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A STUDY ON ENVIRONMENTAL KNOWLEDGE, AWARENESS AND PRACTICES OF HOUSEHOLDS

(Case Study in Hmawbi Township)

KO KO HLAING

EMPA – 29 (17th Batch)

MARCH, 2022

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A STUDY ON ENVIRONMENTAL KNOWLEDGE, AWARENESS AND PRACTICES OF HOUSEHOLDS
(Case Study in Hmawbi Township)

A thesis submitted as a partial fulfillment towards the requirements for the Degree of Master of Public Administration (MPA)

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This is to certify that this thesis titled "**A Study on Environmental Knowledge, Awareness and Practices of Households (Case Study in Hmawbi Township)"** submitted in partial fulfillment towards the requirements for the degree of Master of Public Administration (MPA) has been accepted by the Board of Examiners.

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ABSTRCT

The objectives of study are to identify the environmental problems of Hmawbi Township, Yangon Region and to investigate the environmental knowledge, awareness and practices among people in urban area of Hmawbi Township. The study is based on primary data and secondary data. Participants were asked about their involvement in improving the flow of water in the canals. Hazardous waste which are thrown by most households are eventually land-filled, dumped directly on the ground, or water. Disposing hazardous waste by these ways threatens environmental quality. It is found that environmental degradation, pollution, climate change, noise from traffic or neighbors, congestion, shortage of basic amenities, health problems etc., are some environmental problems in urban areas. The urban environmental problems are harmful effects of mankind on the biophysical environment. Accordingly, government need to create environmental management in both urban and rural areas to disseminate environmental knowledge and must encourage by giving awards according to their performance.

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LIST OF ABBREVIATIONS

ADB	Asia Development Bank
ASEAN	Association of Southeast Asia Nations
CCET	Centre Collaborating with UNEP on Environmental Technologies
CEIC	Census and Economic Information Center
CSOs	Civil Society Organizations
EAS	East Asia Summit
ECL	Environmental Conservation Law
ECR	Environmental Conservation Rules
EIA	Environmental Impact Assessment
EPI	Environment Performance Index
GAD	General Administrative Department
GBD	Global Burden of Disease
INGO	International Non-Governmental Organization
JICA	Japan International Cooperation Agency
LUCF	Land Use Change and Forestry
MOEJ	Ministry of Environment Japan
MONREC	Ministry of Natural Resources and Environmental Conservation
NCEA	National Center for Environmental Assessment
NEQG	National Environmental Quality (Emission) Guidelines
NGOs	Non-Governmental Organizations
PCCDs	Pollution Control and Cleansing Departments
SDG	Sustainable Development Goals
SEZ	Special Economic Zones
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WHO	World Health Organization
WRI CAIT	World Resources Institute Climate Analysis Indicators Tool
YCDC	Yangon City Development Committee

CHAPTER I

INTRODUCTION

1.1 Rationale of the Study

The different environmental issues are threatening communities around the world. Urban environmental issues include water supply, energy supply, soil and air pollution, traffic congestion, noise, climate change, deforestation, industrial and household waste, deserts, depletion of ozone and urban areas. In many parts of the world, cities have become a major engine of economic growth. Exploitation without restriction on the urban environment can lead to rapid population growth, poverty, illiteracy and rule of law. It is caused by a lack of knowledge and values among urban dwellers. Emerging ecological inequalities and environmental problems affect not only the urban environment and ecosystems, but also the urban population. In particular, unwanted consequences such as unsustainable waste disposal, poor sanitation and wastewater management, pollution and loss of biodiversity.

Different governments approach at different levels of government have adopted different plans and approaches to mitigate these effects. These approaches include implementing environmental conservation plans; 3Rs (reduction, reuse, reuse) training; Encouraging green transportation includes adhering to rules and regulations and raising awareness and awareness of the environment. Of these approaches, environmental awareness and awareness among households is even more important because it can change people's environmental practices. Households need to be aware of the problems of the environment and their colleagues. The knowledge, awareness and practice are need to work together to address current issues.

Even in urban areas, public awareness of the environment and giving people priority to the attitudes and values of the urban environment is essential for balance in the urban ecosystem. Lack of environmental awareness and knowledge can lead to poor practices and a low level of success toward sustainable urban development.

Myanmar is a developing country that has been hit hard by the aftermath of Cyclone Nargis in recent decades, floods, deforestation, land damage, water pollution, air pollution. Cities face serious environmental challenges, such as landfills and fires. Urban areas face urban challenges due to rapid urban-urban migration and rapid development, especially in urban areas. Governments at the national and local levels try to meet these challenges unexpectedly. The support of Myanmar citizens is still needed to protect the urban environment.

It is an attractive and livable city, especially in the urban area of Yangon Region. Yangon provides the location for half of the industrial capacity of the largest financial and marketing center. It is the largest provider of critical research and development services. However, despite poor preparation for development pressures, Yangon is embarking on a comprehensive land use and development plan for the city. As a result, adverse effects were felt in Yangon and spread to other cities and surrounding areas. Hmawbi Township has been selected as one of Yangon's townships to measure the environmental practices of people across Myanmar.

Cities are the engines of economic prosperity and social development. However, due to the use of non-renewable resources and air pollution, one of the world's most important problems is the rapid urbanization challenges. (Komeily & Srinivasan, 2015). Cities are growing in population and geographical distribution, and are increasing regionally.

Hmawbi Township in Yangon City has been hit by unprecedented population growth and rapid urbanization, many of which have turned into a source of negative environmental impacts, one of the driving forces behind the rapid depletion of natural resources. The four wards in Hmawbi Township are reorganized into former villages based on Pyay Road, so the township structure is not systematic and long village line. This township is weakness in drainage system, wastewater and waste disposal systems. These problems are directly impact on the environmental situation for the people of Hmawbi Township. So that, household in Hmawbi Township have to understand the environmental needs by studying the environmental issues they face on a daily basis. Depending on the needs, you may be able to determine what needs to be done next.

The households in Hmawbi Township participate in the economy as service providers or consumers. Identifying urban environmental challenges, therefore, affects the environment in everyday life, especially from the perspective of groups and households to interactions with the economic system. Therefore, it is necessary to assess the current environmental situation of the people in Hmawbi Township, Yangon Region of Myanmar and to be able to implement effective and widely accepted solutions and policies with regional priorities.

1.2 Objectives of the Study

The objectives of the study are to identify the environmental problems of Hmawbi Township, Yangon Region and to investigate the environmental knowledge, awareness and practices among people in urban area of Hmawbi Township.

1.3 Method of the Study

The method of study is used the descriptive method based on primary data and secondary data. The primary data is obtained from 300 households in Hmawbi Township, Myanmar. Secondary data were collected from published governmental reports and fact from Global Environmental Outlook, World Bank, ADB, ASEAN, JICA, NGO, INGO, YCDC and websites.

1.4 Scope and limitations of the Study

The scope of study is mainly from 300 households in (4) Wards at Hmawbi Township, Yangon Region. The limitations of the study were the total number of family members and the type and type of house and conditions, environmental education, health and education, water and electricity supply. It is difficult to obtain accurate data for a survey that includes waste disposal systems. The survey period is within September and October, 2020 in Hmawbi Township.

1.5 Organizations of the Study

This study is organized with five chapters. Chapter one is the introduction including rationale of the study, objective of the study, method of the study, scope and limitations of the study and organizations of the study. Chapter two presents the literature review on concept of urban growth, causes of urban growth, importance of knowledge, awareness and practices in urban growth and urban environmental quality management. Chapter three includes background of Myanmar environmental development with rules and regulations of environmental management, environmental problems, conservation of urban environmental development and benefit of sustainable urban development. Chapter four is analyzed on the environmental knowledge, awareness and practices in the Hmawbi Township, Myanmar. Chapter five contains with survey findings and suggestion for the study area.

CHAPTER II

LITERATURE REVIEW

This chapter provides the literature review on environmental impacts of urban growth, causes of urban growth, urban growth and environmental problem, importance of environmental knowledge, awareness and practices in urban growth, and urban environmental quality management.

2.1 Environmental Impacts of Urban Growth

For the past 50 years, the developing countries are experiencing unprecedented urban growth due to industrialization and global economic changes (Cohen, 2006). At the beginning of the 20th century, the world's smallest cities had a population of over one million and most of them in industrialized countries. It is the result of industrialization improvement and population growth. Cities face many environmental and social problems. More than 50% of the population lives in poor housing and most do not have access to clean water or sanitation services. Air pollution, overcrowding and traffic jams are widespread problems. In addition, despite the economy growth rapidly, the domestic economy was able to absorb only a fraction of the growing workforce (Bruna, 2000).

Urban development contributes to economic development. Population is a subset of a measure of productivity and income. Such focus patterns and their economic and demographic differences and their relationships are some of the most interesting processes in the urban economy. Rapid urbanization and the important role that cities play in national and global economies have been in the spotlight in recent years. Urban problems, including environmental ones, are worsening and affecting the lives of many, with an estimated 55% of the world's population expected to become urban by 2015 (United Nations 1996).

Urban development depends on education, health, justice, waste disposal, markets, road and cultural heritage protection. These structures are part of separate sector programs, including capacity building programs. Rehabilitation and reconstruction include social infrastructure, especially after a natural disaster or conflict. Most business ventures take place in cities. This is related to state and urban development.

Eaton and Eckstein (1997) considered the potential for competitive urban development, driven by evidence of French and Japanese urban transitions, and considered partly by consolidating reliance on partial urbanization, partly by consolidating part-time human capital in many cities. As a result, economic growth is driven by the size of cities. If equal growth is the result of the interaction between urban scale impacts and blocking costs. These theories have important implications for the size distribution of cities and the urbanization process.

2.2 Causes of Urban Growth

Many countries offer real estate, transportation and meeting the needs of a growing urban population, including energy and other infrastructure, as well as employment and introductory services such as education and healthcare (United Nation, 2018). Integrated policies aim to improve the lives of both urban and rural communities and strengthen linkages between urban and rural areas, enhancing their current economic and social development. It aims to promote social and environmental relations. The main causes of urban development are natural growth and migration. Due to population growth and urbanization, the city is growing naturally.

2.2.1 Lack of Comprehensive Planning

Regional planning is a major cause of urbanization. As a result, cities do not have adequate development plans. In densely populated cities, the authorities may arrange for a screening without consulting the community. Instead of bridging the gap between communities with existing infrastructure. These densely populated low-lying areas often incur new public finances for infrastructure development without integrating local programs or resources. A regional plan can gradually implement the

plans needed to create a cohesive community that anticipates the growth of new territories (Kinner, 2014).

2.2.2 Rapid Population Growth

Rapid population growth contributes to urbanization in developed countries. for example, urbanization in the western and southern United States is largely due to population growth. Rapid population growth beyond the capacity of nearby cities requires the creation of new communities. As the local population grew, so did the community. Urban development groups are expanding to urban areas to cover the cost of infrastructure, such as roads and canals, to cover the cost of infrastructure. Such an event would be able to attract a creative community outside the city center without the need for extensive planning.

2.2.3 Economic Causes

Poverty in rural areas, the large companies are creating commercial farms or lack of job opportunities in rural areas, has forced young farmers to relocate to urban areas in search of better employment opportunities. Industrialization in developing countries has led to more job opportunities in cities, resulting in a significant increase in cities.

2.2.4 Social Causes

Most young people move to cities to find lifestyle changes and to connect with club venues in cities. Similarly, shows provide employment opportunities, but young people are also attracted to the development of gambling and criminal gangs. In addition, the educational opportunities at universities and technical colleges are attracting young people to urban areas where they and their families can improve their future prospects. Urban centers in developing countries are becoming the capital of education and training as they are in developed countries.

2.2.5 Modernization

New technologies are upgrading urban areas. Better communication, medical aids and social aids will appeal to people in rural areas. Urbanization is a complex process, and many of its drivers are intertwined. Once a rural town becomes an urban area, it can begin to produce many benefits that will attract many people.

2.3 Urban Growth and Environmental Problem

Urban development has led to increased employment opportunities in urban areas, increased income, transportation system and educational aids. It brings about many changes, such as rising living standards and increasing a country's economic development. However, in most developing world, urban growth leads to challenges such as inadequate growth of formal employment, inability of social services to grow with the urban growth, environmental degradation and pollution, depletion of natural resources (etc. ground water scarcity), loss of biodiversity, rise of urban slums and poverty, reducing health, rising government spending for the growing cities, traffic congestion and increasing number of conflicts and crimes.

2.3.1 Infrastructure and Energy

Effective infrastructure and energy are essential to support and enhance the living conditions of the community (Fulmer, 2009). Wars and international sanctions have severely damaged cities' infrastructure, disrupted water supply and sanitation. It also delayed the upgrading of older infrastructure, such as power plants and power distribution systems. (Foote, Block, Crane and Gray 2004). Renewable energy sharing and reducing demand in a safe and secure manner. Flexible Energy generation and distribution are essential for an environmentally and environmentally resilient society (SWECO, 2015). Clearer power systems and power lines require significant investment and effective policies (Widergren, Paget and Secrest 2011). Increasing the share of renewable energy will lead to a cleaner and healthier environment by reducing local air quality and GHG emissions (Siegel and McNulty, 2010). Reducing energy consumption is the cornerstone of policies for energy security and climate change mitigation (Omer, 2008). Energy conservation reduces the need for expensive

investments in energy infrastructure and delays the investment needed for network upgrades.

2.3.2 Natural Hazards

Deserts threaten food security and social and economic development (Reynolds, Smith, Lambin and Tumer, 2007). Sandstorms affect large areas, causing environmental pollution and damage. It causes economic losses and health problems (Liu & Diamond, 2005). Iraq is one of the countries most affected by regional climate change, such as annual rainfall and wetland droughts and landslides (Sissakian, Al-Ansari, N., & Knutsson, S, 2013). Drought directly affects plants and forests, animal species, air and water quality (Ole-MoiYoi, 2013). Most farmland is tolerant of frequent droughts (Shean, 2008).

2.3.3 Transportation

Choosing a mode of transportation is essential for long-term sustainability. The use of alternative means of transport can help alleviate traffic congestion, especially in densely populated areas. As a sustainable mode of transportation, cycling can reduce GHG emissions associated with fossil fuel consumption and help address the risk of a sedentary lifestyle and obesity (Ege & Krag, 2010). Increasing cycling can reduce traffic congestion on the roads and improve the urban environment. Sustainable travel, another type of walking is healthy walking. It is an enhancement of living capacity in cities, (Evans & Jones, 2011). Especially trains, increased use of public transport systems, such as the subway and bus express bus (BRT), reduces all energy-related emissions (Hodges, 2009). Private cars are the main means of transportation in Iraq due to the underdeveloped public transport infrastructure (UNEP, 2015). Reducing motor vehicles on roads is important to mitigate the environmental impacts associated with traffic congestion.

2.3.4 Water

Water is one of the most important natural resources in the Middle East. It is important for the sustainability of industry and the economy (Waylen, Thormaback &

Garrett 2011). Despite the scarcity of rainfall in the Middle East, urban rainwater harvesting is gaining renewed benefits as an alternative to conventional water supply (Lange, Husary, Gunkel and Bastain, 2012). Greywater landscaping can be used on wet soils built for toilet cleaning. Therefore, the need for purified water from appliances can be reduced. In addition, by the middle of the century, population growth; Per capita water supply is projected to fall by half due to rising demand and climate change (Michel and Pandaya, 2012). Therefore, it is necessary to prioritize water conservation strategies with diversification of water resources. On the other hand, Water recycling is seen as a sustainable option to address the mismatch between increasing water resources and rising water demand between available water sources (OECD, 2009).

2.3.5 Waste and Materials

As one of the underdeveloped sectors, "Waste and materials" need to be excluded from hazardous waste disposal technologies, such as dumpsters and incinerators (Knowles, 2009). Waste recycling and recycling saves energy and reduces the impact of climate change by reducing the need for raw materials and natural resources (Thormark, 2006). In addition, the separation of waste from the source increases the recycling. On the other hand, poor quality wastewater from wastewater treatment plants is a fundamental problem in developing countries, causing pollution of lakes and rivers (ECO, 2003).

2.4 Importance of Environmental Knowledge, Awareness and Practices in Urban Growth

2.4.1 Environmental Knowledge

Increasing environmental awareness among urban dwellers is essential for sustainable urban development. Environmental knowledge is the level of knowledge about the environment and the awareness of the negative effects of humans on the environment. Environmental Knowledge is the ability to understand the amount of information pertaining to an individual's environmental issues and their impact on their community and environment. Environmental knowledge has been found to be consistent and positively related to attitudes. Increased awareness of the environment is believed to change attitudes toward the environment.

It is believed that both environmental attitudes and environmental knowledge influence each other. Very little is known about the relationship between environmental knowledge and environmental attitudes. Increases environmental awareness and environmental awareness. Increasing knowledge is a precondition for a change of attitude. Both knowledge and attitudes are considered important to change the way humans act on the environment. Lack of environmental awareness undermines the impact on environmental policy. Positive environmental attitudes are often shown to be compatible with related beliefs and behaviors.

Therefore, environmental protection and education may be related. Increasing awareness solves environmental concerns and awareness among citizens. Reduction, assessing environmental awareness among people using basic questions such as recycling and reusing. In addition, these resources are important in the long run to raise awareness of environmental challenges as they broaden people's knowledge.

2.4.2 Environmental Awareness

To define environmental awareness is understand different environmental movements. Environmentalism is about respecting the needs and responsibilities of human beings; It is an idea that inspires and protects the natural world from human influences. Environmental awareness is an integral part of the movement’s success. There are many resources available to raise environmental awareness; Group learning (in-class or out-of-class); Information and motivational workshops; Environmental books and brochures are just some of the tools that can make people more involved in improving the environment.

Environmental education aims to raise environmental awareness and environmental attitudes, but the results are mixed. Social media contributes to the efforts of the public sector and NGOs. The term ‘awareness’ is used used to refer to a level of knowledge through a person's perception, which can be synonymous with the perception of feeling or sensation. Thus, new environmental knowledge can be defined as the art of sharing knowledge with people. During the 1960's, environmental awareness became more prominent, and human values, Attitudes It will continue to play an important role in the development of attitudes and behaviors toward the environment.

Therefore, environmental awareness programs are essential in the design of mitigation plans to reduce environmental degradation around the world. Sustainable development is defined as "the ability to meet current needs without compromising the environment can meet the needs of future generations." It is undeniable that countries around the world should meet current development needs using natural resources or harvested resources from the environment. To create a future environmental crisis; Failure to harm or compromise the livelihoods of future generations must be addressed in a sustainable manner.

Before raising environmental awareness, it is important to understand environmental issues. Reading the latest environmental news and reading a wide range of books on environmental threats is a good resource, both for attending environmental seminars. Studies have shown that community-based education through educational programs is critical and a step towards promoting sustainable development. Due to the importance of environmental awareness to implement the concept of sustainable development, many studies and programs have been launched around the world.

Environmental awareness can be achieved through planned learning programs, which would impart knowledge, skills, values and attitudes in order to develop responsible lifestyles that would be in harmony with the environment. Urban development depends on environmental awareness, Attitudes Behavioral patterns; It should go hand in hand with the establishment of a quality environmental education that includes literacy and environmental ethics. Involvement in environmental education in these areas will help maintain the quality of the environment, which will enhance the sustainable extraction of natural resources. In general, the environmental awareness improvement tools include the perceptions and perceptions of existing citizens on current environmental issues, as well as the extent to which these citizens face specific types of pollution and environmental challenges, including differentiated pollution and environmental challenges such as water pollution, noise pollution, water scarcity, deforestation, ozone depletion, hazardous wastes and global warming, etc.

2.4.3 Environmental Practices

Good Environmental Practices are defined as those actions that seek to reduce the negative environmental impact caused by activities and processes through changes

and improvements in the organization and development of actions. The components of environmental education are awareness and sensitivity to the environment and environmental challenges, knowledge and understanding of the environment problem and environmental challenges, practices of concern for the environment and maintain environmental quality, skills to identify and help resolve environmental challenges and participation in activities that lead to the resolution of environmental challenges. The term Best Environmental Practices (BEP) refers to the most appropriate combination of environmental management plans and strategies. When making a choice for each case, at least the following rating distances should be considered:

1. Specific functions and product choices, providing information and education to the public and consumers about the environmental consequences of their use and ultimate waste.
2. Developing and implementing good environmental code that covers all aspects of product life.
3. A product is compulsory use of indicators to inform users of its use and the final environmental hazards of its disposal.
4. Saving resources, including energy.
5. Making collection and disposal systems available to the public.
6. Avoid the use of hazardous materials or products and the production of hazardous wastes.
7. Recycling, recovery and re-use.
8. The application of economic instruments to activities, products or groups of products.
9. Establishing a system of licensing, involving a range of restrictions or a ban.

2.5 Urban Environmental Quality Management

2.5.1 Natural Environment

The natural environment refers to an environment created by natural things, such as soil, water, and climate. The urban environment is fundaments to economic and cultural development of the city and is certainly an important indicator of the sustainability of the urban environment. Giffinge, and Meijer (2007) indicated that the attractiveness of the natural environment is an important factor in assessing the quality of a sustainable environmental.

The natural environment dimension comprises five major indicators: air quality, wetland area, green coverage, biodiversity, and land use. Schirnding (2017), proposed an organizational framework for health, environment, and development, with air quality as a major indicator within this framework. Qian (2016), emphasized that wetlands are part of the natural ecosystem and should be increased to protect the natural ecosystem. The authors divided into four categories: population and social-economic, economic activities, environment and sustainable development activities and policies. Green coverage and biodiversity are important indicators under environmental categories.

2.5.2 Artificial Environment

Artificial environments represent common denominators when referring to human made environments in the process of natural transformation and determining the quality of a sustainable urban environment. The artificial environment comprises five major evaluation indicators: green belt area, public health, sustainable transportation, green infrastructure, and green building. Kylili and Fokaides (2016) measured the sustainability of an artificial environment using the key performance indicator (KPI) method and public health was emphasized as a key environmental performance indicator. Green and low-carbon urban infrastructure and sustainable public transport are indicators of a sham environment (Farizkha, Moniz and Santosa, 2015). Green energy free buildings guarantee the integrated development of buildings and other ecosystems as a model choice for sustainable environmental development, enhancing the comfort of human settlements (Yi, Srinivansan, Brahan and Tilley, 2017).

2.5.3 Energy Management

Energy management refers primarily to the management of energy production and consumption processes. Energy management is often used when analyzing the quality of a sustainable urban environment. Alencar (2017) regarded energy management is seen as a pillar of sustainable urban environmental development. The great benefits of improving energy management for an intelligent urban environment (Wang and Dai, 2017).

Energy consumption, pure energy, thermal energy management, and energy efficiency are the four indicators in the energy management dimension. Global energy consumption is estimated 8920 trillion tons of oil per year and could reach to 14,000 trillion tons per year by 2020 (Allouhi, Fouih, Kousksou and Mourad, 2015). Reducing energy consumption is the first principle of sustainable development. Efficient and clean energy use is an essential feature of a sustainable society and a key indicator of regional sustainability. Kylili and Fokaides (2016) identified thermal energy management as a key performance indicator of economic sustainability. The energy efficiency will become a global energy challenge in the 21st Century, and various policies and plans should be put in place to enhance it (Allouhi, Fouih, Kousksou and Mourad, 2015).

2.5.4 Water Management

Water resource use and quality of treatment are among the key criteria for measuring environmental sustainability. Water resources are the key to the sustainable development of smart cities. Water management and rainwater recycling, which are one of the three basic objectives for sustainable environmental development, are essential components of this goal. (Alencar, 2017). Wastewater treatment is an important measure of the detailed design of sustainable water resources development in smart cities. Kylili and Fokaides (2016) found that recycling water is a key performance indicator of water management. Schirnding (2017) suggested that water quality can reflect the health and environmental conditions of the city population. Therefore, wastewater treatment, water quality, reuse of reclaimed water, and rainwater use are the four criteria under the scope of water management.

2.5.5 Waste Management

Waste management refers primarily to solid waste management. Waste management plays an important role in assessing the quality of an intelligent urban environment as it plays a key role in maintaining the shape and environment of the city. Liu, Hsieh and Tzeng (2018), observed that population growth and ongoing urbanization, waste management has become a global problem, and waste disposal facility selection is closely linked to the environment.

Improving the quality of waste management is a fundamental goal for sustainable environmental development, and the production and treatment of recyclables is a key guarantee of waste management (Alencar, 2017). Eriksson, Strid and Hansson (2015), emphasized that food waste represents a large proportion of organic waste and that food waste management should be strengthened. In addition, food wastes are likely to decompose during storage and transport, producing harmful compounds that are harmful to the environment (Lee, Choi, Osako and Dong, 2007).

2.5.6 Pollution Control

Pollution control refers to the adoption of technical, economic, legal, and other means and methods to eliminate and reduce pollution. It is an indispensable part of the study of sustainable urban environment. For environmental and sustainable development, a monitoring network has been created and an index system has been divided into four main categories. Ozone depletion and sound environmental quality are the main indicators under the environmental category (Nader, Salloum, and Karam, 2008). Environmental sustainability of smart cities through quality and quantity indicators such as greenhouse gas emissions and sulfur dioxide content (Girardi and Temporelli, 2017A performance index system to measure environmental sustainability uses carbon concentrations of business activity to indicate air quality and air pollution (Cook and Olafsson, 2017).

2.6 Reviews on Previous Studies

Tin Aung Kyaw (2005), studied about environmental related knowledge, awareness and practices of households in Myanmar. According to the study, the worst urban environmental concerns in Myanmar are lack of public awareness; Insufficient regulations and policies; This is due to limited financial and technical resources and a lack of knowledge. Urban development programs are needed to keep resource conservation of land, water and energy; meeting of basic needs, such as housing, water, sanitation, transportation, pollution control and waste management; effective urban environmental planning and management system; setting aside adequate budgetary resources for the implementation of appropriate plans of actions etc.

Mark C. Mifsud (2011), found that young people are becoming more knowledgeable about the global environment than local environment. In this study, the media highlighted attitudes; Family and friends; The importance of factors, including local content and knowledge, is significantly related to environmental attitudes. These findings need to be taken seriously by local policy makers and local educators in developing new environmental education programs.

Fatma Sadik (2013), investigated knowledge and attitudes of teacher candidates in Social Sciences Education and Science and Technology Education department towards environment. The study found that although there were differences in teaching practice, there was an increase in environmental awareness and a more positive attitude towards the environment. Another important outcome of the study was that participants identified the Internet and television as the most important factors in environmental education.

Aye Myint Zaw (2016), studied about on households environmentally friendly behavior and daily lives on Dawbon Township of Yangon. Concerning this study, behaviors and awareness-raising practices that are in harmony with the household environment were discussed by the government, It was found that close cooperation between the community and stakeholders was needed. The government needs to raise awareness of the school environment in close collaboration with the media and UN, NGO and CSOs.

Zar Ni Maw Win (2016) was explored on environmental pollution impact of municipal solid-waste management and drainage system, case study in Hlaing Township. The main challenge suggested by the study is how to solve urban environmental problems and how to expect better urban environment management. Due to the lack of environmental and regulatory standards and the lack of environmental monitoring data, government services should not ignore the issue of air pollution control. This study discusses the overall condition of the drainage system in Hlaing Township and the adverse effects of the drainage system on the community and society. Urban drainage system management; Operation and maintenance are a challenge for city authorities and need to be sustainable. It requires a well-functioning network of interconnected canals designed to be disposed of to a safe disposal area, designed with appropriate slopes. Adequate funding should be provided for all annual budgets to carry out a regular maintenance plan.

CHAPTER III
AN OVERVIEW OF ENVIRONMENTAL DEVELOPMENT IN MYANMAR

3.1 Background of Environmental Management

Myanmar accounts for 45% of its land area. It is rich in natural resources and rich biodiversity as an economic zone dependent on simple coastline and thriving fisheries and other marine resources. However, despite these natural resources, Myanmar is one of the poorest countries in the world. Myanmar relies on natural resources to boost its economy and provide energy and livelihoods to its population. Natural resources sector includes forestry, agriculture, fisheries and mining have played critical roles in the development and economic transformation of the country and over the years their operations have become more intensive and extractive. Serious environmental problems have arisen including the rapid loss of biodiversity and air pollution. (NCEA, 2008).

Myanmar is struggling to implement environmental protection and conservation protocols that meet international standards. The lack of a comprehensive and coordinated environmental framework, enabling institutional and legal structures, expertise, and greater capacity for natural resource management and funding remain challenges. Conserving ecological richness is about addressing the incentives for environmental degradation and promoting sound environmental policies and practices. Depends on ensuring compliance with laws and regulations (ADB, 2013).

In addition, the industries have to the rapid growth in the mining and energy sectors, climate change is also raising concerns about the impact on the environment. Both air pollution and waste disposal have become a source of fire, especially in Yangon and Mandalay. To establish a transparent and robust Environmental Impact Assessment (EIA) system have been improving solid waste management and pollution control. This system emphasizes the importance of enhancing environmental monitoring and conservation.

As outlined in Myanmar's Sustainable Development Plan, the government is promoting the development of a legal framework in the areas of environmental and natural resource management to balance economic growth with sustainable development. The adoption of the National Environmental Policy (2019) and Myanmar Climate Change Policy, Strategy and Master Plan (2019) is a remarkable achievement strategic guideline for the protection of the environment and climate change are formulated and decided at all levels of government and at all sectors.

The Government of Myanmar has recently made significant progress in developing national strategies and action plans for natural resource management. The planning framework and guidelines include the following:

1. **MSDP 2018** recognizes the importance of the environment and natural resources (ENRs) for economic growth. Goal 3 highlights the need to build infrastructure to facilitate economic growth and to provide effective social and environmental safeguards against the negative effects of infrastructure development.
2. **National Environmental Policy (NEP) 2019** covers three strategic areas: (a) clean environment and healthy ecosystems; (B) sustainable economic and social development; (C) Modernization of environmental protection and management.
3. **Myanmar Climate Change Strategy and Action Plan (MCCSAP) 2018–2030** aims to support the public and private sectors and vulnerable communities to respond to climate change.
4. **National Waste Management Strategy and Master Plan (2018–2030)** aims to implement waste collection for all citizens and to transparently incinerate uncontrolled dumping and disposal of waste.

3.2 Rules and Regulations of Environmental Development

The Environmental Protection Law (ECL), enacted on March 30, 2012, is the most important environmental law. There are more than 60 sectoral laws and regulations, including environmental regulations. For other purposes, some laws enacted in the early 19th and early 20th centuries have environmental provisions. In addition, some elements, such as the Forest Law and the Freshwater Fisheries Law, are important environmental laws.

Starting with the Public Health Law of 1972, environmental aspects are often taken into account when adopting or upgrading national laws. Twenty-nine sectoral laws, including environmental regulations, have been enacted since 1988. These include the 1992 Forest Law; 1994 Wildlife and Natural Areas Protection and Conservation Law; These include the 1998 Fisheries Law and the 1998 Cultural Heritage Zones Protection and Conservation Law, which reflect Myanmar's adherence to international environmental agreements and conventions. Sectorial laws with environmental provisions cover the following areas:

1. Prevention of air and water pollution
2. Protection of the ozone layer
3. Conservation, management and sustainable development of soils and forests
4. Combating desertification
5. Conservation of biodiversity
6. Protection and conservation of cultural heritage
7. Prevention of marine pollution and conservation of marine environment
8. Conservation of groundwater.

3.3 Challenges in Environmental Problems

In recent years, population growth, continuous extraction of minerals and forest resources, excessive use of soil and water and a combination of climate risks are gradually undermining the natural resources and ecosystem services that depend on Myanmar's economy and society.

Widespread deforestation, large-scale mining; biodiversity and land degradation and depletion of water resources are putting enormous pressure on Myanmar's ecosystem, which directly or indirectly supports the majority of local people. Rapid environmental degradation exacerbates current climate-related hazards and severe temperature changes. Decades of economic and political isolation and conflict have neglected the country's environment and ecosystem. Myanmar has some of the lowest human development and environmental performance indicators.

In the 2018 Environment Performance Index (EPI), Myanmar ranks 180 countries out of 24 countries, measuring one of the 24 environmental performance indicators of environmental health and ecosystem viability (Raitzer, Samson and Nam

2015). Environmental principles in Myanmar include the loss of forest resources, water pollution, land destruction, climate change. These include biodiversity reduction and waste management.

3.3.1 Solid Waste Management

In Myanmar, waste management has long been the responsibility of township and township development committees in the respective states and regions. In Yangon, Mandalay and Nay Pyi Taw, three City Development Committees are responsible for waste management of their respective air pollution control and sanitation (PCCDs) and their management divisions and subdivisions. In Myanmar's cities, municipal waste collection systems can often be described as labor-intensive and rely on the use of man-made vehicles and unskilled vehicles. Similarly, in many cities in Myanmar, garbage collectors. Most of the informal sector including scavengers and scavengers involved in recycling.

All cities face restrictions on the management of industrial waste, which is often sent to landfills without prior treatment. In Mandalay and Yangon, medical waste collection services are provided once a week or by telephone by major hospitals and clinics, and daily waste is collected from major hospitals and clinics on a daily basis. Domestic wastewater is usually discharged into stormwater drainage systems and natural waterways. Many private companies located in the Special Economic Zone (SEZ) are implementing wastewater treatment systems in stages, but are now systematically managing industrial wastewater. The main sources of external air pollution are inefficient waste transportation, non-combustible household fuel for cooking, lighting and heating, coal-fired power plants. These include industrial agriculture and incineration.

3.3.2 Water and Air Pollution

In addition to basic human rights to water and energy, air quality has a direct impact on quality of life and is considered an important environmental resource. Poor air quality can lead to respiratory problems, heart disease and stroke. Deaths and morbidity; Decreased productivity and poor visibility have been linked to accidents. Air quality is a key factor in generating electricity and use of motor vehicles consuming

petroleum products. It is associated with industrial practices, such as logging and burning, which are prevalent in many industries and in several ASEAN member states (AMS).

Water Pollution; The Myanmar seas and rivers absorb most of the country's land-based wastes but so far, they are still clean. In 2010, a water quality test conducted by Yangon University showed that Rakhine and Delta area. The biochemical properties of the water in the main coastal zones of Dawei and Myeik areas were shown to be below acceptable quality standards (BOBLME 2011). Significant air pollution incidents have not been recorded to date at major coastal ports. However, signs of high levels of pollution are beginning to appear along the Yangon estuary. Inland lakes are beginning to show high levels of chemical and nutrient supplementation in the Inle Lake and Irrawaddy Rivers (Akaishi, Satake and Tominaga. 2006).

As the country faces industrial development and economic development, land-based pollution from agriculture and industry will increase. For example, the total pesticides used by farmers increased by 331% between 2009 and 2010, most of which will eventually be depleted of water resources (CSO 2012). As an essential economic sector, mining is a major source of water pollution. Since opening to foreign investors, the Ministry of Mines has granted hundreds of legal and illegal mining rights to both local and foreign investors. Between 2009 and 2010, the number of mines increased by 293%, and mining expanded exponentially (CSO, 2012). Mines are associated with water pollution problems. Hazardous materials Without detailed regulations on wastewater and wastewater treatment, water pollution could soon become a problem.

Air Pollution; Air pollution from mobile and stationery resources is a problem in Myanmar, especially in the cities, but it is not serious. Mobile resources include cars, trucks, boats and planes. Stationery resources include small to large industries, gas stations, home heating involved in incineration and solid waste disposal. Myanmar has been allowed to import used cars, and in recent decades fuel consumption in the country has increased not only in transportation but also in industry, and air pollution in cities will soon increase. Due to the low level of industrialization in Myanmar, urban air pollution does not pose a threat to public health. However, as the economy opened up, more and more industrial zones and three special economic zones were established, and industrial zones developed rapidly.

Since 2011, Myanmar has grown rapidly and urban air pollution has risen. Many factors support this path. Yangon and Mandalay, two of Myanmar's largest cities, are experiencing a rapid increase in urban population due to increasing urban-to-urban migration as urban areas grow faster than urban areas. Another factor is that more than 80 percent of the city's population is heated by solid fuels (WHO, 2015). The number of registered vehicles has increased sixfold over the past 10 years and has doubled in the last five years. The number of industries in the suburbs has also increased, and GoM has been steadily promoting the continued development of industrial zones.

In urban areas of Myanmar, air pollution affects both men and women. It has significant health effects that affect women and children differently. Inhalation of particulate matter (PM 2.5) can lead to cardiovascular disease, heart disease and stroke. Chronic obstructive pulmonary disease causes many diseases in adults, including lung cancer and acute respiratory infections. The GBD dataset identifies the risk of death from air pollution and occupational health in Myanmar for the population from 1990 to 2017, and that these risk factors are evolving over time (GBD 2017). While the share of deaths attributed to household air pollution (HAP) has fallen, it remains the leading risk factor related to air pollution for premature death and disability (GBD 2017).

3.3.3 Impacts of Environmental and Greenhouse Gas Emissions

The Yangon City Development Committee (YCDC) and the Department of Medical Research (DMR) jointly compiled the results of air quality monitoring surveys conducted by the former National Environmental Commission (NCEA) in Rangoon and Mandalay in April 2007 and January 2008, respectively. The Occupational Health Division (OHD) of the Ministry of Health conducted weekly air quality measurements in Nay Pyi Taw and Yangon from January to December 2012.

According to the World Resources Institute Climate Analysis Indicators Tool (WRI CAIT), land use change and forestry (LUCF) activities are the main sources of GHG emissions in Myanmar, accounting for 51.0% of the country's total emissions in 2013 (WRI CAIT 2.0, 2017). In the LUCF sector, forest land changes account for 73% of emissions. Agriculture is the second most important source (32.1%), contributing 67% of agricultural emissions through paddy cultivation and animal fermentation. Energy is responsible for 10.9% of emissions, and 50% is due to the combustion of

exhaust gases and other fuels. Waste and industrial processes (IP) accounted for 5.8% and 0.2% of total emissions, respectively (WRI CAIT, 2017).

3.4 Conservation of Urban Environmental Development

Protecting Myanmar's environment is essential for both our present and future generations to enjoy the benefits of Myanmar's development. Myanmar Sustainable Development Plan (2018 – 2030) Goal 5 focuses on the legal, institutional and policy frameworks that need to better protect our environment and ecosystems, strengthening conservation efforts through sustainable development and infrastructure planning and the practice of illegal natural resource practices; Increasing resistance to pollution and other harmful activities.

Strategies and Action Plans involve encouraging good water use practices, increasing renewable energy generation, climate change mitigation, increasing green investments, protecting biodiversity, improving waste management, promoting sustainable urban development and the mainstreaming of environmental consideration into policies, plans and national accounting systems.

Concerns are growing about what the growing economy and population mean for Myanmar's urban environment. Myanmar had a population of 59.78 million in 2020 and 18.34 million (30.68%) were urban (World Bank Data 2020). The urban population is growing at an annual rate of 2.49%. With the rise of industrialization and tourism, the combination of rural migration due to poverty is driving rapid urban development with a devastating impact on fragile urban infrastructure.

In particular, the number of motorcycles in all states and divisions is getting heavier and faster than light vehicles. However, motorcycling is banned in Rangoon. Eliminating traffic congestion is a top priority for city authorities. Yangon is conducting a study to revise its Comprehensive Urban Transport Master Plan to reduce traffic congestion and accidents.

An increase in the urban population means an increase in urban waste that poses a threat to public health and the environment. Garbage collection and disposal has traditionally been handled by civilian authorities in Myanmar. Nay Pyi Taw In Yangon and Mandalay, solid waste management is handled by the Department of Air Pollution Control and Sanitation (PCCDs) under the City Development Committees. The

township development committees of the Township Development Affairs (DDA) of the Ministry of Border Affairs are responsible for 282 waste management in 326 townships across the country. Local civic authorities are responsible for:

1. Supervising, controlling and inspecting storage, collection, transport and disposal of solid wastes
2. Cleaning main drains and lateral drains
3. Allotting, supervising and inspecting cemeteries, constructing and maintaining crematoriums
4. Rounding-up and holding stray animals
5. Issuing and collecting license fees for trades connected with development works, restaurants, hotels, motels and the like.

In Yangon and Mandalay, solid waste management is a priority. Although effective waste management is directly related to an adequate budget, money alone does not solve all the problems. Policy response as follow;

1. Initiation of waste-to-energy (WTE) projects at Htainbin final disposal site (FDS) and Htawechaung FDS in Yangon City area with invitation of bids in 2012 under FDI procedure and build-operate-transfer (BOT), build-own-operate (BOO), build-transfer-operate (BTO) schemes.
2. A need for more efficient environment protection, such as source-reducing, recycling, and composting and disposing in landfill or waste combustors.
3. Developing waste management capacity and seeking international cooperation to upgrade it into an effective 3R-based policy.
4. Need for institutional capacity to respond to long-term policy developments by integrating the goals and objectives of the state, community and business.

The YCDC's Department of Air Pollution Control and Sanitation (PCCD) has been inspecting 70 industrial zones in Yangon since 2001. Pollution treatment has been implemented since 2012 with 3,474 factories in the industrial zone and 210 wastewater treatment plants. YCDC and PCCD are working with factory owners in each industrial zone to build treatment plants. It is recommended to analyze the water level and adjust it according to the informed standards. Failure to comply will result in severe disciplinary action. Water Supply and Sanitation Management is another department under the YCDC, the Water Sanitation and Sanitation Department.

The YCDC ASEAN + 3; ASEAN Working Group on Environmentally Sustainable City (AWGESC); In accordance with the standards agreed upon by the UNFCCC and UNEP, it is planning to conduct research and development on electronic waste management and information systems.

In order to promote a sustainable urban transition, the Government of Myanmar has enacted the National Urban and Regional Development Plan Law; National housing policy; It is developing a national urban policy and is expanding its urban planning capacity. About 75 township-level planners are working to achieve the policy objectives, the first of its kind in Myanmar. A national waste management strategy and action plan is currently being drafted and is expected to be completed in 2017.

3.5 Implementation of Sustainable Urban Development in Myanmar

Given the opportunities provided by democratization and government reform, Myanmar has become more rational and resilient. In addition to integrated spatial plans, significant efforts are being made to coordinate sectoral projects to effectively address the needs of a growing urban population. Significant changes have taken place in the urban development sector since 2012. It includes drafting a number of national policies and frameworks in the urban planning and housing sectors. After decades of disappearances, in addition to the establishment of regional-level urban planning, the necessary laws and regulations need to be implemented under the new policy framework. Development of procedural and administrative documents.

3.5.1 National Urban Policy

Myanmar will finalize its National Urban Policy (NSSP) by the end of 2016 with the aim of developing sustainable cities and developing well-managed cities in the country. The NUP is committed to the positive economic and social development of urban development. Consolidate environmental and social impacts; It will help promote "urban paradigm shift" by mitigating its adverse external conditions and providing a coordinated approach and clear policy guidelines. It will provide a general framework for public intervention in urban areas and will be a key reference for legislative reform in the urban development sector as a reference for sector ministries and service providers.

At present, the NUP Framework has been finalized. There are currently plans to complement this with a Spatial Urban and Regional Development Framework, which will assign roles to different urban centers (activity hubs) and consider strategic opportunities to balance urbanization. In other words, ensuring that cities and towns other than Yangon and Mandalay also have a role to play in the urbanization process.

3.5.2 National Transportation Master Plan

The transport sector plays a key role in boosting Myanmar's economic growth and promoting social development. Infrastructure needs to be improved to take advantage of regional trade opportunities. Coordinating facilities and skilled human resources with long-term upgrades is critical to realizing Myanmar's growth opportunities.

Myanmar is keen to seize the growth opportunities provided by regional integration, and the extent of regional growth and the potential for foreign investment and increased infrastructure funding are helpful in this regard. Myanmar’s strategic location in the ASEAN region, its proximity to Bangladesh, China, India, Laos and Thailand, leave no doubt that Myanmar will play an important role in generating a significant level of regional GDP in the future. However, the possibilities for such growth means that development of the country’s transport sector should be an infrastructure priority, which requires investment in international airports, deep sea ports, inland waterways, strategic rail and highway networks and improvements in cross-border infrastructure and regional connectivity. This will in turn serve to encourage urban-rural interactions and connectivity.

Against this backdrop, the Myanmar National Transport Master Plan is designed to provide the government with guidance on a long-term investment plan that will help it achieve its economic growth goals by 2030. In addition, the Master Plan provides guidelines for adaptation to other industries and private investments, and assists in investment planning and decision-making for a variety of transportation projects.

3.5.3 National Spatial Development Framework

Myanmar is planning to set up a national urban system project to identify the network of major cities and the transport routes that connect them, representing key areas of Myanmar. The draft National Spatial Development Framework (NSDF) includes a basic draft of the National Urban Planning Plan. The NSDF has been included in the National Transport Master Plan until 2030, which provides a solid overall direction for future national's regional development.

The NSDF is responsible for their current activities; The upper level of urban centers (activity centers) is proposed based on an assessment of the current relative weight and their future prospects. Based on this analysis, the framework includes national strategic development centers (Yangon, Mandalay and Nay Pyi Taw); Local cities; Develop an urban-based framework that includes agro-industrial cities and border towns / other special services settlements. Later, urban centers were connected by a transport ax system and simultaneously operated as space corridors for economic development. The Corridor Network considers national regional networks such as the Greater Mekong Subregion Economic Corridor and the ASEAN Highway.

3.5.4 Local-level Urban Planning

Myanmar is currently undergoing a series of legal and institutional reforms to redefine the traditional roles of central government agencies, especially in the delegations of authorities to regional and state governments. Moving forward, the role of the regional government is to focus on land management. It could extend to housing and urban development.

The Township Administration and Development Officer and Township Management Committees, with the exception of prominent cities, are studying to be involved in long-term strategic planning. However, further decentralization efforts are underway, with project authorities being transferred to the local level. The township-level urban planning project was launched in 2012 after decades of failing to come up with ideas for 82 cities across the country. In this regard, efforts are being made to recruit and train township-level planners at the township level, and this continues in up to 80 cities.

3.6 Hmawbi Township Environmental Situation

Hmawbi Township is located at 17º 06′ 0″ N and 17º 36′ 0″ N Latitude and 96º 03′ 0″ E and 96º 28′ 0″ E longitude and above 27 feet sea level, having subtropical climate, hot and humid weather with maximum temperature of 39.3 ºC and minimum temperature 10.0 ºC.

Land utilization in Hmawbi Township is net sown 47862 acres of paddy land, 18729 acres of garden land; 2684 acres of fallow land; 4089 acres of industrial land and 96 acres of urban and other land (Hmawbi Township General Administration Department, 2019). Major crop productions are paddy (summer / monsoon), groundnut (winter), black gram, green gram (winter). Rubber is grown as a perennial crop. As a Livestock breeding, people in Hmawbi Township. Raise cow, goat, duck and chicken etc.

The soil types and the soil characteristics of representative soils in the Hmawbi Township area is meadow soils with neutral reaction, whereas some have the alluvial reaction. Although they are different in plant nutrition, they can be used for pulses and vegetables. Meadow soils of the lower Myanmar have yellow brown color with acid to neutral soil reaction, the meadow soil which occur near the river plains with occasional tidal flood are non-carbonate. They usually contain large number of salts. They contain more plant nutrient than Meadow soils of upper Myanmar. Regardless of the more content of iron, these soils can be utilized for rice and vegetables.

There is no organized structure for environmental governance and management in Hmawbi Township. Sectoral department separately takes responsible for managing environment pertaining to their activity. Whilst forest department monitors the status of deforestation and losses of wildlife, township development committee handles solid waste management. Environmental Conservation Department was formed in Hmawbi Township as regional focal unit to oversee the environmental management of region and to promote environmental awareness among public. General Administrative Department has responsibility for overall township management and governance. Hmawbi communities is prepared for environmental protection activities such as 2700 trees, 20 hardwood trees, 9,000 trees and 58,300 teak and other trees were distributed to the rate of 3 trees per household.

CHAPTER IV

SURVEY ANALYSIS

4.1 Profile of Study Area

To assess the environmental knowledge, awareness and practices of the people in Yangon City, Hmawbi Township was chosen as it has diverse backgrounds of people. Hmawbi Township is located in Northern District of the Yangon Region. Total land area of the township is (183.78 sq/miles) and laying between 17º 06′ 0″ N and 17º 36′ 0″ N Latitude and 96º 03′ 0″ E and 96º 28′ 0″ E longitude, it is located above 27 feet from sea level. Hmawbi Township is bounded on the north by Taikkyi Township, on the east by Hlegu Township, on the Southeast Mingaladon Township, on the South by Shwepyitha Township and on the west by Htantabin Township. It is the home for Myaung Dagar Industrial Zone with total numbers of 65 factories.

Population distribution and density are highly influenced largely by the urban infrastructures. Hmawbi Township population density is high around the main road and the wards, or former villages. According to the Hmawbi Township General Administration Department report (2019), the township population is 202904, the large population 176552 (87%) are living in rural area and remaining 26352 (13%) in the urban. Total population of male is 97213 and female is 105691. The population density of Hmawbi Township is 1,104 persons per square miles and township is comprised (4) Wards, (39) Village Tracts and (195) villages as shown in Table (4.1).

This township currently has a primarily agricultural business, with a large proportion of the population engaged in agriculture. The agriculture is the primary means of employment for those that work locally, while a large percentage of the population resides in Hmawbi Township but works in neighboring township, including in those that make up urban Yangon.

Table (4.1) Households, Wards, Villages, Village Tracts and Population (2019)

Particular	Urban (No.)	Rural (No.)
No. of House	5925	38062
No. of Household	5959	40978
No. of Wards	4	-
No. of Village Tracts	-	39
No. of Villages	-	195
Under 18 Total Male Population	10215	57410
Under 18 Total Female Population	10092	65117
Over 18 Total Male Population	2832	26756
Over 18 Total Female Population	3213	27269
Total Male Population	13047	84166
Total Female Population	13305	92386
Total Population	26352	176552

Source: Hmawbi Township General Administration Department (September, 2019)

The following Table (4.2) shows the population growth rate and sex ratio of Hmawbi Township.

Table (4.2) Population Growth Rate and Sex Ratio (2019)

Population 2018	Population 2019	Growth Population	Growth Rate	Male	Female	Sex Ratio
194160	202904	8744	4.96	97213	105691	0:1

Source: Hmawbi Township General Administration Department (September, 2019)

Education plays a key role in human development. Education can improve people's ability to meet their needs by increasing their productivity, achieving a higher standard of living, accessing standard health states and confidence to innovate and creating in all aspects of life. Education is one of the long-term investments. Education is the cornerstone of the human resource development process by supporting the country's economic growth. According to Hmawbi Township General Administration Department report (2019), there are (1) Technology University, (14) Basic Education High Schools, (32) Basic Education Middle Schools, (95) Basic Education Primary Schools and (8) Monastery Education Schools.

Health is an essential part of social development. The access to health care is a basic need, and a growing population is aware that a healthy population is a valuable national asset. The development of health situation, the main purpose of social development is to increase the number of doctor and patients. This is reflected in the rapid increase in the nurse-to-patient ratio, and the hospital bed population ratio. In Hmawbi Township, there can be seen the establishment of township hospital and health care services.

Regarding from the report of Hmawbi Township General Administration Department (2019), there are (3) government hospitals (Hmawbi Hospital 50 Bedded, Phu Gyi Hospital 16 Bedded, and Wah Net Chaung Hospital 16 Bedded), (5) public clinics, (105) private clinics, (5) rural public health center and (30) branches of rural public health in Hmawbi Township. Doctor Population ratio is 1:16908, Nurse Population ration is 1:7514 and, Health Assistant Population ratio is 1:33817 in Hmawbi Township. Main source of energy is electricity and it is mainly obtained from the government power system in Hmawbi Township.

Table (4.3) Main Source of Energy

Particular	**Number**	**Percentage**
Electricity	31924	56.5
Battery	9293	16.5
Generator (private)	1190	2.1
Water mill (private)	21	0.1
Solar system/energy	681	1.2
Other	271	0.5

Source: Hmawbi Township General Administration Department (September, 2019)

The main source of energy for Hmawbi Township is electricity followed by battery, generator and solar system. And main water sources of the township are surface water, ground water and pipe water. Annual rainfall received is about 100 inches in the study area and therefore this area is assumed that it has fairly heavy rainfall. Rainfall is the primary source, that refills all sources of water and is said to be major source and it comes from precipitation.

In Hmawbi Township, 89.8 per cent of households use improved sources of drinking water (tap water/piped, tube well, borehole, protected well/spring and bottled water/water purifier). Compared to other townships in Yangon Region, it belongs to the highest group and it is also higher than the Union average (69.5%). Some 71.3 per cent of the households use water from tube well, borehole and 11.0 per cent use water from protected well/spring. Some 10.2 per cent of the households use water from unimproved sources. In rural areas, 11.2 per cent of the households use water from unimproved sources for drinking water. (Table 4.4)

Table (4.4) Main Source of Drinking Water

Main source of drinking water	Number	Percentage
Tap water/piped	2875	5.1
Tube well, borehole	40280	71.3
Protected well/Spring	6196	11.0
Bottled/purifier water	1382	2.4
Total Improved Water Sources	**50733**	**89.8**
Unprotected well/Spring	3771	6.7
Pool/Pond/Lake	1274	2.3
Other	486	0.8
Total Unimproved Water Sources	**5736**	**10.2**

Source: Hmawbi Township General Administration Department (September, 2019)

Hmawbi Township drinking water is mainly from tube well, borehole. The township population used good drinking water on health from water vendors. For health reasons, most of the water user that permit physical contact between the water and the user, is treated to potable drinking water standards, although only a miniscule amount of it may actually be used for actual drinking purposes.

4.2 Survey Design

The study aimed to examine on environmental knowledge, awareness and practices of households at Hmawbi Township, by using quantitative method based on primary and secondary data. The survey design for the study involves data collection by conducting a survey using stratify random sample method.

There are 5,959 households in four wards at Hmawbi Township. Total 300 respondents have used stratify random sample chosen proportionately five percentage from each ward in Hmawbi Township. The survey questionnaires were distributed to the respondents throughout the Hmawbi Township between September and October, 2020.

The survey questionnaire includes four parts such as (i) socioeconomic background, (ii) knowledge concerning environmental challenges, (iii) awareness relating to environmental problems and (iv) descriptions for assessing respondent behaviors concerning environmental conservation.

The survey questionnaire had multiple choice questions in which the researcher provided a choice of answers and respondents were asked to select one or more of the alternatives and dichotomous questions. And also used five points 'Likert Scale' (Not at all concerned = 1, A little concerned = 2, Normal concerned = 3, Somewhat concerned = 4, and Very concerned = 5). The survey questionnaire constructed in Myanmar and translated to English in the appendix.

4.3 Survey Findings

In this studying to examine the urban environmental knowledge, awareness and practices among households in Hmawbi Township, total of 300 respondents of households answered the questionnaire were involved.

4.3.1 Characteristics of Respondents

This section is presented the characteristics of respondents in the survey area as shown in Table (4.5).

Table (4.5) Characteristics of Respondents

Particular	**No. of Respondents**	**%**
Gender		
Male	137	45.7
Female	163	54.3
Total	**300**	**100**

Age (Year)		
18 to 24	73	24.3
25 to 34	120	40.0
35 to 44	79	26.3
45 to 54	22	7.3
55 and over	6	2.0
Total	**300**	**100**
Education Level		
Postgraduate/Master/Ph.D	25	8.3
Graduate	152	50.6
Undergraduate	46	15.3
Diploma	4	1.3
High School	67	22.3
Middle School	5	1.7
Primary School	1	0.3
Total	**300**	**100**
Area of job		
Private business	62	20.7
Private employee	76	25.3
Public employee	48	16.0
UN/INGO/NGO employee	18	6.0
Informal job	45	15.0
Dependent	51	17.0
Total	**300**	**100**
Monthly Household Income		
Less than Kyat 500,000	216	72.0
Between Kyat 500,001 and Kyat 1,000,000	60	20.0
More than Kyat 1,000,000	24	8.0
Total	**300**	**100**

Source: Survey data, 2020

As can be observed from 300 respondents, the majority of respondents were females and the mostly respondents were age between 25 years to 34 years. The

educations levels have seen nearly 60% of 300 respondents are graduates level and above postgraduate level, remain 40% have undergraduate level in the study area.

The majority of the household heads are engaged in own businesses expressing a situation that might be somehow related to their education level. In the study of monthly household income, the most of respondents have got less than Kyat 500,000.

4.3.2 Knowledge Concerning Environmental Challenges

The environmental situations refer to knowledge relevant to environmental issues, including global and local environmental problems, which have concerned the general public and society. Increasing concern about global and local environmental problems and issues has led to the substantial efforts by policymakers and non-governmental organizations to promote pro-environmental behavior. Table (4.6) is presented the influenced by human activities and environmental practices of 300 respondents in the Hmawbi Township.

Table (4.6) Influenced by Human Activities and Environmental Practices

Particular	**No. of Respondents**	**%**
Influenced by Human Activities		
Depletion of ground water	44	14.7
Destruction of forest	115	38.3
Exhaustion of fossil fuel	2	0.7
All of the above	139	46.3
Total	**300**	**100**
Environmental Practices		
Carrying a cloth bag while shopping	83	27.7
Using the public transport	22	7.3
Switching off lights or fans when not in use	26	8.7
All of the above	169	56.3
Total	**300**	**100**

Source: Survey data, 2020

The human activity has an effect on the environment for thousands of years. Regarding from 300 respondents in the study area of the influenced by human activities, (115 respondents or 38.3%) answered that destruction of forest has affect the

environmental condition, and (44 respondents or 14.7%) said that depletion of ground water.

Therefore, the human activities and climate change have interacted synergistically to impact the relationship between social and ecological systems in the Hmawbi Township. The environmental practices statement, the mostly respondents (83 respondents or 27.7%) said that they were carrying a cloth bag while shopping, (26 respondents or 8.7%) were switching off lights or fan when not in use and (22 respondents or 7.3%) were using the public transport. It is mean that the respondents have reduced the usage of plastic pollution and control of air pollution.

Recyclable materials include many kinds of glass, paper, batteries, plastic and etc. Materials for recycling are either delivered to a household recycling center or picked up from curbside bins, then sorted, cleaned and reprocessed into new materials for manufacturing new products. Table (4.7) shows the 300 respondents answered for recycle, not be recycled and reused items questionnaire.

Table (4.7) Knowledge of Respondents Regarding Their Daily Used Products Recycle, Not be Recycled and Reused Items

Particular	**No. of Respondents**	**%**
Recycle		
To aid the production of more durable plastic products	10	3.3
To reduce the amount of waste discharge	216	72.0
To reduce air pollution	74	24.7
Total	**300**	**100**
Not be Recycled and Reused Items		
Tissues	133	44.3
Newspaper	33	11.0
Aluminum cans	35	11.7
Plastic bottles	99	33.0
Total	**300**	**100**

Source: Survey data, 2020

Recycling promotes environmental sustainability by removing raw material input and redirecting waste output in the economic system. According to Table (4.7),

most of respondents (216 respondents or 72.0%) said that to reduce the amount of waste discharge followed by (74 respondents or 24.7%) have to reduce air pollution and (10 respondents or 3.3%) answered that to aid the production of more durable plastic products.

Above from Table (4.7), within 300 respondents (133 respondents or 44.3%) said tissues have not been recycled and reused, (99 respondents or 33.0%) answered plastic bottles, (35 respondents or 11.7%) said aluminum cans and (33 respondents or 11.0%) told newspapers.

Table (4.8) Knowledge of Respondents Regarding the Electricity generated in Myanmar and Renewable Resource

Particular	No. of Respondents	%
Electricity		
Burning oil, coal and wood	9	3.0
Nuclear power	4	1.3
Solar energy	11	3.7
Hydroelectric power plants	241	80.3
Generating electricity from natural gas	35	11.7
Total	**300**	**100**
Renewable Resource		
Oil	82	27.3
Ironer	12	4.0
Trees	180	60.0
Coal	26	8.7
Total	**300**	**100**

Source: Survey data, 2020

Above from Table (4.8), majority of respondents said that they got electricity from the government hydroelectric power plants system. And also, the most of respondents answered that the renewable resource from trees followed by oil, coal and ironer.

The following Table (4.9) shows the respondents knowledge on household hazardous products cause problems in both their use and disposal. They pose health risks during use.

Table (4.9) Knowledge of Respondents Regarding the Hazardous Waste, Renewable Energy, Trees and Cups

Particular	No. of Respondents	%
Household Hazardous Waste		
Plastic packaging	214	71.3
Glass	24	8.0
Batteries	54	18.0
Spoiled food	8	2.7
Total	**300**	**100**
Mercury		
Hazardous toxic waste	156	52.0
Non-hazardous toxic waste	144	48.0
Total	**300**	**100**
Wood		
Renewable energy	160	53.3
Non-renewable energy	140	46.7
Total	**300**	**100**
Coal and Petroleum		
Renewable energy	161	53.7
Non-renewable energy	139	46.3
Total	**300**	**100**
True Statements for Trees		
Trees provide fresh air by absorbing carbon dioxide and releasing oxygen.	104	34.7
Shade trees can make buildings up to 20 degrees cooler in the summer.	8	2.7
Tree roots stabilize soil and prevent erosion	4	1.3
All the above	184	61.3
Total	**300**	**100**

Using Disposable Paper Cups is better than Washing Mugs		
Agreed	108	36.0
Not agreed	192	64.0
Total	**300**	**100**

Source: Survey data, 2020

Regarding from 300 respondents, mostly respondents said the plastic packaging. In the study of Hmawbi Township households, most household hazardous waste is eventually land-filled or incinerated, dumped directly on the ground, or sewers. Disposing of household hazardous waste in these ways threatens environmental quality. The majority said mercury is hazardous toxic waste. According to result of 300 respondents, the majority of respondents answered that wood; coal and petroleum have renewable energy. And also, the mostly respondents said that trees provide fresh air by absorbing carbon dioxide and releasing oxygen.

The production of cups, as well as their disposal, has led to a large amount of adverse environmental impacts, global warming, and even pollution. (192 respondents or 64.0%) out of total respondents have not agreed the disposable paper cups is better than washing mugs. The paper cups are difficult to recycle because the majority of them have a thin plastic lining to keep liquids from saturating the paper part of the cup. But (108 respondents or 36.0%) have agreed because single-use cups don't require washing so the respondents will be able to save on energy and water costs.

Table (4.10) Respondents Percentage on Main Source of Environmental Knowledge

Sources	No. of Respondents	%	Rank
Parents and Family Members	23	77	4
Friends and Colleagues	16	5.3	7
School and Academic Works	66	22.0	2
YCDC Knowledge Enhancement Programs	20	6.7	5
Non-governmental Organizations	12	4.0	9
Book, Newspapers and Media	80	26.7	1
Internet and Social Media	52	17.3	3

Specific Environmental Training/Awareness Programs	13	4.3	8
Other Resources	18	6.0	6

Source: Survey data, 2020

According to result of respondents (Table 4.10), the main source of environmental knowledge from various books, newspapers and media. Secondly their schools and academic works. Thirdly they have got environmental information from internet and social media.

4.3.3 Awareness Relating to Environmental Problems

The environment has attracted the attention of decision makers, scientists and even laymen in many parts of the world. They are becoming increasingly conscious of issues such as famines, droughts, floods, scarcity of fuel, firewood and fodder, pollution of air and water, problems of hazardous chemicals and radiation, depletion of natural resources, extinction of wildlife and dangers to flora and fauna. People are now aware of the need to protect the natural environmental resources of air, water, soil and plant life that constitute the natural capital on which depends.

Household members were asked about their awareness of environmental issues (deforestation, floods, air pollution, unsafe water use, and improper waste disposal) in Hmawbi Township. Household members were divided into five levels of general awareness of environmental issues that they were aware of relating to Environmental problem.

The perception of environmental problems by Hmawbi Township people is of great importance for two reasons: first, in the near future they will have a great influence on the running of business and, second, knowing what they think about environmental issues will help to establish better pro-environmental education among them. Therefore, studies on the perception of environmental problems among 300 respondents of Hmawbi Township were undertaken in Table (4.11).

Table (4.11) Percentage of Respondents Perception about Environmental Problems

Particular	No. of Respondents	%
A lot	21	7.0
A fair amount	215	71.7
A little	63	21.0
Nothing	1	0.3
Total	**300**	**100**

Source: Survey data, 2020

Regarding from 300 respondents of Hmawbi Township, (21 respondents or 7.0%) have a lot, (215 respondents or 71.7%) have a fair amount and (63 respondents or 21.0%) have a little perception about environmental problems in the study area.

Environmental sustainability is a key issue for human societies throughout the twenty first century's world. All countries need to secure sufficient quality in the short and the long term of natural resources, ecosystems, and the diversity of plant and animal species, including the human living environment.

The following Table (4.12) shows the 300 respondents' behavior towards environmental protection activities at Hmawbi Township.

Table (4.12) Percentage of Respondents Behavior on Environmental Protection Activities

Particular	No. of Respondents	%
Very active	245	81.7
Little active	44	14.7
Not active at all	3	1.0
Don't know	8	2.7
Total	**300**	**100**

Source: Survey data, 2020

Regarding from Table (4.12), the majority of respondents have very active in the environmental protection activities. Rehabilitation of environmental problems in Hmawbi Township from garbage disposal system. Participants were asked about their

involvement in improving the flow of water in the canals. Household members were divided into four stages to address the environmental issues they should be involved in point of view on environment.

Table (4.13) Percentage of Respondents View on Important of Environment Problems

Particular	**No. of Respondents**	**%**
Environment is one of the top important problems that people currently face.	260	86.7
There are other more important problems than environmental degradation	35	11.7
The environment is not an important problem.	5	1.7
Total	**300**	**100**

Source: Survey data, 2020

According to result of Table (4.13), the most of respondents (260 respondents or 86.7%) said that environment is one of the top important problems that people currently face, (35 respondents or 11.7%) answered more important problems than environmental degradation. So that, all human living depends on the resources to survive and, if humans continue to pollute and over-use these resources, they may be completely destroyed or depleted in a matter of years.

Urban areas are considered as the cradles of human civilization and culture. These are also considered as centers for consumption and products of emissions, solid waste/garbage and sewage because population in urban centers is growing day by day. The urban environmental problems are harmful effects of mankind on the biophysical environment. Environmental degradation, pollution, climate change, noise from traffic or neighbors, congestion, shortage of basic amenities, health problems etc., are some environmental problems in urban areas. (Table 4.14) presents the environmental problems in the Hmawbi Township.

Table (4.14) Percentage of Respondents Concern on Environmental Problems

Particular	Not at all concerned	A little concerned	Normal concerned	Somewhat concerned	Very Concerned
Air pollution	16 (5.3%)	5 (1.7%)	2 (0.7%)	86 (28.7%)	191 (63.7%)
Noise pollution	10 (3.3%)	19 (6.3%)	67 (22.3%)	128 (42.7%)	76 (25.3%)
Automobile emissions	10 (3.3%)	8 (2.7%)	16 (5.3%)	119 (39.7%)	147 (49.0%)
Industrial pollution	5 (1.7%)	6 (2.0%)	6 (2.0%)	75 (25.0%)	208 (69.3%)
Hazardous waste	3 (1.0%)	3 (1.0%)	6 (2.0%)	69 (23.0%)	219 (73.0%)
Water scarcity	4 (1.3%)	3 (1.0%)	16 (5.3%)	96 (32.0%)	181 (60.3%)
Energy scarcity	4 (1.3%)	2 (0.7%)	6 (2.0%)	64 (21.3%)	224 (74.7%)
Flood	3 (1.0%)	1 (0.3%)	4 (1.3%)	72 (24.0%)	220 (73.3%)
Global warming	4 (1.3%)	0 (0.0%)	4 (1.3%)	56 (18.7%)	236 (78.7%)

Source: Survey data, 2020

According to result of 300 respondents at Hmawbi Township, the majority of respondents answered very concerned the environment problems such as air pollution, noise pollution, automobile emissions, industrial pollution, hazardous waste, water scarcity, energy scarcity, flood and global warming.

4.3.4 Assessing Respondents Behavior Concerning Environmental Conservation

This survey aim to study the respondent's behavior on environmental conservation which is included General Environmental information, Environmental Pollution, Garbage Disposal, Toxic and Hazardous Garbage, and Wastewater and Sewage Disposal.

(I) General Environmental Information

Table (4.15) Protect Environmental Pollution and Participates to Stop Pollution

Particular	No. of Respondents	%
Telling to family members/friends to protect environmental pollution		
Often	123	41.0
Sometime	167	55.7
None	10	3.3
Total	**300**	**100**
Participates in campaigns to stop pollution		
Two times or more	97	32.3
One time	69	23.0
None	134	44.7
Total	**300**	**100**

Source: Survey data, 2020

Above from Table (4.15), the most of respondents (167 respondents or 55.7%) said that they are sometime telling to family members and friends for one person can do a lot to protect environmental pollution and (123 respondent or 41.0%) have often told to family members/friends. Although, mostly respondents have not participated in campaigns to stop pollution in the study area.

(II) Environmental Pollution

The concentration of carbon dioxide increases in atmosphere due to emission from vehicles, burning of fossil fuel, emission from volcano, industries, agricultural activity etc. it increases which causes global warming and climate change. The following Table (4.16) shows the 300 respondents are using transport system to go their work.

Table (4.16) Percentage of Respondents Using Daily Transport System

Particular	No. of Respondents	%
Public transport	147	49.0
Private car (or) Taxi (or) Motorcycles	63	21.0
Bicycle and others	90	30.0
Total	**300**	**100**

Source: Survey data, 2020

According to result of 300 respondents, (147 respondents or 49%) are using public transport system, (63 respondents or 21%) used private car (or) taxi (or) motorcycles and (90 respondents or 30%) used bicycle and others. Most of respondents used the public transport. So that, the fuel consumption reduced and decrease the air or noise pollution.

(III) Garbage Disposal

Garbage disposal is the actions performed to remove waste in a commercial kitchen from the premises. The kitchen's waste disposal system should be developed to prevent the occurrence of injury resulting from manual handling tasks (e.g., lifting of waste containers). Appropriate measures need to be taken to dispose food (previously served, unsafe, unsuitable, to be recalled, out of date), grease, garbage, recyclables, etc.

Table (4.17) Percentage of Respondents Action on Disposal System

Particular	No. of Respondents	%
Garbage from eating and drinking while travelling		
Dispose in uninhabited area and people travel area	5	1.7
Taking disposal to the garbage cum	259	86.3
Carrying garbage bag to home	36	12.0
Total	**300**	**100**
Usage of plastic bottles and plastic Bags		
Used as usual	63	21.0
Used less	227	75.7
Used more and more	10	3.3

Total	**300**	**100**
Disposal of garbage		
Disposal by wet disposable, dry disposable and renewable disposable dry sorting	80	26.7
Disposal by wet disposable and dry disposable	123	41.0
Disposal in one package	97	32.3
Total	**300**	**100**

Source: Survey data, 2020

Above from Table (4.17), the majority of respondents are taking disposal to the garbage cum, used less plastic bottles and plastic bags and they were separated disposal by wet disposable and dry disposable. According to the above survey result, most of the respondents were practiced concern on Environmental Conservation.

(IV) Toxic and Hazardous Garbage

Toxic and hazardous garbage results from industrial, chemical, and biological processes. They are found in household, office, and commercial wastes. Examples of common products that routinely become part of the toxic waste streams of industrialized countries include batteries for electronic devices, pesticides, cell phones, and computer.

Table (4.18) Sale and Consumer Products Contain Environmentally Friendly Substances or not:

Particular	**No. of Respondents**	**%**
Items are carefully screened and used sparingly.	190	63.3
Filtered but not reduced.	88	29.3
Filtering, unable to use.	22	7.3
Total	**300**	**100**

Source: Survey data, 2020

Result from Table (4.18), (190 respondents or 63.3%) out of total respondents have carefully screened and used sparingly for sale and consumer products contain

environmentally, (88 respondents or 29.3%) filtered but not reduced and (22 respondents or 7.3%) have unable to use.

(V) Wastewater and Sewage Disposal

Table (4.19) Percentage of Respondents Practice on Wastewater and Sewage Disposal

Particular	No. of Respondents	%
To prevent bad smells that is harmful to health		
Properly packed and sewage outlets are regularly maintained	176	58.7
Cannot do it	124	41.3
Total	**300**	100
Seeing other people dumping rubbish in the sewer		
Strictly forbidden	105	35.0
Indirectly prohibited	173	57.7
Not prohibited	22	7.3
Total	**300**	100
The littering in rivers can harm aquatic life		
Action should be taken and don't allow	252	84.0
I think do not control it	48	16.0
Total	**300**	100

Source: Survey data, 2020

Any liquid wastewater or sewage were coming from households, hospitals, factories, and any other structure. In the study of 300 respondents in Hmawbi Township, (176 respondents or 58.7%) have properly packed and sewage outlets are regularly maintained and (124 respondents or 41.3%) have not do in the statement to prevent bad smell that is harmful to health. At the statement for seeing other people dumbing rubbish in the sewer; (105 respondents or 35%) have strictly forbidden, (173 respondents or 57.7%) have indirectly prohibited and the rest (22 respondents or 7.3%) have not prohibited. The littering in rivers can harm aquatic life question, (252 respondents or 84.0%) said that action should be taken and don't allow and (48 respondents or 16%) thought this situation have not control in the study area.

(IV) Global Warming

Global warming could bring good news for some parts of the world, such as longer growing seasons and milder winters. Unfortunately, it could bring bad news for a much higher percentage of the world's people. Those in coastal communities, many in developing nations, will likely experience increased flooding due to sea-level rise and more severe storms and surges.

Table (4.20) Percentage of Respondents Action on Global Warming

Particular	**No. of Respondents**	**%**
Excessive use of electrical energy is harmful to the environment		
Use with caution	223	74.3
Used as usual	60	20.0
I did not notice my usage	17	5.7
Total	**300**	100
Tree planting festivals		
Participated annually.	52	17.3
Participated once or more.	169	56.3
Not participated.	79	26.3
Total	**300**	100
Shade trees in front of the house, yard and elsewhere		
It has been planted since childhood.	186	62.0
It has been planted in recent years.	93	31.0
Never planted.	21	7.0
Total	**300**	100
Groundwater is drying up		
Used more and more.	156	52.0
Used saving.	48	16.0
Should be told to save water.	96	32.0
Total	300	100

Source: Survey data, 2020

Regarding from Table (4.20), the mostly respondents used caution of electrical energy and participated once or more tree planting festival. The highest percentage of respondents said that shade trees in front of the house, yard and elsewhere has been planted since childhood. The majority of respondents used more and more groundwater. The environmental issues are directly impact on global warming. So that, most respondents participate in tree planting festivals and they have been planted shade trees in front of the house and yard.

CHAPTER V

CONCLUSION

5.1 Findings

The survey area is conducted on 300 households of Hmawbi Township, Myanmar. Hmawbi Township population density is high around the main road and the wards, or former villages. According to the Hmawbi Township General Administration Department report (2019), the township population is 202904, the large population 176552 (87%) are living in rural area and remaining 26352 (13%) in the urban. This township currently has a primarily agricultural economy, with a large proportion of the population involved in farming.

The study aimed to examine on environmental knowledge, awareness and practices of households at Hmawbi Township. As can be observed from 300 respondents, females are more than were males. The highest respondents are age between 25 years to 34 years. The educations levels have seen nearly 60% of 300 respondents are graduates level. The majority of the household heads are engaged in own businesses expressing a situation that might be somehow related to their education level.

Regarding from 300 respondents in the study area of the influenced by human activities, (115 respondents or 38.3%) answered that destruction of forest has affect the environmental condition, and (44 respondents or 14.7%) said that depletion of ground water. Therefore, the human activities and climate change have interacted synergistically to impact the relationship between social and ecological systems in the Hmawbi Township.

The mostly respondents said that they were carrying a cloth bag while shopping. It is mean that the respondents have reduced the usage of plastic pollution and control of air pollution. Most of respondents said that to reduce the amount of waste discharge. Majority of said that they got electricity from the government hydroelectric power

plants system. And also, the most of respondents answered that the renewable resource from trees.

Household hazardous products cause problems in both their use and disposal. They pose health risks during use. In the study of Hmawbi Township households, most household hazardous waste is eventually land-filled or incinerated, dumped directly on the ground, or sewers. Disposing of household hazardous waste in these ways threatens environmental quality. The majority of respondents answered that wood; coal and petroleum have renewable energy. And also, the mostly respondents said that trees provide fresh air by absorbing carbon dioxide and releasing oxygen. Within 300 respondents, 64% out of total respondents have not agreed the disposable paper cups is better than washing mugs because the paper cups are difficult to recycle.

Household were asked about their awareness of environmental issues (deforestation, floods, air pollution, unsafe water use, and improper waste disposal) in Hmawbi Township. Household members were divided into five levels of general awareness of environmental issues that they were aware of relating to environmental problem.

The perception of environmental problems by Hmawbi Township people is of great importance for two reasons: first, in the near future they will have a great influence on the running of business and, second, knowing what they think about environmental issues will help to establish better pro-environmental education among them. The majority of respondents have very active in the environmental protection activities.

Rehabilitation of environmental problems in Hmawbi Township from garbage disposal system. Participants were asked about their involvement in improving the flow of water in the canals. Household members were divided into four stages to address the environmental issues they should be involved in point of view on environment.

The most of respondents said that environment is one of the top important problems that people currently face. So that, all human living depends on the resources to survive and, if humans continue to pollute and over-use these resources, they may be completely destroyed or depleted in a matter of years. Urban areas are considered as the cradles of human civilization and culture. These are also considered as centers for consumption and products of emissions, solid waste/garbage and sewage because population in urban centers is growing day by day.

The urban environmental problems are harmful effects of mankind on the biophysical environment. The majority of respondents answered very concerned the environment problems such as air pollution, noise pollution, automobile emissions, industrial pollution, hazardous waste, water scarcity, energy scarcity, flood and global warming. The most of respondents said that they are sometime telling to family members and friends for one person can do a lot to protect environmental pollution.

In the study of 300 respondents in Hmawbi Township, (176 respondents or 58.7%) have properly packed and sewage outlets are regularly maintained. The littering in rivers can harm aquatic life question, (252 respondents or 84.0%) said that action should be taken and don't allow and (48 respondents or 16%) thought this situation have not control in the study area.

The environmental issues are directly impact on global warming. So that, most respondents participate in tree planting festivals and they have been planted shade trees in front of the house and yard in the Hmawbi Township.

5.2 Suggestions

Based on the survey results, The study suggests that policy makers should focus on the importance of environmental awareness and knowledge in ecosystem rehabilitation programs. The policy makers set implementation goals and the public should be immediately informed of the expected impact of the operational system and environmental rehabilitation programs. Therefore, households have access to adequate information about programs. The government should strive to improve the environment.

While protecting the ecological environment is a shared responsibility of society, it should be tailored to the specific characteristics of different populations and regions. The government should strategically select key components of local environmental awareness campaigns and their resources and ecosystem rehabilitation programs to facilitate the effective implementation of ecosystem programs. The government needs to spread environmental awareness in urban and rural areas and encourage them by rewarding them for their achievements.

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