iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** I **Month of publication:** January 2017

DOI:

www.ijraset.com

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Volume 5 Issue I, January 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Water Consumption Awareness of People in City of Isparta in Turkey

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Abstract: ***This study was conducted in the Isparta region; it aims to determine water use of people on the basis of families and individuals, quantities of water consumption, their attitudes and behaviours towards water saving methods and factors influencing them and their behaviours and attitudes towards water consumption. In the context of this study, a questionnaire was conducted with 400 individuals according to different ages, neighbourhoods and occupational groups on the voluntarily basis in 2016. The first chapter of the questionnaire included questions about demographics and socio-economic conditions of individuals and the second one checked whether they know about water consumption, water saving and the importance of water. Collected data were analysed through Chi-Square analysis and education levels the study attempted to identify income status and differences in water consumption according to occupational and age groups. As a result of the study, it was found out that 76,3% of individuals use water saving methods. 73% of individuals believe that water saving does not decrease quality of life. It is observed that increase in education and income levels cause individuals to pay more attention to water problems. Chi-Square test did not demonstrate statistically significant difference between water consumption quantity of individuals and gender groups; whereas statistically significant difference (p<0.001) was identified according to age and occupational groups. The analysis of behaviours and attitudes of families concerning water consumption is important in order to increase efficiency and maintenance of water consumption. For this reason, several suggestions were assessed in the context of this study.***
Keywords: Isparta, local people, water consumption, water saving, consumption awareness

I. INTRODUCTION

Water is one of the vital resources for all living things. Although about 80% of the earth is water, the quantity of potable water is very limited. Only 2,5% of water on earth is fresh water. This ratio indicates that total accessible fresh water quantity for humans is very little and limited on earth [1,2]. Turkey is poor in terms of water falling water available per person. Due to this situation and population growth and global warming, it is obvious that the quantity of potable water would be more important and valuable. In this context, protection, conscious consumption and management of current water resources are important. Thus, nowadays billions of people are unable to access water of desired quality and quantity. This figure is increasing day by day. These people, majority of which include children and the elderly, suffer from water-associated diseases [3] or perish due to lack of access to safe and clean water. For example, current trends indicate that approximately two third of the world population will face serious water scarcity or drought [4]. These phenomena and contamination of current surface and underground waters, consumption, insufficient water supply network, competition in water use and frequent droughts call for development of alternative plans in an integrative policy for management of water resources [5]. One of these plans is to develop water consumption consciousness and awareness through determination of factors that affect water consumption of families and individuals.

Recently several studies aim to point out the significance of attitudes and behaviours of families and individuals towards water consumption and factors that affect these behaviours and attitudes [6,7,8,9,10,11,12,13,14,15,16]. According to findings of these studies, it is important to raise individuals with water consumption and water saving awareness; and this is possible through reintroducing positive attitudes towards saving and use to individuals. This result and suggestions aim to pioneer necessary changes. The degree of influence of these research results is noteworthy as these data came from families.

This study was conducted in the Isparta region; it aims to determine water use of people on the basis of families and individuals, their attitudes and behaviours towards water saving methods and factors influencing them and their behaviours and attitudes towards water consumption.

II. MATERIAL AND METHOD

The study was conducted in the Isparta Province of Turkey. Isparta is located in the north of the Mediterranean Region, in Lake Country. It is located between 300 20’ and 310 33’ east longitudes and 370 18’ and 380 30’ north latitudes. The region’s altitude is

Volume 5 Issue I, January 2017
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1035 meters and its acreage is 8.933 km2. Total population of the province is 448.298 and population of central district is 244.085. The city is located in the transition zone between the Mediterranean climate and continental climate. The average annual rainfall is 508,3 mm in the city centre. Potable and utility water was supplied from Eğirdir Lake, Darıdere Pond and natural water resources. The water class in the province of Isparta is C2S1. In provincial centre, there is a water treatment plan that belongs to the Municipality of Isparta. During this study standard survey forms and spot survey is used as method. The used questionnaires are implemented as voluntarily to people and it takes 15–20 min to answer. The number of people was determined according to simple casual sampling method in which every individual has equal weight and chance in sampling. Also with this side, the method was called unlimited sampling method [17]. In the context of this study, a questionnaire was conducted with 400 individuals (randomly selected) according to different ages, neighbourhoods and occupational groups on the voluntarily basis in 2016.

The first chapter of the questionnaire included questions about demographics and socio-economic conditions of individuals. The second chapter consisted of 30 questions whether they know about water consumption, water saving and the importance of water. The number of participants was determined by following [18]:

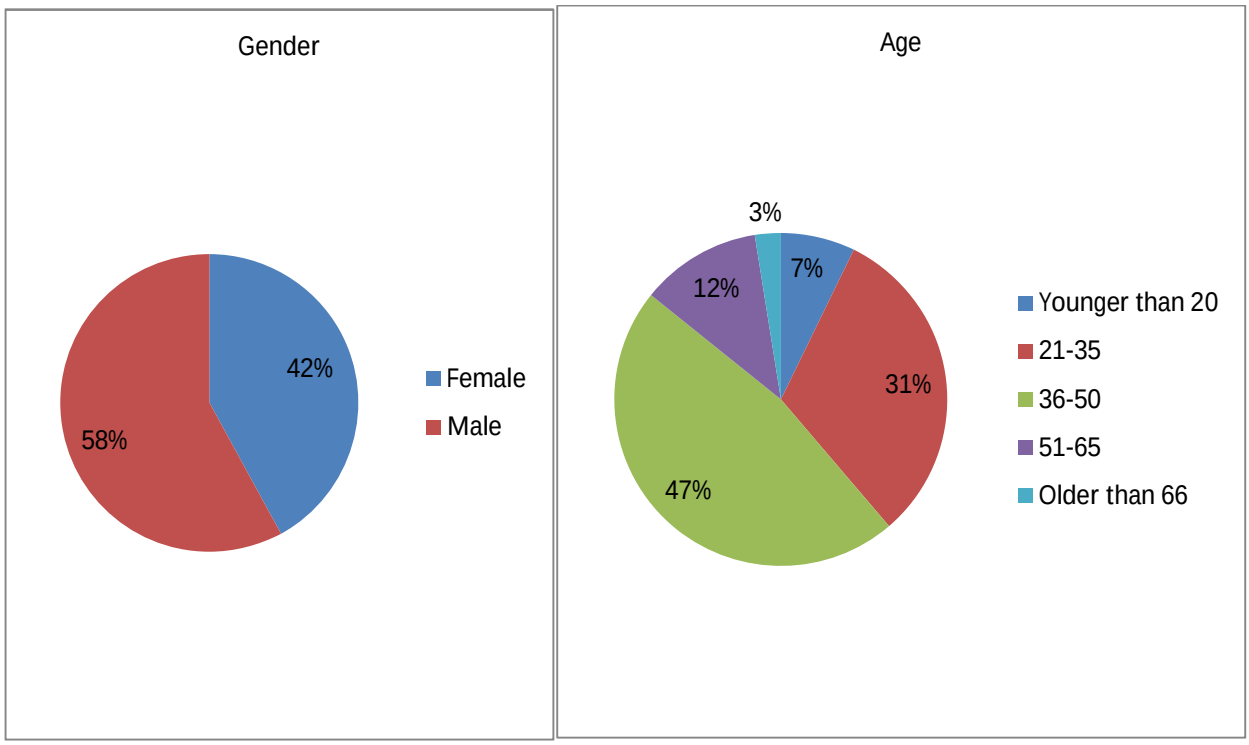
$$n = \frac{Nt^2 pq}{d^2(N-1) + t^2 pq}$$

Where, n refers to the number of sampled individuals, N refers to the number of individuals in target population, t refers to theoretical value on a particular significance level according to “t” table, p refers to frequency of occurrence of examined event, q refers to frequency of non-occurrence of examined event and d refers to ∓ sampling error that is recognised in occurrence of event. The data were assessed with SPSS ver. 20.0 statistical software. Education level, income status, occupation and age groups and differences in water consumption were tested through Chi-Square test analysis.

III. RESULTS AND DISCUSSION

A. Demographic Features of Subjects

According to the data drawing from the implemented questionnaire, the profile of subjects is the following: 223 of them are males; their ages vary between 36 and 50. They are mostly university graduates and public servants (teacher, academics, nurse, lawyer and doctor) (e.g. Fig. 1). The number of individuals in families of subjects varies between 2 and 4; it is presented on Fig. 2.



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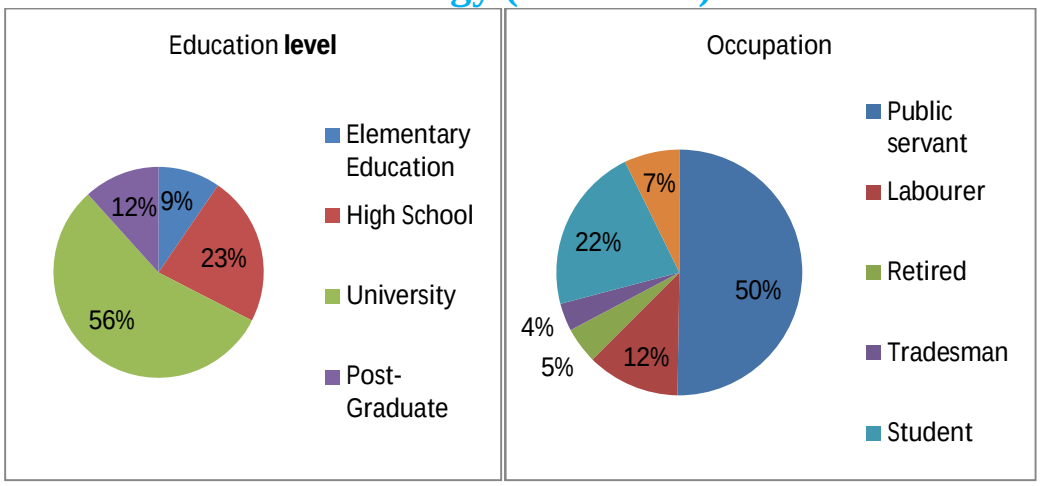


Fig.1. Gender, age, education level and occupation of subjects

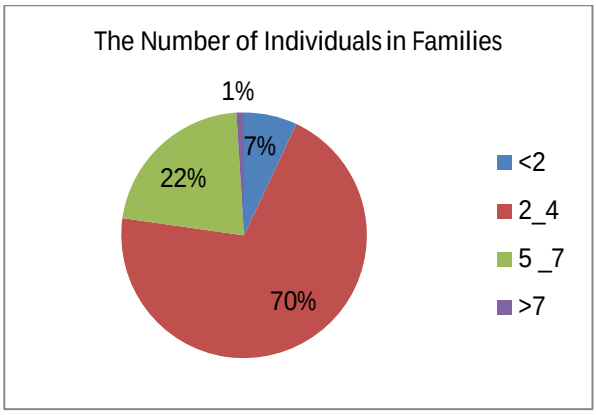
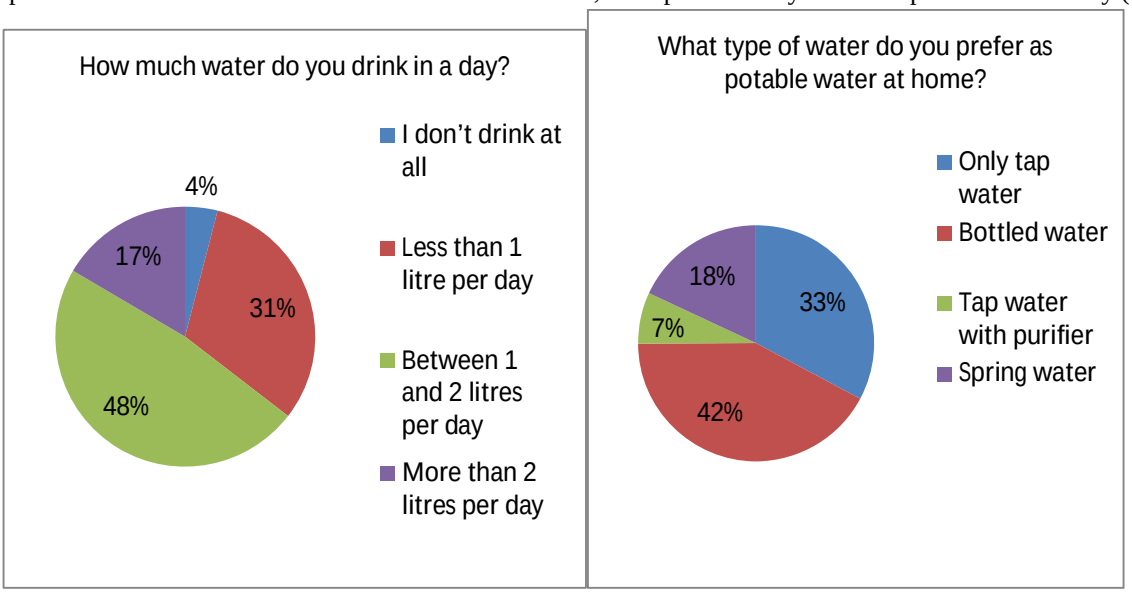


Fig.2. The number of individuals in subject families

B. Water consumption of subjects

The questions to determine opinions of subjects on water consumption and water indicated that 50% of individuals did not find tap water of the city potable as it smells bad and it is chlorinated. Therefore, 48% prefer to buy 1-2 litres potable water daily (e.g.Fig .



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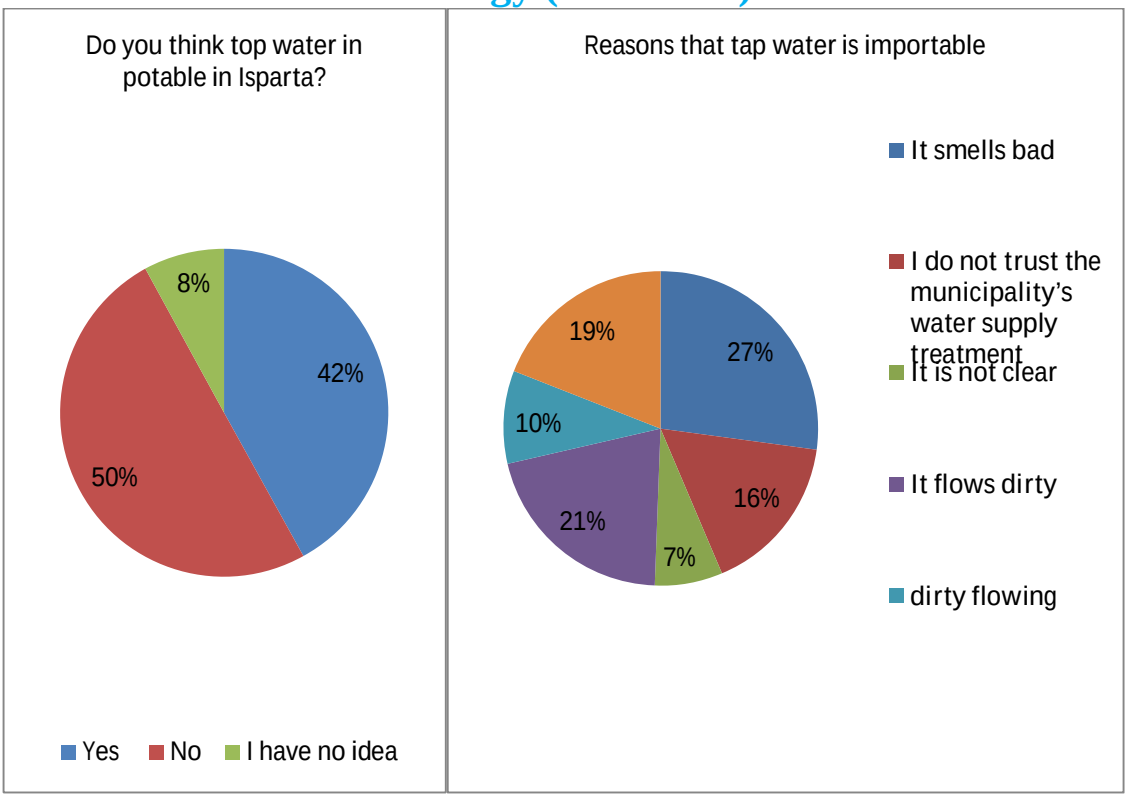
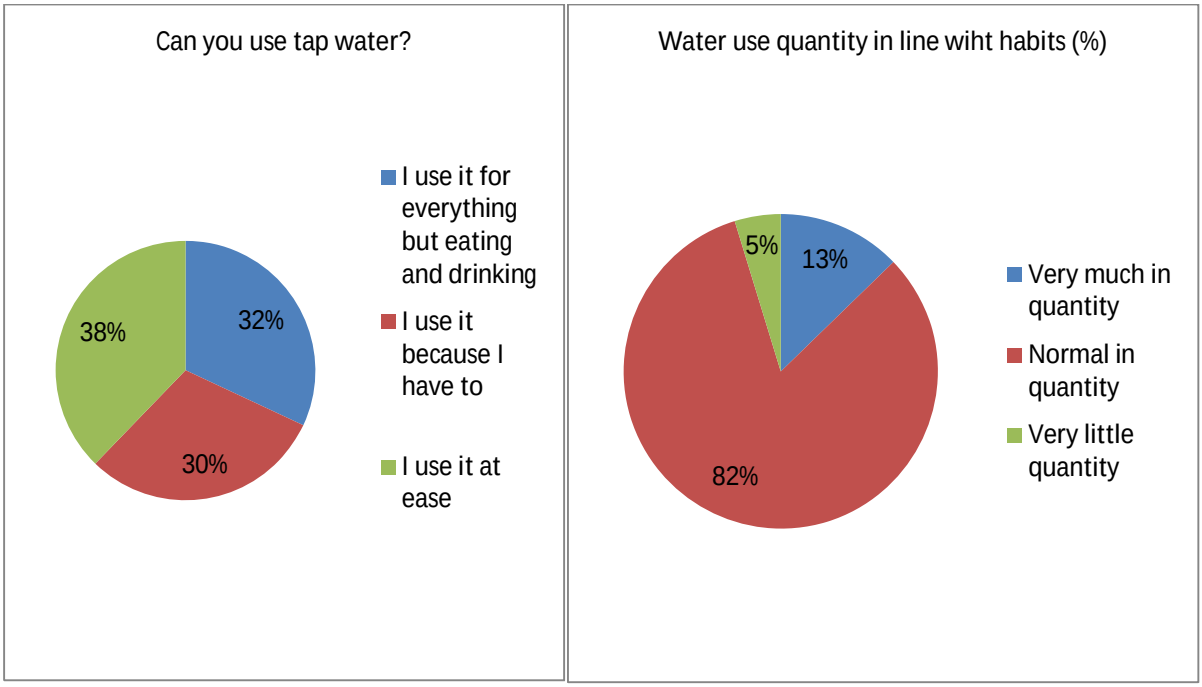


Fig.3. Opinions of individuals on potable water

Individuals expressed that they use tap water, which they found generally non-potable, for mostly bathing and cleaning. Nevertheless, it was found out that they use non-domestic water for internal and external cleaning. It was identified that water use of subjects in line with their habits is normal. Average water costs per household, although depending on water use quantity, ranges from 20 to 30 TL (=10-15 USD/month) and 50% of families regarded this cost normal (e.g. Fig. 4).



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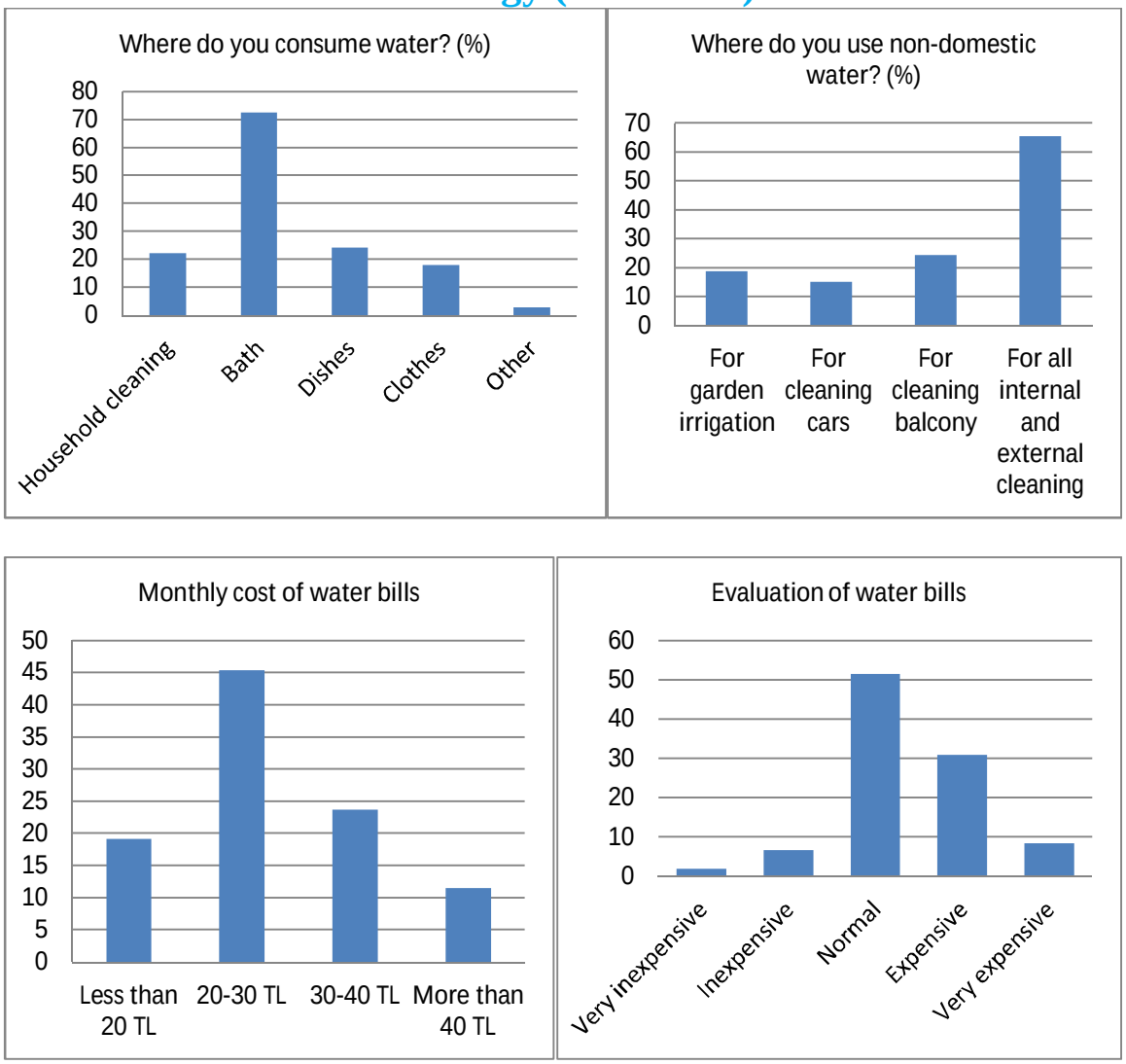

Fig.4. Individuals' water use areas and quantities

In order to determine differences between individuals' water use quantity and gender, age and occupation groups, Chi Square test was applied. Accordingly, no statistically significant difference was found for gender groups; whereas significance differences ($p<0.001$) were identified for age and occupation groups. According to this difference, 36-50 age group consumes more water than other age groups do.

Contrary to previous studies, no significant difference ($p>0.05$) was found between water consumption quantity and pricing. However, to prevent from unconscious consumption water, the idea of increase of water price per m^3 due to increase of water consumption was applied in many provinces of Turkey. This is among the leading motivations to motivate people for water saving. Thanks to this implementation, lucrative outcomes occurred in water saving in Turkey. Nevertheless, 38,9% of participants were in favour of this implementation. 26,9% of individuals, who asserted the contrary, did not consider that this is an implementation for water saving. Here, the main goal is to increase prices in parallel with consumption and to protect water resources [19].

Habits, sensitivities and attitudes of subjects about water saving

The questions and assessments to determine habits, sensitivities and behaviours of individuals indicate that 74% of individuals emphasized cleaning machines should have saving mode. Relatedly, 73% believe that water saving will not reduce quality of life. In addition, vast majority of individuals stated that they save water. These individuals seemed to have these habits for long time. It was found that recent droughts encouraged individuals for saving water and they reflected this behaviour to their close circles. Nonetheless, subjects generally regarded society as "an unconscious society" in terms of water consumption (e.g. Fig.5).

Volume 5 Issue I, January 2017
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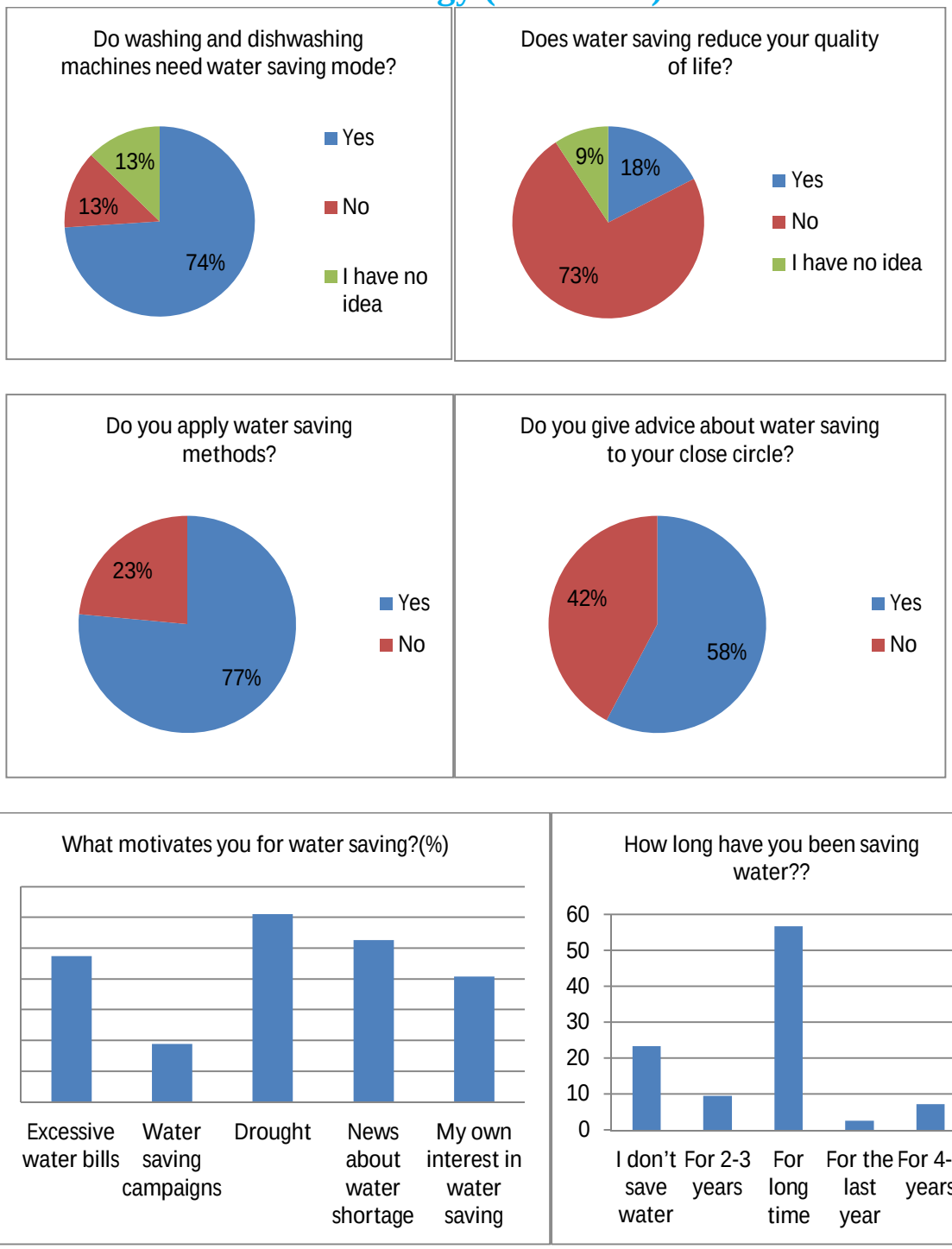

Fig.5. Individuals' habits and behaviours about water saving

According to the results of chi square test, which was applied to determine difference between individuals' gender, age and occupation groups and water saving methods, no statistically significant difference was found in terms of gender and age groups (chi square values= 0.872 and 9.006) but significance differences ($p<0.001$) were identified for occupation groups (chi square value=10.952). According to this value, public servants apply water saving methods considerably.

Similarly, assessment of individuals' gender, age and occupation groups and water saving habits revealed that no statistically significant difference was found between gender and water saving habit (chi square value=1.369). Nevertheless, evaluation of

Volume 5 Issue I, January 2017
ISSN: 2321-9653
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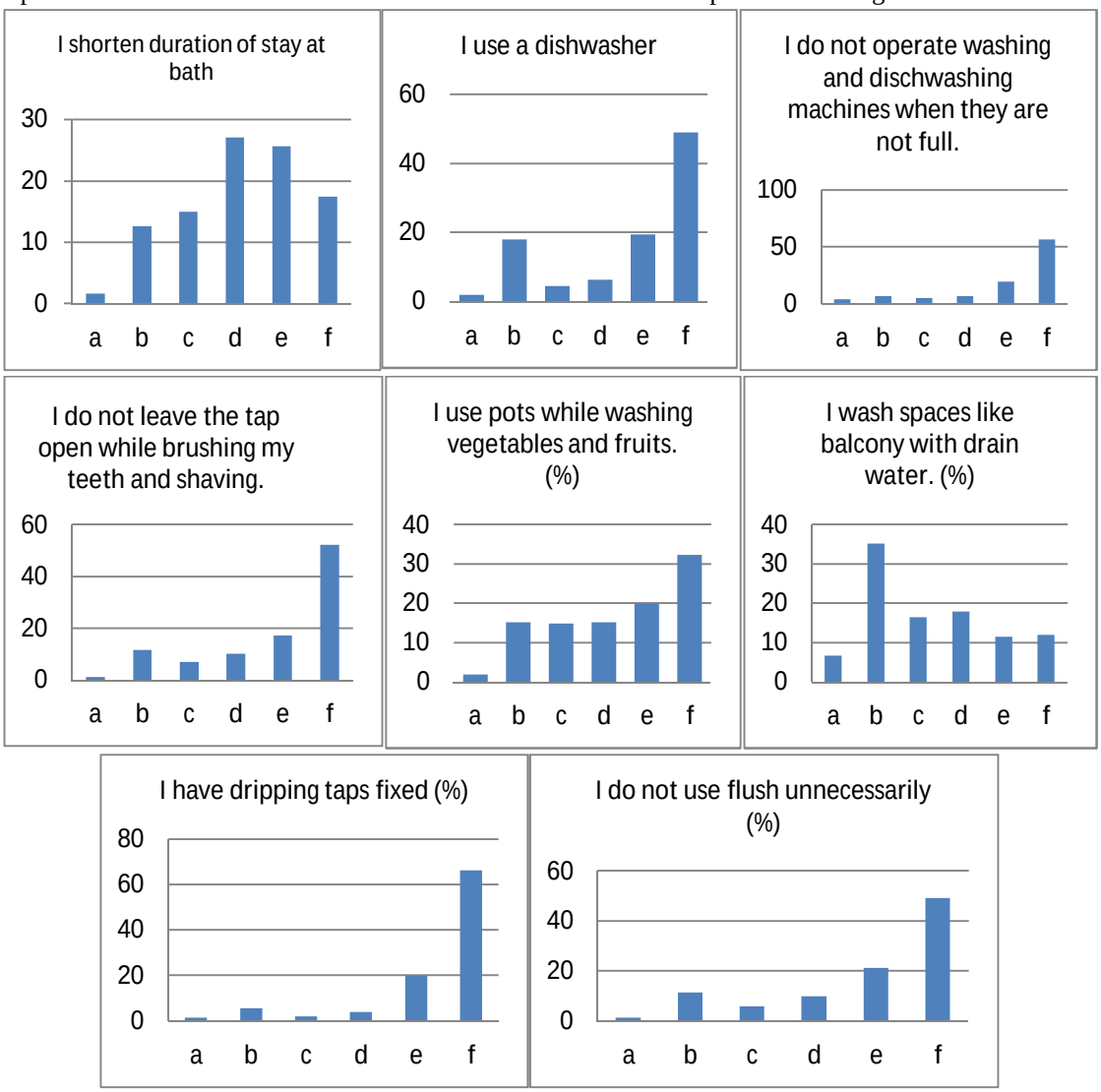
age and occupation groups and water saving habits indicated that 95% difference was identified on significance level in line with chi square values of 28.245 and 67.123. Accordingly, 36-50 age group and public servants' group had these habits for long time. When we look at the reasons for individuals' water saving behaviours, families pointed out excessive water bills, present and future water problems (drought) for their water saving behaviours. These results show that the society has necessary sensitivity but also indicate that necessary measures did not take place. It is also clear that there is no required information about the reasons of water saving and how it is to be done. Data on water saving indicated that individuals with higher education levels pointed out water problems for water saving whereas individuals with lower education mentioned water prices for water saving. This difference is statistically significant ($p<0.05$).

Individuals were given a series of lists of activities in order to determine their attitudes towards water saving methods. They were asked to express their behaviours and attitudes on the matter. The results are presented on Fig. 6.



(a- I have no idea, b-Never, c-Seldom d-Sometimes, e-Frequently, f-Always)

Fig.6. Individuals' attitudes towards water saving.

As seen on Figure 6, a significant difference was identified ($p<0.05$) between individuals in different age and occupation groups in terms of their attitudes towards water saving methods. It was observed that most individuals pay attention to water saving in kitchen, bath and while brushing teeth ad using machines (e.g. Fig. 6). Research on the issue of water saving indicated that monthly savings of a family can reach 300 Euros with the help of water saving techniques; this is mathematically presented as well [20]. Similarly, another study that aimed to determine required water quantity in Florida in 2020 demonstrated that current trend of water

Volume 5 Issue I, January 2017
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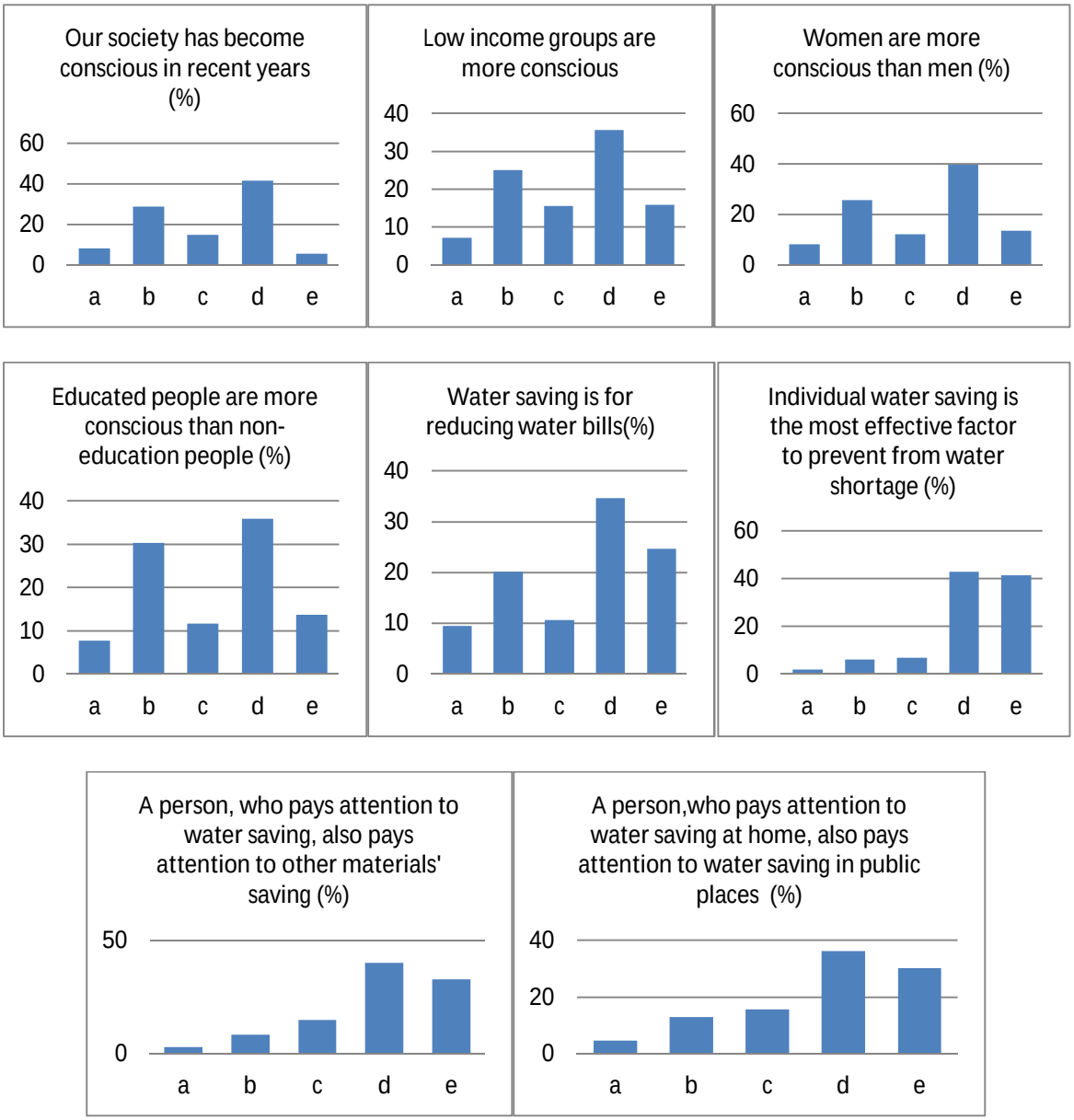
consumption in Florida might make people to pay at least 1000 Rupees due to water shortages; however if people prefer to save water particularly in kitchens and baths, this figure will no more than 500 Rupees [21].

In order to determine individuals' sensitivities about water saving, they were given a serious of expressions and asked whether they agree or disagree with the statements. The results are given on Fig. 7.



(a-strongly disagree, b-disagree, c-I have no idea, d-agree, e-strongly agree)

Fig.7. Individuals' opinions on water saving

The analysis of Figure 7 shows that according to individuals' opinions, low-income groups and women are more conscious however most people save water in order to reduce bills. The figure also shows that individual water saving is important and individuals with habits of water saving are also careful while using other natural resources. Statistical analysis of data on Fig. 7. revealed that there is a significant difference ($p<0.05$) between individuals' age, occupation and education levels and their opinions.

IV. CONCLUSION AND SUGGESTIONS

This study was conducted with 400 individuals and families living in the city centre of Isparta. The study aimed to determine their water saving habits, attitudes and behaviours.

Accordingly, majority of participants are between 36 and 50 years old. 233 of them are males. Most of them are university graduates. Their monthly income ranges from 2500 TL to 5000 TL (1000-1500 USD/month). The numbers of individuals in families are between 2 and 4 and there reside in different neighbourhoods.

In accordance with individuals' habits, type of water use was found normal. It was identified that monthly water consumption quantity varies ($p<0.001$), according to age, education and income level and type of occupation. It was also found out that elderly individuals tend to consume less water per month. Increase of education and income levels cause an increase in water consumption, which also depends occupation of individuals. It was determined that there is no statistically significant difference between water consumption quantity and gender.

In the light of these data, water consumers do not consider tap water potable. This result is observed among individuals' preference of water use that they prefer to use bottled water or less frequently purifiers instead of tap water. Here, it seems important for relevant authority to inform these people to increase ratio of tap water.

Majority of individuals expressed that they apply water consumption methods. It was observed that individuals, who save water, have these habits for long time. Recent droughts have encouraged individuals for water saving. Individuals with water saving habits tend to give advices about water saving to their close circles. These saving behaviours mostly include turning off the tap while brushing teeth, preferring to use machines, behaving carefully particularly during personal hygiene. A few suggested washing vegetables and fruits in a separate pot and staying bath for shorter duration.

Most families expressed that they save water because of present and future water problems (drought). There is a statistically significant difference between reasons for saving water and education and income levels. It was observed that individuals with higher levels of income and education draw more attention to water problems. Individuals with lower income tend to save water mostly because of water bills. This situation indicates that issues of awareness raising, pricing of water and water saving should be reconsidered.

In line with social development, several families now have washing machines and dishwashers. They pay attention to buy machines with water saving modes.

It was determined that those who use dishwashers and wash their clothes in washing machines with proper water saving modes, pay attention to use flushes, have dropping taps fixed and do not leave the tap open during personal hygiene are in majority.

It is significant to analyse families' behaviours and attitudes concerning water use in terms of increasing efficiency and management of water consumption. In this point, suggestions about this issue are the following:

Individuals' awareness of using water efficiently and saving it should be raised.

Purchase of water saving household appliances should be encouraged. Moreover, consumers should prefer such appliances that operate with half full water capacity.

Water use in kitchen, particularly for washing vegetables and fruits, might require excessive water. Awareness should be raised on this matter, particularly through consuming less water.

In kitchens, drain water should be re-used with the help of relevant systems. Low-cost construction of these systems should be encouraged. If possible, some places should be cleaned with drain water.

Low-capacity toilet reservoirs should be purchased. In activities that do not require water all the time, such as bathing teeth brushing, taps should be turn off. Taps that provide sufficient pressure with less water should be preferred.

In order to promote applications to reduce water consumption, the power of mass communication should be exploited.

Several activities to enhance development of individual capacities. In doing so, there should be cooperation between public institutions, non-governmental organisations and universities.

Education on water consumption should be provided. It should be remembered that current attitudes could only turn into behaviours through practices. This can only achieved through continuous trainings. Educated and specialised educators should give these trainings. If we keep in mind that continuity is the key for habits, relevant teachers should give this training as a course in each stage of formal education.

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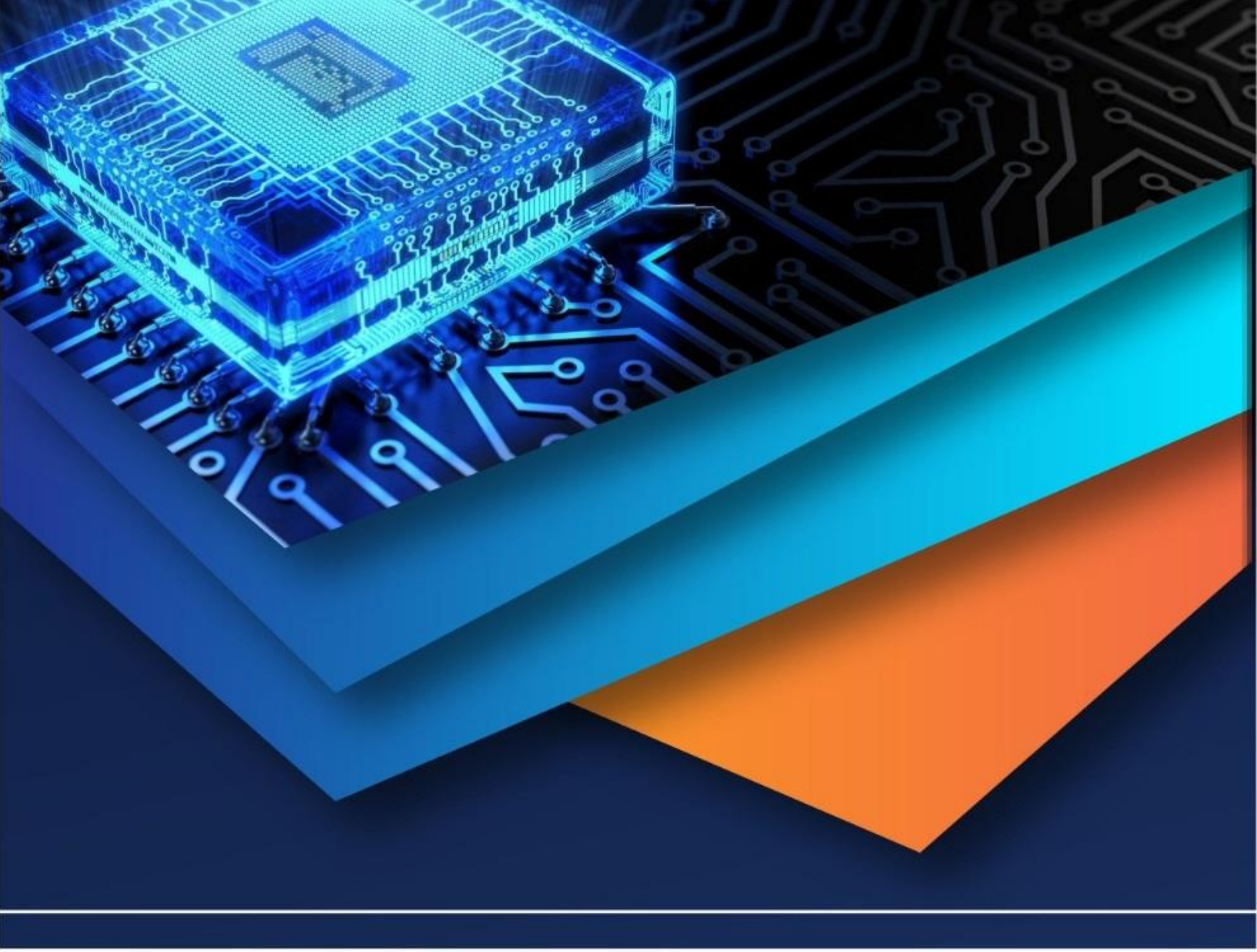

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