SOCIO-ECONOMIC IMPACTS OF BEDELE BREWERY SHARE COMPANY: A Case Study on the South Western Ethiopia

A Thesis Submitted to the Post Graduate Studies of Jimma University for Fulfillment of the Award of the Degree of Masters of Business Administration (MBA)

Prepared by:

ANTENEH GETACHEW

Under the guidance of

MOKONNEN BOGALE (PhD)

And

WONDIMU ABULE (Assistant professor)

JIMMA UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANAGEMENT MBA PROGRAM

JUNE, 2018

JIMMA, ETHIOPIA

TITLE PAGE

SOCIO-ECONOMIC IMPACTS OF BEDELE BREWERY SHARE COMPANY:

A Case Study on the South Western

Acknowledgements

The first and foremost gratitude deserves to the Almighty God, for giving me the robust health and wisdom that made it possible for me to have another academic triumph.

My next deepest gratitude goes to My Advisors Dr Mokonnen Bogale and Mr Wondimu Abule

I am also grateful to Bedele Brewery Share Company officials and the respondents for giving me accurate data

Finally, I would like to acknowledge my family and friends for their support and encouragement.

DECLARATION

JIMMA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

The Socio-economic impacts of Bedele Brewery Share Company:

A case study on south western Ethiopia

By: Anteneh Getachew Daba

Approved by the Board of Examiners:

_____	_____
Main Advisor	**Signature**
_____	_____
Co Advisor	**Signature**
_____	_____
Examiner (External)	**Signature**
_____	_____
Examiner (Internal)	**Signature**

Table of Contents

List of Abbreviations

BBSC ----------Bedele Brewery Share Company

HBSC ---------- Heineken Brewery Share Company

HL ---------- Hectoliters

GDP ---------- Gross Domestic Product

UNECA ---------- United Nations Economic Commission for Africa

AU ---------- African Union

EU ---------- European Union

NBE ---------- National Bank of Ethiopia

OR_____ Odd ratio

US_____ United states

PWW_____ Industrial Process wastewater

SWW_____ Sanitary wastewater

List of Tables

Abstract

In Ethiopia Industrial sector in general and manufacturing in particular suffers lack of appropriate policy for many years like most of developing countries. After lack of encouragement from government for many years, new policy was adopted by Ethiopian government; which focused to solve problem of infrastructure and giving tangible governmental support. As a result, manufacturing sectors expansions was better than another sector in general and brewery industry in particular. However, corporate social responsibility issue was the hidden agenda for many years. Because of this, many households who are living surrounding manufacturing industries are suffering economic, social and environmental problems. So the aim of this study was to examine socio-economic impact of BBSC in southwest Ethiopia, in the case of Bedele, Agaro and Mettu towns. The study was conducted using cross-sectional data collected in 2018. This study employed a multi-stage sampling approach and a total sample size of 187 households from the stated study areas. The results of Socio-economic impact of BBSC on surrounding community were examined by using of descriptive analysis and logistic regression model. The results indicate that the socio-economic of surrounding community was determined by family size, marital status and being employee of BBSC. According to the result, 58% of the respondents reported that, BBSC is not participating on the social infrastructure construction and 44.9% of them responded BBSC is protecting the environment by not releasing harmful waste materials to the environment. The probability level of BBSC employee to be saving monthly is higher by 7% as compared to non-employee of BBSC. The study result indicates that, employee of BBSC monthly saving is higher than that of non-employees of BBSC. Employee of BBSC and monthly saving has a positive relationship as expected. The probability level of participation in monthly saving of households who have less than 5 family sizes is higher by 7% as compared to those households in the second category. The probability level of participation in monthly saving of single respondents is higher by 53% as compared to married respondents. Depending on this result, married respondents may invest on their family than the single respondents. Depending on the logistic regression result, employees of BBSC are in a better position economically compared to that of nonemployees of BBSC. The participation of BBSC on social infrastructure construction is appreciable but it is not as expected by the society surrounding the area of operation of the brewery. It is observed that the environmental conditions are taken care of by the company by planting waste water treatment plant and through breakage handling. The stakeholders of the company have not enough information about the undertakings of the company. The company has to create awareness about the things that are carried out by the company through different channel of communication. BBSC has to focus on the major problems of the surrounding society and by allocating enough funds. And those infrastructures constructions have to cover wider areas so that the societies around the company grasp equal benefits to that of Bedele town. Finally, the company has to give trainings and workshops to the stakeholders about the environmental protection techniques, water usage and waste water management.

Key words: *Scio-economic, environmental impact and Logistic regression*

CHAPTER ONE
INTRODUCTION

1.1. Background of the Study

Industrial development on the earth surface is a major source of growth, especially since the industrial revolution of the 18th century in England (Banii, 2000). The brewing industry has constituted a major focus of interest in industrial organisation economics since the 2nd world war (Scherer, 2000). The pattern of growth in brewery industry dates back to1200AD, when the German brewery was established and it brought about a formal system of manufacturing which boosted the emergence of Europe as a strong growth pole (Room, 2000)

A brewery is a dedicated building for the making of beer, though beer can be made at home, and has been for much of beer's history. Thus, a company or industry that makes beer is called either a brewery or a brewery industry. The diversity of size in breweries is matched by the diversity of processes, degrees of automation, and kinds of beer produced in breweries. Generally, world beer production has been on upward trend with minimum annual growth rate of 1.3% from 2000-2003. The growth of beer production has been remarkable in Asia, Europe and America. But in Africa and Australia, production growth rate has remained at less than 1%. Europe is the world's leading region in beer production with a growth rate of 1.5% from 2000-2003, followed by the USA, Asia, Africa and Australia (Babor, 2008)

The Ethiopian economy is a typical dual economy, in the sense that it has a predominantly agricultural sector, and only a minor industrial and service sector. The dominating agricultural sector accounts for about 50 per cent of GDP; the remaining output is divided to others, mainly to the service sector (NBE, 2004/05). South western Ethiopia economy is highly relied on agriculture specifically it is a cash crop area.

International breweries are helping transform Ethiopia's business landscape as it slowly sells the assets of the former communist state and opens up to foreigners drawn to one of Africa's fastest growing economies. Heineken, Diageo and Bavaria, have snapped up state owned breweries or built new ones in the past 7 years, introducing new beverages and increasing competition for St

George, Ethiopia's oldest beer brand that was itself bought by France's Castel Group in 1998. (Www. Rueters.com, April 1, 2015). As per the explanation of Reuters multinational beer industries are looking for Ethiopia as their target market due to the fastest economic growth seen recently and the increase in the size of the population.

Heineken bought state-owned Bedele and Harar Breweries for a combined $163 million in 2011, introducing the Walia beer at the newly established new brewery at Kilinto, Addis Ababa, which bars staff in Addis Ababa say is catching up St George. (Www. Rueters.com, April 1, 2015). Heineken launched non-alcoholic drink called Buckler in 2016 and started producing Heineken beer for high income consumers in 2016.

Diageo bought state-owned Meta Abo brewery for $225 million in 2012 and has doubled brewing capacity and invested in new brands. The UK based global spirits group has reportedly outbid its major rivals SABMiller and Heineken by $35m. It launched Zemen Beer in December and non-alcoholic Malta Guinness in August 2013. It also launched Azmera beer for lower income consumers, Jano beer for middle income consumers and Guiness for higher income ones. The international maker of spirits such as Johnnie Walker whisky and Smirnoff vodka said it plans to expand Meta Abo by introducing new products. Meta Abo is said to be the last Ethiopia's state-owned brewery to be sold. (www.nazret.com, 01/04/2017). Currently Heineken and Diageo are the biggest multinational company competing each to take over the market leadership from BGI Ethiopia.

Ethiopian Privatization and Public Enterprise Supervising Agency said, in addition to Diageo's $225m bid, there were three more bidding companies for the deal - Southwest Development /Sab Miller with a combined $190m bid, Heineken with $188m and Dashen with $173m. Meta Abo brewery was established by the Ethiopian Government and Ethiopian private nationals in 1963 as a share company. Initially, the production capacity of the brewery was 50,000 hl. Per annual. The brewery supplies 55% of its product to distributors and 45% to retailers. (www.nazret.com,01/04/2017).

New breweries also started to join Ethiopian market. Habesha Brewery owned by Bavaria of Holland located around Debre Brihan started operation with the production capacity of 600,000 hectoliters. Zebidar brewery which is located in Gurage zone around Emdber near to Wolkite

town also started operation in 2016. Raya Beer also another newly joined beer factory from the northern part of the country from Maichew town with a total production capacity of 300, 000 hectoliters.

1.2. Statement the Problem

Corporations besides their monetary benefits that they earn as a profit, they contribute to the nation's economy in terms of employment creation that implies to the increment in disposable income of citizens and by the tax they are obliged to pay from the income they generate. And also now a days, these corporations used to subcontracting some of their operations to the local companies by which they transfer knowledge and skills to the locals.

In addition to this obligations, companies are accountable to undertake corporate social responsibilities in the society they are operating in and has to give due emphasis to protect the environment. Corporate social responsibility is a framework for formulating and employing the expanded roles and responsibilities of the corporate sector to include incorporation of the opportunities and needs of a wider community in the business model. In the areas of environment, social and community development, employment and labor and human rights (UNECA & AU, 2010).

The actual practice of social responsibility in the developing world is not a wide spread phenomena. As stated by UNECA & AU (2010), even though, most of the issues are included in the various laws and policies of the country, their implementation is inevitably lagging behind; that may be due to lack of full awareness of the relevant practices and its consequences. Some companies are also reluctant to the implementation of such rules as costs might be a reason for them. The statement by UNECA & AU also, shows that, a company's performance and business in general could not be measured solely by gaining economic profit to the organizations. Rather its shareholders and managers should be responsible for all others who directly or indirectly affect or are affected by a firm's business activities.

Countries are encouraging foreign direct investment by giving incentives through long term loan, tax advantages and other resources that are helpful to undertake the investments without any problem. Because of globalization corporations are seeking to expand to the fast growing

developing countries' economies. Different multinational brewing companies like Heineken, Diageo and Bavaria joined the growing Ethiopian beer market recently. Heineken bought Bedele Brewery Share Company and Harar Brewery Share Company in 2011 for a combined $163 million. (www.nazret.com,01/04/2017).

After owning BBSC and HBSC, Heineken started to reorganize the breweries to the standards of the Heineken International. It undertaken different reforms; like changing the old machineries that were under operation for more than 18 years and deploying high technology machineries that are efficient and effective on production. These reforms forced the company to right size the employees of the company which is assigning the right worker for the right task. This resulted in reduction of workers from the company. The society was against the right sizing process.

According to a pilot study conducted by the researcher in September (2018), the local society rose that BBSC is not undertaking its responsibilities that benefits the society around the area it operates. They are asking the company to invest on so many projects in the area like stadiums, roads and so on.

"… With an organization recognizing that its actions affect the external environment, and therefore assuring responsibility for the effect of its actions." (David and Guler, 2008)

Environmental protection is the other key element that the company has to focus on. Many question the dedication of the company on environmental protection due to the reason that there are plenty of disposals from operations of the brewery to the environment.

The vulnerability of poor countries is due to weak institutional capacity, limited engagement in environmental and adaptation issues, and a lack of validation of local knowledge (Adams *et al*., 1998)

However, according to Bedele town annual report, (2016) and from my personal observation, the society around the company stressed that the company is not giving them the appropriate benefits in terms of employment, income generation, participation on social activities, on environmental protection and social infrastructures as the company responsibility and rules of study country as well as international level corporate social responsibility.

This research investigated the actual impacts of BBSC on the society mainly on three basic elements, i.e. economic impacts, participation on social infrastructure and implementation of environmental protection by company.

Therefore the main research questions that needed to be addressed in this study are;

1. What are the economic benefits BBSC are rendering to the society?
2. To what extent BBSC is participating on infrastructure through sponsorship?
3. How BBSC is protecting the environment?

1.3. Objectives of the study

1.3.1. General Objectives

The general objective of this paper is to assess the socio economic impacts of BBSC.

1.3.2. Specific Objectives

The specific objectives of this research are to:

- ✓ Estimate the economic impacts of BBSC for the local society
- ✓ Identify the extent of participation on the construction of local infrastructure of BBSC
- ✓ Identify the environmental impacts of BBSC

1.4. Significance of the Study

Eradicating poverty and achieving development requires effective employment and efficient use of resources. However, few studies have been done to establish the link between brewery industry and their socio-economic impact. Even the studies conducted earlier have mainly focused more their relationship at national level.

This study investigated the impact of Bedele brewery Share Company at household level. Thus, the study gathered basic evidences, which shall be also, serve as inputs for researchers and policy makers who may further wish to consider the subject matter of this investigation in the future. Understanding whether or not brewery companies are really effective in economically as well as

socially at micro level have important for policy implication in general. With this regard the study brings important findings regarding the impact of brewery industries on the socio-economic at micro level in the study area.

1.5. Scope and Limitation of the Study

The study was more comprehensive if it encompasses the whole region. Also, this finding may not be applicable beyond the stated region (southwestern Ethiopia) as well as the study county. Also, it was better if this study covered macro level impact. Similarly, the study is delimited to impact of socio-economic in the study. In addition to the stated scope and limitations, there is also budget and time limitation to cover the general impact of the factory at micro and macro level impact. And also lack of reference materials are one of the limitations.

1.6. Organization of the Study

The study has five chapters. Chapter one is concerned with the introductory part including background of the study, statement of the problem, objective of the study, significance of the study, scope and limitation organization of the study. The second chapter of the study deals with literature review, which comprises the theoretical and conceptual framework and Chapter three deals with methodology used for this study. Chapter four deals with results and discussions, and the last chapter comprises summary, conclusion and recommendations.

CHAPTER TWO

LITRATURE REVIEW

2.1. Background of Beer Industry

The first recorded recipe for beer, as it is known today, was *Hymn To Ninkasi* inscribed in rock approximately 4000 years ago in Mesopotamia (Hornsey, 2003). Subsequently, human beings began to develop their community structure around commodity grain products which were used directly to produce bread and beer (Protz, 2004). The creation of this fermented alcoholic beverage has always been influenced by water sustainability motives, as a sometimes safer alternative to polluted drinking water or a lack-thereof in the absence of modern sterilization and treatment technologies (McGovern et. al. 2004).

Barrels of beer, free of water-borne illness and sea-salt, were necessary commodities for sailing voyages across the globe (Protz, 2005) (Stubbs, 2003). Beer in wooden casks provided sailors and explorers with an essential source of nutrition, hydration, and entertainment, where treating seawater to drink was simply unfeasible (Stubbs, 2003). Without the utilization of this fermented beverage, ocean crossing voyages responsible for many history-altering discoveries would have been essentially impossible (Protz, 2005).

Beer is composed of four basic ingredients: Water, hops, malt, and yeast (Bull, 1984). These constituent ingredients all require the usage of energy and water. Globally the brewing industry has seen a massive increase in consumer demand due to a renewed appreciation for more uncommon varieties of beer. Particularly the United States has seen exponential growth in it's number of breweries, number of beer styles, and gallons of beer being produced over the past decade (Brewers Association 2012).

Across the brewing industry, there is a clear motive toward sustainable practices which cause a benefit for the environment as well as the business. I am creating this comparative study to show what sustainability means in the brewing industry by utilizing published literature and my own research with industry professionals. Through the analysis of traditional and modern production methods, examples of brewery waste reduction efforts, efficient equipment design, and interviews with industry peers; I will create a definition for the modern sustainable brewery. This

is highly relevant to the industry by providing standards which breweries can strive for. We are all sustainably minded as brewers because of our direct contact with water. Providing greater insight towards these new and easily applied efficiency techniques gives everyone an advantage in the future of brewing. While there are several leading examples of what sustainable breweries can represent; the study connects brewing to water, food, transportation, and other facets of sustainability to educate fellow brewers and consumers about the impact we can; and have created on a global scale. The brewing industry has the ability to provide benefits on every level from the environment to employees, communities, consumers, and other industries as well. With more breweries opening every year across the country, this has resulted in the increased use of hops, malt, yeast, and most importantly water (Brewers Association, 2012). Also, between 2010 and 2015, the number of breweries in the United States more than doubled from 1800, to over 4200 (Brewers Association 2012). This increased demand has resulted in a larger share of natural resources including water and agriculture being allocated specifically for the brewing sector. Based on sustainability research from New Belgium, Sierra Nevada, and the Brewer's Association, there is large potential for waste use reduction across the industry (Abass A. Olajire (2012)).

According to Ben Wenger (2017) stated, the modern sustainable brewery is defined by a consideration to improve all aspects of production, resource efficiency, and distribution to the customer. Through the development of auditing procedures to benchmark the efficiency of a brewery, industry leading companies have provided inspiration for sustainability to an entirely new generation of craft brewers. Utilizing proven benchmarking methods, combined with the analysis of defining a sustainable brewery, Powder Keg Brewing Company implemented a benchmarking audit in order to assess current efficiency and find areas of process improvement. Breweries may represent only a small portion of water intensive industries; however, the greater effect of sustainability in brewing provides a worldwide benefit to businesses, humanity, and the environment.

2.2. Relationship between Beer Producing and Environment

As Ben Wenger (2017) stated, From grain to glass, all aspects of brewing and delivering beer to the marketplace are burdened with environmental issues, with water and energy consumption

being the two primary natural resource considerations. Carbon emissions are primarily proportional to energy consumption. Barley farming and beer production are the largest consumers of water. In the brewery itself, water consumption is expressed as a ratio of water used to actual beer produced. All of these impacts can best be categorized in three broad areas: (a) upstream the production and transportation of raw materials that will turn into beer and beer packaging; (b) operations the resource consumption that can be tied directly to the brewery and the process of making beer; and (c) downstream the transportation and refrigeration of beer after it leaves the brewery (Abass A. Olajire (2012).

Glass manufacturing, barley production, and malting make up more than three-quarters of the upstream environmental impact of making beer. Glass made with a high percentage of recycled content uses significantly less energy, reducing the glass part of the equation significantly. In countries with national bottle recycling or reusable bottle mandates, the impact of glass as a container for beer is considerably reduced. The embodied energy necessary to make aluminium cans is more than that for glass while its weight for transportation is less, making it comparable overall to glass. Stainless steel kegs make a smaller impact because of their reusable nature. A marketplace strategy using refillable containers and kegs could have terrific benefit for the environment. Traditional growing methods for barley, which require repeated tilling of the land and application of fertilizers and pesticides, have a heavy environmental footprint. Low and no-till methods could decrease this impact, and organic malts would further reduce the overall equation as fertilizers have a heavy carbon footprint of their own. Because intensive tilling practices disrupt the normal storage of organic carbon in the soil, the assumed carbon offset from this natural process is less likely to be realized. Brewers desire a plump barley kernel, which makes irrigation a general practice although barley can be grown as a dry land crop. Barley is steeped, germinated, dried and sometimes roasted in the production of malt for brewing. Drying and roasting are the most energy-intensive parts of this process, using both electrical and heat energy (Abass A. Olajire (2012).

A proactive management approach permits organizations to save money by foreseeing and evading expenditures arising from environmental damage, and minimizing the cost of complying with future legislation. Likewise, operating expense can be lessened through waste minimization, pollution prevention, and the elimination of health and safety hazards (Sarmento et al. 2006) [38

Production of beer at the brewery is the smallest part of the environmental impact calculation. If generally accepted practices are adopted heat exchange for cooling wort and attention to energy and water consumption and conservation brewery operations account for less than 20% of the overall environmental impact. Electrical energy production is a significant factor in this calculation, so subscription to high-quality renewable energy programs can make a measurable decrease in overall carbon consumption and emissions. Breweries that are environmentally committed can have carbon emissions that hover around 5% of the beer's total carbon impact. With a generally accepted industry standard of finished beer-to-water ratio of four and a half barrels of water to one barrel of beer, any effort toward water reduction would be fruitful. Breweries use a lot of water to make beer, especially due to the rigorous and constant cleaning that is necessary during almost every part of the brewing process. A ratio of 3.25 to 1 is considered excellent throughout the world. Many international breweries have set aggressive targets around water usage. According to Banerjee (2001), Beer is also heavy. Transportation by truck to far-away markets carries a formidable environmental cost. Given that, surprisingly, the largest single impact along the beer supply chain is refrigeration at retail, which weighs in at more than 25% of the total carbon footprint. Beer is best when stored at cool, consistent temperatures. Shelf life stability is an on-going area of concern, especially as beer travels farther away from the brewery. Brewers have two competing imperatives; the first is the need to maintain quality all the way to the beer drinker, and the other is the increasing imperative to cut back on environmental impacts. This will challenge brewers in the coming years, especially with the burgeoning demand for distinctive beers from smaller breweries around the world.

In effect, managers must start to consider environmental management a basic part to obtain sustainable competitive advantage (Hunt and Auster, 1990). According to Banerjee (2001), environmentally conscious management is the understanding of environmental issues by organizations and integration of these issues with company's' decision making process. Therefore, environmentally conscious management is an essential part of corporate social responsibility.

2.2.1. Water Consumption

Water is a very substantial ingredient of beer, composing of 90e95 percent of beer by mass. Water is utilized in almost every step of the brewing process (van der Merwe and Friend, 2002).

The chemistry of the water can influence not just the taste but also the brewing efficiency. Therefore, it is essential that water supply by local water authorities is converted into acceptable brewing liquor. This can be achieved by the removal of unwanted ions and addition of required levels of desirable ions. Water consumption for modern breweries generally ranges from 0.4 to 1 m3/hL of beer produced (Hannover, 2002). The water consumption varies depending on the type of beer, the number of beer brands, the size of brews, the existence of a bottle washer, how the beer is packaged and pasteurized, the age of the installation, the system used for cleaning and the type of equipment used. Bottling consumes more water than kegging. Consumption levels are high for once through cooling systems and/or losses due to evaporation in hot climates.

An efficient brewery will use between 4 and 7 L of water to produce 1 L of beer (EC, 2006). In addition to water for the product, breweries use water for heating and cooling, cleaning packaging vessels, production machinery and process areas, cleaning vehicles, and sanitary water. Water is also lost through wort boiling and with spent grains. Large quantities of good-quality water are needed for beer brewing (van der Merwe and Friend, 2002).

2.2.2. Brewery Wastewater

Wastewater is one of the most significant waste products of brewery operations. Even though substantial technological improvements have been made in the past, it has been estimated that approximately 3e10 L of waste effluent is generated per liter of beer produced in breweries (Kanagachandran and Jayaratne, 2006).

The quantity of brewery wastewater will depend on the production and the specific water usage. Brewery wastewater has high organic matter content; it is not toxic, does not usually contain appreciable herbicides and is easily biodegradable (Brewers of Europe, 2002).

Wastewater from breweries is divided into three types; viz:

(a) Industrial Process wastewater (PWW)

(b) Sanitary wastewater (SWW) from toilets and kitchens; and

(c) Rain water.

The brewery's SWW will contribute only small loading whether measured as organic material or as flow, but it will require attention in regard to the clogging of pumps and screens. Rain water should be discharged to a separate drainage system, as it can interfere with the operation of a wastewater treatment plant (Brauer, 2006).

The amount of PWW from a brewery will depend on the extent of production and the efficiency of water usage. The pollutant load of brewery effluent is primarily composed of organic material from process activities. Brewery processes also generate liquids such as the weak wort and residual beer which the brewery should reuse rather than allowing to enter the effluent stream. The main sources of residual beer include process tanks, diatomaceous earth filters, pipes, beer rejected in the packaging area, returned beer, and broken bottles in the packaging area (Brewers of Europe, 2002). The concentration of organic material depends on the wastewater-to beer ratio and the discharge of organic material as wastewater. The concentration of organic material is usually measured as chemical oxygen demand (COD) or biological oxygen demand (BOD) (Wen et al., 2010). If not otherwise indicated, BOD is measured for a five-day period, which is considered a standard incubation period.

Large discharges can occur, and may be attributable to discharge of surplus yeast, trub or other concentrated wastes, which could be disposed of in a better ways. Nitrogen and phosphorus levels are mainly dependent on the raw material and the amount of yeast present in the effluent. Nitrogen concentration will often be in the range of 30e100 g N/m3 (Brewers of Europe, 2002). Nitrogen comes from malt and adjuncts. Nitric acid used for cleaning may contribute to the total nitrogen content. However, the concentration will depend on the water ratio, amount of yeast discharged, and the cleaning agents used. Phosphorus can also come from cleaning agents.

Concentrations vary, but are usually in the range of 30e100 g P/m3 (Brewers of Europe, 2002) as with nitrogen, the actual phosphorus concentration will depend on the water ratio and the cleaning agent used. The concentration of heavy metals is normally very low (Wen et al., 2010). Wear on machines, especially conveyors in the packaging line, can be a source of nickel and chromium (Unicer SA, 2005).

2.2.2.1. Spent Grains

Beer production results in a variety of residues, such as spent grains, which have a commercial value and can be sold as by-products for livestock feed. The nutritional value of spent grain is much less than that of the same amount of dried barley, but the moisture makes it easily digestible by livestock. The amount of spent grains is normally 14 kg/hL wort with a water content of 80% (Fillaudeau et al., 2006).

2.2.2.2. Trub

Trub is slurry consisting of entrained wort, hop particles, and unstable colloidal proteins coagulated during the wort boiling. It is separated prior to wort cooling and represents 0.2e0.4% of the wort volume with a dry matter content of 15e20%. Its content of wort and extract depends on how efficiently the wort and trub are separated. The BOD value of trub is around 110,000 mg/kg wet trub (Fillaudeau et al., 2006).

2.2.2.3. Spent Yeast

In brewing, surplus yeast is recovered by natural sedimentation at the end of the second fermentation and maturation. Only part of the yeast can be reused as new production yeast. Surplus yeast is very high in protein and B vitamins, and may be given to animal feed industry as a feeding supplement. This brewing by-product has dry matter content close to 10% w/w and generates beer losses (or waste) of between 1.5 and 3% of the total volume of produced beer (IFC, 2007).

2.2.2.4. Kieselguhr Sludge

Diatomaceous earth slurry from the filtration of beer also constitutes a very large category, which is high in suspended solid (SS) and BOD/COD. Different methods for regeneration are under development, but presently they are not capable of totally replacing new diatomaceous earth. Diatomaceous earth has various advantages for filtration in brewing process as reported by Baimel et al. (2004). The conventional dead-end filtration with filter-aids (Kieselguhr) has been the standard industrial practice for more than 100 years and will be increasingly scrutinised from economic, environmental and technical standpoints in the coming century (Knirsch et al., 1997). The conventional dead-end filtration with filter-aids consumes a large quantity of diatomaceous earth (1e2 g/l of clarified beer) and carries serious environmental, sanitary and economic

implications (Fischer, 1992). At the end of separation process, diatomaceous earth sludge (containing water and organic substances) has more than tripled in weight.

From environmental point of view, the diatomaceous earth is recovered from open-pit mines and constitutes a natural and finite resource. After use, recovery, recycling and disposal of Kieselguhr (after filtration) are a major difficulty due to their polluting effect.

From the health perspective, the used diatomaceous earth is classified as "hazardous waste" before and after filtration. From an economic standpoint, the diatomaceous earth consumption and sludge disposal generate the main cost of the filtration process. The disposal routes of Kieselguhr sludge are into agriculture and recycling with an average cost of 170 V/ton. Disposal costs vary widely from one brewery to another with a positive income of 7.5 V/ton up to a maximum charge of 1100 V/ton of Kieselguhr purchased (Fillaudeau et al., 2006).

2.2.2.5. Packaging Materials

Other solid wastes include label pulp from the washing of returnable bottles, broken glass, cardboard, bottle caps, and wood that is usually disposed of at sanitary landfills. These wastes should be avoided or at least limited since they are not simple papers but wet-strength paper impregnated with caustic solution.

2.3. Energy Efficiency and Emission in Breweries

Energy efficiency is an important component of a company's environmental strategy (Grossman, 2010; Jürgen, 2011). End-of pipe solutions can be expensive and inefficient while energy efficiency can often be an inexpensive opportunity to reduce criteria and other pollutant emissions. Energy efficiency can be an effective strategy to work towards the so-called "triple bottom line" that focuses on the social, economic, and environmental aspects of a business. The concept of the "triple bottom line" was introduced by the World Business Council on Sustainable Development (WBCSD). The three aspects are interconnected as society depends on the economy and the economy depends on the global ecosystem, whose health represents the ultimate bottom line (Galitsky et al., 2003).

2.3.1. Energy Use and Utilities System

The typical cost of energy and utilities amount to between 3% and 8% of a brewery's general budget, depending on brewery size and other variables (NRC, 2010). Brewery processes are relatively intensive users of both electrical and thermal energy. Thermal energy is used to raise steam in boilers, which is used largely for wort boiling and water heating in the Brewhouse, and in the bottling hall. The process of refrigeration system is typically the largest single consumer of electrical energy, but the Brew house, bottling hall, and wastewater treatment plant can account for substantial electricity demand. A well-run brewery would use from 8 to 12 kWh electricity, 5 hL water, and 150 MJ fuel energy per hectoliter of beer produced. To illustrate, one MJ equals the energy content of about one cubic foot of natural gas, or the energy consumed by one 100 W bulb burning for almost three hours, or one horsepower electric motor running for about 20 min (NRC, 2010). The specific energy use of a brewery is heavily influenced by utility system and process design; however, site-specific variations can arise from differences in-product recipe and packaging type, the incoming temperature to the brewery of the brewing water and climatic variations. Natural gas and coal account for about 60% the total primary energy used by the malt beverages industry (NPC, 2003).

2.4. Economic Impact of Brewery Industry

The production and consumption of beer has great economic significance in the EU. Most importantly, it creates jobs – not just those in the approximately 4,500 (2012) small and large brewing companies based in the EU, but also in the supply, retail and hospitality sectors. In 2012 the work of some two million EU citizens was directly or indirectly related to beer. The governments in the Member States also enjoy considerable benefits. Every beer consumed generates tax, VAT and excise duty revenues, and the jobs created bring in income tax and social security contributions. Some 53 billion euros were generated by taxes and social security contributions related to beer production and consumption in the EU in 2012

Excise duties are an important source of revenue for national governments. In 2012, excise duty revenue accounted for 19% of total beer-generated government revenue in the EU. To be more precise, it was estimated to be as much as approximately 10 billion euros in 2012. Within the EU

there are significant differences between excise duty rates on beer in the various Member States, resulting in differing tax burdens on beer. Excise duty in the Nordic Member States (Denmark, Finland and Sweden) is among the highest in the EU; Norway, too, has a high excise duty on beer. It is also important to note that since January 2008, the vast majority of EU Member States have changed the excise duty levied on beer – in most cases, it was increased. It is expected that continuing increases in the already-high excise duties will negatively impact national economies and potentially reduce government revenues. Regional plan Policy Research and EY conducted a study to look into these effects.

A fundamental tax principle that applies to cross-border trade in the EU is that taxes and excise duties should be paid in the country where the product is bought and that the end consumer should not have to pay additional taxes if they take the product to another country. It should be noted that this applies to goods bought in person by the consumer up to a certain amount and not to online purchases. It follows from this that the large differences between European countries in the excise duty levied on beer, as mentioned above, lead to cross-border shopping. It is consumers from countries with relatively high excise duty rates compared to their neighbors who buy beer abroad most. This impact of high levels of taxes on cross-border trade is commonly accepted and has been described in many publications (Lavik & Nordlund, 2009)

The EU's internal market promotes the free movement of goods, capital, services and people, among other things so that private persons can shop abroad. Cross-border trade can be described as any purchases made by consumers from sellers or providers located in a country other than the one in which they themselves are resident; purchases can be made when travelling abroad or through distance sales channels (European Commission, 2013). In line with the principles of the internal market, consumers are allowed to buy beer abroad in limited amounts without having to pay import tax, excise duty or VAT in their home countries.

According to the study conducted by European commission (2013), the economic effects of high excise duty rates in the Nordic countries and put the economic effects of high excise duties into an EU-wide perspective. The effects assessed include, inter alia, the impact of excise duty policies on government revenue (not only excise duty revenue, but also VAT and employment-related revenues). *Economic database analysis result show that,* the economic impact studies

conducted by Regional plan and EY for The Brewers of Europe in recent years, they have developed an elaborate database with detailed economic statistics on many European beer markets including all 28 EU Member States and Norway. This database was the starting point for our calculations of the economic effects of excise duty policies on beer. And conclude as follow

Stakeholder theory recommends that organizations are motivated to widen their objectives to incorporate other goals in addition to profit maximization. In light of this theory, organizations that embraced the ECSR activities as an approach to promote socially responsible activities and policies is in a better position to react successfully to the stakeholder demands (Maignan & Farrell, 2004).

2.4.1. Employment Impact

Obviously, the extent of cross-border shopping estimated for the four Nordic countries as presented in the previous sections has an impact on the national economies of these countries. Cross-border shopping naturally reduces domestic sales of beer. This in turn has an economic impact on the brewing sector in these countries. We have made an estimate as to the negative impact on employment in the retail sector. The lower national consumption of beer leads to at least 2,590 fewer beer-generated jobs in the retail sector in the four Nordic countries. The negative impact is most noticeable in Sweden. It should be noted that retail is not the only sector that is affected negatively by cross-border shopping for beer. In other sectors, too such as the brewing sector itself and those which supply it – there is a negative impact on employment. This means that in addition to the 2,590 retail jobs that are lost, there are also fewer beer-generated jobs in other sectors (Bentzen, 2013).

According to Bentzen, (2013) study reports, in interviews with experts, the effect of cross-border trade on the retail sector is also acknowledged. Moreover, the interviews suggest that cross-border trade affects the entire structure of the retail sector. For example, cross-border trade affects retail near the border, leaving little scope for small-scale shop selling regional products and local beers. This means that cross-border trade negatively impacts on the number of retail outlets and associated jobs, as well as restricts the range of products offered.

2.4.1.1. Impact on Beer-Generated Employment

While excise duty rates increased in 17 countries, the European brewing industry lost 330,000 jobs between 2008 and 2012.2. In most countries where the excise duty on beer was increased, beer-generated employment decreased. Figure 3.3 presents statistics concerning the relationship between excise duty increases and total beer-generated employment in the countries concerned. It shows that, in 15 of the 17 countries where the excise duty increased between 2008 and 2012, total beer-generated employment declined. Most of the beer-generated jobs that are lost are positions in the hospitality sector. In most of the countries that increased the excise duty and where a decline in beer-generated hospitality jobs was observed, this decline was higher than the EU average of -18.7%. Given the fact that the hospitality sector plays a pivotal role in providing employment opportunities for younger workers, it can be stated that the negative impact of rising excise duties on employment in the hospitality sector hits young people hard. Furthermore, the study concludes that in those countries where the excise duty increased, government revenue was negatively affected by a decline in beer generated government revenues resulting from employment. It should be noted that the costs of unemployment have not been included in these calculations. Taking these into account would have produced an even more negative picture (Abass A. Olajire (2012).

The Nordic countries are examples of nations with high excise duty rates where the figure for beer-generated employment is relatively low compared to the rest of the EU. Beer sales in the hospitality industry in particular, and the associated demand for employment, are relatively low in these countries. Although there are also cultural factors involved in this, it is most probably also related to the high levels of taxation (Abass A. Olajire (2012).

One job at HEINEKEN supports 108 jobs in Africa and Middle East region. More than 1.6 million direct and indirect jobs across the continent are created through barley to bar, an entire economy stems from producing beer. Jobs are created not only in the sourcing of raw materials but also in delivering and selling beer to the consumers, for instance. EUR2.8 billion in added value to the local economies

HEINEKENs positive impact can be felt on a day-to-day basis in local communities. Employee salaries and tax revenues directly improve the quality of life for many people and communities;

secondary revenues, such as supplier revenues, create income and indirect jobs to thousands more.

While trade jobs represent the lion's share of jobs created through our African interests, agricultural jobs represent 15% of the total jobs supported by HEINEKEN in Africa.

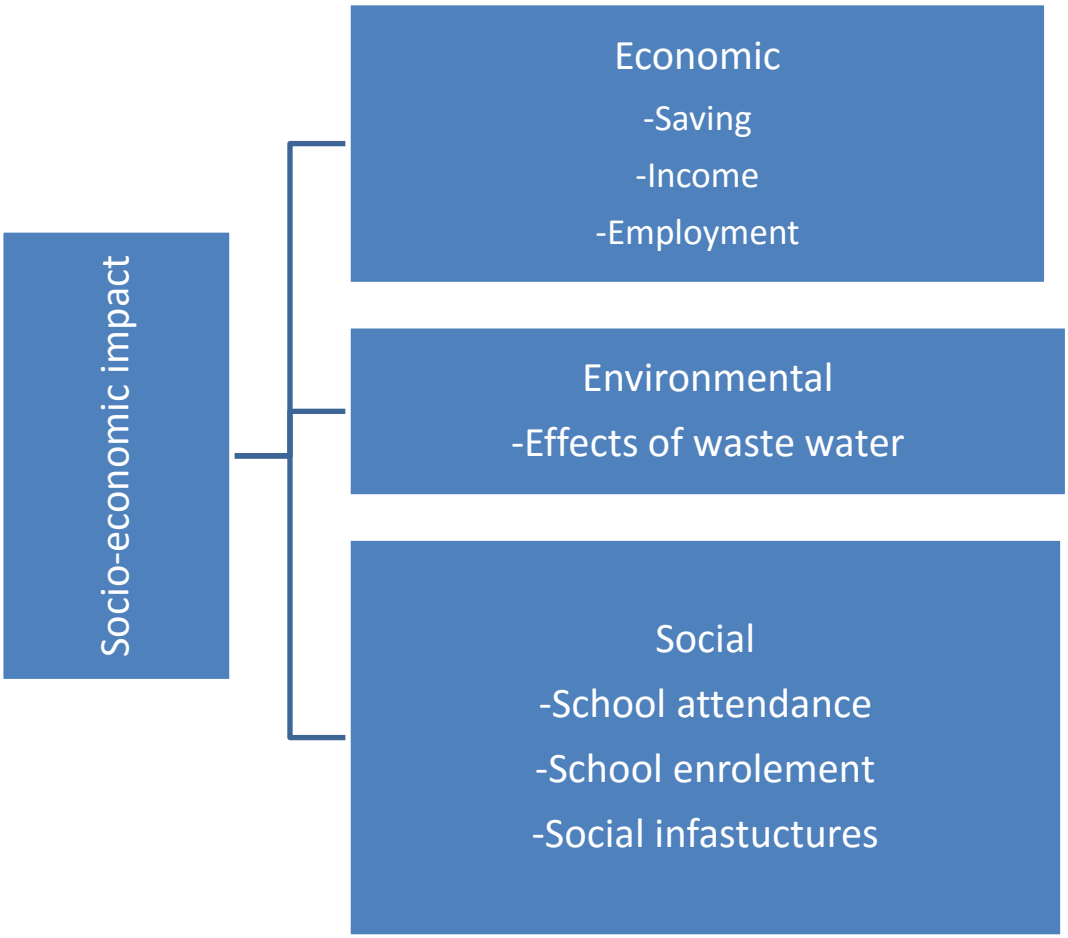
HEINEKEN aim to be a leading brewer in the markets it operates in. It also wants to ensure to have a positive impact on the economy and environment of these communities. In Vietnam, where HEINEKEN is the second biggest brewer, the beer market is expanding rapidly. Heineken in Vietnam; Supports 93,200 jobs in the local economy (65,600 across our value chain and 27,600 through activities induced by wage spending). Every 1 job at HEINEKEN supports 44 other jobs in Vietnam

Contributes around EUR 825 million (VND 20 trillion) per year in total incomes (wages for households, profits for local businesses and taxes for the state), equal to 0.5% of Vietnam's GDP. Out of the EUR 825 million (VND 20 trillion), around EUR 520 million (VND 12.6 trillion) refers to annual tax contributions to the local government, or 1.8% of total government tax revenues By sourcing and manufacturing locally, instead of importing finished beverages, adds around EUR 107 million (VND 2.6 trillion) of incomes and 25,700 jobs to the economy

These results highlight the significant contribution HEINEKEN make, extending beyond income generated through direct jobs. They also provide valuable insight for any further strategic development in the country.

2.5. Conceptual Framework

Conceptual model is starting point and basis for implementing studies and researches so that it is specified desired parameters of the research and their relationship (Edwards et al, 2000). Without clearly stating the conceptual frame work the researcher cannot proceed. It is a fundamental part of the research work because it indicates the desired parameters need to be deeply investigated and their respective relationships are clearly shown by this framework.



Source: Developed by researcher, 2018

Sustainability generally refers to environmental, social and economic sustainability, but the exact relationship between environmental, social and economic sustainability is unclear (Littig &

Griebler, 2005). Brown, Dillard & Marshall (unpublished) describe the relationship between the economy, environment and society as follows:

―Natural systems provide the context and sustenance for social systems and, therefore, must be respected, nurtured, and sustained. Social systems provide the context and purpose of economic systems.

In other words, the economy is a subset of society, which in turn is a subset of the environment. According to Newton (2003), economic sustainability requires environmental and social sustainability and social sustainability hinges on environmental sustainability. Alternatively, the three domains of sustainability can be treated with parity as suggested by Newton (2003).

This study also, tried to analyze Socio-economic impact of BBSC in three different indicators to have a clear view at it. These are Economic, Environmental and Social infrastructure. Saving, income and employment are indicators of economic impact of BBSC. And we put environmental impact and social infrastructure to be analyzed.

CHAPTER THREE

METHODOLOGY

3.1. Study Area

This research is conducted in Western Ethiopia town deeply looking at Bedele brewery Share Company. This study covers the stakeholders of the company, i.e, the society, company workers and government. According to annual report of Bedele brewery (2017), Bedele brewery is located in southwestern Ethiopia, Oromia regional state, Buno Bedele zone Sidisa kebele of Bedele town. The brewery produces 486,000HL of beer per year.

Three neighboring zones are selected and one town per each zone is selected for the study. From Buno Bedele zone, Bedele town is selected, from Ilu Aba Bora Zone, Mettu town and from Jimma zone, Agaro town is selected based on various comparability factors. For example when we can see some information of Jimma Zone from those selected zones from southwestern part of Ethiopia, Jimma zone is with an agro-ecological setting of highlands (15%), midlands (67%) and lowlands (18%). The zone is one of the main coffee growing areas of Oromia regional state and also, as the study countries, Ethiopia. ‘’Coce/ketta muduga’’ which is the birth place of coffee was also, found under this zone administration, which found near to Agaro town. Also, this zone as well southwest part of the country (the study area) is well known by well-endowed with natural resources; that contribute income from foreign currency. According to the information from zone finance and economic development office report, the contribution of natural resource from this zone is very significant to the national economy. The area was reliably receives good rains, ranging from 1200-2800 mm per annum; this atmosphere is very comfortable to invest in the area of agro-industry based on natural resource well-endowed by nature, as well as product produced by active and strong community (UNDP, 2000).

3.2. Study Design

A cross-sectional Study design is employed to look for the socio-economic impact of bedele brewery Share Company in for the local society. Three neighboring zones are selected and one town per each zone is selected for the study. From Buno Bedele zone bedele town is selected, from Ilu Aba Bora Zone Mettu town and from Jimma zone Agaro town is selectedbased on

various comparability factors, including closeness to the brewery, similarity on, infrastructure availability, communication facilities and other socioeconomic characteristics, such as literacy rate, topography, access to electric power, and presence of other development programs. All household, residing in the selected kebeles for more than 6 month consititute the study population.

3.3. Sample Size Determination and Sampling Techniques

One kebele is selected from every town of those selected in each zones. Based on the 2017 census obtained from the kebeles administrations, a total of 14,208 households are living in the three selected Kebeles for this study. The sample size needed to obtain an approximate 100(1-α) % confidence interval for the population proportion of socio-economic impact (P) of length at most 2d, was determined by the following formula (Noel, et al, 2012).

$$n \geq \frac{N}{1+(N-1)(\frac{2d}{z})^2} \approx \frac{N}{1+Nd^2} = 204 \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where, N is the total population, n is the required sample size, d is margin of error, z is the confidence level. ,

After determining the total sample size, a stratified sampling technique used to select households from each kebele. Partition of the study sample to each study kebeles is based on proportional allocation. Then, study households from each selected kebeles were identified through systematic random sampling of every fourth house until the allocated sample size reached. Single respondents from each household were then included to study.

3.4.1. Data Sources

There are two types of data sources, primary and secondary incorporated and utilized in this research paper. Both sources of data are used by categorizing the information which is relevant with each source.

Primary sources used to collect initial material useful to know the society and the Company employees' opinion on the level of socio economic impacts of the company. These data are the data that were collected using methods such as surveys, direct observations, and questionnaire. These sources of information allow the researcher to access original and unedited information. A

primary source requires the researcher to interact with the source and extract information from the record of the organization.

Secondary sources such as annual performance reports, office memos, company strategy papers and the like were used to collect relevant data. Different comments given by the society at different outlets were also used as a source. This may be obtained from records of human resource department of the company.

3.4. Data collection

A structured questionnaire with interview was used to collect data. The structured questionnaire with interview was for individual respondents and Interview was for bedele brewery share company management and also, for government representative in each selected towns. The recruitment of interviewers, editors and supervisors were conducted in the selected Bedele, Mettu and Agaro town administrations by taking into account language skills of the study areas. Before starting data collection, process training was given to data collector on how to approach study subjects, on how to fill the questionnaire, and about the general guidelines of data collection. To ensure data quality, the collected data were checked out for the completeness, accuracy and clarity by the principal investigator and supervisors on a daily based. Additional information are gathered from different stake holders, such as, workers of Bedele brewery Share Company, administrative leaders of the town and company, and other bodies working on societies socio-economic problems through discussion.

3.5. Study Methodology and Data Analysis

3.5.1. Study Methodology

In spite of its popularity, the “before” and “after” evaluation approach has great limitation when used to evaluate the impact of any organization and program, which can lead to for the other socio-economic impact. It depends only on client self-reports; and the lack of a comparison group makes it impossible to know whether the changes describe by clients exist because of the factory (Hashemi et al, 1996).

Also, the authors (Hashemi et al, 1996) indicated that the method of making comparison between employee and non-employee (control group) is the most common cross-sectional design used in evaluation research. Even though this approach represents an improvement relative to "before" and "after" method of impact evaluation because of its controlling group, also it has its own limitations(the responses of employee is compared to those of non-employee through a with framework or without framework). In addition to comparison of employee and non-employee, it is best if this study is use the method of comparing matured (those are employed for more than or equals to 3 years and incoming employee (those are working in the company for less than 3 years with respect to socio-economic impact is the most convenient and useful tool and also it is the most valid of the cross-sectional approaches. The justification of using this approach is to control for the respondents' demographic and socioeconomic characteristics in the regression model analysis.

3.5.2. Method of Data Analysis

Data were coded, checked for completeness and entered into a computer. The data then analyzed by using STATA software package version 14.0 (Stata Corp 4905 Lake way Drive College Station, Texas 77845 USA) for regression analysis. The empirical analysis of the study conducted using both descriptive statistics (like, cross tabulation) to discuss the relationship and correlation between dependent and independent variables. Also, logistic regression analysis was used to analyze the impact level of explanatory variables on dependent variable. Specially, the study used logistic regression for the case of economic impact analysis or evaluation at household level. Various tables are generated to describe characteristics of respondents. Household and individual-level comparison is made in terms of socio-demographic and socio-economic characteristics between employee and non-employee of Bedele brewery Share Company as well as environmental and social impacts are evaluated using chi-square test for categorical variables.

3.6. Estimates of the Model

As we stated before, the aim of this research is to estimate socio-economic impact of BBSC on the surrounding community; which on their economic, social and environment related impacts. The study has three econometric models. The first model is used monthly saving status of households to estimate economic impact of BBSC on community and monthly saving status of

household is taken as the dependent variable. Saving status is chosen because it is assumed the best way to measure the economic impact of at household level.

Assessing the impact of Bedele brewery share company factor on household's socio-economic impact at household level as well as individual level requires adjustments to control for differences between employee and non-employee, nearest to factory and farthest from the factory and also its impact on society of south western Ethiopia. The impact of Bedele brewery share company factor on household's economy at household level was assessed based on the dependent variables indicated below. The variables used in regression are marital status, age and educational level of household head, Households headship status, having children at school age, family size and BBSC employee status ship. The functional relationship between the probability of employee of Bedele brewery Share Company and explanatory variables is specified as:

According to this study, household economic take value of 1, if there is participation in monthly saving at household level.

Let Y_{ij} be the i^{th} household economic status (a binary outcome, 1= alone, 0=otherwise) and economy is evaluated by using monthly saving status as dependent variables (proxy to evaluate economic status of households) living in the j^{th} residences.

$$Yij \sim Bernoulli(P\ j)$$

$$log\ Pj/\ 1-Pj = \beta 0 + \beta 1X1 + \beta 2X2 + \cdots + \beta kXk \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

where P_j is the population proportion of household became Bedele brewery share company employee in the j^{th} residence, $X_1, X_2, \ldots, X_k$ individual/household level characteristics of study subjects and $\beta_0, \beta_1, \ldots \beta_k$ are their associated regression coefficients or parameter to be studied.

The explanatory variables that affect monthly saving status of household status are expressed both qualitatively and quantitatively. Where the dependent variable is dichotomous, many studies show that Probit and Logit models are appropriate. Since the Logit model is simpler in estimation than Probit model (Alderic and Nelson, 1984), Logit model is preferred to the Probit model for this study. In addition, Logit model is a more realistic pattern of change in the probability compared to other qualitative dependent variable models like the Probit, for two

reasons. First, the odds ratio, which is a measure of the strength and direction of relationship between the two variables, has a special property of not requiring variables to be normally distributed. Second, mathematical transformation of the odds ratio is the Logit model. This mathematical transformation removes problem of asymmetry existing in the odds ratio and in turn makes this a superior method (Peng et al, 2005).Monthly saving of respondents/at household level is the dependent variable used to examine the economic impact of the company on the community. It is hoped to capture economic impact at household level.

The second model used in this study was to estimate the social impact of BBSC on the society which is measured by households buying supportive educational material for the children's at school. To analyze the effect of BBSC on the households by supportive educational material for their student's at school is preferable as indicated by (Eduardo, 2009) and (Tassew and Aregawi, 2015). Logit model has been used for estimating the various determinants of social impacts of the community.

Yi = {1, if households are buying supportive material for education of their children 0, $otherwise$

The outcome of this binary variable occur with probability πi which is conditional probability on the explanatory variables for a sampled household is identified as πi ≡ ($Yi\ Xi\ /$) and thus conditional mean equals the probability as follows

$\mu y\ /xi$ = πi^{yi} (1−πi)$^{1-yi}$ = πi……..……(3)

For a binary model the conditional distribution of the dependent variable or random component is given by Bernoulli distribution. Thus the probability function of Yi is

(yi) = πi^{yi} (1−πi)$^{1-yi}$ ……..…….…….….(4)

To ensure that the conditional mean by the conditional probability stays between zero and one, a logistic regression has been applied. Since the probit regression does not have the direct interpretation we have employed the logistic regression model which is directly interpretable. If a dependent variable is qualitative (or categorical) in nature then models such as logit, probit or tobit must be applied to the data.The linear probability model(LPM) assumes that the dependent variable is constant for all independent variables; however, it is very likely that the impact of

independent variable increases or decreases as the predicted probability approaches to one or zero when dependent variable consist of probability.

In addition to this, the LPM presents heteroskedastic problem meaning that the estimated coefficients are not efficient and the hypothesis tests and confidence intervals may not be valid . To overcome these problems when estimating a regression model with a binary outcome, one can use logistic regression. The logit of π is the natural logarithm of the odds that the binary variable Y takes one rather than zero. It is given as follows

$\Pi i = 1/ (1+e)^{-Zi} = 1 / e^{-\sum BjXij\ k\ j=0} =$…….. (5)

$1- \Pi i = 1- (e^z/1+e^z)= 1 /1+e^z$……. ……..…..…. ……(6)

Li = Ln (Πi/ 1−Πi)= $odds$ = zi = β0+β1X1+⋯βkXk +ui ……..……. (7)

$\Pi i /1-\Pi i= e^{Zi} = e^{\beta 0} (e^{\beta 1X1….e\beta kXk})$……..……(8) (Gujarati, 2004)

Where **Li** refers to the natural log odds that a household is considered buying supportive material for education, X*i* is a vector of covariates included in each of the models and βi is a vector of regression coefficients. The variable z is the measure of the total contribution of all explanatory variables used in the model. Here, ß0 is the intercept (constant), and ß1, ß2, ß3 to ßk are the regression coefficients of the predictor variables, x_1, x_2, x_3…,x_k, respectively. Their respective descriptions are given below in table

Finally, the third model used in this study was to estimate the environmental impact of BBSC on the surrounding community or community, which is measured by the respondents witness and information whether they have information or eye witness regarding to wastage released by BBSC to surrounding community or environment which is assumed it have a negative impact on the environment as well as on the health of communities those are living nearest to the factor.

If there is any type of wastages was released by BBSC to the environment or surrounding communities it takes value =1, 0=otherwise. As stated above the environmental impact is evaluated by using respondent's response for the questions have you seen or heard BBSC was released wastages to surrounding environment or community which is harmful for environment

as well as for health of community as dependent variables (proxy to evaluate environmental impact of BBSC on the community), if the value take 1 this study assume that, BBSC have a negative impact on environment. Noted that; measuring of the environmental impacts of many industry or factory was conducted using of laboratory tests in most of developed countries. However, this study was used the direct response of respondents without any laboratory test and it can help as general information or benchmark to open the door for another researchers those have interest to conduct detail studies in the future on this area.

$Yij \sim Bernoulli(P\ j)$

$log\ Pj\ /1-Pj = \beta 0 + \beta 1X1 + \beta 2X2 + \cdots + \beta kXk$…….. (9)

Where Pj is the population proportion of wastages released by BBSC in the jth residence, which affects community or environment, $X1,2,\ldots,Xk$ individual/household level characteristics of study subjects and $\beta 0,\beta 1,\ldots\beta k$ are their associated regression coefficients or parameter to be studied. The reason of using logistic regression was almost the as the reasons stated under model one and two above.

3.7. Validity and Reliability of Data

Reliability and validity are the two most important and fundamental techniques of any measurement procedure. Reliability and validity of the instruments and methodology deal with the quality of data and appropriateness of the methods used. Mwanje (2001) indicates that reliability refers to the degree of consistency of results derived from repeated observations of the same phenomenon under the same circumstances. It is the extent to which any instrument produces the same result on repeated trials. Validity, on the other hand, stands for the degree to which the research measures what is purported to measure.

3.8. Ethical Considerations

While conducting a research, it is important to consider the underlying ethical issues. Before starting to conduct the study, permission was assured from the selected study areas administration. By elaborating the purpose of the study, consent guaranteed from each respondent. Ethical considerations were seriously taken into account so that the concern,

integrity, consents and other human elements of the participants, discussants, and interviewees are protected. Essentially, data collectors are told to respondents the purpose of the study prior to responding to the questions. They was assured that any information concerning them will never be passed to other unauthorized persons or institutes without their consent and cannot be used for other purpose outside this academic research. The selected study participants were requested kindly whether they agree to participate in the study or not. This stated mega research project ethical consideration must be within line with research profession ethics.

CHAPTER FOUR

RESULT AND DISCUSSION

4.1. Socio-economic Impacts of Bedele Brewery on the local society

This chapter depicts data analysis and discussion to this end, the chapter is organized into two main sections. First Section deals with background characteristics of respondents. Such as, household residence, educational level, family size, respondent's religion, sex, marital status, age group, ethnicity and respondents household member size, perception on participation on local infrastructure and perception on waste materials management. Finally the second section deals with econometric analysis with binary regression.

4.1.1. General background characteristics of the study area

This section provides a summary of the socioeconomic characteristics of households and respondents including sex, age, residence, educational status, household facilities, perception on participation on local infrastructure and perception on waste materials management. Information collected on the characteristics of the households and respondents was important to, understand and interpret the finding of the survey and provide indicators of the representativeness of the survey. The information is also useful in understanding and identifying the socio-economic impacts of BBSC.

A total of 204 respondents were selected from a total 14,079 households eligible for this study from selected three towns, namely Mettu, Bedele and Agaro. However, the total numbers of respondents interviewed for the study were only 187 which yielding a response rate of around 92 percent.

According to table 4.1.1.below Out of 187 respondents, 156(83.4%), 15(8%) and 16(8.6%) of them were from Bedele, Agaro and Mettu town, respectively. The response rates for each selected areas were somehow depending on closeness to the brewery.

Table 4.1.1.Respondents Rates

Characteristics		Frequency	Percent	Valid Percent	Cumulative Percent
Household residences	Bedele	156	83.4	83.4	83.4
	Agaro	15	8.0	8.0	91.4
	Mettu	16	8.6	8.6	100.0
	Total	187	100.0	100.0	

Source: Study Survey, 2018

As indicated on table 4.1.2.below, 121(64.7%) of the respondents are non-employees of BBSC and 66(35.3%) are employees of the company.

Table 4.1.2.Employment status of the respondents (BBSC)

Characteristics		Frequency	Percent	Valid Percent	Cumulative Percent
Employment status BBSC	No	121	64.7	64.7	64.7
	Yes	66	35.3	35.3	100.0
	Total	187	100.0	100.0	

As displayed on table 4.1.3, among 187 of households, 105(56.1%) were male and 82(43.9%) are female respondents. For the case of this study sex and household headship status have the same meaning. This study result shows that, as many developing countries household headship was dominated by male.

Table 4.1.3.Hosehold Headship status

Characteristics		Frequency	Percent	Valid Percent	Cumulative Percent
Household headship status	Male	105	56.1	56.1	56.1
	Women	82	43.9	43.9	100.0
	Total	187	100.0	100.0	

Source: Study Survey, 2018

According to table 4.1.4, the average household size, 126(67.4%) were less than 5 membership and 61(32.6%) of them are greater than or equals to 5 household member size.

Table 4.1.4.Total Number of household member

Characteristics		Frequency	Percent	Valid Percent	Cumulative Percent
Family size	<5	126	67.4	67.4	67.4
	>or=5	61	32.6	32.6	100.0
	Total	187	100.0	100.0	

Source: Study Survey, 2018

As per the 4.1.5 table below, from total respondent 1(0.5%) is respondents with no education (they cannot read and write), 11(5.9%) can read and write with some formal education. 5(2.7%) have primary education, 33(17.6%) took secondary education, 63(33.7) have a college diploma, 62(33.2) have degree and 12 (6.4%) holds master's degree. the highest respondent percentages were from Diploma and first degree educational level. Surprisingly, out of total respondents 187 and 67% per cent were under category of diploma and, degree educational level. Also, the results of this study indicate that, the educational level status of the study area is almost the same as most developing countries.

Table 4.1.5.Educational level of the respondents

Characteristics		Frequency	Percent	Valid Percent	Cumulative Percent
Educational level of Household head/respondents	No education	1	.5	.5	.5
	Read and write	11	5.9	5.9	6.4
	Primary	5	2.7	2.7	9.1
	Secondary	33	17.6	17.6	26.7
	Diploma	63	33.7	33.7	60.4
	Degree	62	33.2	33.2	93.6
	Masters and above	12	6.4	6.4	100.0
	Total	187	100.0	100.0	

Source: Study Survey, 2018

4.1.2 Asset Ownership of Respondents or Households

This section provides economic index profile of respondents; such general information helps us to the interpretation of finding and for understanding the results presented later in the discussion part. Basic information collected include House ownership status, household possession and effects status was examined and detailed information was collected on main source of household income and main occupation type of respondents.

Table 4.1.6 survey result shows that, 80(42.7%) of respondents reported that, they are living in their own house, 98(52.4%) of them live in privately rented house and 11(5.9%) are rented publically owned houses. Here rented house have the equal meaning with both private and public rented and those respondents who living in a gifted from their family/relatives and from

public, due to their governmental position was included as rented house. This study result indicated that, almost have of the households are living in the rented house; it indicated most households are insufficient to full fill their basic needs. As a result, this variable affects socio-economic of households negatively. Out of the total privately owned houses, 48.5% of employees have their own houses and 39.7% of nonemployees own private houses. Which means, the number of privately owned houses of employees of BBSC is higher than that of nonemployees; this implies that, household those didn't have their own house faces higher cost of living than the others. As indicated below as house ownership status increase, household saving increase which results income of households to be increase.

. **Table 4.1.6.Type of house possession**

		Are you employee of BBSC?		
		Yes	No	Total
Type of house ownership	Private owned	32	48	80
		48.5%	39.7%	42.7%
	Rented private	29	67	98
		43.9%	55.4%	52.4%
	Rented public	5	6	11
		7.6%	4.9%	5.9%
		66	121	187
		35.3%	64.7%	100.0%

Source: Survey Study, 2018

According to survey results indicated under table 4.1.9 below, the majority of respondents have TV in their house. Which is about 102 (54.5%) have TV and 85(45.5%) of respondents (households) don't have TV. This is may be because of inflation stated by CSA (2016) on imported materials. So, these variables can be the exogenous variables which affects the economy of household negatively, in contrast to BBSC. The percentage of households who have TV is higher for employees of BBSC compared to those who are not. From the employees 72% of them own a TV but only 44.6 % of nonemployees own TV. For this study we don't identify type and size of television. The response of respondents regarding to TV ownerships status were ownership status of household's in general.

Table 4.1.9.Household possession of TV

		Does the household possess a TV?		
		No	Yes	Total
Are you an employee of BBSC	No	67	54	121
		55.4%	44.6%	100.0%
	Yes	18	48	66
		27.3%	72.7%	100.0%
Total		85	102	187
		45.5%	54.5%	100.0%

Source: Study Survey, 2018

4.1.3 Relationship between BBSC and local infrastructure

Do you think BBSC is participating on local infrastructure through funding and sponsorship?

Table 4.1.10.BBSC is participation on local infrastructures through funding

	Response	Residences of respondents			
		Bedele	Agaro	Mettu	Total
Do you think BBSC is participating on local infrastructure funding?	No	93	9	8	110
		49.70%	4.80%	4.30%	58.80%
	Yes	63	6	8	77
		33.70%	3.20%	4.30%	41.20%
	Total	156	15	16	187
		83.40%	8.00%	8.60%	100.00%

Source: Study survey, 2018

According to table 4.1.8 above from the total of 187 respondents, 110 (58.8%) of the respondents think that BBSC is not participating on local infrastructure constructions like health centre, road, schools, etc. 77 (41.2%) of the respondents think that BBSC is fully participating on local infrastructures constructions. Depending on this result, majority of the respondents are not convinced that BBSC is not taking part on the construction of basic infrastructures around the company.

4.1.4 Relationship between Employee of BBSC and Income of household

Table 4.1.11.Relationship between being employee of BBSC and household income level

		Do you save monthly?		Total
		No	Yes	
Are you employee of BBSC?	No	53	68	121
		28.3%	36.36%	64.70%
	Yes	22	44	66
		11.76%	23.5%	35.30%
Total		75	112	187
		40.1%	59.9%	100.00%

Source: Study survey, 2018

Generally, from the total respondents 112 (59.9%) of them responded that they save some portion of their income. Compared to respondents who are not an employee of BBSC, employees of BBSC have higher rate of saving. Employees of BBSC have saving rate of 66.7% and that of nonemployees of BBSC are 56.2%.

This, in turn has a direct implication on income of employees and who are not. In another words, employee of BBSC have a positive impact on household income level. The more your income is the more you save. This means, as number of BBSC employee increase, income of house hold also increase.

4.1.5 Relationship between employee of BBSC and household income

Generally, from the total respondents income of 123(65%) stayed the same in the last three years, 22(11.8%) of the respondents income decreased in the last three years and 42(22.5%) of respondents income increased in the last three years.

Out of the respondents who are not employee of BBSC, 77(63%) of them did not experience any change in their income, income of 18(14.9%) respondents decreased in the last three years and the income of 26(21.4%) respondents is increased in this three years. According to table 4.1.10 equal percentage of the respondents from employees' and nonemployees' monthly income increased in the last three years 27.3% and 21.4% respectively. The percentage increment in income of BBSC employees is higher than that of nonemployees. BBSC employees experienced higher increment on their monthly income.

Table 4.1.12.Relationship between employee of BBSC and household source of income

		How do you rate source of household income over the last 3 years?			Total
		Decreased	stay the same	increased	
Are you employee of BBSC?	No	18	77	26	121
		9.6%	41.2%	13.9%	64.7%
	Yes	8	40	18	66
		4.3%	21.4%	9.6%	35.3%
Total		26	117	44	187
		13.9%	62.6%	23.5%	100.00%

Source: Study survey, 2018

4.1.6 Relationship between saving and household income

Table 4.1.13.Relationship between saving and household income

		How do you rate source of household income over the last 3 years?			Total
		Decreased	stay the same	increased	
Do you save monthly?	No	13	44	18	75
		6.95%	23.52%	9.6%	40.1%
	Yes	13	73	26	112
		6.95%	39.1%	13.9%	59.9%
Total		26	117	44	187
		13.9%	65.6%	22.50%	100.00%

Source: Study survey, 2018

From the respondents who saves part of their income, 73 (65.1%) of respondents' income stayed the same for the past three years. 26 (23.2%) of the respondents who saves income has increased in the past three years.

4.1.7. Perception on participation of BBSC on local infrastructure

Table 4.1.14.Perception on participation on local infrastructure

		Do you think BBSC is participating on local infrastructures		Total
		No	Yes	
Are you employee of BBSC?	No	71	50	121
		37.90%	26.8%	64.70%
	Yes	35	31	66
		18.7%	16.50%	35.30%
Total		106	81	187
		56.6%	43.4%	100.00%

Source: Study survey, 2018

106 (56.6%) of the respondents responded that BBSC is not participating on the construction of local infrastructures like health centres, schools and roads through funding. Out of this 110 respondents, 71 (67%) are not employees of the company and the remaining 33 % are not. And the remaining 81 (43.4%) of the respondents said that BBSC is funding on basic infrastructures that are very important to the society. From the 81 respondents, 31 (38%) are employees of the company and the rest 62% are not.

This study is in agreement with the study conducted by Ezana Messele (2014), Educational institutions plays vital role for both the society and the company. It is the main source of professionals for different organizations. Most companies are expected to support the surrounding educational institutions as a main component of CSR. Employees of Meta Abo Brewery S.C were asked if they know about any activity of the company that supports the surrounding community. Among the respondents, 48% strongly disagree with the idea while 28% of them agree with it. From the remaining respondents 17% of them disagree and support the idea that the company is not supporting educational institutions. Small portion of the employees which is 5% and 2% lies on agree and neutral respectively. In conclusion, from the result one can understand that the company is not giving enough attention to the society in case of helping educational institutions. Based on the results get from managers of the company, they admit that the company has problem in relation with philanthropic components. Of course there are some supports and charity activity made by the company to the society and customers but as we can see from the above results, it is not enough and needs to be improved

However, the data we have collected through interview with BBSC officials shows that the company is participating on social infrastructure construction. The following are what we have got from the interview that is done in 2017

- Funded the construction of Bedele Hospital maternal wing with Birr 6.2 million
- Bought Ambulance for Bedele city for Birr 1.6 million
- Funded the construction of Social club by 3 million birr
- Sponsored the Bedele football club by Birr 226,000

The researcher observed that those listed are done and giving service to the society of Bedele town and the surrounding.

4.1.8. Perception about wastage of BBSC

Table 4.1.15.Perception on release of harmful wastes

		Do you think BBSC is releasing harmful wastes to the environment?		Total
		No	Yes	
Are you employee of BBSC?	No	49	72	121
		26.20%	35.30%	64.70%
	Yes	35	31	66
		18.70%	19.80%	35.30%
Total		84	103	187
		44.90%	55.10%	100.00%

Source: Study survey, 2018

From the total 187 respondents, 44.9% of them responded BBSC is protecting the environment by not releasing harmful waste materials to the environment. And 55.1% of the respondents thought that the company is releasing harmful wastes to the environment and harming the environment.

As per the interview, officials of BBSC declared that there is no harmful waste released by the company to the environment. The company has modern waste water treatment plant that treats the waste water that is discharged to the environment. Besides the breakages are milled and sent to Addis Ababa for recycling.

The researcher observed that the above listed waste water treatment plant and the breakage crusher is available and operating currently.

4.2. Econometric Analysis: Result and Discussion

4.2.1. Determinant Factors of Socio-economic impact of BBSC on the local society

In the previous section we have seen the Socio-economic impacts of BBSC using descriptive analysis. In this section we can see the factors affecting the dependent variable (monthly saving) and how these variables are affecting it.

4.2.1.1. The impact of BBSC on monthly saving.

For this, we fit logistic regression model for the dependent variable monthly saving by considering independent variables included in logistic regression, Age of respondent, Sex, Marital status, Children at school age, Educational status, Being employee of BBSC, Number of children, and Work experience at BBSC as a candidate factors that may affect the odds ratio of respondents to economy of household first.

To evaluate the significant impact of BBSC on the respondents this study use econometric model. For the responses under the survey, this study fit a binary logistic regression for determinant factors of monthly saving (income) selected above. We fit the model in STATA.v.12 and checked the goodness of fit of the model.

The logistic regression result is presented in table 4.2.below as follow, the probability of monthly saving shows direct relationships with explanatory variables and the entire coefficient. However, the extent to which these variables relate with the dependent variable is different. The detail is explained as follows. The study result indicates that, Respondents Participations of monthly saving is statistically significant with marital status and employee of BBSC status at 5% significance level. Also, family size was statically significant at 10% of significance level.

Table 4.2.Binary Logistic Regression Result

Monthly saving	Odd Ratio	p>/Z/
Age of household head	**1.135667**	**0.476**
Sex(HH headship status	**1.535024**	**0.204**
Marital status	**.5308152**	**0.007**
Single	**1**	
Married	**.5308152**	**0.007**
Family size		
<5	**1**	
>or =5	**1.931907**	**0.051**
Educational status of HH	**1.017616**	**0.864**
Employee of BBSC		
Non-employee	**1**	
Employee	**1.930501**	**0.039**
Children at school age	**.677526**	**0.394**
Residence	**1.161515**	**0.563**
Work experience	**1.210145**	**0.537**
Cons	**.303611**	**0.316**

Source: Survey Study, 2018

The odd ratio of non-employee of BBSC monthly saving is 1.93 as compared to BBSC employee. That is, the probability level of non-employee of BBSC to be saving monthly is lower by 93% as compared to employee of BBSC. The study result indicates that, employee of BBSC monthly saving is higher than that of non-employees of BBSC. According to the result of logistic regression above indicates, employee of BBSC has a positive impact on household income as expected.

Also the result in table 4.2 above shows that, the odd ratio of respondents who have family size equal and greater than 5 monthly saving is 0.93 as compared to respondents who do not. That is,

the probability level of participation in monthly saving of households who have less than 5 family sizes is higher by 7% as compared to those households in the second category.

Finally, the result of table 4.2.above shows that, the odd ratio of respondents those are married monthly saving is 0.47 as compared to single marital status respondents. That is, the probability level of participation in monthly saving of single respondents is higher by 53% as compared to married respondents. Depending on this result, married respondents are may be invest on their family than the single respondents. In spite of the fact living cost of large family and single ones are not equal. For example, the house rent for single person and married person are not equal, health fee and school fees are also increase as family size increase.

4.2.1.2. Social impact of BBSC at the study area

In the previous section we have seen that the social impact of BBSC by using descriptive measurement and it determined by various variables as indicated. However, since we had not adjusted our analysis to each independent variable, the observed social impact of BBSC may be determined by many factors at different level and magnitudes. Because of the stated measurement gap, this study consider the following independent variables like Household headship status, employee of BBSC status, monthly source of income of households, saving status of the households, educational level of household head, age of household head, access to credit and information were used in the logistic regression to identify the factors affect social status in the study area. The detail of logistic regression result was interpreted in detail as follow,

As indicated in the table 4.2.below, four variables out of ten found to be significant to determine households buying supportive material for education for their children's at school (which this study consider it as a proxy for social impact). Household headship status, employee of BBSC status and additional source of income of households are significant at 1%, while saving status of the households found to be significant at 10% level of significance.

The above table indicates that, as the coefficient for sex of household head shows, female headed households are more participant in buying supportive educational material for their children's at school than male headed household. For saving status of households, the coefficient is positive,

which shows the existence of positive relationship between buying supportive material for education of their children and household saving status.

As the coefficient for BBSC employee status shows, household those are member (employee) of BBSC are more participant in buying supportive educational material for their children's than non-employee of BBSC. For the variable monthly income of households, the coefficient is positive, which shows the existence of positive relationship between buying supportive material education for their children's and household monthly income. The exact relationship between buying of supportive educational materials for their children's and explanatory variables are stated below:

BBSC Employee status – The coefficient (or parameter estimate) for the variable BBSC Employee status is 1.573. This shows that, for every one-unit increase member (staff) of BBSC Employee, we expect a 1.573 increase in the log-odds of the dependent variable or buying supportive educational materials for their children's, keeping all other independent variables constant. In another word, as access to BBSC employee increase by one percent the probability of households buying supportive educational materials for their children's increase by 157.3% percent. This result indicates that, BBSC have a positive impact on social of households/individuals who are employee of BBSC.

Saving status of households – The coefficient (parameter estimate) for the variable saving status of households is 1.065. This shows that, for every one-unit increase of household saving we expect a 1.065 increases in the log-odds of the dependent variable or buying supportive educational materials for their children's, keeping all other independent variables constant.

Monthly income of households – The coefficient (parameter estimate) for the variable monthly income of household is 3.983. This shows that, for every one-unit increase of household monthly income we expect a 3.983 increases in the log-odds of the dependent variable or buying supportive educational materials for their children's, keeping all other independent variables constant.

Household headship status – The coefficient (parameter estimate) for the variable Household headship status is 1.772. This shows that, by making other variables constant, as the number of

household headed by female increase by one percent the probability of buying supportive materials for the children's increase by 177.2% when compared to households headed by male. In another word, for every one-unit increase of household headed by female we expect 1.772 increases in the log-odds of the dependent variable or buying supportive educational materials for their children's, keeping all other independent variables constant.

The remaining variables like age of the household head, educational level of household heads, Marital status, access to information and credit, marital status of respondents and family size were found to be insignificant for determining social of households, those are living in the study area.

Table 4.3.Logistic regression result of Social impact

Buying Supportive educational material	Coefficient	Std. Err.	z	P>|z |
Age of household heads (Continuous)	-0.061	.3387483	-0.18	0.856
Household headship status , Dummy (1=Male)	1.772	.5669387	3.13	0.002
Saving status of households (Continuous)	1.065	.6034209	1.77	0.077
Marital status (Single as a reference)				
Married	0.238	.9742107	0.25	0.806
Divorced	0 .467	1.212954	0.39	0.700
Widowed	0.479	1.316936	0.36	0.716
Household Educational level (Continuous)	0.127	.5627894	0.23	0.821
Employee of BBSC status dummy (1=Yes)	1.573	.5821005	2.70	0.007
Family size (Continuous)	0 .186	.4814892	0.39	0.698
Information Access (1=Yes)	-0.887	.6818787	-1.30	0.193
Credit Access (1=Yes)	0.231	.5888834	0.39	0.696
Monthly Income of Household (continuous)	3.983	.685296	5.81	0.000
_cons	-3.525	1.776982	-1.98	0.047

Source: Study survey, 2018

4.2.1.3. Environmental impact of BBSC

The quantity of brewery wastewater will depend on the production and the specific water usage. Brewery wastewater has high organic matter content; it is not toxic, does not usually contain appreciable herbicides and is easily biodegradable (Brewers of Europe, 2002). Also, the study identifies, Wastewater from breweries is divided into three types; viz: 1) Industrial Process wastewater (PWW) 2) Sanitary wastewater (SWW) from toilets and kitchens; and 3) Rain water.

The brewery's SWW will contribute only small loading whether measured as organic material or as flow, but it will require attention in regard to the clogging of pumps and screens. Rain water should be discharged to a separate drainage system, as it can interfere with the operation of a wastewater treatment plant (Brauer, 2006). Depending on Brauer, (2006) study result, this study used the first type of waste water from breweries (Industrial Process wastewater (PWW)) related information to evaluate the environmental impact of BBSC by using of descriptive and econometric analysis's. The descriptive analysis was discussed under section 4.1.8 and econometric analysis is analyzed under this sub-section as follow:

Under section 4.1.8 we have seen that the perception of respondents regarding to environmental impact of BBSC by using descriptive measurement and it determined by various variables. In addition, as stated under the specified section there is a controversial result from respondents and as the interview collected from BBSC workers. At the time of descriptive analysis, this study had not adjusted our analysis to each independent variable and the observed environmental impact of BBSC can be determined by many factors at different level and magnitudes.

So by considering the analysis gap under descriptive analysis, this study consider the explanatory variables like Residences of respondents, Household headship status, employee of BBSC status, monthly source of income of households, saving status of the households, educational level of household head, age of household head and access to information were used in the logistic regression to identify the factors affect environment in the study area. The detail of logistic regression result was interpreted in detail as follow,

As displayed in the below table, six variables out of ten found to be significant to having information or eye witness about the environmental impact of BBSC (affecting

environment/surrounding community negatively) because of the wastages released from BBSC (which this study consider it as a proxy for environmental impact). Residence, access to information and educational level of household head status are found to be statistically significant at 1%, employee of BBSC status and access to training are statistically significant at 5% and marital status is found to be statistically significant at 10% level of significance.

Respondents residence status – The coefficient (or parameter estimate) for the variable Respondents residence status is 7.153. This shows that, for every one-unit increase living in Bedele town than Mettu and Agaro, we expect a 7.153 increase in the log-odds of the dependent variable or having information or eye witness about the environment or communities are negatively affected by wastage released from BBSC, keeping all other independent variables constant. In another word, Bedele town communities were mostly affected negatively by wastage released from BBSC than the communities those are living in Mettu and Agaro town. This result indicates that, BBSC have a negative impact on environment as well as the communities those are living nearest to the factory.

Educational level of household head- The coefficient (parameter estimate) for the variable educational level of household head is 11.883. This shows that, for every one-unit increase in Educational level of household head, we expect a 11.883 increase in the log-odds of the dependent variable or having information or eye witness about the environment as well as communities are negatively affected by wastage released from BBSC, keeping all other independent variables constant.

Being employee of BBSC- The coefficient (parameter estimate) for the variable educational level of household head is 3.887. This shows that, for every one-unit increase in number of BBSC employees, we expect a 3.887 increase in the log-odds of the dependent variable or having information or eye witness about the environment as well as communities are negatively affected by wastage released from BBSC, keeping all other independent variables constant.

Access to information- The coefficient (parameter estimate) for the variable educational level of household head is 4.778. This shows that, for every one-unit increase in house hold having an information about environmental impact, we expect a 4.778 increase in the log-odds of the

dependent variable or having information or eye witness about the environment as well as communities are negatively affected by wastage released from BBSC, keeping all other independent variables constant.

Access to training- The coefficient (parameter estimate) for the variable educational level of household head is 2.578. This shows that, for every one-unit increase in households access to training, we expect a 2.578 increase in the log-odds of the dependent variable or having information or eye witness about the environment as well as communities are negatively affected by wastage released from BBSC, keeping all other independent variables constant.

Table 4.4.Logistic regression result of Environmental impact

BBSC wastage effects	Coefficient	Std. Err.	z	P>z
Residence, Dummy (1=Bedele)	7.165	1.85481	3.86	0.000
Household headship status , Dummy (1=Male)	-1.356	1.058388	-1.28	0.200
Age of household head (Continuous)	-0.706	.4632994	-1.52	0.128
Marital status (Single as a reference)				
Married	2.417	1.416807	1.71	0.088
Divorced	0.369	1.600977	0.23	0.817
Widowed	-3.430	2.035486	-1.69	0.092
Education (Continuous)	11.838	3.040037	3.89	0.000
Employee of BBSC status, dummy (1=Yes)	3.887	1.585916	2.45	0.014
Family size(Continuous)	0.015	.851454	0.02	0.986
Information Access , Dummy (1=Yes)	4.778	1.713138	2.79	0.005
Training access Dummy (1=Yes)	2.578	1.067091	2.42	0.016
Credit Access Dummy (1=Yes)	-0.615	.8069354	-0.76	0.446
_cons	-8.648	2.715548	-3.18	0.001

Source: Study survey, 2016

Table 4.4.above shows that, the remaining variables like age of the household head, sex of household head, educational level of household heads, Marital status, access to credit and family size were found to be insignificant to understand the environmental impact of BBSC in the study area.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This final chapter focuses on summary, conclusion and recommendations. First, summary of the main findings followed by results of the study were discussed. Then recommendations how to improve the situations to have a better outcome will be made.

This study was conducted with the general objective of assessing the socio-economic impacts of BBSC on the society. Questionnaire, interview and researcher observation were the main source of data for this study.

5.1. Summary of Major Findings

- Almost 2/3rd of the respondents reported that, the BBSC is not participating on the social infrastructure construction. From the total of 187 respondents, 110 (58.8%) of the respondents think that BBSC is not participating on local infrastructure constructions like health centre, road, schools, etc. 77 (41.2%) of the respondents think that BBSC is fully participating on local infrastructures constructions. However, the data we have collected through interview with BBSC officials shows that the company is participating on social infrastructure construction. The following are what we have got from the interview that is done in 2017 and also according to report of BBSC 2016/17:
  - Funded the construction of Bedele Hospital maternal wing with Birr 6.2 million
  - Bought Ambulance for Bedele city for Birr 1.6 million
  - Funded the construction of Social club by 3 million birr
  - Sponsored the Bedele football club by Birr 226,000

The researcher observed that those listed are done and giving service to the society of Bedele town and the surrounding

- Economic of BBSC Employees is better than that of nonemployees according to the result from the survey. Of total respondents 108 (61%) of them responded that they save some portion of their income. Compared to respondents who are not an employee of BBSC,

employees of BBSC have higher rate of saving. Employees of BBSC have saving rate of 63.9% and that of nonemployees of BBSC are 59.1%.This, in turn have a direct implication on income of employees and who are not.

- From the total 187 respondents, 44.9% of them responded BBSC is protecting the environment by not releasing harmful waste materials to the environment. And 55.1% of the respondents thought that the company is releasing harmful wastes to the environment and harming the environment. As per the interview, officials of BBSC declared that there is no harmful waste released by the company to the environment. The company has modern waste water treatment plant that treats the waste water that is discharged to the environment. Besides the breakages are milled and sent to Addis Ababa for recycling.

  The researcher observed that the above listed waste water treatment plant and the breakage crusher is available and operating

- Employees of BBSC save more than that of nonemployees of the company. The odd ratio of non-employee of BBSC monthly saving is 0.93 as compared to BBSC employee. That is, the probability level of BBSC employee to be saving monthly is higher by 7% as compared to non-employee of BBSC. The study result indicates that, employee of BBSC monthly saving is higher than that of non-employees of BBSC. Employee of BBSC and monthly saving has a positive relationship as expected.
- The higher the family size the higher will be the expenditures. The higher the expenditure the lower the saving. The odd ratio of respondents who have family size equal and greater than 5 monthly saving is 0.93 as compared to respondents who do not. That is, the probability level of participation in monthly saving of households who have less than 5 family sizes is higher by 7% as compared to those households in the second category.
- The odd ratio of respondents those are married monthly saving is 0.47 as compared to single marital status respondents. That is, the probability level of participation in monthly saving of single respondents is higher by 53% as compared to married respondents. Depending on this result, married respondents are may be invest on their family than the single respondents. In spite of the fact living cost of large family and single ones are not equal. For example, the

house rent for single person and married person are not equal, health fee and school fees are also increase as family size increase.

- ❖ BBSC have a higher positive impact on social of households/individuals who are employee of BBSC than that of nonemployees. This can be seen from, for every one-unit increase of household saving we expect a 1.065 increases in the log-odds of the dependent variable or buying supportive educational materials for their children's, keeping all other independent variables constant
- ❖ BBSC has a negative impact on environment as well as the communities those are living nearest to the factory. In another word, Bedele town communities were mostly affected negatively by wastage released from BBSC than the communities those are living in Mettu and Agaro town. This result indicates that, BBSC have a negative impact on environment as well as the communities those are living nearest to the factory.

5.2. Conclusion

Based on the findings of the study, the following conclusions are drawn.

As mentioned under methodology of this study, we used income to evaluate economic impact of BBSC at household level. To evaluate income/economic impact this study used monthly saving status at household level as proxy/indicator. Depending on the logistic regression result, employees of BBSC are in a better position economically compared to that of nonemployees of BBSC. Employees of BBSC earn higher income and their saving is higher than that of nonemployees. The participation of BBSC on social infrastructure construction is appreciable but it is not as expected by the society surrounding the area of operation of the brewery. And also it is concentrated only around Bedele town of Buno Bedele Zone. It is observed that the environmental conditions are taken care of by the company by planting waste water treatment plant and through breakage handling. Even though some of the above functions are not hidden from the public arena, neither the employees nor the society boldly confirms that these engagements are adequately executed by BBSC in such a way that meets the stakeholders' expectation. Even the employees of the BBSC are not well aware of these undertakings to the level they have to know about it.

5.3. Recommendations

To build a better attachment with society that resides around the company and even to the employees of the company, BBSC has close to the stakeholders, participate on environmental protection activities around the company and participate on basic social infrastructure so that the company actively offers its social responsibilities. Besides the company has to give enough awareness to the stakeholder so that they can easily witness the developments.

This can be done through:

The stakeholders of the company have not enough information about the undertakings of the company. Even some of the employees of the company, as per the study, responded that they do not know about these environmental protection techniques, social infrastructures and other accomplishments. The company has to create awareness about the things that are carried out by the company through different channel of communication. This helps the stakeholders of the company to give an insight about it.

According to the study, these social infrastructure funding made by the company are not enough and are not giving enough focus on more basic infrastructures that can benefit the society like education, road, and the like. This can be done focusing on the major problems of the surrounding society and by allocating enough funds. And also the area these infrastructures that are done concentrated around Bedele town. This has to cover wider areas so that the societies around the company grasp equal benefits to that of Bedele town.

Finally, the company has to give trainings and workshops to the stakeholders about the environmental protection techniques, water usage and waste water management.

REFERENCES

Abass A. Olajire (2012). The brewing industry and environmental challenges, Journal of Cleaner Production

Alkire, S. (2015, June). "Multidimensional Poverty Measurement And Analysis". Ophi.

Baimel, S.H., Smith, T.R., Rees, R.H., Coote, N., Sulpizio, T.E., 2004. Filtration with diatomite. Brauwelt Int. 22, 54e55.

Ben Weger (2017). Sustainability in the Brewing Industry - The Greater Effect, University Colorado, boulder Ben Weger Spring 2017

Brown, Rob. *Heineken unveils green targets*. http://www.brewersguardian.com/brewing-features/international/heineken_unveils_green_targets.html/ (accessed January 15, 2018). capacity. Appl. Microbiol. Biotechnol. 35 (1), 128e133

Central Statistical Agency, Ethiopian Demographic Health Survey Addis Ababa, Ethiopia ICF International Calverton, Maryland, USA, 2016

Dr. Tassew, W. (2012). Measuring Multi-Dimensional Poverty: Capabilities, Deprivation and Social Exclusion in Rural And Urban Ethiopia. Addis Ababa

.

Duarte, L.C., Carvalheiro, F., Lopes, S., Marques, S., Parajo, S., Girio, F.M., 2004. Comparison of two post-hydrolysis processes of brewer's spent grain autohydrolysis liquor to produce a pentose-containing culture media. Appl. Biochem. Biotechnol. ABAB Symp. Ser., 1041e1058. Engineering and Plant Operations, vol. 3. Master Brewers Association of the Americas, St. Paul, Minnesota

Evers, G., Buhler, T., 2005. Design and first practical experience: the new Grolsch brewhouse. Tech. Quarterly Master Brew. Assoc. Am. 42, 319e323.

FAO Source, 2003. 2000e2002 world beer production. BIOS Int. 8 (2), 47e50. Fendler, A., 2008. Product carbon footprinting e beer. In: Monograph of the 35th Symposium of the European Brewery Convention on Environmental Sustainability.

Federal Democratic Republic of Ethiopia (July 2002): *Ethiopia: Sustainable Development and Poverty Reduction Program*, Addis Ababa, Ministry of Finance and Economic Development.

Fillaudeau, L., Blanpain-Avet, P., Daufin, G., 2006. Water, wastewater and waste, management in brewing industries. J. Cleaner Product 14, 463e471.

Florence, J.-P., & Feissolle, A. A.-P. (2007). Econometric Modeling And Inference. Cambridge University Press.

Galitsky, C., Martin, N., Worrell, E., Lehman, B., 2003. Energy efficiency implementation and cost saving opportunities for breweries. In: An Energy Star

Greene, W. H. (2002). Econometric Analysis (Vol. 5th Edition).

Grossman, K., 2010. Sierra Nevada Brewing Company. 2010 Sustainability Report.

Gujarati. (2004). Basic Econometrics (Fourth Edition Ed.).

Habermann, W., Pommer, E.H., 1991. Biological fuel cells with sulphide storage, Guide for Energy and Plant Managers. Ernest Orlando Lawrence Berkeley National Laboratory and the US Environmental Protection Agency

Hashemi, S.M., Schuler, S.R. and Riley, A.P. (1996). Rural Credit and Women's Empowerment in Bangladesh. (in: World Development, JSI Research and training Institute). Virginia, U.S.A.

Hunt CB, Auster ER. Proactive Environmental Management: Avoiding the toxic trap. Sloan management review. 1990;

International Finance Corporation (IFC) of World Bank Group, 2007. Environmental Health and Safety Guidelines for Breweries.

Jürgen, F., 2011. Methodology and tool for a fast energy assessment, In: Proceeding workshop Green Brewery, November 2011

Kanagachandran, K., Jayaratne, R., 2006. Utilization potential of brewery waste water sludge as an organic fertilizer. J. Inst. Brew. 112 (2).

Knirsch, M., Penschke, A., Meyer-Pittroff, R., 1997. Disposal situation for brewery waste in Germany e results of a survey. Brauwelt Int. 4, 477e481

Long And Freese. (2006). Regression Models For Categorical Dependent Variable Using Stata (Second Edition Ed.). Stata Presss

Maddala, G.S. (1999). Limited-Dependent and Qualitative Variables in Econometrics. Cambridge University Press, United Kingdom.

Maddala, G.S. (1999). Limited-Dependent and Qualitative Variables in Econometrics. Cambridge University Press, United Kingdom.

Maignan I, Farrell OC. Corporate social responsibility and marketing: An integrative framework. Journal of the Academy of Marketing Science. 2004

Noel Veraverbeke, Yilma Tefera, Legesse Negash, Zeytun Gashaw, Belay Birlie: Notes for the course Principles of Statistical Inference. North-South-South project in Biostatistics Series, Belgium, 2012

NPC (National Petroleum Council), 2003. Balancing Natural Gas Policy. Fueling Demands a Growing Economy.

NRC (Natural Resources Canada), 2010. Energy Efficiency Opportunities in the Canadian Brewing Industry.

Peng, C.J., Lee, K.L., and Ingersoll, G.M., (2002). An Introduction to Logistic Regression Analysis and Reporting. Indiana University- Bloomington

ANNEX A: **QUESTIONER**

JIMMA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF MANGEMENT

Dear respondent

We are academic staff of Jimma University, College of Business and Economics, department of Management. Currently, we are undertaking a research entitled ***'Socio-economic Impact of Bedele Brewery Share Company: Case study of Southwestern Ethiopia***. You are one of the respondents selected to participate on this study. Please assist us in giving correct and complete information to present a representative finding on the stated tittle. Your participation is entirely voluntary and the questionnaire is completely anonymous.

Finally, I confirm you that the information that you share me will be kept confidential and only used for the academic purpose. All information will be used for academic purposes only.

Thank you in advance for your cooperation and dedicating your time!

1. Woreda ? 1=Bedele 2=Mettu 3=Agaro
2. Kebele_____
3. Sex of respondents 1= Male 2=Female
4. Age of the respondent? 1=18-24 2=25-31 3=32-38 4=39-44 5=>4
5. Marital status: 1=Single 2 =Married 3= Widowed 4= Divorced
6. Ethnicity of the respondent ; 1=Oromo 2=Amhara 3=Yem 4 = Dawuro 5=others
7. Religion : 1=Muslim =2 Orthodox 3=Protestant 4=Wakefata 5= other
8. Educational level : 1=No education 2= primary 3= secondary 4= Diploma 5= degree 6= Master's degree and above
9. Number of household member: 1=1<five 2=>or equals to five
10. Are you head of the Household? 1=Yes 0=No
11. How old is the head of the household 1=18-24 2=25-31 3=32-38 4=39-44 5=>44
12. Do you have a children within school age; 1= Yes 0=No

13. Are your children vaccinated? 1=Yes 0=No

14. During last year, have you bought uniforms for your children? 1=Yes 0=No

15. During last year, have you bought bags for your children? 1= Yes 0=No

16. Housing related information (circle your responses)

Type of house possession (circle response)	1 = Own 2 = rented private 3 = rented public 4 = Other
Number of rooms in the house:	1=1 2=2 3=3 4=4 5=>4
Major material used for the construction of walls	1=natural walls 2=rudimentary walls 3= finished walls
Major material used for the construction of roof	1. Thatch 2. Corrugated Iron 3. Tiles 4. Other
Major material used for the construction of floor	1. Dirt 2. Cement 3. Bricks 4. Ceramic tile 5. Other
Is there electricity in the household?	1 = Yes 0 = No

17. Does this household have the following household effects? Circle your answer

HOUSEHOLD ASSETS		**Code**	**Response**
33.1	Does the household possess a TV?	1 = Yes 0 = No	
33.2	Radio?	1 = Yes 0 = No	
33.3	Tape recorder/CD player?	1 = Yes 0 = No	
33.2	Gas stove?	1 = Yes 0 = No	
33.2	Kerosene stove?	1 = Yes 0 = No	

18. How do you rate source of household income over the last 3 years?

1=Decrease Greatly 2=Decreased 3=Stayed the Same 4=Increased 5= Increased Greatly

19. How do you rate overall household income over the last 3 years?

    1=Decrease Greatly 2=Decreased 3=Stayed the Same 4=Increased 5= Increased Greatly

20. Aside from your own work, have you done any work in the last seven days? 1= Yes 0=No

21. How do you rate source of your personal income over the last 12 months?

    1=Decrease Greatly 2=Decreased 3=Stayed the Same 4=Increased 5= Increased Greatly

22. How do you rate overall personal income over the last 12 months?

    1=Decrease Greatly 2=Decreased 3=Stayed the Same 4=Increased 5= Increased Greatly

23. Does any member of this household have saving account? 1= Yes 0=No

24. If your answer for Q 43 yes, from whom? 1=MFIs 2=Bank 3=From both 4=other

25. Do you save monthly? 1= Yes 0=No

26. If yes for Q 63 how much do you save monthly? _____

27. Why you are saving? 1=for emergency case 2=to improve living standard 3=To pay credit 4=for school fee 5=to buy agricultural input 6=other

28. Do you think BBSC is participating on the construction of social infrastructure?

    1= Yes 0=No

29. If your answer for Q 21 is yes, would you please list

    _____

    _____

    _____

    _____

    _____

30. Do you think BBSC is using water efficiently? 1=Yes 0=No

31. Are there trainings given by BBSC? 1=Yes 0=No

32. If yes for Q31, please list the trainings below

    _____

    _____

    _____

_____

33. Do you notice any environmental protection constructed by BBSC?

1=Yes 0=No

34. If yes for Q33, please list below

_____

_____

_____

_____

ANNEX II: Stata out puts

Logistic regression — Number of obs = 187
LR chi2(12) = 204.29
Prob > chi2 = 0.0000
Log likelihood = -24.891477 — Pseudo R2 = 0.8041

BBSCwastegeEffect	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Residence	7.165263	1.85481	3.86	0.000	3.529902	10.80062
HHhead	-1.356592	1.058388	-1.28	0.200	-3.430994	.7178107
Age	-.7060372	.4632994	-1.52	0.128	-1.614087	.202013
MartialStatus						
2	2.417095	1.416807	1.71	0.088	-.3597946	5.193985
3	.3697736	1.600977	0.23	0.817	-2.768084	3.507631
4	-3.430165	2.035486	-1.69	0.092	-7.419644	.5593135
Education	11.83825	3.040037	3.89	0.000	5.879889	17.79661
EmployeeBBSC	3.887329	1.585916	2.45	0.014	.7789914	6.995667
Familysize	.0151718	.851454	0.02	0.986	-1.653647	1.683991
InforAccess	-4.778703	1.713138	-2.79	0.005	-8.136392	-1.421014
Training	-2.578702	1.067091	-2.42	0.016	-4.670163	-.487242
CreditAccess	-.6154817	.8069354	-0.76	0.446	-2.197046	.9660825
_cons	-8.648682	2.715548	-3.18	0.001	-13.97106	-3.326306

Logistic regression — Number of obs = 187

LR chi2(13) = 157.84

Prob > chi2 = 0.0000

Log likelihood = -50.376228 — Pseudo R2 = 0.6104

SuptEducMate	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
Residence	.6558466	.6979079	0.94	0.347	-.7120277	2.023721
HHhead	2.048201	.5757549	3.56	0.000	.9197427	3.17666
Age	-.0182527	.327598	-0.06	0.956	-.6603329	.6238276
MartialStatus						
2	.3391552	.9954738	0.34	0.733	-1.611937	2.290248
3	.398101	1.210056	0.33	0.742	-1.973565	2.769767
4	-.1596231	1.30068	-0.12	0.902	-2.708909	2.389663
Education	-.4050706	.6804981	-0.60	0.552	-1.738822	.9286811
EmployeeBBSC	1.316419	.6987218	1.88	0.060	-.0530506	2.685888
Familysize	.1237447	.2543382	0.49	0.627	-.3747491	.6222385
InforAccess	-.8885835	.6617191	-1.34	0.179	-2.185529	.4083622
Training	.5045325	.7571553	0.67	0.505	-.9794645	1.98853
CreditAccess	.2275527	.5837991	0.39	0.697	-.9166725	1.371778
SourceIncome	3.693365	.6263935	5.90	0.000	2.465657	4.921074
_cons	-3.223663	1.582098	-2.04	0.042	-6.324518	-.1228068