

Spatial Analysis of *Ya* Land Concentration in Sagaing Township

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Abstract

The main aim of this research is to analyse the spatial variation of *Ya* land concentration in Sagaing Township. Sagaing Township lies within the Dry Zone of Central Myanmar. It is one of the three townships of Sagaing District. There are four types of agricultural land such as *Le* land², *Ya* land³, *Kaing-Kyun* land and *Garden* land in Sagaing Township. *Ya* lands are the largest area of the agricultural land of the study area. That is why *Ya* lands occupied 70.24 percent of the agricultural lands of Sagaing Township. To measure the concentration of *Ya* land in Sagaing Township, the location quotient method of Bhatia (1965) was used. According to the value of *Ya* land concentration, it can be classified into three groups; (1) high concentration, (2) medium concentration and (3) low concentration. In high concentration group of *Ya* land, five village tracts were included. In medium concentration group of *Ya* land, Sagaing Town and 55 village tracts were included. In low concentration group of *Ya* land, 17 village tracts were included.

Key words: *land concentration, Le, Ya, Kaing-Kyun, Garden*

Introduction

Myanmar, well known as a traditional agricultural country, is now being implementing the agricultural development plan focusing on the proper land use and land management. The economy of our country is mainly dependent on agricultural activities.

In studying the specific crop cultivation in an area, agricultural land use plays an important role. In Sagaing Township, agricultural land can be defined into four types, such as "*Le*" land, "*Ya*" land, "*Kaing-Kyun*" land and "*Garden*" land. It can be found that the physical factors influence the types of agricultural land in Sagaing Township. Among them, "*Ya*" land is the largest amount of acres in this township. In 2021-2022, the average net sown area of "*Ya*" land is 152,343 acres (70.24 percent of the cultivated area) and the average net sown area of "*Le*" land is 51,154 acres (23.59 percent of the cultivated area). And then, "*Kaing-Kyun*" land and "*Garden*" land have 12,921 acres (5.96 percent of the cultivated area) and 456 acres (0.21 percent of the cultivated area) respectively. Therefore, it can be estimated that "*Ya*" land cultivation influences the agricultural land use of Sagaing Township.

The Study Area

Sagaing Township lies within the Dry Zone of Central Myanmar. Sagaing Township is situated in the south-eastern part of the Sagaing Region. Sagaing Township lies between the latitudes of 21°50' and 22°15' north, and between the longitudes of 95°40' and 96°00' east. The western part of the Sagaing Township is flat plains of the Mu and the southern part is also Ayeyarwady river basins. The area of Sagaing Township is 310,502 acres. In Sagaing Township, there are two towns Sagaing Town (23

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²Wet Crop Cultivated Land, e.g Paddy cultivated Lands

³Dry land, Dry Crop Cultivated Land

wards), Sadaung Town (11 wards), 76 village tracts and 177 villages. The township has a square shape.

Sagaing Township is bounded on the north by Wetlet Township, on the east and south-east by Madaya Township, Patheingyi Township, Amarapura Township and Tada-U Township, on the south by Ngazun Township and on the west by Myinmu Township and Ayadaw Township. (See figure 1)

Sagaing Township can be divided into two physiographic units; The Eastern Sagaing-Minwun Range and The Western Low Flat Plain. According to Koppen's Classification of Climate, receives Tropical Steppe Climate (BSh). The Sagaing fault passing through along the western base of the Sagaing Ridge is a prominent geologic structure in Sagaing Township. In Sagaing Township, Late Cenozoic sedimentary rocks are mainly present. The generalized rock succession in Sagaing Township is Alluvium, Irrawadian Formation, Upper Pegu Group and Sagaing Metamorphic. There are eight main types of soil in Sagaing Township. As the township of Sagaing lies within the Tropical Dry Zone Belt of Central Myanmar and the geological structure favored to the *Ya* land concentration. In 2021-2022, the total population of Sagaing Township was 297,152 persons. The urban population was 94,650 persons and the rural population in Sagaing Township was 202,502 persons.

Aim and Objectives

The main aim of this paper is to analyze the spatial variation of *Ya* land concentration in Sagaing Township.

The objectives are:

1. To examine the types of agricultural land in the study area.
2. To study the physical factors that control the types of agricultural land in the study area.
3. To analyze the spatial variation of *Ya* land in the study area.

Research Questions

1. What are the types of agricultural land in Sagaing Township?
2. What are the physical factors that control the types of agricultural land Sagaing Township?
3. How much is the spatial variation of *Ya* land in Sagaing Township?

Literature Review

Literatures on agricultural geography are varied and widespread. However, Literatures directly oriented to *Ya* land concentration in this study area absent. For this reason, some district literature with their key concepts is extracted and they are expressed as follows.

Agricultural land is perhaps the most vital natural resource modified by man to provide him with food, shelter, clothes and other agricultural products. The agricultural land is defined as land that is normally used for agricultural production, and it includes *Le, Ya, KaingKyun and garden.*

The book namely land utilization: Theory and practice was published in 1981 and written by R.B Mandal. In this book, there are totally (19) Subheadings retained to land use. The methods for land use classification vary from country to country U.S Agricultural Department has based on soil type and topography of the land. In Japan, land classification is based on the cropping pattern. In U.S.S.R, it was by the use of land cover scenario. In British, land use classification, there are three approaches. Then, the land was categorized according to their quality: good, medium and poor. In India, the land is classified by analyzing two factors: physical factors and human factors.

Data Collection and Methodology

In collecting the data, both primary and secondary data are acquired. Primary data are collected by taking a field trip to the selected area, using questionnaire and making structured interview.

Published maps (UTM 2195-09/13, 2196-01, 2295-12/16, 2296-04) and official maps, climatic data, land use data and crops statistics are taken as the secondary data from the respective offices. The required data concerning the physical bases of the township are obtained from General Administrative Department of Sagaing Township, Meteorology and Hydrology Department of Mandalay. Population data are acquired from Immigration and National Registration Department. Most of data concerning the agricultural statistics are taken from Department of Agricultural Land Management and Statistics of Sagaing.

The concentration of *Ya* land was calculated by using the location quotient method adopted by Bhatia (1965).

Index of concentration on *Ya* land =

$$\frac{\text{Area of } Ya \text{ land in village tract}}{\text{Area of total agricultural land in village tract}} \div \frac{\text{Area of } Ya \text{ land in township}}{\text{Area of total agricultural land in township}}$$

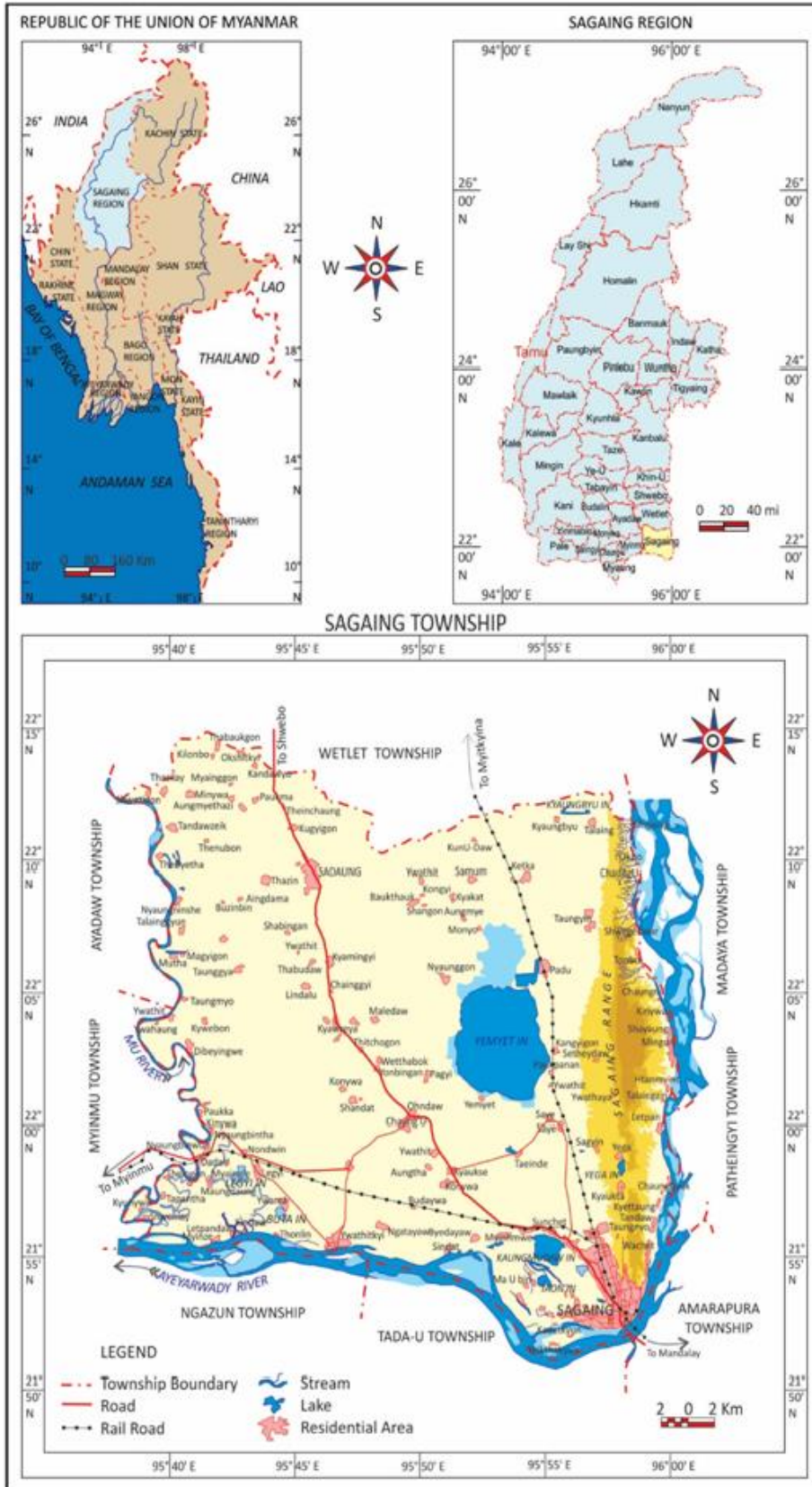
Types of Agricultural Land in Sagaing Township

According to the statistical data of 2021, the total agricultural land area of Sagaing Township was 216,874 acres (69.72 percent of the area of Sagaing Township). Based on topographic features, rainfall and soil, the agricultural land types are varied. Types of Agricultural Land in Sagaing Township are shown in Table (1) and Figure (2).

Table (1) Types of Agricultural Land in Sagaing Township

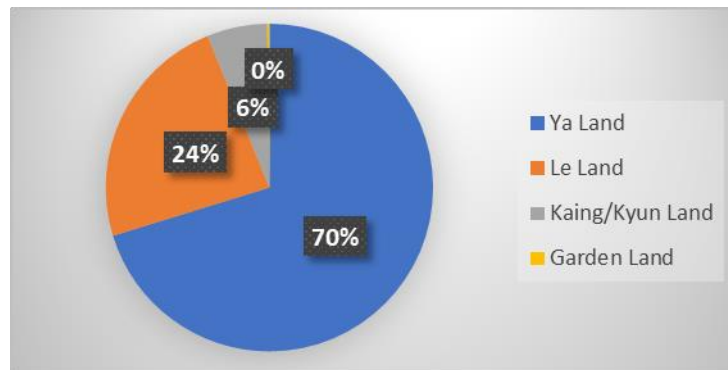
No	Types of Agricultural Land	Acres	Percentage
1	<i>Ya</i> land	152,343	70.24
2	<i>Le</i> land	51,154	23.59
3	<i>Kaing-Kyun</i> land	12,921	5.96
4	<i>Garden</i> land	456	0.21
	Total	216,874	69.72

Source: Department of Agricultural Land Management and Statistics, Sagaing Township



Source: Topographic Map No.2195_09,2195_13,2196_01,2295_12,2295_16,2296_04

Figure (1) LOCATION OF SAGAING TOWNSHIP



Source: Based on Table (1)

Figure (2) Types of Agricultural Land in Sagaing Township

Spatial Analysis of *Ya* land Concentration

In Sagaing Township *Ya* lands are mainly and largely found on Dark Compact Gley Savanna Soil, Dark Compact Irrigated Savanna Soil, Red Brown Savanna Soil, Red Brown Eroded Savanna Soil and Turfy Primitive Soil. On *Ya* lands, wheat, pulses, maize, sesamum, millet, sunflower, groundnut and cotton are grown.

The concentration of *Ya* land was calculated by using the location quotient method adopted by Bhatia (1965). The indices of *Ya* land concentration of Sagaing Township varied from 0.00 to 1.42. The mean value of *Ya* land indices is 0.88 and standard deviation 0.52. Based on mean and standard deviation, three grades of *Ya* lands regions have been determined in Sagaing Township. These are:

- (1) High concentration of *Ya* land – more than 1.4.
- (2) Medium concentration of *Ya* land – between 0.36 and 1.4.
- (3) Low concentration of *Ya* land – less than 0.36

(1) High Concentration of *Ya* Land

In high concentration group of *Ya* lands, five village tracts were included. These village tracts are Wachet, Myetaing, Yekha, Sagyin and Taungyin village tracts. The total area of *Ya* lands in these village tracts was 8,574 acres which accounted for 3.95 percent of total *Ya* land area of Sagaing Township. These village tracts are located on the foothill of Sagaing-Minwun range of Sagaing Township.

(2) Medium Concentration of *Ya* Land

In medium concentration group of *Ya* land, Sagaing Town and 55 village tracts were included. The total area of *Ya* lands in these village tracts was 143,043 acres or 95.71 percent of the total *Ya* lands area of Sagaing Township. These village tracts are located in the central parts of Sagaing Township.

(3) Low Concentration of *Ya* Land

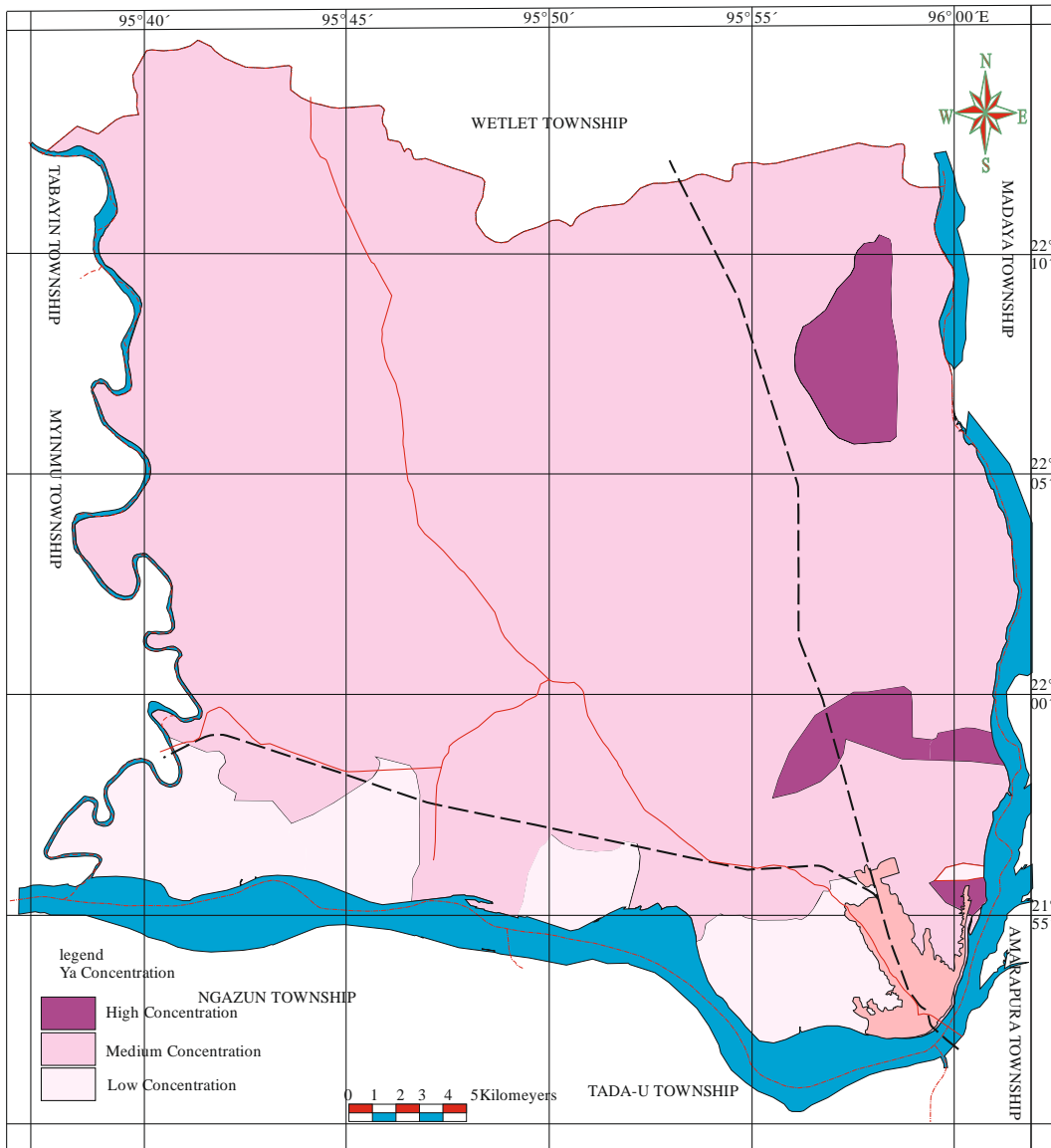
Within the low concentration of *Ya* land groups, there are 17 village tracts. These are Sindat, Kywelu, Naukkyikyun, Tegyi, Zichaung, Daungma, Sinmye, Maubin, Arlaung, Nyaungbinwun, Shwehlay, Kaingpyin, Mumse, Maungthaung, Letpantha, Thaphantha and Ywama village tracts. The total area of *Ya* lands in these village tracts were 726 acres which amounted to 0.34 percent of the total *Ya* land area of Sagaing Township. Most of these village tracts located in seasonal flooded alluvial plain of Mu and Ayeyarwady rivers. In these village tracts, most of the Agricultural lands are *Kaing-Kyun* land and *Garden* lands. As a result, the concentration of *Ya* lands were low in these village tracts. Spatial concentration of *Ya* Land in Sagaing Township is shown in figure (3).

Table (2) Index of Ya Land Concentration in Sagaing Township (2021)

No	Town / Village Tracts	Ya Lands	Total Agricultural Land	Index of Concentration
1	Sagaing	3,257	5,582	0.83
2	Sadaung	11,646	15,029	1.10
3	Nyaungbinzin	697	1,379	0.72
4	Sindat	560	3,230	0.25
5	Pyehtayaw	264	862	0.44
6	Kywelu	0	813	0.00
7	Naukkyikyun	0	853	0.00
8	Tegyí	0	1,459	0.00
9	Zichaung	0	917	0.00
10	Daungma	0	691	0.00
11	Sinmye	0	3,393	0.00
12	Maubin	0	1,317	0.00
13	Wachet	155	155	1.42
14	Kyaukta	1,915	2,001	1.36
15	Arlaung	0	270	0.00
16	Myetaing	205	205	1.42
17	Htandaw	267	511	0.74
18	Chaungpauk	958	1,025	1.33
19	Yekha	695	695	1.42
20	Yemyet	1,422	1,583	1.28
21	Taeinte	3,123	3,819	1.16
22	Sagyin	2,199	2,223	1.41
23	Saye	5,694	6,206	1.31
24	Taunggya	1,914	2,146	1.27
25	Insa	2,258	2,939	1.09
26	Taungmyo	474	1,615	0.42
27	Baukthauk	7,892	9,914	1.13
28	Paukma	1,158	3,810	0.43
29	Minywa	1,164	2,491	0.67
30	Thapyaukkon	679	2,438	0.40
31	Thazin	3,434	5,686	0.86
32	Lintalu	2,484	2,590	1.37
33	Yinmakyin	3,365	3,782	1.27
34	Kyamingyi	2,308	2,546	1.29
35	Marletaw	3,594	3,786	1.35
36	Mutha	427	914	0.67
37	Htandawseik	5,805	7,181	1.15
38	Talaingkyun	685	1,092	0.89
39	Nyaungbinshay	676	808	1.19
40	Nyaungbinwun	0	797	0.00
41	Nyaungbintha	713	783	1.30
42	Legyi	2,617	4,490	0.83
43	Shwehlay	0	2,258	0.00

44	Kaingpyin	0	2,206	0.00
45	Mumse	0	1,398	0.00
46	Maunghtaung	0	1,461	0.00
47	Letpantha	0	1,022	0.00
48	Thaphantha	0	552	0.00
49	Nondwin	1,604	2,385	0.96
50	Depeyinkwe	2,611	2,961	1.26
51	Kywepon	1,680	2,000	1.20
52	Padu	9,772	10,438	1.33
53	Kangyikon	3,327	3,440	1.38
54	Taungyin	5,320	5,380	1.41
55	Kyaukpanan	2,750	2,807	1.39
56	Ketka	3,053	4,191	1.04
57	Kyakat	3,577	4,689	1.09
58	Samon	4,487	5,787	1.10
59	Yedwinkaung	184	224	1.17
60	Ywathitgyi	1,941	2,711	1.02
61	Ywama	166	1,605	0.15
62	Ngatayaw	1,356	2,817	0.69
63	Shantat	3,156	4,178	1.08
64	Yonbinkan	1,341	1,390	1.37
65	Pyitawtha	1,328	2,127	0.89
66	Natkayaing	1,993	2,098	1.35
67	Ohntaw	5,252	5,996	1.25
68	Kyaukse	3,765	4,372	1.23
69	Aungtha	2,820	3,326	1.21
70	Panchi	4,954	5,977	1.18
71	Mingun	897	948	1.35
72	Kin	377	386	1.39
73	Letpan	594	632	1.34
74	Singaing	1,801	1,855	1.38
75	Kyaungpyu	2,668	2,959	1.28
76	Talaing	3,327	4,442	1.07
77	Mazalichaung	942	994	1.35
78	Htonbo	596	836	1.01

Source: Calculated by Researcher



Source: Based on Table (2)

Figure (3) SPATIAL CONCENTRATION OF YA LAND CONCENTRATION IN SAGAING TOWNSHIP (2021)

Results, Findings and Discussion

According to the statistical data of 2021, the total agricultural land area of Sagaing Township was 216,874 acres. In Sagaing Township, Ya lands occupied the largest area among the agricultural land types, amounting to 70.24 percent of the total agricultural land area of Sagaing Township. The indices of Ya land concentration of Sagaing Township varied from 0.00 to 1.42. The mean value of Ya land concentration indices is 0.88 and standard deviation is 0.52. Based on mean and standard deviation, three groups of Ya land concentrations have been determined in Sagaing Township.

In high concentration group of Ya lands, five village tracts were included. The total area of Ya lands in these village tracts was 8,754 acres which accounted for 3.95 percent of the total Ya land area of Sagaing Township. In medium concentration group of Ya land, Sagaing Town and 55 village tracts were included. The total area of Ya lands in these village tracts was 143,043 acres constituted 95.71 percent of the total Ya lands area

of Sagaing Township. Within the low concentration of *Ya* land groups, there were 17 village tracts. The total area of *Ya* lands in these village tracts were 726 acres which amounted to 0.34 percent of the total *Ya* land area of Sagaing Township.

Conclusion

In analyzing the spatial variation of *Ya* lands concentration, it can be found that *Ya* lands were highly concentration in five village tracts. Depending on the soil types and the relief features, *Ya* land concentration are varied spatially in Sagaing Township. This research can provide carrying out the development of *Ya* land's agriculture in Sagaing Township.

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