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Transportation Pattern and Wholesale Sectors in Pyay City

Nwe Yin Min¹, Tun Win², Thin Thin Myat³, Khin Myat Myat Mon⁴

Abstract

Pyay City is located in the transitional zone between the Dry zone of Central Myanmar in the north and the Wet Ayeyarwady Deltaic Region in the south. It is situated on the eastern bank of Ayeyarwady River in Pyay Township, Pyay District, Bago Region. The area of Pyay City is 34.48 sq.km (13.31 square miles or 8521 area). The total population was 116,418 persons in 2019. This paper tried to present the Transportation Pattern and Wholesale Sectors in Pyay City. Pyay City has good communication and transportation in Bago Region. Location of all economic activities in Pyay City is influenced by accessibility, governmental department, universities, private hospital and good transportation. This paper highlights the economic transformation after the construction of Nawaday Bridge and changes in wholesale sector in the period from 1990 to 2019.

Key words: transportation pattern, wholesale sector change

Introduction

Pyay is the second largest City in Bago Region. Pyay is also an exchange center between Upper and Lower Myanmar and Rakhine state. Pyay City is at a junction point. Economic condition and transportation, also develops. The Port of Pyay was the most important function of commodities flow until 1997. Ayeyarwady River is used for carrying of heavy and bulky goods from Pyay to neighbouring regions. Urban expansion rapidly occurs in Pyay City and it becomes commercial center and transportation center for its hinterland. Population growth, urban expansion and transportation sector are changes of urban functions. Spatial distribution of wholesale sector is related to physical factors, transportation, population growth and economic factors.

Study Area

Pyay City is located in the northwestern part of Bago Region. It is situated on the east bank of Ayeyarwady River. Its latitudinal extent is from 18° 45' N to 18° 52' N and the longitudinal extent is from 95° 12' E to 95° 17' E. It has an area of 13.31 sq. miles or 34.48 sq km and consists of ten wards. In 1973, there are seven wards (Nawin, Ywabe, Shwegu, Sinsu, Sandaw, Khittayar Myothit and Kyaunggyi-Odan) in Pyay City. The total population of Pyay City was 69,940 persons in 1973 and it increased to 83,332 persons in 1983, then to 116,418 persons in 2019. The increase of population, to extend its settlement area is to the east, north and south. Area of Pyay is 17.1 sq.-km (6.51 sq.-miles) from 1959-60 to 1989. The urban area did not change. But the number of population: urban function and settlement area change is progress. So, wholesale sector changes are found in Pyay City.

Research Problem

Prior to the construction of Nawaday Bridge in 1997, Pyay City has been the exchange centre of goods between the upper and lower Myanmar and Rakhine State. Wholesale shops dominated the economic activities of the City. After the construction of Nawaday Broker Sale Centre and loading and unloading truck gate compound was found near Nawaday Bridge, warehouse in the City were moved to that newly formed sale center. As a result, wholesale

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sector of economic activities in Pyay City has become obscure. However, the former wholesale area were replaced by retail shops.

Therefore, the research problem is that although the transportation function and other types of function have markedly improved in Pyay City, the status of Pyay City has decreased from regional trade exchange centre to local exchange centre.

Aim and Objectives

The aim of this paper is to investigate the economic transformation after the construction of Nawaday Bridge in Pyay City.

The objectives of this paper are:

- To investigate the expansion of urban area in Pyay City
- To examine the spatial distribution patterns of wholesale sectors in Pyay City.
- To analyze the transformation of economic activity affected by change of transportation patterns.

Sources of Data and Methodology

Data collection- The changes of wholesale sector of the study area was investigated by field observations to get thorough understanding on economic activities of the study area and data were collected from secondary sources. Secondary data were taken from various offices such as Township Administrative Department for general information data, Department of Township Development Committee for land use data and maps, Population and National Registration Department for population data etc. Distribution of wholesale sectors were obtained from field survey, questioners and interviews.

Data processing was done from extracting geographic objects such as ward boundaries, roads, and streets by using Geographic Information System is used to present the change of wholesale sectors.

Background of the Study Area

Phase of Development in Pyay City

Pyay City is situated on the eastern bank of Ayeyarwady River. Thayekhittaya (Srikshestra), one of the ancient Pyu Cities, lies five miles southeast of Pyay city on the eastern Bank of Ayeyarwady River. Thayekhittaya (Srikshestra) City was founded by King Dutdabaung in B.C. 443-373. In 636 Sasana Era, the city was destroyed in the region of King Thupyinnya Nagara Seinda. According to the legend, Pyu of Srikshestra moved to the present place of Pyay city and named it Pyu Myo which later changed to Pyay. The British mentioned it as Prome when it was included in Bago Region.

In 1862, Pyay City - rebuild comprising five wards, namely Nawin, Shwegu, Sandaw, Ywabe and Sinsu was opened. In 1877, the first railway line - Yangon with Prome, was constructed. After the construction of Yangon - Prome railroad and open the port of Pyay. It was good transportation and communication, people move from nearby areas and other region. In 1968 - Teachers Training School was opened in Sinsu ward. In 1973, Pyay City is divided into seven wards (Nawin, Ywabe, Shwegu, Sinsu, Sandaw, Khittaya Myothit and Kyaunggyiodan). In 1987, the Yadanar Manaung new ward (Ywabe Ward). In 1990, the area of Pyay City was 5376 acres or 21.75 sq.km.

In 1990 - Shwetagar (1) to (4) were emerged in Hmoke Shie Village Tract. In 1992, Gnamdamar Industrial Zone 1 was established at Ywabe Ward. In 1993, Nawin New Ward at Nawin. In 1994, Aungmye Pyitharyar (1) and (2) at Nawin. In 1997, the construction of Nawady Bridge, Pyay can connect with easy to Ayeyarwady Region and Rakhine State.

After the construction of Nawaday Bridge - the communication- improved but the commercial – reduced. In 1999, Industrial Zone 2 was established at Ywabe. The government offices - shifted from the urban center to near the High Way Bus Terminal. In 18th Oct, 1999, Pyay become a City of Bago Region (West).

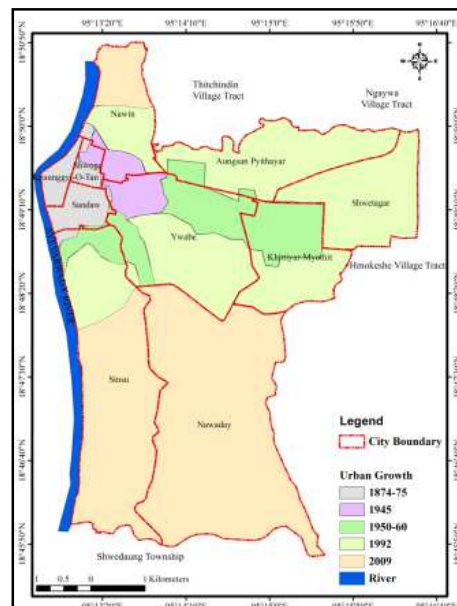


Figure 1. Urban Growth of Pyay City
Source: Planning Department, Pyay Township

In 1979, Pyay Regional College was moved to Prome, it was changed to Pyay College. In 1999, Pyay Degree College and Teacher Training school - upgraded to Pyay University and Education College. GTC (Government Technology College) upgraded Pyay Technology University. After 1999, Pyay General Hospital is relocated and upgraded. In 2001, Nawaday warehouses, cargo trucks compound and wholesale center is established. High Way Bus Terminal and near the Nawaday Bridge emerged at Anauk Ywathit.

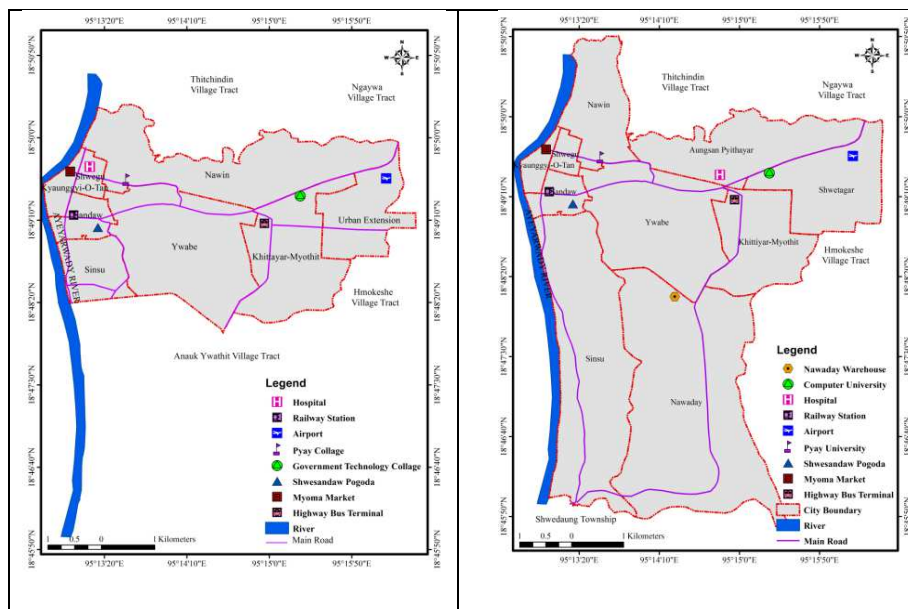


Figure 2. Dominant Landmark in Pyay City (1990 -2019)
Source: General Administration Department, Pyay

In 2003, Aung San Pyitharyar (3) and Koethaung (1) and (2). In 2004, Computer University was opened at Pyay Technology University in Pyay City. Pyay Technology University relocated in Hnawgon Village Tract. In 2011, in the region of New Government, Pyay was changed to District Town because the headquarter of Bago Region rejoined to the main headquarter of Bago Region. Wholesales function has transferred from the urban center to the Nawaday wholesale center.

Human Factors

Pyay City is situated at the junction of rail roads, motor roads and waterway. The increase in population due to the accessibility and good location.

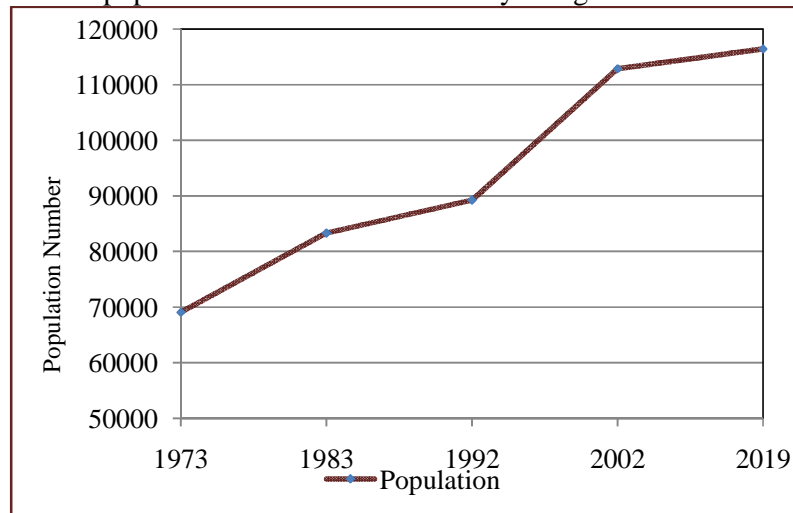


Figure 3. Total Population of Pyay City (1973-2019)

Source: based on General Administration Department, Pyay

In 2019, Ywabe Ward is the most populated area with 32,698 persons due to the large area, Pyay University student are stay, and the main road run through the middle of the Ward and the least was Nawaday Ward with 3,444 persons.

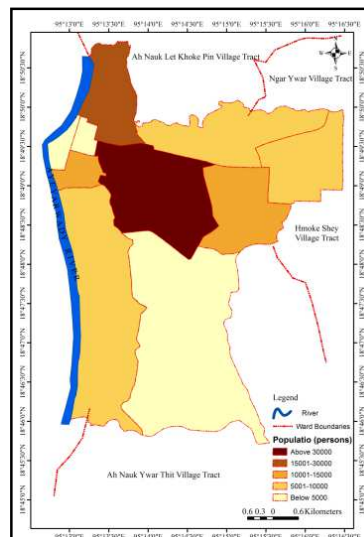


Figure 4. Distribution of Population in Pyay City (2019)

Source: Population and National Registration Department, Pyay

Economic Factors

Economy is the mainly on the trading of agricultural products. After 1988, changes of economic policy and emergence of more brokers, wholesales and retailers and private entrepreneurs and Banks. In 2001, Broker sale center was established at Nawaday Ward and industrial zone 1 and 2 in 1993 and in 2002. After the construction of Nawaday Bridge, the communication is improved but the commercial are reduced. At present, the trading of Pyay is slow and exchange center of upper and lower Myanmar.

Transportation Factor

Pyay city, at a junction point, port of Pyay was the most important function of commodities flow until 1997. After construction of Nawaday Bridge, important of port function has declined.

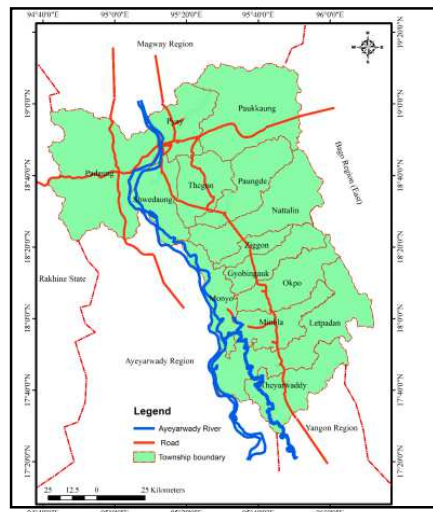


Figure 5. Transportation Road in Bago Region (West)
Source: Construction Department

Nawaday Bridge

It is constructed across the Ayeyarwady River to connect Pyay Township on the east bank with Padaung Township on the west. Before the construction of the Bridge, the transportation between Pyay and the townships west of the Ayeyarwady River had to rely on the Z-crafts. The construction of Nawaday Bridge was started on March 1, 1994 and opened on September 18, 1997. It now connects Ayeyarwady Region, with those of Rakhine State and Magway Region. The flow of trade is getting better and smoother with less time. Pyay becomes a centre of exchanging upper and lower Myanmar goods.

The Role of Wholesale Sectors

Wholesale trade is established and developed in Pyay. Pyay is situated as a transitional Zone of Upper Myanmar and delta region. It can contact with Rakhine State by the highway of Pyay-Taunggyi through Sin Te which is located on the opposite side of Pyay. So, wholesale trade flourished in Pyay. After the construction of Nawaday bridge, the goods are sent to Pyay by 8 wheeled or 10 wheeled truck cars after passing through Nawaday bridge. Because of the expensive toll of Nawaday bridge, some goods are no longer transported to Pyay and they are stationed at Oakshitpin Village of Padaung township which is the junction point so, the brokers sales centre enterprise emerges at Oakshitpin. There appear the direct trade of rice from Ayeyarwady Region with Minbu, Munhla, Pakhoukku by sending the rice to those towns by the motor way of Monywa Ye Oo. Rice are also sent to Taunggyi.

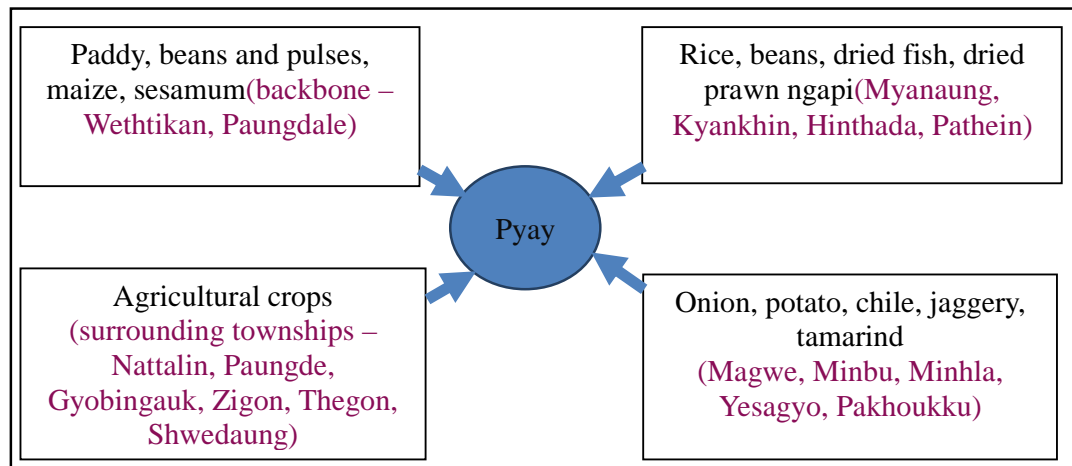


Figure 6. Commodity Flow Patterns in Pyay City before 1997
Source: Interview, 2019.

The establishment of the apartment of brokers' sales centres in the Outskirt area of Pyay and the restriction of not to enter the downtown for the large truck cars, the broilers' sales centres in the town have to carry the goods to their centres from the outskirt by small freight Van. So the transport charges become expensive for the brokers.

So the selling price of the beans and pulses and sesame becomes high because of the various expenses and as a result of it the trading is hindered. In trading the beans and pulses, if there is dissatisfaction with the weighing again with platform scales (weighing machine) of merchants' association. There are quick payment systems in Pyay. It is easy to travel to other places and regions through Pyay and cheapen transport charges are attained by the water way from Pyay.

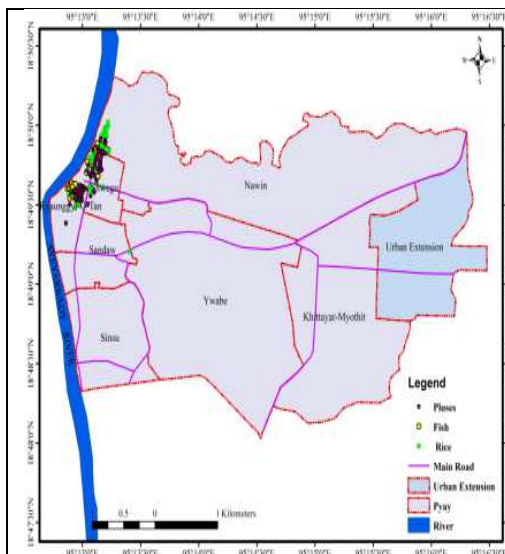


Figure 7. Wholesales in Pyay City before the construction of Nawaday Bridge
Source: Field Survey, 2019.

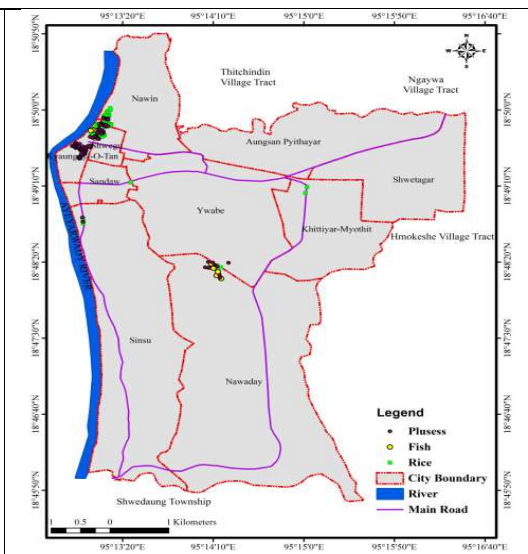


Figure 8. Wholesales in Pyay City after the construction of Nawaday Bridge
Source: Field Survey, 2019.

Findings and Suggestions

Pyay City is situated in Bago Region (West) and is the second largest City in the Region next to Bago. It lies on the eastern bank of the Ayeyarwady River at the junctions of road, railroad and waterway between the upper and lower Myanmar as well as Rakhine State. Its locational advantage enhances the development of trade exchange centre.

In 1973, Pyay City comprised seven wards with a total population of 69,940 and the number of wards increased to ten wards and of population to 116,418. The population growth rate was fairly high with migration people from rural area and other townships as job opportunity was high with commercial activities. The rapid increase in the number of population was also due to the improvement in transportation, particularly after the construction of Nawaday Bridge in 1997 and the establishment of Khittayar Industrial Zone (1) in 1990.

The increasing population demands more land for settlement. With seven wards, the area of Pyay City in 1990 was 21.76 sq.km (5376 acres) and the city area was extended to 34.48 sq.km (13.31 sq. miles or 8521 acres) with ten wards in 2019. The extension of settlement land was towards the east, south and north, but not towards the west, being separated by the Ayeyarwady River. The rapid urban growth, the improvement of transportation, and urban functions are also developed in the Pyay city.

The population of Pyay City has increased rapidly due to its advantageous location which is easily accessible to different parts of the country. The improvement in transportation, the opening of government offices and the presence of industrial zones are the powerful pull factors of population from the nearby rural areas. The increase in population has led to the extension of town area.

The development implies the economic growth of the city. In 1990, the city had been a regional exchange centre of trade. However, the number of wholesale shops declined drastically after the construction of Nawaday Bridge, increasing the small-scale commercial activities and the city has changed into local commodity exchange centre. With the improvement in transportation the hospitals, clinics, banks, government offices and universities have emerged which induce future economic development of the city in the future.

A number of wholesale shops have turned into other types of business while the change in retail business has been limited. Some wholesale shops have become retail shops, while others have been replaced by private banks and other services functions. In 1997 Nawaday Bridge was constructed across the Ayeyarwady River to enhance the accessibility with the area of the west, particularly Rakhine State. Before the construction of the bridge, wholesaling was the main economic activity of Pyay City and it served as a regional exchange centre of goods, between the upper and lower Myanmar and Rakhine State. After the construction of the bridge, commodities from different parts of the country move directly to the destinations and Pyay no longer was a break-of-bulk point. Accordingly, the wholesale sectors in Pyay City decreased in number and the city has turned as a local exchange centre instead of regional. In 2001, Nawaday Warehouse Centre and Truck Car compound were established and then wholesale shops were instructed to transfer to the newly built Warehouse Centre, located near the bridge.

In 1990, Pyay City formed as a node between upper and lower Myanmar and Rakhine State. It also served as a break-of-bulk point where commodities from different parts of the country were exchanged. As such it was a commercial city as a regional commodity exchange centre. Nawaday Bridge across the Ayeyarwady River was opened in 1997 and the commodities from the lower Myanmar moved directly to the upper Myanmar and Rakhine State and vice versa. Accordingly, the volume of trade exchange in Pyay City decreased

sharply and the city turned from regional trade exchange centre to local trade exchange centre. Okshitpin Town is located on Pathein-Monywa Road to the west of Ayeyarwady River and it became a nodal point from which the upper Myanmar, Ayeyarwady Region and Rakhine State are easily accessible. The town gradually became a region trade exchange centre as commodities from Rakhine, Chin States and Sagaing Region are exchanged with that of Ayeyarwady Region at this nodal point

Hence, there are two most notable changes due to the construction of Nawaday Bridge across the Ayeyarwady River. These are the change of Pyay City from regional trade exchange centre to local trade exchange centre and the emergence of new regional exchange centre at Okshitpin Town.

Traffic jam is distinctly found in Shwegu and Kyaunggyi-Odan wards of Pyay due to establishing highway gates at that area. It is one of the problems faced by residents because people from nearby towns and villages come to the Myoma Market and wholesale shops in the area for the purpose of trading their goods. Urban bus lines also get low income because of small amount of passengers. Therefore, to reduce traffic jam and to increase the income of the bus lines, it is necessary to move the small bus gates near the market to the surrounding areas of High way gate. Wholesale shops located near Myoma market should be allocated at Nawaday warehouse to solve traffic jam in Pyay City.

The World Heritage Site of ancient Pyu City, Sriketra is located close to Pyay City. The number of local and foreign visitors has increased after the recognition of the ancient city, improving of the area. The authority concerned and responsible persons should arrange busline to easily get to the ancient site. Hence the preparation for tourism industry should be carried out. The enough electricity supply should be provided continuously in urban area. High quality hotels, rest-houses and restaurants with effective the tourism industry security should be opened to attract more foreign tourists which may enhance the development of recreation function. Road bridges should be upgraded to develop the tourism industry and economic development of study area.

Shwepalinmaw Pagoda is located on the eastern bank of the Ayeyarwady River and the fourth defile of the Ayeyarwady, the Western mountain ranges and the sun-set beauty are discernable from the Pagoda. Therefore, the park around the Pagoda should be beautified with modern landscaping technique so as to attract more visitor.

Conclusion

Pyay City is located in Bago Region (West) and the urban area has been grown rapidly due to high accessibility and vast tract of productive farmland. Being the headquarter of the Bago Region (West), having diverse economic activities with different urban functions and rapidly increasing populations are the manifestation of rapid urban growth.

The population growth rate was fairly high with migration people from rural area and other townships as job opportunity was high with commercial activities. The rapid increase in the number of population was also due to the improvement in transportation, particularly after the construction of Nawaday Bridge in 1997 and the establishment of Khittayar Industrial Zone (1) in 1990. For easy accessibility, government offices were relocated near the highway bus terminal.

The increasing population demands more land for settlement. The extension of settlement land was towards the east, south and north, but not towards the west, being separated by the Ayeyarwady River.

Pyay City is located on No.2 Yangon-Mandalay highway road and then it can easily be connected with Lower and Upper Myanmar as well as with Rakhine State after the construction of Nawaday Bridge. Therefore, Pyay City is highly accessible from all parts of the country. There are two highway bus terminals and 3 railway station in Pyay City. It is the terminal of Yangon-Pyay railroad and the trains that serve along Yangon-Bagan railroad runs across the city. A number of buslines serve between Pyay and major Cities of the country. The Ayeyarwady waterway is used in carrying heavy and bulky commodities and local people also use it for short trip. Generally, Pyay City is highly accessible by different modes of transportation.

In the past, wholesaling business dominated along Lanmadaw and Lanshe roads, but now the area is occupied by banks. Shops selling other items also replace the areas formerly occupied by wholesale shops. There were several onion, potato, fish paste and dried fish wholesale shops near the Myoma market, but the places have been replaced by shops selling other items.

Acknowledgements

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Geographic Analysis on Agriculture of Pyay Township: Black Gram Cultivation

Khin Sanda Moe¹, Tun Win², Hla Yin Nu³

Abstract

The paper tries to present black gram cultivation of Pyay Township from geographical point of view. Being located in traditional zone, wide variety of crop is grown in Pyay Township. Black gram is extensively cultivated due to export crop. As Pyay Township, black gram is grown in cool dry period and it has suitable area of black gram cultivation is 70,020 ha (88.8 percent of the township's area) and less suitable area is 8,820 ha (11.2 percent). The village tracts located in the eastern part are more suitable, in the central part moderately suitability and in the western part less suitable for black gram cultivation. The main objectives of this study are to find out high suitable areas for black gram, to explore spatial variation of black gram cultivated areas and to find out the factors controlling on suitability of black gram. To present the suitability of black gram, soils, climate, elevation, etc were applied and geographical information system-based multi-criteria approach was used.

Key words: suitability, black gram, soils, climate, elevation

Introduction

Land suitability evaluation is a basis to achieve optimum utilization of the available land resources for sustainable agricultural production (Neupane et al, 2014). Verheye, 2008, said that the amount of cultivated land is limited, and most land has been degraded as irreversibility and become unsuitable for agricultural production. FAO (1976) defines land suitability as “the fitness of a given parcel of land for specific uses”. Crop suitability in the strict sense is the match between that crop's soil type, soil nutrient, water availability, day length, temperature range, light intensity, etc., requirements, and what is available (Bull, 2018).

In Myanmar, black gram is one of the major crops that is a major export crop. Although the largest black gram sown areas are concentrated in Ayeyarwady Region, black gram is also cultivated in Bago Region including Pyay Township located in Bago Region west. Monsoon paddy is mainly cultivated in the rainy season and black gram is cultivated as double crop in cool dry period because of high demand and price.

Pyay Township is climatically located in the transitional zone and exiting climatic conditions support cultivation of various crops such as cereals, oil seed crops, pulses, etc. Therefore, various crops are grown in the area although dominant crops are paddy, groundnut, black gram, etc. To present black gram suitability and black gram cultivation from geographical point of view, Pyay Township was selected as study area.

Study Area

Pyay Township is one of the townships in Bago Region (West). It lies on the eastern bank of Ayeyarwady River. In 2018, total population increases to 226,306 persons in which urban population is 122,674 (54.21 per cent of the township's population) and rural population 103,632 (45.79 per cent of the township's population). Agricultural land uses of Pyay

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Township are: *le* land (paddy land), *ya* land (dry farm land), *kaing –kyun* land (riparian land) and garden land. Black gram is one of the major crops of Pyay Township.

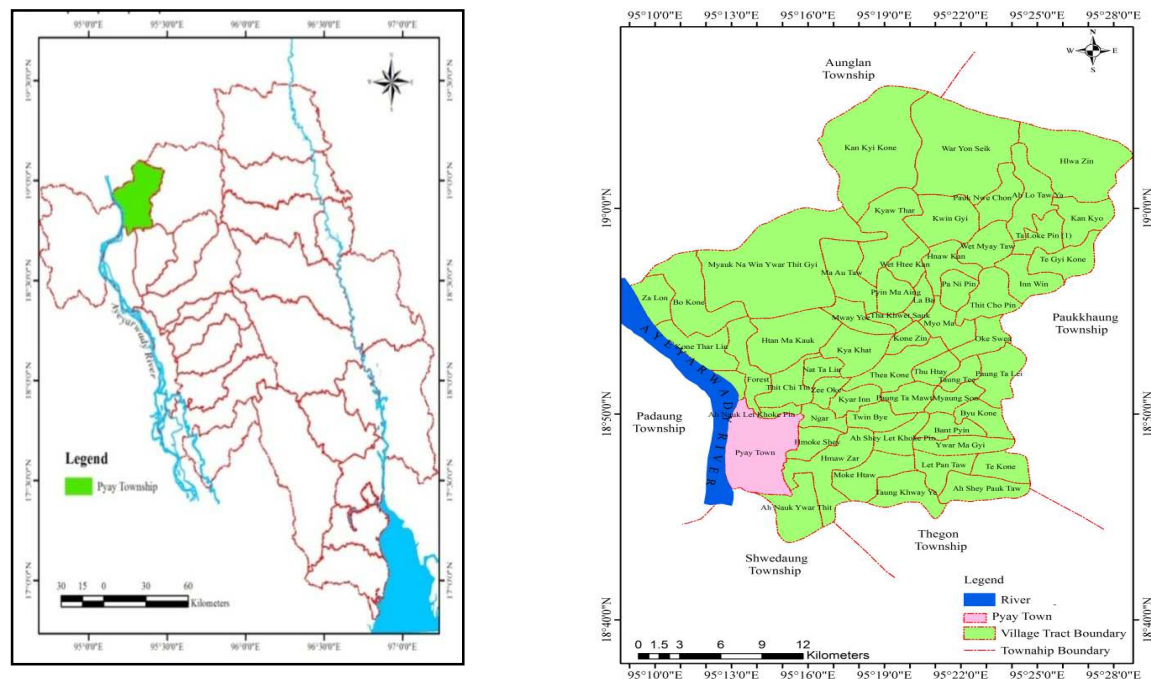


Figure 1 Location of Pyay Township

Source : Myanmar Information Management Unit (MIMU), 2015

The main objectives of this study are

- To find out high suitable areas for black gram
- To explore spatial variation of black gram cultivated areas and
- To find out the factors controlling on suitability of black gram

Data and Methodology

Primary data are collected through field observation, semi-structured interviewed and focus group discussion. Local people, authorities and staff were interviewed to get information on crops low productivity on very high suitable areas. Secondary data such as characteristics of soils, climate, elevation, etc and biological characteristics of crops will be mainly applied in calculation.

Suitability is analyzed by using soils map which was produced from Land Use Department (Yangon, 2010). For climate factors, both rainfall and temperature characteristics were derived by using weighted overlay method based on the concerned data of the stations of Aunglan, Taungoo, Bago and Tharyarwady. Then, the maps of suitability for climate conditions were provided.

Digital Elevation Model (DEM) was applied to do slope analysis based on the satellite images received from ASTER Global Digital Elevation Model (ASTGTM) 90 metre. For slope percent, a model circle has 360°, so if an angle is expressed in terms of a percentage, just divide the angle measurement (in degree) by 360° and multiply by 100. In reverse, divide the percentage by 100 and multiply by 360° (Google: Slope degree to percent).

Land suitability analysis using geographical information system-based multi-criteria approach was applied because land suitability analysis allows identifying limiting factors for agricultural production and enables decision-makers to formulate efficient agricultural management plans.

Result and Findings

Suitability Analysis on Black Gram Cultivation

Land suitability assessment is land evaluation which usually conducted to determine specific land use for a particular location and identify limiting factors for a particular crop production (Abdel Rahman, Natarajan, & Hegde, 2016; Mu, 2006) and it also helps to find out new areas that are high suitable but these are still uncultivated. For most of the maps, the optimal land suitability index will be calculated by applying the norms from DoA (2017).

Land evaluation is a foundation for sustainable land resource planning and management since it help to know whether the resources are degraded or enhanced in quality (Dumanski et al., 2002; Mohana, Mariappan, & Manoharan, 2009). The weighted overlay method is the most suitable approach to multi-criteria for acquires composite index. For that reasons, many variables such as climatic factors, soils factors and land characteristics are applied. In Climatic factors, mean temperature and rainfall (cultivation period), pH value and types of soil from soils properties, and slope from land characteristics are applied in the analysis.

Suitability Analysis for Black Gram Cultivation

The most suitable mean temperature for the cultivation of black gram is between 20 and 27.8 (°C). Less suitable mean temperature for black gram is between 27.8 and 35 (°C) (Department of Agriculture, 2017). Annual rainfall requirement for black gram is between 1000 and 1300 mm and the area gets annual rainfall between 1072 and 1416 mm. Therefore, rainfall available is also beyond the optimum limit. But, farmers cultivate black gram because of high market demand and high profit, although the climatic conditions of the area slightly differ from optimum conditions for black gram.

The existing meadow alluvial and brown meadow soils are most suitable for black gram cultivation, while the area occupying light brown meadow soils are moderately suitable. The areas on light red brown forest soils and light yellow brown soils are having the degree of suitable for black gram cultivation. Red brown forest soils are less suitable for black gram cultivation. The existing soils of the study area are of pH value between 5 and 7. DoA mentioned that soil pH between 5.9 and 6.5 is most suitable area for black gram, between 5.5 and 5.8 moderate suitable, and between 6.5 and 7 suitable.

Table 1 Result of the Variables and Their Associated Class, Degree of Suitability and Rating Scale in Black Gram Cultivation

	Variables	Rating Scale (According to DoA)	Class (rate in study area)	Degree of Suitability
Climatic Factors	Mean Temperature	27. 8 - 35 (° C)	28 - 29 (° C)	Less Suitable
	Annual Rainfall (mm)	1000-1300 mm	1072-1416 mm	Suitable
Soil Factors	Soil (pH)	5.9 - 6.5	5.9 - 6.5	Most Suitable
		5.5 - 6	5.5 - 6	Moderate Suitable
		6.5 - 7	6.5 - 7	Suitable
Land Characteristics	Slope (%)	< 1 %	0 - 1	Most Suitable
		1 - 2%	1 - 2%	Moderate Suitable
		3 - 4 %	3 - 4 %	Suitable
		5 - 6%	5 - 6%	Less Suitable
		>7 %	>7 %	Unsuitable
Land Cover	Type	Agriculture Others	Agriculture Others	Most Suitable Moderate Suitable
		Forest and Water Body	Forest and Water Body	Unsuitable

Source: Doa, Meteorology and Hydrology Department, Land Use Department, DEM

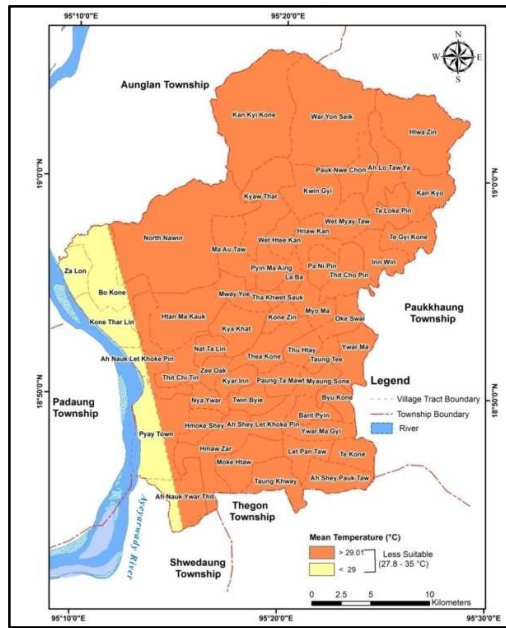


Figure 2 Degree of Suitability by Temperature for Black Gram Cultivation
Source: Based on data of Meteorology and Hydrology Department

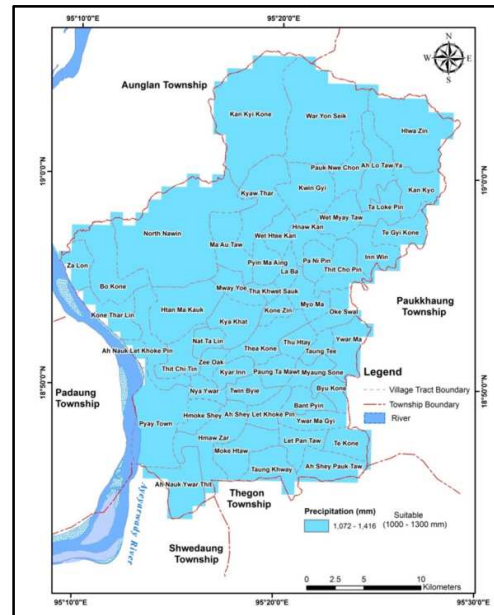


Figure 3 Degree of Suitability by Rainfall for Black Gram Cultivation
Source: Based on data of Meteorology and Hydrology Department

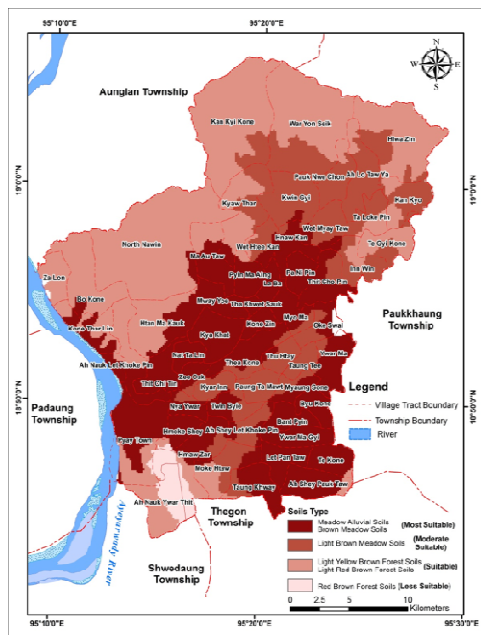


Figure 4 Degree of Suitability by Soil Types for Black Gram Cultivation
Source: Based on data of Land Use Department (Yangon)

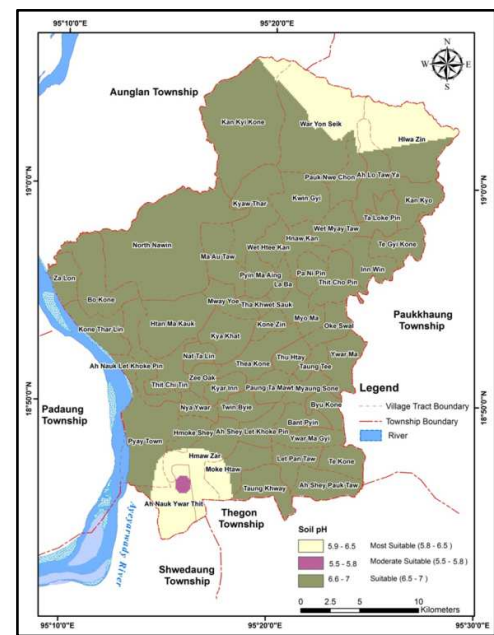


Figure 5 Degree of Suitability by Slope pH Values for Black Gram Cultivation
Source: Based on data of Land Use Department (Yangon)

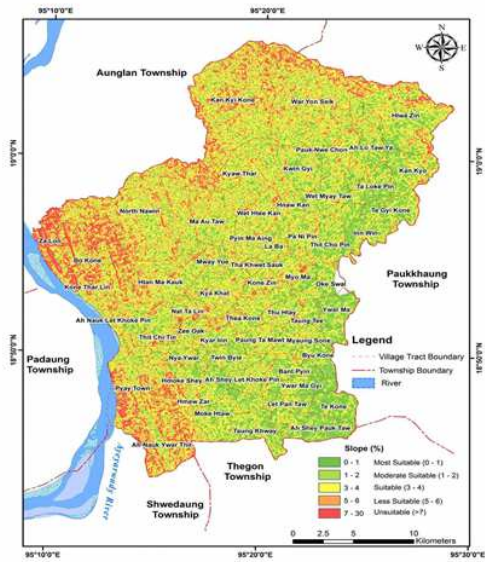


Figure 6 Degree of Suitability by Slope Conditions for Black Gram Cultivation
Source: Based on DEM

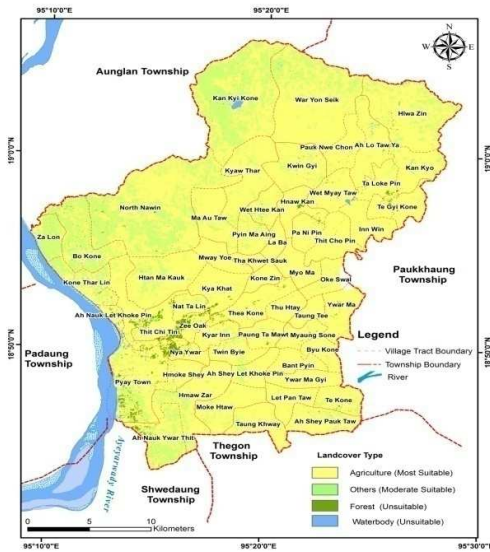


Figure 7 Land Cover Map of Pyay Township
Source: Forest Department, Yangon(2010)

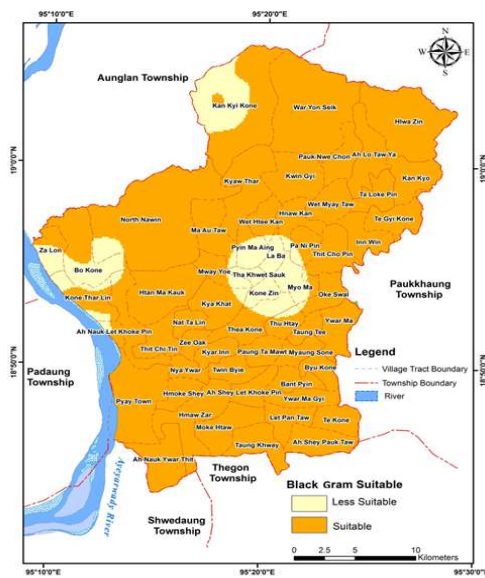


Figure 8 Suitable Areas for Black Gram Cultivation
Source: Based on data of DoA, Meteorology and Hydrology Department, Land Use Department, DEM

Being located in low land area, effects of slope on black gram cultivation is distinct but the areas located in the eastern part are more suitable, the central part is having moderately suitability and in the western part is with less suitable for black gram cultivation. After analyzing the maps for black gram cultivation in Pyay Township, northern parts, north western parts and central parts are less suitable for cultivation and larger suitable area is found in the remaining parts of the township. Actually, according to data obtained from Agricultural Land Management and Statistics, black gram cultivated areas are found in the whole township although black gram cultivated area differ from one village tract to another. It shows that market demand influences on black gram cultivation and farmers cultivated it because of higher price and high economic return.

In Pyay Township, suitable area of black gram cultivation is 70,020 ha (88.8 percent of the township's area) and less suitable area is 8,820 ha (11.2 percent of the township's area) (Table 2 and Fig 7).

Table 2 Black Gram Suitable Area of Pyay Township

	Area (ha)	Percent
Suitability	70,020	88.8
Less suitability	8,820	11.2
	78,840	100

Source: Based on data of DoA, Meteorology and Hydrology Department, Land Use Department, DEM

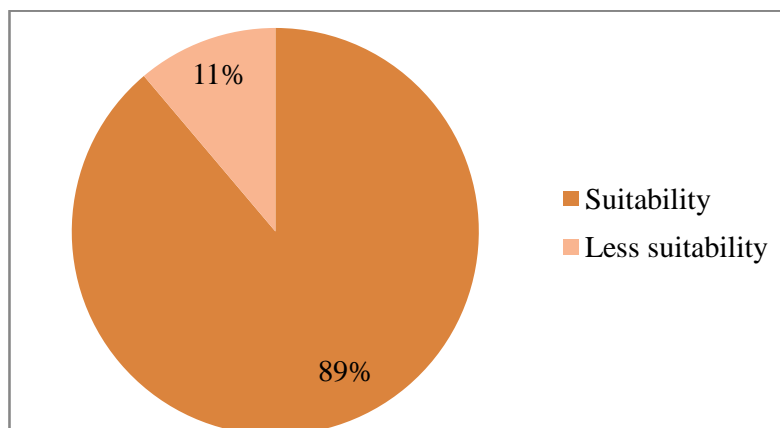


Figure 9 Black Gram Suitable Area of Pyay Township

Source: Based on Table 2

Black Gram Cultivation

In Myanmar, black gram can be grown in hilly area (Kachin, Shan, Mon States), dry area (Mandalay, Sagaing) and delta area (Ayeyarwaddy, Bago) (Myanmar Pulses, Beans & Sesame Seeds Merchants Association, 2019). There are 3 cultivation methods: Khoke-phone-pe, Ye-lite-pe and Htun-pe. “Khoke-phone-pe” is more beneficial than “Ye-lite-pe” or “Htun-pe” because mulching of rice straw-residues conserves soil temperature and moisture, and protects the soil against erosion. It also increases organic matter to the soil which consequently improves the soil's physical condition, and enhances biological activity and soil fertility.

In Pyay Township, Total area occupied by black gram was 17151 ha in 2007-08 and it decreased to 9817 ha in 2017-18 because some farmer cultivated groundnut in 2017-18 due to low price of black gram.

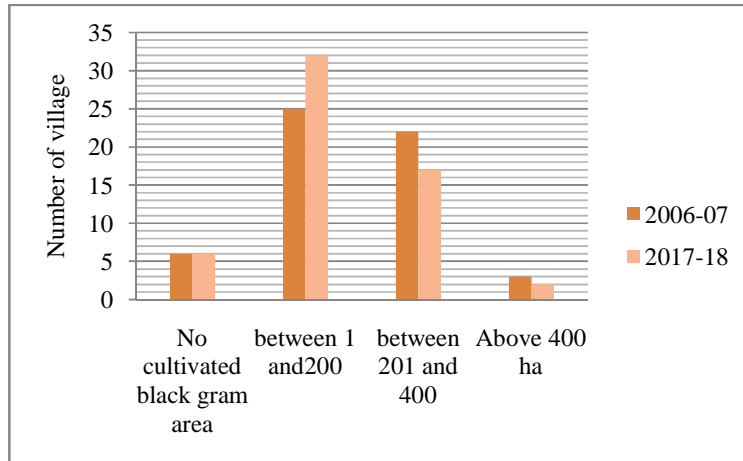


Figure 10 Change in Black Gram Cultivated Area (2006-07 & 2017-18)

Source: Department of Agriculture Land Management Statistics

Like other townships of Myanmar, Black gram cultivated area differ from one village to another. Some villages located on less suitable areas of black gram also possess black gram cultivated area due to higher demand and high price.

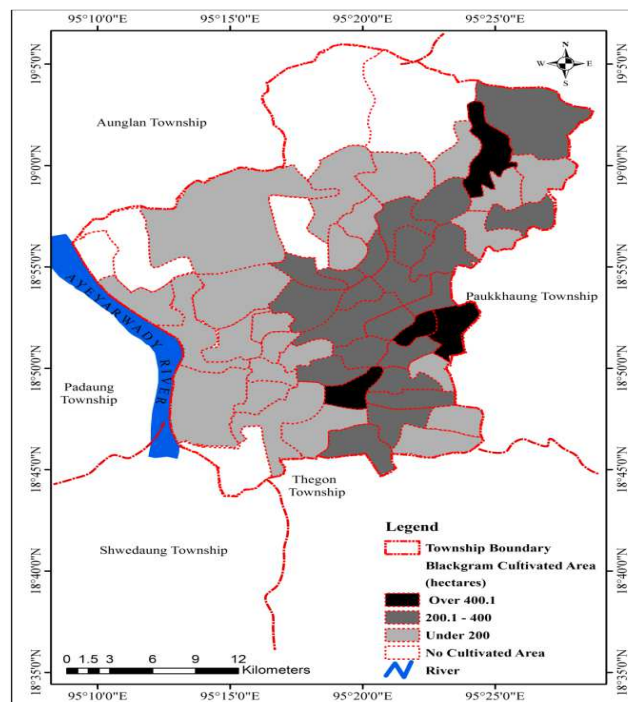


Figure 11 Black Gram Cultivated Areas of Pyay Township

Source: Own calculation based on data of Agriculture Land Management Statistics

The number of village tracts having black gram cultivated area of between 1 and 200 was 29 and it decreased to 25. The number of village tracts having black gram cultivated area of between 201 and 400 was 20 and it increased to 22. The village tracts possessing black gram

cultivated area: Paungdale Taungtee and Ahshey letkhokepin are located in eastern part of the township. The village tracts having small black gram cultivated area are found in the western part of the area.

Conclusion

Pyay Township is situated on the southern part of BagoYoma (forested area) and on the eastern bank of Ayeyarwady River, it can be said Pyay Township is fertile region because of the old alluvial deposition. It also possesses large *le* land that are very suitable for black gram cultivation in cool dry period.

Black gram cultivated area decreases and groundnut cultivated area increase because price of black gram has been decreased since 2 years ago. Farmers want to get more economic return from the crop cultivation and they changed type of crop in cultivation.

The soil of the area includes loamy sand and it supports paddy and black gram cultivation. Although price of black gram decreased, some village tracts cultivate paddy and black gram because of soil suitability. The area expresses that as crop choice is directly related to soil suitability as well as price. Therefore, it is also evident that farmers' crop choice depends not only on suitability but also on price of crop and market demand.

As black gram cultivation give higher income for the farmers who grow black gram as double crops in the cool dry period, black gram cultivated areas are found not only on high suitable area but also on less suitable area. To extend black gram cultivation for the purpose of getting higher income for local farmers, it is needed to do research on value chain, traditional snacks made by black gram, whole sale trade, etc.

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လယ်ယာစိုက်ပျိုးရေးနှင့်ဆည်မြောင်းဝန်ကြီးဌာန၊ ၂၀၁၈ ၊ မတ်ပဲသီးနှံအထွက်တိုးရေးစီမံကိန်းနှင့် အကောင်အထည်
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The Spatial Variation of Basic Education Schools in Nattalin Township by using SWOT Analysis Tools

Thin Thin Myat,¹ Tun Win,² NweYin Min,³ Moh Moh Khaing⁴

Abstract

This research paper examined the spatial distribution of education schools in Nattalin Township, in Thayarwady District, Bago Region (west). It has an area of 527.94 square miles (1367.36 sq.km). The total population of Nattalin Township is 174,197 persons (2018). Among this, 23,986 are urban dwellers and 150,211 are rural dwellers. The major objectives of this study are to; (1) identify the spatial distribution of basic education schools (BES), (2) study the relationship between local people and schools and (3) evaluate the spatial variation of difference between basic education schools and villages. Relevant data will be elicited from both the primary and secondary information, which will be analyzed by using sampling methods, quantitative method, qualitative assessment and SWOT Analysis Tools. According to the results, the average teacher-student ratio is 1:9 (primary), 1:31 (middle) and 1:24 (high) and the pass percentage of matriculation examination is 36.32%. Moreover, the ratio of teacher and student, number of schools, teachers and students attending in the Basic Education Schools in Nattalin Township within 10 years from 2007-2008 to 2018-2019 divided into 3 levels (high, middle and primary) are analyzed by SWOT analysis method with the geographical point of view.

Key word: basic education schools, spatial variation, SWOT analysis

Introduction

According to Myanmar's Ministry of Foreign Affairs: "Every school-age child in school" and "education for all" are the mottoes which guide Myanmar's efforts on educational. In order to catch up with the information age all high schools and even primary schools are being equipped with computers to help students and became familiar with electronic media. A complementary approach in education is to develop a healthy moral mind in a healthy active body. Schools train pupils in moral and social behavior. As a further support toward this goal monastic schools have been revised. The education system of Myanmar is operated by the Ministry of Education. In Nattalin Township, there are 231 basic education schools (urban area and all village tract have at least 2 primary schools). In this township, there are 10 high schools, 14 middle schools and 27 post-primary schools and 180 primary schools in 2017-2018. The passed percentage of matriculation examination is 36.58% in 2017-2018.

Aim and Objectives

Major aims and objectives of this study are;

- to focus the ratio of net enrollment in education to basic education schools in Nattalin Township for improving education.
- to identify the spatial distribution of basic education schools (BES)
- to study the relationship between local people and schools
- to evaluate the spatial variation of difference between basic education schools and villages

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Study Area

Nattalin Township lies between BagoYoma on the east and Ayeyarwady River on the west. It has an area of 527.94 square miles (1367.36 sq.-km) and it is composed of 2 towns, 7 wards and 77 village tracts and 231 villages. Yangon-Pyay railway and motor road run through Nattalin. Nattalin Township is bounded on the east by Kyauktaga Township and Phyu Township, on the south by Zigon Township and Gyobingauk Township, on the west by Moenyo Township and Shwedaung Township, on the north by Paungde and Thegon Township. The area of Nattalin Township is 527.94 square miles (1367.36 sq.km) (Figure. 1).

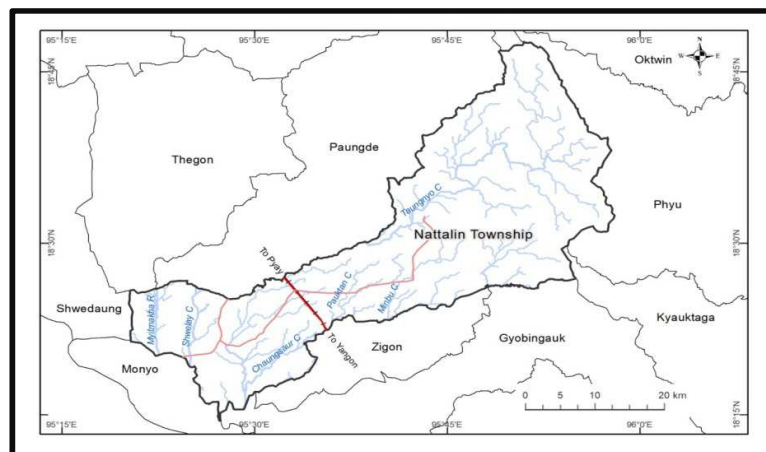


Figure 1 Location Map of Study Area

Source: Land Records Department, Nattalin Township

Methodology and Sources of Data

In this research analyzed physical conditions, human factors, economic factors and basic education schools within Nattalin Township were analyzed. Conditions and spatial variation of basic education schools are studied by using the primary data and the secondary data, which are gathered by using questionnaires, open interviews and the field observations within Nattalin Township. After that, the primary data were obtained from interviews and the field studies. Moreover, spatial distribution and information of Basic Education Schools were partly measured by the results of questionnaires and open interviews. The secondary data were collected from the Immigration and Human Resource Department, Nattalin Township Education Office, Various Schools, and Land Records Department of Nattalin Township. For data analysis, qualitative assessment and quantitative analysis are used to express Spatial Distribution of Basic Education Schools in Nattalin Township. And then, Geographic Information Systems is applied for drawing maps and analyzing land use and distribution of Basic Education Schools. Moreover, spatial variation of basic education schools are measured and assessed by using SWOT analysis tools.

The Development of Basic Education Schools in Nattalin Township

In 1998-1999 academic year, there were 184 basic education schools, comprising 170 basic education primary schools, 1 post-primary schools, 2 sub-middle schools, 8 basic education middle schools, 1 sub-high school and 2 basic education high schools in Nattalin Township. In 2008, there were 2 basic education sub-primary schools, 159 basic education primary schools, 21 basic education post-primary schools, 4 basic education sub-middle schools, 5 basic education middle schools, 3 basic education sub-high schools and 3 basic education high schools in Nattalin Township. The number of basic education schools increased from year to year. In 2018-2019 academic year, there are 232 basic education schools,

including 15 basic sub-primary schools, 161 basic primary schools, 32 basic post-primary schools, 5 basic sub-middle schools, 8 basic middle schools, 4 basic sub-high schools and 7 basic high schools in Nattalin township. (Table 1 and Figure.2 and 3)

Table 1 Total Basic Education Schools in Nattalin Township

Year	High School	Sub-High School				Middle School			Sub-Middle School			Post-Primary School			Primary School			Sub-Primary School				
	Grand Total	Grand Total	Upgrade to High School	Total	Grand Total	Upgrade to Sub-High School	Total	Grand Total	Upgrade to middle School	Total	Grand Total	Upgrade to Sub-Middle School	Total	Grand Total	Upgrade to Post-Primary School	Total	Grand Total	Upgrade to Primary School	Total	Original	New	
2007-2008	3	3		3	5		5	4		4	21		21	159		159	2		2	2		
2008-2009	3	3		3	5		5	4		4	21		21	159		159	2		2	2		
2009-2010	3	3		3	5		5	4		4	21		21	159		159	2		2	2		
2010-2011	3	3		3	5		5	4		4	21		21	159		159	2		2	2		
2011-2012	3	5		5	3	2	5	4		4	21		21	159		159	3		3	2	1	
2012-2013	4	4	1	5	4		4	7	1	8	27	4	25	156	4	160	2	1	3	3		
2013-2014	5	4	1	5	3	1	4	8		8	27	1	28	150	7	157	24	1	25	2	23	
2014-2015	5	5		5	2	1	3	10		10	25	2	27	150		150	28		28	24	4	
2015-2016	5	5		5	2		2	11		11	24	1	25	160		160	19	10	29	28	1	
2016-2017	6	4	1	5	3		3	10	1	11	27		27	160	3	163	20	3	23	19	4	
2017-2018	6	4		4	5		5	9	2	11	30	1	31	162	4	166	15	6	21	20	1	
2018-2019	7	4	1	5	8	1	9	5	4	9	32		32	161	2	163	15	1	16	15	1	

Source: Township Education Office, Nattalin Township

Total Basic Education Students in Nattalin Township

In 2007-2008 academic year, there were 20,156 basic education students in Nattalin Township. Out of which, 12,706 students were primary level students (63.04% of total students), 5,791 students were middle level students (28.73% of total students) and 1,659 students were high school level students (8.23% of total students) in this township. In 2018-2019 academic year, the number of total basic education students were 23,103 students in Nattalin Township. The numbers of primary level students were 12,425 (53.78% of total students), those of middle level students were 7,889 (34.15% of total students) and 2,789 students were high school level students (12.07 % of total students). (Figure 2 and 3)

Total Number of Teachers in Nattalin Township

In 1998-1999 academic year, the total number of teachers were 687, among these, 332 were primary assistant teachers (PAT) with 48.33 % of total number of teachers, 301 junior assistant teachers (JAT) with 43.81 % of total number of teachers and 54 senior assistant teachers (SAT) with 7.86 % of total number of teachers in Nattalin Township. In 2007-2008 academic year, the primary assistant teachers (PAT) were 732 with 63.32 % of total number of teachers, the junior assistant teachers (JAT) were 341 with 29.5 % of total number of teachers and the senior assistant teachers (SAT) were 83 with 7.18 % of total number of teachers. Thus, the total numbers of teacher were 1,156 in Nattalin Township.

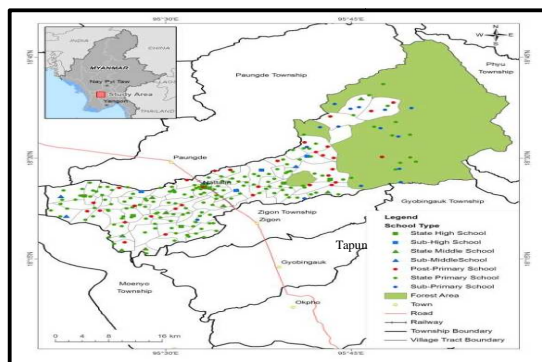


Figure 2 Distributions of Basic Education Schools

Source: Township Education Office, Nattalin Township(1998 to 2019)

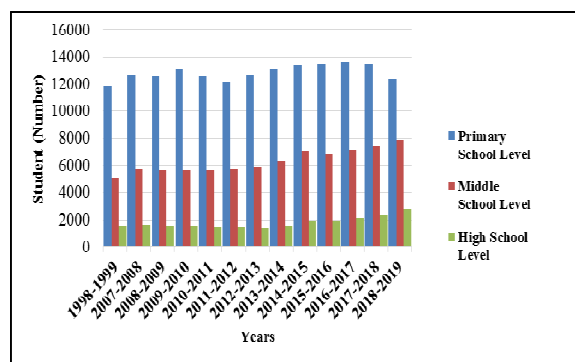


Figure 3 Total Basic Education Students Schools

Table 2 Total Number of Teachers in Nattalin Township

Year	PAT	JAT	SAT	Total	Year	PAT	JAT	SAT	Total
1998 -1999	332	301	54	687	2012-2013	753	368	89	1210
2007-2008	732	341	83	1156	2013-2014	943	390	118	1451
2008-2009	728	336	82	1146	2014-2015	946	394	117	1457
2009-2010	728	337	80	1145	2015-2016	980	389	113	1482
2010-2011	749	349	88	1186	2016-2017	968	381	116	1465
2011-2012	737	363	95	1195	2017-2018	1072	360	122	1554
					2018-2019	1427	248	116	1791

Source: Township Education Office, Nattalin Township (1998 to 2019)

In 2018-2019 academic year, there were 1,791 teachers in Nattalin Township including 1,427 primary assistant teachers (PAT) with 79.68 % of total number of teachers, 248 junior assistant teachers (JAT) with 13.85 % of total number of teachers and 116 senior assistant teachers (SAT) with 6.47 % of total number of teachers in Nattalin Township. (Table 2)

Geographical Distribution of Basic Education Schools in Nattalin Township

The spatial distribution of primary schools in Nattalin Township is clustered in Central Business District (CBD) or town and dispersed village tracts. It is distributed in relation with the density of population and the primary schools are closely situated in Nattalin town and Tapun town. In the rural area, every family can send their children to attend the basic education primary schools as students. So, the primary school are opened near all village tracts. In 1998-1999 academic years, there were 170 primary schools with 11,824 primary level students (64 % of township's students) in Nattalin Township. The average number of student in one primary school was 66 students. In 2018-2019, there were 208 primary schools with 12,425 primary students in Nattalin Township. Therefore, one primary school has 59 students.

There are 2 towns with 7 wards and 77 village tracts in Nattalin Township. There is more correlation between the number of population and the number of primary schools. There are at least two primary schools in each village tract but the number of student is influenced by the geographical factors. So, more students can be found in most densely populated village tracts. There are 161 basic education primary schools, 32 basic education post-primary schools and 15 basic education sub-primary schools in 2018-2019 in Nattalin Township.

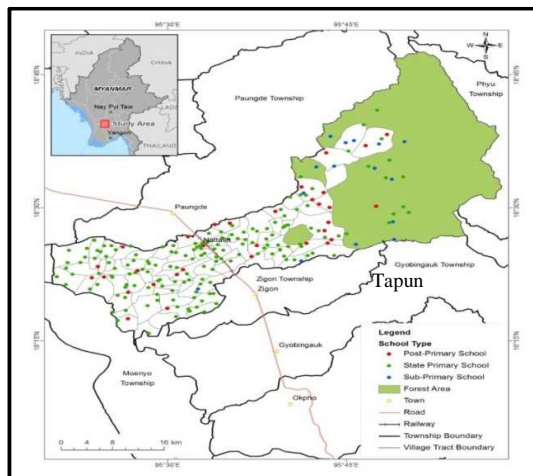


Figure 4 Spatial Distributions of Primary Schools

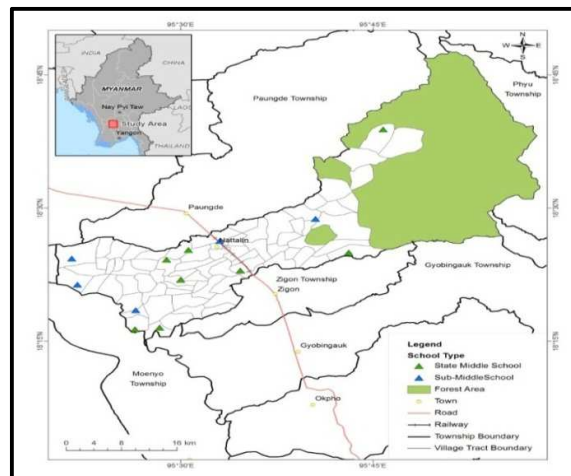


Figure 5 Spatial Distributions of Middle&High Schools

Source: Township Education Office, Nattalin Township

The situations of each high school were mentioned as follow; (1) Nattalin Basic Education High School at Tharzi Ward in Nattalin Town, (2) Myoma Basic Education High School at Myoma Ward in Nattalin Town, (3) Tapun Basic Education High School at Tapun Town, (4) Kayinkone Basic Education High School at Chinyotekwin Village Tract, (5) Gyokyarkan Basic Education High School at Gyokyarkan Village Tract, (6) Damange Basic Education High School at Damange Village Tract, (7) Aungzayar Basic Education High School at Aungzayar Village Tract.

Nattalin Basic Education High School

Nattalin Basic Education High School is situated in Tharzi ward beside the Yangon-Pyay motor road. It was established in 1949. The area of this high school is 10.88 acres. This school area contains 7 buildings including 6 flat buildings and one double-story building. And also canteen, school guesthouse and male's and female's latrine buildings are constructed in school compound. There are 3 platforms (computer, TV, VCD) and one library and one science laboratory room in this high school. In 2018-2019 academic year, there are 238 primary level students (123 male and 115 female students), 622 middle school level students (312 male and 310 female students), and 403 high school level students (175 male and 228 female students) in this high school. In this academic year, there are 8 primary level teachers (PAT), 22 middle level teachers (JAT), and 15 high school level teachers (SAT) in this high school. So, the primary, middle and high school level teacher-student ratios are 1:30, 1:28, and 1:27 respectively. The pass percentage of matriculation examination in 2013-2014 to 2017-2018, in 5 year-period average pass percentage was 23.66%. The highest pass percentage was 28% in 2015-2016 and the least pass percentage was 21.78 % in 2016- 2017. (Table 3)

Myoma Basic Education High School

Nattalin Basic Education High School 2 is situated in Myoma Ward and is called Myoma High School. This school was established in 1916 as primary school, and then it was upgraded in 1955. It was again upgraded to middle school in 1968, sub-high school in 2012 and high school in 2014. The area of this school is 0.65 acres. There are 5 buildings in this school. From 1916 to present day, 27 headmasters and headmistresses governed this school. In 2018-2019 academic year, there are 17 primary level teachers, 22 middle school level teachers and 15 high school level teachers in this high school. There are 530 primary level students (267 male and 263 female students), 685 middle level students (348 male and 337 female students) and 521 high school level students (240 male and 281 female students) in this school. The primary, middle and high school level teacher-student ratios are 1:31, 1:31, 1:35 respectively. The pass percentage of matriculation examination in 2013-2014 to 2017-2018, in 5 year-period, the average pass percentage was 51.88 %. The highest pass percentage was 64.47% in 2013-2014 and the least pass percentage was 39.38% in 2017-2018. (Table 3)

Tapun Basic Education High School

Tapun Basic Education High School is situated in Tapun Town. This school was established in 1945 as primary school and in 1952, it was upgraded to middle school and to high school in 1954. The area of this school is 6.8 acres. There are 11 buildings in this school campus. There are 3 platforms, 1 science laboratory room, and a library in this school. But there is only one computer for office use. In 2018-2019 academic year, there are 8 primary level teachers, 22 middle school level teachers and 15 high school level teachers in Tapun Basic Education High School. In this school, 187 primary level students (100 male students and 87 female students), 654 middle school level students (322 male and 332 female students), and 361 high school level students (181 male and 180 female students) are attending. The pass percentage of matriculation examination in 2013-2014 to 2017-2018, the average pass

percentage was 22.62%. The highest pass percentage was 28.84% in 2016-2017 and the least pass percentage was 18.62% in 2014-2015. (Table 3)

Kayinkone Basic Education High School

Kayinkone Basic Education High School is situated in Kayinkone village, Chinyotekwin Village Tract. Kayinkone Primary School was established in 1950 and it was upgraded to middle school in 1980 and to high school in 2013. The area of this school is 6 acres, including 5 buildings. There are 2 platforms and a library in this school, but science laboratory room is not constructed. In 2018-2019 academic years, there are 8 primary school level teachers, 22 middle school level teachers and 15 high school level teachers in this school. There are 58 primary school level students (23 male students and 35 female students), 395 middle school level students (189 male students and 206 female students), and 417 high school level students (205 male students and 212 female students) in this school. The pass percentage of matriculation examination within 5 years (2013-2014 to 2017-2018), the average pass percentage was 44.66%. The highest pass percentage was 56.94% in 2014-2015 and the least pass percentage was 25.44% in 2017-2018. (Table 3)

Table 3 Pass Percentage of Matriculation Examination of Nattalin Township Basic Education High School

Year	Nattalin Percent	Myoma Percent	Tapun Percent	Kayinkone Percent	Gyokyarkan Percent	Damange Percent	Aungzayar Percent
2013-2014	27.94	64.47	21.45	38.67	14.21	38	5.67
2014-2015	26	51.61	18.62	56.94	13.45	27.59	8.12
2015-2016	28	50.42	22.67	56.88	15.55	17.74	24.24
2016-2017	21.78	53.53	28.84	45.37	44.44	4.97	17.79
2017-2018	24.6	39.38	21.54	25.44	48.71	6.12	29.63

Source: Township Education Office, Nattalin Township

Gyokyarkan Basic Education High School

Gyokyarkan Basic Education High School is situated in Gyokyarkan village, Gyokyarkan Village Tract. Gyokyarkan Primary School was established in 1952. It was upgraded to middle school in 1980, affiliated high school in 1986, sub-high school in 1996 and high school in 2018. The area of this high school is 6 acres. There are 3 buildings in this school campus. Media rooms are opened with 2 platforms (TV, VCD). There is a computer for office use. School library is opened but science laboratory rooms are needed to construct. In 2018-2019 academic year, there are 5 primary school level teachers, 7 middle school level teachers, and 7 high school level teachers in this school. There are 51 primary school level students (26 male students and 25 female students), 263 middle school level students (151 male students and 112 female students), and 171 high school level students (85 male students and 86 female students) in Gyokyarkan Basic Education High School. The pass percentage of matriculation examination within 5 years from 2013-2014 to 2017-2018, the average pass percentage was 27.27%. The highest pass percentage was 48.71% in 2017-2018 and the least pass percentage was 13.45% in 2013-2014. (Table 3)

Damange Basic Education High School

Damange Basic Education High School is located in Damange Village, Damange Village Tract. This school was founded in 1948 as a primary school, then it was upgraded to middle school in 1953 and sub-high school in 1973. In 1981, it became the high school. The area of this school is 2.63 acres with 6 buildings. In 2018-2019 academic year, there are 4 primary school level teachers, 18 middle school level teachers and 12 high school level teachers in Damange Basic Education High School. There are 116 primary school level

students (51 male students and 65 female students), 497 middle school level students (256 male students and 241 female students), 156 high school level students (73 male students and 83 female students) in this school. The pass percentage of matriculation examination in 2013-2014 to 2017-2018 in 5 year-period, the average pass percentage was 18.88 %. The highest pass percentage was 38% in 2013-2014 and the least pass percentage was 4.97 % in 2016-2017. (Table 3)

Aungzayar Basic Education High School

Aungzayar Basic Education High School is situated in Aungzayar Village, Aungzayar Village Tract. Aungzayar Primary School was established in 1958. It was upgraded to sub-middle school in 1976, middle school in 1980, sub-high school in 2011 and high school in 2017. The school area is 10 acres. There are 5 buildings in this school campus. Media rooms are opened with 2 platforms but there is no computer. A school library is opened but science laboratory room cannot be opened yet. There is a sport field with 350' x 200 ' in this a school campus. As the numbers of students are abundant, class rooms are not enough. Besides it needs the enough toilets. From 1958 to present time, there were 15 headmasters and headmistresses governed this school. In 2018-2019 academic years, there were 6 primary school level teachers and 14 middle school level teachers and 13 high school level teachers in this school. Primary school level students were 197 (99 male students and 98 female students), middle school level students were 599 (306 male students and 293 female students) and high school level students were 355 (182 male students and 173 female students) attending in this school. The pass percentage of matriculation examination during 5 year-period (2013-2014 to 2017-2018), the average pass percentage was 17.09 %. The highest pass percentage was 29.63 % in 2017-2018 and the least pass percentage was 5.67 % in 2013-2014. (Table 3)

The Ratio of Teacher and Student in Nattalin Township (Teacher-Student Ratio)

In 1998-1999 academic years, the ratio of teachers and students in Nattalin Township was 1:27. During that year the ratio of primary school teacher and primary school student, the ratio of middle school teacher (JAT) and middle school student, the ratio of high school teacher (SAT) and high school student were 1:36, 1:17, and 1:30. In 2007-2008 academic years, the whole teacher-student ratio was 1:17. In primary school level, the teacher-student ratio was 1:17, the middle school level teacher-student ratio was 1:17 and the high school level teacher-student ratio was 1: 20. In 2018-2019 academic year, the teacher student ratio was 1:13. In primary, middle, and high school level, the ratio of teacher and student are 1:9, 1:32 and 1:24. (Table 3)

Study on the High Schools by using SWOT Analysis

In Nattalin Township, there are 7 basic education high schools and 4 basic education sub-high schools in 2018-2019 academic year. Among them, the potential developments for 7 high schools are evaluated by SWOT Analysis. In this method, the high schools are appraised with (1) Strength, (2) Weakness, (3) Opportunities, and (4) Threats. To evaluate the potential development of high schools, the 7 criteria are used. These criteria are such as (1) Location, (2) Transportation, (3) Infrastructure, (4) Graduation Percentages, (5) Facilities, (6) Parents' Perspective on Education and (7) Support (Figure 6).

Nattalin

	Strength	Weakness	Opportunities	Threats
Location	Good Physical Location (Flat Plain)	Located near the market (noise, bad smell, traffic)		Noises from market make disturbance in learning and teaching
Transportation	Good Transportation		Less efficiency of time consuming	Danger of traffic
Infrastructure	Strong infrastructure	Congestion of existing infrastructures	Possibility to build new buildings	Due to narrow campus, trouble in construction of building
Graduation Percentages	High graduation percentages with highest scores		Many students with distinction can be born, good in school dignity	Student transfer depends on the pass percentage result
	Sufficient student-teacher ratio		Opportunities to get additional and higher learning	
	Sufficient Classrooms		Convenient learning for students	Vertical extension of buildings is needed
Facilities	Having 3 platforms, Laboratory, Library	Insufficient computers for learning (once per week)	Can be skilled computer technology than other village high schools	
Parents' Perspective on Education	Most of the students live in town and their families are good in economic condition, can take care and support in their children's education	Parents' complaints (Scenicity)	Most outstanding student can be born (Family economy is in good condition, being many outstanding students)	
Support	Supporting from parents who have good economy, government	Insufficient Funds		Lack of donation from other social communities

Myoma

	Strength	Weakness	Opportunities	Threats
Location	Good Physical Location (Flat Plain)	School campus is situated on the lowland area	Large area to construct buildings etc.,	Sometimes flood condition in rainy season
Transportation	Good transportation		Less efficiency of time consuming	Danger of traffic (Beside the Yangon Pyay Highway Road)
Infrastructure	Sufficient buildings	Maintenance is needed		Fly free toilets are needed
Graduation Percentages	High graduation percentages		Many professional Institute students can be born.	The number of student depends on the pass percentage result.
	Sufficient student-teacher ratio		Opportunities to get additional and higher learning. Computer training	
	Sufficient classrooms		Effective teaching and social relation between students and also between teachers and students	Increasing students demand for more classrooms.
Facilities	Having 3 Platforms (Computer, TV, VCD) Laboratory, Library	Insufficient computers for learning (Once per week)	Students can understand the computer technology than other schools.	
Parents' Perspective on Education	Parents give the encouragement to their children's education	High percentage of low income families	The opportunities to learn continuously due to the parents' acceptance of the value of education	Unsupportive parents
Support	Ministry of Education, Parent-Teacher Association (Books, Text Books, etc.,)	Not enough funding for sport equipment supplies and teaching aids.		Lack of donation from other social communities.

Tapun

	Strength	Weakness	Opportunities	Threat
Location	Good Physical Location (Flat plain)	Situated in discontinuous area, not separately quiet area		
Transportation	Good Transportation		Less efficiency of time consuming	
Infrastructure	Strong Infrastructure		Possibility to build new three-story building	Lack of funds for new buildings
Graduation Percentages		Pass percentage decreases compared to the past		Students near Gyokyarkon did not come because Gyokyarkon sub-high school was upgraded to high school. So, number of students are getting small
	Sufficient student-teacher ratio		Opportunities to get additional and higher learning	
	Sufficient Classrooms		Convenient learning for students	Increasing students demand for more classrooms
Facilities	Having 3 Platforms, Laboratory, Library	Only one computer for office, no sport field		Lack of knowledge of some important software
Parents' Perspective on Education		Lack of regular parent-teacher meeting. High percentage of low income families		Weak in parent-teacher meeting for student's education. A few opportunity for students whose parents cannot support
Support	Supporting from Parent Teacher Association, Government	Insufficient Funds		Lack of donation from other social organizations

Kayinkone

	Strength	Weakness	Opportunities	Threats
Location	Good Physical Location (Flat plain)		Convenient to learn because of locating separately outside the village	
Transportation		Poor transportation		Get trouble for students to come for long time
Infrastructure		Maintenance needs for old buildings	Possibility to build new buildings	
Graduation Percentages	High Graduation Percentages		Students from other township want to learn in this school.	
	Sufficient student-teacher ratio		Will be able to devote more time and attention in each student	
		Insufficient classrooms		Lack of funds for building with new classrooms
Facilities	Having 2 platforms, Library	Lack of computer (no electricity), no playground		Lack of knowledge of some important software
Parents' Perspective on Education	Many parents who accept the value of education though far from the town		Students' education can be raised due to the increasing number of parents who support and encourage in education	
Support		Insufficient funds	Supporting from good economic status families (because of good economic status families)	Lack of donation from other social communities

Gyokyarkon

	Strength	Weakness	Opportunities	Threats
Location	Good Physical Location (Flat Plain)		Can learn quickly due to located at the edge of village	
Transportation		Can be trouble for student from other villages in rainy season		
Infrastructure	New building		Possibility to repair old buildings	Insufficient funds for old buildings
Graduation Percentages	High Graduation Percentages		Due to high pass percentage, the students who attended in Tapun High School came to attend this school. So, number of students can increase.	
	Sufficient student-teacher ratio (except teachers are needed middle school level teacher)			
	Sufficient Classrooms		Convenient learning for students	
Facilities	Having 2 platforms, Laboratory, Library, Playground			Get little technological knowledge compared to students from other high schools that has computer and science laboratory
Parents' Perspective on Education		Lack of regular parent-teacher meeting		
Support	Strong PTA and school's organization		Able to achieve like other schools' wider opportunities	Lack of donation from other social communities

Damange

	Strength	Weakness	Opportunities	Threats
Location	Good Physical Location (Flat Plain)	Situated at the center of village		
Transportation	Good Transportation		Less efficiency of time consuming	
Infrastructure		Need to repair old buildings	Possibility to create new building (plan)	Lack of funding for new buildings
Graduation Percentages		Low graduation percentage		Number of student can decrease because of pass percentage result
	Sufficient student-teacher ratio		Opportunities to get additional and higher learning	
	Sufficient classrooms		Effective teaching and social relation between students and also between teacher and students	
Facilities	Having 3 Platforms, Library	Only one computer for office use, no science laboratory		Lack of knowledge of some important software
Parents' Perspective on Education	Active involvement on education		Being many families with good economy, can support children's education	
Support	Supporting from Parent-Teacher Association	Insufficient funds		Lack of donation from other social communities

Aungzayar

	Strength	Weakness	Opportunities	Threats
Location	Good Physical Location (Flat Plain)		Separately located, can learn quietly and peacefully (not in the middle of the village)	
Transportation		Poor transportation get trouble in rainy season for students from other villages		Poor transportation in rainy season, take long time to cover the school
Infrastructure		Need new buildings	Possibility to build new buildings	
Graduation percentages	High graduation percentage		Students who attend in Damange High School depend on the information are attracted to this of pass percentage result school	
		Insufficient Student Teacher ratio		Less effective teaching because of multi-subject teaching by individual teacher
		Insufficient classrooms		Due to large number of students, class are organized in two shifts.
Facilities	Having 2 platforms, Library, Playground	Lack of computer and laboratory		Lack of knowledge of some important software
Parents' Perspective on Education		High percentage of parents may not see the value of education		Less encouragement to their children's education
Support	Supporting from Parent Teacher Association	High percentage of low income families		Lack of donation from other social communities

Figure 6 Study on the High Schools by using SWOT Analysis
Source: Field and Interview Result (2019)

Findings and Suggestions

Nattalin is located in Thayarwady district of Bago region (West). Nattalin town is situated in western part of Nattalin Township and is located beside the motor road and railroad. In Nattalin Township, the total population is 174,197 in 2018 and its economic activity is fairly developed. It has 232 basic education schools (7 High Schools, 4 Sub-High Schools, 8 Middle Schools, 5 Sub-Middle Schools, 32 Post - Primary Schools, 161 Primary Schools and 15 Sub-Primary Schools in 2018-2019 academic years. In order to upgrade the standard of education of Nattalin Township, more basic education primary schools should be opened in every village and every ward.

In 2018 -2019 academic year, the total students are 23,103 of which, 12,425 primary level students, 7,889 middle level students and 2,789 high school level students are attending in these schools. In this year, primary level teachers (PAT) are 1,427, middle level teachers (JAT) are 248, and high school level teachers (SAT) are 116. So, the average teacher-student ratio is 1: 13. The primary, middle and high school level teacher -student ratios are 1: 9, 1: 31, 1: 24. According to the teacher-student ratios, in most schools the teacher-student ratios are high. It indicated the deficit of school buildings and number of teachers. Therefore, building of new classrooms and appointment of more teachers should be allocated. The teacher-student ratio can affect the achievement of many individual attention and good teaching. Low teacher-student ratio can obtain the effective teaching and social relation between teachers and students and also between students themselves.

In many basic education schools in Nattalin Township, many old buildings are found. So, the new buildings with new classrooms are needed and the old one should be repaired to achieve the equal opportunities in all schools. According to the study of the areas of school campus, some have large areas but others have not. A school should have a large area to for enough buildings and a playground for all-round development of student. In many schools, computer training as well as the use of computer as teaching aid is still limited. In some schools, there are a few computers and others there is only one computer for office use. In some schools there is no the electricity. To get the uplift of the education standard of Nattalin Township, more budgets should be allocated to provide enough computers for all basic education schools in this township. Moreover, good teachers should be fostered by the arrangement of teaching trainings. Thus, every school will have well trained and well qualified teachers. In studying the basic education schools in Nattalin Township, many schools with the exception of 3 high schools, school libraries, laboratory and multi-media rooms are limited. Hence, every school should have a school library, laboratories and multi-media room for all -round development.

In 2017-2018, the matriculation examination results are 48.71 percent in Gyokyarkan Basic Education High School, 39.38 percent in Myoma Basic Education High School, 29.63 percent in Aungzayar Basic Education High School, 25.44 percent in Kayinkone Basic Education High School, 24.60 percent in Nattalin Basic Education High School, 21.54 percent in Tapun Basic Education High School, 15 percent in Shankone Basic Education Sub-High School, 12 percent in Kyawkkhwet Basic Education Sub-High School and 6.12 percent in Damange Basic Education High School. The numbers of students in these schools depend on the pass percentage result of matriculation examination. The numbers of student increase in Myoma, Nattalin (Tharzi), Aungzayar, Kayinkone and Tapun Basic Education High Schools due to the increase of pass percentage result of matriculation examination.

In some high schools and sub-high schools, the numbers of students are limited because of low pass percentage result in matriculation examination result. The high percentage of the result of matriculation examination depends on the teachers in their respective subject and

teaching methods. The reason is unequal opportunities of learning and effective teaching. Most basic education schools are located in the villages and students face used to difficulties in the rainy season. Some schools are located in the Nattalin and Tapun and so the transportation is good. Besides, the schools in villages use the water from wells and artesian wells. The drinking water for students and teachers should be clean and purified. For all - round development of basic education school in Nattalin Township, teaching aids should be provided more than present condition. In the future, more new schools will be set up with respect to location, area; density of students, good transportation and communication, and so schools should be the good environment for the students to learn peacefully. In conclusion, fostering of good teaching by arranging teaching training will have well trained and well qualified teacher and thus creating the low teacher-student ratio, constructing new buildings with new modern classrooms, and learning quietly and peacefully can become all-round development of the basic education schools in Nattalin Township in the future.

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Disparities on Agricultural Development: A Case Study of Okpo Township

Khin Myat Myat Mon¹, Zin May Oo², Tun Win³, Nwe Yin Min⁴

Abstract

The present paper is an attempt to analyse the spatial patterns of regional disparities, variations in the levels of agricultural development in Okpo Township where economy depends heavily on agriculture. It also stresses effects of physical factors which set the stage for primary economic activities and the development momentum of the economic conditions during the past two decades, especially after 2000. In the area, most of lowland areas are flooded yearly and some areas possess infertile soils. Agriculture, especially, paddy cultivation is common in the area. The analysis is based on the relationship between agricultural development (dependent variable) and selected variables of regional disparities (independent variables) among the Okpo Township from 2000 to 2015 and was analyzed by using primary and secondary data sources. Office data were used to analyze the spatial variation of agriculture conditions in village tracts level by using disparities analysis. Primary data (open and structured interview) were collected to illustrate the processes of agriculture development and spatial variation of economic activities.

Key words: regional disparities, relationship, rural development

Introduction

Agriculture has remained the chief source of livelihood for millions of masses worldwide population an ever increasing pressure on the agricultural resources. Before 1988, agricultural policies of Myanmar controlled and subsidized could be depicted as rigid and highly emphasized on domestic food security and stability of price. After the economic transition to market-oriented economic system in 1988, the major agriculture production are paddy and beans in study area. It plays an essential role in the process of economic development. In 1995, agricultural policy was introduced. For the overall development of agriculture, social and infrastructural changes have been introduced. Therefore, it can be distinguished in three phases: before 1995, and 2000, and 2015 (first phase of agricultural policy -development of major irrigation project and strengthens of cooperative credit institution second phase on high-yielding varieties of crops final phase - modern farm practices). Okpo Township has suffered from regional disparities and inequality. Generally the region is divided into three parts (i) Western low land area (ii) Central plain area (iii) Eastern hill. The main objectives of the research are:

To access the regional variation of levels of agricultural development

To examine the geographical patterns of regional disparities in the study area

To find out the relationship between agricultural development and regional disparities

Study Area

Okpo Township is located in Tharyarwady District, Bago Region. It lies between 18°00' and 18°20' North latitudes and between 95°30' and 96°10' East longitudes which is one of the eight townships of Tharyarwady District. It has an area of 1050.18 square kilometers (405.48 square miles) & 54 village tracts which comprise of 247 villages. The total population was 122278 with 29046 households in 2015. Physical resources are suitable for agriculture.

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Data and Methodology

Based on secondary data relate to regional disparities and agricultural development data has been collected mainly from the official data. Primary data of the relationships between agricultural development and disparities were obtained from field survey, questioners and interviews. Information derived from these questionnaires was used for Factor analysis. Factor analysis was applied to find out main variables by using 24 variables derived from structured questionnaires. Eighteen main variables are obtained from result of Factor analysis were used.

Data Collection

The socio-economic conditions of the study area were investigated by field observations to get thorough understanding and data were collected from secondary sources. Primary data related to socio-economic conditions were obtained from field survey, questioners and interviews. The official data and the information from the interviews were used to classify the development patterns and processes of the study area. To understand and get general socio-economic conditions of study area, questionnaires were sent to wards and village tracts administration. Information derived from this questionnaire was used for Factor and Cluster analysis.

Methodology

This study employs both quantitative and qualitative method. To understand the spatial variation of socio-economic conditions, structured questionnaires was distributed the authority concerned of each village tract and ward. Eighteen main variables obtained from result of Factor analysis were used in Cluster analysis to present the pattern of socio-economic conditions. Based on result of Cluster analysis sample village tracts were selected for further study. Then, from each village tracts, 4 households possessing the different socio-economic conditions were chosen for detail interview. And then the analysis is based on the relationship between agricultural development (dependent variable) and selected variables of regional disparities (independent variables) among the Okpo Township from 2000 to 2015 and was analyzed in this study area by using primary and secondary data sources.

Result and Findings

Yangon-Pyay railway and mortar highway run nearly parallel throughout the middle of Okpo Township. Eastern of Okpo Township is bounded by forest area. In the western part of the Okpo Township is Moe nyo Township separated by Myitmakha River. The eastern part is occupied by hilly areas sloping down to the west. The major streams are Gamon Creek and Gadet Creek taking their sources on Bago Yoma flowing west across the central plain into the Myitmakha River. Okpo Township experiences the Tropical Monsoon Climate (Amw) according to Vladimir Koppen's climatic classification. These soils types are generally Meadow Soils.

Economic Activities

The major economy of Okpo Township is agriculture which depends on location. After 2000, private companies supported local people by providing fertilizers and pesticides to the farmers. Hence, cultivation and production of paddy, beans and peas increased. Before 1990, the cropping intensity was only 109.3 hectares. 2015 period cropping intensity increased to 199.4 hectares because of the use of double cropping systems improving cropping method and trade systems, so, the major cropping intensity increased in the subsequent years. Since 1995, the economic system changed to market oriented economy. Hence private industries related to agriculture appeared. Fishing industries are carried out in the lowland areas of the western part of Okpo Township There are 10 *inns* (natural pond) and five enclosed water ponds (pike chats). The outputs of fish products are gradually decreasing due to the climate conditions. The

most important products of Okpo Township were paddy, rice, and pulses, which were sent to Yangon. Therefore, the regional trade becomes more important in Okpo Township.

Social Indicators

The characteristics of population are important as social characteristics and related to economic opportunities, occupations, road accessibility and topography. After 1995, the local government undertook the development of regional education level with emphasis on primary school. There is only one main township hospital, one clinic for Mother and Child Health, one indigenous medicinal clinic and three private clinics in Okpo Township. The development of agricultural conditions generally focuses on the extension of roads between Urban and Rural areas. Improvement of inter-village road, electricity, and communication has been due to the extension of telephone facilities. Exchange office, increase in use of auto telephone and GSM phone in the study areas.

Table 1 Variables Index of Socio-economic Conditions

No.	Variables	Variables Index	Category
1	Religious Facilities	Rel_F	Social
2	Number of religious person (monks, novices and nuns)	Rel_P	
3	Percent of Buddhist	Bud_%	
4	Number of Graduate	Grad	
5	Percent of Student	Stu_%	
6	Number of school	Scho	
7	Total Population	T_Pop	
8	Population Density	Pop_D	
9	Health worker	H_Wk	
10	Library number	Lib	
11	Road accessibility	Rd_A	Infrastructure
12	Road time duration	Tim_D	
13	Transportation number	Tran	
14	Used of electricity	Elec	
15	Communication	Commu	
16	Agriculture land percent	Ag_%	Economic Activities
17	Cropping Intensity	Cr_I	
18	Farm Size	F_Sz	
19	Machine level	Ma_L	
20	Industries	Indu	
21	Commercial	Coml	
22	Services	Sev	
23	Market	Mkt	
24	Depot	Dept	

The relationship between the agricultural conditions and transportation infrastructure development leads to the development as well as the uplifting of the socio-economic condition of a location. Formerly there were only earth roads. But now, the roads have been upgraded to lateritic roads. Transportation facilities support the development of the economy, social conditions and knowledge. The development of communication system, socio-economic information could easily diffuse to the rural area. Application of factor analysis is based on social, economic and infrastructure variables of 54 village tracts and 6 wards. Variables Index of Socio-economic conditions is shown in Table 1.

Factor analysis is used to know the controlling factor of agricultural development in Okpo Township. Twenty-four variables are used for analysis. Finally, there are six components of output new dataset. Among these components, the largest amount of socio-economic variables is under components 1 and 2 which are more important than other components.

Table 2 The Components of Socio-economic Variables

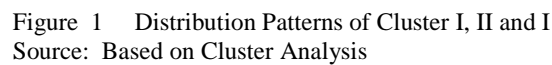
Variables	Component					
	1	2	3	4	5	6
Sev	0.874	0.004	0.127	-0.048	-0.015	-0.057
Comu	0.845	-0.21	0.13	-0.062	0.042	-0.015
Coml	0.794	-0.02	0.135	-0.095	-0.195	0.066
Indu	0.792	-0.18	0.07	-0.125	0.189	0.2
T_Pop	0.78	0.404	-0.053	-0.087	0.195	0.135
Tran	0.703	0.376	0.149	0.09	-0.09	-0.23
Elec	0.665	-0.43	-0.054	0.279	0.069	0.08
Grad	0.661	0.094	0.197	0.473	-0.278	-0.021
Rel_F	0.589	0.536	-0.37	-0.01	-0.247	0.016
Rel_P	0.586	0.125	-0.515	0.121	-0.206	0.012
Mkt	0.529	0.216	0.161	-0.328	0.209	0.104
F_Sz	-0.432	0.394	0.268	0.225	0.381	-0.044
Tim_D	-0.265	0.778	-0.116	-0.309	0.136	0.055
Me_l	-0.027	0.755	0.279	0.266	0.163	-0.035
Cr_I	-0.122	0.64	0.264	-0.045	-0.105	0.478
Lib	0.302	0.639	-0.169	0.338	-0.115	-0.235
Scho	0.446	0.603	-0.142	-0.054	0.214	-0.13
AgLan	-0.511	0.593	0.36	0.192	-0.155	-0.224
Pop_D	0.473	-0.55	0.254	0.135	0.174	0.179
Bud_percent	-0.069	-0.18	0.622	-0.035	-0.582	-0.018
Dept	0.459	0.015	0.482	-0.282	0.324	-0.227
Rd_A	0.263	-0.24	0.002	0.564	0.267	-0.234
H_Wk	0.36	0.228	0.051	-0.455	-0.281	-0.157
Stu_percent	0.002	0.295	0.056	0.32	-0.025	0.705

a. 6 components extracted.

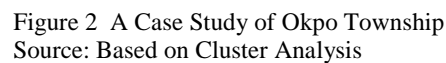
Source: Factor Analysis applied by author.

Cluster Analysis on Agricultural Development Pattern

Hierarchical Cluster Analysis is used to show the pattern of agriculture development of Okpo Township. Figure1 shows the result of Hierarchical Cluster Analysis. In this study, the clusters are closely represented as the result of factor analysis reveals 18 socio-economic variables in component 1 and 2. They are classified as three groups such as the social variables, economic variables and infrastructural variables within 54 village tracts. Level I includes 20 village tracts, Cluster II is composed of 27 village tracts and the Cluster III consists of 7 village tracts which show distribution pattern map (Figure 1). Cluster I, II and III show the average values of socio-economic activities for each indicator. The total averages of socio-economic variables are differences in each cluster.



This chapter analyzes the controlling factors of the agricultural development process in each level of Okpo Township. In each level, the three village tracts were chosen by physical location as Case Study 1, 2 and 3. In each case only 4 households were chosen for detailed study. Figure 2 shows a case study of Okpo Township.



Level I, the main economic activity is agriculture but crops production was rather low. Hence, the input for crops cultivation is rather high. It is difficult to cultivate crops in the area. The area has low accessibility and some earth roads remained unchanged. These conditions affect the socio-economic conditions of the area. Therefore, the development of socio-economic conditions is still low in the study area (Figure 2).

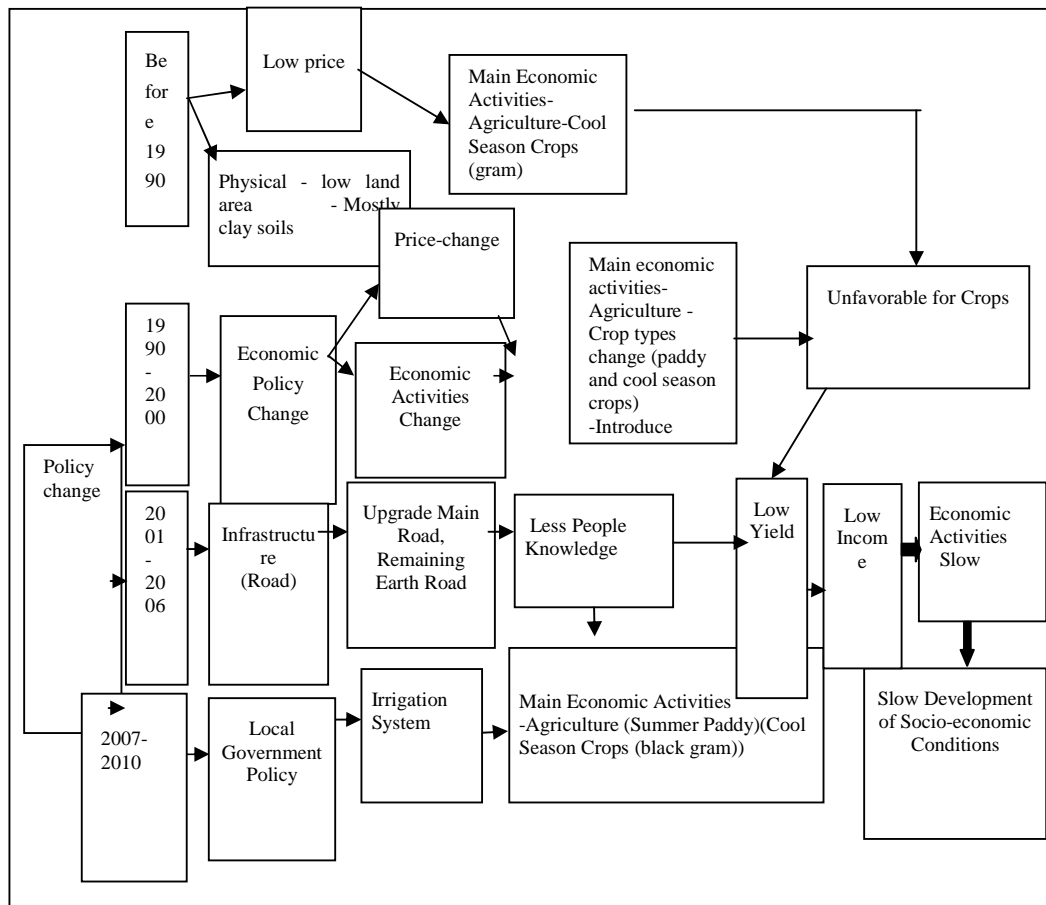


Figure 3 Socio-economic Development Process in Cluster I

Source: Based on Open Interview

General Over View of Level II

In these villages, besides agriculture, they sold agricultural related tools and established stores along the roads. Some place which is far from Highway roads mainly depended on agriculture but small shops selling household things are also found. The people who settled in village tracts locating near the forest work the jobs which are related to forest. Most village tracts have locational advantage because they are located on accessible places. Therefore, the location supports the socio-economic development of the area. Therefore, present growth of socio-economic conditions is gaining momentum and it leads to high level development in the near future.

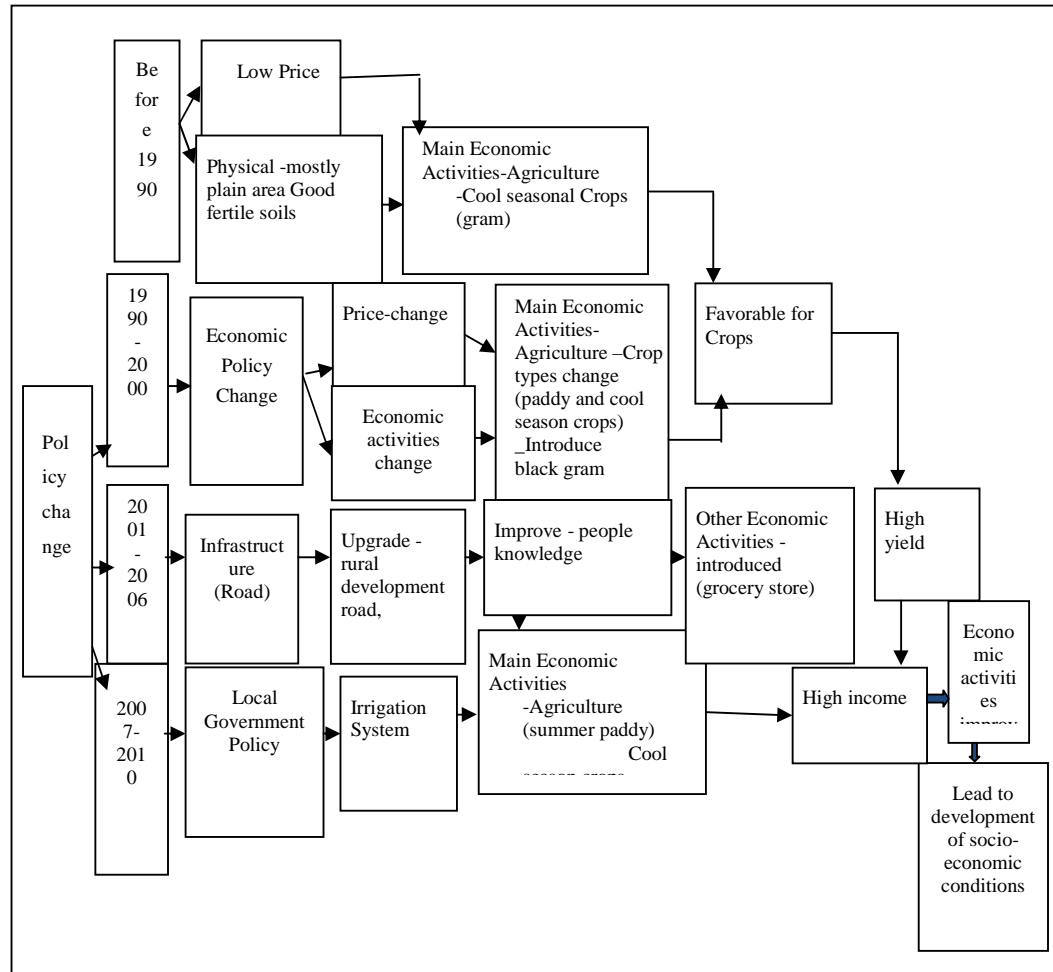


Figure 4 Development Process in Cluster II

Source: Based on Open Interview

General Over View of Level III

Most households are engaged in farmwork (*le* and *kaing*) and fishery. The development in the farmwork has enhanced the improvement in transport facilities, particularly roads and modes of transportation which in turn induces the development of other economic activities, especially trading and other service businesses. Accordingly the social status of the village tracts under study has improved during the past two decades, manifested by the modern household use items recreation facilities.

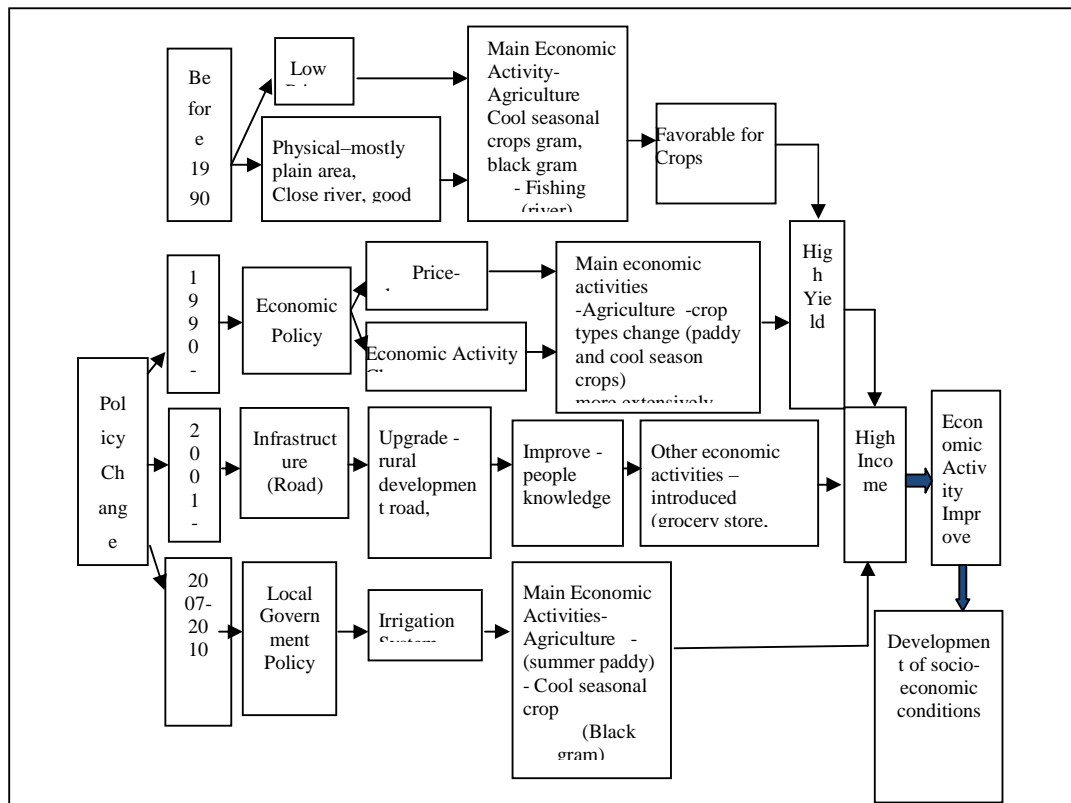


Figure 5 Socio-economic Development Process in Cluster II I

Source: Based on Open Interview

Differences in the Socio-economic Development Process in the Three Clusters

The differences in the socio-economic development processes of the three clusters are presented in Table 3. In Level 1, the area includes two physical divisions: low land and high land. Drainage condition is poor and the area is flooded yearly. In the rainy season, agricultural lands are flooded and farmers encounter difficulties caused by flooding. With low input and traditional farming method the yield per unit area is low. The area is unsuitable for cool season crops and suitable for monsoon paddy cultivation. Economic growth of the area was slow due to natural disturbances. Much of the existing inter-village roads are of earth-surfaced type and there are only a few lateritic roads. As such the pace of socio-economic development in this cluster has been comparatively slow.

In Level II, the plain area is occupying. The area, fortunately, receives irrigation water for the cultivation of summer paddy. The yields of crops are comparatively high in response to high soil fertility and greater input. As such, local inhabitants can upgrade the roads on self-help basis which is connected with Yangon-Pyay Highway. Cluster II possesses more locational advantages than Cluster I due to existing physical factors.

In Level III, case study has different economic based on agricultural development processes because of different physical location. The economy of the area is based on *le* and *kaing* cultivation and fishing. The availability of irrigation water makes the farmers possible to practice triple cropping. Fishery also plays an important role in the economy of the area concerned. The roads have been upgraded which lead directly to the urban area. These inturn

lead to rapid socio-economic development. causing damage to the planted crops especially paddy.

Table 3 Differences in Socio-economic Development Process in the Three Levels

Study Area	Physical factors			Economic activities (based on Agriculture)			Human activities	
	Topography	Drainage	Fertile soil	Primary Sector	Secondary Sector	Tertiary Sector	Economic Policy	Infrastructure
Cluster I	Mostly lowland area	Poor drainage, Flooded area	Soils (poor soils and fertile soils)	Agriculture(Le, kaing)Fishing	-	-	Market Oriented Economy	Rural development road upgraded, remaining earth road
Cluster II	Mostly plain area	Major stream passes	Moderately fertile soils	Agriculture(Le)	-	Buying and selling	Market Oriented Economy, Agriculture policy	Rural development road upgraded New construction development road
Cluster III	Mostly plain area Flooded areas	Close to Myitma-kha River and Min Hla Chaung	Good fertile soils	Agriculture (Le, Kaing), Fishing	Manufacture	Services, Buying and selling,	Market Oriented Economy, Agriculture policy	Railway, Highway, Rural development road upgraded connected to urban area

Conclusion

Agriculture development effects social conditions of the area and social conditions developed markedly after 2000. But, the growth of socio-economic conditions developed in the area varies one place from another. It was resulted from the existing physical factors, government policy and change in infrastructure. As there are different agriculture development levels in the area, the factors causing different socio-economic conditions are sought out. Although the price of crops is high due to the effect of economic policy change, the income is still low due to low crops productivity of the area. As farmers cannot afford to buy sufficient amount of input, yield per unit area decreases. The low accessibility affects the transportation of goods and people and less development in socio-economic activity. As surrounding villages develop in economic conditions, the economic activity of the area has a chance to develop because of its high accessibility. But physical factors support less on economic condition of the area.

The three groups are studied to get thorough understanding on advantages enhancing socio-economic conditions. The relationship between level of agricultural development and level of regional disparities are could be brought government policy, physical factors, social factors and economic factors. Due to the lack of systematic farming method and low input, the yield per unit area as been declining in the very recent years. The low-lying area has witnessed widespread flooding almost every year in the rainy season. The improvement in transportation has been rather slow. Due to low accessibility, lack of knowledge on social and economic conditions is apparent. Some area has potentials to gain economic development due to locational advantage and better accessibility. The locational factor supports the development of the area, but existing physical condition especially soils in the area cause slow economic development. Soil fertility has become exhausted due to repeated crop growing.

The improvement of land transport together with telecommunications has widened the spectrum of knowledge of the local farmers. Some households are engaged in agro-based industry and others earn their living solely on trading. The village tract is located at junction point at which high way road and rural development road meet. The villages are directly related to economic conditions of nearby villages. Although the area is located in fringe area of the township, the area possesses economic opportunities due to infrastructure development. Therefore, physical factors, government policy, economic system, social services and infrastructural facilities are the chief controlling factors of agriculture development in Okpo Township.

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