DOKUZ EYLÜL UNIVERSITY

GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES

PUBLIC OPINION ON WATER REUSE APPLICATIONS IN TURKEY

by

Hatice Sena ALKAN

October, 2011

İZMİR

PUBLIC OPINION ON WATER REUSE APPLICATIONS IN TURKEY

A Thesis Submitted to the
Graduate of Natural and Applied Sciences of Dokuz Eylül University
In Partial Fulfillment of the Requirements for the Degree of Master of Science
in Environmental Engineering, Environmental Technology Program

by

Hatice Sena ALKAN

October, 2011
İZMİR

M.Sc THESIS EXAMINATION RESULT FORM

We have read the thesis entitled **"PUBLIC OPINION ON WATER REUSE APPLICATIONS IN TURKEY"** completed by **HATİCE SENA ALKAN** under supervision of **PROF. DR. NURDAN BÜYÜKKAMACI** and we certify that in our opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

Prof. Dr. Nurdan BÜYÜKKAMACI

Supervisor

Yrd. Doç. Dr. Gökhan TENİKLER

(Jury Member)

Prof. Dr. Ayse FİLİBELİ

(Jury Member)

Prof.Dr. Mustafa SABUNCU
Director
Graduate School of Natural and Applied Science

ACKNOWLEDGMENTS

I would like to express my gratitude to my supervisor Prof. Dr. Nurdan BÜYÜKKAMACI or her patience guidance and motivation.

I would also like to thank the members of my thesis committee, Prof. Dr. Ayşe FİLİBELİ and Assist Prof. Dr. Gökhan TENİKLER, for their support and assistance.

Above all I am most thankful to my brother is Buğra ALKAN for his support, patience and motivation during this study.

My appreciation also goes to my aunt Assist. Prof. Dr. Nihal BÜYÜKUSLU for her support during the field studies.

My very thanks and love go to my dear parents Zühal and İbrahim ALKAN and to my cousin Duygu DEMİRTAN, my grandparents, for their patience, encouragement and support during my life.

I would like to thank all of my survey distribution team; especially Ahmet ÖZAYDINLIK and Ömer ÖZAYDINLIK for their support.

Finally, I thank to my close friends for their moral and encouragement.

Hatice Sena ALKAN

PUBLIC OPINION ON WATER REUSE APPLICATIONS IN TURKEY

ABSTRACT

Nowadays, water resources are rapidly polluted and run out importance. Depending on the population growth, water demand and wastewater generation will increase in the future. Many communities throughout the world are approaching, or have already reached, the limits of their available water supplies. Hence, water reclamation and reuse have almost become necessary for conserving and extending available water supplies. The recycling and reusing of water have a great importance. However, negative response of the public on water reuse creates some problems in application. Therefore, public should be informed and common fallacies needs to be changed. This study was planned and a survey sheet (questionnaire) was prepared. There are some questions related with participant's age, gender, education, income range and fifteen questions about water reuse in the survey. This questionnaire was sent to different regions of Turkey and 375 questionnaires were returned. Data in collected questionnaires was evaluated with SPSS statistical analysis and MS-Excel programs. The results of survey studies will be given opinion of Turkish people on water reuse applications. According to study results; participants have suspicion about reuse of treated wastewater.

Keywords: Wastewater, Water reuse, SPSS statistical analysis

TÜRKİYEDE ARITILMIŞ SULARIN YENİDEN KULLANIM UYGULAMALARINA HALKIN TEPKİSİ

ÖZ

Günümüzde su kaynakları hızlı olarak kirlenmekte ve tükenmektedir. Dünya nüfusunun büyük ölçüde artacağı ve bunun sonucu olarak su ihtiyacında ve atık su üretiminde büyük bir artış yaşanacağı belirtilmektedir. Birçok ülke kendi ulusal su rezervi limitine yaklaşmaktadır veya bu sınıra dayanmıştır. Bu durumda atık suyun arıtılması ve tekrar kullanılması su rezervlerinin korunması, ihtiyacın karşılanması ve mevcut rezervlerin arttırılması gerekmektedir. Bu sebeple suyun geri dönüşümü ve tekrar kullanılması çok büyük bir öneme sahiptir. Arıtılmış suyun yeniden kullanılması konusunda halkın olumsuz tepkisi uygulamada sorunlar çıkartabilmektedir. Bu nedenle, halkın bilgilendirilmesi ve yaygın olan yanlış inanışların değiştirilmesi gerekmektedir. Bu konuyla ilgili olarak bu çalışma planlanmış ve anket formu hazırlanmıştır. Anket formundaki on beş soru, arıtılmış suların tekrar kullanılması uygulamaları, bazı sorular ise katılımcıların yaşları, cinsiyetleri, eğitim ve gelir seviyeleri ile ilgilidir. Anket çalışması Türkiye'nin belli bölgelerine gönderilmiş ve 375 adet anket geri dönmüştür. Toplanan anketlerdeki veriler, SPSS programı istatistiksel analizi ve Excel programı ile değerlendirilmiştir. Araştırma sonuçları katılımcıların atıksuyun geri dönüşüm uygulamaları konusundaki fikirlerini ortaya koymuştur. Araştırma sonuçları genel olarak değerlendirildiğinde; katılımcıların arıtılmış suların yeniden kullanımı konusunda endişeli oldukları görülmektedir.

Anahtar kelimeler: Atıksu, Yeniden kullanım, SPSS istatistiksel analiz

CONTENTS

Page

CHAPTER ONE
INTRODUCTION

1.1 Introduction

Water is very significant in our life. There will be no life without water. Water turned out to be a limited natural resource in recent years and water resources are polluted day by day.

Turkey is not a rich country in terms of existing water potential. In other words our country is get in between water poor countries. Approximately 1,500 m^3 per capita is available annually for water consumption. It is estimated that water availability in Turkey will fall below 1,000 m^3 per capita by 2025 (WHO, 2007). Therefore, the treated wastewater has to be reused and the ways to reuse the effluent from several wastewater treatment plants have to be developed for future demand.

The water reuse applications have rapidly become an imperative issue. However, negative response of the public on water reuse creates some problems in application. The success of the water reuse applications depend on public acceptance. Thus, public opinion is important in planning, constructing, and operating stages for wastewater reclamation and reuse facilities.

In order to determine the public perception and acceptance, some survey studies have been carried out in some countries. According to our knowledge, the assessment of public opinion on water reuse applications in Turkey has not been studied in details, yet. This study developed a survey sheet to be determined public perception on water reuse in Turkey.

1.2 Scope of the Thesis

With the above mentioned objectives, this thesis was organized in seven chapters. After the Introduction Section, literature review about importance of water and water pollution is given in Chapter 2. Some knowledge about wastewater reuse applications is summarized in Chapter 3. In Chapter 4, some case studies were evaluated. In Chapter 5, methods implemented for study. The outcomes of the study are presented in Chapter 6, results and discussion. This chapter also discusses the results of tables and graphics. Finally, Chapter 7 concludes the thesis with major conclusions of the study.

CHAPTER TWO
LITERATURE REVIEW

2.1 Importance of Water

Water is a chemical substance with chemical formula of H_2O. One molecule of water contains two hydrogen atoms covalently bonded to a single oxygen atom. Water can be found in nature in all three common states of matter and may take different forms on Earth. For our lives, water has a crucial role and constitutes main structure of living beings. The water which is the main source of life is also basic element of all microorganisms. In order to carry out their basic activities, microorganisms must have a certain amount of water in their cells. Water ratio can be varied between 70% and 90% in the protoplasm of organisms which are in active state (Kocataş, 2003). Therefore, water is the essence and source of life.

Earth's approximate water volume is 1400 million km^3. However, very small proportion of this volume can be found in usable state. While water is maintaining its importance, water resources are rapidly dwindling around the world. Irregular urbanization, excessive population growth, increase in emission of greenhouse gases and excessive industrialization are the main factors in extinction of water resources of Earth.

On the other hand, usable and drinkable water resources are increasingly consuming because of rapid increase in world's population, development of industry and lack of environmental awareness. Additionally, water resources are unconsciously consumed which is preparing the groundwork of further problems. Therefore, water should be protected as a social property and access to water for everyone should be ensured. Also in order to maintain water resources, we need to protect existing ecology

2.1.1 Water Cycle

The water is cycled between the atmosphere, the ocean, the lake, the stream and the land. This is very significant process.

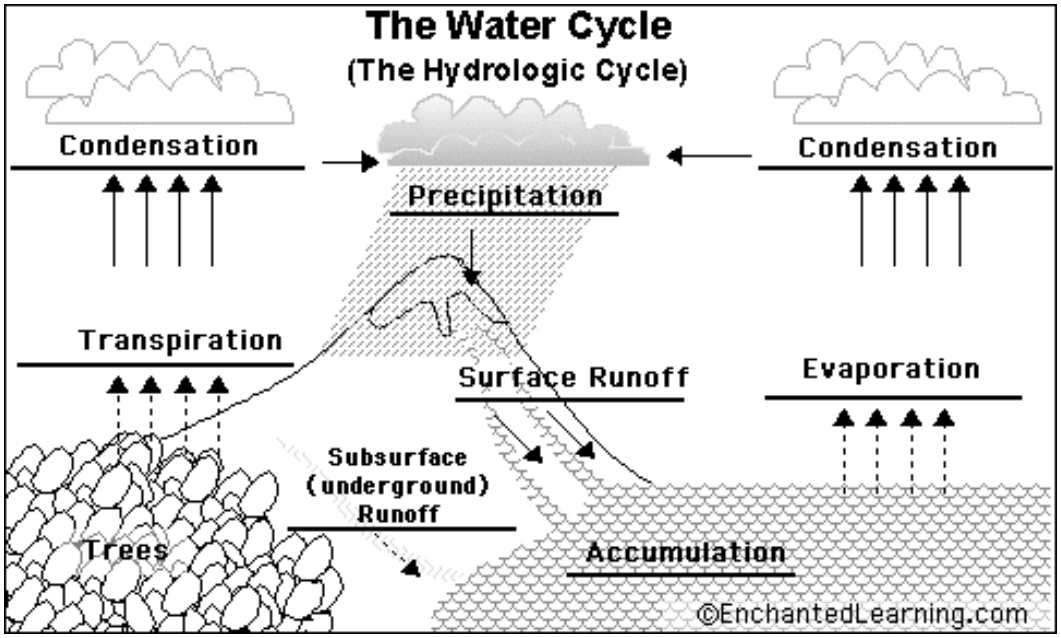

Figure1.1 Water Cycle

There are some processes in Figure1.1. These are:

1. Evaporation
2. Condensation
3. Precipitation
4. Surface Run Off
5. Infiltration
6. Transpiration

(http://www.enchantedlearning.com/geology/label/watercycle/labelanswers.shtml, n.d.)

2.1.2 Water Resources

Water resources are divided into two sections. These sections are surface water and groundwater.

Surface water is water collecting on the ground or in a stream river, lake, wetland or ocean. It is related to water collecting as groundwater or atmospheric water. Surface water is naturally replenished by precipitation and naturally lost through discharge to the oceans, evaporation evapotranspiration and sub-surface seepage (Türkman, 2000).

Groundwater is water located beneath the ground surface in soil pore spaces and in the fractures of rock formations. Groundwater is recharged from, and eventually flows to, the surface naturally; natural discharge often occurs at springs and seeps, and can form oases or wetlands. Groundwater is also often withdrawn for agricultural, municipal and industrial use by constructing and operating extraction wells (http://www.aquaearth.co.za/index.php?option=com_content&view=article&id=125&Itemid=384, n.d).

2.1.3 Water Demand

Water resources are sources of water that are useful or potentially useful. Uses of water include household, agricultural, industrial, recreational and environmental activities. All of these human uses require fresh water and non health risk.

In rich countries, people use between 850 and 1000 liters of water in each day. In poor areas where people rely on public taps for their water, consumption drops to between 20 and 70 litres each per day (http://www.environment.nsw.gov.au).

Some believe that fresh water will be a critical limiting resource for many regions in the near future. Therefore we need to try alternative ways to protect water resources from pollution.

Important water problems can be categorized into two groups: The pollution is growing rapidly, putting more pressure on our water supply and amount of water is effectively reduced by pollution and contamination.

To solve this problem, depletion of water sources must be prevented and also we need to give more importance to recycling of wastewater and water. Addition to this we need to use modern technologies and give more attention to awareness of society about this issue.

2.1.4 Water Quality

Water is essential to human life and the health of the environment. As a valuable natural resource, it comprises marine, freshwater (river and likes) and groundwater environments that stretch across coastal and inland areas.

Water has two dimensions that are closely linked: quantity and quality. Water quality is commonly defined by its physical, chemical, biological and aesthetic characteristics (http://www.environment.nsw.gov.au/water/waterqual.htm, n.d). Water quality indicators can be categorised as:

- biological: bacteria and algae
- physical: temperature, turbidity and clarity, colour, salinity, suspended solids, dissolved solids
- chemical: PH, dissolved oxygen, biological oxygen demand, nutrients, organic and inorganic compounds
- Aesthetic: odours, taints, colour
- radioactive: alpha, beta and gama radiation emitters

A healthy environment is one in which the water quality supports a rich and varied community of organisms and protects public health (http://www.environment.nsw.gov.au/water/waterqual.htm). The water may be used by the community for:

- supply drinking water
- recreation (swimming, boating)
- irrigating crops
- industrial processes
- navigation and shipping

- wildlife habitats
- protection of aquatic ecosystems

Turkish water quality standards are classified in two major groups: (i) water quality standards for waters intended for human consumption and (ii) discharge standards of major industrial operations and water quality standards for ambient water bodies including rivers, lakes and seas. The quality standards of waters intended for human consumption also cover the drinking water quality criteria and are specified in the Regulation for Waters Intended for Human Consumption (ITASHY, 2005).

It ıs expecting that; EU is going to develop current legistation and applications on the field of water usage. EU latest policy initiatives and legislative developments relevant for the negotiation process. Some directives are Water Framework Directive (2000/60/EC), Marine Strategy Framework Directive, The Framework Directive on Waste (2006/12/EC). The Water Framework Directive is a European Union directive which commits European Union member states to achieve good qualitative and quantitative status of all water bodies (including marine waters up to one nautical mile from shore) by 2015.

2.2 Water Distribution On Earth

Water is widely distributed on Earth as freshwater and salt water in the oceans. Fresh water is naturally occurring water on the Earth's surface in ice sheets, ice caps, glaciers, bogs, ponds, lakes, rivers and streams, and underground as groundwater.

The volume of the water on the Earth is approximately 1.4 billion km^3 and about 97.5% of this is saline, while the remaining 2.5% is fresh water. Most fresh water, about 68.7%, is currently ice.

Our country has 501 billion m^3 of annual precipitation, of which 274 billion m^3 is assumed to evaporate from surface and transpire through plants and 69 billion m^3 of

precipitation directly recharges the aquifers, whereas 158 billion m^3 forms the precipitation run off (www.dsi.gov.tr).

There is a continuous interaction between surface runoff and groundwater, but it is estimated that a net 28 billion m^3 of groundwater feeds the rivers. So, average annual surface water potential is 186 billion m^3, with the surface runoff of 7 billion m^3 coming from neighboring countries, total surface runoff within the country reaches 193 billion m^3. Our country is not rich country for water resources and according to annual per capita of water potential records; water amount in Turkey will have been decreased very seriously by near future (www.dsi.gov.tr).

Per capita availability of potential water resources is 1652 m^3 in Turkey. However according to Turkish Statistical Institute records, in year 2030 Turkey's population will be nearly 100 million that means per capita availability of potential water resources will be 1120 m^3 (www.dsi.gov.tr).

80 countries which are forming 40 percent of Worlds population, already suffer from water shortage. The years between 1940 and 1980, the water usage has been doubled. Due to rapid increase in population while the water resources remain constant, water demand is increasing every day (The United Nations World Water Development Report3, 2009).

To maintain water resources of Turkey as healthy and sufficient for future generations, this resources need to be protected and must use wisely.

2.3 Water Potential Of Turkey

According to international records, to be rich in water resources a country must have more than 10,000 m^3 per capita per year. Water supplies between 1,000 - 2,000 m^3 per person/year make a country water-stressed. When the figure drops below 1,000 m^3 nations are considered water-scarce. When a country becomes water-scarce

it means that the country experiences a severe constraint on food production, economic development, and production of natural systems.

According to Turkish Statistical Institute reports, Turkey's water supply per capita is varied between 1,500 and 1,735 meter cube which means Turkey is on the range of water-stressed countries.

When we look at the continental view of water potentials of countries, according to united nation records, Turkey is on 103^{th} place on the list of usable water potential of countries list between 182 countries.

Water consumption increased slightly during last decade depending on the development of the soil and water resources expanding urban population and development of industrial sector. Total water consumption rose to 42 m^3 by the end of 2000 as a result of numerous projects developed by various agencies including DSI who is in charge of developing water resources. In last decade, actual water consumption of turkey is recorded as; 72 percent of usage is required for irrigation, 16 percent of usage is for drinking and 12 percent of usage is for industrial sectors (TUSIAD, 2008).

2.4 Uses Of Water

There are many ways that we use our water. Water is our most valuable resource. Water is vital to life. Humans, plants, and animals are made up of mostly water. All living things would die if it weren't for water. We use water for drinking, washing, cooking, and irrigating as well as many other things. Domestic use includes water that is used in the home every day, including water for normal household purposes, such as drinking, food preparation, bathing, washing clothes and dishes, flushing toilets, and gardens. Irrigation is important use of water for agriculture. Even more water is used by industries to generate electricity, manufacture things. It is heated and the steam is used to run machinery. Cities use water for fire fighting, street cleaning, and watering public areas such as parks, golf course trees and flowers.

Commercial water use includes fresh water for motels, hotels, restaurants, office buildings, other commercial facilities.

2.5 Water Pollution

Water pollution is one of the main concerns of the world today. The governments of numerous countries have striven to find solutions to reduce this. Water pollution is observed as the result of many deaths and epidemic diseases. It has been suggested that it is the leading worldwide cause of deaths and diseases and that it accounts for the deaths of more than 14,000 people daily.

In addition, migration to cities along with industrialization movements have been caused rapid and irregular urbanization In our country, main factors which cause water pollution can be grouped as; industrialization, urbanization, population growth, pesticides and fertilizers.

2.5.1 Health Impacts Of Water Pollution

Water pollution is a form of pollution that not only causes disease, but also makes spreading some diseases easy. While water pollution gives rise to cancer, heart disease, chronic respiratory diseases, and other diseases, it can also cause development and nervous system disorders, together with immune system disorders. Drinking water plays a significantly important role because of its direct relationship with health. Illnesses such as hepatitis, typhoid fever, paratyphoid, dysentery, polio, and parasites prove that drinking water is contaminated by sewage and disinfection is adequate.

Many areas of groundwater and surface water are now contaminated with heavy metals, POPs (persistent organic pollutants), and nutrients that have an adverse affect on health. Water-borne diseases and water-caused health problems are mostly due to inadequate and incompetent management of water resources. Safe water for all can only be assured when access, sustainability, and equity can be guaranteed. Access can be defined as the number of people who are guaranteed safe drinking water and

sufficient quantities of it. There has to be an effort to sustain it, and there has to be a fair and equal distribution of water to all segments of the society (http://edugreen.teri.res.in/explore/water/health.htm).

Polluted water is a major cause of human disease, misery and death. According to the World Health Organization (WHO), as many as 4 million children die every year as a result of diarrhoea caused by water-borne infection. The bacteria most commonly found in polluted water are coliforms excreted by humans (Edwin, 1996).

Pesticides: The organophosphates and the carbonates present in pesticides affect and damage the nervous system and can cause cancer. Some of the pesticides contain carcinogens that exceed recommended levels. They contain chlorides that cause reproductive and endocrinal damage.

Lead: Lead is hazardous to health as it accumulates in the body and affects the central nervous system. Children and pregnant women are most at risk.

Fluoride: Excess fluorides can cause yellowing of the teeth and damage to the spinal cord and other crippling diseases.

Nitrates: Drinking water that gets contaminated with nitrates can prove fatal especially to infants that drink formula milk as it restricts the amount of oxygen that reaches the brain causing the ‘blue baby’ syndrome. It is also linked to digestive tract cancers. It causes algae to bloom resulting in eutrophication in surface water.

Petrochemicals: Benzene and other petrochemicals can cause cancer even at low exposure levels.

Chlorinated solvents: These are linked to reproduction disorders and to some cancers.

Arsenic: Arsenic poisoning through water can cause liver and nervous system damage, vascular diseases and also skin cancer.

Other heavy metals: Heavy metals cause damage to the nervous system and the kidney, and other metabolic disruptions.

Salts: It makes the fresh water unusable for drinking and irrigation purposes. Exposure to polluted water can cause diarrhoea, skin irritation, respiratory problems, and other diseases, depending on the pollutant that is in the water body (http://edugreen.teri.res.in/explore/water/health.htm, n.d).

CHAPTER THREE
WASTEWATER REUSE AND PUBLIC OPINION ON WATER REUSE APPLICATION

3.1 Wastewater Reuse

Wastewater is any water that has been adversely affected in quality by anthropogenic influence. It comprises liquid waste discharged by domestic residences, commercial properties, industry, and/or agriculture and can encompass a wide range of potential contaminants and concentrations (http://www.quora.com/Wastewater, n.d).

The term wastewater reuse is often used synonymously with the terms wastewater recycling and wastewater reclamation. Because the general public often does not understand the quality difference between treated and untreated wastewater, many communities have shortened the term to water reuse, which creates a more positive image. The U.S. Environmental Protection Agency (EPA) defines wastewater reuse as, "using wastewater or reclaimed water from one application for another application". The deliberate use of reclaimed water or wastewater must be in compliance with applicable rules for a beneficial purpose (landscape irrigation, agricultural irrigation, aesthetic uses, ground water recharge, industrial uses, and fire protection) (McKenzie, 2005).

3.2 Types Of Reuse

Wastewater reuse can be grouped into the following categories:

Urban Reuse: The irrigation of public parks and golf course as well as for fire protection and toilet flushing in commercial and industrial buildings.
Personal Reuse: Laundry, Bathing
Agricultural Reuse: Irrigation of crops
Environmental Reuse: Wetland enhancement and restoration
Industrial Reuse: Process or makeup water and cooling tower water

Recreational Impoundments: Such as ponds and lakes
Groundwater Recharge
Snow generation, swimming pool

3.3 Reasons For Wastewater Reuse

Wastewater reuse must be treated biologically and chemically, to provide public health. One of the most important section in reuse program is to protect the public health.

Advantages of water reuse are:

- This technology reduces the demands on potable sources of freshwater.
- It may reduce the need for large wastewater treatment systems, if significant portions of the waste stream are reused or recycled.
- The technology may diminish the volume of wastewater discharged, resulting in a beneficial impact on the aquatic environment.
- Capital costs are low to medium for most systems and are recoverable in a very short time; this excludes systems designed for direct reuse of sewage water.
- Operation and maintenance are relatively simple except in direct reuse systems where more extensive technology and quality control are required.
- Provision of nutrient-rich wastewaters can increase agricultural production in water-poor areas.
- Pollution of rivers and ground waters may be reduced.
- Lawn maintenance and golf course irrigation is facilitated in resort areas.
- In most cases, the quality of the wastewater, as an irrigation water supply, is superior to that of well water.

Disadvantages of water reuse are:

- If implemented on a large scale, revenues to water supply and wastewater utilities may fall as the demand for potable water for non-potable uses and the discharge of wastewaters is reduced.
- Reuse of wastewater may be seasonal in nature, resulting in the overloading of treatment and disposal facilities during the rainy season; if the wet season is of long duration and/or high intensity, the seasonal discharge of raw wastewaters may occur.
- Health problems, such as water-borne diseases and skin irritations, may occur in people coming into direct contact with reused wastewater.
- Gases, such as sulfuric acid, produced during the treatment process can result in chronic health problems.
- In some cases, reuse of wastewater is not economically feasible because of the requirement for an additional distribution system.
- Application of untreated wastewater as irrigation water or as injected recharge water may result in groundwater contamination (UNEP, 1997).

3.4 Public Thoughts About Applications Of Water Recycling And Cultural Acceptability

A large part of Turkey's population has concerns about directly usage of treated waste waters. The reason for that is, the idea of pathogenic micro-organisms which are harmful to human life still exist in these waters even after the treatment processes. People are still insecure against treatment technologies. However most people are willing to accept reused wastewater for irrigation, golf course and for cooling purposes in industrial processes.

3.5 Why Public Participation Is Important

It is important to inform population about water recycling applications. Wrong informations about this issue can cause problems in applications. Therefore public should informed about topic Thus we can prevent our water resources from rapid depletion. The initial phase of public participation is explanation recycling applications in understandable manner. In this phase alternative ways may be tried.

Various educational activities can be done in order to inform the population about this topic. Initially, the educational program can start on pilot regions, after first phase it can be generalized over all areas. By giving more attention to doubts which are generally encountered on society, solutions of problems can be found.

Also media resources such as internet and newspapers can be useful for inform population. Addition to this, information packets and brochures can be printed. Other ways to follow in order to gain public awareness about applications of recycling water are social meetings and advertisements. In our study, this case is taken place as 6^{th} question on our poll and the answers of this question are discussed at result section of this thesis.

A policy is required to be established by government about the topic. Thus process of public awareness will be accelerated.

3.6 Public Education

Education is key to overcoming public fears about a reuse system, particularly fears that relate to public health and water quality.

Public opinion is important in planning, constructing, and operating wastewater reclamation and reuse facilities, as it is the public who must pay for them as well as accept the direct utilization of the treated wastewater. Generally the public gets most of its information on environmental issues through the mass media, newspaper,

radio, and television. There are many techniques that can be used to communicate with the public and these include:

- Brochures
- Information packets
- Newsletters
- Videotapes or slide shows
- Advertisements
- Fact sheets
- Press releases
- Open house and plant tours
- Educational and in formational workshops
- Community meetings
- Community advisory groups
- Service group presentations
- Educational activities with schools
- The news media (e.g. radio and television interviews)
- A telephone hotline established by the appropriate organization
- Electronic devices and computers (McKenzie, 2005)

Public attention can attracted on project of recycling of water and its applications by using educational programs and inform methods. Since health risks are the most common concern in our community, such concerns can be overcome by information meetings and educational programs.

Looking at the examples mentioned above, for the structure of a large organization, there can be a private telephone line where the relevant information about topic can be given.

In my opinion most efficient method that can be applied even in rural areas of our country is arranging small meetings in every week where applications of recycling water can be discussed and using all sources of media to inform community about

topic. Even with simple precautions, great success can be obtained by using this method.

Education is given as a first step in the family and schools. Therefore, the basic education of this issue is needed to be given when our children at their younger ages. Also information about water recycling should start to give at the first classes of the school education. Educational programs which gain interest of young children can be prepared in order to inform them about recycling of water. And also animated cartoons, visual media, books will help children to increase their knowledge on this subject.

CHAPTER FOUR
CASE STUDIES

There are limited studies about public opinion on water reuse applications. DuBose (2009) investigated the public opinion for reuse in Corvallis and Oregan, USA. They sent 1200 surveys were distributed over a period of two months. For the first stage of the study, surveys were posted; reminders were sent after four weeks. Some participants requested to be removed from the contact list by phone; a total of 518 surveys were completed. The study also input data into Excel, and presented answers as graphs using frequency distribution and cross listing methods. Multiple regression was also used in this study. Study results concluded that participants did not prefer situations that involve direct contact practices. This result proves how skeptical the public is regarding the safeness level of the water. Another result of this case study, proved that the public favored being informed by the media the most. The public do not prefer being contacted by mail, or be informed via meetings. It identified that television programs would be an ideal way to increase awareness. The purpose of the study was to gain an idea regarding the awareness level of participants on the subject, what type of information participants required in order to feel safe when using the water, which reasons caused participants to doubt the safety of the water, and what could be done to eliminate these doubts (DuBose, 2009).

The second case study is Liu (2006), a study conducted in Santa Clara County in California. Water reuse operations have gained grave importance as a result of the ongoing population increase. Quantitative analysis methods is used in the study. The survey reported that participants worried about the health risks the most. The study also reported that participants should not doubt the treated water used for agricultural irrigation. It was based on four hypotheses; the most interesting being that women do not prefer using recycled water (Liu, 2006).

The other case study is Bruvold (1988) who developed two hypotheses. Firstly human contact was the more significant determinant of public opinion on effluent reuse in the abstract reuse survey. Secondly the five factors of environment, health,

conservation, treatment cost and distribution cost were the more important factor of public opinion data. Van der Hook et al. (1999) reports on a survey performed in which 97% and 80% of public supported wastewater reuse for toilet flushing and for clothes washing respectively in Amsterdam (Friedler & Lahav, 2006). The results of surveys show that socioeconomic and environmental factors play role perceptions of water/wastewater reuse applications.

CHAPTER FIVE
METHODS

5.1 Study Site

In this study, survey study site is all regions of Turkey. A multiple choice questionnaire-type survey was conducted the population of Turkey. Questionnaires were sent to all regions, Akdeniz, Dogu Anadolu, Ege, Guneydogu Anadolu, Ic Anadolu, Karadeniz, and Marmara. During distribution of questionnaires, all age groups and income levels were taken into account and randomly selected people were asked to fill out the questionnaires. Volunteers undertook the task of distribution of questionnaires to individuals.

5.2 Data Collection

The main part of this study is survey sheets (public opinion on water reuse applications questionnaire). Participants could complete the survey online, in a face to face interview, and by mailing.

Questions in the questionnaire were selected from a huge question pool and questionnaire was prepared in most appropriate manner in order to reveal the level of public knowledge about this subject. Questionnaire has 15 questions and some of them are multiple-choice questions. Questionnaire form is given in Appendix.

After preparation, 500 questionnaires were distributed to all over Turkey and 375 of them were fully answered (75% of questionnaires were returned). There wasn't answer questions in 375 surveys. After a certain amount of time, reminders were made for questionnaires. Distribution of questionnaires over cities is given in Table 6.2 As it clearly seen in Table 6.2, most participation and return was obtained from province of Marmara and city of Istanbul.

5.3 Data Analysis

After questionnaires were returned, results were examined in Statistical Package for the Social Sciences (SPSS) packet program and as a result of that; some graphics and tables were prepared. Frequency distribution and Cross-tabulation was used to compare answers. Each question is examined individually according to demographic characteristics, reflections of community were revealed. The SPSS is one of the most commonly used statistical analysis programs in academia. It is used by market researchers, health researchers, survey companies, government, education researchers, marketing organizations and others. The program contains numerous statistical methods. Data can be transferred from Excel and other programs to the worksheet of this program, which is a great help during analysis. SPSS contains a 10-program menu; File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Window, and Help. The version used for our study was 15.0 For Windows Evaluation Version.

Demographical data, four variables identified the biographical back round of each participant:

- Gender: Female, Male
- Age : 10-15 years old, 16-25 years old, 26-40 years old, 40-55 years old, 55 or over
- Education: Primary Education, High School, University, M.Sc, Ph.D.
- Income Range: <500 TL, 500-1000 TL, 1000-2000 TL, 2000-3000 TL, >3000 TL

In questionnaire, 39.6% of participants were men and 60.4% of them were women.

CHAPTER SIX
RESULTS AND DISCUSSION

6.1 Frequency Analysis

In order to examine the demographic characteristics of the participants within the research, frequency analysis related to participants' ages, genders, educations and incomes was performed. Findings from this analysis are given in Table 6.1

Table 6.1 Numerical and Percentage Distribution of the Sample Profile

	Number (n)	Percentage (%)
Age		
10-15	4	1.1
16-25	122	32.5
26-40	172	45.9
40-55	58	15.5
55 or over	19	5.1
Total	375	100.0
Gender		
Male	148	39.6
Female	226	60.4
Total	374	100.0
Education		
Primary	36	9.6
Hıgh	121	32.3
University	188	50.1
M.Sc	29	7.7
Ph.D	1	0.3
Total	375	100.0
Income		
<500TL	59	15.7
500-1000TL	92	24.5
1000-2000TL	181	48.3
2000-3000TL	27	7.2
>3000TL	16	4.3
Total	375	100.0

As seen from the table, 1.1% of participants were at the age between 10-15 years, while 32.5% were between 16-25 years, 45.0% were between 26-40 years, 15.5% were between 40-55 years and only 5.1% of them were over 55 years old. 39.6% of participants were male while 60.4% of them were female. Among survey participants, education levels are given as follow, 9.6% primary school, 32.3% high school, 50.1% collage, 7.7% graduate, and 0.3% Ph.D.

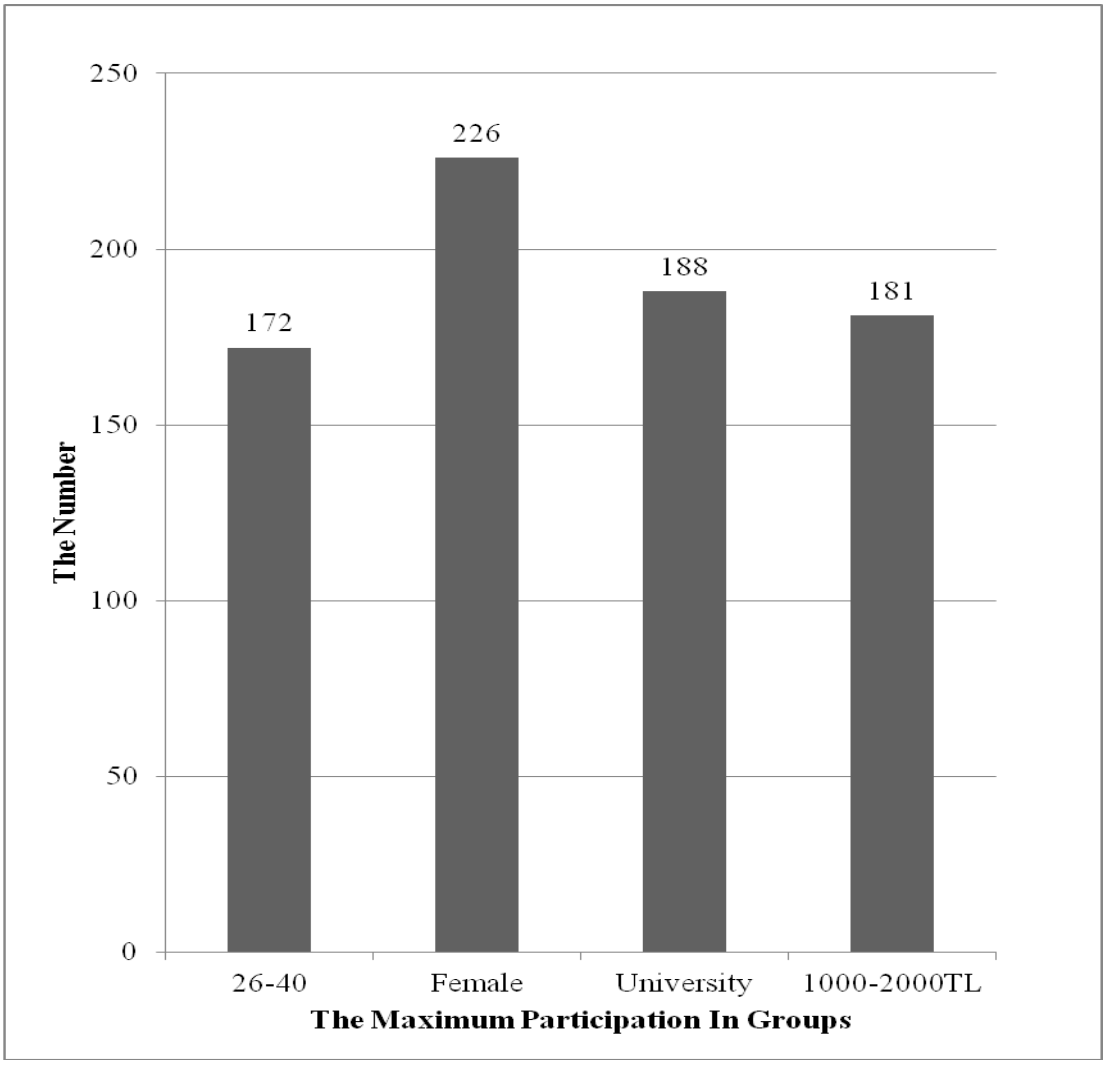

Figure 6.1 Graphical Expression of Table 6.1

Distribution of sampling profiles by provinces was given in Table 6.2. According to the table, most participation took place in Istanbul followed by Edirne.

Table 6.2 Distribution of Sampling Profiles by Provinces

City	Number (n)	Percentage (%)
05 - Amasya	9	2.4
06 - Ankara	21	5.6
07 - Antalya	12	3.2
10 - Balıkesir	1	0.3
12 - Bingöl	1	0.3
16 - Bursa	4	1.1
20 - Denizli	1	0.3
21 - Diyarbakır	2	0.5
22 - Edirne	67	17.9
24 - Erzincan	3	0.8
25 - Erzurum	2	0.5
32 - Isparta	1	0.3
34 - İstanbul	118	31.5
35 - İzmir	51	13.6
39 - Kırklareli	1	0.3
42 - Konya	1	0.3
43 - Kütahya	1	0.3
45 - Manisa	31	8.3
47 - Mardin	2	0.5
52 - Ordu	1	0.3
55 - Samsun	6	1.6
56 - Siirt	11	2.9
57 - Sinop	1	0.3
58 - Sivas	1	0.3
61 - Trabzon	1	0.3
62 - Tunceli	1	0.3
63 - Şanlıurfa	1	0.3
65 - Van	7	1.9
72 - Batman	14	3.7
73 - Şırnak	1	0.3
76 - Iğdır	1	0.3
Total	375	100.0

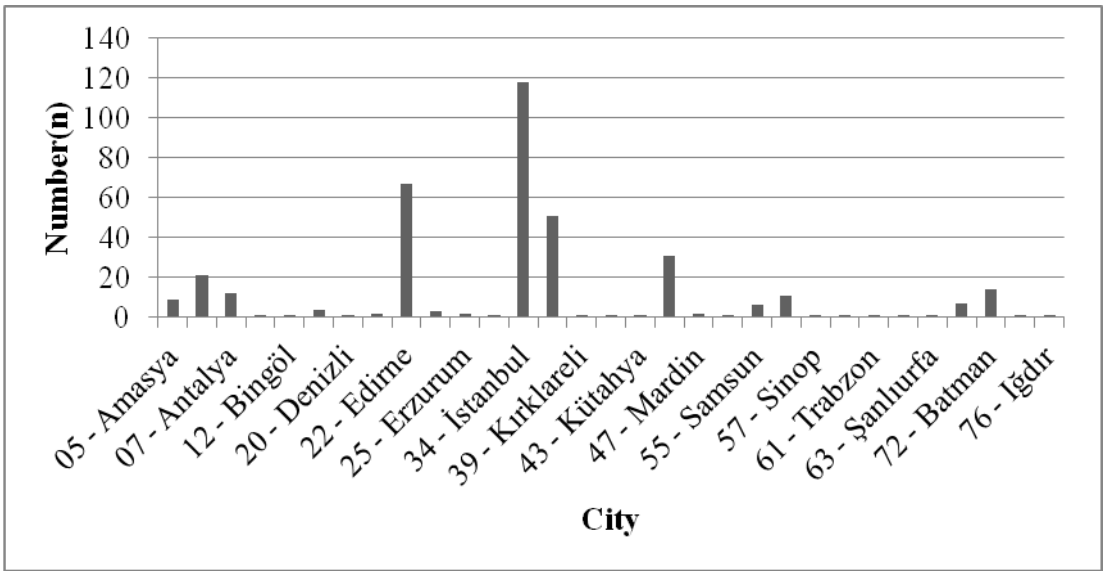

Figure 6.2 Graphical Expression of Table 6.2

6.2 Responses Based On The Participants' Ages

According to participants' ages, distribution of the responses which is provided by participants to question of "Do you whether water resources have been polluted and consumed very fastly in nowadays?" is given in Table 6.3 and Figure 6.3.

It is clearly seen from the table, 96 percent of participants were agreed with this opinion, while 4 percent of them were responded negatively. Most of the participants (96%) thought that the water resources of our country are polluting and consuming.

Table 6.3 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "Do you whether water resources have been polluted and consumed very fastly in nowadays?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q1	YES	n	4	118	163	57	18	360
		%	1.1%	31.5%	43.5%	15.2%	4.8%	96.0%
	NO	n	0	4	9	1	1	15
		%	0.0%	1.1%	2.4%	0.3%	0.3%	4.0%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

According to participants' ages, distribution of the responses which are provided by participants to question of "Have you taken some precautions to reduce water consumption in daily life?" is given in Table 6.4 and Figure 6.4. The results show the majority of participants (mostly 26-40 ages) take some measure for use of water in daily life.

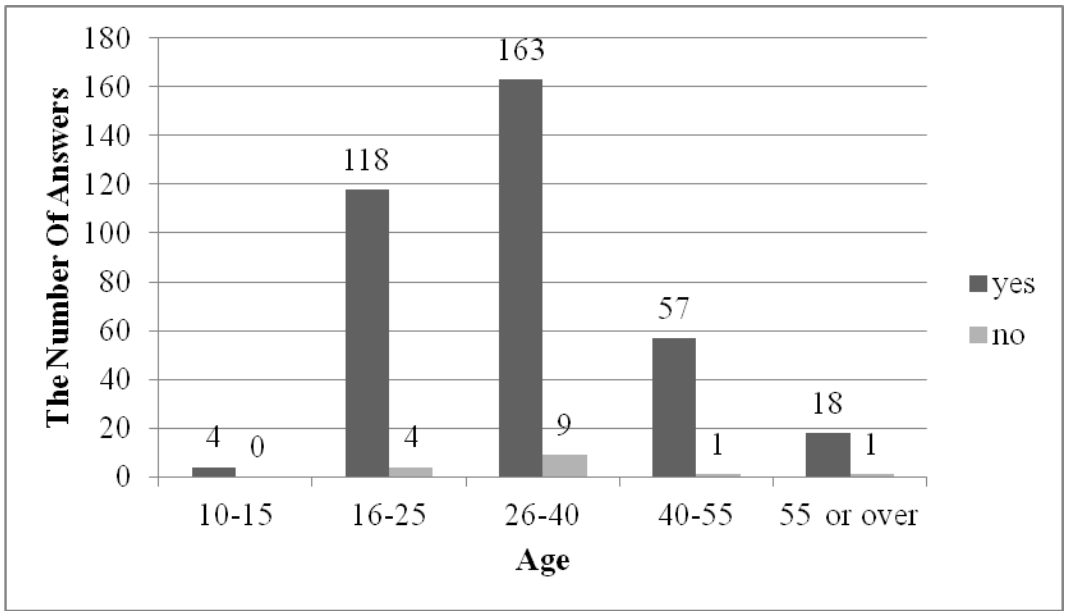

Figure 6.3 Graphical Expression of Table 6.3

Table 6.4 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "Have you taken some precautions to reduce water consumption in daily life?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q2	YES	n	1	76	125	48	14	264
		%	0.3%	20.3%	33.3%	12.8%	3.7%	70.4%
	NO	n	3	46	47	10	5	111
		%	0.8%	12.3%	12.5%	2.7%	1.3%	29.6%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

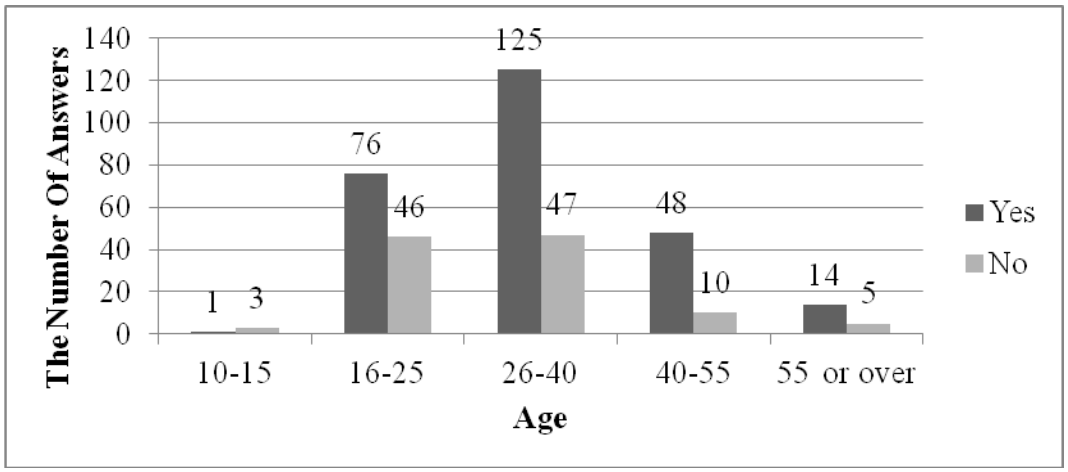

Figure 6.4 Graphical Expression of Table 6.4

According to participants' ages, distribution of the responses which are provided by participants to question of "Do you think whether our country give much more attention on waste/wastewater treatment?" is given in Table 6.5 and Figure 6.5. Majority of those surveyed said no to this question. As seen from the results, most of participants thought that treatment of water needs more importance in our country.

Table 6.5 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "Do you think whether our country give much more attention on waste/wastewater treatment?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q3	YES	n	0	10	19	10	6	45
		%	0.0%	2.7%	5.1%	2.7%	1.6%	12.0%
	NO	n	4	112	153	48	13	330
		%	1.1%	29.9%	40.8%	12.8%	3.5%	88.0%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

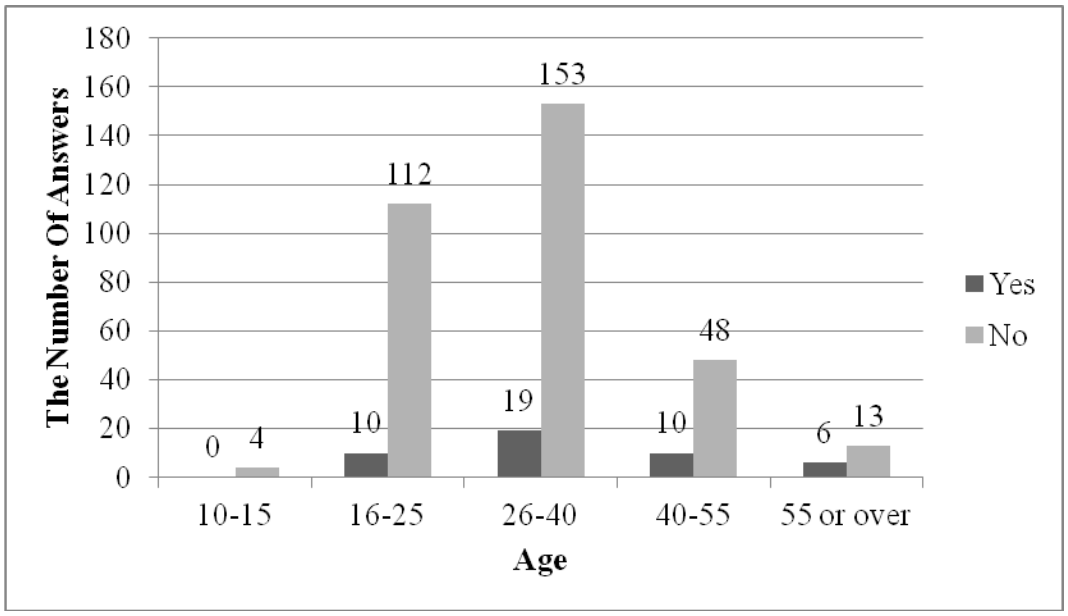

Figure 6.5 Graphical Expression of Table 6.5

According to participants' ages, distribution of the responses which are provided by participants to question of "Do you have any information about water/wastewater treatment systems?" is given in Table 6.6 and Figure 6.6. Most participants responded this question negatively. No difference was observed among the age groups, almost every participants in any age said no for this question. It is clearly seen from the result, policies about this topic need to develop in order to pull up public awareness.

Table 6.6 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "Do you have any information about water/wastewater treatment systems?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q4	YES	n	1	50	66	21	7	145
		%	0.3%	13.3%	17.6%	5.6%	1.9%	38.7%
	NO	n	3	72	106	37	12	230
		%	0.8%	19.2%	28.3%	9.9%	3.2%	61.3%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

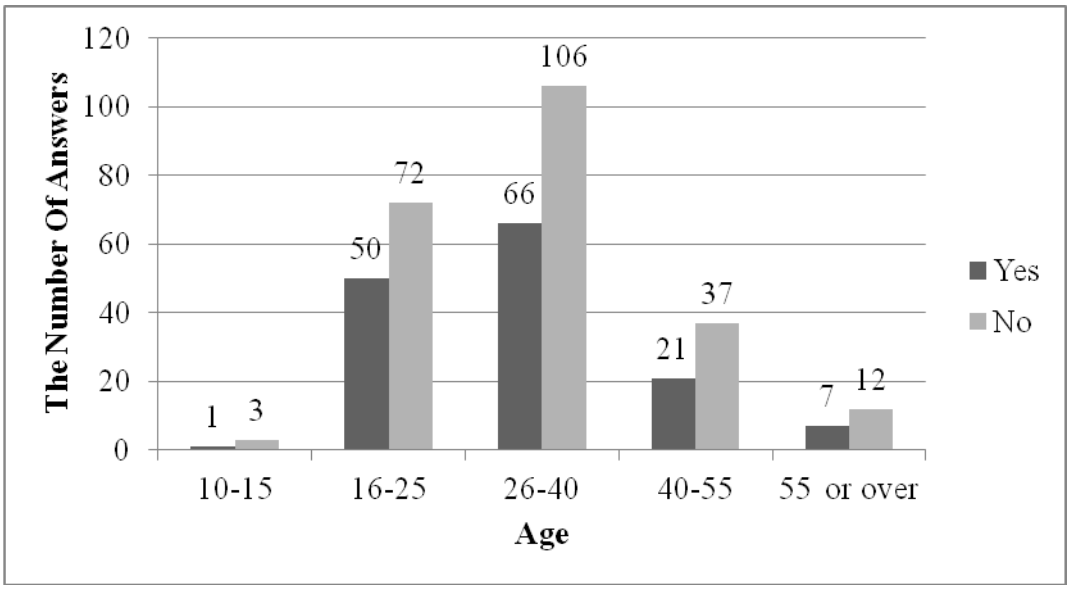

Figure 6.6 Graphical Expression of Table 6.6

According to participants' ages, distribution of the responses which are provided by participants to question of "Are you aware of the treated wastewater reuse applications?" is given in Table 6.7 and Figure 6.7. Most of participants said no for this question. Note that, the percent of yes answer between 40-55 years old respondents is reached fifty.

Table 6.7 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "Are you aware of the treated wastewater reuse applications?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q5	YES	n	1	56	82	29	7	175
		%	0.3%	14.9%	21.9%	7.7%	1.9%	46.7%
	NO	n	3	66	90	29	12	200
		%	0.8%	17.6%	24.0%	7.7%	3.2%	53.3%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

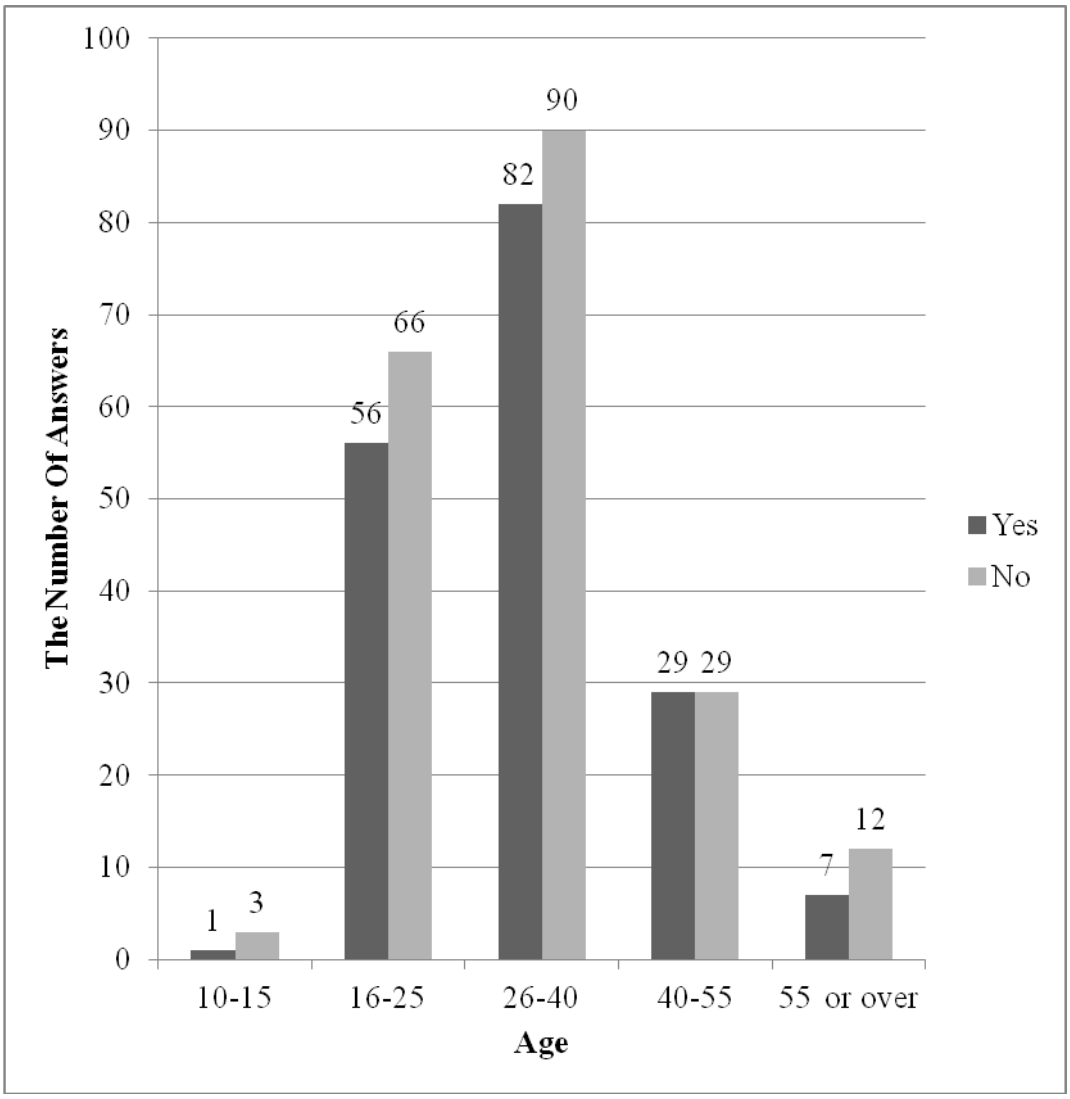

Figure 6.7 Graphical Expression of Table 6.7

According to participants' ages, distribution of the responses which are provided by participants to question of **"**If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below." is given in Table 6.8 and Figure 6.8.

The overall most popular information source about topic is television which is followed by radio, newspaper and magazines. From the results, we can state that media is the most powerful way to inform community, therefore we should take assist more from media, in order to increase public's knowledge about treatment and reuse of water.

Table 6.8 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below."

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q6	newspapers, journal, etc.	n	1	41	49	22	8	121
		%	0.8 %	33.9 %	40.5 %	18.2 %	6.6%	100.0%
	TV, radio	n	1	46	58	19	8	132
		%	0.8 %	34.8 %	43.9 %	14.4 %	6.1%	100.0%
	Internet	n	0	34	48	9	3	94
		%	0.0 %	36.2 %	51.1 %	9.6 %	3.2%	100.0%
	Friend /Family	n	0	24	26	5	2	57
		%	0.0 %	42.1 %	45.6 %	8.8 %	3.5%	100.0%
	Environmental Groups	n	0	17	17	13	3	50
		%	0.0 %	34.0 %	34.0 %	26.0 %	6.0%	100.0%
	University	n	0	14	15	0	0	29
		%	0.0 %	48.3 %	51.7 %	0.0 %	0.0%	100.0%
	People Concerned With Environmental Engineering	n	0	16	13	4	5	38
		%	0.0 %	42.1 %	34.2 %	10.5 %	13.2%	100.0%
	Other – Please clarify it	n	0	8	8	0	0	16
		%	0.0 %	50.0 %	50.0 %	0.0 %	0.0%	100.0%

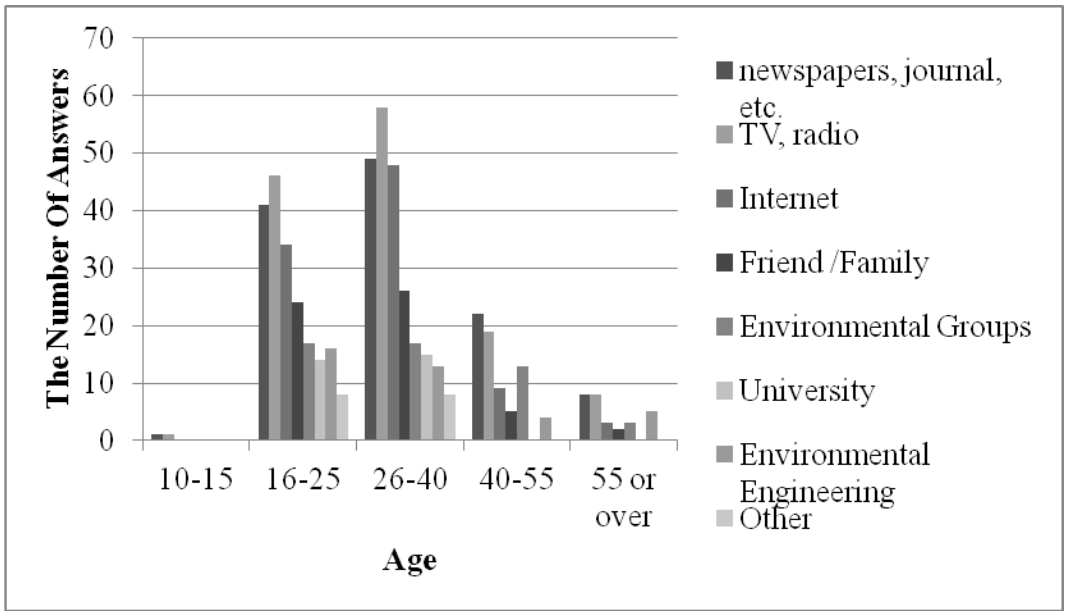

Figure 6.8 Graphical Expression of Table 6.8

According to participants' ages, distribution of the responses which are provided by participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?" is given in Table 6.9 and Figure 6.9. For this question, most of participant who were at the age between 10-15 and 16-25 said yes, while almost all others ticked no answer. From the results a little more than half of respondents (51.7 percent) were stated that they can use purified water for drinking purpose**.**

Table 6.9 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q7	YES	n	3	71	85	28	7	194
		%	0.8%	18.9%	22.7%	7.5%	1.9%	51.7%
	NO	n	1	51	87	30	12	181
		%	0.3%	13.6%	23.2%	8.0%	3.2%	48.3%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

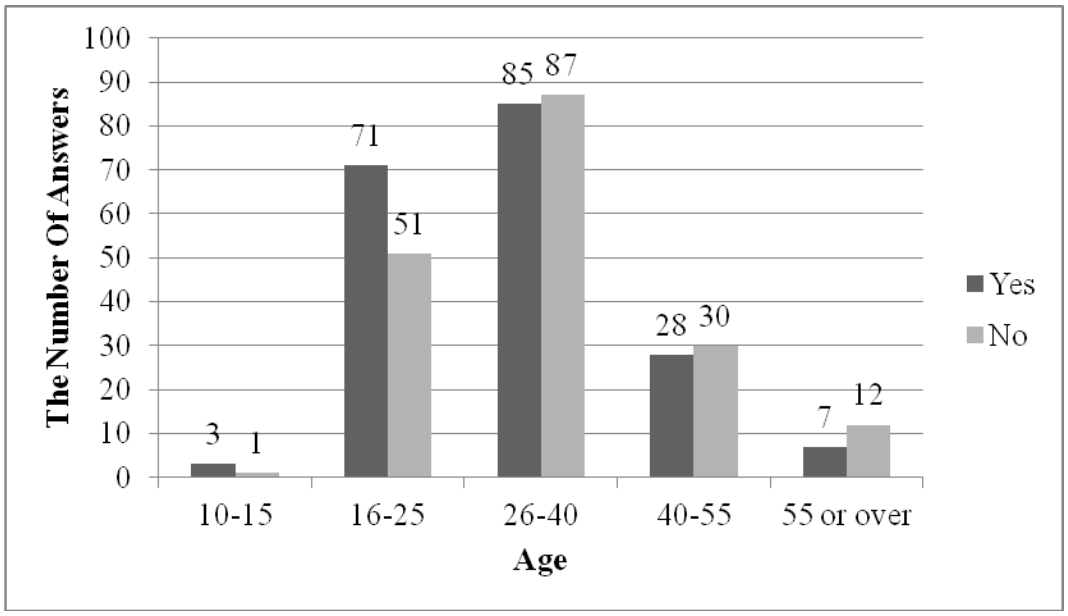

Figure 6.9 Graphical Expression of Table 6.9

According to participants' ages, distribution of the responses which are provided by participants to question of "In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?" is given in Table 6.10 and Figure 6.10. Most of participant for all ages except 16-40 years range ticked no box for this question. Note that, no vote from 16-40 years old participants has a high percentage.

Table 6.10. Based on participants' ages, the distribution of the responses which are provided by survey participants to question of " In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q8	YES	n	3	74	116	46	14	253
		%	0.8%	19.7%	30.9%	12.3%	3.7%	67.5%
	NO	n	1	48	56	12	5	122
		%	0.3%	12.8%	14.9%	3.2%	1.3%	32.5%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

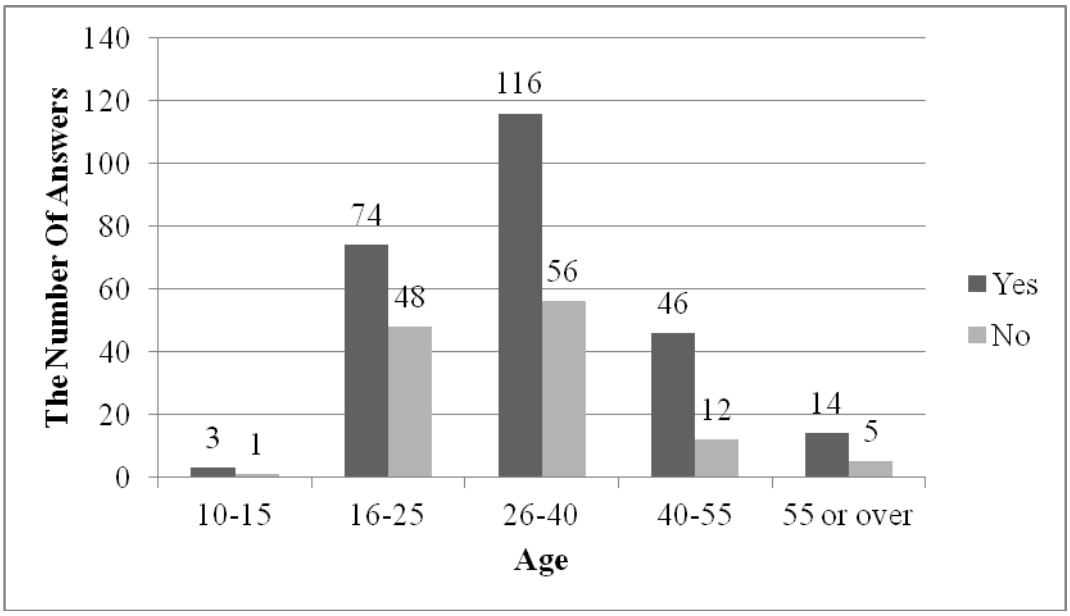

Figure 6.10 Graphical Expression of Table 6.10

According to participants' ages, distribution of the responses which are provided by participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?" is given in Table 6.11 and Figure 6.11. From the examination of this question's result, most of participants chosen, using treated water in toilet systems as an alternative way for application of reuse of water. Other alternative ways from survey results are, cleaning roads, using in constructions and using in fire extinguish systems.

According to participants' ages, distribution of the responses which are provided by participants to question of "Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below?" is given in Table 6.12 and Figure 6.12. There isn't description of the other option. Almost all participants from any age have concerns (respondents whose age was in between 10-55 from micro-organisms mostly, older than 55 years old participants from the reason of poison and other harmful materials which may be found in treated water) about quality of treated water. One understanding from results, participants concerns came out from existance of pathogenic micro-organisms in water. Public should inform about reliability of treatment proceses in order to get rid off wrong ideas and myths from public's common thoughts.

Table 6.11 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q9	Drinking water	n	2	27	27	13	2	71
		%	2.8%	38.0%	38.0%	18.3%	2.8%	100.0%
	Cooking in the home	n	2	25	27	11	2	67
		%	3.0%	37.3%	40.3%	16.4%	3.0%	100.0%
	Food preparation in restaurants	n	1	21	15	9	2	48
		%	2.1%	43.8%	31.2%	18.8%	4.2%	100.0%
	Preparation of canned vegetables	n	1	11	12	6	0	30
		%	3.3%	36.7%	40.0%	20.0%	0.0%	100.0%
	Bathing	n	0	38	39	15	2	94
		%	0.0%	40.4%	41.5%	16.0%	2.1%	100.0%
	Swimming pool	n	0	35	37	10	3	85
		%	0.0%	41.2%	43.5%	11.8%	3.5%	100.0%
	Laundry	n	1	61	68	20	4	154
		%	0.6%	39.6%	44.2%	13.0%	2.6%	100.0%
	Agricultural irrigation	n	0	65	86	34	13	198
		%	0.0%	32.8%	43.4%	17.2%	6.6%	100.0%
	Irrigation of golf course	n	0	57	96	27	7	187
		%	.0%	30.5%	51.3%	14.4%	3.7%	100.0%
	Toilet flushing	n	1	81	107	39	11	239
		%	0.4%	33.9%	44.8%	16.3%	4.6%	100.0%
	Fire fighting	n	2	68	101	32	13	216
		%	0.9%	31.5%	46.8%	14.8%	6.0%	100.0%
	Snow generation	n	0	51	56	27	1	135
		%	0.0%	37.8%	41.5%	20.0%	0.7%	100.0%
	Construction	n	1	79	105	34	16	235
		%	0.4%	33.6%	44.7%	14.5%	6.8%	100.0%
	Road washing	n	1	81	107	36	11	236
		%	0.4%	34.3%	45.3%	15.3%	4.7%	100.0%
	Irrigation of park	n	2	74	95	29	12	212
		%	0.9%	34.9%	44.8%	13.7%	5.7%	100.0%
	Industry	n	2	72	89	27	11	201
		%	1.0%	35.8%	44.3%	13.4%	5.5%	100.0%

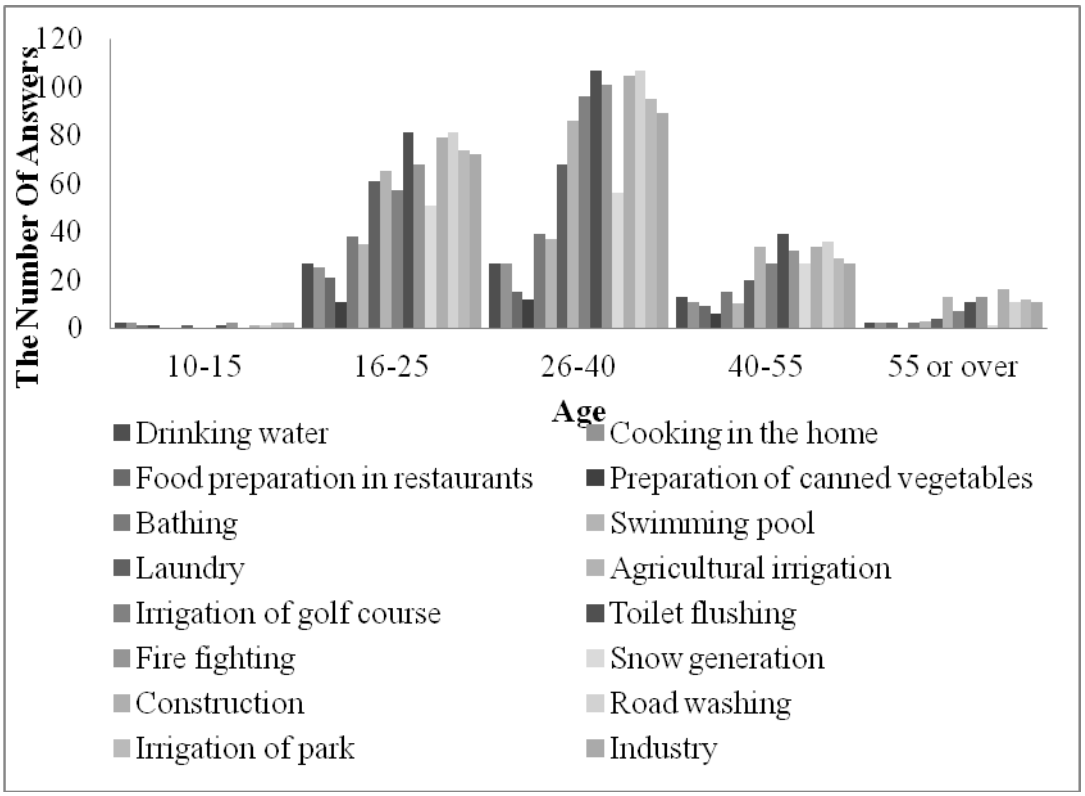

Figure 6.11 Graphical Expression of Table 6.11

Table 6.12. Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q10	Pathogens	n	3	95	131	37	9	275
		%	1.1%	34.5%	47.6%	13.5%	3.3%	100.0%
	Toxic substances	n	1	75	96	21	12	205
		%	0.5%	36.6%	46.8%	10.2%	5.9%	100.0%
	Doubt about wastewater treatment methods	n	1	68	88	29	8	194
		%	0.5%	35.1%	45.4%	14.9%	4.1%	100.0%
	Long term unknown health effects	n	2	70	88	29	10	199
		%	1.0%	35.2%	44.2%	14.6%	5.0%	100.0%
	Other – Please clarify it	n	0	8	12	5	3	28
		%	0.0%	28.6%	42.9%	17.9%	10.7%	100.0%

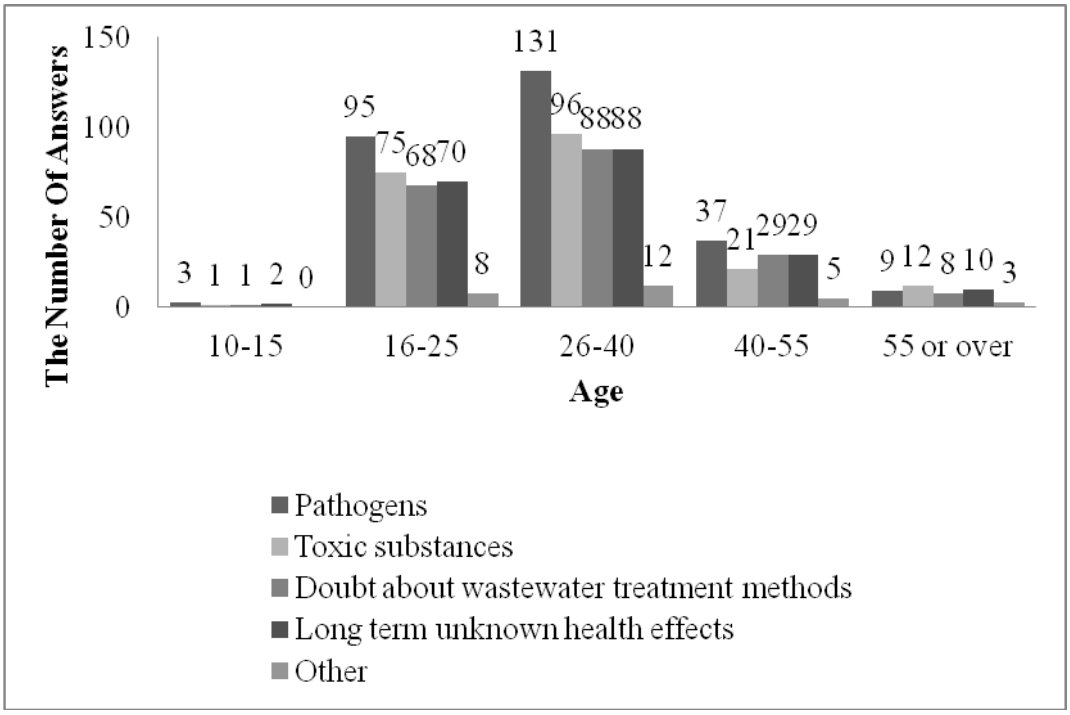

Figure 6.12 Graphical Expression of Table 6.12

According to participants' ages, distribution of the responses which are provided by participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct" is given in Table 6.13 and Figure 6.13. Majority of participant were agreed with this opinion.

Table 6.13 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q11	YES	n	2	82	123	43	12	262
		%	0.5%	21.9%	32.8%	11.5%	3.2%	69.9%
	NO	n	2	40	49	15	7	113
		%	0.5%	10.7%	13.1%	4.0%	1.9%	30.1%
Total		n	4	122	172	58	19	375

	%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

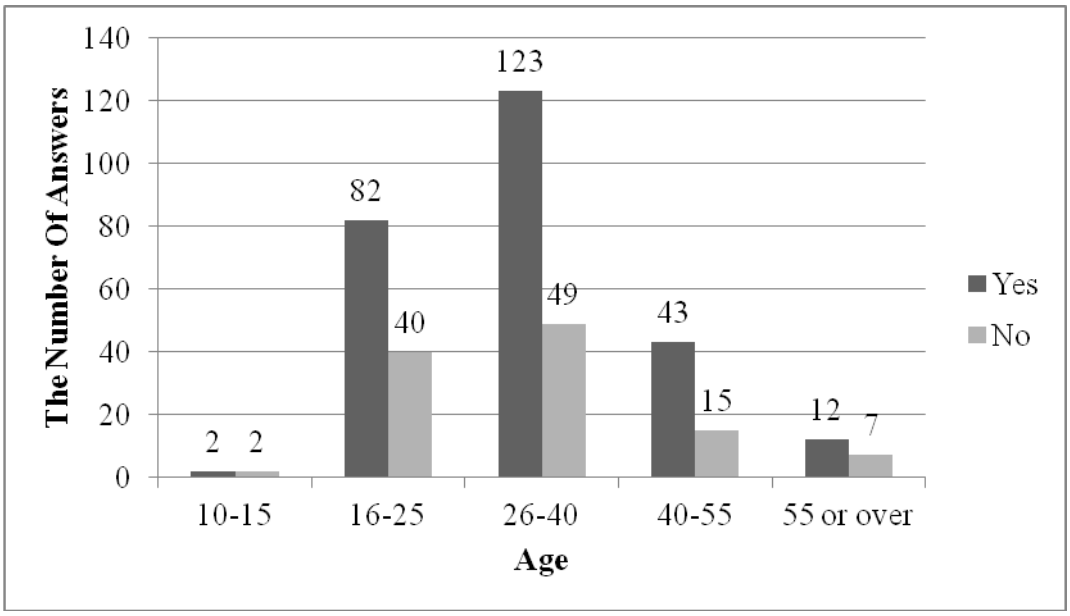

Figure 6.13 Graphical Expression of Table 6.13

According to participants' ages, distribution of the responses which are provided by participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?" is given in Table 6.14 and Figure 6.14. Frequencies of answers of yes and no votes are very close to each other, according to results of this question.

Table 6.14 Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q12	YES	n	3	63	87	30	10	193
		%	0.8%	16.8%	23.2%	8.0%	2.7%	51.5%
	NO	n	1	59	85	28	9	182
		%	0.3%	15.7%	22.7%	7.5%	2.4%	48.5%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

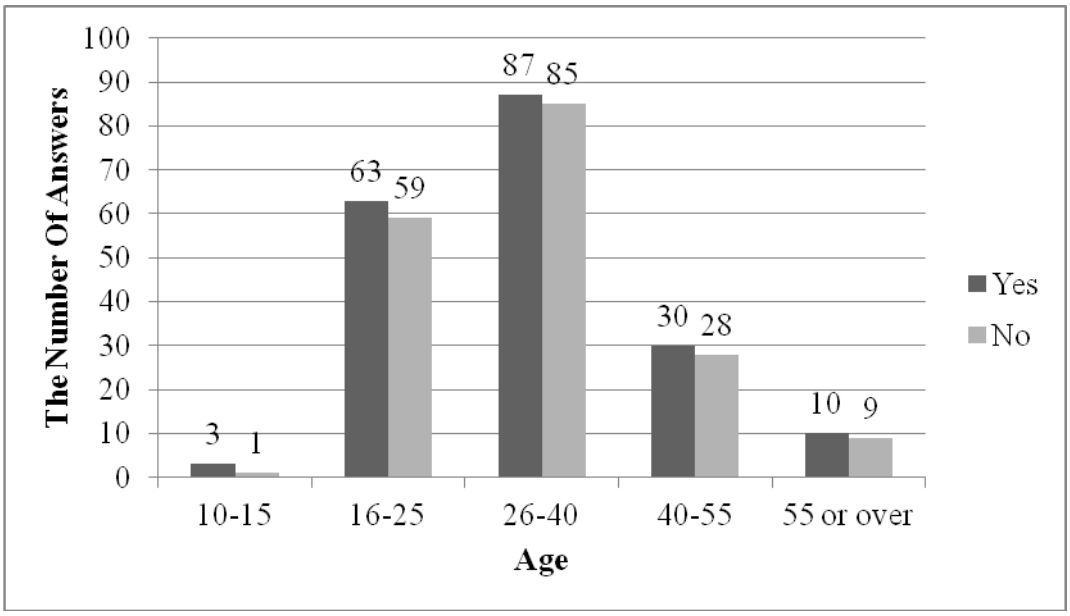

Figure 6.14 Graphical Expression of Table 6.14

According to participants' ages, distribution of the responses which are provided by participants to question of "What types of wastewater you can reuse after following required wastewater treatment processes?" is given in Table 6.15 and Figure 6.15. Groups of 10-15 and over 55 years old participants were ticked mostly none, while other year ranges 16-25, 26-40, and 40-55 were responded domestic wastewater.

Table 6.15. Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "What types of wastewater you can reuse after following required wastewater treatment processes?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q13	Domestic wastewater	n	1	61	81	26	7	176
		%	0.6%	34.7%	46.0%	14.8%	4.0%	100.0%
	Industrial wastewater	n	0	6	13	2	0	21
		%	0.0%	28.6%	61.9%	9.5%	0.0%	100.0%
	Both of them	n	1	11	19	6	2	39
		%	2.6%	28.2%	48.7%	15.4%	5.1%	100.0%
	None of them	n	2	51	73	24	10	160
		%	1.2%	31.9%	45.6%	15.0%	6.2%	100.0%

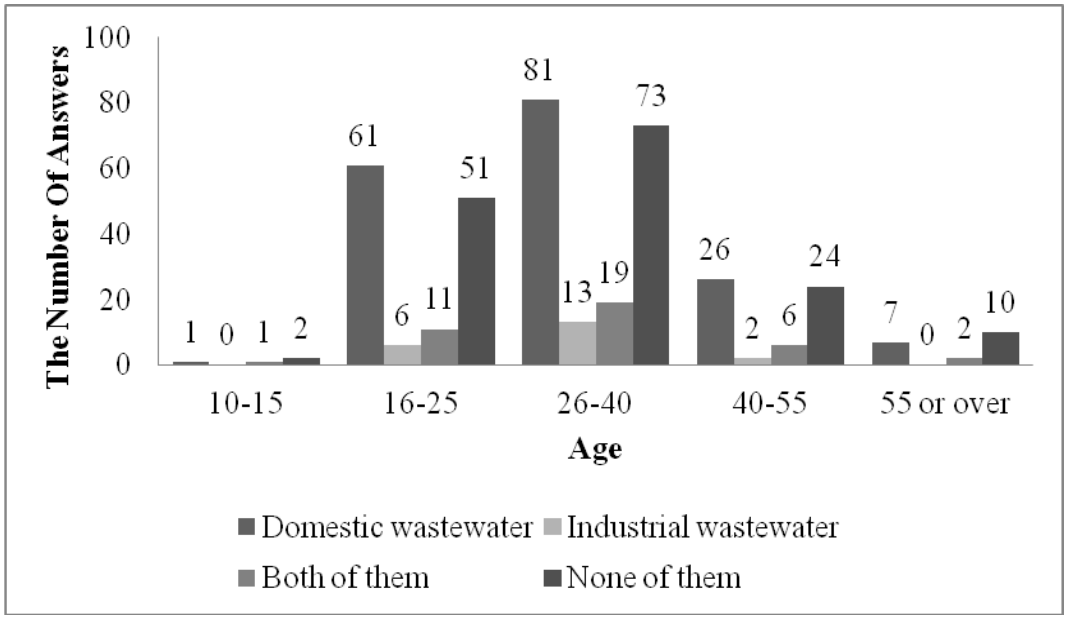

Figure 6.15 Graphical Expression of Table 6.15

According to participants' ages, distribution of the responses which are provided by participants to question of "Do you think that our public is ready for those applications?" is given in Table 6.16 and Figure 6.16. Most of the participants were stated that public is not ready for application of reuse of water.

Table 6.16. Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "Do you think that our public is ready for those applications?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q14	YES	n	0	15	27	8	4	54
		%	0.0%	4.0%	7.2%	2.1%	1.1%	14.4%
	NO	n	4	107	145	50	15	321
		%	1.1%	28.5%	38.7%	13.3%	4.0%	85.6%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

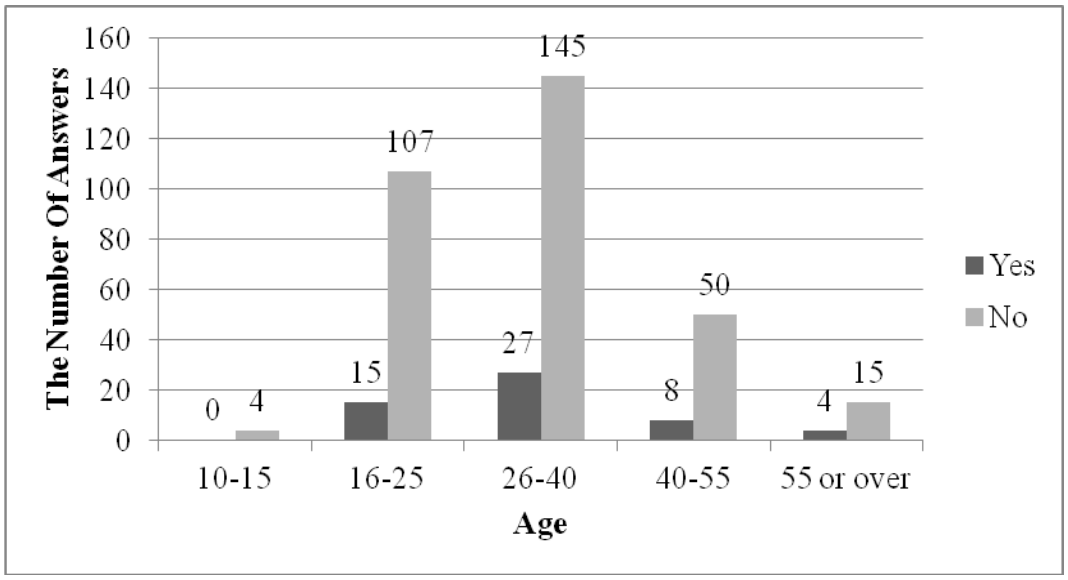

Figure 6.16 Graphical Expression of Table 6.16

According to participants' ages, distribution of the responses which are provided by participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public?" is given in Table 6.17 and Figure 6.17. Almost all of participants answered no for this question. According to this result, participants stated that there is lack of information transmission between community and organizations that responsible from water and wastewater management.

Table 6.17. Based on participants' ages, the distribution of the responses which are provided by survey participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public?"

			Age					Total
			10-15	16-25	26-40	40-55	55 or over	
Q15	YES	n	0	11	6	4	4	25
		%	0.0%	2.9%	1.6%	1.1%	1.1%	6.7%
	NO	n	4	111	166	54	15	350
		%	1.1%	29.6%	44.3%	14.4%	4.0%	93.3%
Total		n	4	122	172	58	19	375
		%	1.1%	32.5%	45.9%	15.5%	5.1%	100.0%

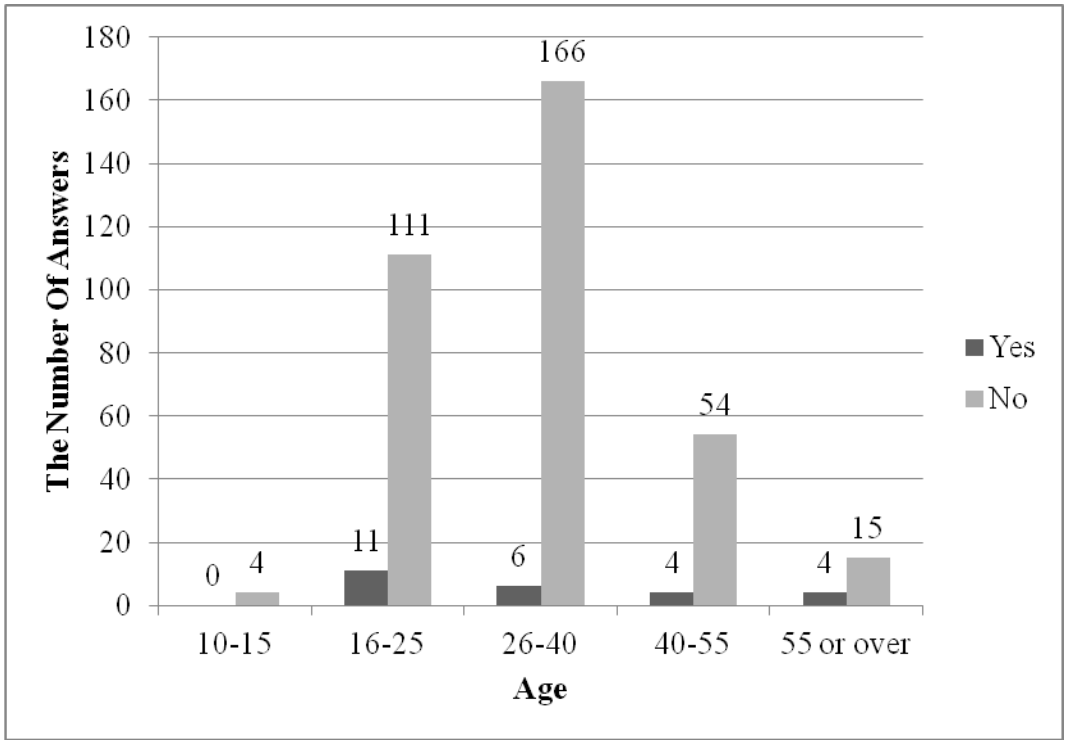

Figure 6.17 Graphical Expression of Table 6.17

One of aims of this study is to find out what really public thinking about this topic and how can we inform them more efficiently? According to results, there is an interest among public to acquaint reuse applications, nevertheless it is clearly understandable that people who responsible from these applications, were not informing community well enough.

6.3 Responses Based On The Participants' Genders

According to participants' genders, distribution of the responses which are provided by participants to question of "Do you think whether water resources have been polluted and consumed very fast in nowadays?" is given in Table 6.18 and Figure 6.18. Both genders answered yes for this question.

Table 6.18. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "Do you think whether water resources have been polluted and consumed very fast in nowadays?"

			Gender		Total
			Male	Female	
Q1	YES	n	139	220	359
		%	37.2%	58.8%	96.0%
	NO	n	9	6	15
		%	2.4%	1.6%	4.0%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

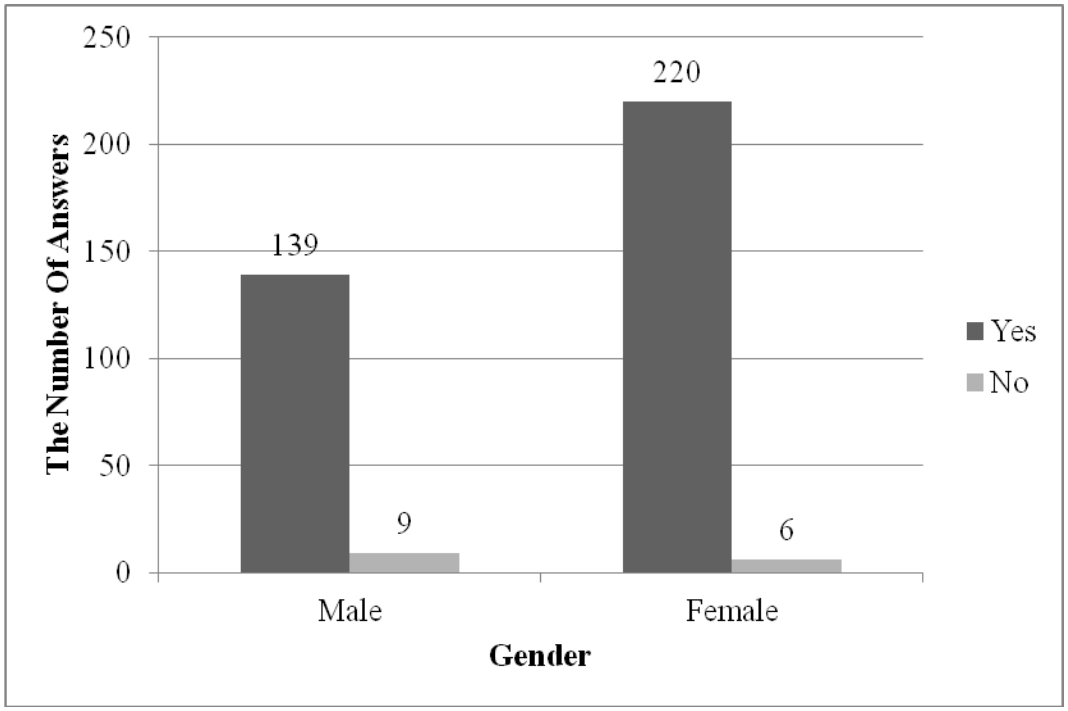

Figure 6.18 Graphical Expression of Table 6.18

According to participants' genders, distribution of the responses which are provided by participants to question of "Have you taken some precautions to reduce water consumption in daily life?" is given in Table 6.19 and Figure 6.19. Almost all of participants from both genders answered no to this question.

Table 6.19. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "Have you taken some precautions to reduce water consumption in daily life?"

			Gender		Total
			Male	Female	
Q2	YES	n	104	159	263
		%	27.8%	42.5%	70.3%
	NO	n	44	67	111
		%	11.8%	17.9%	29.7%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

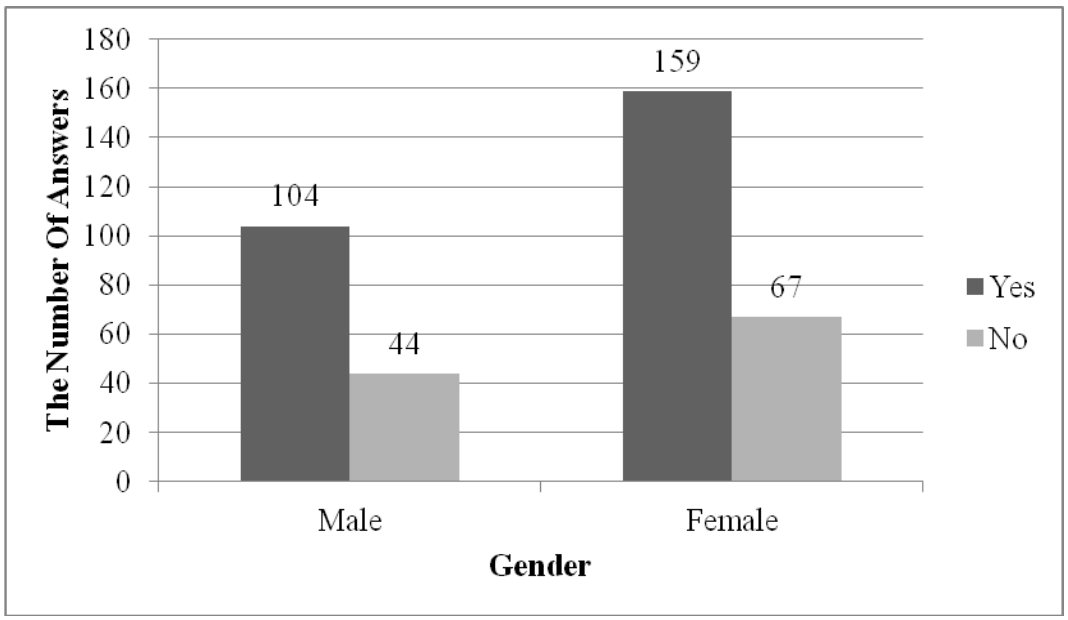

Figure 6.19 Graphical Expression of Table 6.19

According to participants' genders, distribution of the responses which are provided by participants to question of "Do you think whether our country give much more attention on water/wastewater treatment?" is given in Table 6.20 and Figure 6.20. Majority of participants answered no to this question.

Table 6.20. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "Do you think whether our country give much more attention on water/wastewater treatment?"

			Gender		Total
			Male	Female	
Q3	YES	n	25	20	45
		%	6.7%	5.3%	12.0%
	NO	n	123	206	329
		%	32.9%	55.1%	88.0%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

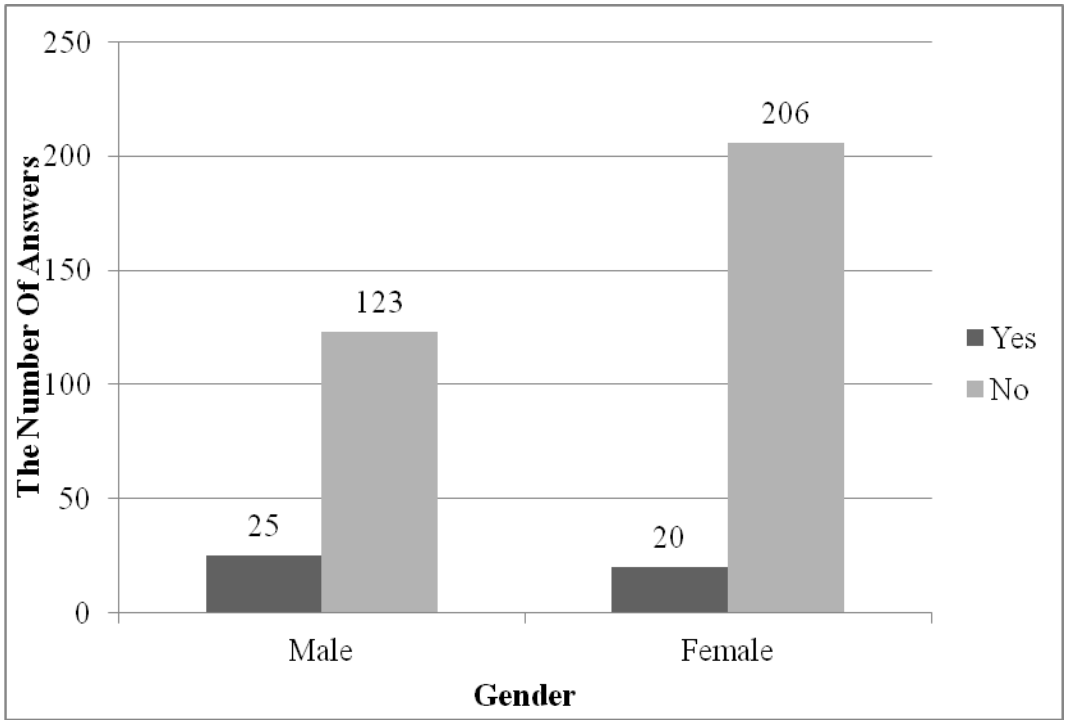

Figure 6.20 Graphical Expression of Table 6.20

According to participants' genders, distribution of the responses which are provided by participants to question of "Do you have any information about water/wastewater treatment systems?" is given in Table 6.21 and Figure 6.21. In overall, majority of both genders answered no to this question. But for people who ticked yes, male participants' number was higher than female voters, which means male participants' knowledge about water reuse applications, is more than females.

Table 6.21. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "Do you have any information about water/wastewater treatment systems?"

			Gender		Total
			Male	Female	
Q4	YES	n	69	75	144
		%	18.4%	20.1%	38.5%
	NO	n	79	151	230
		%	21.1%	40.4%	61.5%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

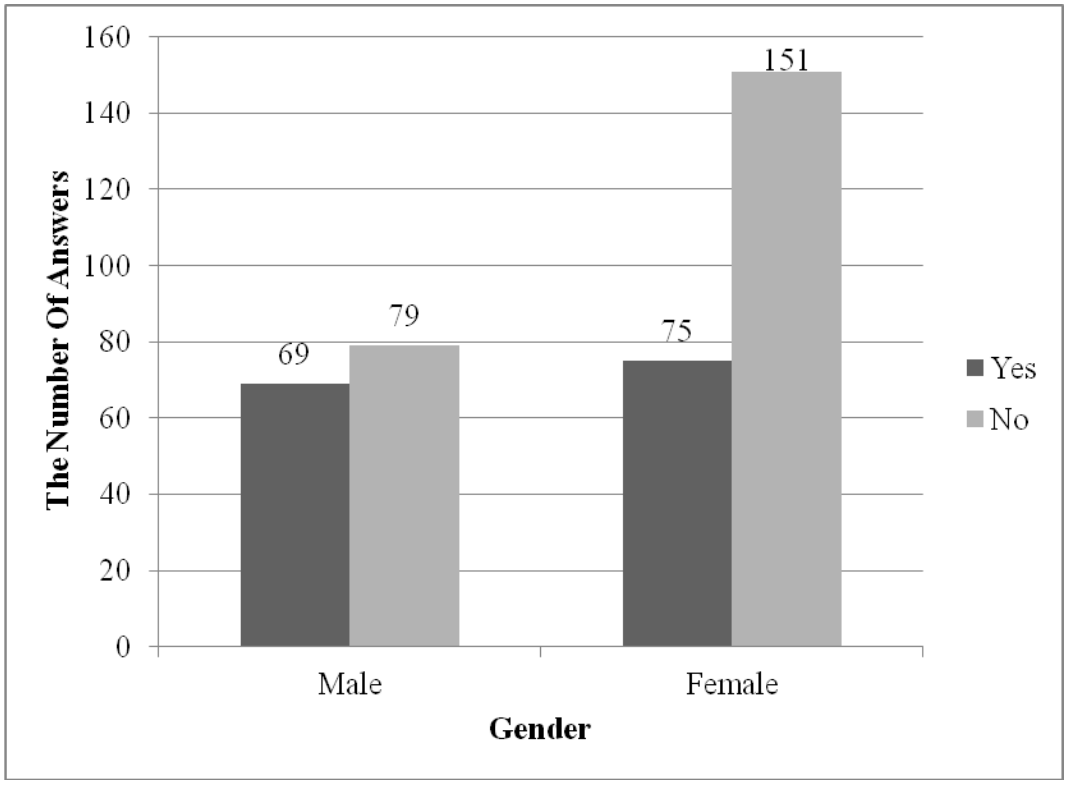

Figure 6.21 Graphical Expression of Table 6.21

According to participants' genders, distribution of the responses which are provided by participants to question of "Are you aware of the treated wastewater reuse applications?" was given in Table 6.22 and Figure 6.22. Most of male participants answered yes to this question while females ticked no mostly.

Table 6.22. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "Are you aware of the treated wastewater reuse applications?"

			Gender		Total
			Male	Female	
Q5	YES	n	76	98	174
		%	20.3%	26.2%	46.5%
	NO	n	72	128	200
		%	19.3%	34.2%	53.5%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

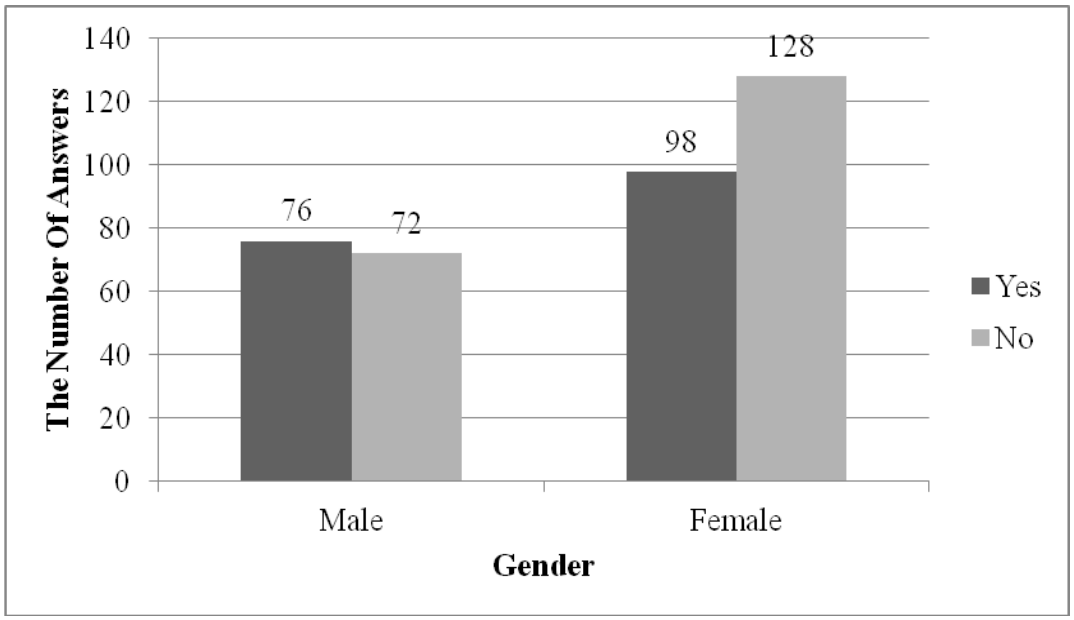

Figure 6.22 Graphical Expression of Table 6.22

According to participants' genders, distribution of the responses which are provided by participants to question of "If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below." was given in Table 6.23 and Figure 6.23. Majority of participants chosen TV and radio items. The result shown that media is more significant instrument to teaching for water reuse applications.

Table 6.23. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below."

			Gender		Total
			Male	Female	
Q6	newspapers, journal, etc.	n	54	66	120
		%	45.0%	55.0%	100.0%
	TV, radio	n	53	79	132
		%	40.2%	59.8%	100.0%
	Internet	n	39	55	94
		%	41.5%	58.5%	100.0%
	Friend /Family	n	17	40	57
		%	29.8%	70.2%	100.0%
	Environmental Groups	n	18	31	49
		%	36.7%	63.3%	100.0%
	University	n	10	19	29
		%	34.5%	65.5%	100.0%
	People Concerned With Environmental Engineering	n	12	26	38
		%	31.6%	68.4%	100.0%
	Other – Please clarify it	n	6	10	16
		%	37.5%	62.5%	100.0%

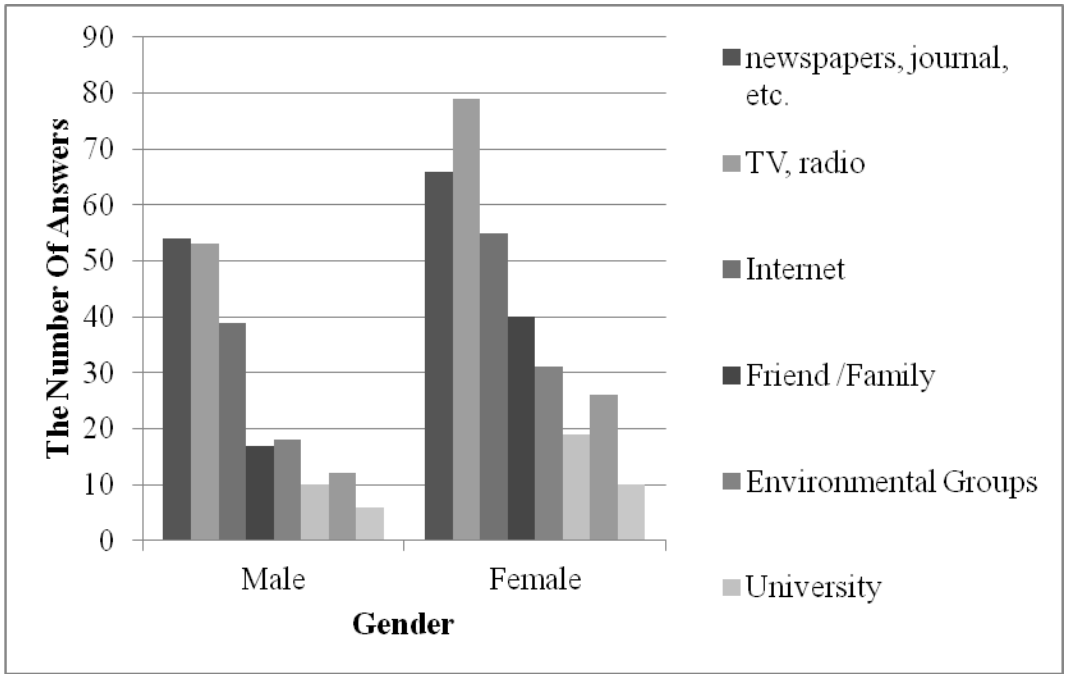

Figure 6.23 Graphical Expression of Table 6.23

According to participants' genders, distribution of the responses which are provided by participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?" was given in Table 6.24 and Figure 6.24. While most of male participants answered no to this question, majority of female respondents ticked yes. It is interesting to notice that yes votes among female participant were higher than we expected. As we understand from the result of this question, female participants were likely to use treated water for drinking purpose.

Table 6.24. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?"

			Gender		Total
			Male	Female	
Q7	YES	n	72	122	194
		%	19.3%	32.6%	51.9%
	NO	n	76	104	180
		%	20.3%	27.8%	48.1%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

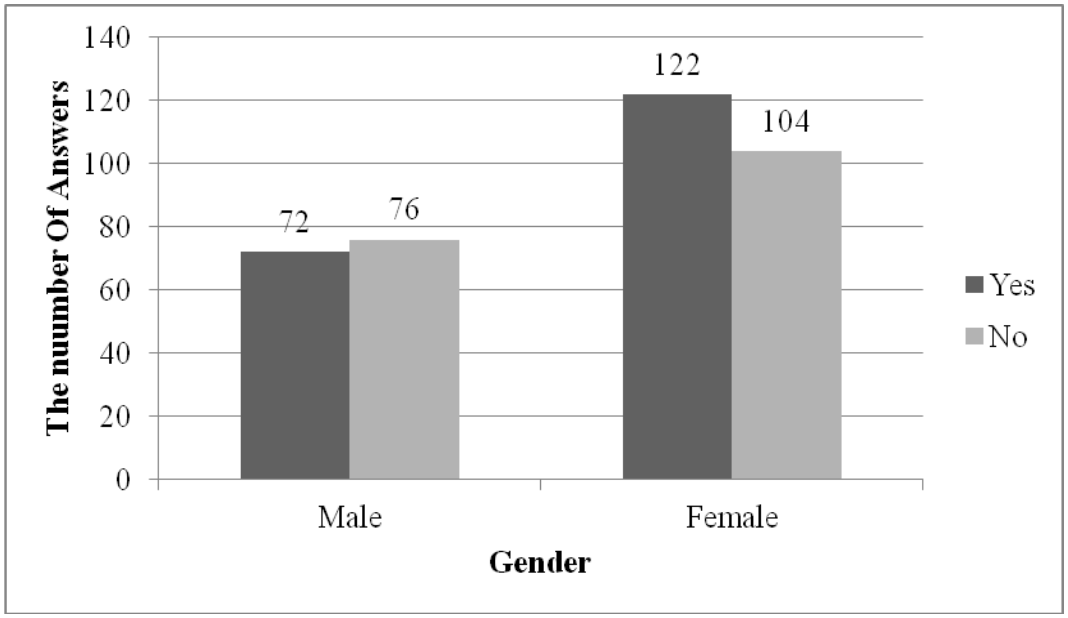

Figure 6.24 Graphical Expression of Table 6.24

According to participants' genders, distribution of the responses which are provided by participants to question of "In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?" was given in Table 6.25 and Figure 6.25. Majority of participants from both genders answered yes to this question.

Table 6.25. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?"

			Gender		Total
			Male	Female	
Q8	YES	n	103	150	253
		%	27.5%	40.1%	67.6%
	NO	n	45	76	121
		%	12.0%	20.3%	32.4%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

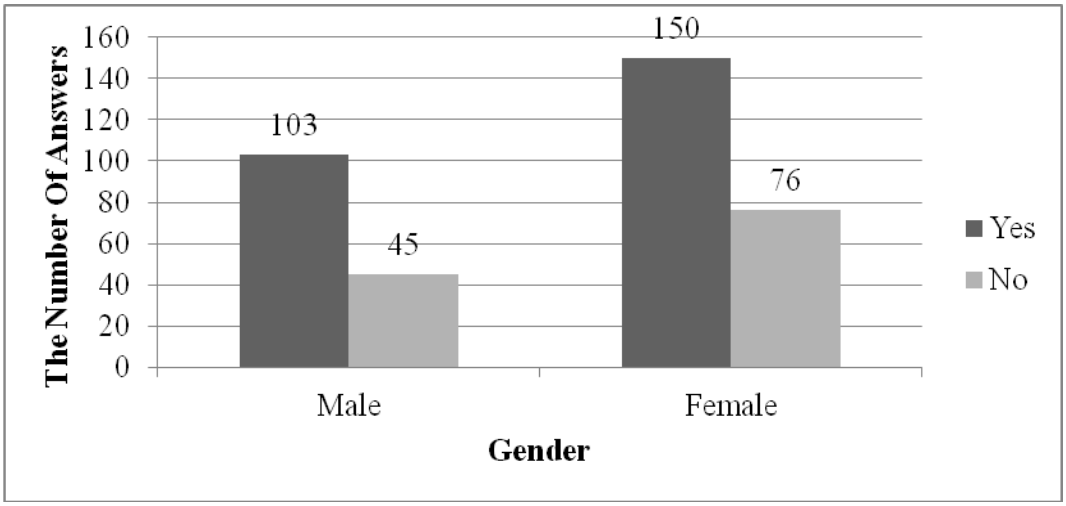

Figure 6.23 Graphical Expression of Table 6.25

According to participants' genders, distribution of the responses which are provided by participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?" was given in Table 6.26 and Figure 6.26. As we understand from the result of this question; majority of genders the most selected to toilet flushing from wastewater reuse alternatives

Table 6.26. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?"

			Gender		Total
			Male	Female	
Q9	Drinking water	n	25	46	71
		%	35,2%	64,8%	100,0%
	Cooking in the home	n	18	49	67
		%	26,9%	73,1%	100,0%
	Food preparation in restaurants	n	17	31	48
		%	35,4%	64,6%	100,0%
	Preparation of canned vegetables	n	11	19	30
		%	36,7%	63,3%	100,0%
	Bathing	n	39	55	94
		%	41,5%	58,5%	100,0%
	Swimming pool	n	36	49	85
		%	42,4%	57,6%	100,0%
	Laundry	n	61	93	154
		%	39,6%	60,4%	100,0%
	Agricultural irrigation	n	86	111	197
		%	43,7%	56,3%	100,0%
	Irrigation of golf course	n	66	120	186
		%	35,5%	64,5%	100,0%
	Toilet flushing	n	99	139	238
		%	41,6%	58,4%	100,0%
	Fire fighting	n	85	130	215
		%	39,5%	60,5%	100,0%
	Snow generation	n	49	85	134
		%	36,6%	63,4%	100,0%
	Construction	n	95	139	234
		%	40,6%	59,4%	100,0%
	Road washing	n	91	144	235
		%	38,7%	61,3%	100,0%
	Irrigation of park	n	84	128	212
		%	39,6%	60,4%	100,0%
	Industry	n	80	120	200
		%	40,0%	60,0%	100,0%

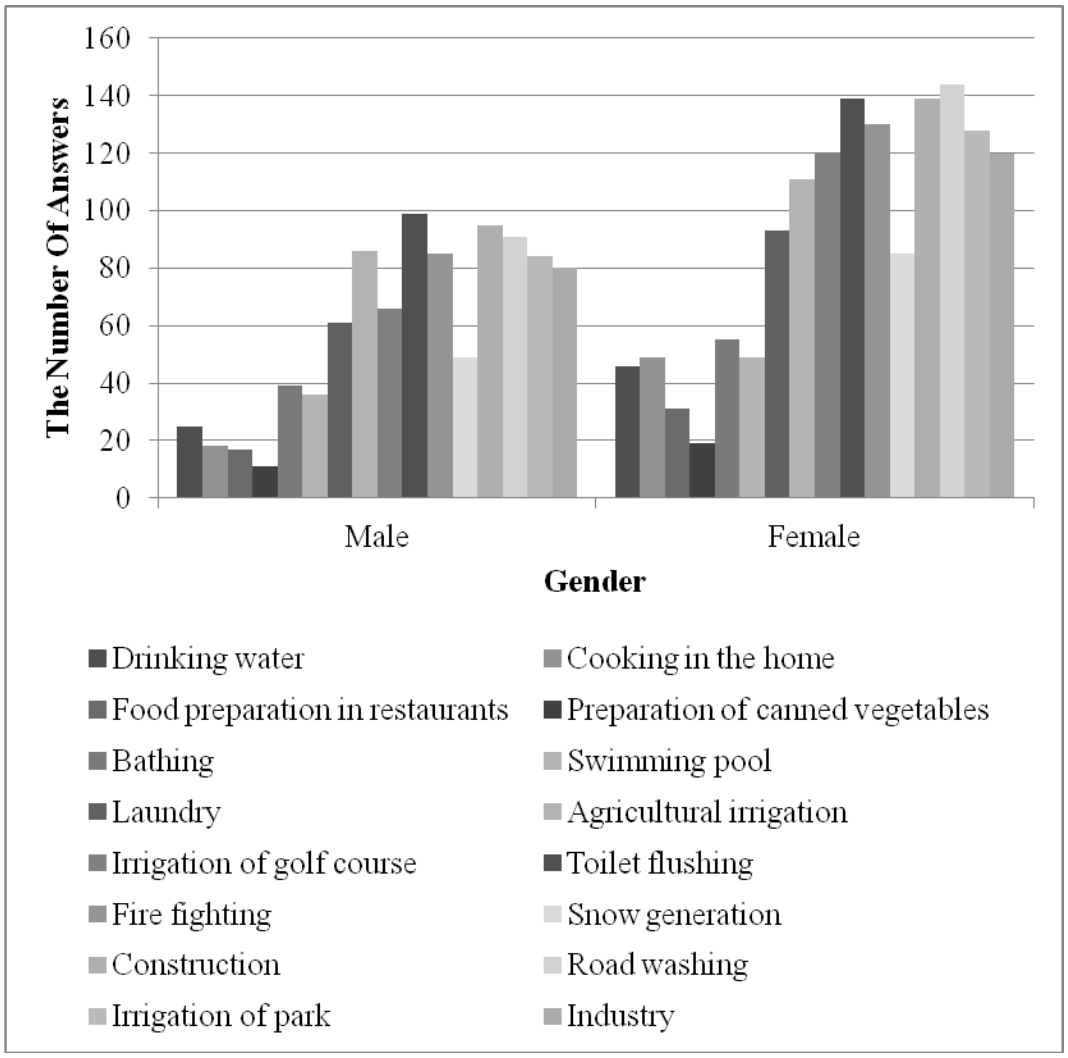

Figure 6.26 Graphical Expression of Table 6.26

According to participants' genders, distribution of the responses which are provided by participants to question of "Do you have any suspicion about reuse of treated wastewaters?" was given in Table 6.27 and Figure 6.27. Most concerning point of reuse application of water for participants is existence of pathogenic microorganims. Also it is understandable from results that, the majority of participants were found treatment processes insecure.

Table 6.27. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "Do you have any suspicion about reuse of treated wastewaters?"

			Gender		Total
			Male	Female	
Q10	Pathogens	n	95	179	274
		%	34.7%	65.3%	100.0%
	Toxic substances	n	76	129	205
		%	37.1%	62.9%	100.0%
	Doubt about wastewater treatment methods	n	67	127	194
		%	34.5%	65.5%	100.0%
	Long term unknown health effects	n	75	124	199
		%	37.7%	62.3%	100.0%
	Other – Please clarify it	n	12	16	28
		%	42.9%	57.1%	100.0%

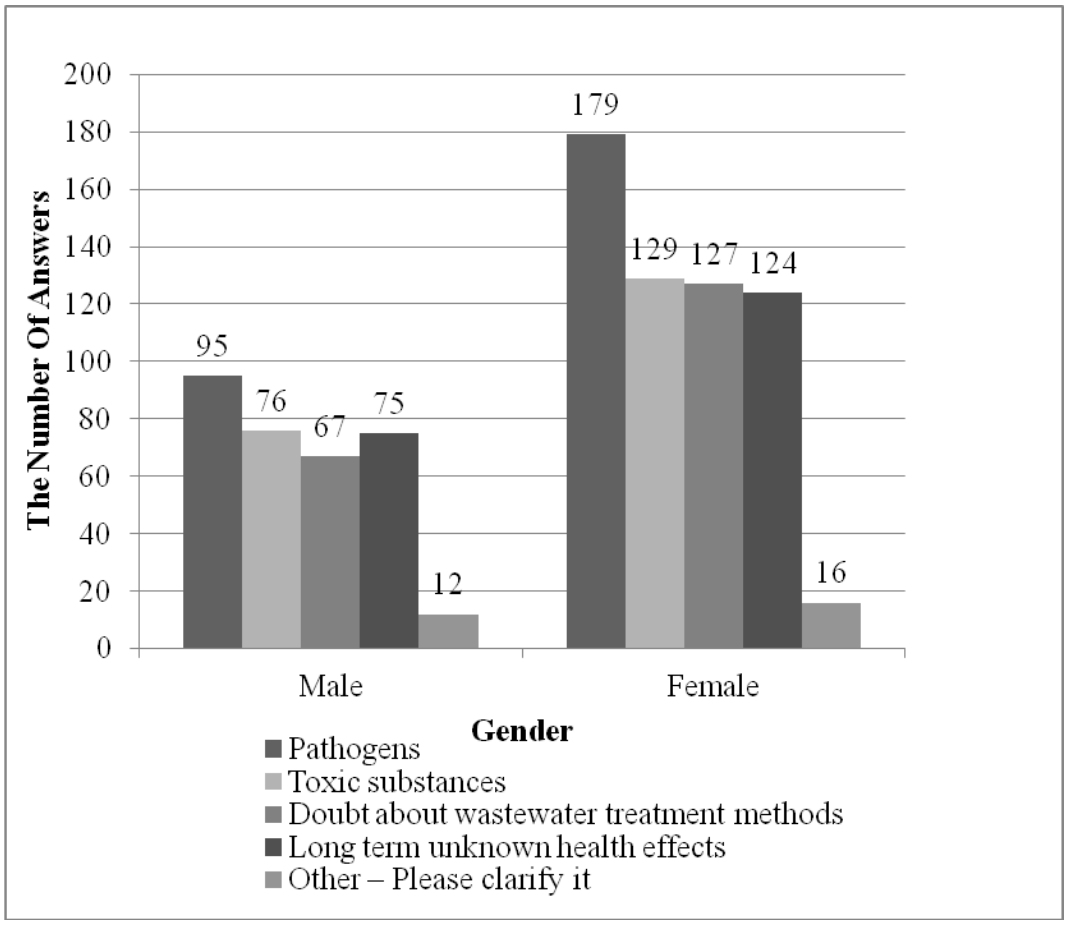

Figure 6.27 Graphical Expression of Table 6.27

According to participants' genders, distribution of the responses which are provided by participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct" was given in Table 6.28 and Figure 6.28. Both female and male participants were answered yes to this question. As we understood from the result, most of participants thought that using treated water is suitable for irrigation and agricultural applications.

Table 6.28. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct"

			Gender		Total
			Male	Female	
Q11	YES	n	112	149	261
		%	29.9%	39.8%	69.8%
	NO	n	36	77	113
		%	9.6%	20.6%	30.2%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

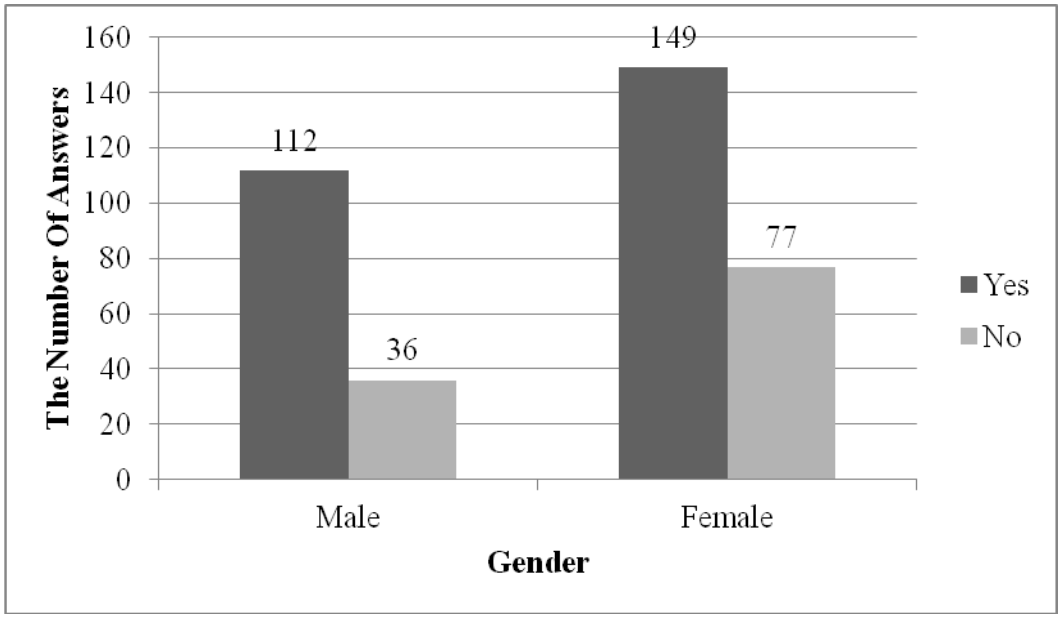

Figure 6.28 Graphical Expression of Table 6.28

According to participants' genders, distribution of the responses which are provided by participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?" was given in Table 6.29 and Figure 6.29. Majority of male participants ticked no box, while most of female participants answered yes to this question.

Table 6.29. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?"

			Gender		Total
			Male	Female	
Q12	YES	n	71	121	192
		%	19.0%	32.4%	51.3%
	NO	n	77	105	182
		%	20.6%	28.1%	48.7%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

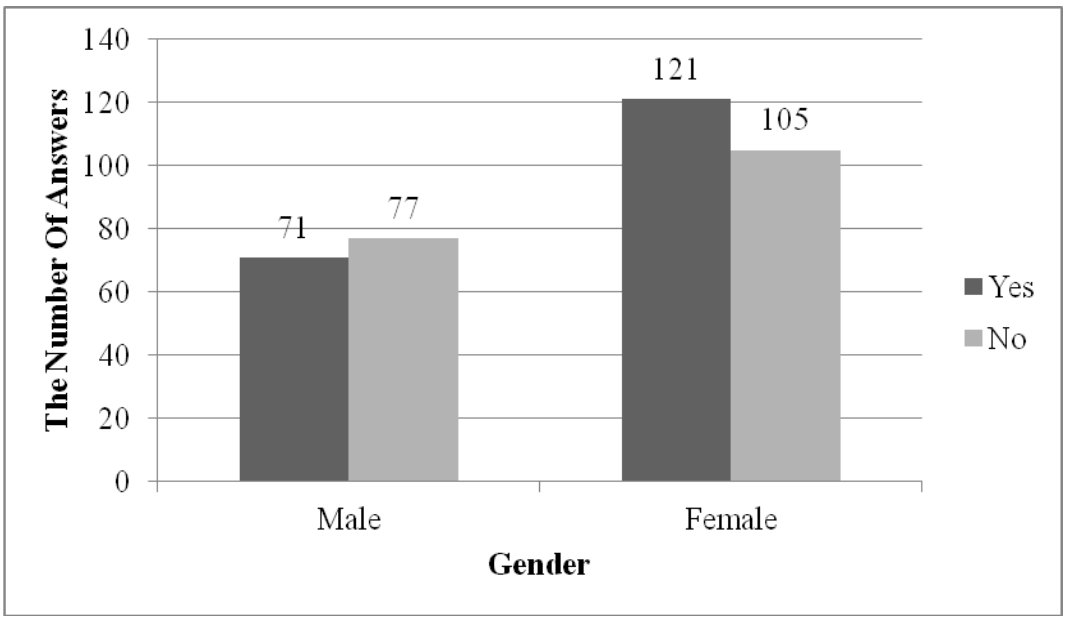

Figure 6.29 Graphical Expression of Table 6.29

According to participants' genders, distribution of the responses which are provided by participants to question of "What types of wastewater you can reuse

after following required wastewater treatment processes?" was given in Table 6.30 and Figure 6.30. Majority of participants answered domestic water to this question.

Table 6.30. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "What types of wastewater you can reuse after following required wastewater treatment processes?"

			Gender		Total
			Male	Female	
Q13	Domestic wastewater	n	74	101	175
		%	42.3%	57.7%	100.0%
	Industrial wastewater	n	6	14	20
		%	30.0%	70.0%	100.0%
	Both of them	n	17	22	39
		%	43.6%	56.4%	100.0%
	None of them	n	56	104	160
		%	35.0%	65.0%	100.0%

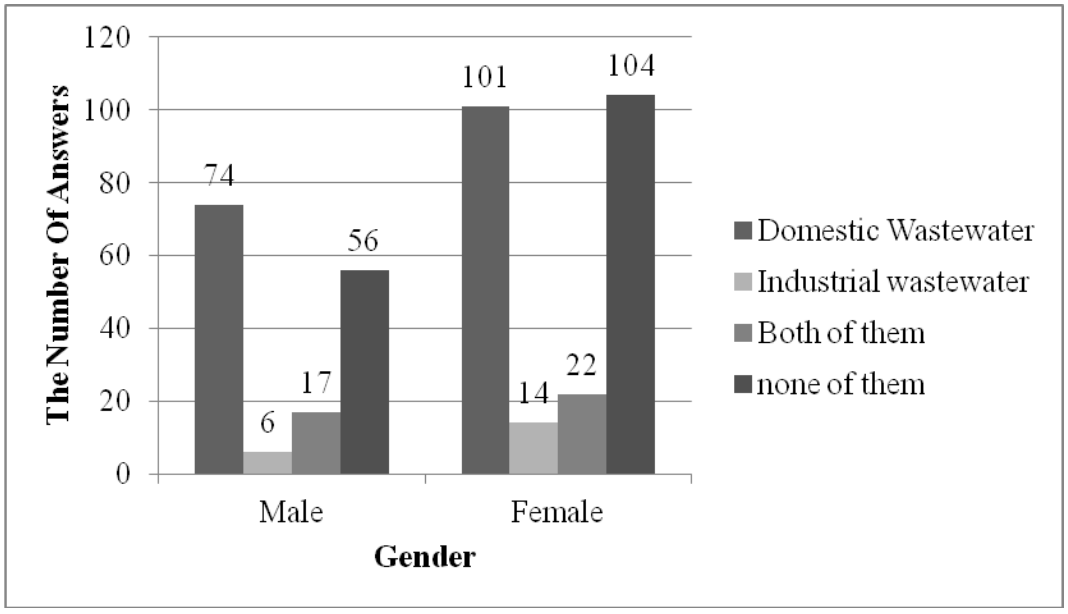

Figure 6.30 Graphical Expression of Table 6.30

According to participants' genders, distribution of the responses which are provided by participants to question of "Do you think that our public is ready for

those applications?" was given in Table 6.31 and Figure 6.31. Almost all of participants answered no to this question.

Table 6.31. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "Do you think that our public is ready for those applications?"

			Gender		Total
			Male	Female	
Q14	YES	n	19	35	54
		%	5.1%	9.4%	14.4%
	NO	n	129	191	320
		%	34.5%	51.1%	85.6%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

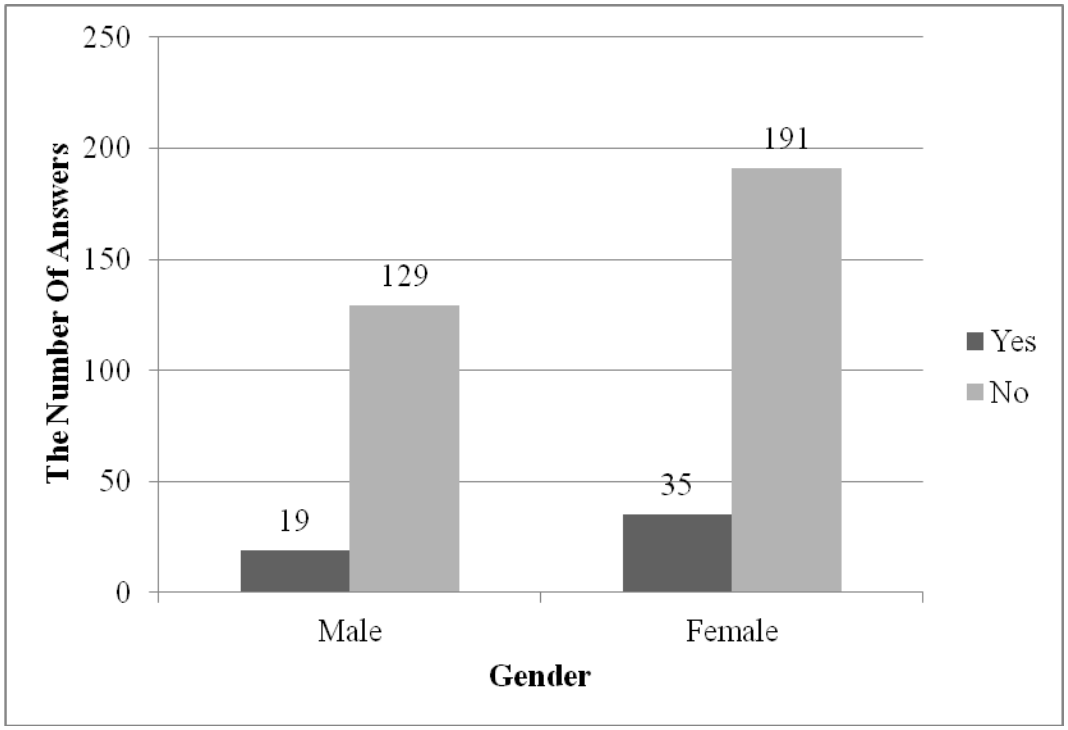

Figure 6.31 Graphical Expression of Table 6.31

According to participants' genders, distribution of the responses which are provided by participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the

reusability of treated wastewater to the public?" was given in Table 6.32 and Figure 6.32. Majority of respondents from both genders answered no to this question.

Table 6.32. Based on participants' genders, the distribution of the responses which are provided by survey participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public?"

			Gender		Total
			Male	Female	
Q15	YES	n	12	13	25
		%	3.2%	3.5%	6.7%
	NO	n	136	213	349
		%	36.4%	57.0%	93.3%
Total		n	148	226	374
		%	39.6%	60.4%	100.0%

Figure 6.32 Graphical Expression of Table 6.32

6.4 Responses Based On The Participants' Educations

According to participants' educations, distribution of the responses which are provided by participants to question of "Do you think whether water resources have

been polluted and consumed very fast in nowadays?" was given in Table 6.33 and Figure 6.33. Majority of respondents from all education catagories answered yes to this question.

Table 6.33. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "Do you think whether water resources have been polluted and consumed very fast in nowadays?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q1	YES	n	32	112	186	29	1	360
		%	8.5%	29.9%	49.6%	7.7%	0.3%	96.0%
	NO	n	4	9	2	0	0	15
		%	1.1%	2.4%	0.5%	0.0%	0.0%	4.0%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	0.3%	100.0%

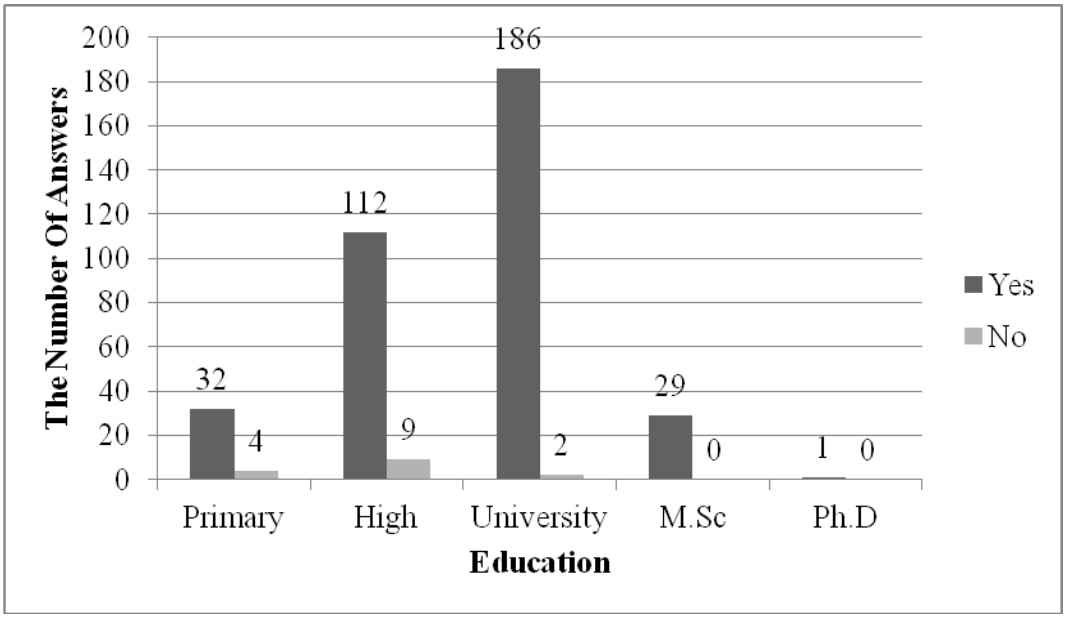

Figure 6.33 Graphical Expression of Table 6.33

According to participants' educations, distribution of the responses which are provided by participants to question of "Have you taken some precautions to reduce

water consumption in daily life?" was given in Table 6.34 and Figure 6.34. Majority of respondents from all education catagories answered yes to this question.

Table 6.34. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "Have you taken some precautions to reduce water consumption in daily life?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q2	YES	n	22	80	139	22	1	264
		%	5.9%	21.3%	37.1%	5.9%	0.3%	70.4%
	NO	n	14	41	49	7	0	111
		%	3.7%	10.9%	13.1%	1.9%	0.0%	29.6%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	0.3%	100.0%

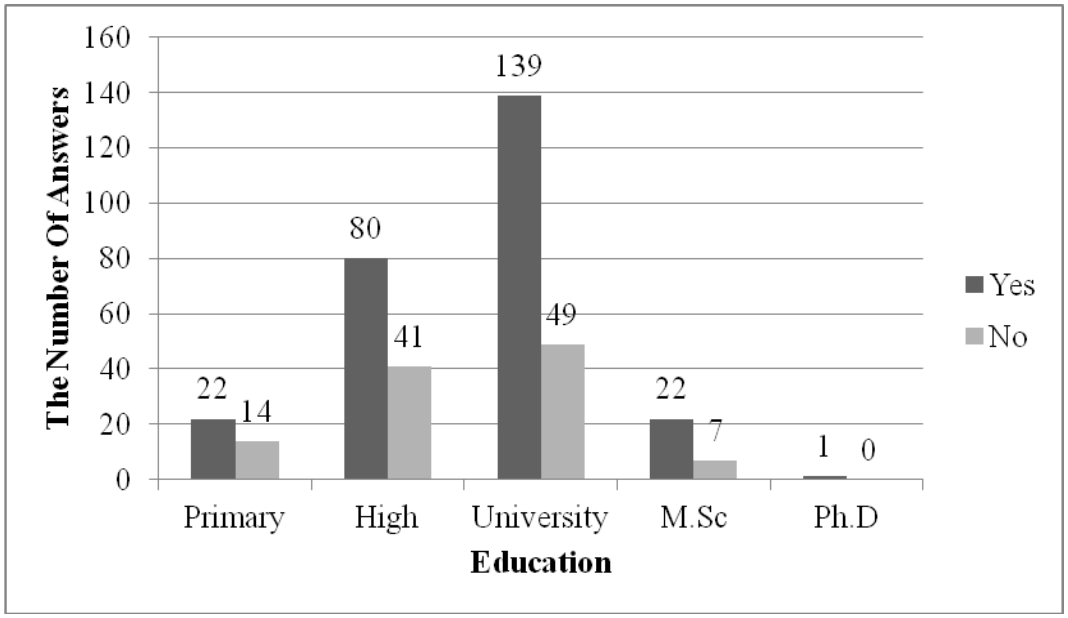

Figure 6.34 Graphical Expression of Table 6.34

According to participants' educations, distribution of the responses which are provided by participants to question of "Do you think whether our country give much more attention on water/wastewater treatment?" was given in Table 6.35 and Figure

6.35. Majority of respondents from all education catagories answered no to this question

Table 6.35. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "Do you think whether our country give much more attention on water/wastewater treatment?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q3	YES	n	10	15	17	3	0	45
		%	2.7%	4.0%	4.5%	0.8%	0.0%	12.0%
	NO	n	26	106	171	26	1	330
		%	6.9%	28.3%	45.6%	6.9%	0.3%	88.0%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	0.3%	100.0%

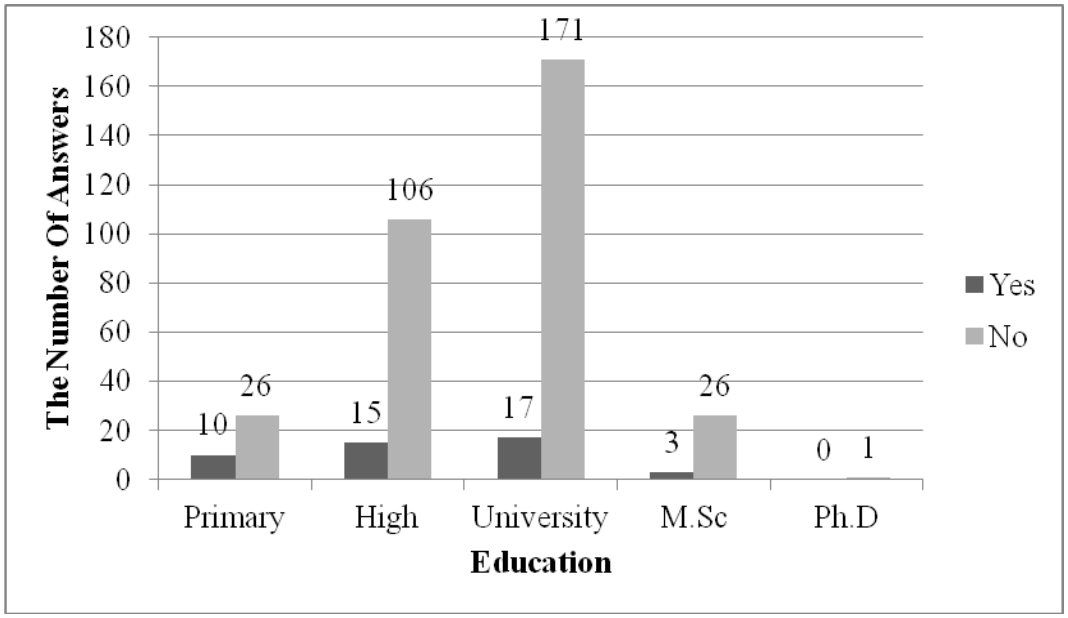

Figure 6.35 Graphical Expression of Table 6.35

According to participants' educations, distribution of the responses which are provided by participants to question of "Do you have any information about water/wastewater treatment systems?" was given in Table 6.36 and Figure 6.36.

Majority of respondents from all education catagories answered no to this question. Especially percentage of yes answers from participants with M.Sc degree was high.

Table 6.36 Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "Do you have any information about water/wastewater treatment systems?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q4	YES	n	9	48	74	14	0	145
		%	2.4%	12.8%	19.7%	3.7%	.0%	38.7%
	NO	n	27	73	114	15	1	230
		%	7.2%	19.5%	30.4%	4.0%	.3%	61.3%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	.3%	100.0%

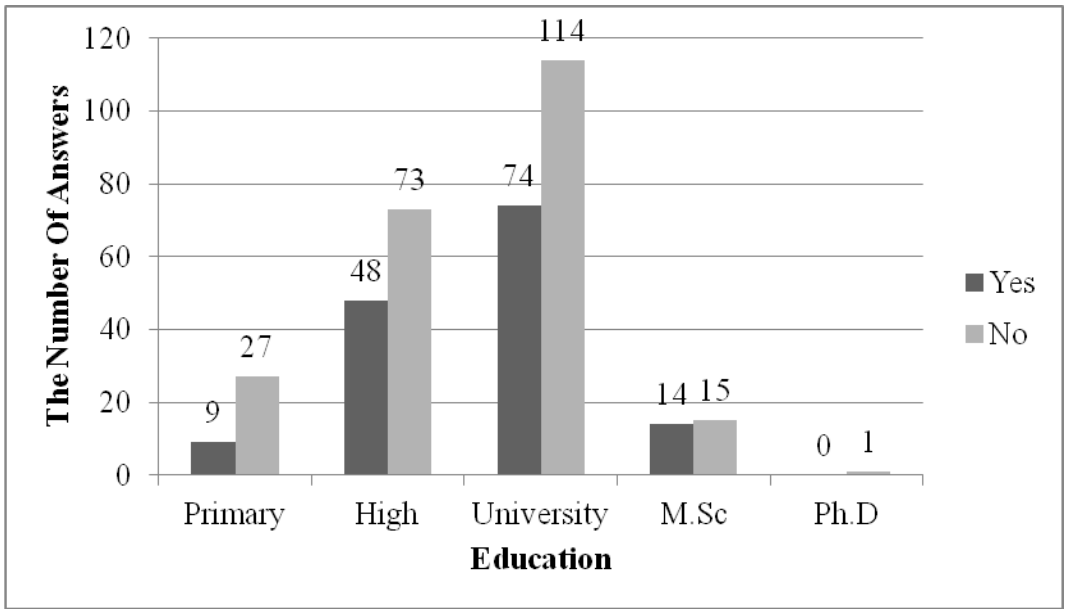

Figure 6.36 Graphical Expression of Table 6.36

According to participants' educations, distribution of the responses which are provided by participants to question of "Are you aware of the treated wastewater reuse applications?" was given in Table 6.37 and Figure 6.37. For this question, most of primary school, high school and college educated participants answered no, while majority of participants with Ph.D and M.Sc degrees answered yes. According

to this result, it is easily notable that, the difference between education degrees and public awareness of this issue is directly proportional.

Table 6.37 Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "Are you aware of the treated wastewater reuse applications?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q5	YES	n	9	54	90	21	1	175
		%	2.4%	14.4%	24.0%	5.6%	.3%	46.7%
	NO	n	27	67	98	8	0	200
		%	7.2%	17.9%	26.1%	2.1%	.0%	53.3%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	.3%	100.0%

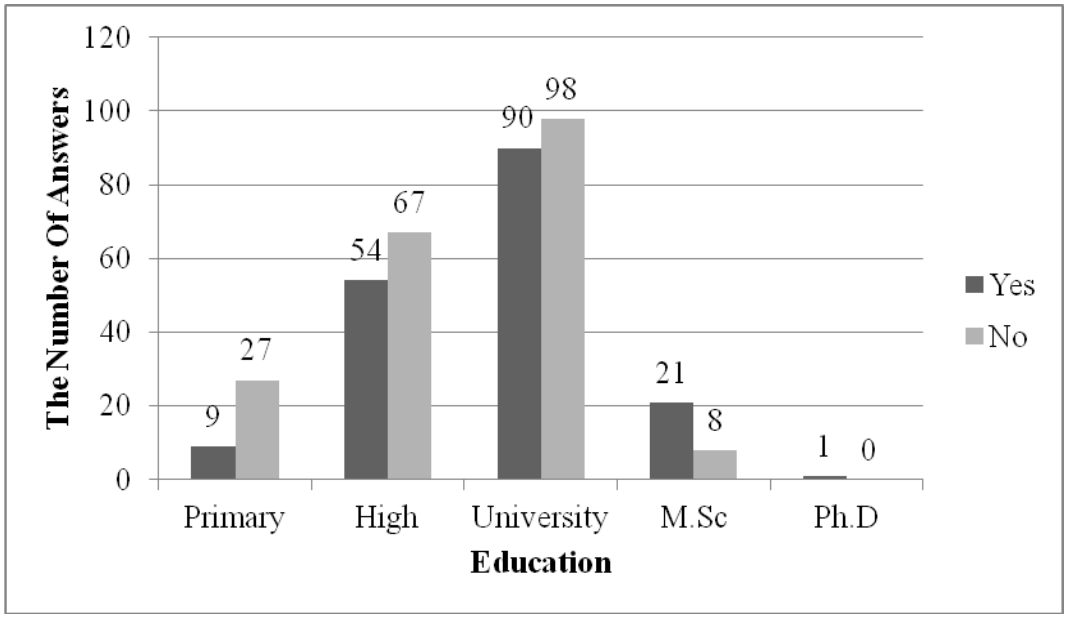

Figure 6.37 Graphical Expression of Table 6.37

According to participants' educations, distribution of the responses which are provided by participants to question of **"**If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below." was given in Table 6.38 and Figure 6.38.

Table 6.38. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below."

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q6	newspapers, journal, etc.	n	15	21	69	11	5	121
		%	12.4%	17.4%	57.0%	9.1%	4.1%	100.0%
	TV, radio	n	23	29	65	7	8	132
		%	17.4%	22.0%	49.2%	5.3%	6.1%	100.0%
	Internet	n	8	19	48	11	8	94
		%	8.5%	20.2%	51.1%	11.7%	8.5%	100.0%
	Friend /Family	n	12	11	30	2	2	57
		%	21.1%	19.3%	52.6%	3.5%	3.5%	100.0%
	Environmental Groups	n	4	9	32	3	2	50
		%	8.0%	18.0%	64.0%	6.0%	4.0%	100.0%
	University	n	6	6	13	2	2	29
		%	20.7%	20.7%	44.8%	6.9%	6.9%	100.0%
	People Concerned With Environmental Engineering	n	6	9	19	1	3	38
		%	15.8%	23.7%	50.0%	2.6%	7.9%	100.0%
	Other – Please clarify it	n	2	5	9	0	0	16
		%	12.5%	31.2%	56.2%	0.0%	0.0%	100.0%

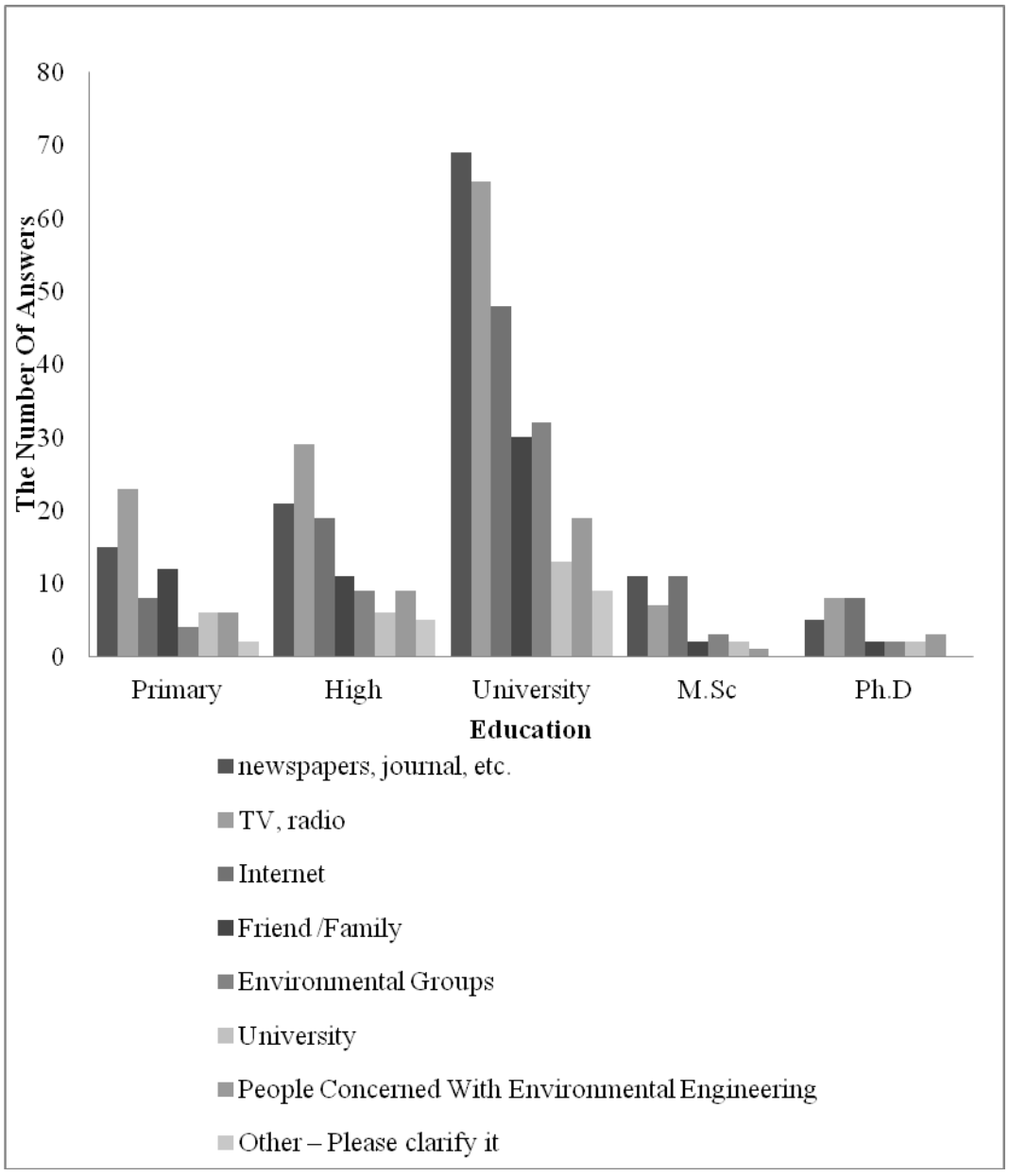

Figure 6.38 Graphical Expression of Table 6.38

According to participants' educations, distribution of the responses which are provided by participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?" was given in Table 6.39 and Figure 6.39. For this question, most of primary school, high school and college educated participants answered yes, while some of participants with Ph.D and M.Sc degrees answered no.

Table 6.39. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q7	YES	n	21	61	98	14	0	194
		%	5.6%	16.3%	26.1%	3.7%	0.0%	51.7%
	NO	n	15	60	90	15	1	181
		%	4.0%	16.0%	24.0%	4.0%	0.3%	48.3%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	0.3%	100.0%

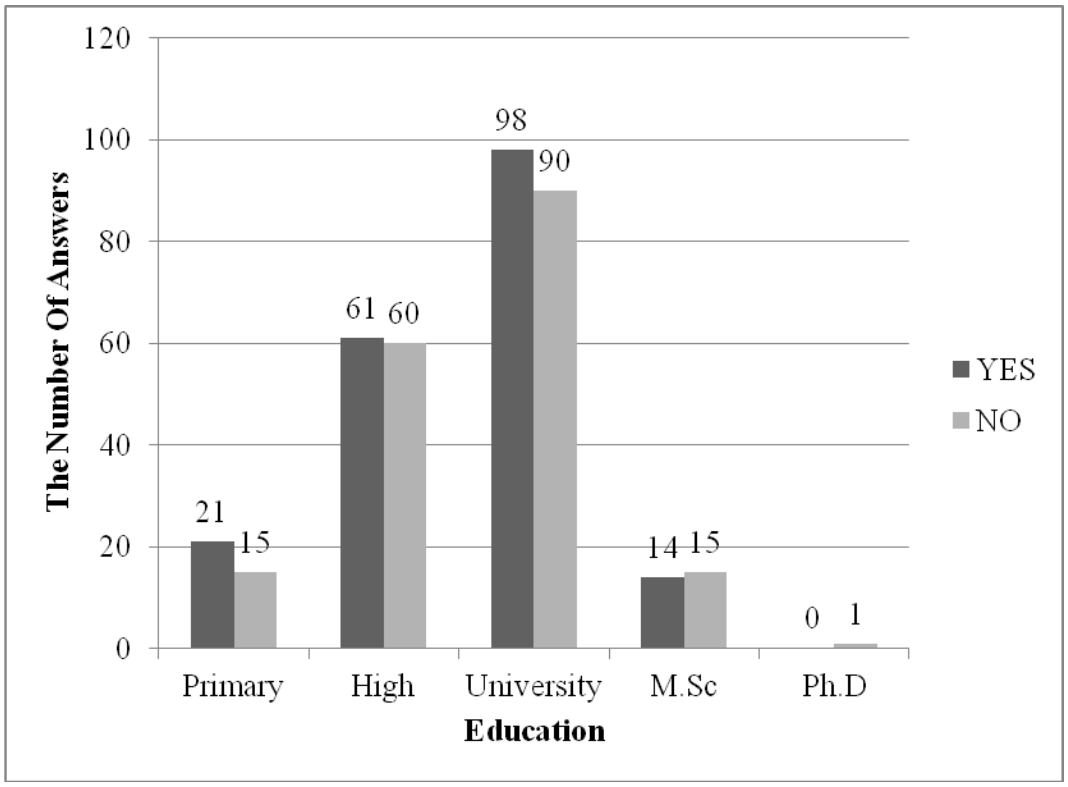

Figure 6.39 Graphical Expression of Table 6.39

According to participants' educations, distribution of the responses which are provided by participants to question of "In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?" was given in Table 6.40 and Figure 6.40. Most of primary school, high school and collage educated participants answered yes.

Table 6.40. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q8	YES	n	21	76	135	21	0	253
		%	5.6%	20.3%	36.0%	5.6%	0.0%	67.5%
	NO	n	15	45	53	8	1	122
		%	4.0%	12.0%	14.1%	2.1%	0.3%	32.5%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	0.3%	100.0%

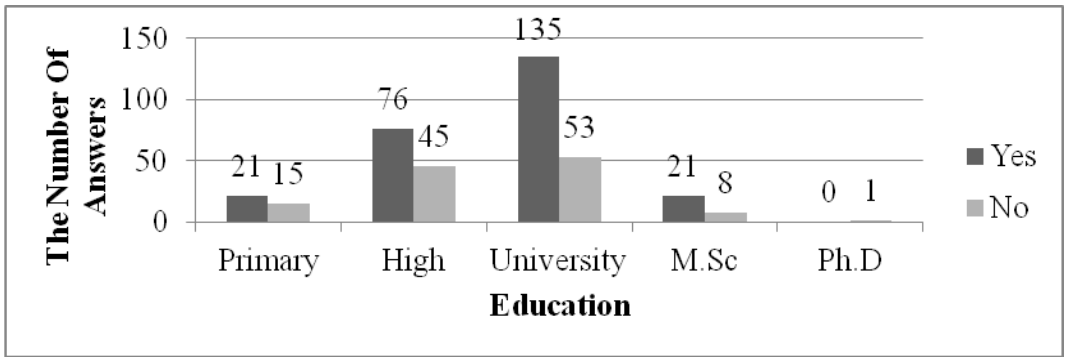

Figure 6.40 Graphical Expression of Table 6.40

According to participants' educations, distribution of the responses which are provided by participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?" was given in Table 6.41 and Figure 6.41. From the result of this question, participants ticked mostly toilet usage and damping streets while snow generation took place in last. As a conclusion from these responses, it is easily seen that there is a lack of knowledge about applications of water among community.

According to participants' educations, distribution of the responses which are provided by participants to question of "Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below?" was given in Table 6.42 and Figure 6.42. The results show that, most of participants should be worry about wastewater treatment systems.

Table 6.41. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q9	Drinking water	n	14	21	31	5	0	71
		%	19.7%	29.6%	43.7%	7.0%	0.0%	100.0%
	Cooking in the home	n	8	12	41	6	0	67
		%	11.9%	17.9%	61.2%	9.0%	0.0%	100.0%
	Food preparation in restaurants	n	9	9	26	4	0	48
		%	18.8%	18.8%	54.2%	8.3%	0.0%	100.0%
	Preparation of canned vegetables	n	4	8	15	3	0	30
		%	13.3%	26.7%	50.0%	10.0%	0.0%	100.0%
	Bathing	n	9	26	49	10	0	94
		%	9.6%	27.7%	52.1%	10.6%	0.0%	100.0%
	Swimming pool	n	7	25	44	9	0	85
		%	8.2%	29.4%	51.8%	10.6%	0.0%	100.0%
	Laundry	n	13	50	76	15	0	154
		%	8.4%	32.5%	49.4%	9.7%	0.0%	100.0%
	Agricultural irrigation	n	13	65	102	17	1	198
		%	6.6%	32.8%	51.5%	8.6%	0.5%	100.0%
	Irrigation of golf course	n	10	49	107	20	1	187
		%	5.3%	26.2%	57.2%	10.7%	0.5%	100.0%
	Toilet flushing	n	15	79	123	21	1	239
		%	6.3%	33.1%	51.5%	8.8%	0.4%	100.0%
	Fire fighting	n	11	67	117	20	1	216
		%	5.1%	31.0%	54.2%	9.3%	0.5%	100.0%
	Snow generation	n	6	39	76	14	0	135
		%	4.4%	28.9%	56.3%	10.4%	0.0%	100.0%
	Construction	n	11	76	129	18	1	235
		%	4.7%	32.3%	54.9%	7.7%	0.4%	100.0%
	Road washing	n	10	71	131	23	1	236
		%	4.2%	30.1%	55.5%	9.7%	0.4%	100.0%
	Irrigation of park	n	14	62	113	23	0	212
		%	6.6%	29.2%	53.3%	10.8%	0.0%	100.0%
	Industry	n	13	57	112	19	0	201
		%	6.5%	28.4%	55.7%	9.5%	0.0%	100.0%

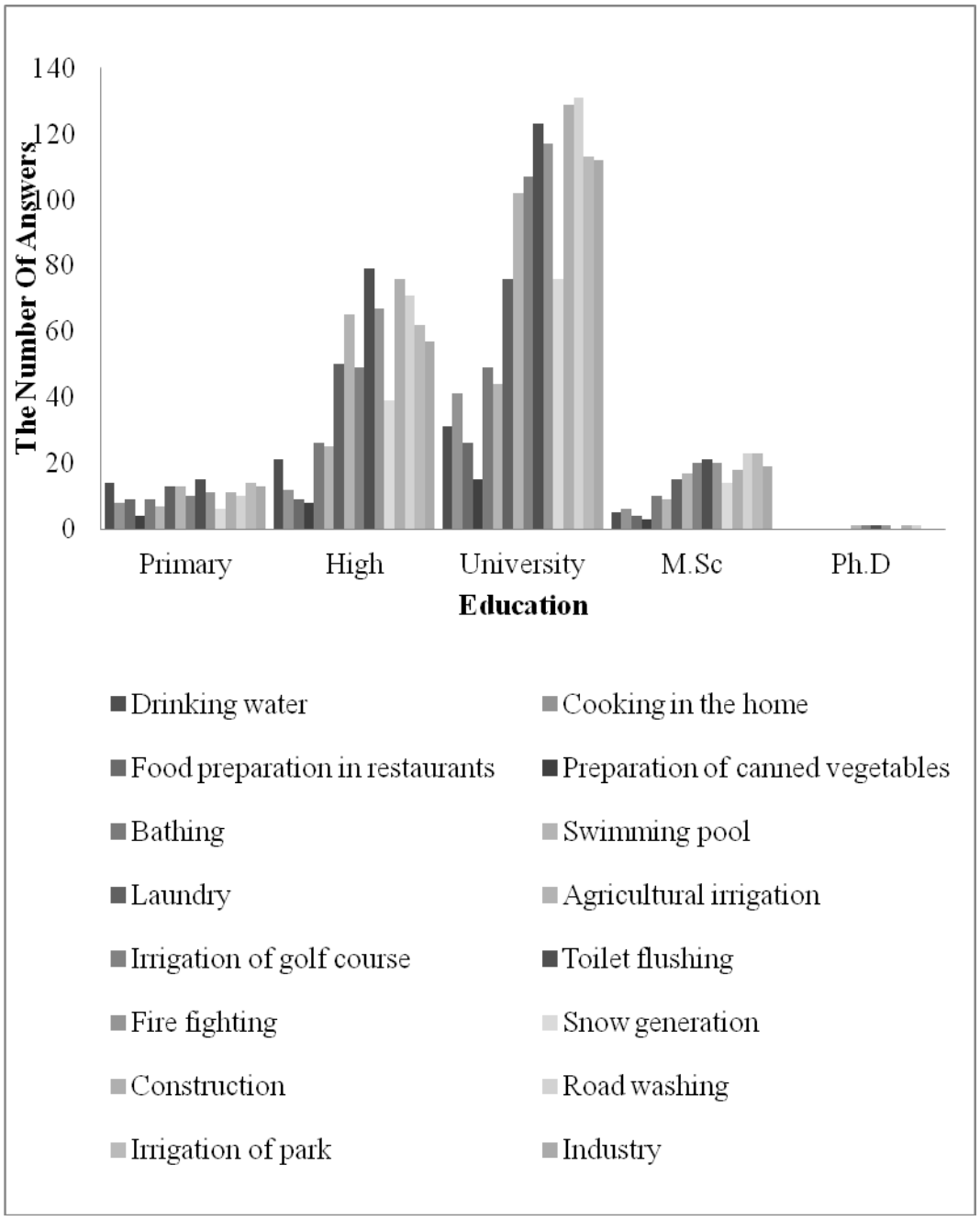

Figure 6.41 Graphical Expression of Table 6.41

According to participants' educations, distribution of the responses which are provided by participants to question of "Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below?" was given in Table 6.42 and Figure 6.42. The results show that, most of participants should be worry about wastewater treatment systems.

Table 6.42. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q10	Pathogens	n	25	82	148	20	0	275
		%	9.1%	29.8%	53.8%	7.3%	0.0%	100.0%
	Toxic substances	n	12	60	115	17	1	205
		%	5.9%	29.3%	56.1%	8.3%	0.5%	100.0%
	Doubt about wastewater treatment methods	n	16	52	106	20	0	194
		%	8.2%	26.8%	54.6%	10.3%	0.0%	100.0%
	Long term unknown health effects	n	14	62	100	23	0	199
		%	7.0%	31.2%	50.3%	11.6%	0.0%	100.0%
	Other – Please clarify it	n	3	7	16	2	0	28
		%	10.7%	25.0%	57.1%	7.1%	0.0%	100.0%

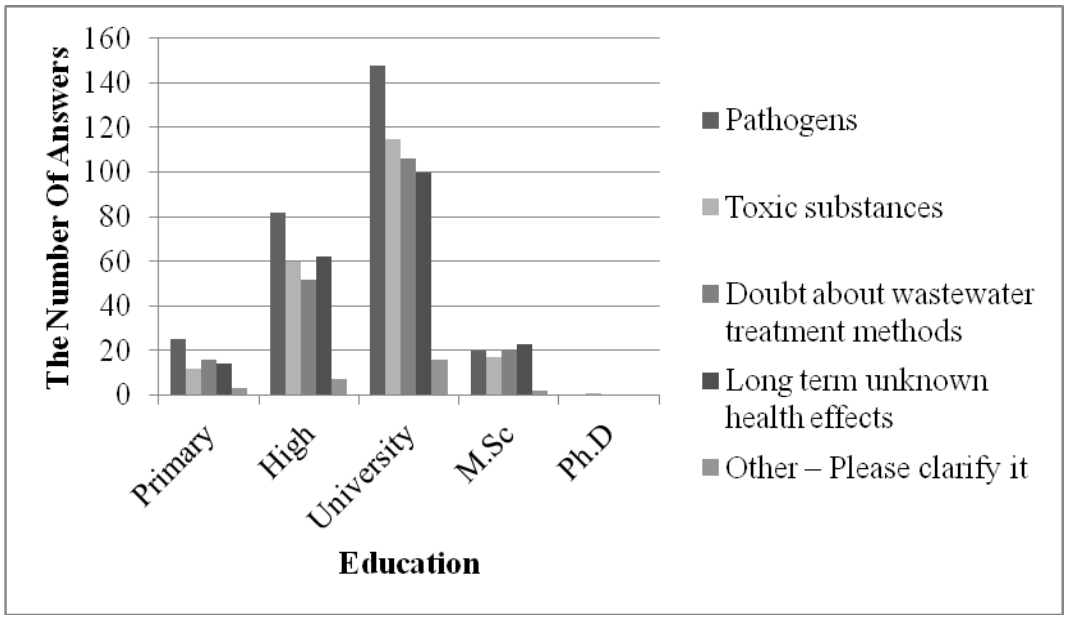

Figure 6.42 Graphical Expression of Table 6.42

According to participants' educations, distribution of the responses which are provided by participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct" was given in Table 6.43 and Figure 6.43. For this question, most of respondents from education groups of primary school, high school, collage and M.Sc, answered yes.

Table 6.43. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q11	YES	n	25	81	133	23	0	262
		%	6.7%	21.6%	35.5%	6.1%	0.0%	69.9%
	NO	n	11	40	55	6	1	113
		%	2.9%	10.7%	14.7%	1.6%	0.3%	30.1%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	0.3%	100.0%

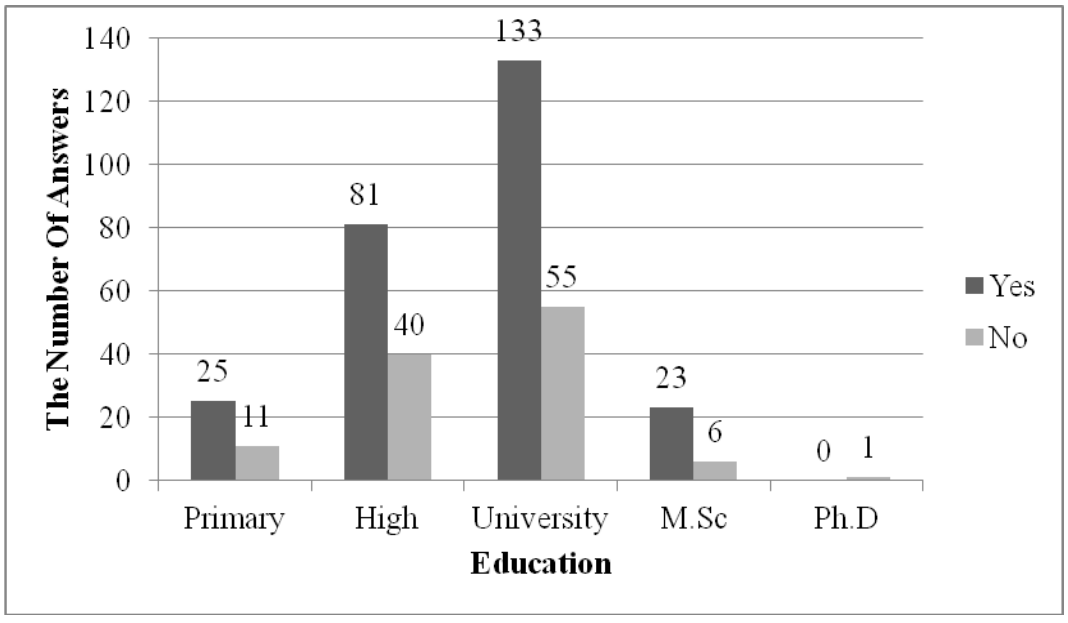

Figure 6.43 Graphical Expression of Table 6.43

According to participants' educations, distribution of the responses which are provided by participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?" was given in Table 6.44 and Figure 6.44.

Table 6.44. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q12	YES	n	18	57	103	14	1	193
		%	4.8%	15.2%	27.5%	3.7%	0.3%	51.5%
	NO	n	18	64	85	15	0	182
		%	4.8%	17.1%	22.7%	4.0%	0.0%	48.5%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	0.3%	100.0%

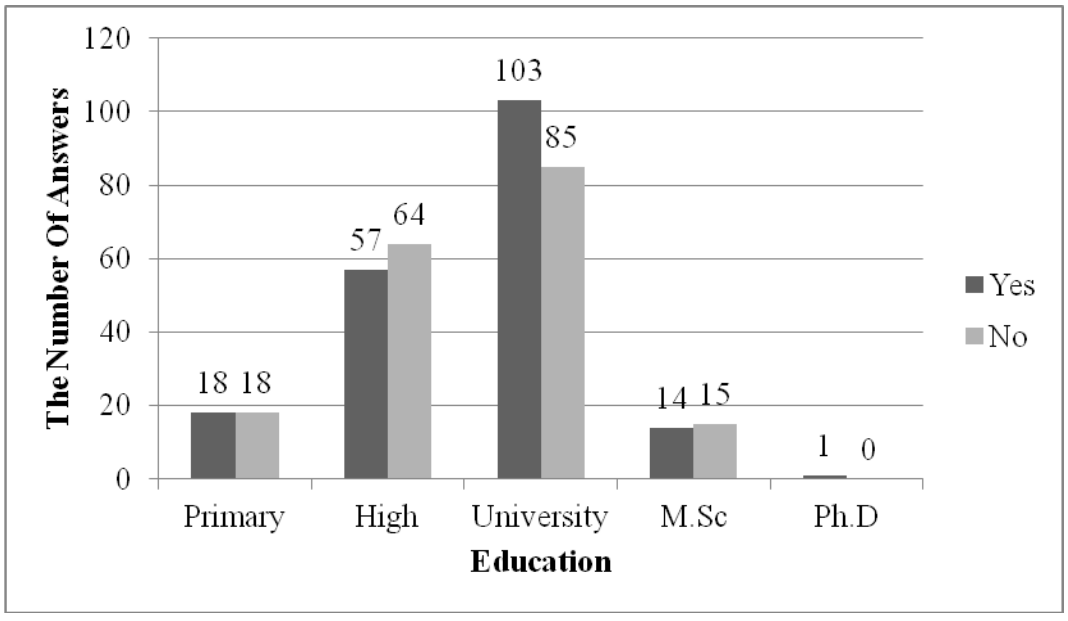

Figure 6.44 Graphical Expression of Table 6.44

According to participants' educations, distribution of the responses which are provided by participants to question of "What types of wastewater you can reuse after following required wastewater treatment processes?" was given in Table 6.45

and Figure 6.45. Majority of participants stated that usage of treated domestic wastewater for applications can be acceptable.

Table 6.45. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "What types of wastewater you can reuse after following required wastewater treatment processes?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q13	Domestic wastewater	n	18	57	83	18	0	176
		%	10.2%	32.4%	47.2%	10.2%	0.0%	100.0%
	Industrial wastewater	n	2	4	15	0	0	21
		%	9.5%	19.0%	71.4%	0.0%	0.0%	100.0%
	Both of them	n	5	7	24	3	0	39
		%	12.8%	17.9%	61.5%	7.7%	0.0%	100.0%
	None of them	n	11	56	84	8	1	160
		%	6.9%	35.0%	52.5%	5.0%	0.6%	100.0%

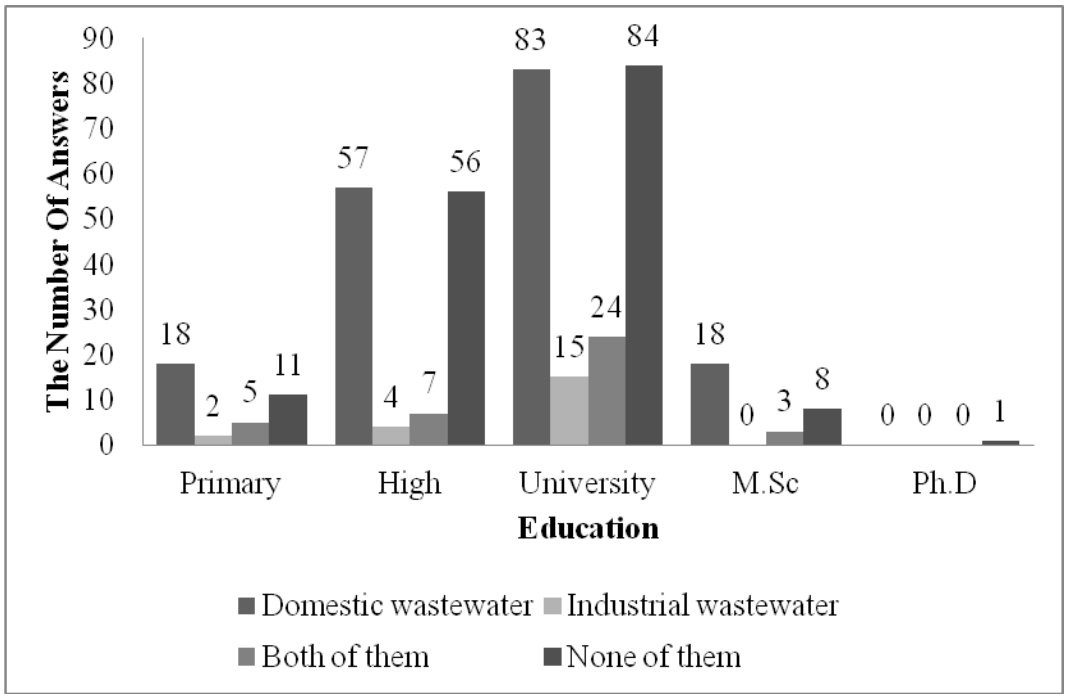

Figure 6.45 Graphical Expression of Table 6.45

According to participants' educations, distribution of the responses which are provided by participants to question of "Do you think that our public is ready for

those applications?" was given in Table 6.46 and Figure 6.46. Most of participants from all education groups answered no to this question.

Table 6.46. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "Do you think that our public is ready for those applications?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q14	YES	n	4	14	31	5	0	54
		%	1.1%	3.7%	8.3%	1.3%	0.0%	14.4%
	NO	n	32	107	157	24	1	321
		%	8.5%	28.5%	41.9%	6.4%	0.3%	85.6%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	0.3%	100.0%

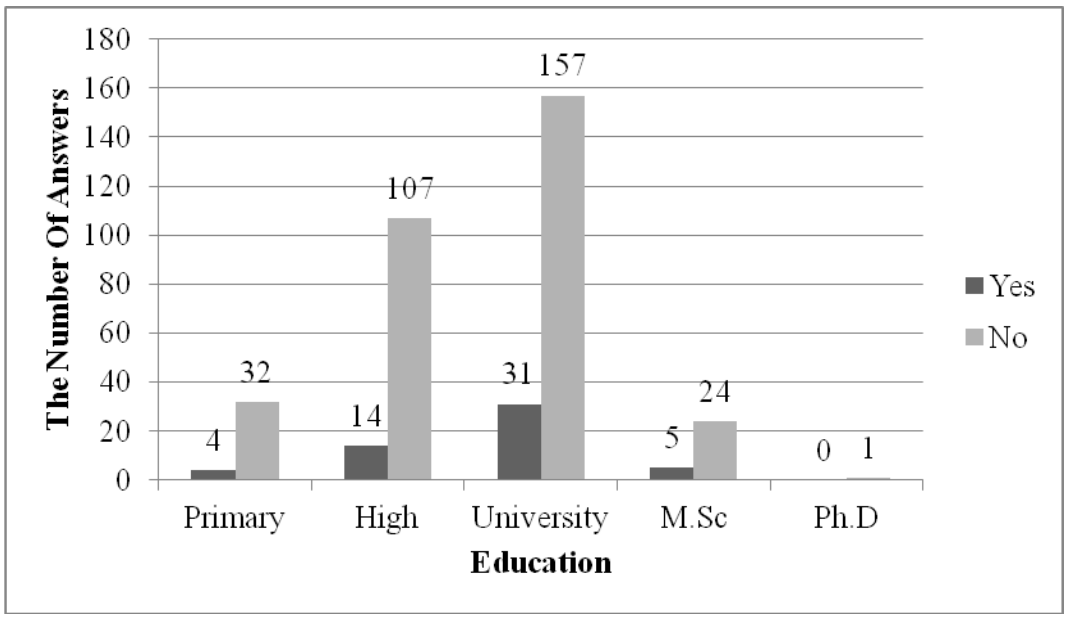

Figure 6.46 Graphical Expression of Table 6.46

According to participants' educations, distribution of the responses which are provided by participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public?" was given in Table 6.47 and Figure 6.47. Most of participants from all education groups answered no to this question.

Table 6.47. Based on participants' educations, the distribution of the responses which are provided by survey participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public?"

			Education					Total
			Primary	High	University	M.Sc	Ph.D	
Q15	YES	n	5	8	10	1	1	25
		%	1.3%	2.1%	2.7%	0.3%	0.3%	6.7%
	NO	n	31	113	178	28	0	350
		%	8.3%	30.1%	47.5%	7.5%	0.0%	93.3%
Total		n	36	121	188	29	1	375
		%	9.6%	32.3%	50.1%	7.7%	0.3%	100.0%

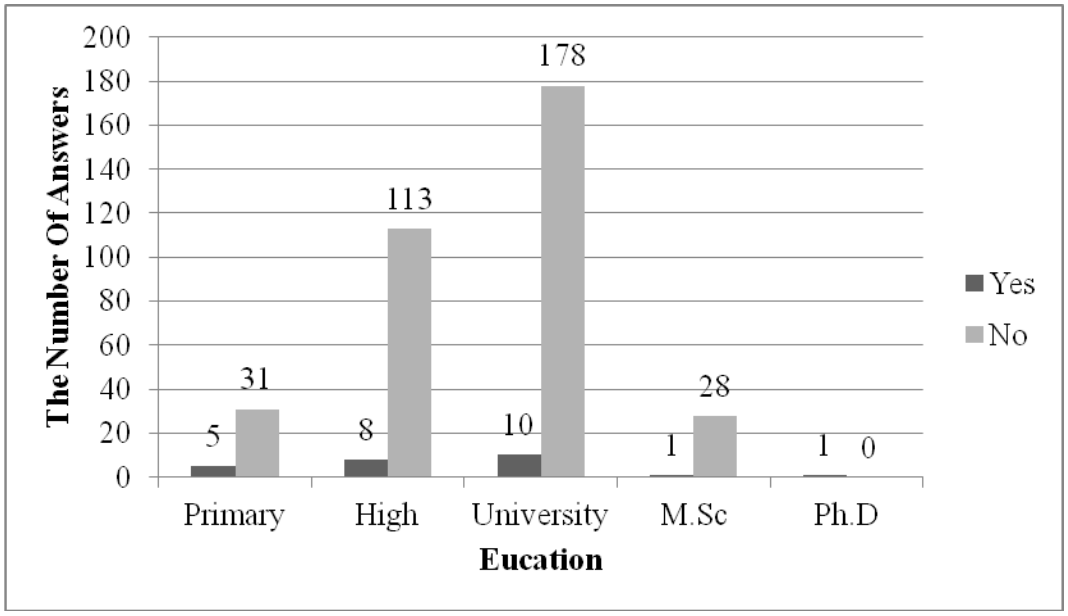

Figure 6.47 Graphical Expression of Table 6.47

6.5 Responses Based On The Participants' Incomes

According to participants' incomes, distribution of the responses which are provided by participants to question of "Do you think whether water resources have been

polluted and consumed very fast in nowadays?" was given in Table 6.48 and Figure 6.48. Majority of participants of survey from all income groups answered yes to this question. While survey was conducting 1 American dollar ($) was equal to 1.6050 Turkish lira.

Table 6.48. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Do you think whether water resources have been polluted and consumed very fast in nowadays?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q1	YES	n	54	86	177	27	16	360
		%	14.4%	22.9%	47.2%	7.2%	4.3%	96.0%
	NO	n	5	6	4	0	0	15
		%	1.3%	1.6%	1.1%	0.0%	0.0%	4.0%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

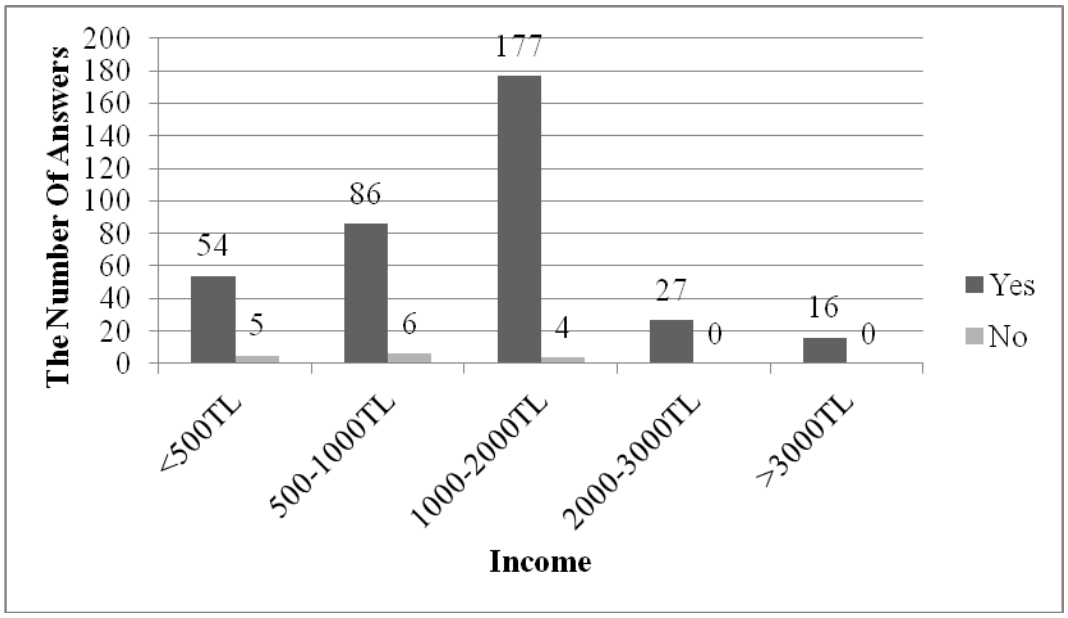

Figure 6.48 Graphical Expression of Table 6.48

According to participants' incomes, distribution of the responses which are provided by participants to question of "Have you taken some precautions to reduce water consumption in daily?" was given in Table 6.49 and Figure 6.49. Majority of

participants of survey from all income groups answered yes to this question. According to result, public awareness about topic is increasing day by day.

Table 6.49. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Have you taken some precautions to reduce water consumption in daily?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q2	YES	n	31	61	137	23	12	264
		%	8.3%	16.3%	36.5%	6.1%	3.2%	70.4%
	NO	n	28	31	44	4	4	111
		%	7.5%	8.3%	11.7%	1.1%	1.1%	29.6%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

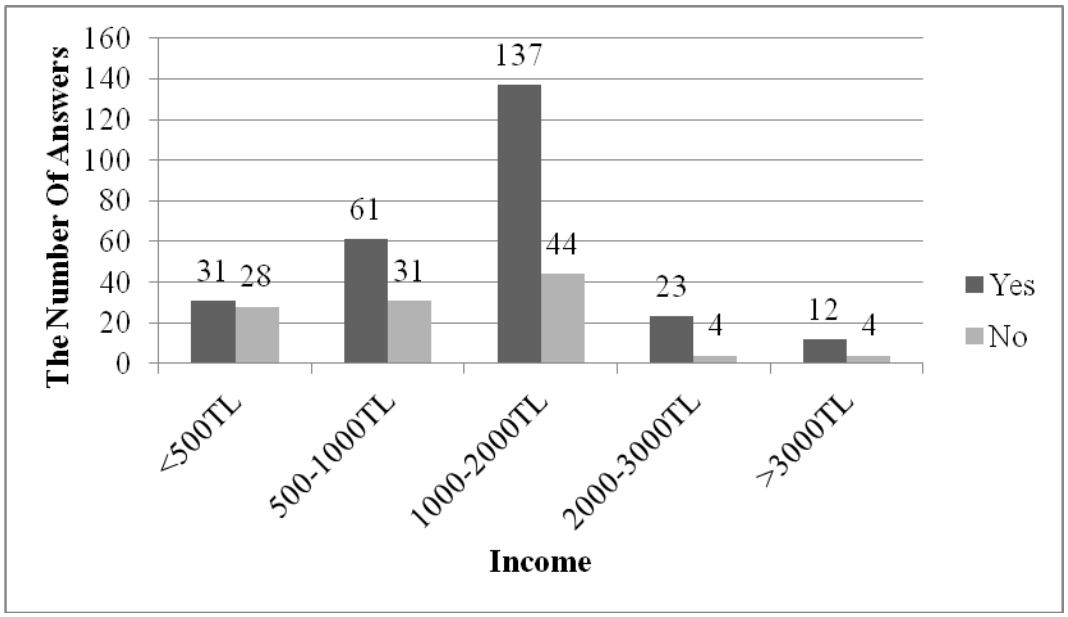

Figure 6.49 Graphical Expression of Table 6.49

According to participants' incomes, distribution of the responses which are provided by participants to question of "Do you think whether our country give much more attention on waste/wastewater treatment?" was given in Table 6.50 and Figure

6.50. Majority of participants of survey from all income groups answered no to this question

Table 6.50. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Do you think whether our country give much more attention on waste/wastewater treatment?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q3	YES	n	9	8	23	2	3	45
		%	2.4%	2.1%	6.1%	0.5%	0.8%	12.0%
	NO	n	50	84	158	25	13	330
		%	13.3%	22.4%	42.1%	6.7%	3.5%	88.0%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

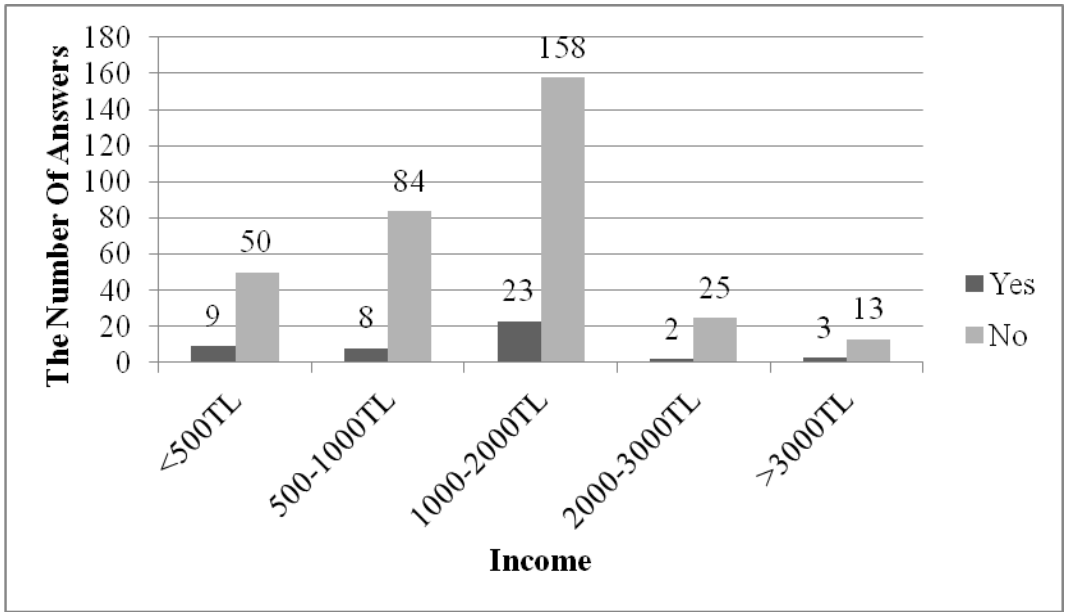

Figure 6.50 Graphical Expression of Table 6.50

According to participants' incomes, distribution of the responses which are provided by participants to question of "Do you have any information about water/wastewater treatment systems?" was given in Table 6.51 and Figure 6.51.

Majority of participants of survey from all income groups answered no to this question.

Table 6.51. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Do you have any information about water/wastewater treatment systems?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q4	YES	n	28	29	68	11	9	145
		%	7.5%	7.7%	18.1%	2.9%	2.4%	38.7%
	NO	n	31	63	113	16	7	230
		%	8.3%	16.8%	30.1%	4.3%	1.9%	61.3%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

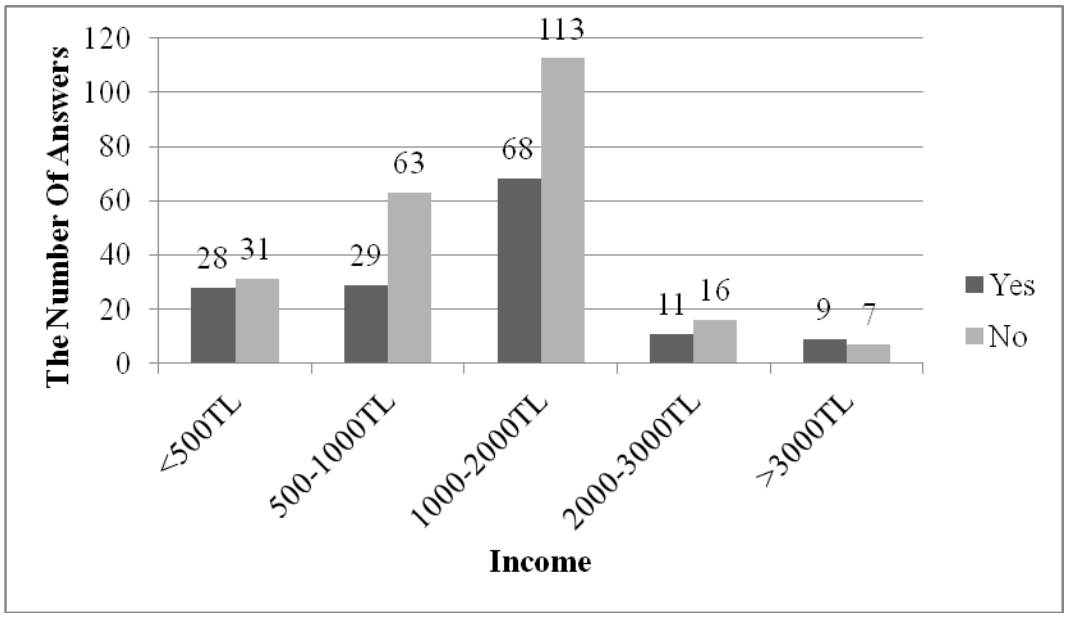

Figure 6.51 Graphical Expression of Table 6.51

According to participants' incomes, distribution of the responses which are provided by participants to question of "Are you aware of the treated wastewater reuse applications?" was given in Table 6.52 and Figure 6.52. Majority of Participants whose income was lower than 3000TL (except 500-1000TL income

range) answered yes to this question, while other respondents who have high income answered no.

Table 6.52. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Are you aware of the treated wastewater reuse applications?

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q5	YES	n	32	31	84	15	13	175
		%	8.5%	8.3%	22.4%	4.0%	3.5%	46.7%
	NO	n	27	61	97	12	3	200
		%	7.2%	16.3%	25.9%	3.2%	0.8%	53.3%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

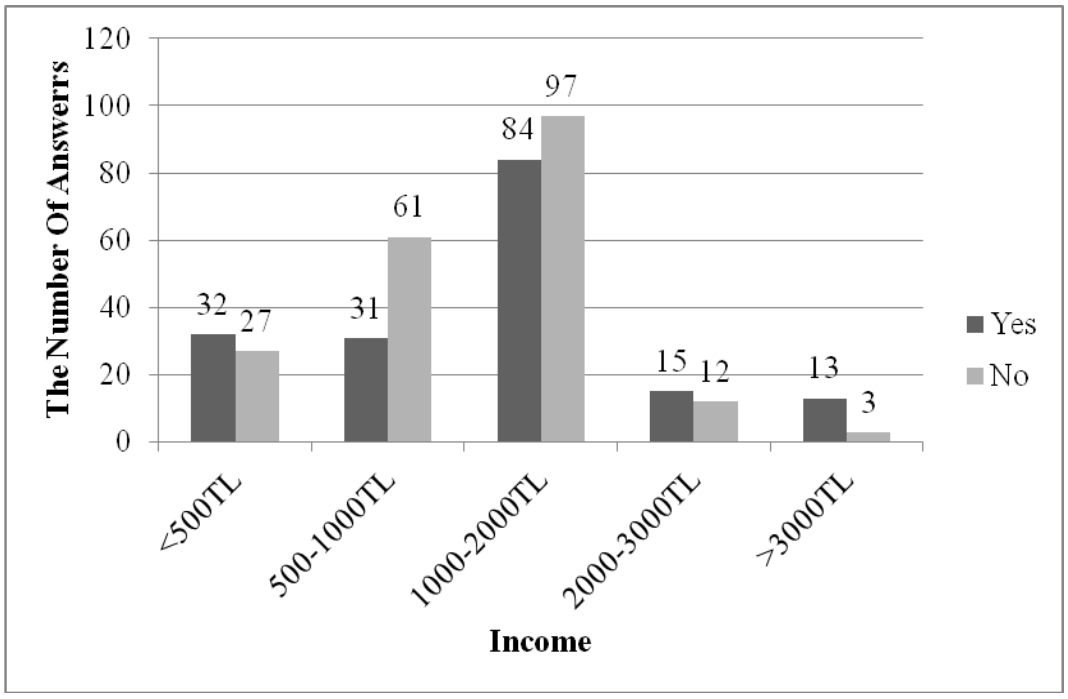

Figure 6.52 Graphical Expression of Table 6.52

According to participants' incomes, distribution of the responses which are provided by participants to question of **"**If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below." was given in Table 6.53 and Figure 6.53.

Table 6.53. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below."

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q6	newspapers, journal, etc.	n	15	21	69	11	5	121
		%	12.4%	17.4%	57.0%	9.1%	4.1%	100.0%
	TV, radio	n	23	29	65	7	8	132
		%	17.4%	22.0%	49.2%	5.3%	6.1%	100.0%
	Internet	n	8	19	48	11	8	94
		%	8.5%	20.2%	51.1%	11.7%	8.5%	100.0%
	Friend /Family	n	12	11	30	2	2	57
		%	21.1%	19.3%	52.6%	3.5%	3.5%	100.0%
	Environmental Groups	n	4	9	32	3	2	50
		%	8.0%	18.0%	64.0%	6.0%	4.0%	100.0%
	University	n	6	6	13	2	2	29
		%	20.7%	20.7%	44.8%	6.9%	6.9%	100.0%
	People Concerned With Environmental Engineering	n	6	9	19	1	3	38
		%	15.8%	23.7%	50.0%	2.6%	7.9%	100.0%
	Other – Please clarify it	n	2	5	9	0	0	16
		%	12.5%	31.2%	56.2%	0.0%	0.0%	100.0%

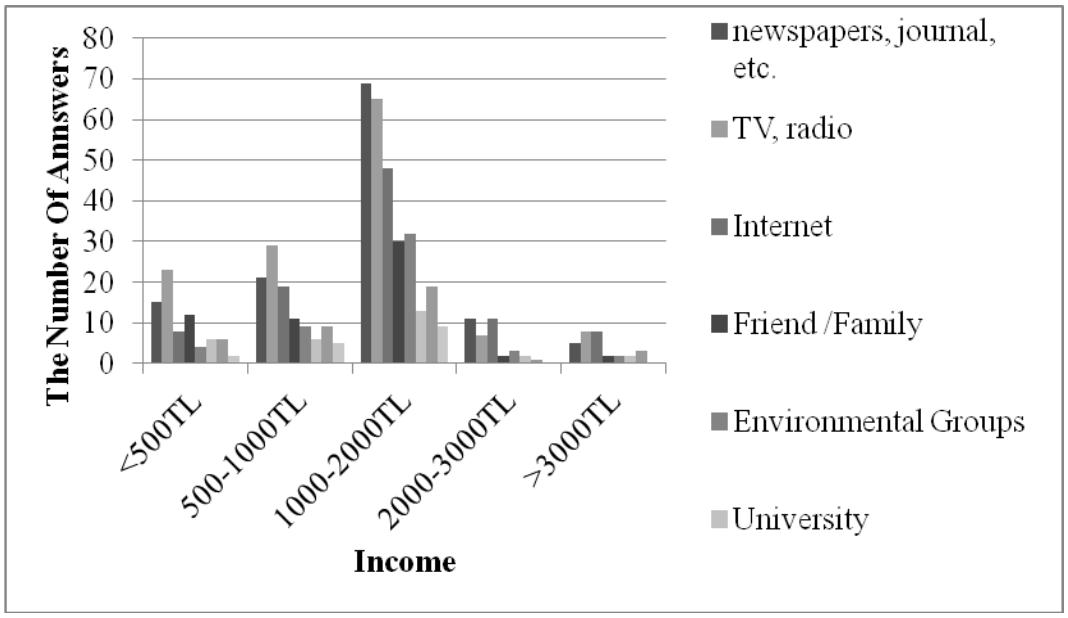

Figure 6.53 Graphical Expression of Table 6.53

According to participants' incomes, distribution of the responses which are provided by participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?" was given in Table 6.54 and Figure 6.54. Majority of Participants whose income was lower than 2000TL answered yes to this question, while group of 2000-3000TL income, answered no. Also it is noticeable that, numbers of yes and no answers of participants with higher than 3000TL were equal.

Table 6.54. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q7	YES	n	32	48	94	12	8	194
		%	8.5%	12.8%	25.1%	3.2%	2.1%	51.7%
	NO	n	27	44	87	15	8	181
		%	7.2%	11.7%	23.2%	4.0%	2.1%	48.3%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

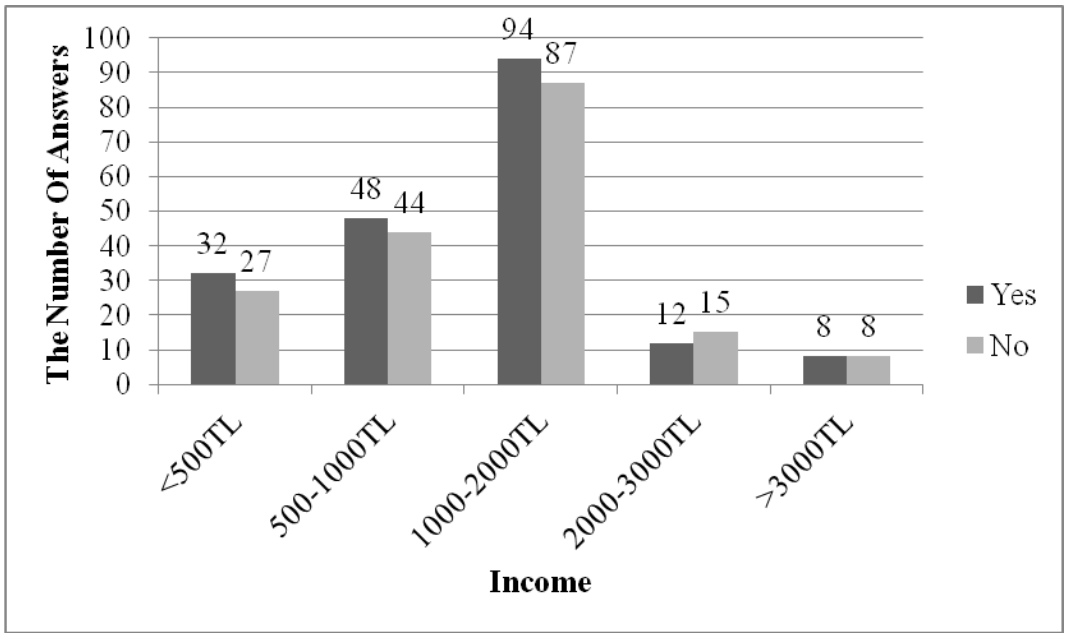

Figure 6.54 Graphical Expression of Table 6.54

According to participants' incomes, distribution of the responses which are provided by participants to question of "In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?" was given in Table 6.55 and Figure 6.55. Majority of participants of survey from all income groups answered yes to this question.

Table 6.55. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q8	YES	n	41	56	125	21	10	253
		%	10.9%	14.9%	33.3%	5.6%	2.7%	67.5%
	NO	n	18	36	56	6	6	122
		%	4.8%	9.6%	14.9%	1.6%	1.6%	32.5%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

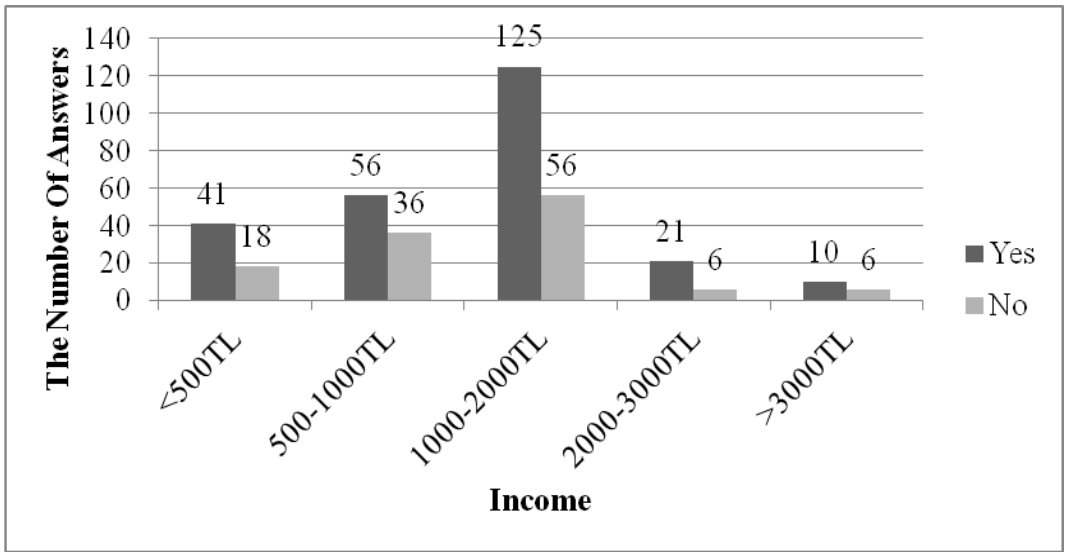

Figure 6.55 Graphical Expression of Table 6.55

According to participants' incomes, distribution of the responses which are provided by participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?" was given in Table 6.56 and Figure 6.56.

Table 6.56. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q9	Drinking water	n	14	19	31	3	4	71
		%	19.7%	26.8%	43.7%	4.2%	5.6%	100.0%
	Cooking in the home	n	11	12	35	7	2	67
		%	16.4%	17.9%	52.2%	10.4%	3.0%	100.0%
	Food preparation in restaurants	n	8	12	24	4	0	48
		%	16.7%	25.0%	50.0%	8.3%	0.0%	100.0%
	Preparation of canned vegetables	n	5	5	15	5	0	30
		%	16.7%	16.7%	50.0%	16.7%	0.0%	100.0%
	Bathing	n	12	21	54	6	1	94
		%	12.8%	22.3%	57.4%	6.4%	1.1%	100.0%
	Swimming pool	n	10	15	49	7	4	85
		%	11.8%	17.6%	57.6%	8.2%	4.7%	100.0%
	Laundry	n	21	42	76	11	4	154
		%	13.6%	27.3%	49.4%	7.1%	2.6%	100.0%

	Agricultural irrigation	n	26	46	100	17	9	198
		%	13.1%	23.2%	50.5%	8.6%	4.5%	100.0%
	Irrigation of golf course	n	22	48	92	19	6	187
		%	11.8%	25.7%	49.2%	10.2%	3.2%	100.0%
	Toilet flushing	n	32	59	120	19	9	239
		%	13.4%	24.7%	50.2%	7.9%	3.8%	100.0%
	Fire fighting	n	32	43	114	20	7	216
		%	14.8%	19.9%	52.8%	9.3%	3.2%	100.0%
	Snow generation	n	16	29	68	14	8	135
		%	11.9%	21.5%	50.4%	10.4%	5.9%	100.0%
	Construction	n	33	52	121	20	9	235
		%	14.0%	22.1%	51.5%	8.5%	3.8%	100.0%
	Road washing	n	32	52	122	21	9	236
		%	13.6%	22.0%	51.7%	8.9%	3.8%	100.0%
	Irrigation of park	n	26	49	109	21	7	212
		%	12.3%	23.1%	51.4%	9.9%	3.3%	100.0%
	Industry	n	29	47	99	19	7	201
		%	14.4%	23.4%	49.3%	9.5%	3.5%	100.0%

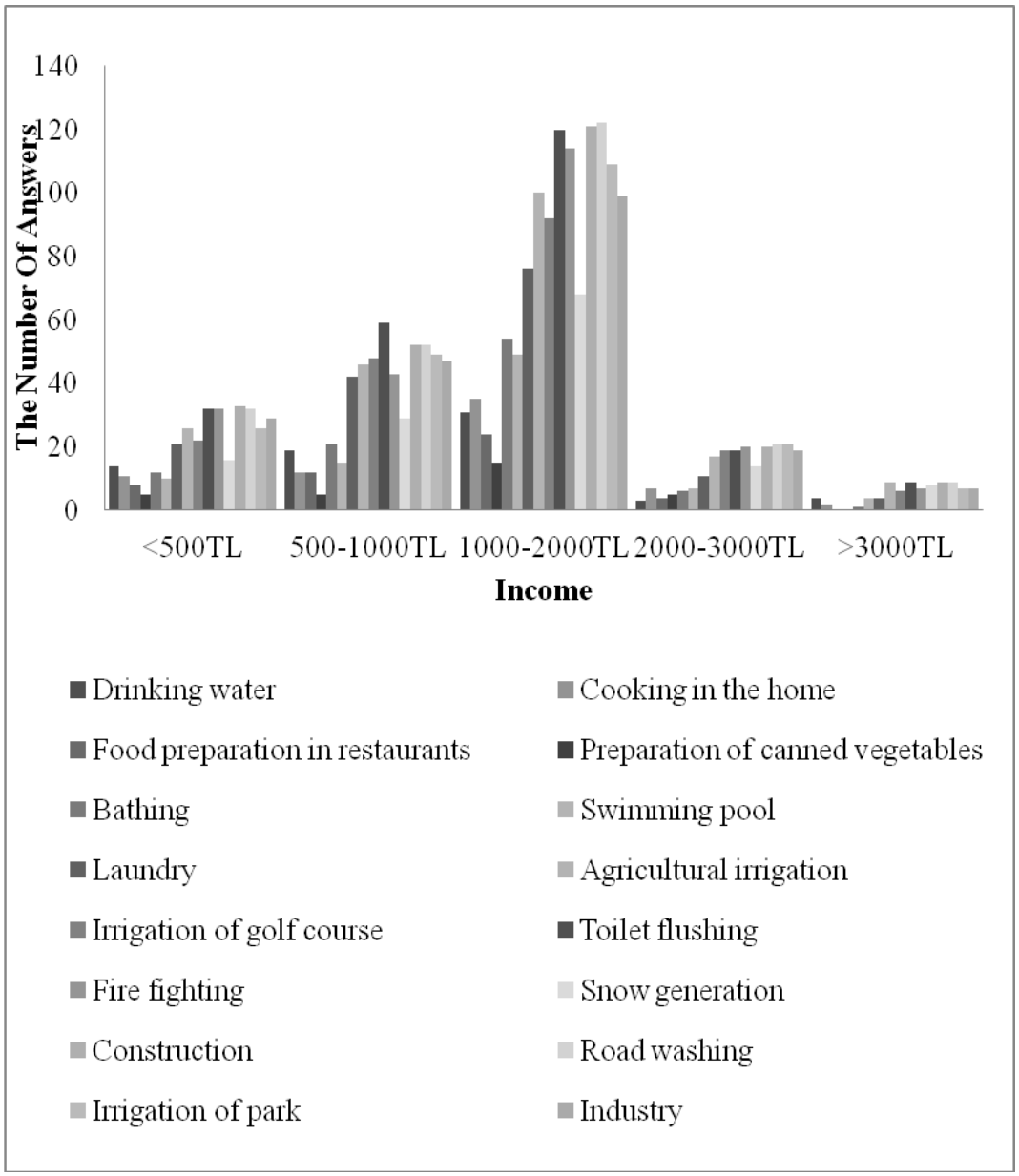

Figure 6.56 Graphical Expression of Table 6.56

According to participants' incomes, distribution of the responses which are provided by participants to question of "Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below?" was given in Table 6.57 and Figure 6.57.

Table 6.57. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q10	Pathogens	n	46	71	129	18	11	275
		%	16.7%	25.8%	46.9%	6.5%	4.0%	100.0%
	Toxic substances	n	29	49	107	14	6	205
		%	14.1%	23.9%	52.2%	6.8%	2.9%	100.0%
	Doubt about wastewater treatment methods	n	27	40	104	13	10	194
		%	13.9%	20.6%	53.6%	6.7%	5.2%	100.0%
	Long term unknown health effects	n	27	45	104	15	8	199
		%	13.6%	22.6%	52.3%	7.5%	4.0%	100.0%
	Other – Please clarify it	n	3	6	16	2	1	28
		%	10.7%	21.4%	57.1%	7.1%	3.6%	100.0%

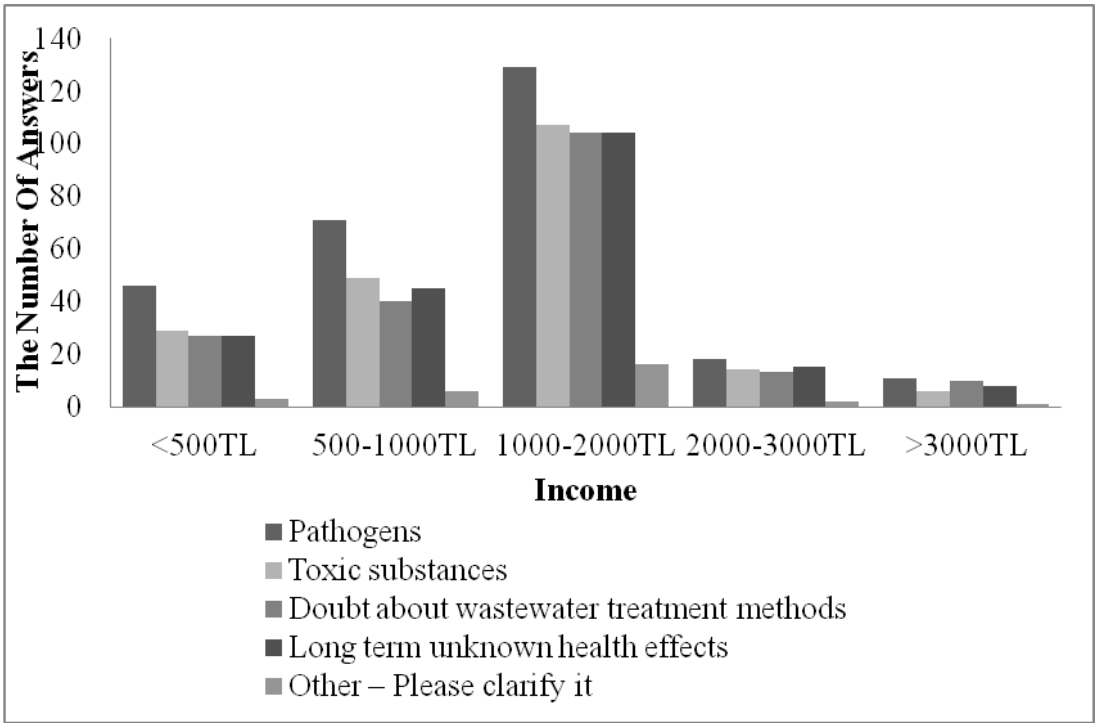

Figure 6.57 Graphical Expression of Table 6.57

According to participants' incomes, distribution of the responses which are provided by participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct" was given in Table 6.58 and Figure 6.58. Majority of participants of survey from all income groups answered yes to this question.

Table 6.58. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q11	YES	n	44	59	128	20	11	262
		%	11.7%	15.7%	34.1%	5.3%	2.9%	69.9%
	NO	n	15	33	53	7	5	113
		%	4.0%	8.8%	14.1%	1.9%	1.3%	30.1%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

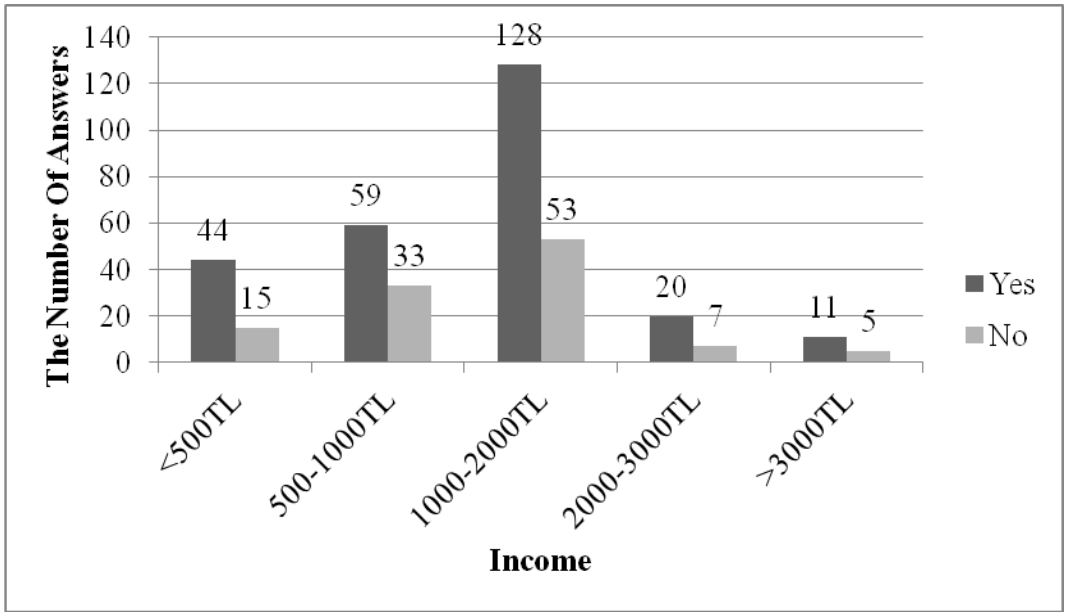

Figure 6.58 Graphical Expression of Table 6.58

According to participants' incomes, distribution of the responses which are provided by participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?" was given in Table 6.59 and Figure 6.59. Majority of Participants whose income was lower than 500TL and higher than 3000TL answered no to this question, while others answered yes. Numbers of the yes and no answers of participants with income level of 500-1000 were equal.

Table 6.59. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q12	YES	n	29	46	99	15	4	193
		%	7.7%	12.3%	26.4%	4.0%	1.1%	51.5%
	NO	n	30	46	82	12	12	182
		%	8.0%	12.3%	21.9%	3.2%	3.2%	48.5%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

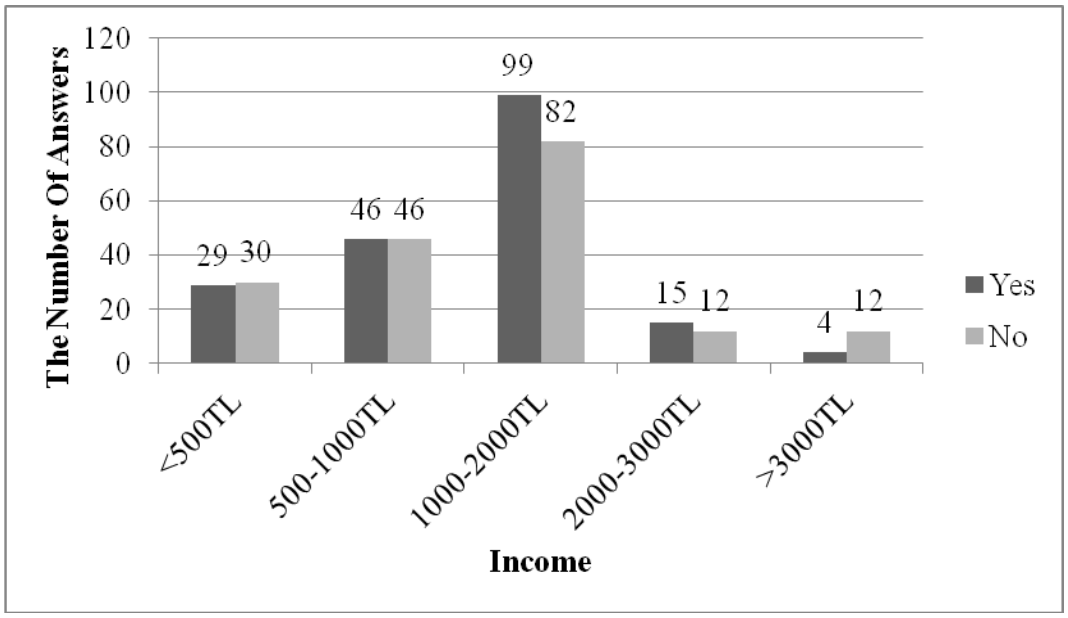

Figure 6.59 Graphical Expression of Table 6.59

According to participants' incomes, distribution of the responses which are provided by participants to question of "What types of wastewater you can reuse after following required wastewater treatment processes?" was given in Table 6.60 and Figure 6.60. Noted that domestic wastewater and none selections of this question were the higher two responses given by most of survey participants.

Table 6.60. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "What types of wastewater you can reuse after following required wastewater treatment processes?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q13	Domestic wastewater	n	27	40	87	12	10	176
		%	15.3%	22.7%	49.4%	6.8%	5.7%	100.0%
	Industrial wastewater	n	1	1	16	3	0	21
		%	4.8%	4.8%	76.2%	14.3%	0.0%	100.0%
	Both of them	n	8	5	22	1	3	39
		%	20.5%	12.8%	56.4%	2.6%	7.7%	100.0%
	None of them	n	24	46	74	13	3	160
		%	15.0%	28.8%	46.2%	8.1%	1.9%	100.0%

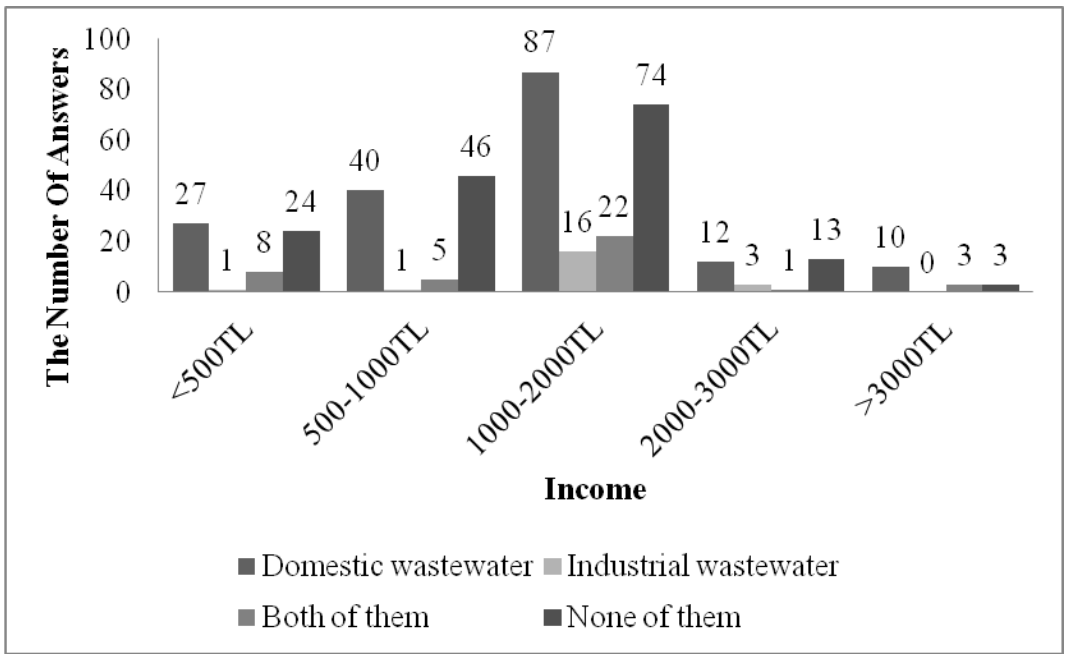

Figure 6.60 Graphical Expression of Table 6.60

According to participants' incomes, distribution of the responses which are provided by participants to question of "Do you think that our public is ready for those applications?" was given in Table 6.61 and Figure 6.61. Majority of participants of survey from all income groups answered no to this question so the executives should be have more consciously for supplying better information about water/wastewater reuse systems to public.

Table 6.61. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Do you think that our public is ready for those applications?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q14	YES	n	5	13	29	3	4	54
		%	1.3%	3.5%	7.7%	0.8%	1.1%	14.4%
	NO	n	54	79	152	24	12	321
		%	14.4%	21.1%	40.5%	6.4%	3.2%	85.6%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

According to participants' incomes, distribution of the responses which are provided by participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public?" was given in Table 6.62 and Figure 6.62. Majority of participants of survey from all income groups answered no to this question.

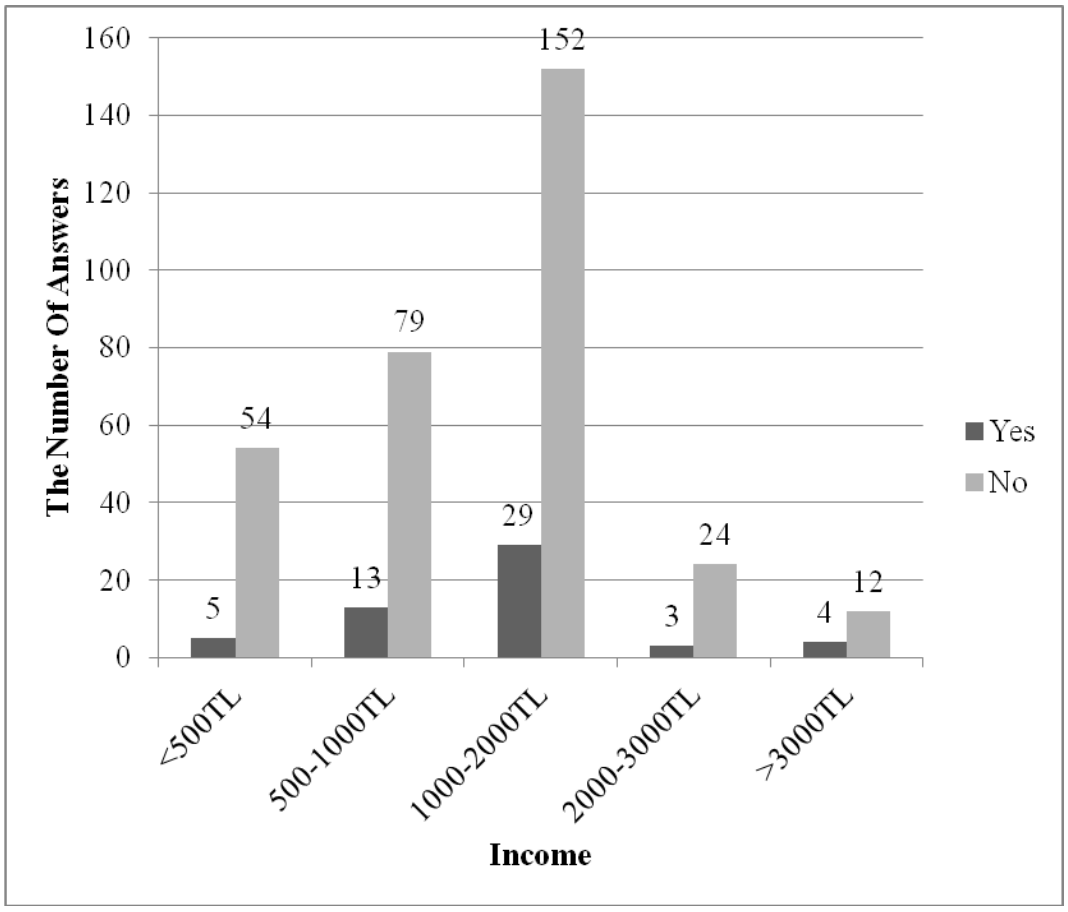

Figure 6.61 Graphical Expression of Table 6.61

Table 6.62. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public?"

			Income					Total
			<500TL	500-1000TL	1000-2000TL	2000-3000TL	>3000TL	
Q15	YES	n	3	4	14	2	2	25
		%	0.8%	1.1%	3.7%	0.5%	0.5%	6.7%
	NO	n	56	88	167	25	14	350
		%	14.9%	23.5%	44.5%	6.7%	3.7%	93.3%
Total		n	59	92	181	27	16	375
		%	15.7%	24.5%	48.3%	7.2%	4.3%	100.0%

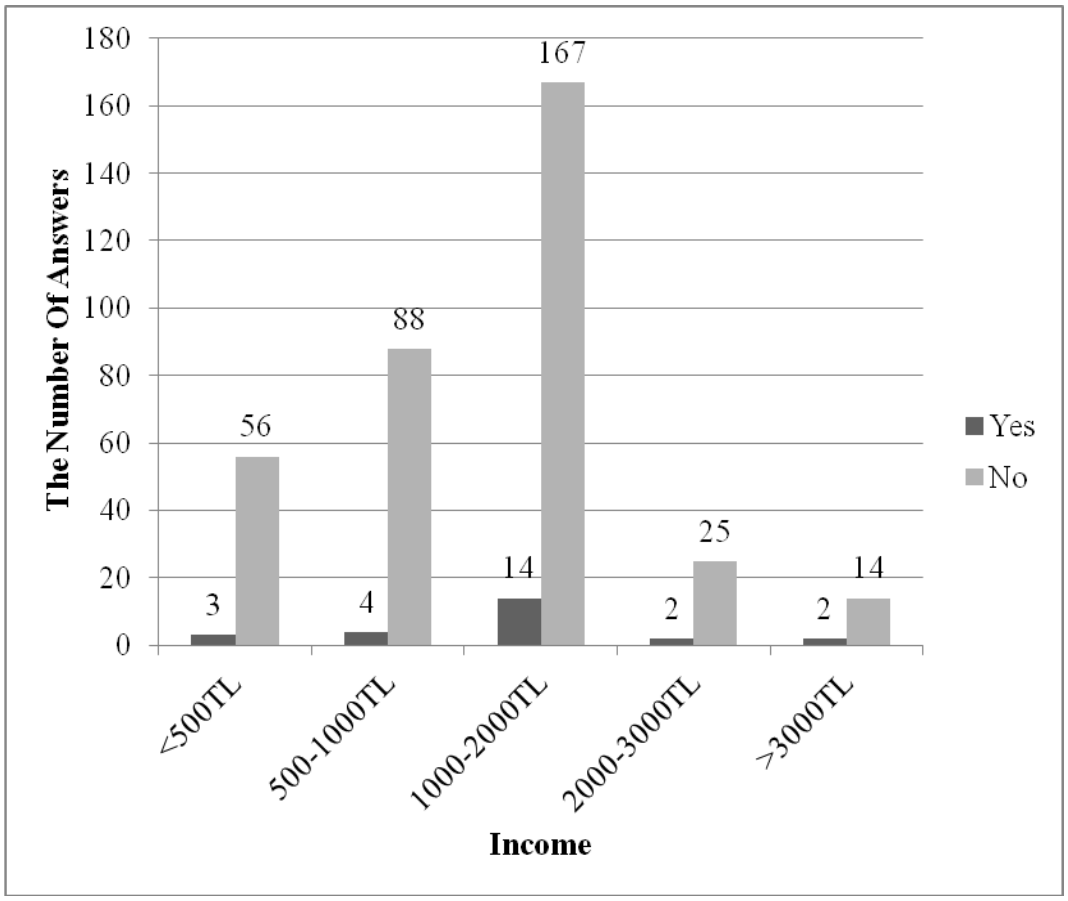

Figure 6.62 Graphical Expression of Table 6.62

6.6 Responses Based On The Participants' Regions

According to participants' regions, distribution of the responses which are provided by participants to question of "Do you think whether water resources have been polluted and consumed very fast in nowadays?" was given in Table 6.63 and Figure 6.63. Majority of participants of survey from all regions answered yes to this question. Marmara and Ege Regions have rich water sources while Güneydoğu Anadolu has water shortage problem. In this region, this problem is tried to remove with huge water projects.

Table 6.63. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "Do you think whether water resources have been polluted and consumed very fast in nowadays?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q1	YES	n	185	82	13	17	22	17	24	360
		%	49.30%	21.86%	3.46%	4.53%	5.86%	4.53%	6.40%	96.00%
	NO	n	6	2	0	1	1	1	4	15
		%	1.60%	0.53%	0.00%	0.27%	0.27%	0.27%	1.06%	4.00%
Total		n	191	122	172	18	23	18	28	375
		%	50.93%	32.50%	45.90%	4.80%	6.13%	4.80%	7.46%	100.00%

According to participants' incomes, distribution of the responses which are provided by participants to question of "Have you taken some precautions to reduce water consumption in daily?" was given in Table 6.64 and Figure 6.64. Majority of participants of survey from all regions answered yes to this question. According to result, public awareness about topic is increasing day by day.

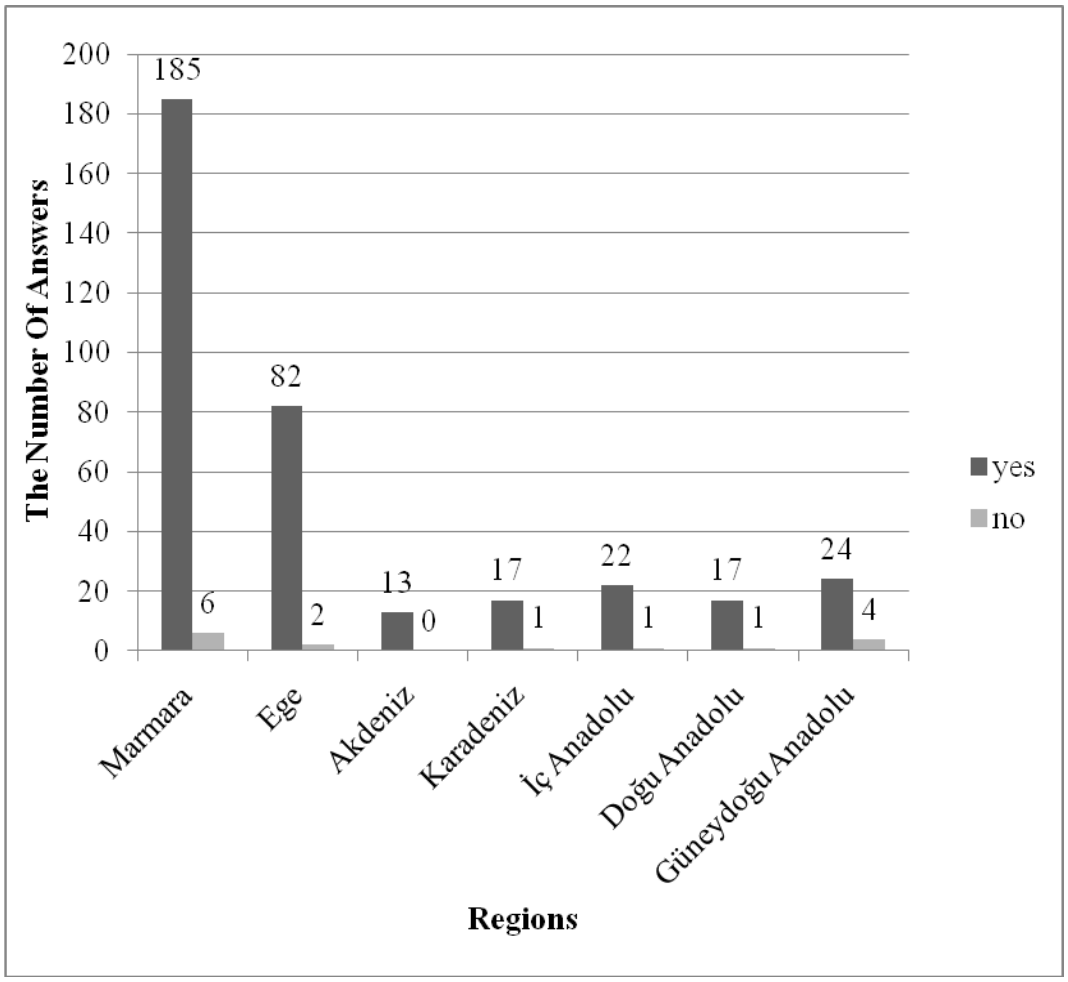

Figure 6.63 Graphical Expression of Table 6.63

Table 6.64. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "Have you taken some precautions to reduce water consumption in daily?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q2	YES	n	127	68	10	15	18	12	14	264
		%	33.90%	18.10%	2.70%	4.00%	4.80%	3.20%	3.70%	70.40%
	NO	n	64	16	3	3	5	6	14	111
		%	17.10%	4.30%	0.80%	0.80%	1.30%	1.60%	3.70%	29.60%
Total		n	191	84	13	18	23	18	28	375
		%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%	100.00%

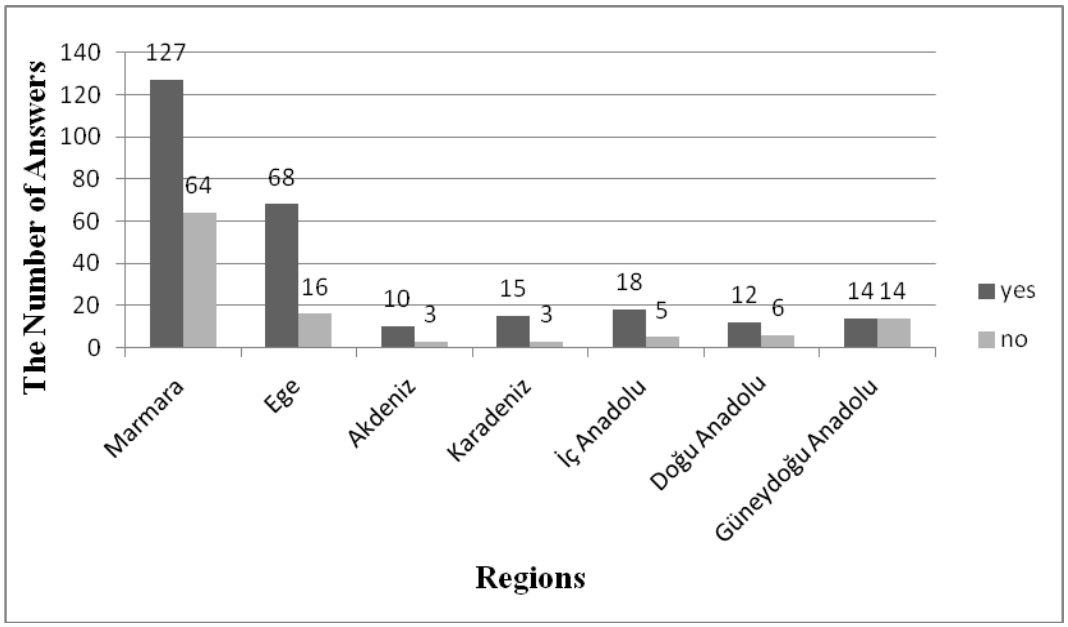

Figure 6.64 Graphical Expression of Table 6.64

According to participants' regions, distribution of the responses which are provided by participants to question of "Do you think whether our country give much more attention on waste/wastewater treatment?" was given in Table 6.65 and Figure 6.65. Majority of participants of survey from all regions answered no to this question

Table 6.65. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "Do you think whether our country give much more attention on waste/wastewater treatment?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q3	YES	n	28	12	1	0	0	1	3	45
		%	7.50%	3.20%	0.30%	0.00%	0.00%	0.30%	0.80%	12.00%
	NO	n	163	72	12	18	23	17	25	330
		%	43.50%	19.20%	3.20%	4.80%	6.10%	4.50%	6.70%	88.00%
Total		n	191	84	13	18	23	18	28	375
		%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%	100.00%

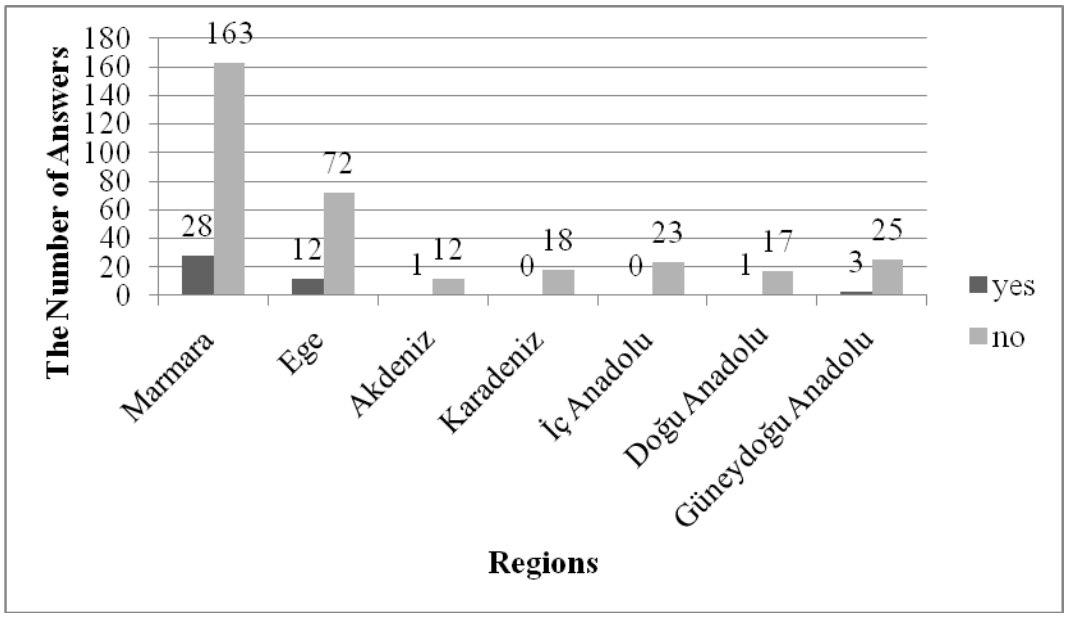

Figure 6.65 Graphical Expression of Table 6.65

According to participants' regions, distribution of the responses which are provided by participants to question of "Do you have any information about water/wastewater treatment systems?" was given in Table 6.66 and Figure 6.66. Majority of participants of survey from all regions answered no to this question.

Table 6.51. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "Do you have any information about water/wastewater treatment systems?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q4	YES	n	75	32	8	4	6	6	14	145
		%	7.50%	3.20%	0.30%	0.00%	0.00%	0.30%	0.80%	12.00%
	NO	n	116	52	5	14	17	12	14	230
		%	43.50%	19.20%	3.20%	4.80%	6.10%	4.50%	6.70%	88.00%
Total		n	191	84	13	18	23	18	28	375
		%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%	100.00%

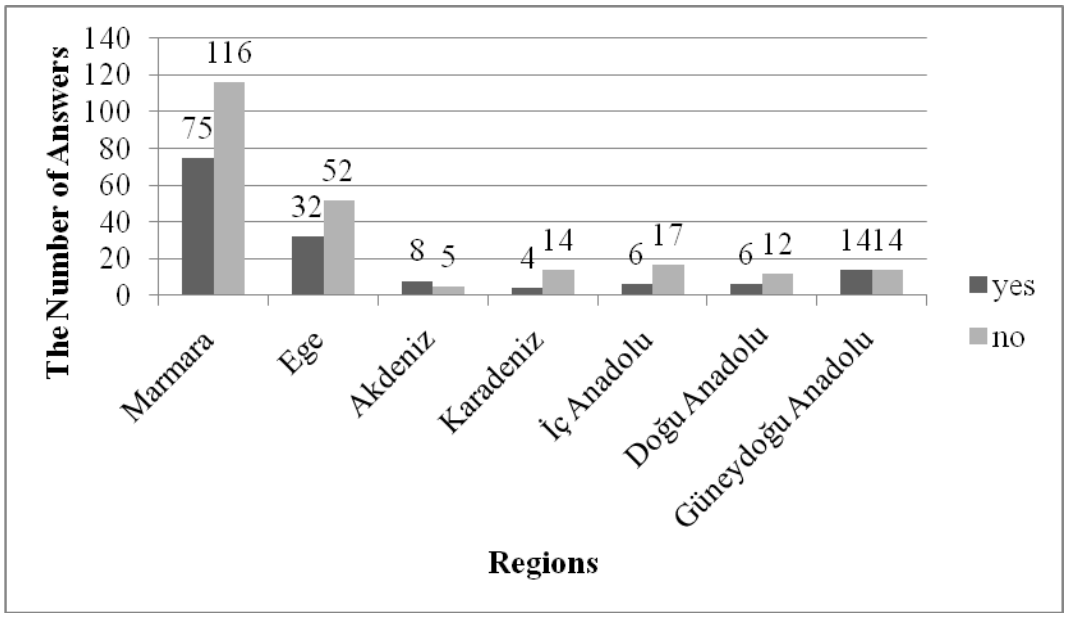

Figure 6.66 Graphical Expression of Table 6.66

According to participants' regions, distribution of the responses which are provided by participants to question of "Are you aware of the treated wastewater reuse applications?" was given in Table 6.67 and Figure 6.67. Majority of participants answered no to this question, especially Marmara Region.

Table 6.67. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "Are you aware of the treated wastewater reuse applications?

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q5	YES	n	87	40	11	7	11	4	15	175
		%	23.20%	10.70%	2.90%	1.90%	2.90%	1.10%	4.00%	46.70%
	NO	n	104	44	2	11	12	14	13	200
		%	27.70%	11.70%	0.50%	3.20%	3.20%	3.70%	3.50%	53.30%
Total		n	191	84	13	18	23	18	28	375
		%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%	100.00%

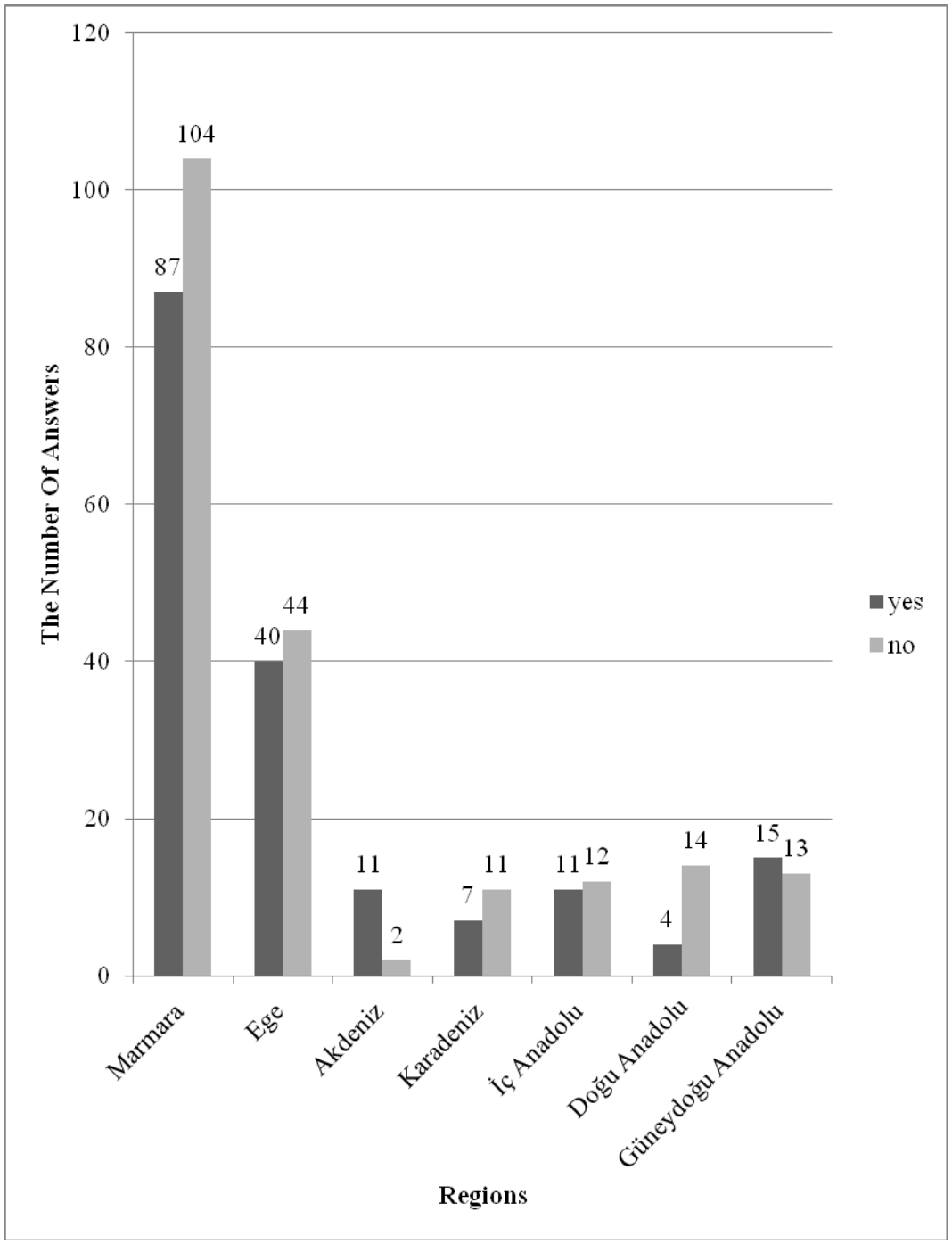

Figure 6.67 Graphical Expression of Table 6.67

According to participants' regions, distribution of the responses which are provided by participants to question of **"**If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below." was given in Table 6.68 and Figure 6.68.

Table 6.68. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below."

			REGIONS							Total
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	
Q6	newspapers, journal, etc.	n	58	33	8	3	6	2	11	121
		%	15,50%	8,80%	2,10%	0,80%	1,60%	0,50%	2,90%	100,00 %
	TV, radio	n	68	26	6	5	12	4	11	132
		%	18,10%	6,90%	1,60%	1,30%	3,20%	1,10%	2,90%	100,00 %
	Internet	n	52	18	6	4	7	2	6	94
		%	13,60%	4,80%	1,60%	1,20%	1,90%	0,50%	1,60%	100,00 %
	Friend /Family	n	36	9	3	1	3	2	3	57
		%	9,60%	2,40%	0,80%	0,30%	0,80%	0,50%	0,80%	100,00 %
	Environmental Groups	n	31	10	3	1	1	2	2	50
		%	8,30%	2,70%	0,80%	0,30%	0,30%	0,50%	0,50%	100,00 %
	University	n	19	4	3	1	0	0	2	29
		%	5,10%	1,10%	0,80%	0,30%	0,00%	0,00%	0,50%	100,00 %
	People Concerned With Environmental Engineering	n	21	8	4	2	2	0	1	38
		%	5,60%	2,10%	1,10%	0,50%	0,50%	0,00%	0,30%	100,00 %
	Other – Please clarify it	n	11	1	0	3	0	0	1	16
		%	2,90%	0,30%	0,00%	0,80%	0,00%	0,00%	0,30%	100,00 %

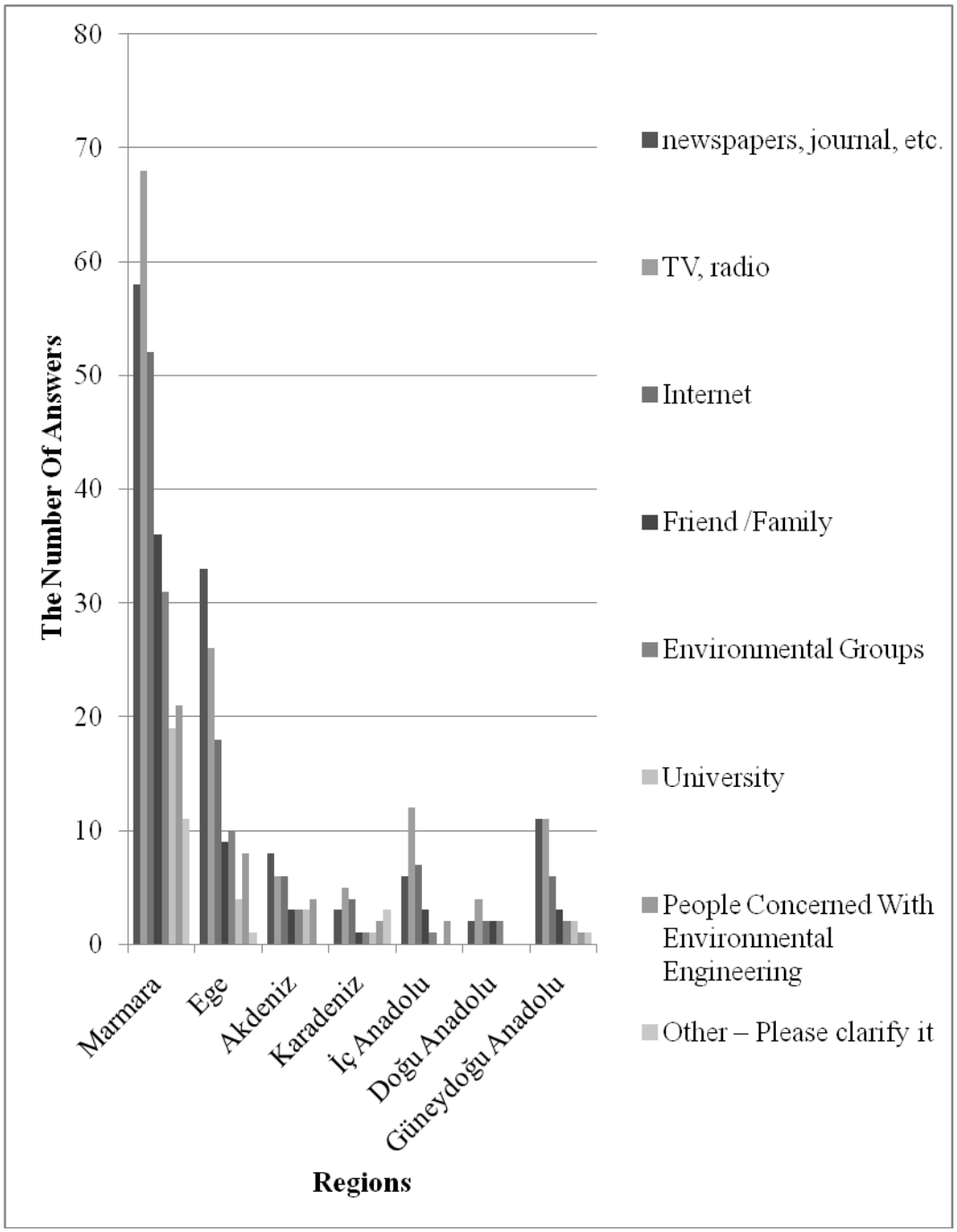

Figure 6.68 Graphical Expression of Table 6.68

According to participants' regions, distribution of the responses which are provided by participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?" was given in Table 6.69 and Figure 6.69. Four regions answered yes to this question.

Table 6.69. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q7	YES	n	103	36	5	11	11	13	15	194
		%	27.50%	9.60%	1.30%	2.90%	2.90%	3.50%	4.00%	51.70%
	NO	n	88	48	8	7	12	5	13	181
		%	23.50%	12.80%	2.10%	1.90%	3.20%	1.30%	3.50%	48.30%
Total		n	191	84	13	18	23	18	28	375
		%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%	100.00%

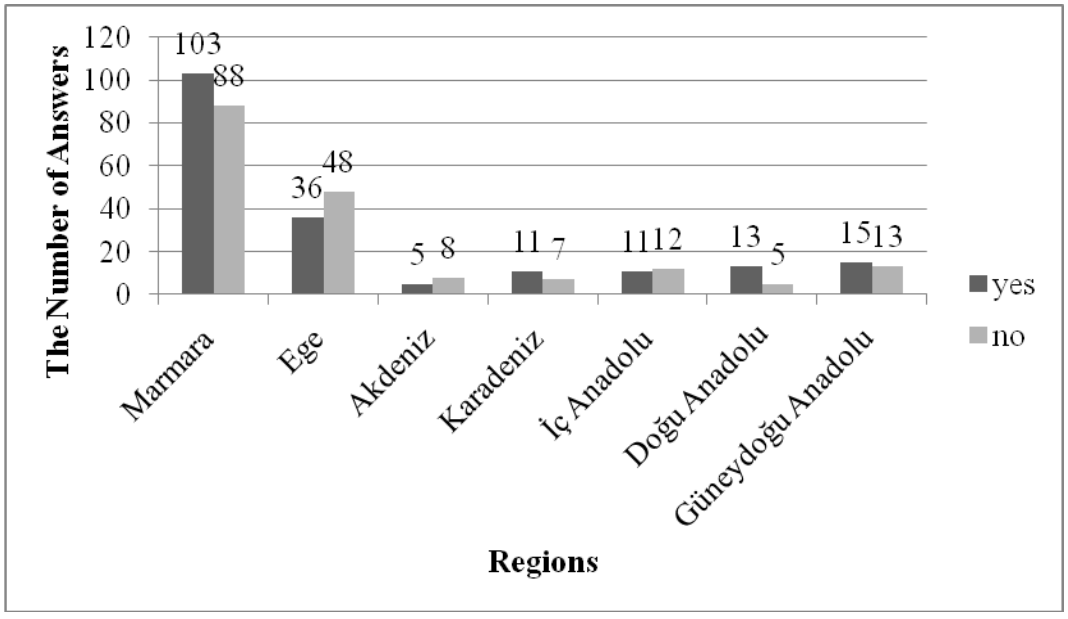

Figure 6.69 Graphical Expression of Table 6.69

According to participants' regions, distribution of the responses which are provided by participants to question of "In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?" was given in Table 6.70 and Figure 6.70. Majority of participants of survey from all regions answered yes to this question.

Table 6.70. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q5	YES	n	126	57	9	12	16	15	19	254
		%	33.60%	15.20%	2.40%	3.20%	4.30%	4.00%	5.10%	67.70%
	NO	n	65	27	4	6	7	3	9	121
		%	17.30%	7.20%	1.10%	1.60%	1.90%	0.80%	2.40%	32.30%
Total		n	191	84	13	18	23	18	28	375
		%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%	100.00%

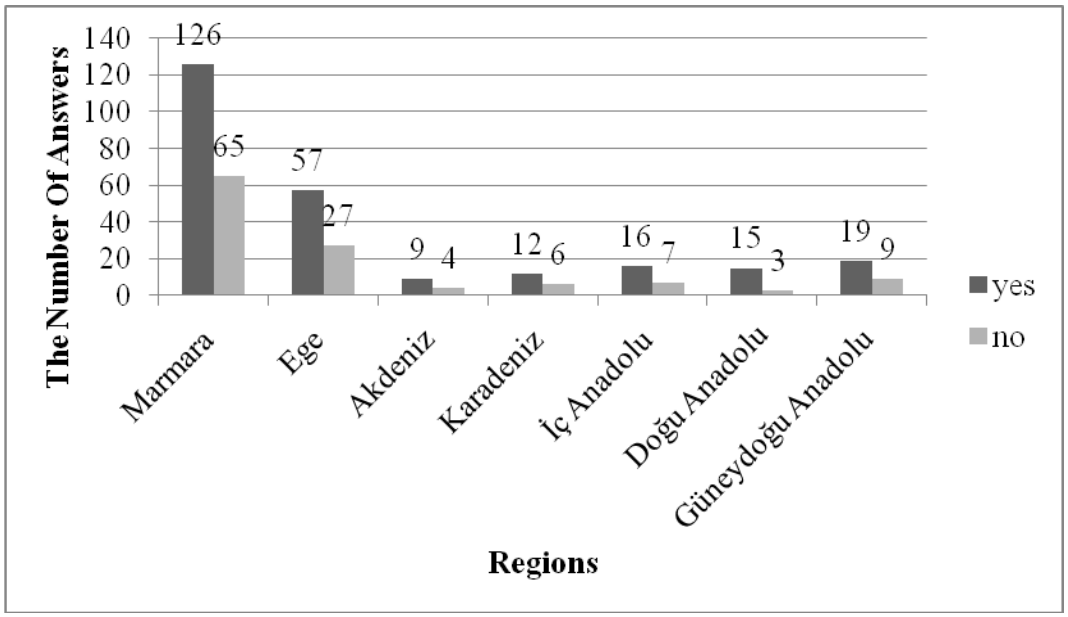

Figure 6.70 Graphical Expression of Table 6.70

According to participants' regions, distribution of the responses which are provided by participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?" was given in Table 6.71 and Figure 6.71.

Table 6.71. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q9	Drinking water	n	49	13	1	0	2	3	3	71
		%	13.10%	3.50%	0.30%	0.00%	0.50%	0.80%	0.80%	100.00%
	Cooking in the home	n	46	8	1	2	4	3	3	67
		%	12.30%	2.10%	0.30%	0.50%	1.10%	0.80%	0.80%	100.00%
	Food preparation in restaurants	n	30	5	1	1	4	3	4	48
		%	8.00%	1.30%	0.30%	0.30%	1.10%	0.80%	1.10%	100.00%
	Preparation of canned vegetables	n	22	4	1	1	1	0	1	30
		%	5.90%	1.10%	0.30%	0.30%	0.30%	0.00%	0.30%	100.00%
	Bathing	n	53	18	4	2	6	3	8	94
		%	14.10%	4.80%	1.10%	0.50%	1.60%	0.80%	2.10%	100.00%
	Swimming pool	n	55	16	3	2	1	6	2	85
		%	14.70%	4.30%	0.80%	0.50%	0.30%	1.60%	0.50%	100.00%
	Laundry	n	91	28	5	5	11	4	10	154
		%	24.30%	7.50%	1.30%	1.30%	2.90%	1.10%	2.70%	100.00%
	Agricultural irrigation	n	90	54	10	7	11	7	19	198
		%	24.00%	14.40%	2.70%	1.90%	2.90%	1.90%	5.10%	100.00%
	Irrigation of golf course	n	95	42	10	9	10	9	12	187
		%	25.30%	11.20%	2.70%	2.40%	2.70%	2.40%	3.20%	100.00%
	Toilet flushing	n	109	63	11	12	14	13	17	239
		%	29.10%	16.80%	2.90%	3.20%	3.70%	3.50%	4.50%	100.00%
	Fire fighting	n	105	56	10	7	12	10	16	216
		%	28.00%	14.90%	2.70%	1.90%	3.20%	2.70%	4.30%	100.00%
	Snow generation	n	70	30	8	6	9	7	5	135
		%	18.70%	8.00%	2.10%	1.60%	2.40%	1.90%	1.30%	100.00%
	Construction	n	111	65	11	6	14	12	16	235
		%	29.60%	17.30%	2.90%	1.60%	3.70%	3.20%	4.30%	100.00%
	Road washing	n	115	61	12	8	13	12	15	236
		%	30.70%	16.30%	3.20%	2.10%	3.50%	3.20%	4.00%	100.00%
	Irrigation of park	n	105	49	9	10	13	13	13	212
		%	28.00%	13.10%	2.40%	2.70%	3.50%	3.50%	3.50%	100.00%
	Industry	n	104	47	10	9	11	9	11	201
		%	27.70%	12.50%	2.70%	2.40%	2.90%	2.40%	2.90%	100.00%

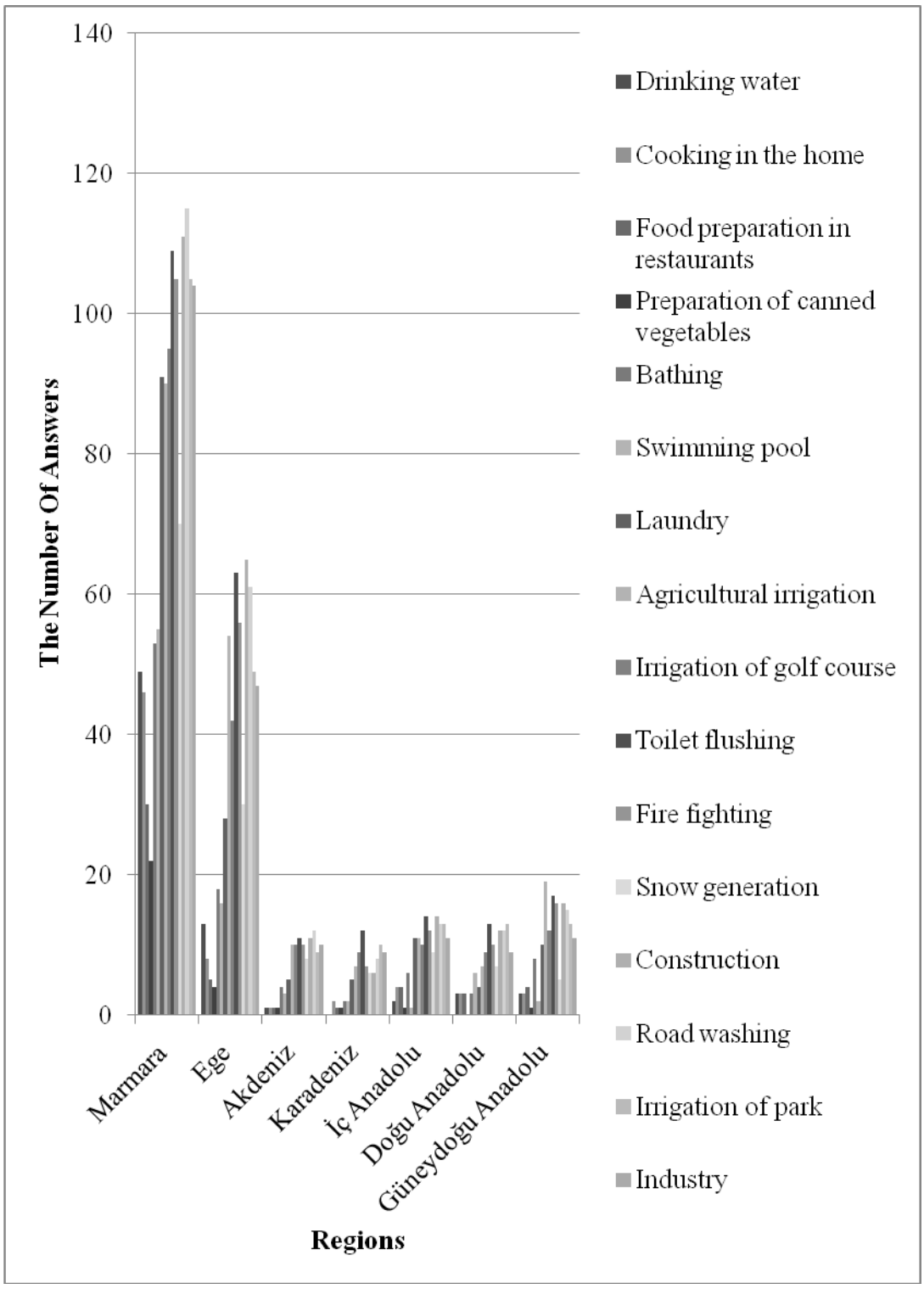

Figure 6.71 Graphical Expression of Table 6.71

According to participants' regions, distribution of the responses which are provided by participants to question of "Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below?" was given in Table 6.72 and Figure 6.72.

Table 6.72. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q10	Pathogens	n	145	54	12	13	15	13	23	275
		%	38.70%	14.40 %	3.20%	3.50%	4.00%	3.50%	6.10%	100.00 %
	Toxic substances	n	110	40	8	4	8	12	23	205
		%	29.30%	10.70 %	2.10%	1.10%	2.10%	3.20%	6.10%	100.00 %
	Doubt about wastewater treatment methods	n	108	33	10	6	13	11	13	194
		%	28.80%	8.80%	2.70%	1.60%	3.50%	2.90%	3.50%	100.00 %
	Long term unknown health effects	n	106	37	9	8	16	7	16	199
		%	28.30%	9.90%	2.40%	2.10%	4.30%	1.90%	4.30%	100.00 %
	Other – Please clarify it	n	16	5	2	1	2	2	0	28
		%	4.30%	1.30%	0.50%	0.30%	0.50%	0.50%	0.00%	100.00 %

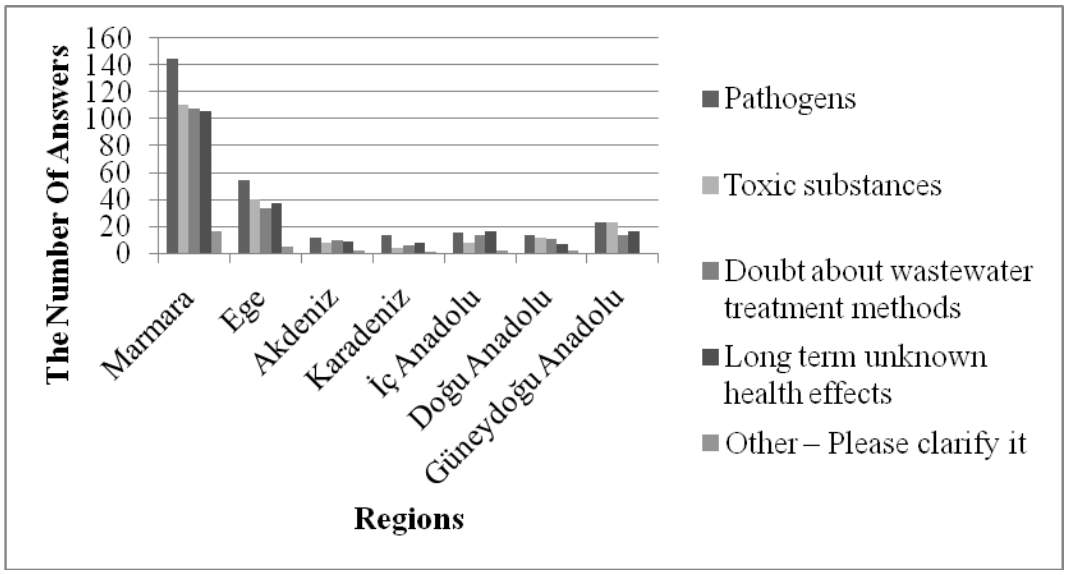

Figure 6.72 Graphical Expression of Table 6.72

According to participants' regions, distribution of the responses which are provided by participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct" was given in Table 6.73 and Figure 6.73. Majority of participants of survey from all regions answered yes to this question.

Table 6.73. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q11	YES	n	130	57	12	13	16	15	20	263
		%	34.70%	15.20%	3.20%	3.50%	4.30%	4.00%	5.30%	70.10%
	NO	n	61	27	1	5	7	3	8	112
		%	16.30%	7.20%	0.30%	1.30%	1.90%	0.80%	2.10%	29.90%
Total		n	191	84	13	18	23	18	28	375
		%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%	100.00%

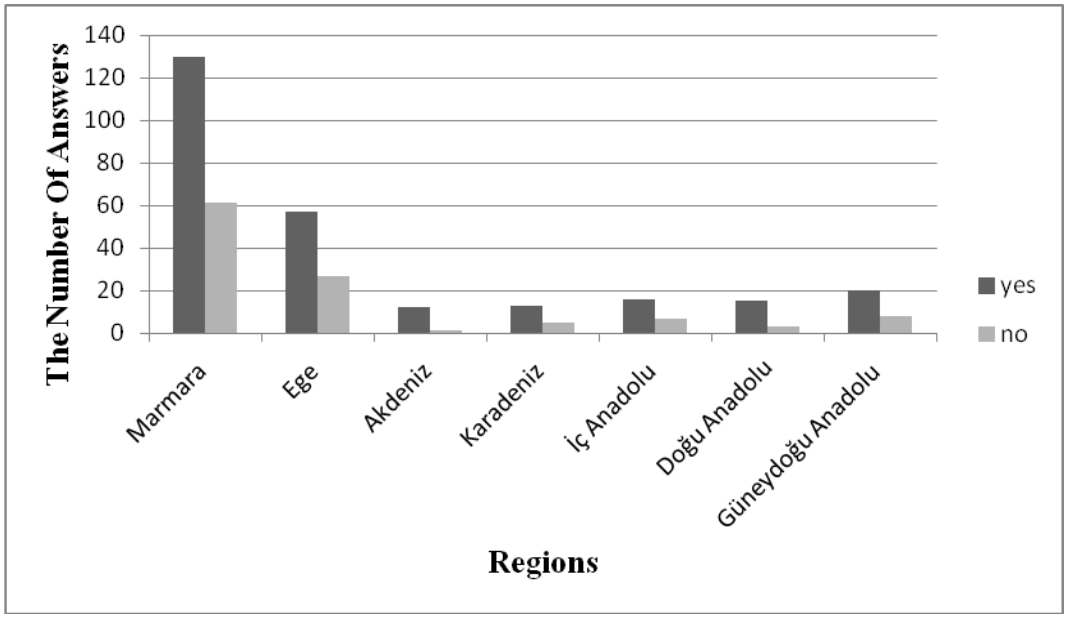

Figure 6.73 Graphical Expression of Table 6.73

According to participants' incomes, distribution of the responses which are provided by participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?" was given in Table 6.74 and Figure 6.74. Majority of participants yes to this question.

Table 6.74. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q12	YES	n	97	41	5	12	13	9	15	192
		%	25.90%	10.90%	1.30%	3.20%	3.50%	2.40%	4.00%	51.20%
	NO	n	94	43	8	6	10	9	13	183
		%	25.10%	11.50%	2.10%	1.60%	2.70%	2.40%	3.50%	48.80%
Total		n	191	84	13	18	23	18	28	375

	%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%	100.00%

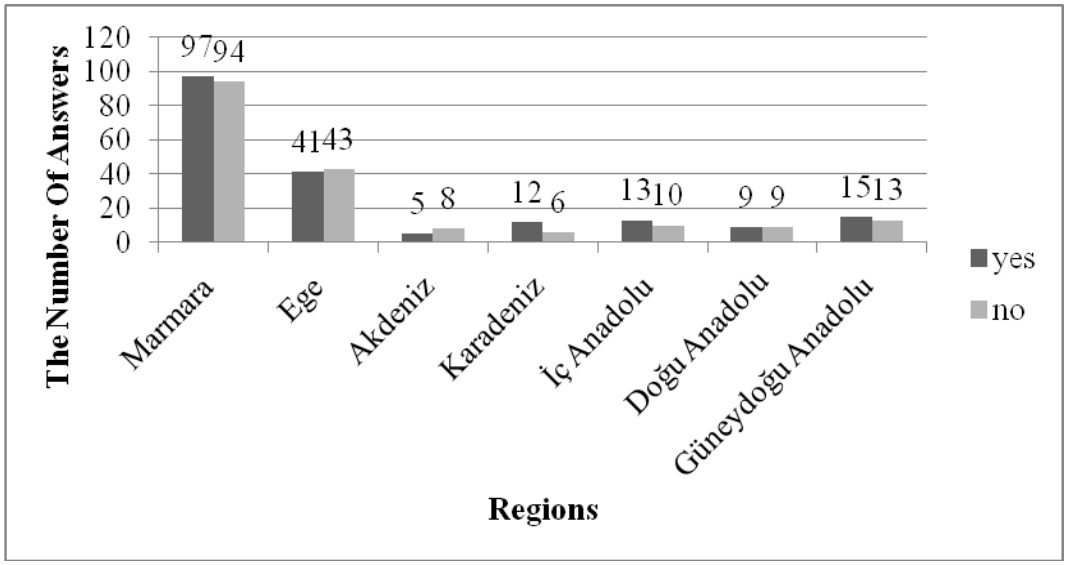

Figure 6.74 Graphical Expression of Table 6.74

According to participants' regions, distribution of the responses which are provided by participants to question of "What types of wastewater you can reuse after following required wastewater treatment processes?" was given in Table 6.75 and Figure 6.75. Noted that domestic wastewater and none selections of this question were the higher two responses given by most of survey participants.

Table 6.75. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "What types of wastewater you can reuse after following required wastewater treatment processes?"

			REGIONS							Total
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	
Q13	Domestic wastewater	n	99	32	7	10	10	8	10	176
		%	26.40%	8.50%	1.90%	2.70%	2.70%	2.70%	2.70%	100.00%
	Industrial wastewater	n	12	1	1	0	3	1	3	21
		%	3.20%	0.30%	0.30%	0.00%	0.80%	0.30%	0.80%	100.00%
	Both of them	n	20	6	1	2	1	4	5	39
		%	5.30%	1.60%	0.30%	0.50%	0.30%	1.10%	1.30%	100.00%
	None of them	n	76	45	4	6	9	7	13	160
		%	20.30%	12.00%	1.10%	1.60%	2.40%	1.90%	3.50%	100.00%

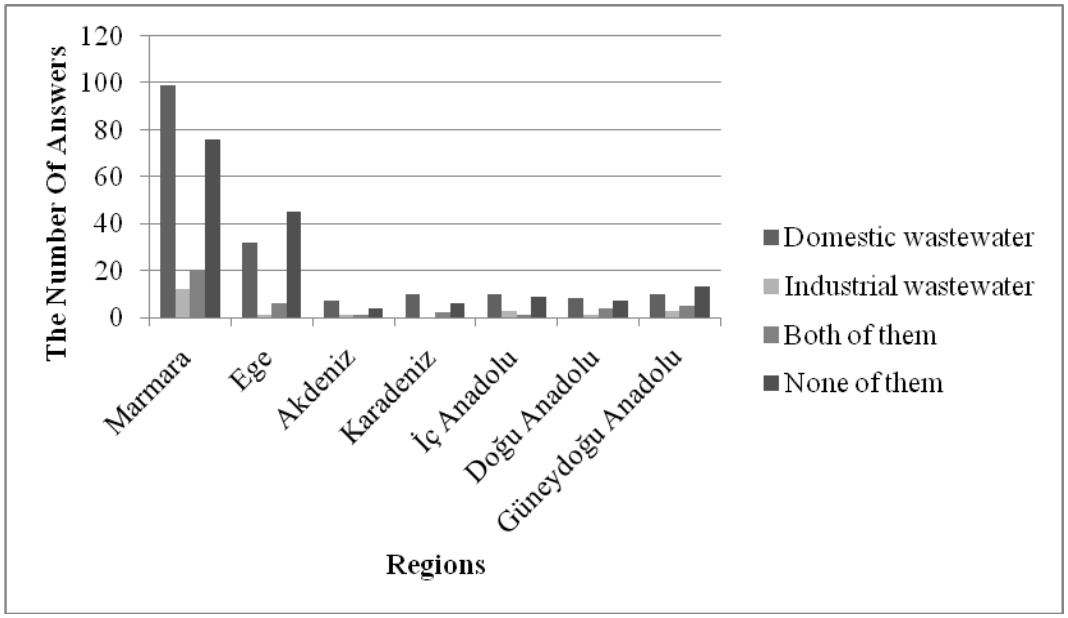

Figure 6.75 Graphical Expression of Table 6.75

According to participants' regions, distribution of the responses which are provided by participants to question of "Do you think that our public is ready for those applications?" was given in Table 6.76 and Figure 6.76. Majority of participants of survey from all regions answered no to this question.

Table 6.76. Based on participants' incomes, the distribution of the responses which are provided by survey participants to question of "Do you think that our public is ready for those applications?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q14	YES	n	27	7	3	7	0	5	5	54
		%	7.20%	1.90%	0.80%	1.90%	0.00%	1.30%	1.30%	14.40%
	NO	n	164	77	10	11	23	13	23	321
		%	43.70%	20.50%	2.70%	2.90%	6.10%	3.50%	6.10%	85.60%
Total		n	191	84	13	18	23	18	28	375
		%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%	100.00%

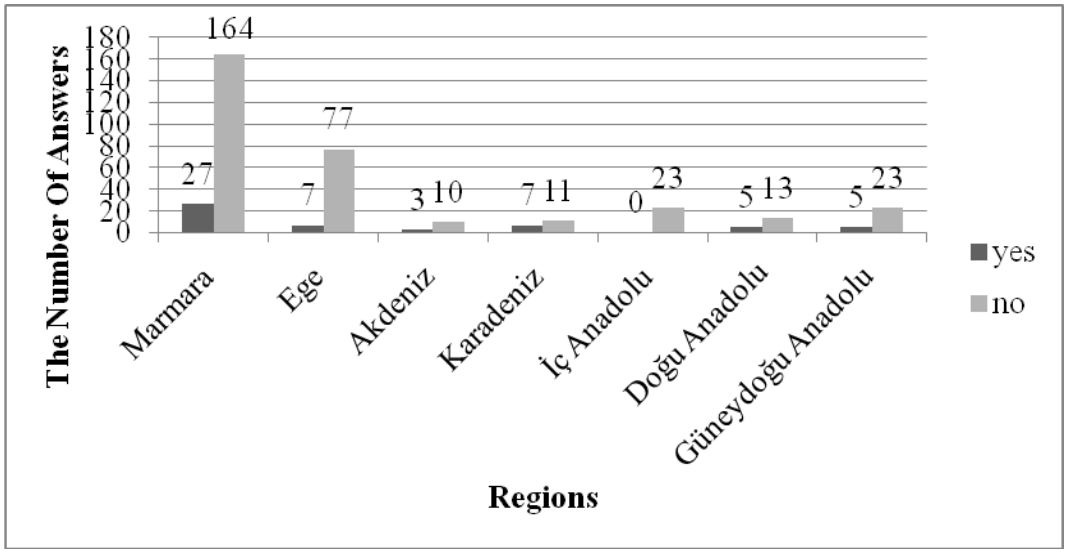

Figure 6.76 Graphical Expression of Table 6.76

According to participants' regions, distribution of the responses which are provided by participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public?" was given in Table 6.77 and Figure 6.77. Majority of participants of survey from all regions answered no to this question.

Table 6.77. Based on participants' regions, the distribution of the responses which are provided by survey participants to question of "Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public?"

			REGIONS							
			Marmara Region	Ege Region	Akdeniz Region	Karadeniz Region	İç Anadolu Region	Doğu Anadolu Region	Güneydoğu Anadolu Region	Total
Q15	YES	n	16	6	1	1	0	0	1	25
		%	4.30%	1.60%	0.30%	0.30%	0.00%	0.00%	0.30%	6.70%
	NO	n	175	78	12	17	23	18	27	350
		%	46.70%	20.80%	3.20%	4.50%	6.10%	4.80%	7.20%	93.30%
Total		n	191	191	84	13	18	23	18	28

	%	50.90%	50.90%	22.40%	3.50%	4.80%	6.10%	4.80%	7.50%

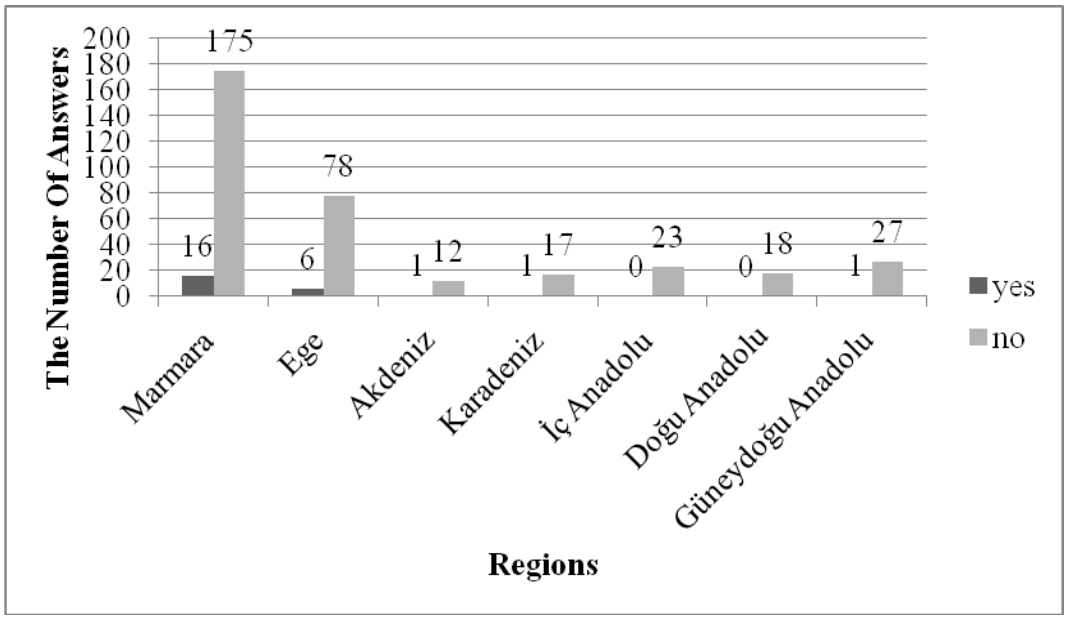

Figure 6.77 Graphical Expression of Table 6.77

CHAPTER SEVEN
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In this study, survey studies were carried out in order to determine the public opinion on water reuse applications in Turkey. Depending on the survey studies, the following results were obtained:

- The study showed that both women and men still have concerns about usage of wastewater. Especially in the application of the use of treated wastewater as drinking water, these concerns are increased.
- Results showed the public is most concerned about health risks of recycled water. In addition, the participants want to know about health implications and food safety of recycled water when it is used for irrigating food crops. Most feared subject in public opinion about this issue is pathogen and harmful microorganisms will be in water even after treatment process.
- The cost of treating water is another issue the public worry about.
- Both genders felt that wastewater reuse for applications not involving close personal contact (such as firefighting, car washing, lawn irrigation and agricultural uses) was acceptable.
- To turn the common thoughts of community about this issue to positive, public awareness in various ways is crucial.
- In order to determine the general policies and ways to increase public interest on this topic, studies like this can become very useful. For example, informative programs can be broadcasted on television; however, the attention-grabbing content and the times at which these programs are broadcasted will increase the success rate of these programs. In addition, agencies can be established that provide information on the subject. Agencies can provide the necessary information either over the phone or via meetings. Call centers can be established to achieve such a purpose. Studies that inform the public about how safe treatment systems are, and

persuade them that they are safe by eliminating their doubts, will be successful.

- Scientists should be a part of the informing procedure and the training period.
- The education programs concerned with this issue was increased; the application of wastewater reuse in next year's will absolutely be successful.
- It should not be forgotten that small things make a huge difference in people's lives because water is the source of life and our reason for living.
- The results of the survey does not change according to variables such as participants ages, genders, educations, incomes.

5.2 Recommendations

In this study, 375 surveys could be collected. In order to obtain more detailed knowledge about this mention, more surveys should have been distributed all over the regions.

REFERENCES

Bonomo, L., Nurizzo, C., & Rolle, E. (1999). Advanced wastewater treatment and reuse: related problems and perspectives in Italy. *Water Science & Technology, 40*, (4-5), 21-28

Bruvold, W.H.(1988). Obtaining public support for innovative reuse projects. *Water reuse symposium 3*, San Diego Ca, 122-132

Büyükkamacı, N.(2009) . *Efficient Water Management Component: Re-Use*. October 25, 2011, from, http://www.imoizmir.org.tr/UserFiles/File/Izmir-Kent-Sempozyumu/bildiriler/bildiriler/200833.pdf

Dolnicar, S., Saunders, C. (2005). *Marketing Recycled Water Review of Past Studies and Research Agenda.* M.H. Muston (Ed.), School of Management & Marketing, The University of Wollongong, NSW, 2522, Australia. ISBN 1 74128 082 6

DuBose, K. (2009). A survey of public opinion for water reuse in Corvillas, Oregon: Attitudes, Values and Preferences. *Oregon State University Master of Publiv Policiy Program.*

EPA Manual. Guidelines for Water Reuse, USA. EPA/625/R-04/108, 2004.

Friedler, E., & Lahav, O. (2006). Centralised urban wastewater reuse: what is the public attitude?. *Water Science & Technology, 54* (6-7), 423-430.

Health Impact of Water Pollution. (n.d.). Retrieved August 10, 2011 from http://edugreen.teri.res.in/explore/water/health.htm

ITASHY (2005). *Insani Tüketim Amaçlı Sular Hakkında Yönetmelik.* Official Gazette dated 17/02/2005, No.25730, Ankara.

Kantanoleon, N., Zampetakis, L. & Manios, T. (2007).*Public perspective towards wastewater reuse in a medium size, seaside, Mediterranean city: A pilot survey, Ressources, Conservation and Recycling 50*:282-292.

Kennedy, L., & Tsuchihashi, R. (2005). Is water reuse sustaınable factors affectıng ıts sustaınabılıty. *The Arabian Journal for Science and Engineering, Volume 30, Number 2C.*

Khouri, N., Kalbermatten, J. & Bartone, C. (1994*). The Reuse of Wastewater in Agriculture: A Guide for Planners.* Washington: The International Bank for Reconstruction and Development

Kocataş, A.(2003*). Ecology And Environmental Biology* (7th ed.). İzmir: Aegean University Press.

Liu, J. (2006). *Public perceptions of water reuse In Santa Clara County, California*. A thesis presented to the faculty of the department of environmental studies San Jose State University, UMI Number:1438577

Mendoza-Espinosa, L., Victoria Orozco-BorbOn M. & Silva-Nava, P. (2004). Quality assessment of reclaimed water for its possible use for crop irrigation and aquifer recharge in Ensenada, Baja California, Mexico. *Water Science & Technology, 50* (2), (4-5), 285-291

McKenzie, (2005). *Guidelines for Water Reuse.*

Groundwater, (n.d.). Retrieved September 7, 2011 from http://www.aquaearth.co.za/index.php?option=com_content&view=article&id=125&Itemid=384

Office of environment & heritage. (n.d.). Retrieved September 7, 2011 from http://www.environment.nsw.gov.au/

Özalp, N. (2010). *Applıcatıon of ultrafıltratıon to anorganızed ındustrıal dıstrıct wastewater treatment plant effluent for water reuse*. Dokuz Eylül University graduate school of natural and applıed scıences. Retrieved September 1, 2011, from http://www.fbe.deu.edu.tr/

Pallant, J.(2007). *SPSS*. NY:McGraw- Hill.

Po, M., Kaercher, D. & Blair, E. (2003). *Lıterature revıew of factors Influencıng publıc perceptıons of water reuse.* Technical Report 54/03

Robinson, K., Robinson,C. & Hawkins, S. (2005). Assessment of public perception regarding wastewater reuse. *Water Science & Technology*, *5*, (1), 59-65

Rowe D. R., *Handbook of Wastewater Reclamation and Reuse,* ISBN: 087371671X, 1995, US Water News.

SPSS 15.0 data analysis methods. (n.d.). Retrieved September 9, 2010, from www.istatistikmerkezi.com

Survey Preparation Guide. (n.d.). Retrieved August 28, 2011 from http://yunus.hacettepe.edu.tr/~tonta/courses/spring2009/bby606/Anket_Hazirlama_Kilavuzu.pdf

Şengül, F., & Küçükgül, E. (2002). *Physical-Chemical Unit Operations And Processes In Environmental Engineering* (5th ed.). İzmir: Dokuz Eylül University Faculty Of Engineering Printing Unit.

Şengül, F., & Müezzinoğlu, A. (2001). *Environmental Chemistry* (4th ed.). İzmir: Dokuz Eylül University Faculty Of Engineering Printing Unit

Tanik, A., Ekdal, A., Germirli Babuna, F.& Orhon, D. (2005). Recent practices on wastewater reuse in Turkey. *Water Science & Technology, 51* (11), 141-149

Tanik, A., Ekdal, A., Germirli Babuna, F.& Orhon, D. (2005). Urban Wastewater Management in the United States: Past, Present, and Future. *Journal of Urban Technology, 7* (3), 33-62

The Limitiaco Consulting Group, (2005). *2004 Hawaii Water Reuse Survey and Report.*

The United Nations World Water Development Report3, (2009).

TUIK, Turkish Statistical Institute (2009).

TUSIAD. (2008). Türkiyede su yönrtimi sorunlar ve öneriler. T/2008-09/469. Retrieved August, 23, 2011 from http://www.gapsel.org/condocs//ekutuphane/su_yonetimi.pdf

Türkman, A.(2000). *For A Livable Environment*. İzmir: Dokuz Eylül Publications.

Tyson, J.M.(2002). Perceptions of sewage sludge. *Water Science & Technology, 46,* (4-5), 373-380

UNEP, Water and Wastewater Reuse. *An Environmentally Sound Approach for Sustainable Urban Water Management* , (1997).

Wastewater Reuse Conserves Water And Protects Waterways, (2005). Retrieved October 19, 2010, from www.nesc.wvu.edu.

Wastewater Reuse In The Mediterranean Basin- Problems And Challenges, (n.d.). Retrieved September 13, 2011, from http://www.uest.gr.

Water. (n.d.). Retrieved august 29, 2011 from www.dsi.gov.tr

Water Cycle. (n.d.). Retrieved August 15, 2011 from (http://www.enchantedlearning.com/geology/label/watercycle/labelanswers.shtml)

Water Framework Directive (2000/60/EC), *Marine Strategy Framework Directive, The Framework Directive on Waste* (2006/12/EC)

Water Quality. (n.d.). Retrieved August 15, 2011 from http://www.environment.nsw.gov.au/water/waterqual.htm

Wastewater Reuse. (n.d.). Retrieved August 16, 2011 from (http://www.quora.com/Wastewater)

World Business Council for Sustaineble Development. Water version 2. *Facts & trends.* (n.d.). Retrieved September 2, 2011 from (http://www.wbcsd.org/DocRoot/lD1tMGiLZ7NL9mBOL2aQ/WaterFactsAndTrends-Update.pdf

World Health Organization (2007). Guidelines for Drinking-water Quality (3rd ed.). Geneva: WHO Press.

APPENDIX

ARITILMIŞ SULARIN YENİDEN KULLANIM UYGULAMALARINA HALKIN TEPKİSİ ANKETİ
PUBLIC OPINION ON WATER REUSE APPLICATIONS QUESTIONNAIRE

Yaşınız (Age) :

□ 10-15 □ 16-25 □ 26-40 □ 40-55 □ 55 ve üzeri (55 or over)

Cinsiyetiniz (Gender):

□ Kadın (Female) □ Erkek (Male)

Eğitim Durumunuz (Education):

□ İlköğretim (Primary Education)
□ Lise (High School)
□ Üniversite (University)
□ Yüksek Lisans (M.Sc)
□ Doktora (Ph.D.)

Bulunduğunuz Şehir (Your City):

İsteğe bağlı olarak aylık gelir seviyenizin düzeyini işaretleyiniz (Optional-Please remark your income range):

□ <500 TL (< 350 $) □ 500-1000 TL (350-700 $) □ 1000-2000 TL (700-1400 $) □ 2000-3000 TL (1400-2000 $) □ >3000 TL (>2000 $)

1. **Günümüzde su kaynaklarının hızla kirlenmekte ve tükenmekte olduğunu düşünüyor musunuz?** (Do you think whether water resources have been polluted and consumed very fast in nowadays?)

□ Evet (Yes)
□ Hayır (No)

2. **Günlük hayatınızda su tüketimini azaltmak için bazı önlemler aldınız mı?** (Have you taken some precautions to reduce water consumption in daily life?)

□ Evet (Yes)
□ Hayır (No)

3. **Ülkemizde suyun arıtılması ile ilgili konulara gereken önemin verildiğini düşünüyor musunuz?** (Do you think whether our country give much more attention on water/wastewater treatment?)

- Evet (Yes)
- Hayır (No)

4. **Atıksuların arıtılması (temizlenmesi) için kullanılan arıtma sistemleri ile ilgili bilginiz var mı?** (Do you have any information about water/wastewater treatment systems?)

- Evet (Yes)
- Hayır (No)

5. **Arıtma tesisinden çıkan arıtılmış suların tekrar kullanılması uygulamalarından haberdar mısınız?** (Are you aware of the treated wastewater reuse applications?)

- Evet (Yes)
- Hayır (No)

6. **Eğer yukarıdaki 5. soruya evet cevabı verdiyseniz, bu bilgileri hangi kaynaklardan elde ettiğinizi lütfen belirtin. Aşağıdaki seçeneklerden bir veya daha fazlasını işaretleyebilirsiniz.** (If your answer for the above question (Question 5) is yes, please explain how you learned them. You can choose one or more items given below.)

- Yazılı basın (newspapers, journal, etc.)
- Televizyon, radyo (TV, radio)
- İnternet (Internet)
- Arkadaş/aile (Friend /Family)
- Çevresel gruplar (Environmental Groups)
- Üniversite (University)
- Çevre mühendisliği ile ilgili insanlar (People Concerned With Environmental Engineering)
- Diğer – Lütfen belirtiniz (Other – Please clarify it)

7. **Arıtılmış suyun kalitesinin uygun olduğu garanti edilirse, içme suyu olarak kullanır mıydınız?** (If the quality of treated wastewater is certified as best quality, can you use this water for drinking purposes?)

- Evet (Yes)
- Hayır (No)

8. **Arıtılmış sularla sulanmış oyun parklarındaki çimlerde çocukların oynaması sizce güvenilir midir?** (In the case of treated wastewater reuse for grass irrigation, is it appropriate that the children can play on the grass?)

- Evet (Yes)
- Hayır (No)

9. **Aşağıda arıtılmış suların yeniden kullanım alternatiflerinden örnekler verilmiştir. Size göre hangi alternatif veya alternatifler daha uygulanabilirdir?** (According to wastewater reuse alternatives given below; which one or ones are more applicable in your opinion?)

- İçme suyu olarak kullanılması (Drinking water)
- Evde yemek yapımında (Cooking in the home)
- Restoranlarda (Food preparation in restaurants)
- Konservelerde (Preparation of canned vegetables)
- Vücut temizliğinde (Bathing)
- Yüzme havuzlarında (Swimming pool)
- Çamaşır yıkama (Laundry)
- Tarımsal Sulama (Agricultural irrigation)
- Golf sahalarının sulanmasında (Irrigation of golf course)
- Tuvalet sistemlerinde (Toilet flushing)
- Yangın söndürme cihazlarında (Fire fighting)
- Yapay kar üretim makinelerinde (Snow generation)
- İnşaatlarda (Construction)
- Yolların yıkanması (Road washing)
- Parkların sulanması (Irrigation of park)
- Sanayide (Industry)

10. **Arıtılmış suların kullanılması konusunda sizi endişelendiren durumlar aşağıdakilerden hangileridir?** (Do you have any suspicion about reuse of treated wastewaters? If yes, you can choose one or more items below.)

- Suyun içinde hastalık yapan mikroorganizmaların bulunma olasılığı (Pathogens)
- Suyun içinde zehirli madde bulunma olasılığı (Toxic substances)
- Arıtma işlemlerini güvenilir bulmama (Doubt about wastewater treatment methods)
- Uzun dönemde bilinmeyen sağlık sorunlarının olabileceği düşüncesi (Long term unknown health effects)
- Diğer – Lütfen belirtiniz (Other – Please clarify it)

11. **Ülkemizde tarım en önemli gelir kaynaklarından biridir. Su kıtlığı olması durumunda, arıtılmış suların tarımsal sulama amaçlı olarak kullanılmasını doğru buluyor musunuz?** (Agriculture is one of the significant economical resources in our country. In your opinion, in the case of water shortcomings, reuse of treated wastewater for agricultural irrigation purposes is correct?)

- Evet (Yes)
- Hayır (No)

12. **Arıtılmış sularla sulanan sebze ve meyvelerde sağlığı tehdit edecek durumlar olduğunu düşünüyor musunuz?** (In your opinion, are there any health risks if the fruits and vegetables are irrigated by reclaimed water?)

- Evet (Yes)
- Hayır (No)

13. **Hangi tip atıksuyu arıtıldıktan sonra yeniden kullanmayı düşünebilirsiniz?** (What types of wastewater you can reuse after following required wastewater treatment processes)

- Evsel atıksu (Domestic wastewater)
- Endüstriyel atıksu (Industrial wastewater)
- Her ikisi de (Both of them)
- Hiçbiri (None of them)

14. **Halkın bu konuyla ilgili uygulamalara hazır olduğunu düşünüyor musunuz?** (Do you think that our public is ready for those applications?)

- Evet (Yes)
- Hayır (No)

15. **Ülkemizde su ve atıksu yönetiminden sorumlu olan kurum/kuruluşların, arıtılmış atıksuların yeniden kullanılması ile ilgili olarak, halka yeterince bilgi verdiğini düşünüyor musunuz?** (Do you think that the authorities which are responsible for water/wastewater management transfer enough information on the reusability of treated wastewater to the public)

- Evet (Yes)
- Hayır (No)