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Contents

Summer Paddy Cultivation in Hlegu Township

Win Pa Pa Myo

Abstract

This paper studies summer paddy cultivation in Hlegu Township. Being staple food, paddy cultivation plays an important role in Myanmar. People lived in rural areas mainly depend on agriculture and most farmers in rural areas cultivate paddy. The paper highlights weakness in summer paddy cultivation. Population has been increasing at an accelerating rate in Yangon Region and in Hlegu Township. As its chief economy is based on agriculture, it can somewhat satisfy the high food demand of Yangon City. In order to boost agricultural produces, to convert the waste land into agricultural land, to reduce the intensity and magnitude of flood over the low-lying areas, and to supply potable water to the increasing population of Yangon City, several dams were constructed within Hlegu Township after 1990. This caused an obvious change in the land cover of the township. To highlight the changes, a 25-year period (1990 and 2015) is used as a base for detailed study. Land cover data were obtained from satellite image data. To do the research work, primary and second data were collected through 5 field trips. Physical factors and human factors, data and information obtained from library, departments concerned, field surveys and interviews are organized and analyzed.

Key words: summer paddy, land cover change

Introduction

Hlegu Township is located in urban fringe area and it is one of the townships in the northeastern part of Yangon Region. It is 46.67 km from the downtown of Yangon City. It is a marginal area of the division and it can share the burden of congestion in the developed parts of Yangon City. In Myanmar, about one third of the population depend mainly on agriculture especially paddy cultivation. Rain-fed lowland paddy is grown extensively. Rain-fed lowland paddy field is divided in to two kinds, these are monsoon and summer paddy cultivation. Monsoon paddy is extensively cultivated due to water availability from monsoon rain. Monsoon paddy is sown in mid-June and harvested in October or November. Summer paddy needs irrigation water. In order to boost agricultural produces, to convert the waste and vacant land into agricultural land, to reduce the intensity and magnitude of flood over the lowlying areas, and to supply potable water to the increasing population of Yangon City, several dams were constructed within Hlegu Township after 1990. The Ngamoeyeik Creek -flows across the middle section -is the most important for navigation with boats throughout the year carrying agricultural and forest products from north to south and vice versa. The Ngamoeyeik - joins the Yangon River often passing through North Okkalapa Township. Bala Creek is one of the tributaries of the Ngamoeyeik and the boundary line between Hlegu and Mingaladon townships.

Aims and objectives

- to know the past and present land cover situation,
- to study physical factors and its effects on the paddy cultivation of Hlegu Township
- to assess the extent of agriculture land use and
- to point out summer paddy cultivation

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Methodology

In presenting the physical factors and human factors, data and information from library, departments concerned, field surveys and interviews are organized and analyzed. Land cover data obtains from satellite image data. The facts and data available are tabulated, calculated and presented in diagrams. Some maps and data analyze by using GIS technique. For land cover map, Remote Sensing and GIS techniques were used for the data analysis. Other secondary information were collected from various sources and used in the study. An intensive field trip with GPS was organized .During the field trip, informal interviews were conducted with government staff and local people and questionnaires were distributed to the local people and collected. Statistical analyses for these training areas were performed to find out their consistency. The facts and data available are tabulated, calculated and presented in diagrams.

Study Area

Hlegu Township situated between north latitudes 16°55′ and 17° 40′ and between East longitudes 96° 0′ and 96° 25′. This area is located in the north-eastern part of Yangon Region. Hlegu Township is located about 29 miles away from Yangon City and in fringe area of Yangon Region. (Figure 1). It has an area of 1495 sq. km and represents 14.25 percent of Yangon Region (Myint Thida, 2011). Hlegu Township consists of 5 wards and 52 village Tracts .It is located on the Yangon-Bago High Way Road, produces in the area are easily carried to Yangon City and its location supports agriculture and drinking water of the area.

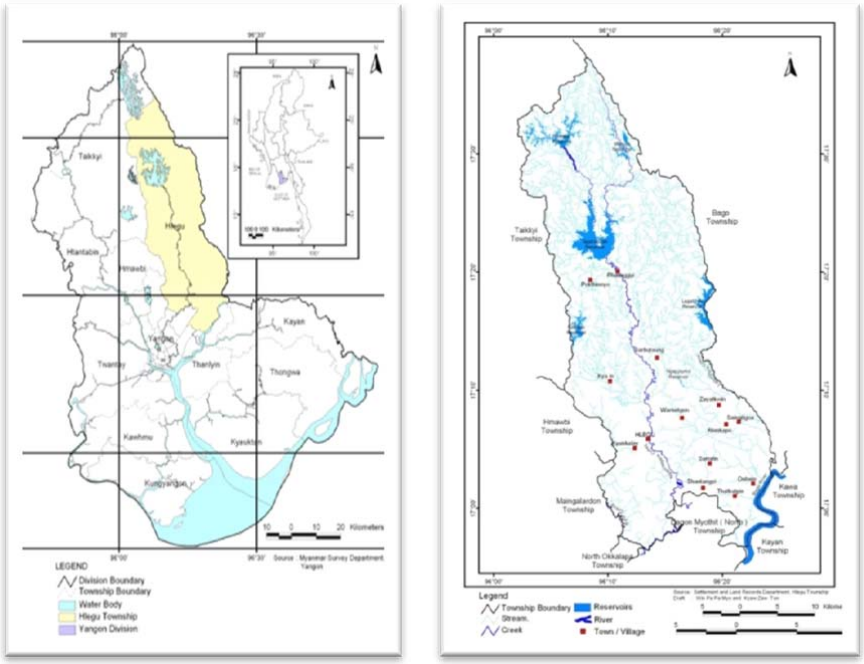

Figure 1 Location of Hlegu Township

Source: Land Records Department, Hlegu Township

Geographical Background of the study area

The northern and eastern parts of Hlegu Township are relatively higher than the southern part. The low land area is found in the south and along the Ngamoeyeik .(Figure 2). It is an alluvial plain formed by the deposition of silt carried by Ngamoeyeik and its tributaries. These flat lands support the paddy cultivation. Hlegu Township which occupies the southeastern margin of Ayeyarwady deltaic region is flanked by low hills and mountain spurs of Bago Yoma in the north and northwest. The relief of the township generally slopes towards the south. Accordingly most streams take their sources from the hilly region of the north and drain towards the south. The region has tropical monsoon climate and enjoys the southwest monsoon.The rainfall is abundant for rice cultivation. The existing climatic conditions support paddy cultivation of the area. Soil is important for agriculture of the township and formed as different types depending upon the topography, drainage and natural vegetation of the area. In Hlegu Township, soils of the study area vary from place to place. Among these soils types, Alluvial soils, Alluvial Meadow Soils, Brown Meadow Soils, Meadow Gley soils are favourable for paddy cultivation of the study area. But, the northern and eastern parts of the Township are lateritic soil.

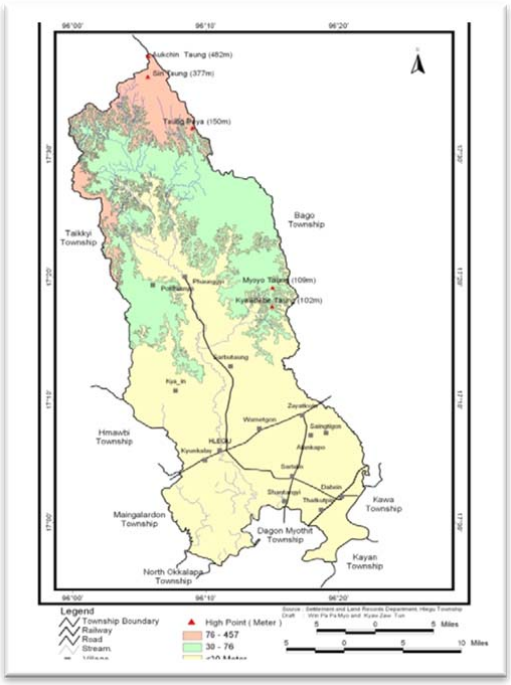

Figure 2 Relief of Hlegu Township

Source: Land Records Department, Hlegu Township

Changes of Land Cover

According to satellite image data, land cover of Hlegu Township is classified into 8 types and land use divided into 7 types. The change of land cover between 1990 and 2015 is presented in Figure 3.According to figure 4, in 1990 the agricultural land was 32 percent and it increased to 45 percent in 2015. The increase in agricultural land was mainly due to the construction of reservoirs which provide water in the dry season to the lands once left as wastes. Consequently, the area of cultivable waste land had contracted sharply from 19 percent to 1 percent. This change is noteworthy as the waste land has become productive farmland, enhancing to some extent, the development of the rural area. The construction of several

reservoirs and related infrastructures for irrigation and the extension of land used for military purpose have resulted in the reduction of forest land area from 36 percent to 24 percent. The sharp decrease was largely on account of the removal of forest for the facilitation of irrigation infrastructure, based on the concept that irrigated farmland would be productive in the long run than forest land.

In 1990, settlement land area was only 4 percent, but it has increased sharply in 2015 to 21 percent. With the increase of population, settlement and industrial lands have also increased, further expanding the area of land not available for cultivation. Water body area has also increased from 2 percent to 7 percent because of construction of reservoirs. The increase in Transportation that was mainly due to the construction of Transportation land is also increasing. Pasture land area was 6 percent in 1990 decreased to 1percent in 2015. The decrease in pasture land was mainly due to construction of road, extension of settlement land, for military purposes and construction of reservoirs.

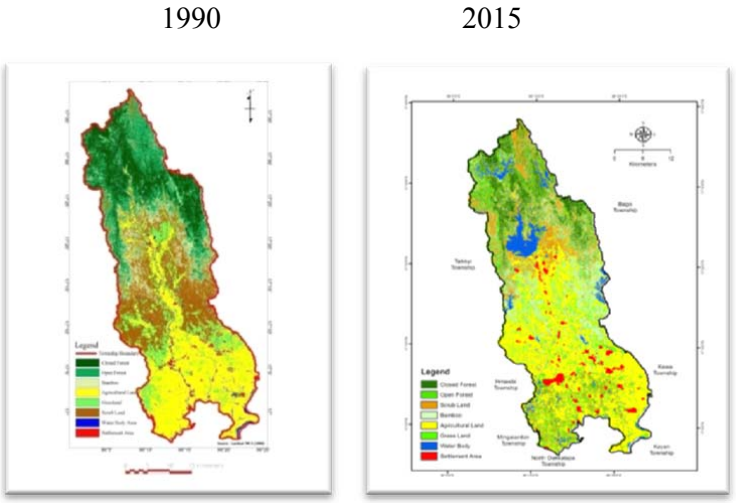

Figure 3 Land Cover of Hlegu Township

Source: Landsat TM 7+, 132-48

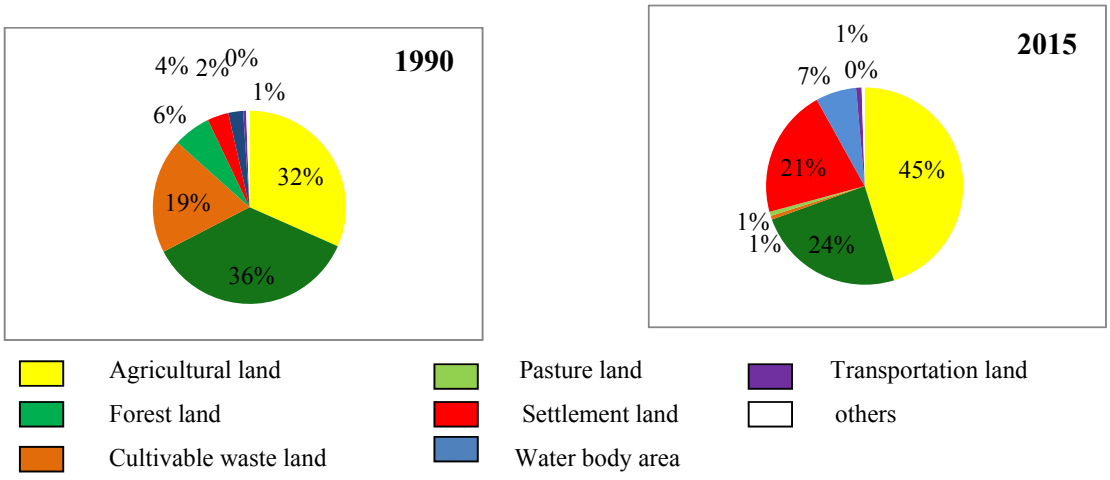

Figure 4 Changes of Land Use in Hlegu Township

Source: Land Cover Map and Field Survey

Change of Agricultural Land Use

Agriculture is the most important economic activity of the study area and thus much of the land is used for cultivation. The fertile alluvial plain along the central portion, drained by the Ngamoeyeik Creek as well as the southern portion are suitable for the successful cultivation of the township. In 1990-91, the agriculture land use was 47759 hectares which account for 32 percent of the township area. The agriculture land area gradually increased 64519 hectares in 2014-2015(45%)

Types of Agriculture Land

The cultivated land of Hlegu Township can be classified into three types. These are wet or Le land, garden land and Dhani land. Le land occupies flat alluvial plain it is the most dominant type of cultivated land in Hlegu Township. These are found in the southern part of township. Monsoon paddy is mostly cultivated in rainy season and summer paddy in the hot season by irrigation. In 1995-96, there were 39544 hectares of Le land. Le land area decreased to 38877 hectares in 2014-2015. The area of Le land usually depends on the climatic conditions and partly on the socio-economic factors.

Garden lands occupy the eastern, western and northern parts of the township where lateritic soils are dominant. The area of garden land in Hlegu Township was 27299 hectares in 1995-96. After 1995-96, the area of garden land gradually increased and it reached to 30959 hectares in 2014-15. The area has been gradually expanding at the expense of degraded forest land and waste land. The increase was due to the lack of capital investment for growing perennial crops and vegetable and flowers.

The area occupied by Dhani land has 106 hectares. The acreage remained unchanged in the period from 1995-96 to 20015-2016.

Paddy Cultivation in Hlegu Township

The paddy is cultivated mostly in Hlegu Township. Monsoon paddy area is under rain fed conditions and the summer paddy is cultivated only by irrigation using reservoir. According to Table 1 and figure 5 , the cultivated area of monsoon paddy occupied 37220 hectares in 1995-96. The cultivated area of monsoon paddy was gradually decreased to 36040 hectares in 2014-15. Farmers practice traditional cultivation in monsoon paddy cultivation. The cultivated of summer paddy occupies 15125 hectares in 1995-1996. In 2014-2015, the cultivation of summer paddy decreased to 12198 hectares. Summer paddy cultivated areas are concentrated in the southern part of the area.

Table 1 Changes of paddy cultivated area in Hlegu Township

Year	Monsoon Paddy	Summer Paddy
	Hectares	Hectares
1994-1995	36927	1877
1995-1996	37220	15125
1999-2000	35266	15764
2014-2015	36040	12198

Source:Agriculture Department,Hlegu Township

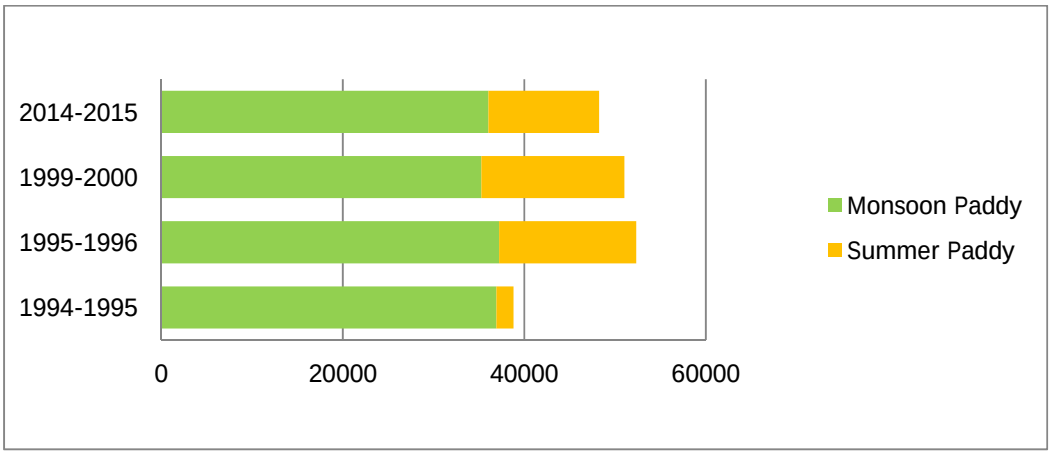

Figure 5. Changes of Paddy Cultivation in Hlegu Township

Source: Based on Table 1

Water availability is important in summer paddy cultivation and irrigated water is sometimes insufficient for summer paddy cultivation. In that period, farmers try to cultivate other crops that do not need much water for cultivation.

Water Availability for Summer Paddy Cultivation

Bago River, Ngamoeyeik, Lagunpyin and Balar Creeks, sources for summer paddy cultivation, take their sources from the northern part of the ranges and hilly region and BagoYoma. Irrigation is artificial application of water for growing crop during dry periods. The types of irrigation system for summer paddy cultivation are dam and reservoir irrigation, river water pumping irrigation, well irrigation. The Ngamoeyeik Dam is one of the large-scale irrigation and it is situated in Hlegu Township. Ngamoeyeik Dam is the most important source of irrigation water for summer paddy cultivation. Ngamoeyeik Dam project was started in November 1992 and completed in March 1995. Its main dam was constructed across Ngamoeyeik Creek. It is not only supplier to summer paddy cultivation in Hlegu Township but also to supports useable water for the urban population of Yangon City in daily.

Spatial Distribution of Summer Paddy cultivation

In agriculture sector, Irrigation plays a major role of the summer paddy cultivation area. The Ngamoeyeik Dam supports irrigation water for summer paddy in Hlegu Township. The location of canal system is a supporting factor for summer paddy cultivation. In Hlegu Township, the different types of canals irrigation are found. Northern part and middle part are less canal system, so, it causes the farmers lessen their intension for irrigated summer paddy and loaded by higher labour input and investment, and then lessen the summer paddy areas. The summer paddy was started in 1995 after construction of the Ngamoeyeik Dam project in Hlegu Township. In Yangon Region, Hlegu Township possesses irrigated agricultural land. Summer paddy is mostly cultivated crop in Hlegu Township. But summer paddy concentration varied from place to place. No summer paddy cultivated areas are founded in northern part of Hlegu Township such as HpaungGyi (West), Ma Yan Chaung, Ngar Su Taung, And Poke Thin Nyo. Monsoon paddy, pulses, rubber, groundnut, vegetables and other crops are grown in these areas. The most of summer paddy cultivating areas are found in the southern part of Hlegu Township. Tha Nat Pin, Bar Lar and Ta Dar Gyi are major summer paddy cultivating areas.

Meadow Gley soils are found in this areas.Table 2 Production of Summer Paddy in Hlegu Township (1995- 2015)

Years	Cultivated Area (Acres)	Hectares	Mature Acre	Yield Per Acre	Production Baskets
1995-96	37375	15125	37375	77.24	2886845
1999-2000	38984	15764	38974	67.79	2642386
2005-2006	30021	12149	30021	81.25	2439206
2010-2011	32250	13051	32250	81.02	2367234
2014-2015	30141	12197	30141	82.39	2507966

Sources: Agriculture Department, Hlegu Township

During the first 5 years from 1995-96 to 1999-2000, summer paddy cultivated area increased to 15764 hectares from 15125 hectares. But yield of per acre was decreased to 67.79 baskets from 77.24 baskets during that period due to labour shortage. In 2005-2006, summer paddy cultivating area was 12149 hectares, and then increase to 12197 hectares in 2014-15. However, the yield of summer paddy per acre increased to 82.39 baskets from 81.25 baskets due to experience of farmers, knowledge and using mechanizing for summer paddy cultivation.

Findings and Conclusion

Change in summer paddy cultivating area is clearly found in Hlegu Township. These changes are caused by the effects of physical factors and human factors. Effects of drainage, elevation and soils are distinctly found. In 2014-15, the total cultivated area of Hlegu Township is 64519 hectares which account for 45% of the area. It is the largest landuse type in the township. After the construction of the dam and irrigation system in 1995, the summer paddy cultivating area increased in Hlegu Township.

Therefore, the dam and existing irrigation system are major factors supporting the summer paddy cultivation. Paddy cultivation give low benefit for farmers and sometimes farmers encounter losses. Although farmers really know the effect of fertilizer on production, farmers cannot afford to use sufficient fertilizer owing to the high price of fertilizer is high. Farmers want to use agricultural machinery in paddy cultivation, they cannot afford to buy and small farm size and low accessibility caused by poor roads is major determinant factors in machine use.

Some farmers in the area want to cultivate other crops such as vegetables for the purpose of getting more income. Therefore, paddy cultivation is not beneficial to farmers and farmers do not want to cultivate paddy. According to interview and questionnaire's results, local people get higher net return by cultivating vegetable. Vegetable cultivation only takes about 3 months. Moreover, vegetables can be successfully grown because the roots of the vegetable are too short and existing soils can be transformed by adding some nutrients to the soils. Therefore, vegetable cultivation supports the economy of the local people. According to interview, some famers want to cultivate vegetables because farmers get more income by cultivating vegetables and flower. To be successful in paddy cultivation and to get high income for the farmer, it is needed to educate the farmers in paddy cultivation including fertilizer use to get higher benefit through higher production. Although farmers really

understand that chemical fertilizer affects the paddy production, they cannot use sufficient amount of fertilizer in paddy cultivation due to the high cost of fertilizer. Different relief of the township directly support to uneven distribution of summer paddy cultivating area. Summer paddy area is concentrated in one third of the southern township and decrease in the northern part. In the northern and middle part of Hlegu Township, irrigated canal system is insufficient for summer paddy cultivation. Therefore, farmer prefers to cultivate vegetables such as cash crops rather than summer paddy. Cropping pattern changes are also related to the physical factors institutional factors and socio-economic factors.

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