, Pyay Township, Nattalin Township, Pantaung Township, Paukkaung Township, Paungte Township, Minhla Township, Moenyo Township, Shwetaung Township, Letpattaung Township, Thegone Township, Tayawati Township and Oakpo Township.

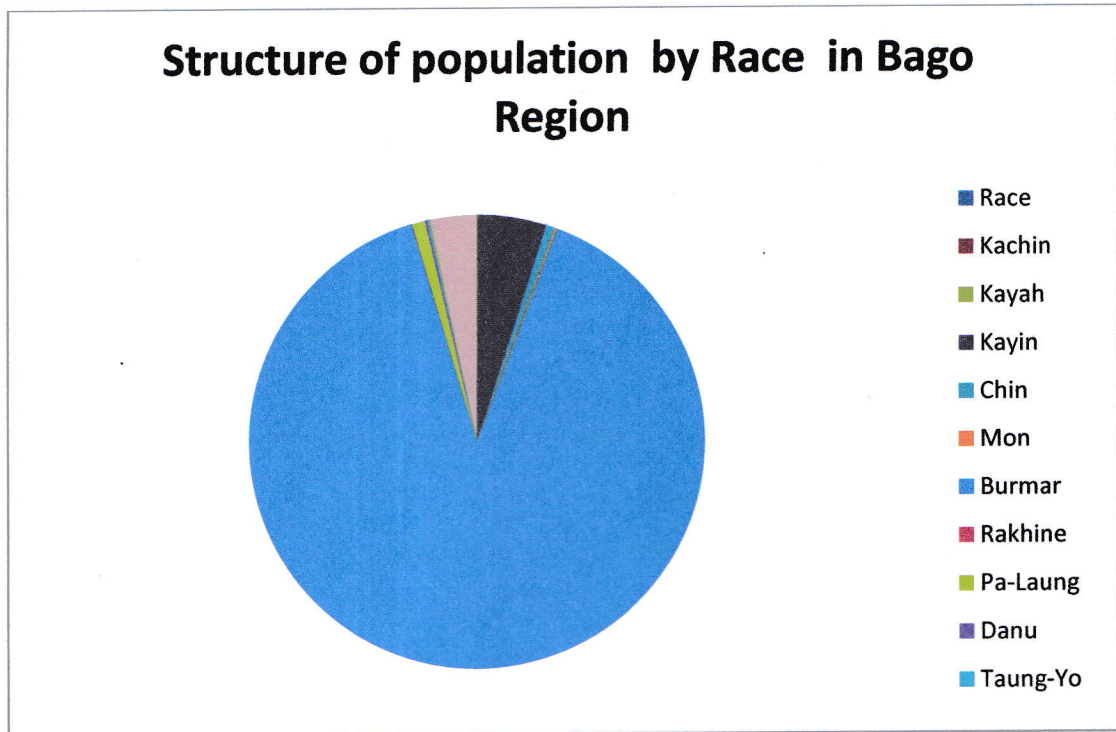
The population is 4904988 and the area is 15214.13 square miles, so the density of population is 322 populations per one square mile. Structure of population by race is described as the following table (3.1).

Table (3.1) Structure of Population by Race in Bago Region (2016-2017)

S.N	Race	Population	Percentage (%)
1	Kachin	26	0.00
2	Kayah	3444	0.07
3	Kayin	239355	4.88
4	Chin	30906	0.63
5	Mon	7772	0.16
6	Bamar	4397719	89.66
7	Rakhine	1955	0.04
8	Shan	44863	0.91
9	Pa-Laung	9258	0.19
10	Danu	6457	0.13
11	Taung-Yo	4859	0.09
12	Kayan	2929	0.06
13	Foreign Immigrant	155610	3.17
	Total	4904753	100.00

Source: General Administration Department (Bago Region)

Figure (3.1) Structure of Population by Race in Bago Region (2016-2017)



Source: General Administration Department (Bago Region)

According to the table (3.1) and figure, there are difference races live in Bago region and among them Burma is the highest in the percentage and Kachin is the least in the percentage. Foreign immigrants such as Chinese, Indian and other also reside in the region.

CHAPTER IV

Agricultural Inputs and Paddy Production in Bago Region

4.1 Types of Paddy

There are three types of paddy which are being mainly cultivated and produced in Myanmar. Bago Region is also observed that cultivation is running with these three kinds of paddy. They are short-term, medium-term (HYV- High Yield Variety which is not different much from long-term) and long-term. Short-term consists of Yadanar Toe, YadanarAung, Shwe Myanmar (90 days), PyiDaw Yin, ShwePyiHtay, TheeHtat Yin, MR-9 and sticky rice, etc. long-term consists of KyawZayya, YarYarHtun, Water Tolerant, Paw San Hmyoae, Shwebo Paw San, InnmaYaebaw, Ayeyar Min, TaungPyanHmyoae, Yarsabar(farm rice), NgaSein, Ziyar and Mee Pone, etc. Medium-term includes ManawThukha, Sinn Thukha, ShweThwelHtun, PalalThwel, Vietnam, Sinn ThweLatt, KayinmaHtatesaung, Yasinn Lone Thwe, Hmawbe-2 and Taungyarsabar (upland rice), etc.

The period of the plantation of long-term paddy is from 130 days to 150 days. Medium-term paddy takes 100-130 days and short-term's one, 90-110 days. These kinds of paddy are mostly cultivated in September. Clay soil is the most suitable to cultivate them. 60-70 baskets of rice can be gained as the typical yield. Agricultural species can gain about 120 baskets at most. Yield or production rate of them can be varied according to seeds, water, paddy ground and climate.

4.2 Paddy Planting Methods of Bago Region

In Bago Region, paddy is being cultivated and produced by four primary methods of planting. These four planting methods are Transplanting, Direct seeding, Hand-scattered planting, and SRI planting.

(i) Transplanting

The nursery of seedlings (0.10 acre) has to be cultivated for 1 acre of paddy field. From one to one and half tin of seeds must be used for one acre of paddy field. First, good seeds can be obtained by soaking seeds or winnowing seeds with tray. Seeds are soaked, radicle emerged and scattered uniformly in the nursery. 25-30 day-seedlings are transplanted in rows to paddy field.

(ii) Direct seeding

The rate of seed, using for one acre of nursery is used 1.5 to 2 baskets of seeds. The cultivation can be carried out by soaking seeds and lining radicles in row, or making rows, placing seeds by hand or placing in rows by using drum seeder.

(iii) Hand-scattered planting

From one and half to two and half baskets of seeds must be used. Planting procedure is soaking seeds to emerge radicles and scattering them to the paddy field uniformly.

(iv) The System of Rice Intensification Planting

SRI (The System of Rice Intensification) is a method of planting which acts on improving the quality of necessary concepts and practical processes to conduct cases that deal with necessary seedling, fertilizer, and nutriment in cultivated area. SRI is neither a new rice species nor a hybrid. It is just a planting method. Any kind of rice is can be cultivated by SRI planting method. Therefore, rice which is suitable for the region of the paddy can be cultivated by using SRI. Since this method produces health seedlings, it makes the yield to be good. This method is the one to gain benefits at most for people who have limited land, investment, labor, and water.

In this method, using seed are 10 cans for one acre. Seeds are planted in nursery in shape of mat and shifted to paddy field after 8 to 12 days. The reasons of gaining high by planting with SRI method are (1) planting in much spacing, (2) shifting seedlings when they are young enough, (3) placing seeds into the soil, (4) using less seeds, (5) reducing necessity of water, and (6) using organic humus.

Benefits can be obtained by planting in SRI method. The advantages of SRI method are (1) costs can be saved due to less necessity of seed (10 cans per acre), (2) the use of water is less since the paddy field is applied by dry system, (3) Since fertilizers and pesticides are not used, the expense of them can be reduced, (4) being tasteful and hygienic is obtained as the outcome of organic agriculture, (5) enormity in propagation, lengthen in stem and seed-head, and high yield with weighted seeds, (6) seeds can be extracted from the original seeds, (7) in the same type of rice, life duration of plants or seedlings is 10 days less than that of traditional planting method, (8) soil deposits since the physiology occurs rapidly, and (10) in the same size of

seeds, seeds of this method are heavier than others, the percentage of containing brans and shells is less and so is debris, such advantages can be gained.

4.3 Land Utilization of Bago Region (2010-2016)

The total land with area of Bago Region is (9,737,043) acre. According to 2016-2017, the total agricultural land is (33,33951) acre. Land utilization of Bago Region is mainly divided into five. They are total agricultural land, forest reserves, other forest acre, cultivable wastelands and other lands. Total agricultural land consists of net sown area and fallow land. Other lands include (a) mining lands, (b) railway land, (c) irrigation land, (d) road land, (e) industrial land, (f) airfield land, (g) lake land, (h) grazing land, (i) underwater land, (j) urban land, (k) rural land, (l) religious and graveyard land, (m) others. Land utilization of Bago Region can be seen in Table (4.1).

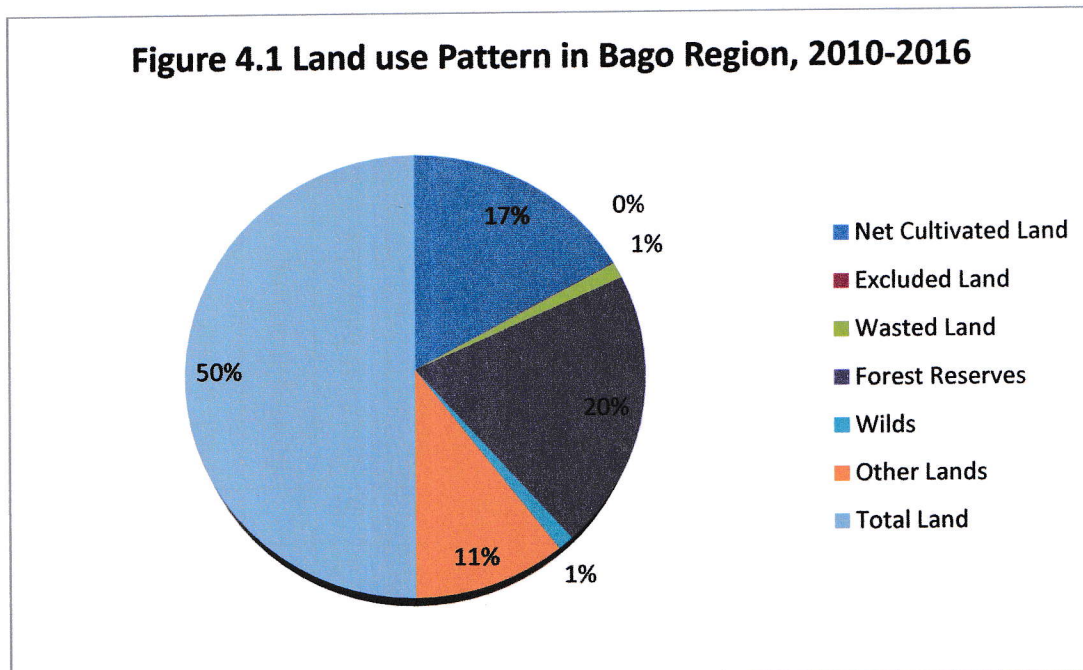
According to Table (4.1), the net sown acre of 2010-2011 (3,312,182) has increased to (3,330,100) acre in 2016-2017. The fallow land which possessed (5,384) acre in 2010-2011, has decreased to (3,851) acre in 2016-2017. Similarly, then, cultivable waste lands, forest reserves, other forest area and other lands have respectively decreased. Other lands which possessed (2,022,067) acre in 2010-2011 have increased to (2,132,267) acre in 2016-2017. Agricultural lands have increased since the government is encouraging crops production.

Table 4.1 Land Utilization of Bago Region (2010-2011 to 2016-2017)

Year	Net Sown Acre	Fallow Land	Cultivable Waste Land	Forest Reserves	Other Forest Acre	Other Land	Total
2010-2011	3,312,182	5,384	227,529	3,950,433	219,448	2,022,067	9,737,043
2011-2012	3,309,929	8,509	215,031	3,950,422	214,794	2,038,358	9,737,043
2012-2013	3,314,747	8,354	211,261	3,950,422	212,676	2,039,583	9,737,043
2013-2014	3,253,765	7,465	212,711	3,937,002	201,498	2,124,602	9,737,043
2014-2015	3,291,039	6,244	202,877	3,927,745	193,023	2,116,115	9,737,043
2015-2016	3,323,388	5,698	181,118	3,910,420	189,654	2,126,765	9,737,043
2016-2017	3,330,100	3,851	173,090	3,910,420	187,315	2,132,267	9,737,043

Source: Department of Farmland Management and Statistics (Bago Region)

Figure 4.1 Land use Pattern in Bago Region, 2010-2016



Source: Table (4.1) Land use Pattern in Bago Region, 2010-2016

4.4 Firm Equipment Utilization

In accordance with the agriculture of Myanmar is transforming from manual farming into mechanical farming, tractors and push tractors are being used to harrow, and pump, threshing machines, harvesters are made to use in the whole Myanmar. Nowadays, modern machines and equipment are being used instead of previous conventional cultivation methods. The role of mechanical farming is also important in farming sector. From the seeds planting to harvesting, agricultural machinery devices are very crucial. Time and manpower can be saved by using agricultural machinery devices. The utilization of agricultural machinery devices are divided into state-owned and private-owned. By the cooperation of government sector and private sector, agricultural machinery devices are being distributed cheaply to farmers. Department of mechanical farming is presenting educate presentation to famers such as agricultural demonstrations as the famers' desire.

Machines such as tractor, push tractor, sowing machine, combine harvester (machine which can do harvesting and threshing at the same time), harvester, threshing machine and pump are being used in Bago Region. In this region, push tractors are being used at most and sowing machines, at least.

The status of agricultural machinery devices utilization of Bago Region is shown in following Table (4.2).

**Table 4.2 The status of agricultural machinery devices utilization of Bago region
(2016-2017)**

Sr.	District	State - owned							Private - owned						
		Tractor	Push tractor	Sowing machine	Combine harvester	Harvester	Threshing machine	Pump	Tractor	Push tractor	Sowing machine	Combine harvester	Harvester	Threshing machine	pump
1	Bago	91	7	-	19	3	3	2	2,210	23,824	1	188	174	1,032	3,728
2	Taungoo	84	7	-	14	3	1	-	460	7,609	-	68	85	1,463	1,988
3	Pyay	77	-	-	8	3	8	-	301	6,148	22	30	11	1,810	3,001
4	Thararwaddy	127	6	-	19	2	-	-	537	16,853	-	249	45	1,520	9,753
The whole region		379	20	-	60	11	12	2	3,508	54,434	23	535	315	5,825	18470

Source: General Administration Department (Bago Region)

4.5 Land and Cattle Utilization

It was found that some farmers are still using cattle as the conventional methods in Bago Region. Cows are mostly used and in some cases, buffaloes. As farming devices or equipment, plows and furrows are still being used. During transforming from manual farming to mechanical farming, such farming devices and cattle are still important as well. According to 2016-2017 survey, it was observed that the number of plow, furrow and the number of cattle is increased, shown in Table 4.3.

Table 4.3 The quantity of plow, furrow and cattle of Bago Region (2016-2017)

Sr.	District	The number of plow	The number of furrow	The number of cattle	The number of cows
1	Bago	135,284	129,748	144,995	255,427
2	Taungoo	89,321	87,934	63,345	169,886
3	Pyay	99,114	97,174	53,112	259,632
4	Tharyarwaddy	119,335	103,177	10,280	197,508
The whole region		443,054	418,033	271,732	882,453

Source: General Administration Department (Bago Region)

4.6 Paddy production of Bago Region (2005-2006 to 2016-2017)

Bago Region is the region which is rich in water resource since Ayeyarwaddy river, Sittaung river and Bago river are situated in that region. In addition, there are dams, dykes, lakes and drainages. Bago Region is the second most paddy produced region in Myanmar. Due to fine soil, rice, oilseeds, industrial raw crops can also be cultivated. Bago Region is mainly cultivating monsoon paddy, then summer paddy (hybrid) is also being cultivated yearly. In Myanmar, summer paddy is mainly cultivated in Bago Region, Yangon Region and Ayeyarwaddy Region. It was cultivated in the whole country since (1993-1994). The government encouraged to cultivate summer paddy as a project. Water is necessary for cultivation that is carried out to get convenience by using five ways and farmers were given incentives from all sides to cultivate summer paddy. Summer paddy cultivation is the business that supports the rice surplus of Myanmar.

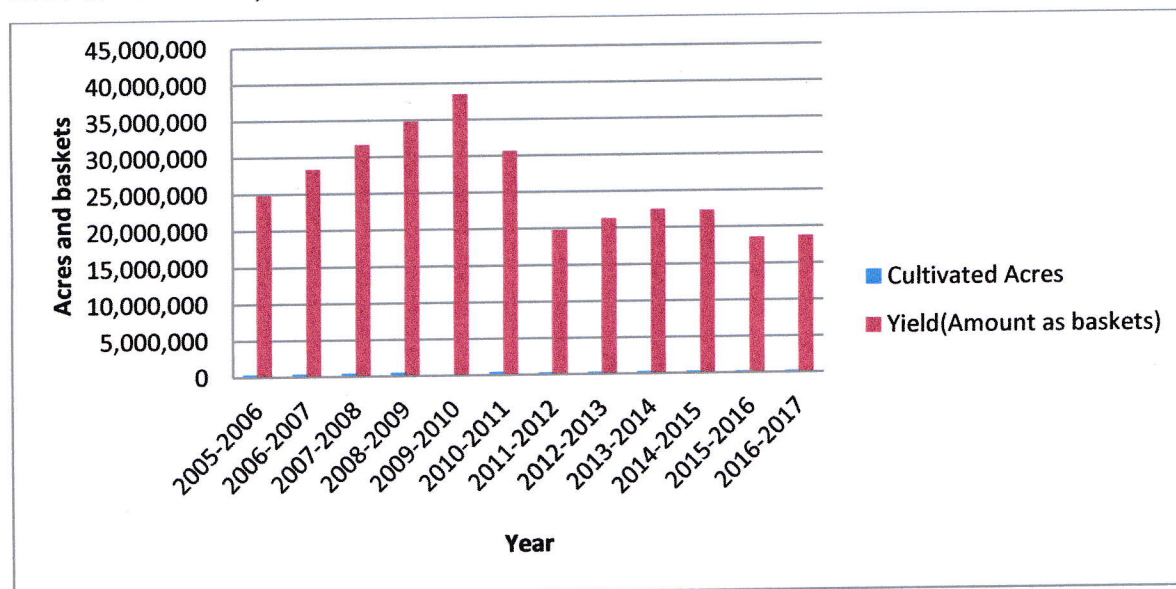
Cultivating summer paddy is extending cultivation area after managing water supply issues on the current cultivated land. In Rice cultivated areas, cultivate rice was regarded as summer paddy from October to end of April. The status of the cultivation and production of summer paddy and monsoon paddy of Bago Region are listed in Table (4.4) and Table (4.5).

Table 4.4 Summer Paddy Cultivation and Production of Bago Region (2005-2006 to 2016-2017)

Year	Cultivated Acres	Harvested Acres	Yield(rate)	Yield(Amount as baskets)
2005-2006	321,457	321,457	77.35	24,865,333
2006-2007	361,608	361,394	78.51	28,373,932
2007-2008	400,565	400,285	79.16	31,688,448
2008-2009	431,084	431,084	80.80	34,833,168
2009-2010	474,694	474,694	81.13	38,513,841
2010-2011	389,048	389,048	78.87	30,683,764
2011-2012	247,954	247,954	79.87	19,803,526
2012-2013	258,660	258,660	82.36	21,303,180
2013-2014	269,816	269,816	83.31	22,479,559
2014-2015	264,700	264,700	84.26	22,304,132
2015-2016	215,598	215,598	86.16	18,576,064
2016-2017	217,955	217,955	85.94	18,730,766

Source; Ministry of Agriculture, Livestock and Irrigation Department (Bago Region)

Figure 4.2 Summer Paddy Cultivation and Production in Bago Region (2005-2006 to 2016-2017)



Source: Ministry of Agriculture, Livestock and Irrigation Department (Bago Region)

In Table (4.4), the cultivated acre, harvested acre, production rate (yield rate) and the number of basket (yield) are described from 2005-2006 to 2016-2017 yearly. (321,457) acre of land was used as cultivated acre of summer paddy in 2005-2006, the yield was (24,856,333) baskets and the rate of production was (77.35). In 2006-2007, the cultivated acre increased to (361,608) acre. The yield increased to (28,373,932) baskets and the rate of production also increased to (78.51).

In 2007-2008, the cultivated acre used about (400,565) acre and the yield was (31,688,448) baskets, the production rate was (79.16). The cultivated area increased to (431,084) in 2008-2009 and the yield increased to (34,833,168) baskets.

In 2009-2010, the total cultivated acre was (474,694) acre and then decreased to (389,048) acre by the year 2010-2011. (38,513,841) baskets, the yield, in 2009-2010, decreased to (30,683,764) baskets in 2010-2011. The production rate also decreased to (81.13) to (78.87).

The acre, total 247,954 acres used as cultivated acre in 2011-2012, the total 9,803,526 baskets of yield, and the production rate was 79.87. In 2012-2013, the cultivated acre increased to (258,660) acre and the yield increased to (21,303,180) baskets as well, and the rate of production increased to (82.36).

By the year 2013-2014, the cultivated acre was (269,816) acre, and the yield was (22,479,559) baskets. The rate of production gained about (83.31). In 2014-2015,

the cultivated acre decreased to (264,700) acre, the yield decreased to (22,304,132) tin, but the rate of paddy production increased to (84.26).

In2015-2016, the total cultivated acre was (215,598) acre and then increased to (217,599) acre by the year 2016-2017. Although the yield had increased from (18,576,064) baskets to (18,730,766) tin, the production rate slightly decreased from (86.16) to (85.94).

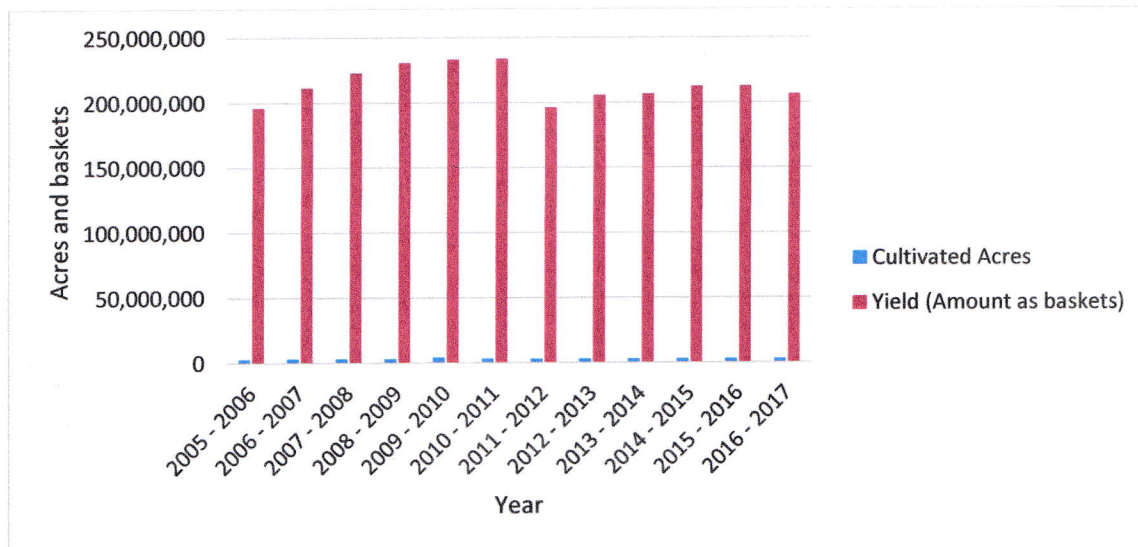
There are fluctuations of yield depending on the rate of production and cultivated area. The yield and production rate depend on labor capital and management on utilization of inputs within the workplace. Additionally, the yield can be varied according to the fluctuation of grain prices and the weather. The status of the cultivation and production of monsoon paddy of Bago Region is shown in Table (4.5).

Table 4.5 Monsoon Paddy Production of Bago Region (2005-2006 to2016-2017)

Year	Cultivated Acres	Harvested Acres	Yield (rate)	Yield (Amount as baskets)
2005 - 2006	2,760,595	2,757,571	71.10	196,020,955
2006 - 2007	3,007,789	2,949,468	71.71	211,513,103
2007 - 2008	3,011,004	3,004,223	74.18	222,861,574
2008 - 2009	3,025,066	3,024,766	76.27	230,700,782
2009 - 2010	3,942,007	3,040,847	76.71	233,261,870
2010 - 2011	3,045,348	3,044,439	76.82	233,873,823
2011 - 2012	2,806,561	2,788,052	70.39	196,243,026
2012 - 2013	2,767,936	2,743,893	74.97	205,711,059
2013 - 2014	2,757,862	2,726,294	75.83	206,745,775
2014 - 2015	2,761,549	2,744,104	77.41	212,415,829
2015 - 2016	2,764,603	2,720,566	78.14	212,597,049
2016 - 2017	2,742,500	2,667,335	77.43	206,538,500

Source: Ministry of Agriculture, Livestock and Irrigation (Bago Region)

Figure 4.3 Monsoon Paddy Production of Bago Region (2005-2006 to 2016-2017)



Source: Ministry of Agriculture, Livestock and Irrigation Department (Bago Region)

In Table (4.5), the cultivated acres, the rate of production and the yield are described yearly from 2005-2006 to 2016-2017. The cultivated acres of monsoon paddy are more than that of summer paddy and so is the yield. Summer paddy has been cultivated to support total rice production and consumption after 1992's.

The cultivated acres of monsoon paddy were increasing yearly from 2005-2006 to 2009-2010, yield and production rate were also increasing. During 2010-2011 to 2013-2014, there were consecutive declines in cultivated acre. Although cultivated acre decreased, the yield and production rate were increasing in 2010-2011. In 2011-2012, yield and production rate decreased as the cultivated acre decreased. The yield and production rate were decreasing though cultivated acre decreased in 2012-2013 and 2013-2014. In 2014-2015 and 2015-2016, cultivated acre re-increased, yield and production rate re-increased as well.

By the year 2016-2017, cultivated acres decreased and so did the yield and production rate. By comparing 2005-2006 and 2016-2017, the yield increased from (196,020,955) baskets to (206,538,500) baskets although the cultivated acre decreased from (2,760,595) acre to (2,742,500) acre. The production rate also increased from (71.1) to (77.43).

Yield has variations depending on cultivated acres and production rate. Carrying out to increase yield yearly is based on availability to expand cultivated acres, using inputs systematically, ability to change techniques, giving instructions to farmers, systematic cultivation, preventing natural disasters, providing awareness,

surveying systematically by the Ministry of Agriculture and Irrigation, and saving agricultural data systematically, etc. By increasing yield in each district, the consumption of the whole country will be sufficient and the country will be able to export rice to foreign countries to gain foreign income. Producing good seeds and paddy varieties must be done.

4.7 Paddy Production of the Districts inside Bago Region (2005-2006 to 2016-2017)

There are four districts in Bago Region. These districts are Taungoo District, Bago District, Pyay District and Tharyarwaddy District. All districts are producing paddy. The schedule of the paddy cultivated area and production is shown in Table (4.6). According to Table (4.6), rice cultivated area and production (baskets; the unit of measure) of each district is displayed.

Table 4.6 Paddy cultivated acres and production of districts inside Bago Region (2005-2006 and 2016-2017)

Sr.	District	Cultivated Acres		Production (Baskets)	
		2005-2006	2016-2017	2005-2006	2016-2017
1	Taungoo District	549,379	594,230	42,989,439	48,862,537
2	Bago District	1,236,323	1,252,402	85,066,939	95,955,969
3	Pyay District	511,476	403,499	35,611,801	30,571,172
4	Tharyarwaddy District	784,874	710,324	57,218,109	49,879,588
Total		3,082,052	2,960,455	220,886,288	225,269,266

. Source; The Ministry of Farming and Irrigation (Bago Region)

According to the Table (4.6), Bago District is the one which cultivates and produces paddy at most in Bago Region. In 2005-2006, Bago District used (1,236,323) acre of land as the cultivated acre, and its total baskets of paddy produced was (85,066,939) baskets. In 2016-2017, it was observed that paddy cultivated acre had increased to (1,252,402) acre and the total baskets of paddy produced had obviously increased to (95,955,969) baskets.

Tharyarwaddy District is the second most paddy produced district. (784,874) acre of cultivated acre was used in 2005-2006. The total baskets of paddy produced was (57,218,109) baskets. By the year 2016-2017, it was found that the cultivated

acre had decreased to (710,324) acre, and the total baskets of paddy produced had decreased to (49,879,588) baskets.

Taungoo District is the most paddy produced district, third of Bago region. According to 2005-2006, the cultivated acre was (549,379) acre and then, in 2016-2017, it had increased to (594,230) acre. In total baskets of paddy produced, (42,989,439) baskets of 2005-2006 had increased to (48,862,537) baskets in 2016-2017.

In these four districts, Pyay District is the one which produces paddy at least. (511,476) acre of cultivated acre was used in 2005-2006. The total baskets of paddy produced was (35,611,801) baskets. In 2016-2017, the cultivated acre had decreased to (403,499) acre and the total baskets of paddy produced had decreased to (30,571,172) baskets likewise.

According to Table (4.6), in Bago Region, Bago District and Tharyarwaddy District are producing paddy at most and there is a growth in cultivated acre and the total baskets of paddy produced. , Pyay District and Tharyarwaddy District are producing paddy and not only cultivated acre but also paddy produced are decreasing on the total baskets. Although the total cultivated acre of Bago Region had decreased from (3,082,052) acre of 2005-2006 to (2,960,455) acre in 2016-2017, the total baskets of paddy produced had increased from (220,886,288) baskets of 2005-2006 to (225,269,266) baskets in 2016-2017 due to the good production rate of paddy.

CHAPTER V

Conclusion

5.1 Findings

Myanmar's economic system has been shifted from a central of planned economy to a market oriented economy since 1988-1989. During the transition period of market economy after 1988, agricultural sector was gradually liberalized in such areas as choice of crop pattern, compulsory selling, and trading including export. Under market oriented economic system of the government, it is obvious that the farmers are likely to grow more profitable rice than other before. Along with the opening of market economy, farmers in Myanmar possess an opportunity of selling out their products directly to open market and has gain more profits. The government's main objective in agriculture has been to grow sufficient rice to feed the population and to have a surplus for export. Additionally, high yield varieties of seeds, diesel for pumps and for machines, fertilizer and seasonal loans were supported to the selected crops. The effects were significant in yielding and in sown acreage expansion so that total agricultural production increased year by year.

Bago region is one of the agricultural productions for export. Social and Economic conditions of people in this region are mainly depend on an agricultural products such as paddy, maize, pulses, oilseeds and industrial crops, the agricultural contribution to GDP in Bago region was 18% in 2015-2016. According to the overall land use data available from government sources, there is still a large area of arable land left unutilized. Bago region still has (173090) acres of cultivable waste lands. By the cooperation of government sector and private sector, agricultural machinery devices are being distributed cheaply to farmers. The utilization of agricultural machinery devices are divided into state-owned and private-owned. Department of mechanical farming is presenting educate presentation to farmers such as agricultural demonstrations as the farmers' desire. Machines such as tractor, push tractor, sowing machine, combine harvester, harvester, threshing machine and pump are being used in Bago region. During transforming from manual farming to mechanical farming, such farming devices and cattle are still important as well. According to 2016-2017 survey, it was observed that farmers are still being used farming devices or equipment, plows and farrows.

The region has its own potential of growth and importance in the Myanmar economy. It can be expected that this situation will persist in the future because there is ample scope for increases in paddy yields, so that total output can still grow. Bago region is mainly cultivating monsoon paddy, then summer paddy (hybrid) is also being cultivated yearly. During the study period, in Bago region, Bago district and Tharyarwaddy district are producing paddy at most and there is a growth in cultivated area and the total baskets of paddy produced. Although the total cultivated area of Bago region had increased from (3,082,052) acre of 2005-2006 to (2,960,455) acre in 2016-2017, the total baskets of paddy produced had increased from (220,886,288) baskets of 2005-2006 to (225,269,266) baskets in 2016-2017 due to the good production rate of paddy. Since rice is the main source of foreign exchange for importing capital goods. Bago region plays an important role in Myanmar economy.

5.2 Suggestions

In general, the total cultivable waste land can be turned into cultivated lands, it is indeed totally unnecessary even to mention how much good it will do for the advantage of the region and the people. It is important to transform from traditional farming to mechanized farming in order to achieve the agricultural development of the region. The government should provide much opportunity to the exporters to export agricultural products and quality paddy and related input materials such as fertilizer, pesticides, high quality paddy seeds, technologies and agricultural loans to the farmers.

Private Seeds Company should be encouraged for the long-term. Productivity improvement is a major component engine of true growth and development. For the productivity improvement, human resource development program (HRD) is essential. Well qualified person are required to undertake the effective research and development program (R & D). Therefore, the person who may concerned with paddy production are allowed to attend local training. Agricultural promotion activities and necessary supportive measure should be sufficiently provided that as to up-grade production and exports of these crops. Since Bago region is suitable for double cropping like rice-pulses and pulses, these areas should be specialized as agricultural zones. These agricultural zones should play similar roles like agriculture projects with specific objectives and targets to be implemented. With these kinds of strategic approaches to agricultural intensification is not only land-use will be more

economically effective but will also contribute more to export. Bago region would be developed productivity in agriculture sector year by year. All people will be high living standard.

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