

Local Benefit of Mawlamyine Industrial Zone in Mawlamyine City, Mon State

Khine Khine Shein¹, Khin Hninn Phyu², Zin Mar Tun³

Abstract

Manufacturing industry has become a vital part of the global economy and every nation is now trying to become an industrialized one and Myanmar is also trying to get it. Many countries have reached higher development levels in all dimensions- economic, social and environmental for the benefit of their people. Clearly, future strategies for poverty reduction need to be economically empowered. Being developed in some basic structures of physical and human resources, to find out the best way to construct a modern developed nation with advanced technologies is one of the most important goals for Myanmar. To fulfill the mentioned requirements, government has established new industrial zones throughout the country. Among them, some have the locational advantages to develop their industrial sector in the country. In this research paper a systematic and scientific research work is based on the frames of components of the manufacturing: such as raw materials, capital, power, market, government policy, labour forces and transportation. The discussion will be focused on the location characteristics of Mawlamyine Industrial Zone and nearby townships. The locational advantage would be expected results of the research as the locational advantage can be the intellectual framework around which industry and also sectors of society can reach consensus on how to improve living standards and the environment. Moreover, the level of sustainability of the industrial sector might be foreseen according to the bases and its location.

Keywords- Local benefit, industrial zone, ecology, society, economy, environment, pollution, Mawlamyine.

Introduction

Industrial zone is an area that lies within sub-urban area or separated from the Central Business District. One of the great changes occurred on global scale is the Industrial Revolution. The revolution in industrial technology created an unprecedented expansion in productivity, resulting in substantially higher standards of living". (James M. Rubenstein, 2003). "Since the industrial revolution, manufacturing has become a vital part of the U.S and world economies. The evolution of large manufacturing systems was made possible by harnessing the inanimate energy of water powered and increasing use of coal in the 18th and 19th centuries and petroleum and nuclear power in the 20th Century" (The National Geographic Desk Referenced, 1999). However, it has been pronounced that the industrial development including information technology is an essential element for all round development of the every nation of the world in the beginning of 21st century. As an alternative perspective, trace on our country shows that it has different cultural background unlike the other nations of the world. In accordance with civilization, urbanization, and general development have also different characters. With more and more advance in higher technologies, it is generally accepted that one of the major challenges of 21st Century is to be developed industrially or technologically. Then it became an essential task for several governments of all developing countries including Myanmar. When Myanmar changed its economic system from planned economy to market oriented economy in 1988, many efforts have been made to obtain its industrial development. The private sector industrial development was reinforced in many aspects by enacting laws and regulations. In Myanmar, the most distinguished effort in

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industrial development is the establishment of the Industrial Zones since 1989. At the present time, many scholars in various academic fields are conducting the research works on industrial development. As the additional fulfillment of the above requirements especially from a geographical perspective, the author decide to explore what and how “Location of Mawlamyine Industrial Zone” has been supportive for the advantage of economy of Mawlamyine as well as Myanmar.

Background of Study

The study area is located in Kha-yone-ka-roke village, Nyaungbinsaik Ward, Mawlamyine City, Mon State. It is 1½ miles away from the Mawlamyine, the capital of Mon State. It lies between 16° 28' 29" N and 16° 29' 24" North latitudes and between 97° 40' 23" E and 97° 40' 45" East longitudes. It is an area of 162.35 acres. It is nearly rectangular in shape. The location of the industrial zone is accessible by high way and water transportation. It is a major factor governing the location of the industrial zone. It is the most advantageous location.

Research Problem

Based on the above background following problems will be observed:

- What are the local benefits of Mawlamyine Industrial Zone?
- Are there any changes in social, economy, environment of industrial zone according to its present location?
- Any particular aspect would be necessary for relocating/ allocating the Industrial Zone in future?

Aims and Objectives

The main aim of this research is to make an observation and an assessment on the location of Mawlamyine Industrial Zone.

The objectives are:

- to observe the physical conditions of past and present,
- to provide the environmental changes that have effect on the surrounding area,
- to trace the initial development of industry in this study area,
- to classify the types of industry (using manufacturing criteria),
- to explain the better opportunities gained from special function, and
- to propose some suggestions for future development of industrial complex in this study area.

Data and Methodology

Two types of data are used in this research paper, primary and secondary data. The primary data are collected from field observations, using questionnaires, interviews, and open-talks, taking a random sampling method. Other secondary data relevant are collected from various department offices, organizations, reports, research paper, some media and the similar sources. Location map based on topographic maps of scale (1:63360), UTM map (1:50000), 2007 and Google Earth images. Necessary figures are drawn by relevant graphical and statistical methods.

Results and Findings

Geographical Background of Mawlamyine Industrial Zone

Mawlamyine, the capital of Mon State, is an important sea-port of Myanmar. It is located at the mouth of Thanlwin River as well as the junction of Thanlwin, Attaran, Gyaing, Dayebauk and Mawlamyine Rivers. It lies between $16^{\circ} 24' 00''$ and $16^{\circ} 31' 30''$ North Latitudes and between $97^{\circ} 36' 30''$ and $97^{\circ} 41' 30''$ East Longitudes.

Mawlamyine Industrial Zone is located in the Kha-yone-ka-roke village, Nyaungbinsaik Ward, Mawlamyine City, Mon State. It is $1\frac{1}{2}$ miles away from the Mawlamyine urban area, the capital of Mon State. It lies between $16^{\circ} 28' 29''$ N and $16^{\circ} 29' 24''$ North latitudes and $97^{\circ} 40' 23''$ E and $97^{\circ} 40' 45''$ East longitudes. It is an area of 162.35 acres (0.25 sq miles). The maximum length from north to south is 5000 feet and the maximum width from east to west is 1500 feet. It is nearly rectangular in shape. It is bounded by Kyonwan Village on the east, Nyaungbinsaik Ward on the west, Barbugone Village on the north and Attaran River on the south. On the west and south, the Attaran River forms for the most part as a natural boundary. (Fig. 1)

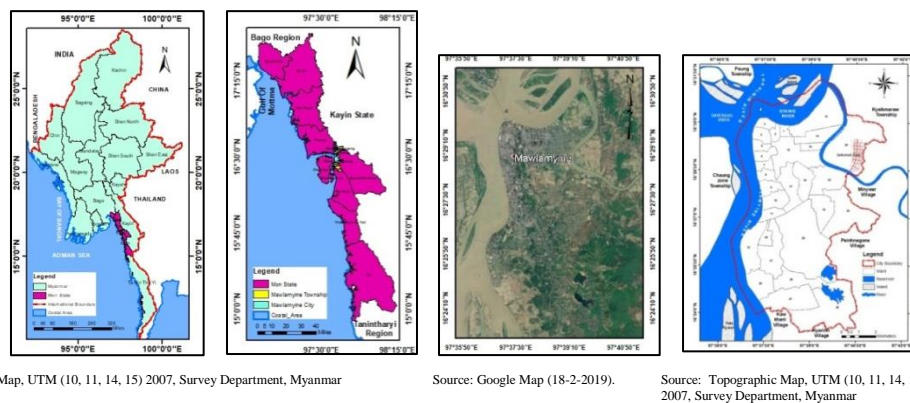


Figure 1. (a) The Location of Mon State in Myanmar (b) Location of Mawlamyine in Mon State (c) Location of Mawlamyine Industrial Zone

Mawlamyine Industrial Zone is located on an almost flat alluvial low lying plain which is near the Attaran River. During heavy rains and when it coincides with high tide, low lying parts along the river are flooded. The overall situation of the drainage condition of the Industrial Zone is good enough because stagnation is not common even during the peak rainy season.

Climate is one of many external drivers which have the potential to significantly influence on some types of industries. However, a changing climate is the main driver to affect the availability of raw water resources for industries. In summer months of March, April and May, there is mostly insufficient water in Mawlamyine Industrial Zone.

At present, big trees are not found naturally. By summing up the situation above, it can be said that all of the physical aspects can take an effective contribution to the establishment of the Industrial Zone directly or indirectly.

Social factors are also important factors, which must be taken into consideration, when studying the development of current situation in the Industrial Zone. The population and population characteristics of Mawlamyine Industrial Zone include total population and its growth, population distribution and density.

The population of Mawlamyine Industrial Zone has increased. Its population has increased due to good communication, good situation, increased number of industries, in

accordance with development of the economy. The residents of the Industrial Zone in Mawlamyine from 2002 to 2022 are shown in Table 2. Myanmar changed over to open-market economy in last three decades. Therefore, many people involved in the trade from far and near came to Industrial Zone and some settled for their betterment. As a consequence, population increase was remarkably high. Thus, the population increase of the Industrial Zone is due not only to the natural cause alone but also to the immigration of personal and families. Accordingly, land use pattern of the Municipality also changed. In 2022, the population of the Industrial Zone was 8912. The demand for labour for the various industries was one of the reasons for the increase of population within a short period. (Fig. 2)

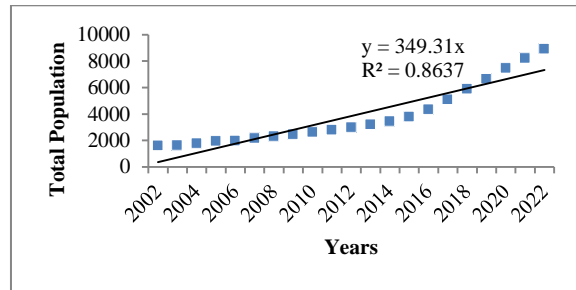


Figure 2. Trend Line of Population Growth in Mawlamyine Industrial Zone (2002-2022)

The population distribution in the Industrial Zone is influenced by economic factors other than physical geographic factors. The density of population heavily depends on good economic condition and development of transportation activities. Industrial Zone which is located in the centre of the transportation network is the cause to be more populated. Within the study area, the density of population is 55 persons per acre in 2022.

Labour forces are residing near the villages and in the Mawlamyine Industrial Zone (Table 2.)

Table 2. Labour Forces, Dependency Ratio of Mawlamyine Industrial Zone (2017)

Sr No.		Number	Percentage
1.	Total Population	8912	100 %
2.	Work Age (between 18 and 60 years)	6810	76.14 %
3.	Dependents (under 18 and over 60 years)	2102	23.59 %

Source: Head Office of Mawlamyine Industrial Zone.

The following facts and situations should be considered as the fundamental for potential development of manufacturing industry.

- (a) Mawlamyine has existed as essential node for population flow (i.e migration) of Mon State
- (b) Mawlamyine is the hub for human resources, and
- (c) Mawlamyine possesses the favorable physical conditions for different types of agricultural product and the associated economy and wellbeings that are basic requirements for potential development of human resource.

Moreover, some important aspects should also be taken into account as follows:

- (a) A hospital or a dispensary is needed for accidents or health care of the workers. So, a dispensary for social security is opened in the Industrial Zone. But it is not yet served properly by the health careers.

Establishment and Development of Mawlamyine Industrial Zone

In the era (1988-2010), the State Peace and Development Council had strived for the development of industry throughout the country as much as possible. In establishing a modern developed nation, State Peace and Development Council had laid down a range of political, economic and social objectives. Out of the four economic objectives, one was to build the country as a modern industrialized nation. The result of this was the emergence of industrial zones or industrial estates across the country.

Many years ago the old industries of Mawlamyine District were located throughout the urban area. After 1988, the government had got a plan to establish an industrial zone in Mon State. Accordingly, a site which has an area of (254.30) acres, No (11/12) in Kyauktan Village tract, southern part of Mawlamyine, was chosen for the new industrial zone in 1999. (Fig. 3)

Nyaungbinsaik Ward, Kha-yone-ka-roke village was chosen as a new place for industrial zone instead of Kyauktan village due to the encroachment of the tide and difficulty of transportation. At present Mawlamyine Industrial Zone has been established on an area of (162.35) acres, No (94/95/96) Kha-yone-ka-roke village in Nyaungbinsaik Ward in Mawlamyine City. 292 plots of 100 × 100 square feet and 240 plots of 80 × 60 square feet have cleared since 4th February, 1999. Moreover, an area of (830.66) acres is going to be projected soon. Therefore, land utilization and land cover have been changes and environmental charges occurred. On 27th July 2008, 47- heavy industries, 155- medium and 19 cottage industries were registered. Altogether 221 private industries have been firstly founded in the Industrial Zone (Fig. 4).

In relation to Mawlamyine Industrial Zone, since its inception, the Zone experienced gradual expansion both in terms of the areal extent of industrial land and types and numbers of industry. In future, the number of private industries may increase if they would get the supports from the government and other investments.

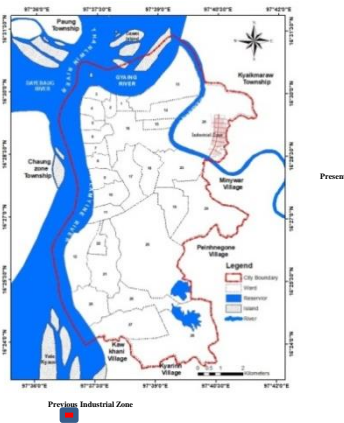


Figure 3. Previous and Present Location of Mawlamyine Industrial Zone
Source: Based on Topographic

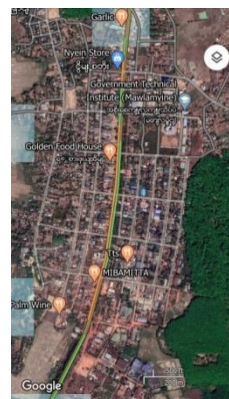


Figure 4. Location of Mawlamyine Industrial Zone
Source: Google Map (29-5-2020).

Analysis on the Locational Advantage based on the Fundamentals of Manufacturing Industries in Mawlamyine Industrial Zone

The present study of an analysis on locational advantage of Mawlamyine Industrial Zone falls into the category of the streets study, as it examines only the Industrial Zone within the Mawlamyine, covering an area of (162.35 acres, 2019), constituting almost one-fourth of

the urban area, being 23 percent of Mawlamyine. Mawlamyine Industrial Zone is located in Nyaungbinseik Ward, near the Attaran River.

In analyzing the various reasons, why manufacturing is located at a particular place or why it has remained at that location, a combination of favorable factors for the emergence and existence of manufacturing which comes to appear. A total of six primary components come to the fore for any successful operation of manufacturing, namely, raw materials, power and fuel, market, labour, transportation and capital. There are in fact the basic requirements for the development of manufacturing.

Capital

Local capital plays a key role in the development of manufacturing in the country. This reason is also true to Mawlamyine Industrial Zone. Capital is principally very important to implement the projected industrial development. The total capital invested in Mawlamyine Industrial Zone, as of 8 October 2019, was about 2134.35 million kyats (about 1.61 million US\$). During the above mention fiscal year, heavy industries of Mawlamyine Industrial Zone received from Directorate of Industrial Supervision and Inspection, Mon State to Kyats 1350 million (US \$ 1.02 million), medium industries got Kyats 734.22 million (US \$ 0.56 million) and Kyats 50.13 million (US \$ 0.038 million) had gone to the small industries.

Raw Materials

For the private, various industries, raw materials are different due to various kinds of industries. Although some raw materials are imported from foreign countries, most of them are available in our country. Some raw materials are even available in Mon State. It is found that Mawlamyine Industrial Zone got its necessary raw materials from a variety of sources, some locally, some regionally and many more from neighbouring and foreign countries.

Power

Power is found to be one of the major factors that determine the location of industry. The Mawlamyine Industrial Zone has received its electrical power from Kyaikmaraw Feeder, where the electricity is relayed from Thaton natural gas station. At present, electricity distribution to Mawlamyine Industrial Zone is about 11/0.4 KV 500kva contributed by Shwemyotaw Street, 11/0.4 kv Transformers, 11kv Ngantay-Kyaikmaraw Feeder, 11 kv industrial zone power line, 400v power lines and future constructed to the power lines and transformers in Mawlamyine Industrial Zone. Most manufacturing industries in the Zone have their own private transformers with which they could use electricity to operate their industries. (Fig. 5)

Market

Every industry, whether large or medium or small or cottage ones, they must have a market to sell their goods. Without a market, no manufacturing can survive at all. Thus, market is essential to be succeed for any manufacturing, whatever to its product and whatever its size of production. Mawlamyine Industrial Zone is located in the eastern part of the city, side by side residential quarters. In the case of waterways, both the major rivers of Mon State, the Thanlwin and Attaran serve to this end. As it is a big market, all kinds of products from all manufacturing types of Mawlamyine Industrial Zone can be distributed or sold throughout the State. Concerning with the national market, there can be much to say, as it mostly depends on the quality of produced products. The products from the Industrial Zone are distributed in Mon State and all the other parts of the country, except, Ever Flow River rubber factory (E.F.R) which processed raw materials from rubber for export to foreign countries.

Government Policy

Government policy plays a key role in any development plan in a country. Any development, be it political, social or economic, can be brought about by an individual, a community or a society. Here, administrative power can be viewed in three levels: individual, communal and societal. In any country, each and every society is represented by its administrative government. Therefore, the policy must, if not perfect, be proper and right. Now, the transformation process is planned into developed Mawlamyine Industrial Zone. It is a reflection of government policy change, that occurred under the rule of the State Peace and Development Council Government. When the government implemented its industrialization policy, it planned to build industrial zones at major urban areas of townships. Only at that time, Mawlamyine got a chance to establish industrial ward, not industrial zone.

Transportation

Transportation greatly influences manufacturing in every aspect of it, such as in terms of location, high and good quality productivity, raw material availability, sending/ exporting market, development and so on. The availability of transportation facilities with its type of transportation is a prime factor in setting a location for an industry. With regard to transportation, Mawlamyine Industrial Zone can be said that it has a good accessibility to all parts in its Mon State, and to every corner in the country for Mawlamyine has all means of transportation, except airway transportation. First of all, by the location on the east side of Attaran River, or eastern side of Mawlamyine urban area, east of Thanlwin River, via two river spanning bridges; the Thanlwin Bridge (motorways and railway) and Attaran Bridge (motorways) are accessible. Communication and transportation to the regions of the country, east of Thanlwin also is good for Mawlamyine, because all motorways and railways leading to the northern and southern parts of the country pass through it. Mawlamyine Industrial Zone is situated on Mawlamyine- Thaton, Mawlamyine- Hpa-an, Mawlamyine- Yangon highway roads. Moreover, Yangon-Mawlamyine-Ye-Dawei railway lines is only one and half miles away from Mawlamyine. It is observed that Mawlamyine Industrial Zone is rich in natural resources and economic factors which forms the requisites for the sustainability development of the Industrial Zone.

Types of Industries and Five Years Running Means for the Private Industries from 2002-03 to 2018-2019

Types of Industries

There are eleven kinds of industry in Mawlamyine Industrial Zone. They are food and beverage industry, clothing and apparel making industry, construction industry, consumer-goods manufacturing industry, household-goods manufacturing industry, industrial raw material manufacturing industry, metal and petroleum processing industry, agricultural equipment manufacturing industry, electrical appliances manufacturing industry, transport vehicles manufacturing industry and miscellaneous. In 2001-02, Industrial Zone was under construction, and the industries were not established there. In the year 2019-20, the number of private industries increased to 267 marking an increase of 140- private industries.

In 2002-03 there were 16 heavy industries and the number increased to 37 in 2019-20. Medium industries increased from 40 in 2002-03 to 140 in 2019-20. It is also observed that small or cottage industries decreased from 71 in 2002-03 to 37 in 2019-20. Some owners of the cottage industry have to lease the land and to build the building and some have to stop operating for lack of capital. Some cottage industries are promoted to medium scale industries and some to heavy scale industries by acquiring land from the government.

Future Prospects for Job Opportunities with New Economic Zone in Mawlamyine

The East-west Economic Corridor is an economic development program initiated in order to promote development and integration of 5 Southeast Asian countries, namely Myanmar, Thailand, Laos, Cambodia and Vietnam. This corridor became operational on December 12, 2006. The economic corridor is created based on a road of 1,450 km with the west end at port city of Mawlamyine (Myanmar), crossing Kayin State, and the Vietnamese provinces of Da Nang City as the east end. From Myanmar and Thailand, Trilateral Highway is being upgraded, with most part already completed and remaining upgrade will be completed by 2020.⁴

The Myanmar government planned to develop a new special economic zone in Mon State as in the eastern part of the country to create job opportunities and to encourage foreign investments.⁵ The government plans to develop a seaport and industrial park on the coast of Mon State on the Indian Ocean. A planned highway linking Thailand-Vietnam will pass through Mon State.⁶ This new economic zone shall be the biggest and better connected than any other economic zones in Myanmar.

New economic zone will be constructed in Mawlamyine, Mon State which was jointly developed with Japan. In 2021, Myanmar State Counselor Aung San Suu Kyi believed a V-shaped economic recovery was possible in Myanmar.

If the plan of the government comes true, Mawlamyine, the capital of Mon State, will be economically, socially the environmentally benefitted from other neighbouring countries and investors and the economic sectors. If Mawlamyine develops, it will have the effects on the development of its hinterland Township: Chaungzon, Mudon, Thanbyuzayat, Kyaikmayaw, Ye, Thaton, Bilin and Kyaikhto and which will also initiate to develop other sectors like: tourism indirectly.

Analysis on the Locational Advantage of Problems, Challenges and Effect of Mawlamyine Industrial Zone

Distribution of Electric Grid Line Systems

Since the dawn of Industrial Revolution, the sustainability of industry is largely determined by the availability of power, be it water, wind and fuel. No industry can be developed full scale without sufficient supply of power. Since the establishment of the Industrial Zone, electricity supply is a major problem for the Zone. At this stage, many of practical problems arose with many delays and drawbacks, which led to extra cost for industrialists. For these reasons, industrialists were unable to connect the electricity to the entire zone, that becomes a big obstacle for the sustainability of Mawlamyine Industrial Zone. With the demand of the electricity for the industries, a sub-power station and grid line connections are in need. So the entrepreneurs of the industries requested to power station carry out the following plans;

1. To build a 33/11 KV, 5 MVA sub-power station,
2. To build 1700, 11 KV electric line,
3. To build 11/0.4 KV, 500 KVA and
4. To build more (10/70) 400/230 V electric lines.

If these stations will be constructed, the electricity can be distributed sufficiently.

⁴ East-West Eco..... en.m.wikipedia.org (6-11-2020)

⁵ <https://asia.nikkei.com/Economy/suu-kyi-courts-Japan-Investment-with-new-economic-zone>. (5-11-2020)

⁶ Investment and Foreign Economic Relations Minister Thaug Tun said:

Water Resources and Water Supply Systems

Water is the life blood of all living things and so does to the survival of everything, including human actions and activities. Without water, nothing can happen and exist. Thus the availability of water determines the development of human actions and activities, be it business or industry. Mawlamyine Township Development Committee and Department of Water Resource dug five tube wells distribute water in the Industrial Zone. However, the distribution of water from those wells become less and insufficient during summer. So, the industries faced difficulties because of the shortage of water supply. So, water is pumped with a machine from the Attaran River. Some industries dug their own surface well or tube well. There is no pipe line service system yet. Thus, the availability of water for the supply to the industrial zone should be enough and if there exists any inefficient in the water supply, it will be due to improper and inadequate distribution system, not by the poor availability of water from water source.

Waste Disposal System

The Mawlamyine Industrial Zone is built near the Attaran River, which supplies water for the plants. In addition, about half of the residents from the urban and nearby villages used the river water through the Attaran River pumping system. There are two ways to dispose of wastewater from factories. Some plants have not treated and directly disposed wastewater, which can damage the groundwater system through time, and some plants dispose of the wastewater after treatment. Solid waste can be used as paving and composting from miscellaneous industry. The liquids are discharged through sewers near the plant. These ditches can also indirectly damage groundwater. Wastewater should be treated and disposed of, but over time it can indirectly damage the river ecosystem. There are different kinds of fish in the river, algae, weeds and soil are destroyed, so it can in-turn impact on the livelihoods of fishermen. These studies have been suspended due to the incidence of covid19. If further study is required, the wastewater must be analyzed in detailed. The results could not be concluded whether there is ecosystem damage or not.

Findings

By observing locational advantage of Mawlamyine Industrial Zone, the following problems are exemplified.

- The main requirement of the heavy industries is fuel (for example, Ever Flow River Manufacturing Co. Ltd)
- Next, every industry needs sufficient water (for example, a factory which manufactures rubber-based products)
- The third problem is insufficient raw materials.
- Fourth, it is observed that safety of the workers in the work place should be improved.
- By observing waste disposal systems, the researcher found that some industries abandoned waste water directly into the gully/ ditches near the factories. And, the others abandoned it into the Attaran River after being purified.

On the other-hand, local people from near-by villages and Mawlamyine use water from the Attaran River for drinking and various domestic purposes. So, it is found that health and environmental problems will arise if the waste water is not well managed properly.

By studying this research paper and based on the responses from the open talks, the problems encountered in various industries could be solved as follows:

- The production of the industries would be improved if the government could supply the required fuel/ energy to the registered industries with reasonable prices.

- Second, the problem of the distribution of water could be solved if the Industrial Zone Water Supply Committee and Department of Water Resource could manage to distribute water to the whole Zone.
- Third, the problem of the demand of electricity for the industries could be solved by installing transformers and by setting up the new cables.
- Fourth, (for providing better health care for the workers and accidents in the work place), a dispensary or public health care unit should be promoted.
- Every factory should be aware of the security of the Zone and the hazards of careless fire.
- Sufficient raw materials are needed for the production of semi-finished and finished products. So, it will be convenient if the respective departments could supply the required raw materials. Then, the production would be increased.
- The entrepreneur who really wants to invest or to give loan in the Industrial Zone is needed. Then the Mawlamyine industrial zone will be improved with the development of the factories.

Consideration

- Problem will be created by waste water disposed from some factories.
- It may have serious consequences for the health of local people, plant, soil, and animal life in Attaran River and on the banks.
- Systematic conservation practices and policy.
- Regarding economic sustainability of the Industrial Zone, the policy, law enforcement, international cooperation and encouragement by the concerned authorities are essential.
- For the environmental sustainability, the impacts of the expansion/ development of the Industrial Zone has to be critically taken into account as a priority.
- The job opportunities will be fulfilled the social sustainability if the East-West Economic Corridor is implemented.

Conclusion

The Industrial Zone Overseer Committee has instructed industrialists to produce their paddy, rice and other products from Mon State. Production of rubber and garden products; to become sustainable factories in the future; we are working to increase the productivity of industries that support agriculture. There are 267 factories currently operating in Mawlamyine Industrial Zone with 1,466 workers, so the relevant departments should take into account the needs of business owners and workers. The availability of capital to entrepreneurs is a big obstacle to promote the industry or to increase the productivity or to upgrade their manufacturing systems. Raw materials that come from abroad should be available enough, as long as the country is on good term with its neighbouring countries and other far away countries alike. Insufficient electricity is one of major reasons that cause slow industrial development in Mawlamyine Industrial Zone. Market as the determinant factor of manufacturing, is good in terms of local, regional and national level, for Mawlamyine Industrial Zone. Now, transformation process from industrial ward to industrial zone is underway. So, the products and raw materials can be distributed by road, by rail and by water way. In particular, other industrial zones, including the Mawlamyine Industrial Zone, have developed sustainable industries with an emphasis on environmental protection. So, Mawlamyine area will be developed in social, economy and political consideration.

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References

Anderson, H., Beiswenger, E. and Purdom, W., (1987, 1983, 1980). *Environmental Science*, United States of America.

Eurocham Myanmar, *European Chamber of Commerce in Myanmar*, Yangon, (October 2018).

Fellows, K. (1975). *Quantitative Geography*, John wiley & Sons Ltd, London New York, Sydney Toronto.

Khine Khine Shein, Ma (1999). *A Geographical Analysis on Water Supply and Distribution Systems in Mawlamyine Town*, Unpublished Research, Department of Geography, Mawlamyine University.

Khine Khine Shein, Ma (2001). *Types of Industries and Waste Disposal System in Mawlamyine Industrial Zone*, Unpublished Research, Department of Geography, Mawlamyine University.

Maung Maung Aye, Prof (2002). *Research Methodology in Geographic Science*, Department of Geography, The Dagon University.

ကျမ်းကိုးစာရင်း

၁။ ခရိုင်အေးချမ်းသာယာရေးနှင့် ဖွံ့ဖြိုးရေးကောင်စီ (၁၉.၁၀.၂၀၀၄) (၂၇.၇.၂၀၀၅) (၁၉.၁၁.၂၀၀၈) (၁၃.၈.၂၀၀၉) (၁၅.၁၀.၂၀၁၀) (၁၈.၁၁.၂၀၁၆) (၂၃.၈.၂၀၁၇)။ မော်လမြိုင်စက်မှုဇုန် တည်ဆောက်ရေး လုပ်ငန်းဆောင်ရွက်မှု အခြေအနေတင်ပြချက် / မော်လမြိုင်ခရိုင်၊ မော်လမြိုင်မြို့။

၂။ ခရိုင်ရာဘာစက်ရုံ (၂၀၀၀)။ ကုမ္ပဏီနောက်ခံသမိုင်းနှင့် လက်ရှိလုပ်ငန်းများ ဆောင်ရွက်မှု အခြေအနေ အစီရင်ခံစာ၊ မော်လမြိုင်စက်မှုဇုန်၊ မွန်ပြည်နယ်။

၃။ Lwin and Swam 4, Trading Co., Ltd (2000) ကုမ္ပဏီနောက်ခံသမိုင်းနှင့် လက်ရှိ လုပ်ငန်းများ ဆောင်ရွက်မှု အခြေအနေအစီရင်ခံစာ၊ မော်လမြိုင်စက်မှုဇုန်၊ မွန်ပြည်နယ်။

၄။ ကျောက်ဆည်ခရိုင်စက်မှုလုပ်ငန်း (၂၀၀၅)။ မန္တလေးတိုင်း၊ ကျောက်ဆည်ခရိုင် အတွင်းရှိ စက်မှုလုပ်ငန်းများကို ပထဝီဝင် ရှုခေါင်းမှ စိစစ်လေ့လာခြင်း၊ ဆရာ/ဆရာမ များ ပထဝီဝင်ဌာန၊ ကျောက်ဆည်တက္ကသိုလ်။