GREEN LOGISTICS PRACTICE: THE CASE OF PURIFIED WATER BOTTLING COMPANIES IN ETHIOPIA

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Green Logistics Practice, The case of purified water Bottling Companies in Ethiopia

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Statement of Certificate

This is to certify that Mussie Kefale Abebe has carried out his thesis work on the topic entitled Green Logistics Practice; the Case of purified water bottling companies in Ethiopia. The work is original in nature and is suitable for submission for the award of Master's Degree in Logistics and Supply Chain Management.

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Statement of Declaration

I, hereby, declare that this thesis, GREEN LOGISTICS PRACTICE: THE CASE OF PURIFIED WATER BOTTLING COMPANIES IN ETHIOPIOA is my original work and has never been presented for a degree in any other university in whole or in part, and that all sources of materials used for this thesis have been acknowledged.

Declared by

Name	Signature	Date
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Glossary of Terms

CSCMP: - Council of Supply Chain Management Professionals

CES: - Consumer Electronics Show

GrSCM: - Green Supply Chain Management

GLM: - Green Logistics Management

ESA: - Ethiopian Standard Agency

FMHACA: - Food, Medicine & Healthcare Administration and Control Authority

MOT: - Ministry of Trade

MSE: - Micro and Small Enterprise

ECAE: - Ethiopian Conformity Assessment Enterprise

FDA: - Food and Drug Authority

ISO: - International Standard Organization

IBWA: - International Bottled Water Association

EFBW: - European Federation of Bottled Water

WHO: - World Health Organization

Abstract

The purpose of the study is to investigate purified water bottling companies' practice of green logistics regarding plastic bottles after the water is used. It attempts to describe the role of main stakeholders starting from the producers of purified water, government offices, plastic bottle collectors and organizations involved in collection and recycling of used plastic bottles. Due to the increased demand and consumption of bottled water in Ethiopia, there has been a growing concern about the thrown used plastic bottles everywhere and to minimize its impacts on environment, green logistics practice is an important process which is not effective due to lack of awareness on source separation, risky and inconsistent collection processes due to the fall on the selling price of collected plastic bottles, high cost of transporting plastic bottles, low community participation and low contribution of bottling companies to environmental protection. Primary and secondary sources were used to gather data by self-administered questionnaires to water producing companies, interviews with plastic recycling company employee and informal plastic collector including books, magazine, journals and websites. The study sample consisted of 111 employees selected through convenience sampling technique from three water producing companies with a total of 1117 population. The results show that producing companies do not give much concern for reverse logistics activities of plastic bottles. The detailed analysis and interpretation of the data collected using tables and grouping of responses given for the questions and interview questions done in the fourth chapter. Finally the findings of the research and the recommendations given by the researcher are included in the fifth chapter. The research is limited by not including other purified bottling companies located at another part of the country due to corona virus issue not to move from place to place and contact with companies easily. In terms of future areas of research, measuring the green logistics management practice of purified water bottling companies need to include the full supply chain actors as an area which requires further investigations.

Key words; Green Logistics, Plastic pollution.

CHAPTER ONE
INTRODUCTION

The term logistics covers a wide concept which includes order receiving, procurement, transportation, warehousing, packaging and collection of previously sold materials. The green logistics management practice comprises each of the above mentioned activities starting from production stage of the product until it reaches to the final consumers and vice versa in reverse logistics helps to benefit from green logistics. Sibihi & Eglese (2009) defines green logistics as the activities which measure the environmental impact of the distribution of products and services, look for strategies which mitigate damage, and leading to sustainable development. This study focuses on the purified water bottling companies towards green logistics management practice and therefore, the major area covered is the waste management practice of used plastic bottles by the producing companies and other major stakeholders such as plastic collectors and plastic recyclers.

By today environmental pollution becomes a major problem around the world countries, and a main agenda in big conferences and summits was this environmental pollutions which Ethiopia was a major participant mostly since a lot of impact is shown directly and indirectly affecting the world environment; such as increase of global temperature, affecting oceans and seas with the living creatures inside and outside. Ethiopia played a key role in UNEP's billion trees since early 2007 which 12.6 billion trees have been planted worldwide in 193 countries, with Ethiopia's contribution was the third largest behind India and China (UNEP 2012). In 2009 at the Copenhagen UNFCCC conference of December, Ethiopia insisted on and obtained the promise of $ 100 billion per annum from developed nations to developing countries caused by environment pollution (Africa report 2019).

Even though industrial pollution is mainly the outcome of developed countries, but the consequence will not only affect some western countries (Western Europe and North America) rather a whole nations of the world. Other than big manufacturing industries found in developed nations, plastic wastes are also one of the major pollutant of the environment which is easily found in every country and pollute the environment as it's not easily decay by the soil like paper products, affects water bodies and also needs high

fossils fuel to initially produce. Therefore Ethiopia and other developing countries can play their role in protecting the environment by minimizing their plastic wastes.

1.1 Background of the Study

In some parts of the world, drinking water clean as much as possible without using any mechanical filtration of processes to remove impurities has a long history almost equivalent to ancient human civilization history. People used pure springs, wells and boiling water to secure from bacteria and germs. Filters have been used to clarify water for thousands of years. Medical experiences written in India dating to 2000 BC, mentions filtration through sand and gravel were used as a method of purifying water. Hippocrates in Greece advocated filtration through cloth bags in the fourth century BC. The Romans dug channels parallel to lakes to take advantage of natural filtration through soil when using lakes for water supplies. Venice, Italy, stored rainwater in cisterns but drew the fresh water from wells in sand that surrounded the cisterns (John W. 2005). Whereas bottling water has a recent history that began in the United Kingdom at the Holy well in 1621 from spring (Pandal 2018). At that time, people used and buy purified bottled waters for the case of their treatment for illness but late in the 19th and early 20th century, visits to natural springs and Spa became fashionable among the peoples in urban areas of United Kingdom and United States (Pandal 2018).

It was in 1999 that the first bottled water, Highland spring was introduced in Ethiopia by the APPEX bottling Share Company and by the late of 2019 there were more than eighty purified water bottling companies (Reporter 22, June 2019) registered by Ministry of Trade. Especially in the last three and four years, it was common to hear new brand name of purified waters since a lot of companies are joining the industry.

As purified water bottling production is increasing highly, so as the scrap plastic bottles are highly polluting the environment because of lack of Green logistics management in the area by the companies, consumers and other stakeholders including government body. According to the study conducted in plastic bottles and bottle caps, they rank as the 3rd and 4th most collected plastic trash items from the ocean (Addis fortune 2016).

The effect of plastics is not limited only to affect the oceans, also when the animals in the ocean consume plastics, their digestive system could get clogged up that leads them to death and it moves along the food chain by prey and predators including human beings. In the North Pacific alone, an estimated 12,000 to 24,000 tons of plastic end up in fish each year and over one million sea birds and 100,000 mammals die from ingesting plastic yearly (Hugh March 24, 2019). Also plastic trashes are not easily decay by the soil makes it difficult to harvest the soil and grow seeds.

Even though entrepreneurs around the world are trying to recycle and use plastic bottles for different purposes such as printer ink cartridge, roofing tiles, carpets, boats and even houses, still recycling rates remains low. As indicated by the study, only fewer than half the bottles bought worldwide are collected for the recycling and reusing purposes (Guardian 2016).

1.2 Statement of the Problem

Green logistics, formed from two words one is "logistics" means the key of new transportation system by using modern technology to manage another, the second word, "Greenness" is to say about environment and positive thinking word; when integrated two words become eco-friendly environment and efficiency of transportation and distribution system (Wijitra S. 2013).

The previous logistics was forward distribution i.e. transportation, warehouse management, packaging and inventory management from producer to consumer. Consideration of environment has opened new market for recycling and disposal through new part such as reverse logistics that is related to waste transport and movement of used materials, and green logistics has important role to tradeoff process, transportation and delivery. It was the world trend to concern about carbon dioxide emission from metabolic in transportation sector included the packaging damage environment and loss (Wijitra S. 2013)

Although the purified water bottles production industry and the consumption rate is highly accelerating, the Green logistics management practice of the used plastic bottles do not get much attention, as anyone can see the major collected trashes around houses

and cities are mostly these used plastic bottles. We can simply observe during rainy seasons in our surrounding how plastic bottles are becoming wastes and polluting our environment by closing the sewerage system causes floods on asphalts leads to traffic congestion and challenging different households in residential areas repetitively. Plastic bag wastes pose serious environmental pollutions and health problems in humans and animals. The situation is worsened in economically disadvantaged countries like Ethiopia. The trend of utilization of plastic bags is increasing from time to time in spite of good deal of awareness of the residents about the adverse effects of these products (Adane and Mulugeta 2013).

Since Logistics in general and specifically green logistics management is young discipline, there is a research gap in assessing the performance in Ethiopia, especially the Green logistics management of used plastic water and soft drink plastic bottles is not effective due to lack of awareness on source separation, risky and inconsistent collection process due to the fall on the selling price of collected plastic bottles, high cost of transporting plastic bottles, lack of safe and enough storage space, low community participation and low contribution of bottling companies to environmental protection (Hagos W/Gabriel 2016).

Dealing with the environmental costs in rapidly growing economic development, urbanization and improving living standards in cities have led to an increase in the quantity and complexity of generated waste, representing phenomenal challenge (UNDP 2004) which Ethiopia is facing right now. The below table is taken from the study that shows the consumers of purified water bottles in Addis Ababa city are environmentally unconscious and the practice of green logistics management level is very low with regard to the disposal of plastic bottles after use. In the study, 142 respondents were asked and 35.9 % replied as they put the used plastic bottle in rubbish bin after use, 37.3% reuse the empty bottle, 3.5% give the empty bottles for recyclers but 23.2% of the respondents replied they dispose the empty bottles anywhere after use.

Table 1.1 Disposal of Empty Bottle

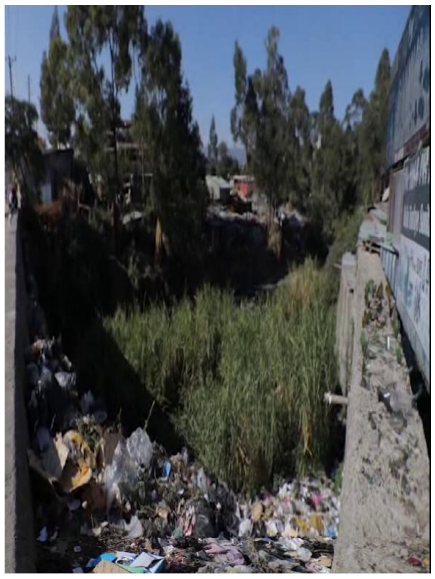
Disposal	Frequency	Percent	Cumulative Percent
Put in rubbish bin	51	35.9	35.9
Reuse	53	37.3	73.2
Recycle	5	3.5	76.8
Dispose anywhere	33	23.2	100
Total	142	100	

Source: Matiwos Ensermu; Trends in Bottled water use survey in Addis Ababa, 2014

Producers play a major role in green logistics management practice than other stakeholders since they are sources of the product and a clear gap is shown in the purified water producing companies in Ethiopia as they are not well practicing it "Organizations face increasing pressure to take responsibility for their environmental performance" (Kussing & Pienaar, 2009:431). Because society's stance towards environmental issues has been changing, and factors such as legislative initiatives, increasing awareness from customers, and organization's perception on new business opportunities, are the reason why organizations need to pay more attention (Salema, Povoa & Novais 2006:615)

As Ethiopia mainly Addis Ababa is the seat of African Union (AU), diplomats of many countries, many international organizations and tourist destination of the country, a lot is expected to be done in waste management practices to improve the status of the city for both international community and Ethiopian society. Other than producers; consumers, scholars and government body needs to consider widely economic, legislation, corporate citizenship and environmental with green management Issues.

Fig 1.1 plastic pollution in Addis Ababa city



Source: Photograph

Fig 1.2 Rubbish collected in Addis Ababa city

Source: Photograph

Therefore, considering there is a gap and different obstacles exist in the green logistics management practice of purified plastic waters which affect almost all the society and as a whole the country, the researcher got the interest to study and try to investigate what causes the gaps and lack of green logistics management.

The study also tried to give recommendation and suggestive ideas after observing and analyzing the major obstacles. It can give also a hint for further researches to be made for an increasing production, consumption and pollution of used plastic bottles of the country.

1.3 Research Questions

The below questions are designed for the study.

1. What is the relationship between used plastic bottles and reusing/recycling activities to practice green logistics management in the area?
2. What would be the role of purified water bottling companies and government in the green logistics management?
3. What are the main obstacles in the green logistics management of purified water bottling?
4. What are the main advantages of green logistics management of purified water bottling companies in relation to organizational performance?

1.4 Objective of the Study

The general scope of the study is to analyze and investigate the green logistics management practice of purified water bottling companies in Ethiopia regarding on the used plastic bottles.

Specifically the objectives are:-

1. Identify the major stakeholders in the overall green logistics management practice of purified water plastic bottles.
2. Identify the gaps and obstacles for the practice of green logistics management.
3. Evaluate and recommend better green logistics management for the purified water bottling companies in Ethiopia.

1.5 Definition of Terms

1.5.1 Conceptual Definitions

- Purified water: - A water that is made just clean from germs and bacteria for drinking purpose.
- Company: - An entity having legal personality and thus able to own property and to sue and be sued in its own name.
- Green Logistics Management: - Integrated environmental thinking in to the supply chain management that goes further than just making sure CO2 levels are minimized for logistics process (CSCMP).

1.5.2 Operational Definitions

- Purified water: - A Plastic water sold by purified water bottling companies which some minerals are added in the content during the purification process.
- Company: - Purified water producing firms.
- Green Logistics Management: - The overall logistics activity including recycling, reusing and remanufacturing of used plastic bottles in order to add value and protect the environment from plastic pollution.

1.6 Significance of the study

The researcher who is observing plastic pollution everywhere mainly in Addis Ababa city and facing the unusual climate change of the country believes this study will give some hints for better green logistics management of used plastic bottles which currently is the main issue of the world countries and Ethiopia; also with giving suggestive ideas and recommendation how to solve and tackle the obstacles for green logistics management of plastic wastes, the study can facilitate the smooth process flow for the main actors in Ethiopian companies.

1.7 Scope of the Study

The green logistics management practices of used plastic bottles involves many stakeholders including all producing companies, plastic recyclers, retail shops, restaurants, hotels, consumers and government body. However the researcher mainly focused on the purified water bottling companies located at surrounding neighboring cities of Addis Ababa i.e. Oromia region of Sebeta and Alemgena. Also the main facilitators for the green logistics management of plastic wastes and individuals who collect plastic trashes (Qoralew) are covered in the study. But purified water bottling companies, plastic recyclers, customers, consumers and facilitators that are located in Amhara, Tigray, Benishangul, Gambela, Southern region and Oromia regions except the special zone of Oromia around Addis Ababa are excluded from the study.

1.8 Limitation of the Study

Even though such kind of studies should involve all actors including the whole purified water bottling companies and other major stakeholders in the green logistics management such as government body, plastic recyclers, restaurants, hotels, plastic collectors and retail shops found in the study area, the research doesn't cover other water companies located at another region, responsible personnel, officials and offices due to lack of sufficient time by the researcher and lack of cooperation of the respondents and also respondents commitment to complete the questionnaire was another constraint with respect to green logistics management practices of purified water production.

1.9 Organization of Study

The study is organized in to five main chapters. First chapter includes background of the study, problem statement, research questions, scope and limitation of the study with objectives. The second chapter presents literature reviews from selected related books, articles and blogs with different subsections. At the third chapter, the methods used for the research, design approach with population sampling techniques; and in the fourth chapter, data collections, presentation, analysis and results are explained. Finally summary, conclusion and recommendation with suggestive ideas based on the findings of the study are included in the fifth chapter.

CHAPTER TWO
RELATED LITERATURE REVIEW

2.1 Overview of Plastics

The term "plastic" is derived from the Greek word "plastikos" meaning fit for molding, and molded. It refers to the material's malleability, or plasticity during manufacture that allows it to be cast, pressed, or extruded in to a variety of shapes – such as films, fibers, plates, tubes, bottles, boxes, and much more (Hagos 2016).

Plastic is one of the most important human inventions which have known to have emerged around 1800s (Berhanu F. 2019). Plastic is also one of the materials that have evolved to become completely synthetic over the last century; although in the beginning it was a material which was synthetic from natural existing compounds found in oil, natural gas, coal and some plants. The production of plastics in Ethiopia began in 1890s by the British based company named "Rain Proof" which however, overrun their business for short period of time due to lack of interest by consumers to use new plastic bags as it was a new kind of product to carry small types of materials (Berhanu F. 2019).

Commonly there are seven types of plastic types according to Sea studios foundation on February 2013 (cited in Hagos 2016) and explained as follows;

1) Polyethylene Terephthalate (PET); used for soft drink, water and other beverage bottles detergent and cleaning containers, peanut butter and other food container bottles. PET is recycled into: new bottles, polyester for fabric and carpet, fill for bumper cars and fiberfill for sleeping bags and jackets. It's one of the most easily recycled plastic types. No known health issues are identified regarding the use of this plastic type.
2) High density polyethylene (HDPE); milk and water jugs, laundry detergents, shampoo and motor oil containers, shampoo bottles some plastic bags are the basic ones. Clear HDPE containers are easily recycled back in to new containers. Colored HDPE are converted in to plastic lumber, lawn and garden edging, pipes, rope and toys. No known health issues are identified still for the usage of this plastic type.

3) Polyvinyl Chloride (PVC OR V); Clear food packaging, cling wrap detergents and window cleaner bottles, some plastic squeeze bottles, cooking oil and peanut butter jars, vinyl pipes shower curtains, home siding and window and door frames. PVC is one of the least recyclable plastic due to additives. Potentially harmful substances are also created by its disposal. Many harmful chemicals are produced in the manufacturing, disposal, or destruction of PVC including Lead DEHA (di (2ethylhexyl) adipate). Dioxins Ethylene dichloride Vinyl chloride effects of exposure to these chemicals may include: decreased birth weight, learning and behavioral problems in children, suppressed immune function and disruption of hormones in the body, cancer and birth defects and genetic changes. Harmful chemicals created as a byproduct of PVC can also settle on grassland, where they can be consumed by livestock, and accumulate in meat and dairy products that are directly ingested by human being.
4) Low Density Polyethylene (LDPE); bread, frozen food and grocery bags most plastic wraps. Some bottle LDPE is not usually recycled. No known health effects associated with the use of these plastic while organic pollutants are formed during manufacturing.
5) Polypropylene (PP); deli soups, syrup, yoghurt and margarine containers disposable diapers outdoor carpet house wrap clouded plastic containers (baby bottles and straws). PP is not easily recycled. Differences in the varieties of type and grade mean achieving consistent quality during recycling is difficult. No Known health issue is associated with PP.
6) Polystyrene (PS); CD cases, disposable cutlery formed polystyrene (Styrofoam), food containers packaging, insulation egg cartons, building insulation recycling. PS is possible to recycle, but not normally economically viable. Styrene can leach from polystyrene. Over the long term, this can act as a neurotoxin. Studies on animals report harmful effects of styrene on red- blood cells, the liver, kidney, and Styrene can be absorbed by food and once ingested can be stored in body fat. It's thought that repeated exposure could lead to bioaccumulation.
7) Mixed (Other); Lids medical storage containers, electronics, most plastic baby bottle, five gallon water bottles, sport water bottles, metal food can liners and

clear plastic. These types of plastics are difficult to recycle. Health effects vary depending on the resin and plasticizers in this plastic that often includes polycarbonates. Polycarbonate plastic leaches bisphenolA (BPA), a known endocrine disruptor. By mimicking the action of the hormone, estrogen, bisphenolA has been found to effect the development of young animals; play a role in certain types of cancer; create genetic damage and behavioral changes in a variety of species.

Plastics are crucial part of 21st century life. Not only they provide us with useful, lightweight and durable products, but they play a key role in the sustainable development of our world. Every activity in modern life is influenced by plastics and many depend entirely on plastics products. It would be hard to produce cars without synthetic bumper, dashboards, steering wheels and switches. It would almost impossible to make medicine without plastic hypodermic syringes and artificial hip joints. The same is true in telecommunications, dependent on plastic telephones, circuit boards and cable insulation. Our entertainment and leisure relies on the unique combination of the characteristics offered by plastics in sports equipment and clothing, CDs, Video and audio tape, television and cinema.

In 2009, UNEP reported that the world's annual consumption of plastic materials has increased from 5 million tons in the 1950s to nearly 100 million tons; thus, 20 times more plastic is produced today than 50 years ago and also by estimation of UN Environment, one million plastic bottles are purchased in every one minute across the world and a total of five million single –use plastic bags are used every year. Scientists estimate that since the 1950s, some 8.3 billion tons of plastic have been produced with more than 60% of that making its way to landfills and the natural environment. Rivers are part of the problem and currently, including the river Nile and major water bodies of the world are believed to be carrying 90% of the eight million tons of plastic waste dumped every year (Birhanu F. 2019).

Plastic bottles play a huge role in environmental pollution. Since most products sold are made of plastics or packaged in them, both ending up not recycled but dumped in landfills and burnt. Recycling saves on landfill space since a plastic bottle takes an

average of 500 years to biodegrade (Addis fortune, July 08, 2012). The processed water shall be filled in sealed containers of various types /sizes/ shapes made from the plastic materials permitted under WHO and CES99 in our country suitable for direct consumption without further treatment. The filling & packing of the processed water features like jugs, jugs with built- in taps, jars with threaded (reusable) caps, bottles etc. which are not tamperproof and leak proof shall not be permitted (Ermias 2018). There are many terminologies presently adopted by the industry & consumer for describing the processed water and packed in different packaging. For the purpose of uniformity in describing the various types of containers, the following definitions are put in a table below.

Table 2.1 Bottled water container types

Type of container	**Description**
Bottle	One time use plastic containers, to be crushed after use.
Cup	One time use plastic container in the shape of cup or glass/ tumbler that is to be crushed after use.
Glass Bottle	Containers made of glass material which are to be used after serialization
Pouch /Sachet	Containers made of PE plastic in the shape of a bag to be crushed after use.
Jars	Reusable plastic containers.

Source: Ermias Kiros 2018.

2.2 Using purified water in plastic bottles

Ermias Kiros (2018) defined packaged/ bottled drinking water as water derived from any portable source which may be subjected to treatments such as decantation, filtration, combination of filtrations, aeration, filtration with membrane filter, cartridge filter, sand filter activated carbon filtration, re- mineralization, reverse osmosis or any other method to meet the prescribed standard and packed. It may be disinfected to a level that will not lead to harmful contamination in drinking water. Bottled drinking water (other than packaged natural mineral water) is water that is intended for human consumption and that

is sealed in bottles with no added ingredients except that it may optionally contain safe and suitable antimicrobial agents (Ermias 2018).

The first production of purified water in a plastic bottle in Ethiopia was introduced in 1999 by APPEX Bottling Share Company namely Highland spring, established by the famous Ethiopian entrepreneur Ermias Amelga and partners, but stopped operation in 2010 due to excise tax disputes with Ethiopian Revenue and Customs Authority (ERCA). Until recently, three up to five years and sometimes right now most consumers in Ethiopia use the name "Highland" to buy or indicate other purified water plastic bottles. Currently there are more than eighty purified water bottling companies in allover Ethiopia which most of the companies are located in Oromia region at the special zone of Oromia around Addis Ababa city such as Burayu, Sebeta and Sululta (Andualem 2018). In Ethiopia, as indicated in different studies the demand for bottled water is increasing and plastic bottles are more preferable due to their cost, lightness and drink everywhere, irrespective of their environmental impacts. Even though the cost of bottled water is higher when compared with tap water, due to the high threats on quality of tap water, so many consumers freely drink if it's bottled, and this leads to further increase of the demand of bottled water. This escalated demand may be due to their convenient packaging, ease of access, and better taste than tap water (Rodwan 2014). However, the main reason rests on the assumption that bottled water is safe and healthier for consumption than piped water (Doria 2006). Soft drinks in Ethiopia are bottled using glass bottles which are returnable to the company after drinking and can be rarely purchased at a higher price for single bottles if you don't have empty exchange bottle; but plastic bottles' low cost and use and throw after usage as compared with those of glass bottles makes it more preferable to increase sales of products. So that banning of using plastic bottles due to its negative effects will be challenging and the best option is to control its side effects to the environment and human health (Woldegebriel H. 2016).

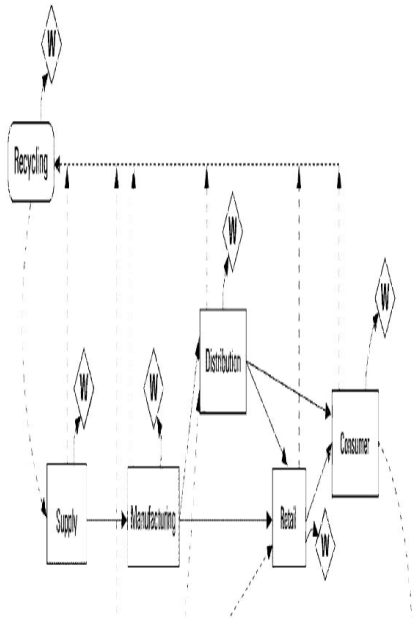
2.3 Green Logistics management practice in the production of purified water bottling companies in Ethiopia

2.3.1 Overview of Green Logistics Management

The concept of green logistics management gets its origin in Mid 1980s and has been accepted widely in overall the world. Green logistics represents all activities that provide information for the purposes of consumer goods production about all specifications wished by the consumer and needed for their conversion, and strive to increase market demand (lee & Klassen 2008). Green logistics refer to activities which measure the environmental impact of the distribution of products and services, and look for strategies which mitigate damage. Leading to sustainable development (Sibihi & Elgese 2009)

Related to the overall economic benefit to a country, green logistics management can be defined in terms of the integration among private, operational, strategies, local and global elements; in terms of government intervention, as representative of the general government sector; in terms of pressure on the private sector, to contribute to the construction of the financial & economic sector and to solve public sector problems and support it; and in terms of the integration of different sectors with one another, which also means observing the operational processes of the other sectors and adapting them to the elements and principles of the particular environmental strategy. Over the long term, all of these contribute to building the economy; here is where a third perspective comes in, a view that looks beyond the local context to the larger global framework (Mckinnon et al., 2010). Turkay and Funda (2011) and SIbihi and Eglese (2009), explain green logistics as an intensification of efforts to find methods, standards and criteria to reduce costs and achieve a balance among the three elements (environmental, social and economic components).

Figure 2.1 Green supply chain management

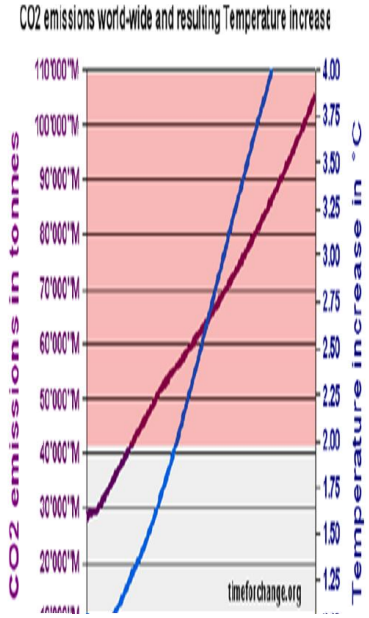


Key: W: - waste /disposed material

Source: - Beamon 1999

CSCMP explains green logistics as to integrate environmental thinking in to a supply chain management that goes further than just making sure CO2 levels are minimized for logistics processes. Green logistics and supply chain needs a clear and thoughtful developed strategy to implement actions to improve sustainability on all levels of a supply chain, not only from an operational perspective but also from a legal and environmental protection (CSCMP 2019).

Fig. 2.2 Effect of carbon dioxide (Co2) emission



Source: - Wijitra Srisorn 2013.

Logistics is a tool to move goods, materials and peoples from one place at a specific time to another place at another time. It is considered relevant for operations in modern systems, not only at a local level, but also at an international level, where we observe a decentralization and globalization of logistical support in the development of products and services within the supply chain, an indicative of green logistics, according to which the optimal use of the costs and time is important in order to add real value to the economy and finance at the macro level (Lehtonen 2004).

Green Logistics involves all attempts to measure and minimize the ecological impact of logistics activities that include the forward and reverse flows of products, information and services between point of origin and point of consumption, its aim is to create a sustainable company value using a balance of economic and environmental efficiency.

Green logistics concept is to characterize logistics systems and approaches that use advanced technology and equipment to minimize environmental damage during operations (Thiell M. et al. 2011). The basic elements of the modern concept of green logistics are time and costs, which interact with one another in the environment in order to produce according to an optimal method, and to distribute the products at the lowest cost and in the shortest time possible, while reducing the rate of product damage and loss and working on recycling waste to achieve an optimal use (Kumar 2015).

Today multiple pressures are forcing companies to practice green logistics management both nationally and internationally in almost every country; governments are proclaimed regulations that bound companies on environmental management responsibilities on their products. Internationally, international organizations such as ISO (International Standards Organization) provided guidelines to certify companies based on the criteria in ISO 14,000 for evaluating environmental responsibility in to the overall business by measurement of consumption of natural resources, energy emissions and other waste systems. In Ethiopian case, still government didn't impose any regulation that binds producers, hotels /restaurants and consumers in plastic wastage except production and import of plastic bags with a thickness of 0.03 millimeter or less.

Knowing the wider perspective of the green supply chain is an important step in knowing the branch of environmental sustainability. There are large amounts of literatures that surround GrSCM, especially from 1989 to the present. But the key themes that came out of the GrSCM literature over the last twenty years are the concepts of green design, green operations, reverse logistics, waste management and green manufacturing (Guide & Srivastava 2007). The aim of green logistics costs and increase profits in order to maintain sustainable development; in other words, it affects the financial statements, by taking into account the cost element, the cost components and their direct impact on corporate profitability (Piecy & Alan 2010).

2.3.2 Reverse Logistics management practices

Reverse logistics sometimes referred as "products take back" is the major concept of green logistics management that is seen as possible solution for green logistics (Gutta B. 2016). Reverse logistics is a process where a manufacturer accepts previously shipped products from the point of consumption for possible recycling & recovery (Forkes 2009). Reverse logistics is naturally included within the concept of green logistics, and we can see that it stimulates considerations in different environments for inclusion within the green logistics concept (Pagek & Wu 2009).

CSCMP defines logistics as "the process of planning, implementing and controlling products for the efficient and effective transportation and storage of goods including services and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements". Whereas reverse logistics can be defined as a specialized segment of logistics focusing on the environment and management of products and resources after the sale delivery to the customer that includes product returns for repair and further more a process that enables organizations to become more environmentally capable through recycling, reusing and reducing the amount of materials used (CSCMP 2015:151).

Even though Johnson (1998) argues that reverse logistics were motivated primarily by economic factors and not concerns about protecting the eco- system, different studies support the benefit of reverse logistics towards green environment. Tibben- Lembke (2002) and Nan Hock and Erasmus (2000) suggest that reverse logistics can bring about profitability, reduction of waste and advertising. Zhu and Sariks (2004) took this idea about win- win relationships on environmental and economic performance. While Pagell & Wu (2009) stated that reverse logistics is naturally included within the concept of green logistics, and it can be seen that it stimulates considerations in different environments for inclusion with in the green logistics concept (Pagell & Wu 2009). Reverse logistics includes reducing operational costs, and saving money and increasing value by reselling or recycling resources in the environmental in order to cover any potential losses or operational costs (Voigt & Thiell 2004).

2.3.2.1 Recycling and Reusing logistics Practices

As a valuable and finite resource, the optimum use for most plastic after its first use is to be recycled, preferable into a product that can be recycled again. Used plastics can be recycled up to six times. If it doesn't make economic or environmental sense to recycle, then the energy can be recovered through Energy from Waste (EFW) incineration. Used plastics have a higher calorific value than coal and at a time of high energy prices unrecyclable materials can, through EFW provide a much needed local energy supply (Wondimu S. 2016).

Rob Opsomer (2020) from Ellen MacArthur foundation, stated that 78 million tones plastics packing produced every year in the world which only 14% is collected for recycling and 2% is recycled for new packaging while the rest 14% get burnt after use, 40% remains at land filled and the remaining 30% of all plastic packaging pollutes the environment.

Fig 2.3 Plastic bottle parts

Source: - Adapted from Rob Opsomer 2020

Recycling is a critical step towards environmental protection by processing used materials in to new products, reducing resources, saving primary energy, preventing pollution and lowering greenhouse emissions (EFBW 2010).

Studies show that recycling rate of used plastic bottle is low in all over the world and Ethiopia. “Only fewer than half the bottles bought worldwide are collected for the recycling and reusing purposes” (Guardian 2016).Unaware of the advantage of recycling used plastic bottles by the society is the major constraint that is observed as recycling options avoids high energy consumption of producing virgin plastic and the emission of greenhouse gases during the virgin plastic production (AU & UNEP report may 2006). Lack of sufficient convenient access to recycling collection opportunities for products used away from home can also be mentioned as a gap for plastic recycling market.

Reuse is the process of collecting completely unused or slightly used products from the customer and injecting them back in to supply chain without any upgrading process (Eltayeb et al. 2011).

There are also some challenging factors that are observed in the process of using used plastic bottles in Ethiopia. The major market area to buy and sell used plastic bottles is Merkato around TANA mall at which Trucks, donkeys, and people rush to line up and exchange the bottle for cash. The shouts of drivers of trucks and taxies are heard as they call out to sellers of bottles. The price of bottles depends on market demand and weather conditions. Merchants in Mercato take the plastic bottles to regional towns and rural areas where locals use them to carry kerosene, store traditional brews, and carry hoy water for Christians and feet cleaning water for Muslims. Some purchase the bottles to refill them with tap water and sell for one/two birr in the market, mostly to chat chewers (Addis fortune July 08, 2012). Customers and consumers who buy the used plastic bottles mostly do not have a clue of the chemical content of the plastic and how many times they need to use them. Under the federal law of Ethiopia, Ingredients of the plastics need not be labeled, and most manufacturers are unwilling or unable to disclose these contents or their sources.

2.4 Stakeholder Theory

The stakeholder theory argues that organization has relationships with many constituent groups and that it can be engender and maintain supports of these groups by considering and balancing their relevant interests (Clarkson 1998). It looks the relationships between an organization and its internal and external environment and also how these relationships affect the organization mode of conducting its activities.

Green logistics management is a wider concept that involves many stakeholders and their interactions other than the company that produce the product which the failure made the gaps that exist in Ethiopia. The modern crisis that occurred affected the companies and the countries that are planning for sustainable development, to prevent the waste and loss of resources, in order to attain a green economy. However, it's also the social responsibility of all individuals, companies and sectors of government to play a part in the integration and interaction of all activities, in order to build a green economy through green logistics (Kumar 2015).

2.4.1 Purified water bottling companies towards green logistics practice

There are different motivators for companies to switch to "green" in their supply chain. Although some of the motivators are quite unclear, Wu and Dunn (1995) suggests that some organizations are simply doing this because it's the right thing to do for the environment. Perhaps some are more radical to environmental change, but others may not (Wu & Dunn 1995). Studies however have shown that profitability and cost reduction are some of the main motivators for business to become "green" in the supply chain (Srivastava 2006; 2007, Darnall et al., 2008). Gold and Seuring (2011) indicated that sustainable development is part of green logistics , which companies seek to take into account in terms of creativity at work and the differentiation of action in order to achieve competitiveness in the market and improve the quality of services provided to customers.

Ruthir Banomyong at the supply chain cluster development on the 6th meeting of logistics management and supply chain indicated that environment was the one of indicator to measure the successful in sustainable supply chain management and to study which factors was made organization changed to green logistics classified by two parts as internal and external factors (Wijittra 2013). Internal factors are internal driven related to

organization, in the part of policy particular to reduce cost and environment supplier control force driven from exclusive level that asked organization had to participate for sustainable management in order to support friendly environment operation those supports were supported by top and middle management level to start new system that that officers must have participation and create culture (Helen Walker & Neil Jones 2012). External factor highest affected adaptation of toward green logistics such as customer factor and market then law factor, directive in both production and buyer country, competitive factor and social factor respectively in term of supplying raw material management factor and total cost factor not affected adaptation. Internal of organization factor affected the successful of adaptation both policy and organization resource that impacted to more successful organization (Sirintip Prapakornvemol 2009).

The disposal of a product is also not only the responsibility of the customers due to economic, legislative and environmental reasons that comprises almost all parts of the society but stringent packaging and environmental regulations are driving companies to be more accountable for their products so that there are fewer disposals, as fewer disposable products can benefit both the company and the environment (Rogers and Tibben 2011). Companies integrate activities from carious industrial, financial, services and insurance sectors within the green logistics channel, involved in the formulation of a monetary policy. If there is a strong supply chain, there may also be a strong cash index that contributes to building the country's economy (Markley & Davis 2007).

Table 2.2 indicates reverse logistics practices are significantly influential on all performance indicators. A similar situation is also observed for green purchasing and manufacturing practices. In order to explore the relationship between green logistics practices and firm performance, a regression analysis is performed for each performance indicator. Standardized regression coefficients obtained from regression analysis for the relationship between green logistics practices and firm performance.

Table 2.2 Green logistics practice and organizational performance; standardized regression coefficients

Green logistics practices	Operational performance	Economic performance	Environmental performance
Reverse logistics practices	0.421	0.215	0.258
Green distribution and marketing practices	-	0.219	-
Green purchasing and manufacturing practices	0,366	0.399	0.354

Source: Kazim Sari, Impact of green logistics practices on firm performance 2018

To minimize environmental pollution of plastic wastes and comply with corporate social responsibility, some companies advocated a policy in their strategy. At the opening ceremony for the introduction of new brand purified water bottle "Top water" in April 2018, the company manager, Ato Shimeles stated that to fight the environmental pollution Top water had introduced a new incentive package for the youth engaged in the collection of used plastic bottles by increasing the selling price from 3.57 birr kg. to 4.25 birr per kg., and for those who collect thrown Top bottles the company pay 5 birr per kilogram. Ato shimeles further had noted that the company would provide 1000 pairs of gloves, branded uniform and PP bags for the plastic bottle collectors in order to protect its brand Top plastic bottle from being seen on streets and do its social responsibility (Andualem Sisay Gessesse 2018). Another water bottling company launched in Chacha town near Debreberhan city by the name of "Avante water"; its General Manager announced that the packaging bottle is thicker and uses 50 percent less plastic than the average bottle in Ethiopia which the thickness meets European standards; and further noted that they will not only collect, recycle and export the plastic bottle but also the company needs to minimize the plastic they are discharging in the first place (Capital April, 2019).

2.4.2 Other Participants of Green Logistics Management in the Purified Plastic water production in Ethiopia

i) Informal Collectors (Qorales)

Qorales are people that collect different types of waste materials from the environment and buy from households by saying loudly "qoralew" which means "qorqoro yalew" (anyone who has metal sheet) even though they tend to buy other plastics, shoes, used tires and used vehicle battery. A study shows that from collected materials by qorales, plastic bottles covers the highest percentage by 24.7% while metals 22.6%, papers 16.1%, glasses 6.5%, food related wastes 12.9% and others 17.2% (Hagos G. 2016).

Table 2.3 Materials collected by informal collectors

	Responses		Percent of Cases
	N	Percent	

Source: Hagos Gebre 2016

According to Andualem Sisay Gessesse (2017), in and around the city of Addis Ababa, there were around 600 youth groups engaged in garbage collection organized as Micro & Small Enterprise. In Addis Ababa city, used plastic bottles are collected by both MSE and individual informal collectors. The responsibility of collecting all garbage from households and garbage area including used plastic bottles is fall under the groups, while the informal plastic collectors pick materials from garbage collecting areas or streets if the material can be changed in to cash.

ii) Government

Government has a key role in the purified water bottling industry as any other industry. Since 2013, the responsible government body to control the production of purified water is ESA (Ethiopian Standard Agency) by setting standards for bottled drinking water but previously, only getting the certificate from FMHACA (Food Medicine & Health Care Administration and Control) was enough to start production. FMHACA mainly focuses on production inputs such as infrastructural components, technology, human resources and the production environment but not on the mineral content and composition of the product. The ESA in 2015; announced on its official website that it closed many factories in relation to product quality and safety problems.

Recently, consumption of bottled water has been increasing but the quality of the water used for human consumption is not subjected to any stringent quality control measures. Recent study by the IBWA revealed that 25% of all bottled waters are simply tap water placed in a bottle which is an invalid method of bottling water by the FDA under certain good manufacturing practices regulations (Ermias 2018). Though the government is trying to control the production by setting compulsory standards and requirements by Ministry of Trade (MOT) and ECAE (Ethiopian Conformity Assessment Enterprise), still lack of awareness exist on customers and consumers about the certification and standards of ECAE.

Addis Ababa City Administration Solid waste management agency is the responsible government body to control the activity of youth groups that are organized in collecting wastes in Addis Ababa city which mostly collects plastic wastes. Many countries in Europe, America and some countries in Africa such as Kenya, Tanzania and Rwanda have a law that restricts and bans single- use plastic (plastic bags). European Union is currently considering introduction of a law that totally bans single- use plastic across its member countries. Ethiopian government has proclaimed a policy to control hazardous materials and pollution from industrial wastes. Urban administrations and regional states may transfer responsibilities to the lowest administrative units to formulate and implement action plans on solid waste management by ensuring the collection of solid waste bins sufficient frequency to prevent overflow; planning and carrying out public

awareness raising activities; ensuring that measures are taken to prevent pollution arising from the mishandling of solid wastes (EFDRE proclamation No.13, February 2007 article 5/4). The solid waste proclamation number 513/2007 prohibits to produce, import and use of plastic bags with a thickness of 0.03 millimeter or less. Birhanu Fekade (June 2019), on reporter stated that "there were about some 80 water bottling companies which most of them are liable to the wide spared littered bottles in and out of the capital. Millions of bottles are thrown away on any open environ these days".

iii) Community participation

The community in waste plastic bottles management can be referred as the consumers and customers of the companies who are in the middle between the companies and the consumers such as hotels and restaurants that directly sell the purified bottle to consumers. There are two categories of each sides, which the first are customers and consumers of purified water bottles who care for the environmental pollution and try to protect the environment from plastic wastes. While on the other side, there are customers and consumers that don't care whether the environment is polluted or not, they just throw away the plastic bottles after using the water. The conducted study on trends in bottled water use in Addis Ababa city shows that even when buying bottled waters, less concern is given by consumers regarding on the pollution caused by plastic bottles package than green environment packing which only accounts 4.9% of the respondents replied that lowering price & environmentally friendly packing could encourage them to buy bottled water- as this implies less consideration is given to environmentally friendly packing by respondents (Matiwos E. 2014).

Table 2.4 Change bottled water purchase encouragement

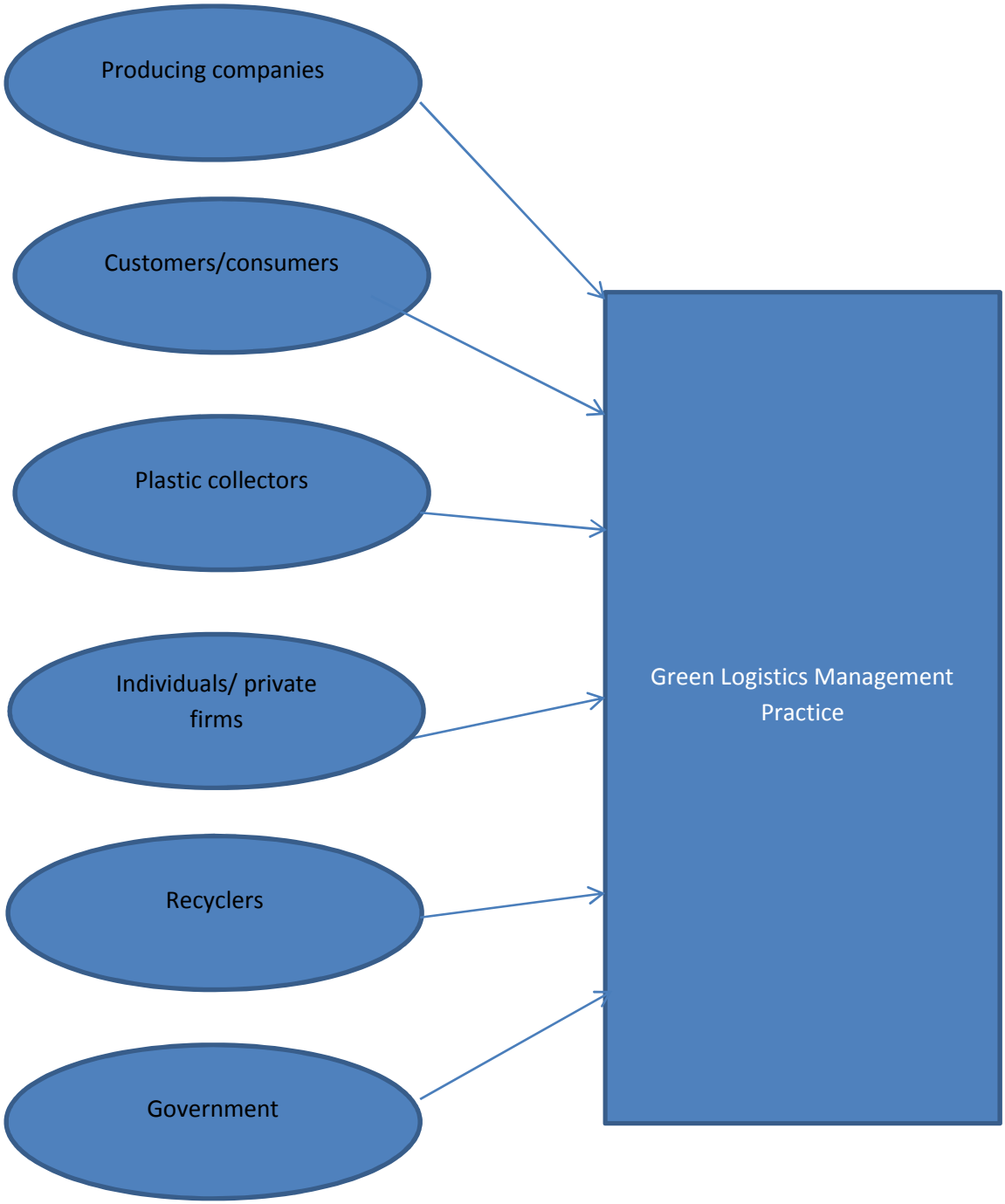
	Frequency	Percent	Cumulative percent
Lowering price, more attractive package	18	12.7	12.7
Lowering price, environmentally friendly packing	7	4.9	17.6
Lowering price, better quality	22	15.5	33.1
Lowering price, better quality, more environment friendly packing	55	38.7	71.8
Lowering price	40	28.2	100
Total	142	100	

Source: Matiwos Ensermu 2014

2.5 Conceptual Framework

In the study of green logistics management practice of purified water bottling companies in Ethiopia, the major stakeholders will be investigated to understand their roles and their performance in reducing environmental pollution that's caused by used plastic bottles. Green logistics management of used plastic bottles can be mainly characterized by reusing /recycling activity, corporate social responsibility of producing companies, government intervention by binding regulations and community participation in solid management, whereas lack of proper green logistics management will lead to pollution of the environment due to plastic wastages which the outcome is general chaos to the country by affecting the living creatures.

Fig 2.4 Conceptual Framework



Source: Developed by the researcher

Purified water producing companies are sources of the plastic bottles; they know how much plastic bottles are distributed to the market through their customers. Customers of the companies are consists of Hotels, restaurants, retail shops, hospitals, clinics, universities and other small shops that buy the purified plastic bottles in large amount from the producing companies. Customers are the major actors in the used plastic bottle collection process since most used plastic bottles are collected from the above mentioned areas where consumers buy and used the plastic waters and left at the same place except the small shops where consumers buy the plastic waters for their travelling place or for home purposes.

Informal plastic collectors collect the used plastic bottles either by buying from the customers in a very low price or by free. After collecting the used plastic bottles from the organizations and from the grounds in different areas, the collectors will go to the individuals/private firms whom collect the used plastic bottles and other plastic materials such as Jeri-can, plastic bags and plastic oil containers by buying from the plastic collectors in Kilogram which sometimes the price varies according to seasons. These individuals/ private firms doesn't make recycling of plastic bottles rather sell to other big recycling companies that crash and export to make different types of clothes and other plastic materials.

Most of small recycling companies do not have trade licenses and produce a single use plastics/ plastic bags which is banned from imports and to use in Ethiopia by FDRE government.

In all the above mentioned activities of plastic bottles; starting from its production till its crashing, government plays a big role with producing companies, customers' of producing companies, youth groups /informal collectors and recycling companies.

Generally, using plastic bottles than glass bottles has many advantages. From producers' angle, low cost of producing the plastic bottles, easily get the ingredients of the plastic as compared to the glasses and no need of reverse logistic management to reuse make it choice able. In the consumers' side, using the purified plastic waters everywhere they travel by carrying as not need to have returnable bottles like the glasses, its lightness and

its trust ability to avoid some bacterial diseases than pipe water has made the plastic waters consumption rate in increasing rate. For hotels /restaurants too, risk of breakages and inventory management to exchange the glass bottles by refilled ones from suppliers are not expected to be done in providing purified plastic waters to their customers. Moreover, it results in increasing of income by selling it to their customers rather freely provide pipe water. It must be also stated that all producing companies, retailers, hotels /restaurants and consumers pay taxes for government in generating more revenue for the country. Whereas the disadvantage of using plastic bottles in related to environmental pollution needs better green logistics management attention by the above mentioned stakeholders to benefit from plastics. Otherwise, the disadvantages are causing increasing collateral damages in related to the environment and generally, in the social life of the society from time to time.

CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

This chapter explains the principles and procedures used by the researcher to acquire the required information to see the practice of green logistics management by the producing companies when conducting the research. It includes the study area, research approach, research designs, sampling technique used on the research and tools of data collection.

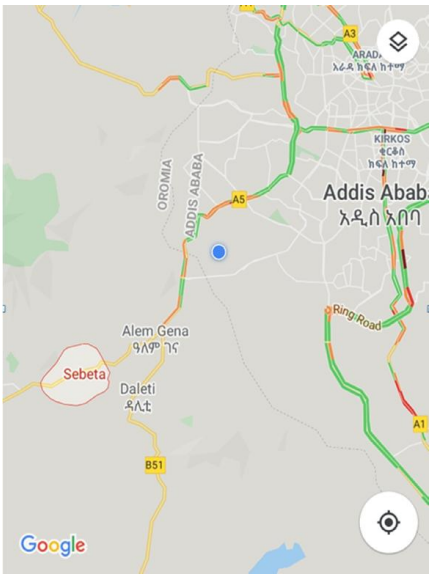
3.1 Description of the study Area

The Study area of the research is focused on the companies that produces purified water and sell in plastic bottles found closer to Addis Ababa city i.e.in. Alemgena and Sebeta regions of Oromia regional state. Alemgena and Sebeta towns are located at south western of Addis Ababa in the main road that takes to Jimma city with 15.8 killometers and 20.05 killometers respectively from the capital city. Most Purified water bottling factories are located outside of Addis Ababa closer to springs and wells such as Burayu, Sebeta, Alemgena, Sululta and Debreberhan cities are main cities of Ethiopia that purified water bottling companies are located (Andualem 2018).

Figure 3.1 Major water Factories in Ethiopia

Source: Google Map

Figure 3.2 Alemgena and Sebeta



Source: Google Map

3.2 Research Approach

The approach recognizes the green logistics management practices of purified water bottling companies in Ethiopia, as the result of the interaction of major stakeholders that their roles and relationships are described in order to understand their responsibilities. Mixed Approach or both qualitative and quantitative research approaches are implemented in the research. The study used quantitative approach because the data on the main questionnaires are quantitative and also analyzed by using statistics, while qualitative approach is used to get more depth information that may be difficult to calculate quantitatively.

3.3 Research Designs

The research is based on to find gaps to implement the practice of green logistics management, and give recommendation accordingly. The research design used by the researcher is explanatory. As Explanatory research works to give the survey and research design a better focus and significantly limits any unintended bias information (Muhammad Yousaf 2018). The Explanatory research allows researcher to study new things and question new things, it is not used to give us some conclusive evidence but

helps us in understanding the problem more efficiently (Muhammad Y. 2018). Particularly, a survey research method is used for this thesis in order to obtain the required data from main stakeholders through different data collection techniques. Because survey research is surveys gather data at a particular point in time with the intention of describing the nature of existing conditions can be compared, or determining the relationships that exists between specific events. Typically survey method is used to scan a wide field of issues, populations, programs etc. in order to measure or describe any generalized features (Abiy Zegeye et .al, Sep. 2009).

3.4 Population and Sampling Techniques

The target population of the study includes producing companies, informal plastic collectors and plastic recycling companies. As per the scope of the study, samples are selected by non- probability sampling technique and among non-probability sampling techniques, convenience sampling technique is used to reach to the sample respondents. Convenience sampling is used since the researcher used respondents that are available at a certain specific time and place. In convenience sampling, participants are selected based on availability and willingness to take part and useful results can be obtained, but the sample may not be representative of other characteristics, such as age or sex (Saran Shantikumar 2018). From purified water producing companies found in the selected area, the questionnaire is filled by three of the companies' employees (Abbahawa Trading, Pacific Industry and Yes Water Company). By using Solvin's formula to calculate the sample size for the three purified water bottling companies i.e. AbbahawaTrading 411 employees (HR department 2020), pacific industry's 270 employees (HR department 2020) plus 436 employees of Yes water factory (Ato Gashaw company's employee) 111 questionnaires are distributed totally and 37 questionnaires (111/3 = 37) for each of the three companies:

n=N/1+N (e) 2

Where: - n is sample size

N is population of the study

e is possible error term with estimated error terms of 9%,

n=1117/1+1117(0.09)2

n= 111

3.5 Data sources and Types

Both primary as well as secondary data are used. Primary source of data are used to get firsthand information from the selected participants of the study through observation, questionnaires and interview questions. A useful short interview is conducted with some used plastic bottle collectors and Ato kemil Mohammed, who has been working at one of the plastic recycling company as a mechanical & Electrical worker for seven years, to obtain more information about the relationships among the recycling company, producing companies and plastic collectors. The questionnaire for the producing companies is structured based on the responsibilities towards green logistics management and self – administered by the researcher which was also necessary to translate the questions in the questionnaire in to Amharic language since some respondents were noticed as unwilling or incapable to fill it in English. Questionnaires are preferred since they are easy to analyze and save time in data collection (Oso and Onen, 2011). While secondary data is used in the study from past researches, books, magazines, websites and journals to see the relationships, interactions and responsibilities of stakeholders in the practice of green logistics management of purified water bottling companies in Ethiopia.

3.6 Data collection procedures

Before data collection, under consideration to easily gain access to the purified water producing companies, the researcher obtained an authorization letter from the university. After a questionnaire is prepared and approved by advisor, the researcher went outside of Addis Ababa to visit producing companies found in Sebeta and Alemgena, and to

facilitate questionnaire that would be filled by them. After collection of the first part of the primary data, the researcher got back to informal plastic collectors and plastic recycler found in Addis Ababa city to observe and make short interview regarding the collecting process of waste plastic bottles.

3.7 Validity and Reliability of the research

Validity is concerned with whether the findings are really about what they appear to be about (Anol 2012). Validity simply means that a test or instrument is accurately measuring what it's supposed to (Stephanie G 2016). Validity defined as the extent to which data collection method or methods accurately measure what they were intended to measure (Anol 2012).

To ensure the quality and validity of the data, data collecting tools were carefully adopted and developed from previous researches conducted by Bethelhem Guta from "Relationship Between reverse Logistics Practices and Organizational Performance", Camilla Louise Bjerkli on the title of "Plastic wastes" and from Hagos Welde gebriel on the "Assessment of Reverse logistics on used water and Soft drink plastic bottles in Addis Ababa city" with some modifications including supply chain professionals' assessment that are actively working on the business.

Reliability is the consistency of a set measurements or measuring instrument, often used to describe a test. Reliability is inversely proportional to a random error (Pellissier 2007). As there are many statistical tools to measure reliability, Cronbach's alpha is used to check the reliability of the findings since most of the questions on the questionnaire are prepared with multiple possible answers, it's the most widely used internal- consistency coefficient (Stephanie G. 2016).

By entering all variable data on the questionnaire in to the SPSS software to calculate the reliability of the research 0.723 score has obtained that shows the reliability and acceptable of the study. Also to avoid some confusions and ambiguity for respondents, the questions are carefully translated in to Amharic to assure the reliability of the data.

3.8 Research Ethical consideration

"Ethics refers to the appropriateness of your behavior in relation to the rights of those who became the subject of your work, or are affected by it" (Saunders, Lewis and Thornhill 2001).All referenced materials and previously related studies are recognized and also the researcher has respected all ideas with free from biasedness and keeps confidentiality of the parties who are participated on the research. The data were collected from the sample respondent through questionnaires; the respondents were not required to write their name. The result of the study is to be used for academic purpose only and the response of the participant is fully confidential. The information that the respondent gave was analyzed without any change by the researcher. Furthermore, the work that has been used in this research as a base for this study were cited appropriately as the researcher respect the work of previous studies.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND INTERPRETATION

In this chapter after the data had been collected, the collected data are categorized, analyzed and interpreted under qualitative and quantitative approaches. Quantitative data gathered through questionnaires are coded, classified as per their similarity on their characteristics, and possible comparisons are done using tables, graphs, frequencies, percentages and correlation by SPSS statistics 20 Software. The collected data from observation and interviews are discussed and explained by words.

4.1 Overall response rate

It took three weeks to collect the overall data from producing companies using the questionnaires.

Table 4.1 Overall response rate

Sample	Number	Percent
Number of questionnaires distributed	111	100%
Returned questionnaires	109	98.1%
Incomplete questionnaires	2	1.8%
Complete filled questionnaires	107	96.3%

Source: Survey result

4.2 Respondents level of Education and service

These questions are put to measure whether respondents have better knowledge and observation of their company's activity towards green logistics practice regarding to the plastic packages it uses after the water is used or not.

As shown on the bellow's table 73.9% of the respondents have worked more than 2 years in the company, shows that they have good knowledge and observation on their company's activity regarding green logistics practices and Table 4.3 shows that 73.8 % of respondents are professionals having diploma and above are working on the companies and better interpret activities and understood their working environment.

Table 4.2 Length of service of Respondents

	Frequency	Percent	Cumulative percent
0 – 2 years	28	26.2	26.2
2 – 4 years	63	58.9	85.0
More than 4 years	16	15	100
Total	107	100.0	

Source: survey result

Table 4.3 Level of Education of Respondents

	Frequency	Percent	Cumulative percent
Certificate	28	26.2	26.2
Diploma	45	42.1	68.2
BA/BSC	33	30.8	99.1
MA/MSc or above	1	0.9	100
Total	107	100.0	

Source: survey result

4.3 Green Logistics practice by the purified water bottling companies

4.3.1 System to manage used plastic bottles by the company

Purified water bottling companies plays a major role in the green logistics management practices of used plastic bottles since they are source of the products. Recycling/Reuse is the major activity of producing companies to minimize wastes, usage of energy, lower production costs and increase production rate. The data gathered through questionnaire to the company's employee shows that their company doesn't actively participate in the reusing and recycling activities. Except the 20 liter Jars plastic container which is collected by the company itself for refilling and reuse purpose, the survey result shows that purified water producing companies are not mainly focused on reuse/recycling activities.

14% of the respondents think that their company doesn't have any practical system for reuse of plastic bottles at all, while 18.7% responds that it's in small extent that their company is engaged in reusing activity; 44.9% in a medium way; 19.6% in great extent and only 2.8% of the respondents replied as their company is actively participate on reusing activity of used plastic bottles.

Table 4.4 Return system of plastic bottles for reuse

	Frequency	Percent	Cumulative Percent
Not at all	15	14	14
Small extent	20	18.7	32.7
Medium extent	48	44.9	77.6
Great extent	21	19.6	97.2
Very great extent	3	2.8	100.0
Total	107	100.0	

Source: survey report

Regarding recycling activities, which the companies engaged in supporting and facilitating recyclers and suppliers to reproduce used plastic bottles to other valuable materials, only 21.5% of the answers are supporting that their company is widely engage in recycling activities; while 38.3 agree that their company is on medium extent on recycling activities, 29.9% answered it's on small extent and 10.3 replied as their company is very inactive in recycling activities. The result shows that the company needs to plan strategically for reusing and recycling activities.

Table 4.5 Return system of plastic bottles for recycling

	Frequency	Percent	Cumulative Percent
Not at all	11	10.3	10.3
Small extent	32	29.9	40.2
Medium extent	41	38.3	78.5
Great extent	23	21.5	100.0
Total	107	100.0	

Source: survey report

4.3.2 Creating awareness to the public by the companies

As mentioned earlier, companies have major responsibilities to manage their products and wastes to avoid environmental pollution and do their corporate Social Responsibility as there are obliged to rules and stays on their business when only their customers and peoples stay alive safely. Regarding the purified plastic bottle producers, study conducted in Addis Ababa city shows that 23.2% consumers dispose the plastic container anywhere after use (Matiwos Ensermu 2014) and to minimize such kind of outcome, "does the producing companies create awareness on the society to the public about disposing plastic bottles?" was the question given to the samples, and the 55.1% of the answers show that this activity is in a medium and needs more attention, 18.7% answers of the respondents is "Not at all" means their company doesn't have any involvement to aware the community about disposing plastic bottles, 22.4% responds that it's in very small extent and only 3.7% are replied that their company involves in community awareness programs. As the result showed, a lot needs to be done and no practical work has been done before to aware the customers and consumers after using the waters in the plastic bottles.

Table 4.6 Create awareness to the community

	Frequency	Percent	Cumulative Percent
Not at all	20	18.7	18.7
Small extent	24	22.4	41.1
Medium extent	59	55.1	96.3
Great extent	4	3.7	100.0
Total	107	100.0	

Source: survey result

4.3.3 Top Management awareness and commitment of companies towards Green logistics management

Marketing tutor (www.marketingtutor.net) defines company as a natural legal entity formed by association and group of people to work together towards achieving a common objective. A company is led by a team known as management and according to management principles the management plan, organize, direct and control the day to day activities of the company. If the management has low concern for green logistics practices, so as the whole company flows to the same direction. When a person has a great awareness to the problems it will has also great commitment to solve the problems.

To observe the relation of management awareness and their commitment from the collected data by the purified bottling company's employees, an analysis by Pearson correlations technique is applied and as shown in the below table, it is 0.459, which is between 0.4 – 0.7 and from the result of the survey, there is a positive relationship between Top management and their commitment towards practicing green logistics management in their companies.

Table 4.7 Correlation analysis

Source: Survey result

The data collected from the survey shows that the sample respondents of 20.6 % replied as there's small extent on management team lacks awareness about GLM while 1.9% think that lack of awareness doesn't exist at all; 16.8% of the answers showed top management have great lack of awareness and 60.7% on medium extent.

Table 4.8 Lack of Top management awareness

	Frequency	Percent	Cumulative
Not at all	2	1.9	1.9
Small extent	22	20.6	22.4
Medium extent	65	60.7	83.2
Great extent	18	16.8	100.0
Total	107	100.0	

Source: survey report

Table 4.9 Top management commitment

	Frequency	Percent	Cumulative
Not at all	2	1.9	1.9
Small extent	32	29.9	31.8
Medium extent	41	38.3	70.1
Great extent	23	21.5	91.6
Very great extent	9	8.4	100.0
Total	107	100.0	

Source: survey report

As shown on the above table 4.9, 31.8% of the respondents replied as the commitment of Top management is considered lower as the score is 29.9% and 1.9% for “small extent” and “not at all” options respectively. While 29.9% shows the management team commitment for GLM is higher, by 21.5% and 8.4% for “Great extent” and “very great extent” options respectively, and 38.3% answered as the of management commitment is in a medium extent.

Therefore Top management awareness is low that led to lower commitment in the practice of green logistics management.

4.3.4 Supports to Individual plastic collectors

As mentioned earlier on the related literature review chapter, some producing companies such as “Top Water” is trying to facilitate the green logistics management practice by supporting individual plastic collectors by providing gloves, overalls and by increasing

prices when buying the used plastic bottles. A question was raised to see whether the companies support the collectors of used plastic bottles since they are the main facilitator in collecting the used plastic bottles from streets, household areas, hotels/restaurant, hospital/clinics, Universities, and also sells for recyclers, individuals or private companies. From the result obtained, 4.7% replied as their company doesn't provide any support, 40.2% as some extent or on a low level support, 44.9% as medium and whereas only 10.3% answered that their company provides support for used plastic bottle collectors and facilitate the green logistics management practice.

Table 4.10 Company support to used plastic bottle collectors

	Frequency	Percent	Cumulative
Not at all	2	1.9	1.9
Small extent	32	29.9	31.8
Medium extent	41	38.3	70.1
Great extent	23	21.5	91.6
Total	107	100.0	

Source: survey report

4.3.5 Supports from government

Other than used plastic water collectors and recycler companies, government plays a big role in green logistics management practice of used plastic bottles by regulating rules, providing different supports in finance, training, organizing and facilitating the overall network of GLM. As government is supporting the organized group of youth under MSE whom collects overall wastes in garbage areas of the city of Addis Ababa, the support doesn't include the individual plastic collectors though most of the used plastic bottles are collected by these informal collectors since they are not limited to time as the youth groups of MSE.

Table 4.11 Support from government

	Frequency	Percent	Cumulative
Not at all	10	9.3	9.3
Small extent	44	41.1	50.5
Medium extent	44	41.1	91.6
Great extent	8	7.5	99.1
Very great extent	1	0.9	100.0
Total	107	100.0	

Source: survey report

As depicted in table 4.11, government support to the purified water bottling companies is considered very low (small extent) by 41.1% and furthermore, 9.3% answered that there's not any kind of support from government to their companies, while 7.5% replied the support is at great extent, and 0.9% is very great extent and 41.1% as a medium extent.

4.4 Recyclers and Used Plastic water bottle collectors

From the short interview & discussion with Ato Kemil Mohammed, who has been working in one of the Recycler Companies around shegole area of Addis Ababa, the researcher has noted that most green logistics activity processes are made without the knowhow of the government. Plastic collectors collect the used plastic bottles and sell 2-3 birr per kg to the individuals mostly as they find them easily rather than going to Merkato- Minalesh Tera i.e. Coba Impact Plc.; the big recycling company in Addis Ababa. According to Kemil, Other than Coba impact Plc., two other major recyclers are located in Kality of Addis Ababa and outside of Addis Ababa that have big machine for making cloth and export after crashing the plastic bottles. But the crashing of plastic bottles and production of single use- plastics (plastic bags) is made by hiding from government as most of the individuals do not have license and doesn't fulfill trade registration process. "there is lack of raw materials such as Jeri-can, plastic bottles, cover plastic of plastic bottles are highly needed" as Kemil continues to state the problems that most recycling companies are facing. Even though the recycling business is profitable and pays better to employees as compared with the other businesses, it needs high budget

in order to begin the operation; Discontinuity of Electric power is another issue for recycling companies which needs high power to operate. For example, averagely the company pays 30,000 birr per month.

Fikadu, an Individual plastic collector around Jemo2 area of Addis Ababa told the researcher that he was previously government employee but in order to have flexible working time he began this collection of plastics. He gets the used plastic bottles mainly from household areas and street but due to corona virus pandemic the business is inactive and he isn't getting the plastic bottles as before. Due to the virus he has now only collecting from 2 up to 3 sacks of used plastic bottles per day and sells 3birr per kg if the price is good, and 2 birr if it falls. The flexible working hours enables the informal plastic collectors to have the better chance than the unions that are organized by Addis Ababa City Administration, as the unions are collecting all wastes in the morning time, the rest thrown used plastic bottles falls under the hands of informal collectors. According to Fikadu most informal collectors collects the plastic bottles far away from their living areas as they don't want to be known by the neighboring society due to low priority given to this kind of work activities and from Illiterate individuals there are diploma holders that are engaged in used plastic bottles collecting activity.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

In this chapter, an attempt is made to give a summary of the research findings, conclusions, recommendation and suggestion for further research. The main purpose of this study was to observe the green logistics practice of purified water bottling companies with other stakeholders. Data for analysis was obtained by use of questionnaires and the information obtained was analyzed quantitatively with the aid of statistical package for social sciences (SPSS) version 21 computer software.

5.1 Summary

The main aim of this study is to assess the green logistics management activities of purified water bottling companies in Ethiopia related to the plastic bottles packages. Various related issues have been raised since the companies couldn't alone achieve the expected green environment which is free from plastic pollution. The major stakeholders' coalition has an important role in recycling, creating awareness to the community and facilitating the collection process. Various data collected methods have been used to see the green logistics practices process such as observation of recycling company, short interviews with main stakeholders and by using questionnaires. Fourteen questions are prepared on the questionnaire in a structured way which most of the questions on the questionnaires are taken from previously made research papers regarding on reverse logistics processes of different companies, and also supply chain professionals gave feedback whether the questions can give the desired outcome from respondents and appropriate modification has made.

Most referred books, articles, blogs and websites that are used on this study are written after the year 2016 which the researcher got many ideas. From the data findings processed by SPSS software different comparisons are made from the replies and the researcher identify the below summary points regarding on the green logistics practices of purified water bottling companies.

- Companies are not giving attention for reuse/recycle activities of plastic bottles for themselves and their suppliers, rather than the big 20 liters Jar.

- The companies are only focusing on production and there is not a formal policy document on how to dispose the used plastic bottles but according to ISO and other international agreements, it is the responsibility of the company not to pollute the environment by the package of its products.
- Based on the study, top management of the companies have a knowledge gap on green logistics management and how their product is highly polluting the environment after the use of the purified water, and this knowledge gap has led to low commitment of the companies not to actively participate on recycling/reuse activities which benefit their organization and as a whole the country.
- Producing companies are not actively supporting the used plastic water containers collection process that is made by group of youths who are organized under MSE and individual informal plastic collectors.
- Other than companies, recyclers and plastic collectors, government of Ethiopia is not performing its expected responsibility towards avoiding plastic pollution by making law and facilitating support to the companies.

5.2 Conclusion

Green Logistics Management principle is a wide concept but the research focused on how purified water bottling companies are practicing this principle in regards to the plastic bottles. Even though the companies are not producer of the plastic packages, they know how many plastic bottles are used and distributed to the market after they receive the product from their suppliers, so the major responsibility is the purified water bottling companies and they need to take the lion share of the collection process of plastic wastes as they are also in the midway between their customers and their suppliers. The greatest obstacles relating to organizational and management related problems were perceived to be a lack of top management commitment to reverse logistics, lack of departmental collaboration and resistance to change to include reverse logistics. Not including reverse logistics in strategic planning and lack of top management awareness of the importance of reverse logistics was also perceived to be a major problem, but to a moderate extent. The results indicated that organizational and management-related problems were indeed perceived to be a problem in the organization.

Green logistics management is a young discipline, and not only purified water bottling companies but it's not also practiced well in other business areas and it's considered as a luxury activity without considering its negative impacts which pose on the society through times. Other than business areas, customers and consumers are not taking responsibilities in environmental protection activities towards avoiding plastic pollution as the study made in "Assessment of Reverse logistics on used water and soft drink plastic bottles in Addis Ababa city" shows 28.4% of plastic bottles are collected from the streets of Addis Ababa, 17% from households, 11.4% from landfills, 18.2% from different areas and only 25% is collected from waste bins by plastic collectors (Hagos 2016). The percentages indicate that consumer and customers' participation in safely avoiding plastic wastes is in a low level which shows rules are also important to enforce the community and producing companies to avoid plastic pollution other than making awareness programs.

5.3 Recommendation

The purpose of this study is to evaluate the green logistics management practice activities made by purified water bottling companies with respect to the plastic bottles since plastic pollution is highly affecting oceans, soil, water sewerage pipes in asphalt roads and other related environmental pollutions. Based on this study the researcher put the following possible solution to minimize plastic pollution that's caused by used plastic bottles.

- Purified water bottling companies need to give much concern for reverse logistics activities for reuse/recycle purposes with their suppliers by planning strategically. As they intend to reuse the 20 liter jars, proper mechanisms should be developed with how many times to reuse each plastic bottle since it's common to use again and again plastic bottles for home purposes, churches and mosques.
- Companies have better knowledge than customers on their products and a clear policy on how to dispose the plastic bottles after use is essential and needs to clearly write on the plastic covers for their customers and consumers, arrange public awareness workshops and make advertisement on how to dispose the used plastic bottles and the consequence of plastic pollutions.

- Green logistics management principles needs to be more considered as the major parts of corporate social Responsibility of the companies and with this concern, as companies are expected to avoid other pollutions of chemicals and polluting gases, avoiding plastic pollution must be another area that should be focused by the producing companies and their management team. Even if its outcome is not directly seen like other polluters, it doesn't mean that it will result with high damage through times.
- Companies need to work closer with used plastic bottle collectors by providing different kinds of supports. For example, recycling companies facilitate the collection process by easily reach to plastic collectors in receiving and buying the collected plastic wastes.
- Responsible government bodies ESA, FDA, MOT, ECAE and Addis Ababa city waste Management and Cleansing Agency needs to work together on how companies should operate with the rules and regulations in ingredients of plastics, community awareness on disposing plastic bottles, recycling processes, reuse of plastic products and waste collection process. It needs also minimize the bureaucracy of government offices for overall green logistics activities in order to smooth the practice

5.4 Suggestion for Further research

Further researches are necessary on the waste plastic management processes on how to minimize the effect of used plastic bottle pollution including other plastics with full supply chain actors. Considering the wide acceptance and usage of plastic products, how to replace plastic bags by other packaging materials needs also to be the main focus area. As Ethiopia doesn't seems at the right time to ban the usage of plastics because still right now the majority of the people, small shops and even big supermarkets highly use the package of plastics including the 0.3 mm banned plastic bags.

References

Abiy Zegeye, Alemayehu Worku, Daniel Tefera, Melese Getu, Yilma Seleshi, September 2012, *Introduction to research methods, preparatory module for Addis Ababa University graduate programs,* Addis Ababa city administration urban planning, sanitation and beautification bureau solid waste manual plan.

Adane L., Muleta D., August 2011, *Survey on the usage of plastic bags, their disposal and adverse impacts on environment: A case study in Jimma city, southern Ethiopia*, Journal of Technology and Environmental Health Sciences Vol.3(8) pp. 234-248.

Addis fortune, July 2018, Volume 13.

Amemba, S.C., Nyaboke, P.G. / Osoro A. and Mburu N., 2013, *Elements of green supply chain management,* European journal of Business and Management.

Azevedo, S.G., Carvalho H., & Cruz Machado, Volume 2011, *The influence of green practices on supply chain performance: a case study approach,* Transportation Research Part E: Logistics and Transportation Review.

Asian network for scientific information 2014, *Assessment of contemporary municipal solid waste management: the case study of Ethiopia.*

Ben Foley, 2018*, Purposive sampling 101,* survey gizmo.

Beamon, B.M. 1999, *Designing the green supply chain,* Logistics Information Management.

Betelhem Guta, AAU June 2016, *Relationship between reverse logistics practices and organizational performance,* Addis Ababa, Ethiopia.

Birhanu Fikade, 22 June 2019, *Ethiopia: plastic pollution – Ethiopia's reaction*, the reporter, Addis Ababa.

Camila Louise Bjerkli, July 2015, *The cycle of plastic waste: An analysis on the informal plastic recovery system in Addis Ababa, Ethiopia* (Master Thesis), NTNU.

CSCMP, *Vide Council of Supply Chain Management Professionals*.

Codex, 2012, *Standard for Natural Mineral Waters*, Codex Standard 108 -1981, IS 1050: 2012

Creswell, J.W. 2009, *Research design: qualitative, quantitative, and mixed methods approaches 3rd edition*, LA: Sage.

De Giovanni, P. & Esposito Vinzi, N.2012, *Covariance versus component– based estimations of performance in green supply chain management*, international journal of production economics.

Doria MF*, Bottled Water versus Tap water, 2006, Understanding consumers, preferences,* Journal of water and Health.

Eltayeb, T.K, Zailani S., & Ramayah T., 2011, *Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes, resources, conservation and recycling.*

Ermias Kiros G/Mariam, May 2018*, Evaluation of commercial bottled drinking waters in Addis Ababa city,* Ethiopia*.*

European federation of bottled waters*, Achieving sustainable life cycle,* EFBW first sustainability report.

Elias Mazhindu, Trynos Gumbo and Tendayi Gondo, October 26, 2012*, Waste management threats to human health and urban aquatic habits - A case study of Addis Ababa*, Ethiopia.

Ethiopian environmental policy, EFDRE federal negarit gazeta.

Faris Alshubiri, March 2017*, The Impact of green logistics – based activities on the sustainable monetary expansion indicators of Oman,* Dhofar University, Oman.

Fortes, J 2009*, Green supply chain management: a literature review,* Otaga management graduate review.

Hazan, B. T., Cegieiski, C. and Hanna J.B, 2011, *Diffusion of green supply chain management examining perceived quality of green reverse logistics*, the international journal of logistics management.

Helen Walker, Neil Jones, 2012, *Sustainable supply chain management across the UK private sector", supply chain ... environmental logistics and green supply chain management*.

Hugh, March 2019, *Environmental impact of plastic bottles and bottled water (facts)*

Huscroft, J.R.Jr, 2010, *The reverse logistics process in the supply chain and managing its implementation*, Auburn, AL, Auburn University.

*J*oan Reinbold, March 2018, *Ancient water purification methods*

Jhon Wiley, 2005*, MWH's water treatment: principles and design- 3rd edition,* United States of America.

Kazim Sari, 2018, *The impact of green logistics practices on firm performance; evidence from Turkish health care industry,* Beykent University, Istanbul, Turkey.

Kumar A., 2015, *Green logistics for sustainable development: an analytical review,* IOSRD International Journal of Business.

Laosirihongthong, T., Adebanjo, D., & Tan, K.C., 2013*, Green supply chain management practices and performance,* industrial management & data system.

Marketing Tutor, viewed on May 14 2020*,* www.marketingtutor.net.

Matiwos Ensermu (PhD.), September 2014, *Trends in bottled water use survey in Addis Ababa: Implication on reverse logistics of bottled water manufacturing in Ethiopia,* International journal of science and research (IJSR).

Maxwell, J. A. 1996, *Qualitative research design: An Interactive Approach London*, Applied Social Research Methods Series.

Mugenda, M.O. and Mugenda, G.A., 2003, *Research methods: quantitative and qualitative approaches*, Nairobi.

Olavarrieta, S., & Ellinger, A.E., 1997, *Resource - based theory and strategic logistics research,* International journal of physical distribution & logistics management

Rodwan JG, 2011, Bottled water: the recovery continues – US and international developments and statitics, Available at: URL:www.bottledwater.org.

Saunder, L. and Thorn H., 2001, *Research perspective: stage publication*, London.

Selamawit Alem, 2006, *Solid waste management in Addis Ababa, manual 2012, with respect to urban plans, sanitary landfill sites and solid waste management planning,* Addis Ababa.

Sirak Wondimu, March 2016, *Measuring performance of reverse logistics system in pet bottles recovery in EABSCo.* Addis Ababa, Ethiopia.

Stephanie Glen, July1, 2016, *Reliability and validity in research: definitions, Examples*. Urban Development Indicators Finance & Economic Development Bureau. http://www.epa.gov/osw/conserve/materials/plastics.

Sirintip Prapakornvemol, 2009*, Adaptation of Thai Industry towards green logistics*, Science thesis master, Chulalongkorn University.

Wijittra Srisorn, 2013, *The Benefit of green logistics to organization*, world academy of science, engineering and technology, International journal of social, Behavioral, educational, economic, business and industrial engineering Volume: 7, No:8, 2013.

APPENDIX
Questionnaire

Addis Ababa University School of Commerce

Department of Logistics and Supply Chain Management

Dear respondent,

This research intends to determine the extent to which purified water bottling companies adopt green logistics practices concerning the relationship among the companies, customers and other major stakeholders. The information obtained from this survey shall keep confidential, and shall be used strictly for academic purposed only. Most of the questions can be answered by simply making a tick in a box. Your participation in this survey shall be highly appreciated.

Thank you very much!

Section A: General Information

1	Which department /section you are working for?	
2	Which position you are currently enrolled?	1. Management ☐ 2. Worker ☐
3	Length of service in the company?	1. 0 - 2 years ☐ 2. 2-4 years ☐3. More than 4 years ☐
4	Level of Education?	1. Certificate☐ 2. Diploma☐3. BA ☐ 4. Masters & Above ☐

Section B: Green Logistics Practices

Indicate the extent to which your organization has implemented to the following green logistics practices. There are five options to answer [1] Not at all, [2] small extent, [3] Moderate, [4] Great and [5] Very great extent. Please put check mark "√" on the box provided that reflects your idea.

	Green logistics practices	1	2	3	4	5
1	There is return system for used packaging materials to suppliers for reuse					
2	There is return system for used packaging materials to suppliers for recycle					
3	Our organization has well documented policy about disposing plastic bottle.					
4	Our organization creates awareness to the public about disposing plastic bottles after use.					
5	Our organization is capable of generating energy from renewable sources of energy					
6	Lack of top management awareness exists in the company about green LM.					
7	Top management commitment on the practice of green logistics.					
8	Are there seasonal variations in the production of purified waters					
9	Our company supports used plastic bottle collectors					
10	Our company gest supports from the responsible government body regarding on reuse/ recycle or disposing used plastic bottles example. Training, facilities, any means					

Thank you for your cooperation!

መጠይቅ ለተጣራ ውሃ አምራች ፋብሪካዎች

አዲስ አበባ ዩኒቨርስቲ

ሎጂስቲክስና ሰፕላይ ቼይን ማኔጅመንት ዲፓርትመንት

ይህ መጠይቅ የተዘጋጀው የተጣራ ውሃ ፋብሪካ ማምረቻ ፋብሪካዎች ከሌሎች ባለድርሻ አካላት ጋር በመሆን አካባቢን ፅዱና አረንጓዴ በማድረግ ደረጃ እያደረጉ ያሉትን ተግባራት በጥናት ለመመልከት ነው፡፡ በዚህ መጠይቅ ላይ የሚመለሱ ምላሾች በሚስጥር የሚጠበቁ ሆነው ሙሉ ለሙሉ ለትምህርታዊ ግብዓት ብቻ የሚውሉ ይሆናል፡፡ አብዛኞቹ ጥያቄዎች በቀላሉ ምላሽ ለመስጠት ቀለል ብለው የተዘጋጁ ሲሆኑ ስም መፃፍ አስፈላጊ አይደለም፡፡

ስለ ትብብርዎ በቅድሚያ አመሰግናለሁ፡፡

ክፍል ነ) አጠቃላይ መረጃ

ነ	በየትኛው የስራ ክፍል ውስጥ እያገለገሉ ይገኛሉ?	
2	የስራ መደብ መጠሪያ?	
3	የአገልግሎት ጊዜ?	0 - 2 ዓመት ☐ 2. 2-4 ዓመት ☐ 3. ከ 4 ዓመት በላይ ☐
4	የትምህርት ደረጃ ?	ሀ. ሰርቲፊኬት☐ ለ.ዲፕሎማ ☐ ሐ. ዲግሪ ☐ መ.ማስተርስ ና በላይ☐

ክፍል 2) የአካባቢ ጥበቃ ክንውን

ከተቀመጡት 5 አማራጮች ውስጥ መስሪያቤትዎ በምን ያህል ደረጃ የአረንጓዴ አካባቢን ጥበቃ እያከናወነ እንዳለ " √" በማድረግ ይመልሱ፡፡ የተቀመጡት 5 አማራጮች የሚያመለክቱት 1) በጭራሽ 2) በጥቂቱ 3)በመካከለኛ ደረጃ 4)በሚገባ 5)በከፍተኛ ደረጃ

	አካባቢ ጥበቃ ክንውን ተግባራት	**1**	**2**	**3**	**4**	**5**
1	ያገለገሉ ፕላስቲኮችን ለማሰባሰብና መልሶ ለመጠቀም (ይዞታቸው ሳይቀየር) የተዘረጋ ጥሩ አደረጃጀት አለ					
2	ያገለገሉ ፕላስቲኮችን ለማሰባሰብና ለሌላ ግልጋሎት እንዲውሉ (ይዞታቸውን በመቀየር) ለማድረግ የተዘረጋ ጥሩ አደረጃጀት አለ					
3	መስሪያ ቤቱ በጥራትና በደንብ የተዘጋጀ ያገለገሉ የፕላስቲክ መጠጫዎችን የማስወገጃ ፖሊሲና መመሪያ አለ					
4	መስሪያ ቤቱ ለህብረተሰቡ ስላገለገሉ የውሃ ፕላስቲክ መጠጫዎች አወጋገድ የግንዛቤ መስጫ መድረኮችን ያዘጋጃል					
5	መ/ቤቱ ከታዳሽ ኃይሎች ኃይል የማመንጨት በቂ አቅም አለው					
6	የድርጅቱ ዋና ዋና የስራ ኃላፊዎች ስለ አረንጓዴ አካባቢ ጥበቃ በቂ ግንዛቤ የላቸውም					
7	የድርጅቱ ዋና ዋና የስራ ኃላፊዎች አረንጓዴ አካባቢ ጥበቃ ለመተግበር ያላቸው ተነሳሽነትና ዝግጁነት					
8	የተጣራ የውሃ ምርት ከወቅቶች አንፃር ተለዋዋጭ ነው					
9	መ/ቤታችን ያገለገሉ የውሃ መጠጫ ፕላስቲኮችን ለሚሰበስቡ ድጋፍ ያደርጋል					
10	መ/ቤታችን ከመንግስት የሚመለከተው አካል ያገለገሉ የፕላስቲክ መጠጫዎችን መልሶ ጥቅም ላይ ስለማዋልና ስለማስወገድ ድጋፍ ያገኛል፡፡ ለምሳሌ በስልጠና፣ በመሳሪያዎች ወይም በተለያየ መንገድ					

አመሰግናለሁ፡፡