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A Geographical Study on Agricultural Land Use Pattern of Taungdwingyi Township

Yee Yee Cho*

Abstract

The study will tell us what is the existing pattern of land use. With the help of this study we can know those various changes or factors which will help in improving land use. The land use types will be examined at village tract level of Taungdwingyi Township with comparison method for the time (i.e. from 2001-02 to 2018-19). By comparing the land use types and respective areas, it can be observed that how different land use types have been changed from one type to another throughout the study period.

Key words: Land use pattern, the land use types, changes.

Introduction

Land use is a multi-disciplinary area and is a prerequisite resource base for all activities of society. Land use patterns refer to the spatial distribution of human activities. Moreover, micro-level study, for each village tract will show the high or medium or low percentage of the cultivated land to total land area of each village tracts. To achieve these results, the changing pattern of general land use types will be considered for the land use classes.

Study Area and Field of Study

Taungdwingyi Township is located in the Central Dry Zone of Myanmar. But, its location on the foothill of Bago Yoma (Bago Range) makes it to experience tropical savanna climate with the average annual rainfall between 20 inches and 40 inches. Hence, the study area is sometimes out of the Dry Zone Belt of Myanmar. Taungdwingyi Township has a total area of 760 square miles or 486,403 acres. Most dominating soil is Meadow Alluvial Soil in Township. It consists of 72 village tracts. Total population of Taungdwingyi Township in 2018 was 266,017.

Aims and Objectives

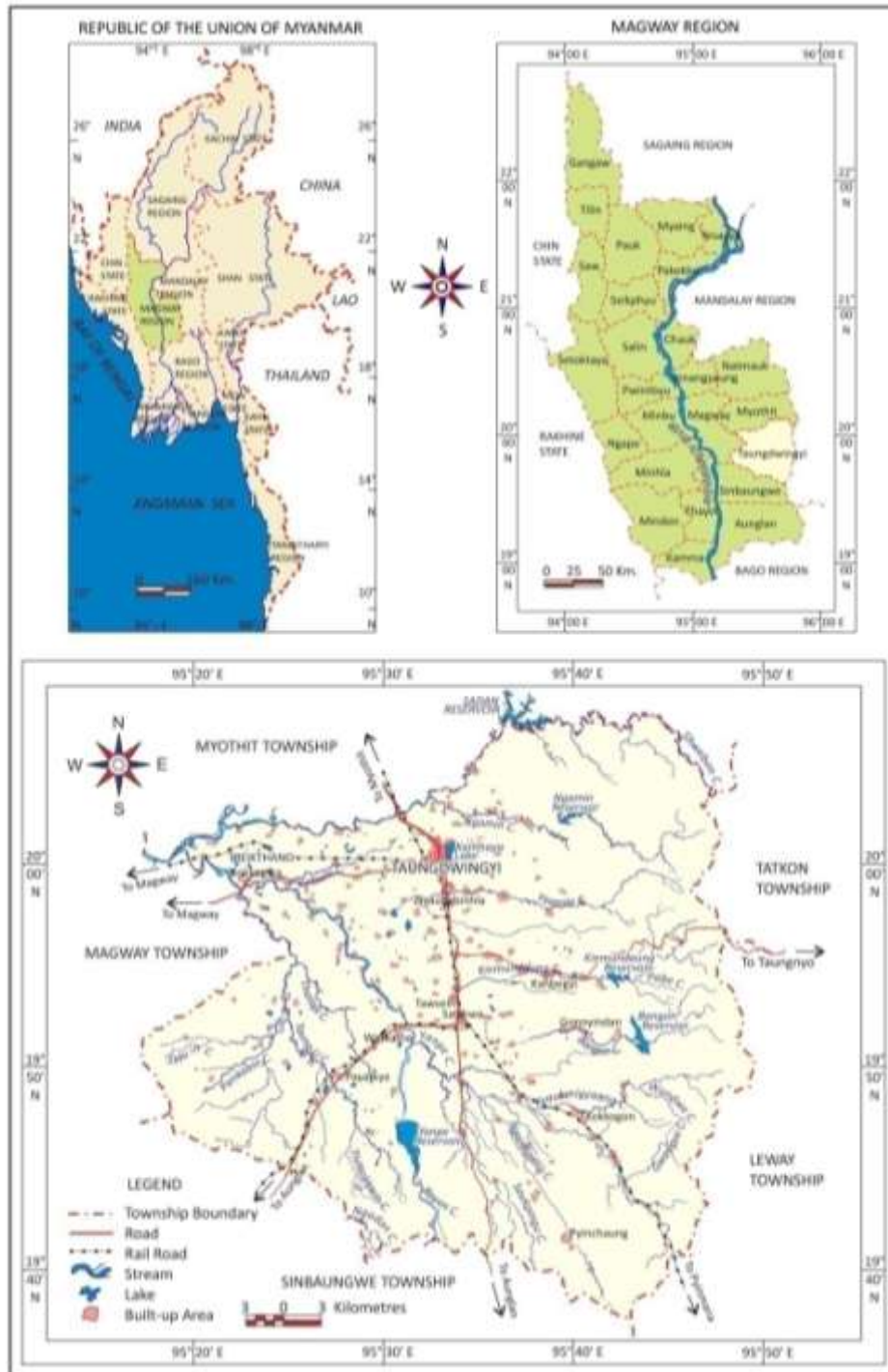
The aim of this study is for sustainability in agricultural land use of Taungdwingyi Township.

- (a) To identify the existing pattern of land use
- (b) To analyze the changing pattern of land use
- (c)

Material and Methods

The present study of land use is based on the study area. It involves basically secondary data. The secondary data concerning land use has been collected from various sources, was arranged, processed and then presented. In this study, land use changes were analyzed by use of 2001-02 and 2018-19.

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Figure(1) Location of Taungdwingyi Township

Source: UTM Map No.1995-05, 1995-06,1995-09,1995-10,1995-13,1995-14,2095-08,2095-12 and 2095-16.

Agricultural Land Use Pattern

Agricultural Land Use Classification

According to the Land Records Department, Myanmar, the land use types are classified as follows:

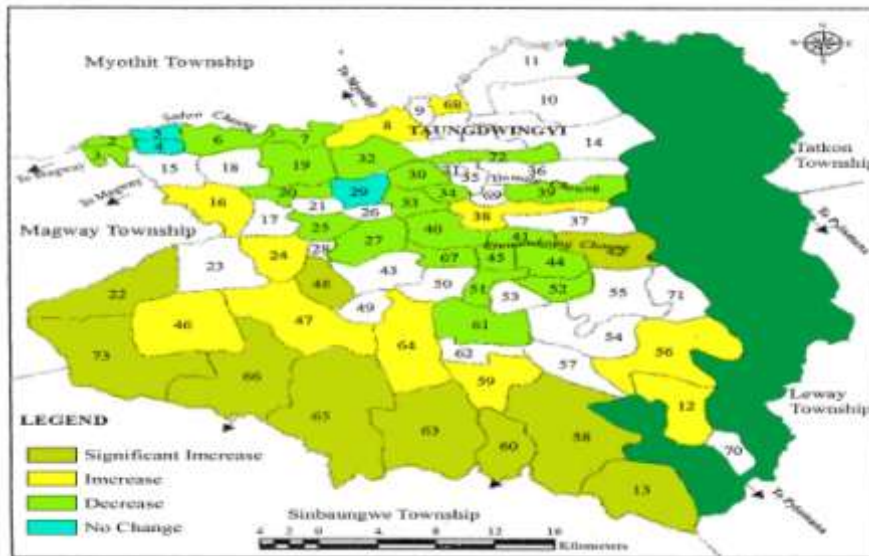
1. Cultivated land
2. Uncultivated land
3. Virgin land

4. Unused land

5. Forest land

1. Cultivated Land

Under this category, the land used for the crop grown is included. But, only the actual land area on ground is considered and is also known as net sown area. It is meant that the parcel of the earth's surface which is being used for agricultural purpose. In the study area, the cultivated land had increased to (about 24489 acres of the land area during 17 years from 2001-2002 to 2018-2019). Out of 73 village tracts, only 10 have been found with significant increase in cultivated land with an amount of more than 1000 acres.



Figure(2) Pattern change of cultivated land use in village tracts of Taungdwingyi Township during 17 years (2001-02 and 2018-19)

Source : Land Records Department, Taungdwingyi Township

Of the remaining lands, less than 500 acres of cultivated land were decreased in 22 village tracts. Eleven village tracts of the rests have been found with increase in the cultivated land. The remaining 46 village tracts have been more or less with the same amount of cultivated land after 17 years period. The distribution of cultivated land of the village tracts according to their increase or decrease or same trends are shown in Table (1) and Figure (2).

According to this map, it is observed that about half of the total number of village tracts have been formed with the increase of their respective cultivated land. It is profitable for the agricultural sector. The village tracts which lie at the foothill of the eastern Bago Yoma have decreased character especially where there is no perennial water source.

2. Uncultivated Land

The land used for canals, dams, water body, factory, cantonment area, residential area, commercial and industrial purposes, religious and cemetery, transportation and pasture, etc, are included in this category. In the study area, this type of land use had become 78677 acres in 2018-19 while it was 89,915 acres in 2001-02. The decrease within 17 years was 11238 acres. It is clearly seen that such decrease was mainly due to the extension of residential lands, industrial lands and cantonment area. Figure (3) showed the changes of uncultivated land in the village tracts for 17 years period. The significant increase area was found in 4 village tracts and increase area was found in 1 village tracts. The decrease trend of this land use was found in 24

village tracts. The significant increase of this land use was noticed in the village tracts of Kalama ,Sugaukgyi ,Pyinnyin, Kokkogon and their background reasons were increase of industrial land and cantonment area, respectively. Whereas, the significant decrease of such land is found in Aungzu, Letpanbu, Nagmin, Thitya, Gyochaung, Hmokeshe, Wathonbu, Leiktaik, O-bauk village tracts.

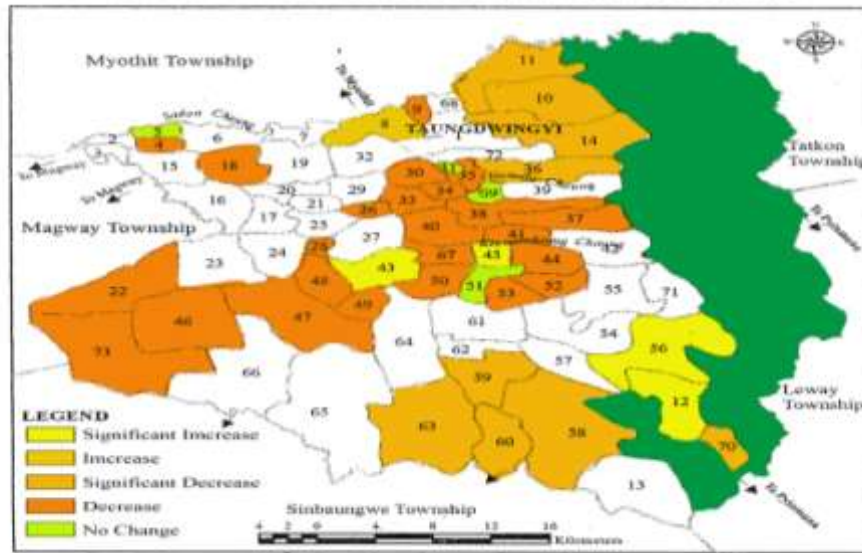


Figure (3) Pattern change of uncultivated land use in village tracts of Taungdwingyi Township during 17 years (2001-02 and 2018-19)

Source : Land Records Department, Taungdwingyi Township

3. Virgin Land

In this type of land use, the land which is covered by trees (big or small) and bushes but not used for agriculture is considered. According to Figure (4), the significant increase of this type of land could be found in nine village tracts Aungzu ,Letpanbu ,Kalama, Nagmin, Kokkogon, Gyochaung ,Hmokeshe,Leiktaik,O-bauk.. In Kokkogwa village tract, some area of virgin land is defined as Beikthano wild life sanctuary and some portion is changed into residential land after 17 years. That is why, its virgin land area had been significant decreased in five village tracts. Fourteen village tracts have been found with decrease in virgin land. Whereas, more than 50% of the total number of village tracts had no virgin area in both study period.

Some virgin lands had been increased in Simihtun ,Gonnyindon ,Talokegon, Lettet village tracts because some private companies returned back their rented land area to Land Records Department after 12 years as they could not invest for more period.

4. Unused Land

Such type of land is defined as the land which is suitable for cultivation but are still not used for crop growing. Out of 73 village tracts, after 17 years, only 23 village tracts had unused land according to the official data. The significant decrease was noticed in Lettet and Leiktaik village tracts and was due to the conversion of land use types for residents or agriculture. According to 2018-19 data, Kalama and Gyochaung village tracts had increase of unused land. It was mainly due to the strong restriction for cultivation by the Forestry Department. But, in 6 village tracts which are located in the south-western part have experienced decrease in the

waste land. It is due to the new reclamation land for agriculture in 2018-19. As shown in Map (4), no area of unused land was found in 49 village tracts after 17 years.

5. Forest Land

Under this category, the forest cover area which is demarcated by the Forest Department as forest nursery, reserved forest, wildlife sanctuary are included. Out of 73 village tracts, only 19 have forest land cover. Kimmundaung village tract was significant increase of forest land in 2018-19.

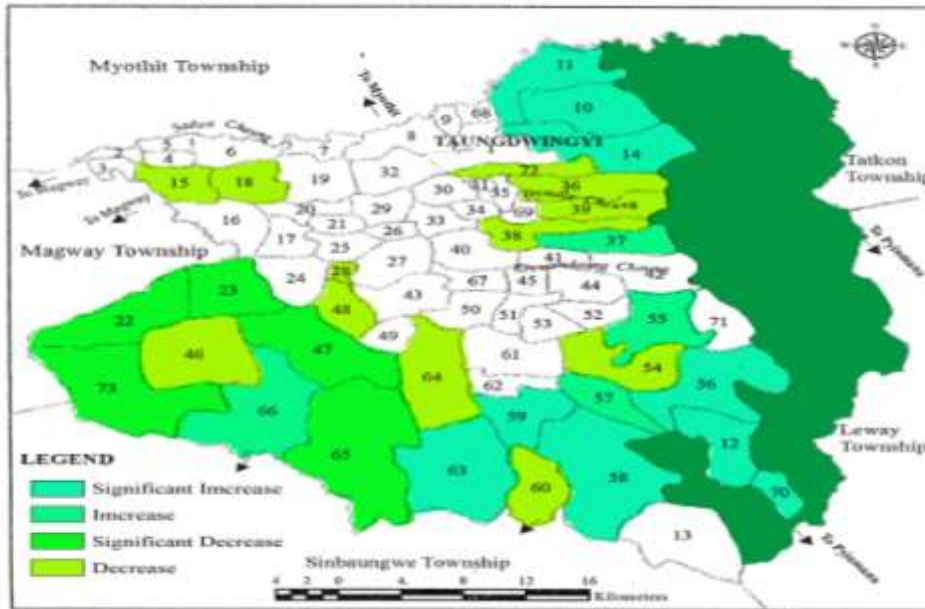


Figure (4) Pattern change of virgin land use in village tracts of Taungdwingyi Township during 17 years (2001-02 and 2018-19)

Source : Land Records Department, Taungdwingyi Township

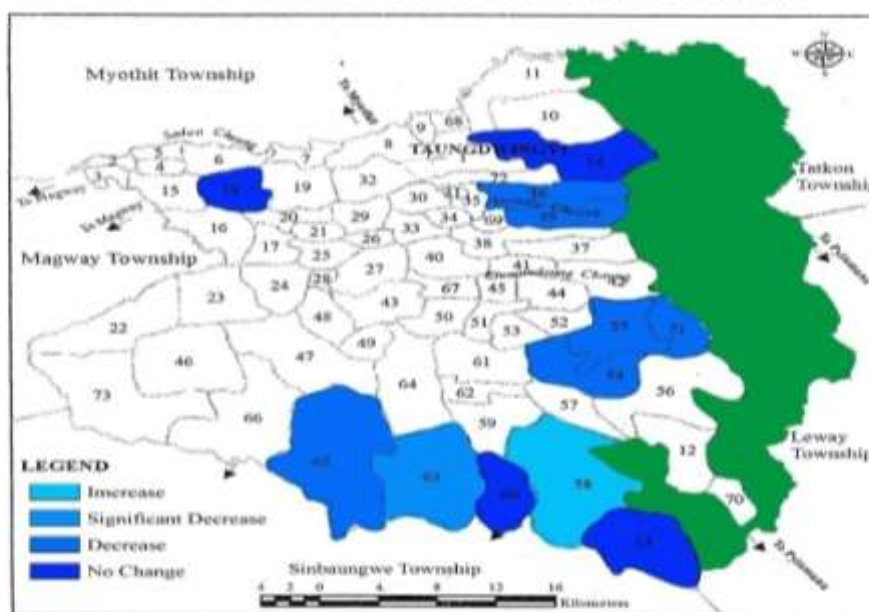


Figure (5) Pattern change of unused land in village tracts of Taungdwingyi Township during 17 years (2001-02 and 2018-19)

Source : Land Records Department, Taungdwingyi Township

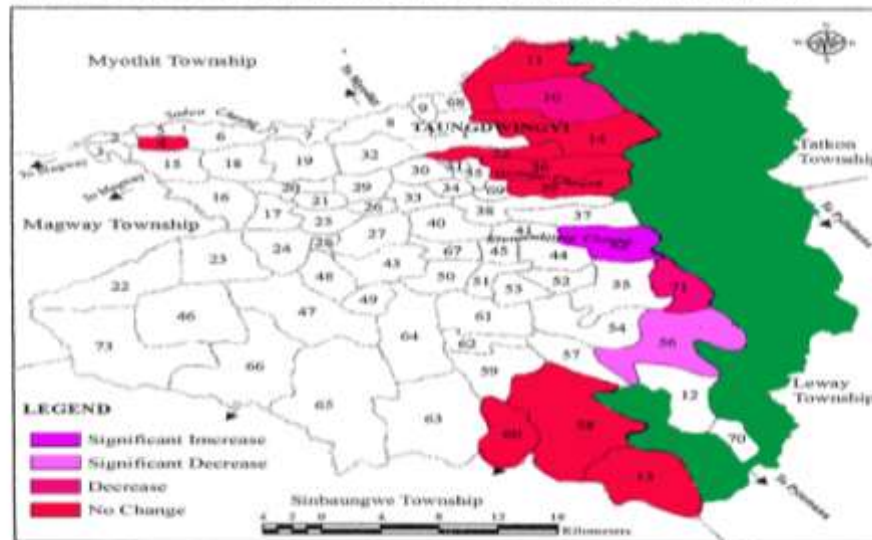


Figure (6) Pattern change of forest land in village tracts of Taungdwingyi Township during 17 years (2001-02 and 2018-19)

Source: Land Records Department, Taungdwingyi Township

In the village tracts of Kokkagon, there was significant decrease after 17 years. It is mainly due to the permission of Forest Department to convert into agricultural land and cutting logs by the local people which causes deforestation.

Figure (6) shows the changing trend of forest land use in the village tracts of Taungdwingyi Township for 17 years period. No area of forest land was found in 56 village tracts within 17 years. Though there was no area of forest land in those village tracts which is demarcated by the Forest Department, there was some small area of community forest in some village tracts for fuel wood. It is unfortunate that the areas which are very close to the eastern highland, there was no forested area.

Findings and Results

Land use, water and soils are the basic resources of agriculture. Taungdwingyi Township is the predominantly of agricultural region. Most of the peoples are directly or indirectly related to the agricultural activities. In Taungdwingyi Township has a total of 760 square miles or 486403 acres. The land usages are different categories. The cultivated land use area is 33.15%, uncultivated is 18.49%, virgin land is 8.96%, unused land is 6.60%, and forest land is about 32.80% in 2001-02.

The land use has been changed in 2018-19. The land put to cultivated land use is 38.19%, uncultivated land use is 16.18%, virgin land use is 12.28%, unused land is about 5.38%, forest land use is about 27.98%. The present land use has changes particularly in cultivated land area is about 5.04%. Cultivated area of Taungdwingyi Township has increased yearly due to the availability of land resources and the use of agricultural inputs.

Table (1) Agricultural Land Use of Taungdwingyi Township (2001-02-2018-19)

Sr	Categories	2001-2002%	2018-2019%	Remark
1	Cultivated land	33.15	38.19	Increase
2	Uncultivated land	18.49	16.18	Decrease
3	Virgin land	8.96	12.28	Increase
4	Unused land	6.60	5.38	Decrease
5	Forest land	32.80	27.98	Decrease
Total		100	100	

Source: Compiled by Researcher

Acknowledgements

The author would greatly thankful to Dr.Aung Aung Min (Rector in charge),Dr Thwe Linn Ko (Pro-rector)and Dr Tun Win (Professor &Head) Department of Geography, Pyay University for allowing to carry out this research paper.

References

- Sujatha.P ,Punithavathi.J ,Tamilenthi.S, Baskaran.R(2011),”Land Use Pattern and Cropping Pattern of Orthanadu Block, Thaniavur District” ,Tamil Nadu using GIS, Department of Earth sciences Tami University, India ,Journal of Experimental Sciences ;19-23
- Kumar Jagdeep(2013) ”Land use and cropping pattern in Village Surah, The Jhajjar Distt, Haryana” Indian Journal of Research Volume ;2/Issue;12/

The Famous Handicraft Industries of Villages in Chaungzon Township

Khine Khine Win*

Abstract

Chaungzon Township is one of the ten townships in Mon State. Except Agriculture, major economic activities are mainly based on manufacturing activities. Many types of manufacturing industries are found in the area. Among the manufacturing industries in Chaungzon Township, slate and slate pencils industry and handicraft industry are found slow progress in Chaungzon Township. This is due to the shortage of skilled labours, decrease of market demand and insufficiency of capital. In a nowadays, these manufacturing activities will be rapid growth because of the Mawlamyine - Chaungzon Bridge was opened for movement of commodities and products of this township.

Key words: handicraft manufacturing, activities, industries.

Introduction

These industries reflect spatial variation in the cost of production factors and markets and different activities of production. In addition to these economic forces, manufacturing patterns are influenced by environmental, cultural and political considerations.

For the successful operation of slate, slate pencils and handicraft industries endeavor, six primary components must be considered: raw materials, power and fuel, market, labour, transportation and capital. In Chaungzon Township, manufacturing activities are the fifth economic activity. After practicing market-oriented economic system in Myanmar like other economic activities, the number of manufacturing activities have increase in Chaungzon Township. Existing slate, slate pencils and handicraft activities, these activities provide jobs and income to the local people living in the study area. This paper is that to provide handicraft industry in Chaungzon Township and to discuss the activities which play a significant role in the economic sector of the township.

The objectives of this study area are as follows:

- To examine the facts which are supporting handicraft industries in the past and present.
- To determine the effectiveness of this industries.
- To predict the trend of these industries in the future of the study area.

Study Area

Chaungzon Township is situated in the western part of Mawlamyine District separated by Mawlamyine River. It lies between Latitudes 16° 8' N and 16° 32' N and also between longitude 97° 21' E and 97° 38' E. It has an area of 658.13 square kilometer or 5.35 per cent of the total area of Mon State. There are 3 wards and 43 village tracts in this township. The surrounding island is Hintha island.

The shape of the township resembles a triangle shape. In the north of the township, the extent from east to west is 20 kilometer (12.5 miles) and from north to south is 37.6 kilometer (23.5 miles).

As Chaungzon is an island township, it is surrounded by the Gulf of Mottama in south and west, Paung Township in the north separated by Dayebauk river, Mawlamyine Township and Mudon Township in the east separated by the mouth of Thanlwin River.

There are also strengths and weakness of the location for the development of Chaungzon Township. In Chaungzon Township, the required raw materials for slate, slate pencil and handicraft are available within the region. It is quite near to the Mawlamyine market place. Therefore, these are many good opportunities to run these industries.

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Human Factors

Population plays an important role not only in labour force but also in demand side. Most of the slate, slate pencil and handcraft industries require skilled labour. Most of the daily wage earners and the majority work near their houses. Most slate industries are found in Ywalut (35 persons) and Mudu (100 persons) village tract because of labour availability and higher demand. The total population is not directly related to the number of these industries. In 2018, the total population was 158,889 persons and a density of 241 persons per square kilometers.

Muyitkalay Village Tracts is the most populous and the densely populated in the township with the population of 8,888 persons and the density of population was 1,351 persons per square kilometers in 2018. Tawpon Village Tracts is the least density in the Chaungzon Township with the total population of 528 persons and the density of population was 26 persons per square kilometers in 2018.

Factors Affecting the Role of Handicraft Industries

Among physical feature, relief and climate mainly affect the spatial distribution of these industries in Chaungzon Township. In this study area, the other influencing factors are raw materials, power, market, labour, transportation and capital.

Raw Materials

In Chaungzon Township, the required raw materials for industry can be obtained within the region. The requirement of materials is also a main factor for these industries. Industrial business are widespread near the region where raw materials are available.

In Chaungzon Township, the most popular industry is the production of slate tablet and slate pencil, essential stationary for primary education, and this product can be produced only from Chaungzon Township in Myanmar. The product is mainly produced in Mudu village tract because slate can be extracted from Mudu mountain. The raw materials for the production of slate tablet and slate pencil are slate, wood and dye. Slate and wood are a kind of local product. Dye is brought from Mawlamyine. The popular handicraft industries are domestic industries only. These industries are traditional industries, they can be seen in the many places. The required raw materials for these industries are also available within the region.

Power

The availability of continuous power or electricity supply is one of the determinants and factor for the establishment and existence of these industries.

In the study area, except some handicraft industries such as coir matting, plaster toy, paper toy, the remaining handicraft industry, slate and slate pencils industries need electricity for producing these products. Today, the electricity can be used as a power supply of these industries and the cost of manufacturing produce are generally lower. So, primarily charcoal and diesel is a common denominator applied to manufacturing. In Chaungzon Township, most of these industries are operated by means of their own generator.

Market

The market as a locative factor in manufacturing is increasingly important. In Chaungzon Township, the production of slate and slate pencil industries are frequently oriented to a market, because wood and slate, the fundamental requirements, is available within the region. The production of handicraft Industries are used not only in Chaungzon Township but also exported to Mawlamyine, Mudon, Thanintharyi Region, Mandalay Region and Kayin State.

In the study area, these industries have ready market. These market supply finished goods and make the growth of these industries in the area. The finished products of slate, slate pencils and handicraft products of Caungzon Township are mainly distributed in local and the

surplus is transported to Mawlamyine, Yangon, Thaton, Hpa-an, Mandalay, Khikhto, Bago, Dawei, Myeik, Myawaddy, Thanbyuzat, Mudon, Sittway and also Bagan.

Labour

The cost, availability, stability and productivity of labour are vital factors in these industries. Labours need unskilled, semi-skilled and highly skilled for these industries. Handicraft products, slate tablet and slate pencil industry are contributed from generation to generation. As these industries are based on skill, no worker from outside are hired. The majority of labour for all industries are male and few female. Beside labour costs, the availability and stability of different types of labour are important localizing factors.

Transportation

The location manufacturing is greatly influenced by accessibility facilities. The location of the industry in the study area may depend directly on the type of transportation present. Chaungzon Township, Island Township connected with Mawlamyine City cross Thanlwin Rivers Bridge. This bridge was connected from Chaungzon Township and Mawlamyine City. Nowadays, road transport is support the development of these industries in Chaungzon Township. Mawlamyine Chaungzon Bridge is 5203 feet long and was opened 9th May, 2017. After opening the bridge, products from these industries in Chaungzon Township can be sent to the market place through the Bridge.

Capital Investment

The availability of capital within a given region was a major factor in the growth of manufacturing. Most of the handicraft, slate and slate pencils are small scale industries, owned by privates. They often have little or medium investment to promote their work.

Slate and Slate Pencils Industry

Slate and slate pencils industries are the main industry of Chaungzon Township. Mudu village tract is the most slate producing village tract because Mudu is situated adjacent to Mudu Hill. U Aung Thein; the native the Mudu village tract; started producing slate in 1945. The slate industry has significantly improved since the 1960s. Nowadays; the number of people who run slate industry is 15 and it conduct 2.17 percent of all wards and village tracts.

The central maintain ranges in Chaungzon Township consist of slate; phyllite and gneiss. Many steps are needed to be accomplished in producing slate tablets such as digging slate, breaking raw slates in slides, cutting to get required sizes, polishing, moulding, washing, showing sunlight, painting and framing (Plate 1).

This type of industries is minly labour-intensive, with both skilled workers and semi-skilled labours. The planning and polishing of slate sheets are done by skilled workers and splitting, fixing wooden frames, riveting and dyeing are done by skilled workers. Every industry needs from 3 to 6 workers. The labour force of slate and slate pencils industries are 100 persons or 2.1 per cent of the labour force of manufacturing activities. The average daily income of a workers is from 500 to 6000 kyats, according to their skills. The income of a slate digger is from 9,000 to 12,000 kyats per day. The production capacity of slate mainly depends on the markets demand. The production is 29000 boards per month (or) 203,000 boards per year.

The main raw materials are slate. Other raw materials are wood, rivet, dye of black colour. The wood used for slate frame are Thitphyu. The white wood is available within Chaungzon Township. The raw slate to make slate tablets is purchased from the owner of slate well in Mudu village tract. Previously, the finished slate boards were sold, being packed in paper boxes to the whole Myanmar.

Nowadays, the slate tablets are produced in four sizes. Starting from this year, the slate tablets (5'' × 3'') that is convenient for souvenir is produced. The slate pencils and slate tablets are used not only in Chaungzon Township but also distributed to Mawlamyine market, Kayin

State, Yangon, Patheingyi, Hinthada, Bago, Thabon, Bhamo, Ye and Madaya. These slate pencils and slate tablets are used in Mon language schools and monastery Education Centres. The sale price for slate tablet is from 500 to 1,000 kyats.

Slate pencils are also mainly produced from the slate industry. Firstly, rough slate sheets are dried in the sun. And then, they are planed, soaked in the water and cut, dyed, dried in the sun and wrapped up in paper. Any workers, male or female, can make slate pencils. The price of 100 slate pencils are 1200 kyats. The average production rate is 100000 slate pencils per month and 700000 per year.



A. Slate and Slate Pencils Industry



B. Products of Slate and Slate Pencils

Plate 1. Slate and Slate Pencils Industry of Mudu Village Tract (1.6.2018)

Handicraft Industries

In the handicraft industry of Chaungzon Township, there are 104 handicraft industries, and it conduct 13.04 percent of all wards and village tracts. In the handicraft industry, coir rope and coir doormat, weaving plaster toy, paper toy, wooden ball pen and wooden handicrafts are included (Plate 2).

The required raw materials for coir rope and coir doormat industries are available from Kawsein village tract and Chaungzon Township. The required thread for weaving industries is available from Mawlamyine and Madaya Townships. The required material for plaster toy, plaster powder is available from Mawlamyine. The required material for paper toy industry is available within Chaungzon Township. The required material for wooden ball pen and wooden handicrafts is available within Chaungzon Township and Bago Region. Nylon ropes which are the raw material for coir doormat industry are available from Mawlamyine.

The required workers are 1 to 5 persons for coir rope and coir doormat industry, and the labour cost is 2,500 kyats per worker. 5 to 20 persons are needed for weaving industry. 1 to 3 workers are needed for plaster toy and paper toy industries, and 3 to 5 workers are needed for wooden ball pen and handicrafts industries and the labour cost is from 5000 to 8000 kyats for per worker. The labour force of handicraft industries is 490 persons and 10.4 percent of the labour force of manufacturing activities. All industries used skilled labour only. The products from these industries are used not only in Chaungzon Township but also exported to Mawlamyine, Ye, Dawei, Myeik, Bago, Mandalay, Pyin Oo Lwin, Pyay, Madaya and Myawady. Coir doormats are used not only for doormat but also for planting orchid. Handicraft industries are found in Kalwei, Taungzon, Ywalut, Kalaw, Mukwe village tracts and Chaungzon Extension Ward (Figure 1). The price of wooden ball pen is 1,000 kyats. The price for doormat is from 1,500 to 3,500 kyats. The production is 170 ballpens and from 10 to 50 coir doormats per day. Number of Handicraft industries within wards and village tracts in Chaungzon Township as shown in Table (1) and Figure (2.).

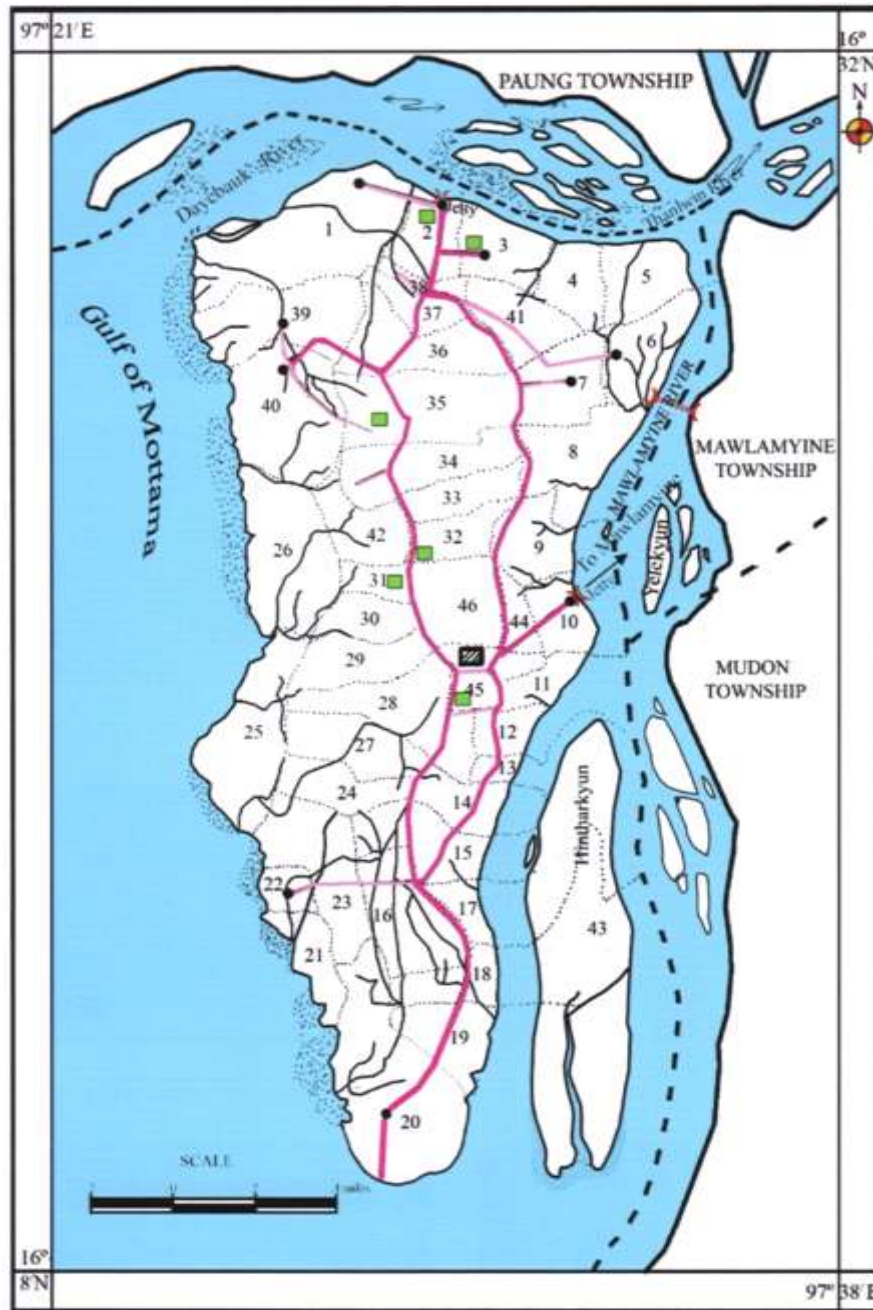


Figure 1. Distribution of Handicraft Industries (2018)



A. Wooden ballpens



B. Wooden Handicraft



C. Paper toys



D. Plaster toy



E. Dyeing coir doormat



F. Making coir doormat



G. Looming



H. Weaving

Plate 2. Handicraft Industries of Ywalut, Mukwe and Taungzon Village Tract

(3, 1.6.2018)

Source : Field observation

Table 1. Number of Handicraft Industries within Wards and Village Tracts of Chaungzon Township

No.	Wards and Village Tracts	Wards and Village Tracts Number	Handicraft industries	Items
1.	Taungzon	3	70	Coir doormat
2.	Kalwei	2	20	Coir rope
3.	Ywalut	35	6	Plaster toy, paper toy
4.	Mukwe	31	5	Weaving
5.	Chaungzon Extension	45	2	Wooden ballpen and Handicraft
6.	Kalaw	32	1	Weaving
Total		6	104	

Source: Field Observation (1.6.2018)

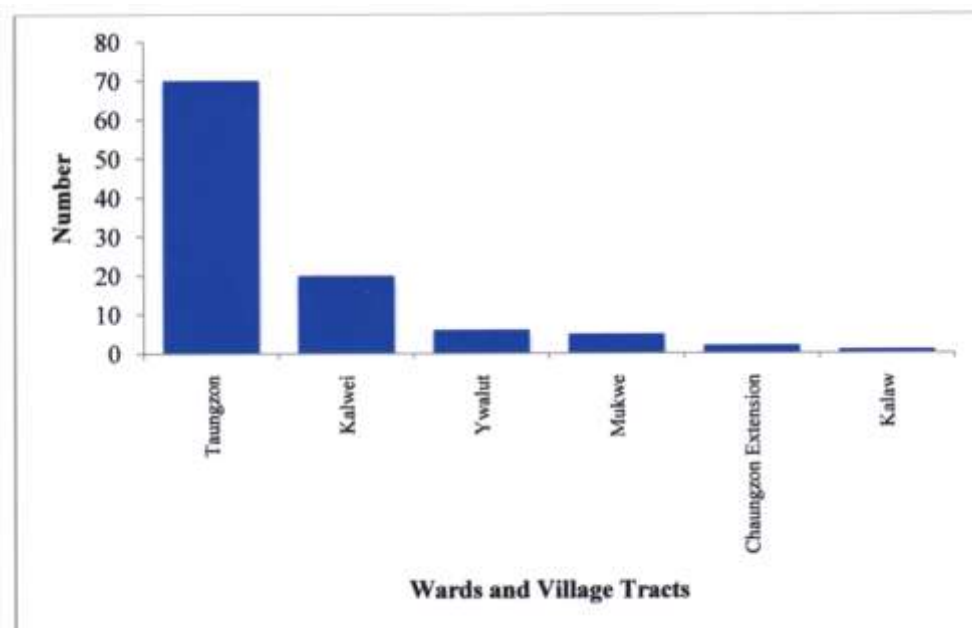


Figure 2. Number of Handicraft Industries within Wards and Village Tracts of Chaungzon Township

Source: Based on Table 1.

There are 70 coir doormat industry in Taungzon village tract because this area is easy available raw material and skilled labour for this industriy.

In Hneemote village tract Bamboo production rank first in number (213) among the manufacturing activities in Chaungzon Township. Bamboo product industry is 200 industries in Hneemote village tract. Taungzon village tract is second largest manufacturing activities (77). The largest number of manufacturing industry in handicraft industries is Taungzon village tract. The smallest number of manufacturing industry is Daung Ou village tract.

Prospects of Handicraft Activities in Chaungzon Township

Manufacturing activities for Chaungzon Township is primary supplied by local raw material.

Slate tablets and slate pencils industries are found declining from 2006-07 to 2015-2016. The cause is that although slate tablets and slate pencils are widely used in the past, but a present, books are being substituted in the place of slate tablets and also pencils and ballpen replace in the slate pencils.

Handicraft industries are found declining from 2006-07 to 2016-17. Among these industries, coir dormat industries are mainly declining because of the replacement of foreign rad dormat and doormat made of cloth in the place of coir dormat.

Nowadays, bridge was opened at 9th may 2017. When the bridge is opened, may pilgrims from local and foreign countries with visit Chaungzon Township. In Chaungzon Township, 24-hours power supply is available now, so these industries can also be run with the combination of modern technology and skilled worker.

In the future, these manufacturing activities in Chaungzon Township will get successes and reduce the problem by fulfilling the necessities which are required at present. The prospect of these manufacturing activities would improve in the future.

If the labors mentioned above can be accomplished, these manufacturing activities will also improve and Chaungzon Township will also be developed for sure.

Findings and Discussion

Chaungzon Township is one of the ten townships in Mon State and it is situated near Mawlamyine City. So, manufacturing products of Chaungzon Township affects on the Mawlamyine City.

Distribution of these activities depends on labour, raw material availability, power supply and transportation.

Slate and Slate pencils industries are mostly found in Mudu village tract because raw materials are available from the Mudu Hill, traditional industries and availability of family income. In slate and slate pencils industries is also found that the same during the period from 2006-07 to 2011-2012. Now the number of slate and slate pencils industries is gradually decreased from 2012-13 to 2015-16.

Handicraft industries are mostly found in Ywalut, Taungzon, Mukwe, Kalaw, Kalwei and Chaungzon Extension because of population and availability of family income. Most of the finished products from the handicraft industries are sold not only in the local area but also to distant places.

One village one product system is a process in which a product is mainly manufactured only in one village Mudu village tract is famous for slate and slate pencils, Taungzon village tract for coir doormats, mukwe village tract for weaving industries.

According to poverty eradication programmed, loans are disbursed to industrialist so as to create job opportunities. In the future, the manufacturing activities in Chaungzon Township will get success and reduce the problems by fulfilling the necessities which are required at present. So, these activities of Chaungzon Township can be developed by setting up cooperatives and Chaungzon Township will also be developed for sure.

Conclusion

Traditionally, geography deals with the spatial aspects of the surface and examines how the pattern of spatial features are distributed and what are the controlling process for these activities.

Chaungzon Township is located in the western part of Mawlamyine Township. The whole island comprises as Chaungzon Township.

The role of handicraft activities depends on labour, raw material availability, electric power and transportation. The population of Chaungzon Township supports the growth of these industries. People work nearby their home. These activities support daily were earners. Raw materials are easily available from within local area and Mon State, Kayin State, Tanintharyi Region, Yangon Region and Bago Region.

The most important main road in Chaungzon Township runs from Kalwei in the north to Kamarkey in the south through Chaungzon Town. The existing passenger traffic transportation routes support these activities to carry raw materials from markets.

Finally, it can be seen the most of Chaungzon economy. If they are carried out with the consideration of the geographical phenomenon such as spatial attributes, the momentum of development of Chaungzon industries would surely and harmoniously be developed.

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References

- Pinki Mandal Sahoo, Sandhani Sarkar, Koushik Das (2006): "Role of Handloom Cottage Industry in The Development Spectrum of Bishnupur Municipality of Bankura District, West Bengal: An Analytical Approach", Gjra-Global Journal For Research Analysis . Vol-5, issue-2, (<https://www.worldwidejournals.com>)
- Shamitha.K. V, Balasubramanian, P., 2018, Socio Economic Condition of Handloom Weavers : A study with Special Referance To Handloom Weavers Co-Operative Society. In Kannur District, International Journal of Pure And Applied Mathematics, Volume 119 No.16 2018, 1411-1423.

Geographical Analysis on Distribution Pattern of Dumping Site in Pyay City

Khin Sandar Win*

Abstract

This research is emphasized on present disposal system and waste management of Pyay City which is located in downtown area of Pyay Township. There are two main parts in the study. The first part is focused on waste disposal system which is mainly operated by Pyay Township Municipal Committee and the second part is mainly concerned with public awareness and waste management of urban residents in Pyay Township. The distribution patterns of wards disposal dumping sites are depicted and analyzed by using spatial statistics facilities of GIS. The purpose of the research paper is to assess to effectiveness of health and environmental problem base on a case study of Pyay City in 2017-2018. Secondary data and primary data collected by questionnaires and interviews are analyzed and discussed from the environmental point of views.

Key words: relation of the population density and distribution patterns of dumping sites

Introduction

Pyay City is a trading centre between the upper and lower Myanmar and Rakhine State. As the population of Pyay City increased from year to year, the urban functions also developed and the production of waste increased too. So, I choose this title with the intention, to reduce the waste disposal in Pyay City, to find the ways of waste disposal management, to describe the types of waste disposal and management to define the waste management system of Pyay Township Municipal Committee and private management, to change the produces behavior and to change commodity user behaviors in Pyay City through education and law.

Study Area

Pyay is one of the populated town in Bago Region. It is located on the eastern bank of Ayeyarwady river in Bago Region (West). It lies between north latitudes 18°45' and 18°52', and also between east longitudes 95°12' and 95°17'. The total area of Pyay City is 34.47sq-km and comprises with 10 wards. The total population in 2018 was 114,554 persons.

Research Problem

The research problem is the current waste disposal management in Pyay City is poor.

Aim and Objectives

The aim of this study is the spatial distribution of waste disposal in Pyay City. The objectives are:

To find the ways of waste disposal management in Pyay City.

To reduce the waste disposal in Pyay City.

To examine the controlling factors in waste disposal management in Pyay City.

Data and Methodology

For spatial analysis of the waste disposal management in Pyay City, Geographical Information System (GIS) was used. Besides, other statistical methods were also used. Many analytical models are set-up for particular geospatial analysis procedures. Of these, some models are constructed by using Buffer, measuring of point location and mean centre. According to this application, the analysis of point distance large dumping sites, medium dumping sites and small dumping site is to point distance by using measure tool for this research purpose.

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Physical Background of the Study Area

Pyay City is situated on the eastern bank of Ayeyarwady River in Bago Region (West). It is the second largest city of Bago Region. It lies between north latitudes 18° 45' and 18° 52' and also between east longitudes 95° 12' and 95° 17'. It has an area of 34.47sq-km. It has the extreme length of 4.12 miles from north to south and the extreme width of 2.8 miles from east to west. Pyay City is composed of 10 wards. Generally it is rectangular in shape.

Population Factors

Total population number of the Pyay City is related to waste product. According to 1983, the total number of population was 83,332 persons and it increased to 89,223 persons in 1992. In 2018, the population of Pyay City was 114,554 persons. In 2018, the largest number of population is found in Ywabe ward with 31,866 persons. The least number of population is found in Nawaday ward. Among 10 wards in Pyay City, Nawin, Shwegu, Sandaw, Kyaunggyi O-Tan, Pyithayar, Ywabe, Sinsu and Khittayar Myothit wards are dense population. Nawaday ward is sparsely populated. In 1983, the area of pyay changed to 16.86 sq-km and the population density was 4942.58 persons per sq-km. In 1992, the area of pyay became 21.75 sq- km and the density was 4102 persons per sq-km. In accordance with the increase of population, the urban expansion is larger and larger from 7 wards in 1992 to 10 wards with 34.47 sq-km in 2018. So, the population density in 2018 was 3573.54 persons per sq-km.

Total Households Number

It increased to 14,189 in 1992. In this period, the growth of household was 0.85 percent per year. In 2018, the number of household was 22357 within 26 years, the settlement wards increased to 10 wards from 7 wards in accordance with the population increase. In 2018, the largest number of household was found in Ywabe ward with 5543, because of the changing area of settlement wards with the increase of settlement wards from 7 wards in 1992 to 10 wards in 2018. The second largest household's area was Nawin ward with 3829 household and the third largest household area was Khittayar Myothit ward with 2931 households. The smallest household area was Shwegu ward with 480 households. In accordance with the increase of household number, the waste disposal can be discarded more and more. (Figure1)

Table 1 Population, Households and Density of Wards in Pyay City (2018)

No	Wards	Sq.km	Population	Household	Density per Sq km
1	Nawin	2.9008	19701	3829	6791.57
2	Sinsu	6.4491	7320	1662	1135.04
3	Kyaunggyi O-Tan	0.4403	3627	822	8237.57
4	Shwegu	0.2849	3673	480	12892.24
5	Sandaw	0.6993	10807	2328	15454.02
6	Ywabe	4.5066	31866	5543	7070.96
7	Khittayar Mothit	3.2375	15003	2931	4634.13
8	Pyithayar	3.3152	9105	2111	2746.44
9	Nawady	9.8679	3339	745	338.37
10	Shwetagar	2.7713	10113	1906	3649.19
Total		34.4729	114554	22357	3323.01

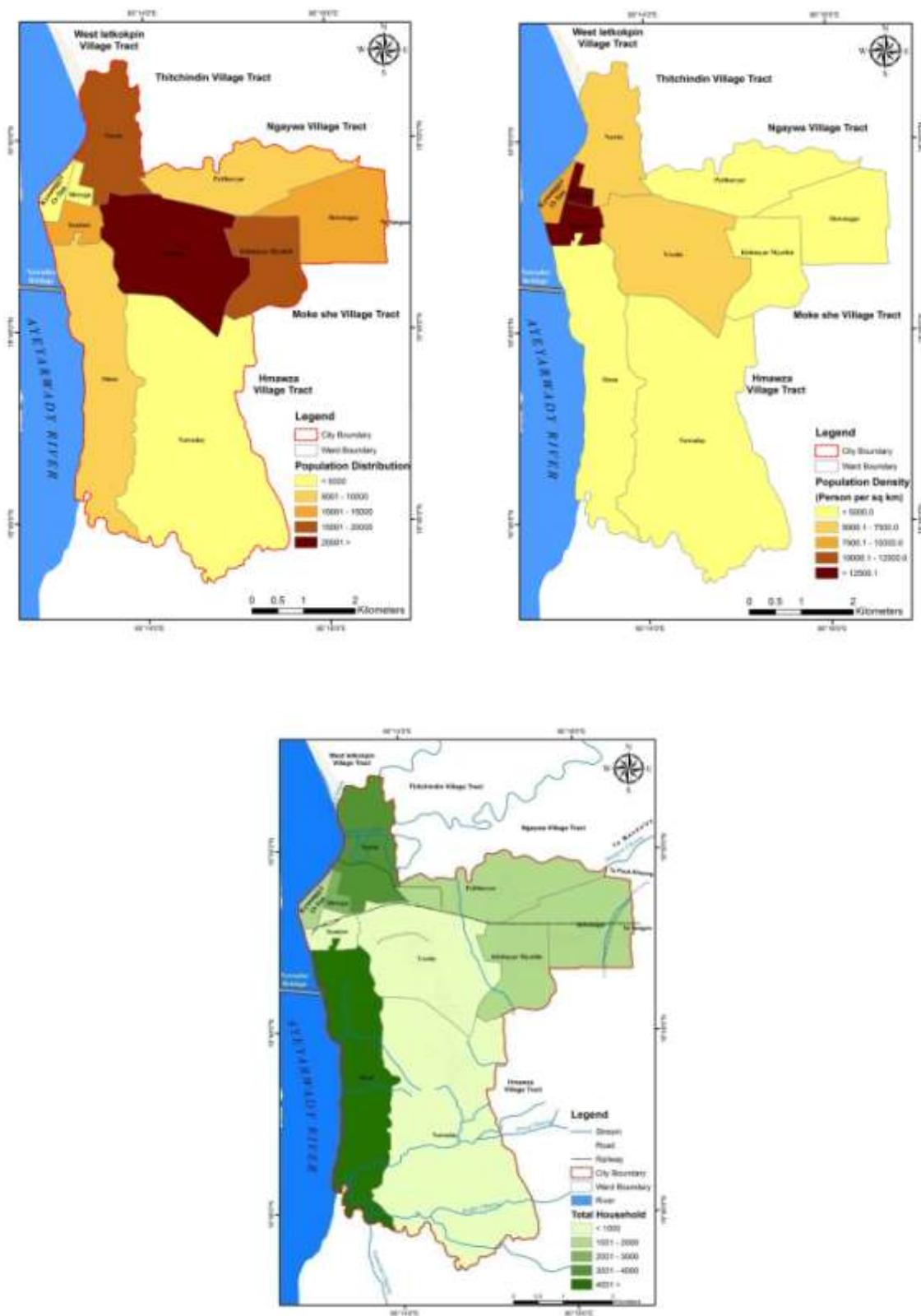


Figure 1 Population distribution , density and households of wards in Pyay City

Source: Table 1, Immigration and Man Power Department, Pyay City

Distribution Patterns of Dumping Sites in Pyay City

Distribution patterns of Dumping Sites can be classified into two types. These are temporary small dump site and permanent dump site. The temporary small dump sites are found within wards of the Pyay City. Locally permanent dump sites are called waste ponds and plastics boxes. In Pyay City, distribution of dump sites can be cleaned into three types. These are large dump site $10 >$ (tons), medium dump site 5-10 (tons), and small dump site (tons) < 5 . Of these 42 large dump sites, 32 medium dump sites and 32 small dump sites are found in Pyay City. The solid wastes are transported to the final disposed site namely new dump sites. In previous time, the solid waste carried to old dump sites. But, this old dump sites are filled up in 2014. The solid waste is taken away in 12 trips during the day and 10 trips during the night. Totally 22 trips to find the disposed site each truck carries about 1.5 or 2 tons. So, 45 tons of garbage is removed daily in Pyay City. (Figure 2)

Transportation of Waste in Pyay City

In Pyay City, there are eight collection trucks and two push-carts collection and transported from the storage sites to the disposal sites because there is no directly transportation. The present transportation system is inadequate for collection of waste in Pyay City because of population density and growth rates and then the high rates of household's numbers from field observation in (2018) record.



Figure 2 Distribution points of dump dumping sites in Pyay City

Source: Table 2 , Field Data

Table 2. Distribution Point of Dumping Site in Pyay City

No	Ward	Large Dump Site (LDS %)	Medium Dump Site(MDS %)	Small Dump Site(SDS %)
1	Nawin	7(17)	4(13)	7(22)
2	Sinsu	4(9)	4(13)	1(3)
3	Kyaunggyi O-Tan	2(5)	2(6)	2(6)
4	Shwegu	2(5)	3(9)	2(6)
5	Sandaw	7(17)	2(6)	5(16)
6	Ywabe	10(24)	7(22)	3(9)
7	Khittayar-Myothit	5(12)	2(6)	6(19)
8	Pyithayar	1(2)	2(6)	1(3)
9	Nawaday	1(2)	2(6)	4(13)
10	Shwetagar	3(7)	4(13)	1(3)
	Total	42(100%)	32(100%)	32(100%)

Source: Field Data.

Relation of the Distribution Patterns of Dumping Sites and Area Variation in Pyay City

There are 106 dumping sites in Pyay City, which are varied not only place to place but also ward by ward. They are large dumping sites, 10>tons, medium dumping sites, 5 to 10 tons and small dumping sites <5tons. Some dumping sites are variable sizes within wards. Then the sizes and patterns of Pyay City's Areas, the number of household sizes and the population density are not balanced in ward by ward. These conditions of the area variations are influenced upon not only waste disposal sizes but also waste management system in Pyay City. Because some areas are large sizes but waste disposal sites are small amount conditions. Although some areas are small but dumping site areas are large amount and some area are favorable with coincide sizes of dumping site in Pyay city. These occurrences are dangerous conditions of waste disposal sites. It needs to maintain safe for environment problems such as health and hazards. It can be said that in accordance with the increase of household number, the waste disposal sites can be discarded more and more. As a result, population crowded area may cause to health and environmental problems in Pyay City.

Analysis on Relation of the Population Density and Distribution Patterns of Dumping Sites in Pyay City

In 2018, the highest density of population was found in Snadaw ward and 15,454 persons. Shwegu and Kyaunggyi O-Tan wards were the second highest rate and third highest density areas and 12,982 and 8237 persons per sq-km. The Shwegu, Kyaunggyi O-Tan, and Sandaw wards are small in area, but they are situated in near the Myoma Market and at the strategic point of economic activities with good transportation and communication. This is why the population densities in these wards are high with the total numbers of waste disposal sites (27) can be found in the densely populated wards of Snadaw ward, Shwegu and Kyaunggyi O-Tan wards in Pyay City. Although the sizes of areas are small, there is densely populated wards, but large amount of dump sites (11), medium amount of dump sites (7) and small amount

of dump sites(9) respectively. It can be said that there is weakness of regular collection by employed workers in these wards. Although the wards with the second lowest population density rates between 5000.1 and 7500.0 persons per sq-km were Nawin and Ywabe wards, total numbers of waste disposal sites(38) can be found in there. The large dump sites(17),medium dump sites(11)and small dump sites(10)are found respectively. From the above facts, there is although the lowest population density, the large rates of dumping sites are found, it can be said that unsystematic management and weakness of environmental awareness from local inhabitants are found in there. In 2018, the wards with the population density under 5000persons per sq-km,were Sinsu, Khittayar Myothit, Pyithayar, Nawaday and Shwetagar wards. The total numbers of waste disposal sites(41) can be found. Of these,large dump sites(14),medium dump sites(14) and small dump sites(13) are found in there. The least dumping sites was found in Pyithayar ward, the population density under 5000 persons per sq-km and the total area of (3.3)sq.km were found, totally amount is(4),large dump sites(1), medium dump sites(2) and small dump sites(1) are found. From the above facts, the ward of Pyithayar is not only suitable sparsely populated density areas but also systematic dumping sites pattern. It can be said that there is safe of environmental conditions for local inhabitants within areas,Pyay City. The least population density was found in Nawaday ward with 338 persons per sq-km in 2018.The total area of Nawaday ward is highest but the least number of population lives there.This is why the population density is lowest in Nawaday ward. The total numbers of waste disposal sites(7)can be found.Of these large dump sites(1),medium dump sites(2) and small dump sites(4) are found in there. It can be said that the residents of settlements area of Nawaday ward is sparsely populated areas and systematic controlled by local people. In accordance with the population density, large numbers of waste disposal sites and the sizes of areas are closely related with environmental problems of in this area. It will be caused as serious conditions of health and hazards problems from the above facts .(figure 3)

Table 3. Relation of Total Dumping Sites and Population Density in Pyay City

No	Ward	Areas (sq km)	Population Density Per Sq km	Total Dump Sites	Percent (%)
1	Nawin	2.9008	6791.57	18	17
2	Sinsu	6.4491	1135.04	9	8
3	Kyaunggyi O-Tan	0.4403	8237.57	6	6
4	Shwegu	0.2849	12892.24	7	7
5	Sandaw	0.6993	15454.02	14	13
6	Ywabe	4.5066	7070.96	20	19
7	Khittayar-Myothit	3.2375	4634.13	13	12
8	Pyithayar	3.3152	2746.44	4	4
9	Nawaday	9.8679	338.37	7	7
10	Shwetagar	2.7713	3649.19	8	7
	Total	34.4729	3323.01	106	100%

Source: Field Data.

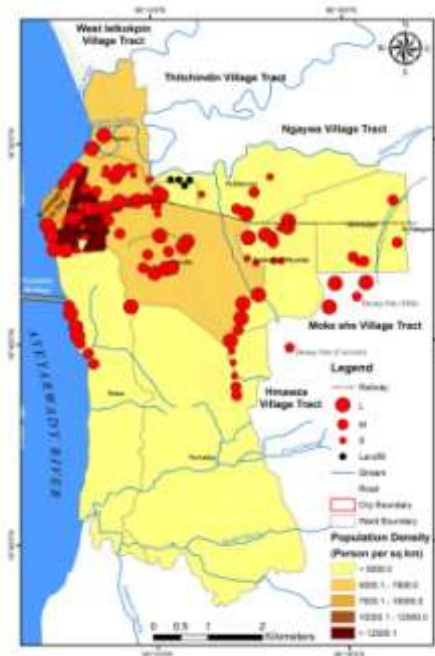


Figure 3 Relation of the Population Density and Distribution Patterns of Dumping Sites in Pyay City

Source: Table 3, Field Data.

Point Distance Analysis on Relation of Population Density and Solid Waste Dumping Sites in Pyay City

Geographical analysis is based on 106 dumping sites (large, medium, small) in Pyay City. The number of 42 is large dumping sites (LDS), the number of 32 is medium distribution of dumping sites are varied ward by ward in Pyay City. This analysis can be calculated through data management by approximate buffering using GIS software (10.1) based on 106 dumping sites within 10 wards. Of these, large dump sites are 2, medium dump sites are 2, small dump sites are 2 fall within point distance of 0.5 km buffer zone in Kyaunggyi O. Tan. The area is (0.4403) sq.km, the number of population density is (8237) persons and the number of household density is (1867). Shwegu and Sandaw wards are within 1.0 km buffer from mean centre of market place. The number of population density is (12892) persons and (15454) persons with the number of household density is (1685) and (3329) households are lived in the area of (0.2849) sq.km and (0.6993) sq.km. The users depend on large dumping sites are 9, medium dumping sites are 5 and small dumping sites are 7, the totally sites are (27) in there. From the above facts, there are large amount of dumping sites with more densely populated areas are found within the amount of smallest area of Kyaunggyi O. Tan, Shwegu and Sandaw wards than other wards of Pyay City. It can be said that, it may be caused first priority as health and environmental problem than other ward of Pyay City. The Nawin ward is 2.0 km buffer from mean centre of market place. The users depend on large dumping sites are 7, medium dumping sites are 4, small dumping sites are 7. Large amount of dumping sites with more densely populated areas are found, but within the little big areas. It can be said that, it may be caused as second priority health and environmental problem than other ward of Pyay City. Area of the Ywabe and Sinsu wards are located within 2.5 km to 4.0 km buffer from mean centre. Totally amount of dumping sites (20) and more densely populated areas within little big areas are found in Ywabe Ward. But Sinsu is located in the big areas, totally amount

of dumping sites (9) and second least densely populated areas. It can be said that, it is not serious health and environmental problems than other ward of Pyay City, because the users depend on adequate dumping sites. The large dumping sites are 7, medium dumping sites are 6, and small dumping sites are 11. Totally amount of dumping sites (24) are found within in Khittayar Myothit, Pyntharyar and Nawaday wards. These are fall within 4.5 km to 5.0 km buffer from mean centre. The users depend on dumping sites (24) From the above facts, there are small amount of dumping sites with less densely populated areas and are found within the largest area .From the above facts, the areas posed as big than other ward. It can be said that, it is not least serious health and environmental problems than other ward of Pyay City. On the other hands, the totally dumping sites are 8 in Shwetagar ward which is over 5.0 km buffer from mean centre. The users depend on large dumping sites are 3, medium dumping sites are 4 and small dumping sites are 1. Four small amount of dumping sites with moderate densely populated areas are found within the little big area. From the above facts, it can be said that, it may be caused health and environmental problems than other ward of Pyay City. So, if the dumping sites are nearest with the densely populated area and the areas are smallest, it may be caused by health and environmental problems. It is conducted on spatial patterns of dumping sites (106) dumping sites of remote areas, Pyay city. According to Kyaunggyi O-Tan, Sinsu, Sandaw wards are filled about one km distance, these areas are densely populated areas for Pyay City not only nearest location of mean centre but a large amount of dumping sites. So, the dumping sites are nearest with the densely populated area. It can be said that, these areas will be caused first priority of health and environmental problems. Then Sinsu ward is located in the big areas, totally amount of dumping sites (9) and second least densely populated areas. It can be said that, it is not serious health and environmental problems than other ward of Pyay City, because the users depend on adequate dumping sites. (Figure 4)

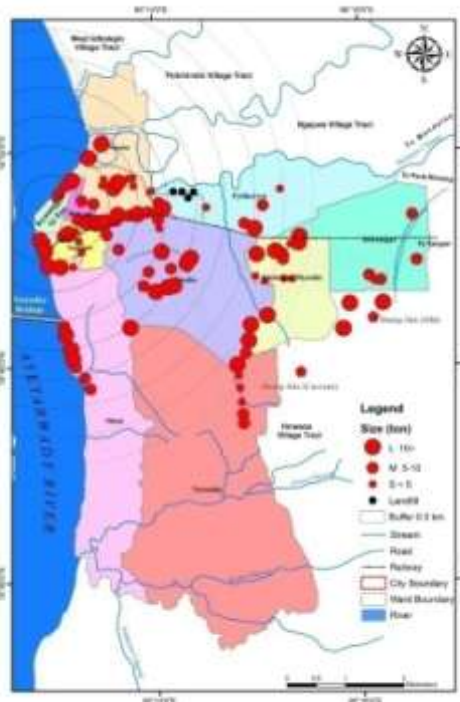


Figure 4 Point analysis on relation of population density solid waste dumping sites in Pyay City .

Source: Table 4 , Field Data.

Table 4. Point Analysis on Relation of Population Density and Solid Waste Dumping Sites in Pyay City

No	Wards	Buffer	Areas	Population Density	Household Density	LDS	MDS	SDS	Total (%)
1	Kyaunggyi O-Tan	0.5km	0.4	6791.57	1175	2	2	2	6(6)
2	Shwegu	1.0km	0.3	1135.04	106	2	3	2	7(7)
3	Sandaw		0.7	8237.57	5287	7	2	5	14(13)
4	Nawin	1.5-2.0km	2.9	12892.24	1319	7	4	7	18(17)
5	Ywabe	2.5-4.0km	4.5	15454.02	859	10	7	3	20(19)
6	Sinsu		6.4	7070.96	513	4	4	1	9(8)
7	Khittayar Myothit	4.5-5.0km	3.2	4634.13	10287	5	2	6	13(12)
8	Pyithayar		3.3	2746.44	636	1	2	1	4(4)
9	Nawaday		9.9	338.37	75	1	2	4	7(7)
10	Shwetagar	Over 5.0km	2.8	3649.19	687	3	4	1	8(7)

Source: Field Data

Findings and Result

Kyaunggyi O-Tan, Sinsu and Shwetagar wards have problem because Kyaunggyi O-Tan, Sinsu, Shwetagar have not Communal dump sites. Many wards are not problem for waste disposal sites but most Communal dumping site is unpleasant for foul smell and untidy scene because the present transportation system is inadequate for effective collection of waste in Pyay City. The collection system practiced at present is convenient to most of the households. But some households are inconvenient. In interviewing results, most of the households are interested in environmental household problem at present and any problem of garbage of neighbors has negative answers. There is the problem of garbage in the neighborhood, because the Municipal staff do not collect the garbage for the garbage tank regularly. There is no fixed place for the garbage, some unknown people drop the waste things at night in front of some houses without carrying. Most of the households are quite able to get along with the present system of garbage cleaning. But they are desire of having a Bell-Ring system to alert the households using bells.

For effective collecting system, total population density and the largest household density area must be built large dumping sites tankers and practiced to Plastic Boxes dumping site design plan must be built by local authorizes teams, within between connect boundary of edge each ward. If the densely populated area's dumping sites must be moved to edge connect point of sparely populated area, waste disposal must be carried out to filling up within reclaim area to urban expansion with increasing rates of population. These are waste materials effect to this environment, there by leading to health hazards. Thus, solid waste management program and systematic waste collection method are necessary. Another way to manage the solid waste

disposal is to use recycle method. Amount of solid waste should be reduced by using recycle method. Most of the inhabitants within Pyay City are well aware of the health hazards and negative impacts on the environment that can derive from the unsystematic waste disposal.

In accordance with the changing situation , funds needed for systematic collection of solid waste disposal should be allocated, otherwise the related problems would become more actuate and the ground plan of beautifying Pyay City, there would be successful and materialized.

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References

- Kyi.U.et.al.(2007) studied on “Urbanization in Pyay” the research finding on “expansion of urban areas”.which was an unpublished research paper for Department of Geography,Pyay University.
- Myint Myint Thein ,Daw.(2007) studied on “Geographical Analysis on Flooded Areas of Pyay”, It which was an unpublished research paper for Department of Geography, Pyay University.