A Spatial Distribution of Onion Cultivation in Myittha Township

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Abstract

This paper focus on the "Spatial Distribution of Onion Cultivation in Myittha Township". In Myittha Township, most of the people are living in rural areas and their occupation is agriculture work. The aim of this research is to study the development of onion cultivation and also explained the spatial distribution of onion cultivation. In onion cultivation, there are two types of onion cultivation: monsoon onion and winter onion which are presented by using statistical techniques. In addition, the spatial distribution of onion cultivation was studied in detail. As an outcome, this research paper may partially contribute to the rural economic development of Myittha Township.
Key words: Onion Cultivation, Topography, Soil

Introduction

Onion has been cultivated since the ancient times. The onion (Allium cepal) is also known as the bulk onion or common onion, is a vegetable that is the most widely cultivated species of the genus Allium. As a food item, these are usually served cooked as a vegetable. Onions are best cultivated in fertile soil that is well drained. Onion needed a high level of nutrient sufficient quantities but it may be supportated low level of availability during the growing period.

Aim and Objectives

The main aim is to study the spatial distribution of onion cultivation in Myittha Township.

The objectives are:

- to explain the physical factors that influence on the onion cultivation in the study area
- to describe onion distribution pattern

Methodology and Sources of Data

In this study, the primary data were collected from field surveying, interviews, question responses and questionnaires. Secondary sources were obtained from meteorology and hydrology department, agricultural land management and statistics department, Myittha Township. The data were analyzed by using GIS. Grain size analysis on the sample soil was made at the Mechanics Lab by means of sieving and pipette method.

Study Area

Myittha Township is located at Kyaukse District in Mandalay Region. It lies between north latitudes 21˚09′ and 21˚33′ and east longitudes 95˚56′ and 96˚23′. Its area is 342.63 square miles (219,295 acres). The township composed of 6 wards and 82 village tracts with 227 villages. The study area is the most prominent in the onion cultivation in central Myanmar. Therefore, the area was chosen to study the situation of onion cultivation.

Physical Factors Affecting upon Onion Cultivation

Topography and Drainage

Myittha Township is located at the southern part of Kyaukse plain. Most of the areas are generally flat alluvial plains and ¾ of the township areas are plains and the rest are hilly areas. Flat plains are found behind the foot hill area of Shan plateau which comprised 70% of the total area. Flat alluvial plain composed of silt and clay deposits and poor drainage .The area of onion cultivation has (6,121) acres, it lies under 100 ft a.m.s.l in height. Among them 5,869 acres are cultivated in the winter season and 252 acres are cultivated in the monsoon season. In addition to the area of (2,824) acres are cultivated at the level of between 100 ft a.m.s.l and 200 ft a.m.s.l. Of which 2,794 acres are cultivated in the winter season and 91 acres are cultivated in the monsoon season. A small area of onion has cultivated about 61 acres are cultivated between 200 feet and 300 feet. In the study area, the major rivers are Panlaung River, Samon River and Htongyi River they flow across the study area. Therefore topography and drainage support the onion cultivation Figure (1).

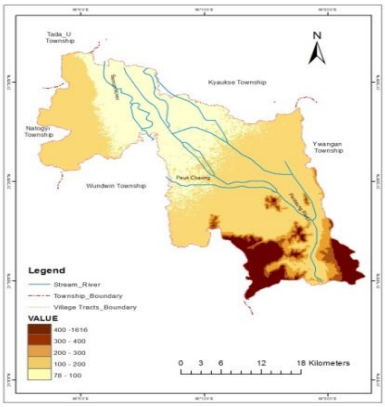

Figure (1) Topography and Drainage of Myittha Township

Source: Digital Elevation Model (DEM)

Climate

In climate it is controlling effect on the distribution of onion cultivation. The temperature condition of study area is suitable for onion cultivation, The average maximum temperature is 94.10˚F, the average mean temperature is 81.71˚F and the average minimum temperature is 69.28˚F in the study area. Onions are adapted to a wide range of temperature and optimal leaf growth occurs at 68˚F to 77˚F (source: https//harvesttotable.com). The average mean temperature is 76.61˚F in winter period and 82.98 ˚F in monsoon period. It is suitable for onion cultivation. In the study area it has the range of temperature is 12˚F and 7.37˚F in the winter and monsoon period respectively. The average annual rainfall is 31.58 inches. It has a double peak rainfall in the study area. The first peak and the second peak occurred at October and May with 6.92 inches and 5.48 inches respectively (source: meteorology and hydrology department).

Table (1) The Distribution of Onion Cultivation (Acres) Depend on Soil Types

No	Soil Type	Village Tracts	Acres	Percentage
1	Cinnamon Soil	2	31	0.35
2	Red Brown Savanna Soil	3	72	0.8
3	Dark Compact Red Brown Savanna Soil	10	1948	21.63
4	Red Brown Savanna and Eroded Crushed Stone Red Savanna Soil	3	850	9.44
5	Meadow Alluvial Soil	2	475	5.27
6	Primitive Crushed Stone Soil	1	0	0
7	Turfy Primitive Mountainous Red Earth Soil	1	0	0
8	Dark Compact Alkaline Savanna Soil	2	429	4.76
9	Dark Compact Irrigated Savanna Soil	58	5201	57.75
	Total	82	9006	100

Source: Agriculture land Department, Myittha Township

Table (2) Properties of Soil Affecting upon Onion Cultivation in Myittha Township

No	Soil Texture	Moisture	pH	Soil Colour	Soil Type
1	Silt Loam	7.3	8.3	Yellowish Grey	Dark Compact Irrigated Savanna Soil
2	Silt Loam	12.6	8.2	Light Greyish Brown	Dark Compact Irrigated Savanna Soil
3	Silt Loam	7.6	8.4	Light Greyish Brown	Dark Compact Irrigated Savanna Soil
4	Silty Clay Loam	8.4	8.1	Light Greyish Brown	Dark Compact Irrigated Savanna Soil
5	Silt Loam	17.8	8.1	Light Greyish Brown	Meadow Alluvial Soil
6	Silt Loam	19.4	8.1	Light Greyish Brown	Dark Compact Irrigated Savanna Soil
7	Silt Loam	13.4	8.1	Brown	Dark Compact Irrigated Savanna Soil
8	Silt Loam	12.4	8.3	Light Greyish Brown	Dark Compact Irrigated Savanna Soil
9	Silty Clay Loam	22.6	8.1	Yellowish Brown	Dark Compact Irrigated Savanna Soil
10	Silt Loam	18.9	8.1	Light Grey	Dark Compact Irrigated Savanna Soil
11	Silty Clay Loam	15.8	8.2	Light Greyish Brown	Dark Compact Irrigated Savanna Soil
12	Silty Clay Loam	20.2	8	Yellowish Brown	Dark Compact Irrigated Savanna Soil
13	Silty Clay Loam	25.1	8.2	Grey	Cinnamon Soil
14	Silty Clay Loam	20.2	8.1	Grey	Cinnamon Soil
15	Silt Loam	22.1	8.1	Greyish Brown	Cinnamon Soil
16	Silt Loam	26.5	8.2	Yellowish Grey	Dark Compact Irrigated Savanna Soil
17	Silt Loam	0.6	8.1	Greyish Yellow	Dark Compact Irrigated Savanna Soil
18	Silt Loam	21.3	8	Brown	Dark Compact Irrigated Savanna Soil
19	Silt Loam	8.9	8.1	Grey	Red Brown Savanna Soil
20	Silty Clay Loam	11.3	8.2	Greyish Brown	Dark Compact Irrigated Savanna Soil

Source: Complied by researcher

Soil

According to field study, the most suitable type of soil is dark compact irrigated savanna soil. These soils are found on the low land area stretching from the eastern Samon River to the western Ngalinezin canal. This soil occupied 58-village tracts and its onion cultivated area is 5,201 acres with 57.75 percent of the total area of the township. These soils can support the best onion quality. The second most dark compact red brown savanna soil is found at 10-village tracts. Its cultivated area is 1,948 acres with 21.63 percent of the total area (Table 1). These soils can be planted the whole year round and the soil is enriched with nutrients and moist.

According to table (2), there are silt loam (65%) and silty clay loam (35 %) in the study area. It is slightly alkaline in reaction with pH 8 to 8.4. Although the optimum level was between 6 and 7.87, onion is likely to grow in a soil with pH ranged from 5.5 to 8.2 (source; Ei Ei Phyo, Spatial Analysis on the Effect of Physical Factors upon Onion Cultivation in Myittha Township, MA Thesis, 2018, unpublished). The texture of silt loam and silty clay loam are favorable to grow onion especially Shwe Phala species. The light greyish brown color of soil is the best for onion (interview from farmer).

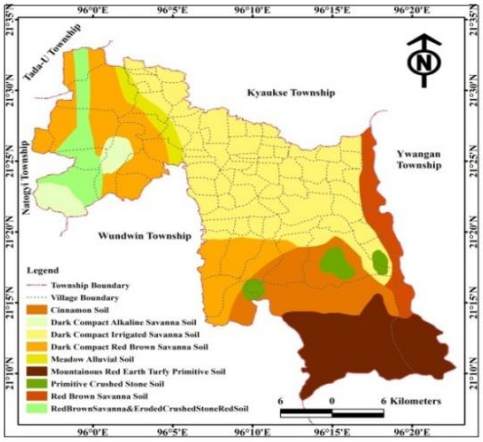

Figure (2) Soil Type of Myittha Township

Source: Land Management and Registration Department of Myittha Township

Condition for Onion Cultivation

Onion can be grown under a wide range of environmental condition both in temperate and tropical. Although onion cultivation can be grown on many types of soil and the soil must be well drained for onion growing. Dark compact irrigated savanna soil is suited for onion in Figure (2). Although onion is likely to grow in a soil with pH ranged from 5.5 to 8.2, the optimum level was between 6 and 7.87

Spatial Distribution of Onion Cultivation in Myittha Township

Onion cultivation depends on physical environment such as topography, climate and soil. According to the statistics of 2017-2018 the total onion cultivated area was 9006 acres with 7.52% of the total area. The onion can be grown in winter season and monsoon season. (Source: Agriculture land Department, Myittha)

Spatial Distribution of Winter Onion Cultivation

The area under winter cultivation was 8663 acres which amounted to 96.19% of the total onion cultivated area in the township. The area under monsoon onion cultivation was 343 acres with 3.81% of the total onion cultivated area in the township. (Source: Agriculture land Department, Myittha)

According to proportion of the total onion cultivated area, during the period of 2017-2018, winter onion cultivation can be divided into three groups in Figure (3). They are:

(i) High level importance of onion cultivation area (over 20%)
(ii) Moderate level importance of onion cultivation area (10-20%)
(iii) Low level importance of onion cultivation area (under 10%)

(i) High Level Importance of Onion Cultivation Area (over 20 %)

It includes 2,197 acres with 25.36% of the total onion cultivated area. It consist of 8-village tracts namely Nwashayo, Tamarbin, Paukmyaing, Hmine in, Kathegon, Shwepawkyun, Innyin and Minelan.These village tracts are located at the central part of the Myittha Township. These village tracts are found as high level onion cultivation area because of irrigation facility is available from the nearest dam.

(ii) Moderate Level Importance of Onion Cultivation Area (10%-20%)

It includes 3,331 acres with 38.45% of the total onion cultivation area. It consist of 20-village tracts namely Yitkan, Nyaunggyit, Wettain, Thittagone, Deyegaung, Yanaye, Ponna, Kyauksauk, Thotan,Ywamonegyi, Mashet, Kyunhla, Yway, Chin, Hkantgyi, Thilin, Letpanseik, Kinseinze, Letkokkon and Hkandaw. These village tracts are located at the western and northern part of the township. These village tracts have attained the moderate level cultivation area because of available of water facility.

(iii) Low Level Importance of Onion Cultivation Area (under 10%)

It includes 3,135 acres which amounted to 36.19% of the total onion cultivation area. It consist of 47 village-tracts namely Pyaw, Gway, Yokan, Thabyetha(Weat), Kywesweh, Ywathit, Yewun, Ywashay, Hnehweh, Kokkokone, Kyandaw, Laungdawu, Nwakulay, Kywetap, Ngahsu, Ohshitkone, Talaingon, Kyaungpangon, Konywa, Kokkosu, Kume, Thalun, Thabyetaung, Pwelonekyaw, Myainggon, Minemaw, Kayetoke, Ohngon, Kanshwe, Myinthsonlay, Langwa, Shwelay, Hlwepauk, Thikaung, Monedawlay, Monedawgyi, Minle, Tesoe, Bonkwin, Thabyetha (East). Ywakhainggyi, Myinywagyi, Lunkyaw, Mathe, Dawein, Daing and

Pahkan.These village tracts are located at the central, south eastern and southern part of Myittha Township,

The remaining 7 village tracts are not cultivated onion crop in the study area.

Although the physical factors are likely to favour the cultivation of onion, it cannot be intensively cultivated in winter season. Because of it required many labour and production cost is high in their works. In some area, onion growers are also facing with scarcity of water.

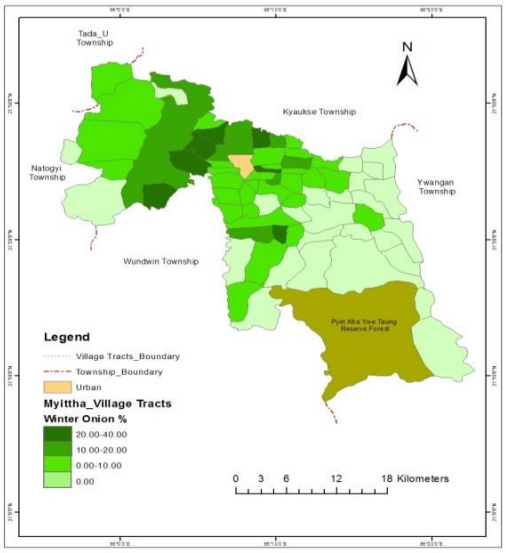

Figure (3) Spatial Distribution of Winter Onion Cultivation

Spatial Distribution of Monsoon Onion Cultivation

It includes 343 acres with 3.81% of the total onion cultivated area. it is found that 24-village tracts are engaged in their monsoon onion cultivation. And the rest of 58-village tracts are not cultivated the monsoon onion crop in the winter period. The monsoon onion cultivation can be divided in three groups in Figure (4). They are:

(i) High level importance of onion cultivation area (over 3%)

(ii) Moderate level importance of onion cultivation area (between 1% and 3%)

(iii) Low level importance of onion cultivation area (under 1%)

(i) High Level Importance of Onion Cultivation Area (over 3%)

It has 3 village tracts with 11 acres of 19.24% of the total onion cultivation area. These are Yewun, Hnehweh and Letpanseik village tracts and it is located at north eastern part of Myittha Township because of better drainage and better marketing in the study area.

(ii) Moderate Level Importance of Onion Cultivation Area (between 1% and 3%)

It comprises 10-village tracts namely Hminein. Ponna, Thotan, Ywamonegyi, kywesweh, Ywashey, Thilin Kokkokone, Kokkosu and Langwa. Its cultivated area is 169 acres with 49.27% of the total onion cultivation area. These village tracts are located at the northern and central part of Myittha Township. Because of better drainage system and water is available and is easy utilized.

(iii) Low Level Importance of Onion Cultivation Area (under 1%)

It has 108 acres which amounted to 31.49 % of the total onion cultivation area in low level. It consists of 11- village tracts, namely Yokan, Yitkan, Deyegaung, Yanaye, Kyauksauk, Mashet, Konywa, Hkandaw, Myainggon, Ohngon and Pahkan. These village tracts are located at the northern, south, west and eastern part of Myittha Township. During the year of 2017-2018, the rainfall occurred in irregular pattern and poor drainage and the damage caused the plant growth and the plant disease has fallen. So the farmers are facing the damage in the cultivation of crops.

The remaining 58 village tracts are not cultivated onion crop in the study area due to heavy rain in October.

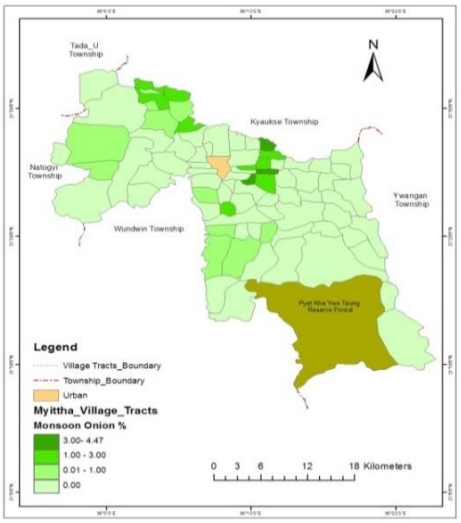

Figure (4) Spatial Distribution of Monsoon Onion cultivation

Result and Discussion

In this study, the data are analyzed by GIS application. It was observed that the more low elevation of farmland, the more importance of onion cultivation because the low level of cultivated land is provided with help of irrigation especially winter period. The physical property of soil was tested at the Mechanics Lab by means of sieving and pipette method. From the result of soil sample it was known that the texture of silt loam and silty clay loam are favorable to grow onion. Myittha Township is located in dry zone region of central Myanmar. It experiences high temperature and low rainfall in the study area. The town area is expanded and the agricultural lands are falling into the town area. Myittha Township is getting difficult in insufficience

of water for agricultural land. Onion is one of the main crops in the study area and also important local product in the township. It gets sufficient water resources, by irrigating and tube wells are implemented. By doing so, this study area will become more prosperous in the future than before.

Conclusion

The main aim of the research is to investigate the spatial distribution of onion cultivation in Myittha Township. The findings show that soil properties were the most influencing factor to cultivate onion in the study area. In terms of supply water requirement, the area drained by river and cannal provided to produce onion crop. As a factor of topography, the onion cultivation was determined by the elevation due to water supply from cannals and rivers. Thus, it can be assumed that soil, water supply and topography are affecting on onion cultivation.

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