LOCAL ECONOMY: MAIZE CULTIVATION AND ITS ECONOMIC RETURN OF LASHIO TOWNSHIP*

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Abstract

Lashio, one of the townships of Northern Shan State, is located along Mandalay Muse Road. It is composed of twelve wards and 75 village tracts including 490 village tracts. Like other places of Myanmar, its economy mainly based on agriculture activities. Major crops grown in this township are paddy, maize, groundnut and beans etc. This paper mainly stresses on maize cultivation. In the study area, maize cultivation has boomed up since last 15 years. In 2021-22 the area under maize cultivation was 27,252.93 hectares (67,342 acres) represent 47.15 percent of the total agricultural land. The aim of this paper is to study net economic return of maize cultivation supporting the economy of cultivators in Lashio Township. The objectives are to investigate the favourable conditions for maize cultivation, to examine spatial distribution of maize cultivation and to explore strength, weakness, opportunity and threat of maize cultivation in Lashio Township. Primary data and secondary data were applied in this research paper. Primary data were acquired through field observation, informal talks and discussion with farmers and the responsible persons of the departments concerned. Secondary data such as climatic data, maize cultivated area, productivity and population were derived from the department concerned. Cost-benefit analysis and SWOT analysis were applied in presenting the paper.

Keywords*:* agriculture, maize cultivated area, economic return, cost-benefit, SWOT

Introduction

Myanmar is an agricultural country, and the agriculture sector is the backbone of its economy. The agriculture sector contributes 37.8 percent of gross domestic product (GDP), accounts for 25 to 30 percent of total export earnings and employs 70 percent of the labour force. One major economic objective is "Development of agriculture as a base and all-round development of other sectors of the economy as well" (FAO, 2017).

Myanmar is a maize producing and exporting country among 171 **maize** producing countries in the world (MPBSMA, 2021). Maize (Zea mays L.) is an important cereal crop in world after wheat and rice and hybrid maize was introduced to Myanmar in the mid-1990s by Thai agro-industrial conglomerate Charoen Pokphand (CP) and maize production has boomed since this time (FAO, 2019), to supply a burgeoning export market to China and a rapidly growing domestic animal feed industry in Myanmar. Maize is food for man and feed for animal and it can be cultivated throughout the year (Choudhri, et al, 2018).

The country exports maize to China (mainland) and Thailand. Most maize production is concentrated in upland areas of Myanmar. Shan State occupies approximately half of the country's total planted area of maize (USDA, 2019).

Agriculture activity especially maize cultivation is extensively grown in Lashio Township. About 70 percent of the township's population engaged in maize cultivation. To study

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maize cultivation, Lashio Township was selected as study area for the purpose of presenting net return of maize cultivation by using cost-benefit analysis.

Study Area

Lashio is one of the townships of Northern Shan State. The total area of Lashio Township is 4,230.5 square kilometres (1,633.4 square mile). It is made up of twelve wards and 75 village tracts. In 2022 the total population of the township was 300,966 persons of which 145,479 persons or 48.34 percent were urban population and 155,487 persons or 51.66 percent rural population.

Aim

To study net economic return of maize cultivation supporting the economy of cultivators in Lashio Township.

Objectives

- To investigate the favourable conditions for maize cultivation
- To examine spatial distribution of maize cultivation and
- To explore strength, weakness, opportunity and threat found in maize cultivation of Lashio Township

Data and Method

Primary data such as cost, price, income, benefit, etc were collected through field observation, informal talks and discussion with farmers and authorized persons of the department concerned.

Secondary data were obtained from the respective departments, relevant books, journals and magazines.

In presenting the paper, cost benefit analysis was applied to illustrate net return from maize cultivation and SWOT analysis was applied for the purpose of upgrading maize cultivation in Lashio Township.

Results and Findings

The Favourable Conditions for Maize Cultivation
Physical Factors

Lashio Township is located in the Northern Shan State lies on the Mandalay-Muse motor road. It is located between North latitudes 22° 35″ 53′ and 23° 04″ 27′ and between East longitudes 97° 31″ 10′ and 98° 22″ 48′ (Figure 1.a , 1.b).

The Lashio Township boundary is 232 miles long. The township boundary is partly demarcated by streamlet, streams, rivers, mountain divides and valleys. The area of the township is 4,230.5 square kilometre (1,633.4 square miles). It is composed of 12 urban wards and 75 village tracts (Figure 2).

Source: Myanmar information Management Unit

Figure (1.a) Location of Shan State in Myanmar

Source: Myanmar information Management Unit

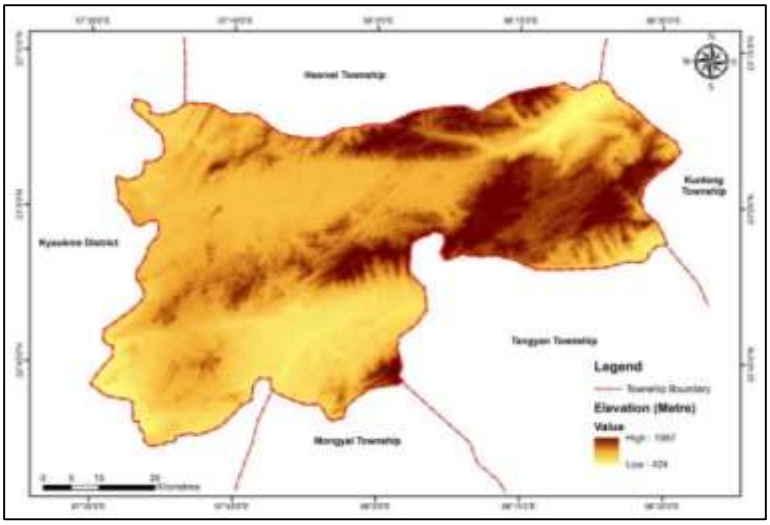
Figure (1.b) Location of Lashio Township in Shan State

Source: Department of Agriculture and Land Management Statistics, Lashio Township

Figure (2) Urban Area and Village Tracts of Lashio Township

Nearly the whole region with rugged, mountainous and moderately to steeply sloping area, and narrow alluvial plain are general characteristics of the township topography. Comprising some parts of the alluvial plain is a flat. However, the majority of the areas are undulating and rolling topography (Lwai Shwe Poung, 2014). Thus, relief of the study area favours maize cultivation (Figure 3).

The elevation of the northern edge of the township is about 660.91 metre (7,114 feet) above mean sea level and it is the highest peak in the township.



Source: Digital Elevation Model

Figure (3) Relief of Lashio Township

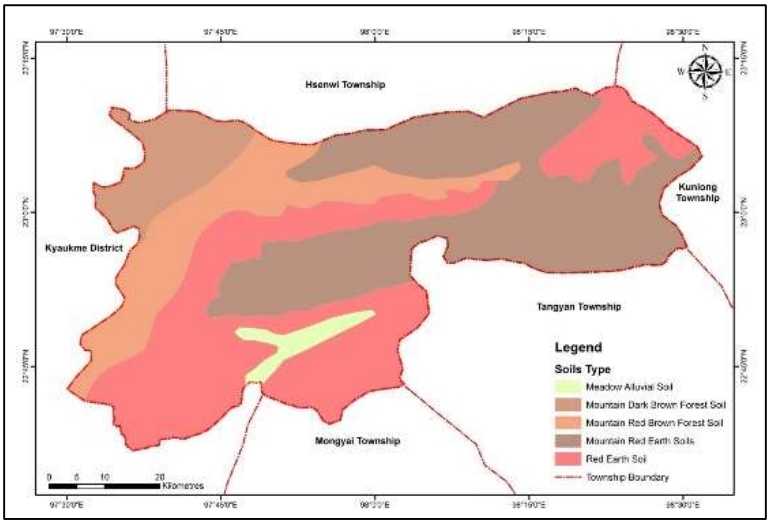
Among the physical factors, climate is quite significant and it determines the cultivated area, harvest area and yield per unit. Various impacts of climate change especially rainfall variability affect various agricultural activities and crop loss is caused by temperature and rainfall variability (Klein, Schipper & Dessai, 2005).

Maize is grown over a wide range of climatic conditions because of its many divergent types. Global agriculture including maize cultivation is facing the probable impact of global warming. Recent studies suggest that the production of major commodities has declined since 1980 due to global warming (Lobell et al 2011).

During 12 year period from 2010 to 2022, the average maximum temperature was 26.32°C (79.38°F) and average minimum temperature was 16.59°C (61.86°F). Average mean temperature was 19.90°C (67.82°F).

Average annual rainfall was 1,236.48 mm (48.68 inches). Rainfall was highest in July with 232.16 mm (9.14 inches) and lowest in February with 8.89 mm (0.35 inches). According to Koppen's Climatic Classification, the study area experiences Cwa type of climate (Subtropical Monsoon Climate).

Depending on the parent material, the underlying rock, climatic condition and natural vegetation, types of soil varies from place to place. Five main types of soil are found in Lashio Township.



Source: Myanmar Survey Department, Yangon

Figure (4) Soils of Lashio Township

They are: Meadow Alluvial Soil, Mountain Red Brown Forest Soil, Red Earth Soil, Mountain Dark Brown Forest Soil and Mountain Red Earth Soil (Figure 4) and most soils are favourable for maize cultivation.

In brief, physical conditions such as relief, climatic conditions and soils are suitable for maize cultivation.

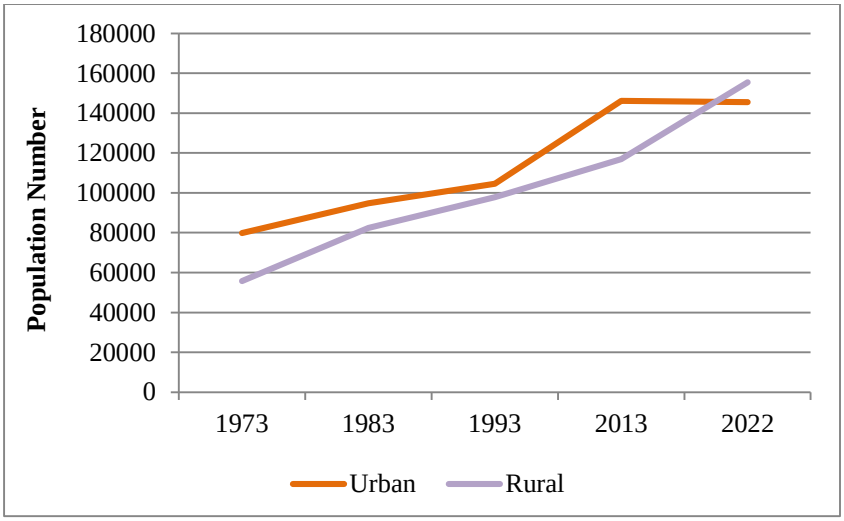
Social Factors

In 1973, the total population of the township was 135,565 persons. Out of the total population, rural population represented 41.08 percent and urban population 58.92 percent. In 2022, total population of the township was 300,966 persons and the number of rural population was 51.66 percent while urban population 48.34 percent. Unlike other places of Myanmar, rural population is lower than urban population. This is partly due to some of the native people migrate to neighbouring area for better job opportunities. Nevertheless, about 70 percent of the township's population depend on agriculture activities for their livelihood. This witnessed the role of primary sector of the study area (Table 1 and Figure 5).

Table (1) Urban and Rural Population of Lashio Township

No	Year	Urban	Percent	Rural	Percent	Total population
1	1973	79,874	58.92	55,691	41.08	135,565
2	1983	94.839	53.50	82,433	46.50	177,272
3	1993	104.546	51.68	97,763	48.32	202,309
4	2013	146.117	55.55	116,900	44.45	263,017
5	2022	145,479	48.34	155,487	51.66	300,966

Source: Immigration and Man Power Department of Lashio Township



Source: Based on Table (1)

Figure (5) Urban and Rural Population of Lashio Township

Economic Factors

Major crops grown in Lashio Township are rice, maize, groundnut and beans etc. Maize is one of the most important crops grown in the study area and one of the important income generating activity. The area under maize cover 47.15 percent of total agricultural land which is the largest among other crops area.

Market is one of the significant determining factors for the development of agriculture sector. In 2017-18, price per viss of maize was between 450 and 600 kyats and increased to between 960 and 1150 kyats in 2021-22. In Lashio Township, majority of maize are sold to foreign market especially China. Depending on market demand and the quality of maize, price fluctuates from time to time. The instability of price is, to some extent, affects maize growers of Lashio Township.

Maize Cultivation

In 2012-13, the area under maize was 18,230.27 hectares (45,047 acres) and production was 80,529.38 tons (3,170,448 baskets). 2016-17 onward, maize cultivated area has appreciably increased due to high market demand. In 2021-22, maize cultivated area further increased to 27,252.93 hectares (67,342 acres) and production was 120,918.50 tons (4,760,571 baskets) (Table 2 and Figure 6).

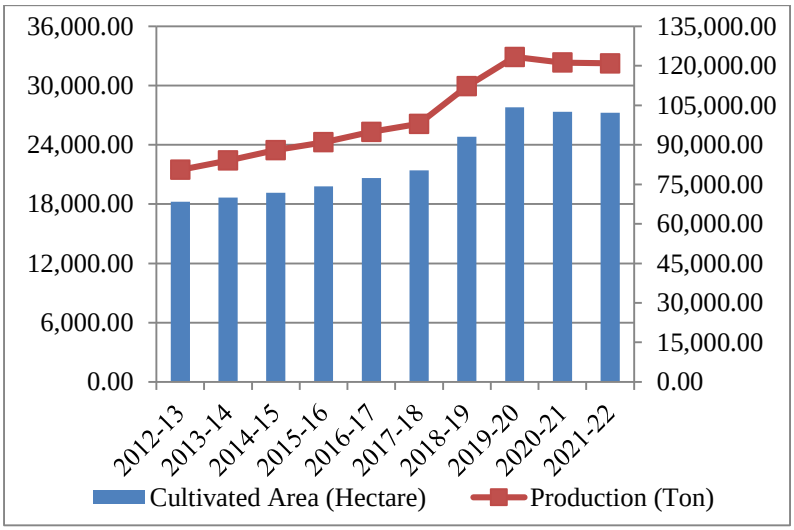
In 2021-22 maize cultivation was practiced in the whole township but the area under maize varies from place to place. In 2021-2022, the total area under maize cultivation was 27,252.93 hectares (67,342 acres) representing 47.15 percent of the total agricultural land. In 2021, the largest maize area above 1,000 hectares (2,471 acres) were found in five village tracts: Man Pwe (Lon), Sai In, Nam Paung, Naung Phaw and Nam Tune located in the southwestern of the township except Nam Tune Village Tract. These village tracts occupied largest maize cultivated area due to lower part of the township. The second largest maize cultivated area between 750 hectares (1,853.25 acres) -1,000 hectares (2,471 acres) were found in four village tracts and they were located in the southwestern part of the township. Maize cultivated area less than 250 hectares (617.75 acres) were found in 37 village tracts and most of these village tracts

lie in the middle and eastern part of the study area (Figure 7). Due to located in the higher part of the township, these village tracts possess small cultivated area.

Table (2) Change in Maize Cultivated Area and Production of Lashio Township

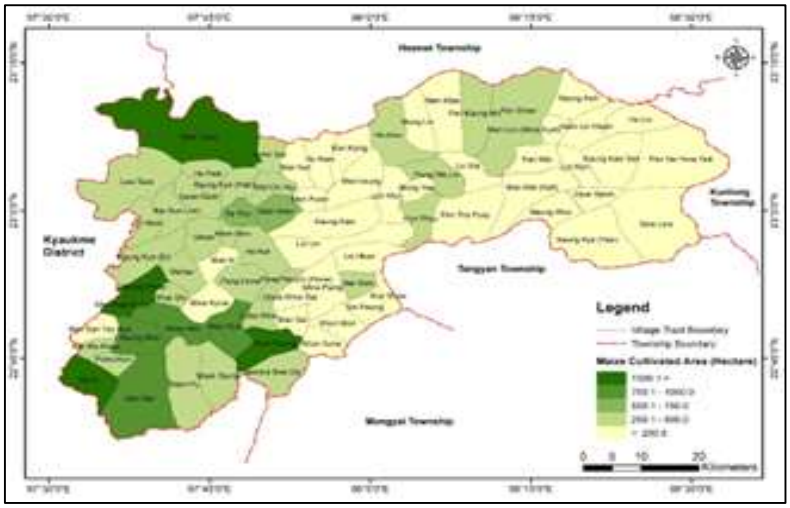
Year	Cultivated Area (Hectare)	Production (Ton)
2012-13	18,230.27	80,529.38
2013-14	18,667.75	84,049.54
2014-15	19,146.90	87,995.40
2015-16	19,799.27	90,943.66
2016-17	20,649.94	94,924.52
2017-18	21,418.86	97,959.75
2018-19	24,808.17	112,206.43
2019-20	27,804.13	123,384.18
2020-21	27,350.06	121,222.21
2021-22	27,252.93	120,918.50

Source: Department of Agriculture Land Management and Statistics, Lashio Township



Source: Based on Data From Department of Agriculture and Land Management Statistics, Lashio Township

Figure (6) Change in Maize Cultivated Area and Production, Lashio Township



Source: Based on Data from Department of Agriculture and Land Management Statistics, Lashio Township

Figure (7) Spatial Variation of Maize Cultivation by Village Tracts

Cost Benefit Analysis

Firstly, land preparation was made in the first week or second week of May to cultivate maize and it costs 50,000 kyats for per acre of land for once. After land preparation, fertilizer was applied to maize field and then maize seed were dropped at the same time. During seed dropping period, five labourers are required for per acre of land and labourer charges is 50,000 kyats. Price per bag of maize seed is 85,000 kyats and it is enough for per acre of land. At that time, only one kind of fertilizer was used. After three weeks later, weeding is made again and fertilizer is applied second time. At that time, the cultivaters mixed two kinds of fertilizer, Kabarlone and Pale (urea) used in maize cultivation. Price per bag (50 Kg) of pale fertilizer is about 110,000 Kyats.

After four months of cultivation, harvesting is made. Depending on the cultivators and cultivation season, harvesting time varies. Harvesting season is between the end of October and December and plucking maize is mostly done by female workers. Threshing is carried out by machine and it costs 90,000 kyats for per acre of land. Majority of farmers grow 808 maize variety due to better appearance. Yield per acre is 35 baskets (dry maize seed). Weigh per bag of maize seed is 33 viss. In 2022, price per viss of maize seed was about 1,000 Kyats.

Therefore, the cultivaters earned 1,155,000 kyats. Total cost for maize per acre of land was 610,000 kyats. Benefit for cultivators was 545,000 kyats per acre of maize land. Depending on the location, maize varieties, farmer's attitude, input use and capital investment, not only the production but also the expenditure and benefit differ from one place to another. Cost benefit analysis was calculated based on the price of 2022.

Table (3) SWOT analysis of Maize Cultivation in Lashio Township

Strengths	**Weaknesses**
- Favourable relief and climate - Less risk and durable after per month of plantation - Earn income within a short period - Can store for along time - High market demand	- Rely on foreign market - High investment - Market instability - Lack of advance technology - Lack of innovation
Opportunities	**Threats**
- Creation of MSME if the government can support advance technology - Job opportunities for native people - Gaining more profit and can stay at home	- Seed controlled by foreign countries especially China - Soil degradation caused by continuous cultivation and chemical fertilizer uses

Source: Field Observation, 2022

Conclusion

In general, physical factors especially relief, social factors and economic factors are the supporting factors for the growth of maize cultivation. As Lashio Township lie on mountainous area and possesses rolling topography that is free from water logged, the area is suitable for maize cultivation. Regarding with social factors, the township located in rural area, majority of the local people rely on agricultural activities.

In respect to economic factors, maize cultivators earn profit in a short period. The cultivaters sometimes encountered loses, unfortunately when demand is low and price fluctuation created by traders and entreprenures. Spatial distribution of maize cultivated area strongly related on geographical factors.

To boost maize cultivation as well as production, sufficient agricultural loans should be disbursed to farmers to buy necessary inputs, implements and machineries, etc. Besides, local farmers should be trained and educated to use improved and suitable farming method and suitable amount of inputs as well as high yield varieties.

In the future, maize requirements will be increased due to constantly increasing population. Increased use of chemical fertilizer for higher production will cause environmental problems especially soil, air and water pollution. Therefore, it is needed to do further agricultural researches on soil suitability, price and demand, risks on maize cultivation, etc for the purpose of reducing pace of environmental pollution.

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