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PAKISTAN WATER CRISIS AND BEHAVIORAL APPROACH OF DENIZENS TOWARDS ITS CONSERVATION ON THE BANK OF RIVER KABUL

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Abstract

Approximately two third of the Earth's surface is covered with the life-sustaining liquid, water. Studies depict that by the middle of the century, more than half of the humanity will reside in water-stressed areas, which also include Pakistan. Pakistan is among the list of those countries, which are confronting chronic water issue. Pakistan is water stressed country and the situation is going to be more critical in future. The degradation and over exploitation of water resources by human is not a new phenomenon. Water as common pool resource is commonly available for people either free or they pay small amount of money which do not attract the attention of the users to use carefully. The behavior of people is the key problem in over exploitation of resources of water. People either use the water resources carelessly, which do not attract their attention to conserve water for the reason of facing water problems in future. The study shows that Behavioral change is an effective way of tackling the water shortage and ensuring the efficient management of water resources. Behaviors of people for conservation of water were highly depend upon education level, age, past history of respondents water shortage problem, awareness, attitude of family, friends and surrounding of respondents.

Key words: Water Crisis, Water Conservation, Water Leakage, Consumer Behavior. Water Wastage.

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Introduction

The relentless problem of resource depletion is however of environmental concern. The issue of environmental degradation is a consequence of the population explosion multiplied with ever increasing consumption per person. Our world can be considered to be biophysically finite therefore a rise in global population in the long run can engender climatic changes, land erosion, quantitative increase in greenhouse gases, water depletion, exhaustion of fossil fuels etc. According to a study the humanities ecological footprint (the measure of consumption) is one and a half times the earth's capacity to sustainably supply the resources to meet the demands of individuals. This shortcoming between the restrained supply and uncurbed demands is met through the destruction of natural capital (the category includes water resources, atmosphere, fossil fuels, forests, wetlands, biodiversity etc.). From a psychological point of view, every person considers his own actions to be of extremely insignificant importance hence has no incentive to cut on his consumption by considerable units. However, restraining oneself could somehow lead to marginal improvement in the existing condition of a resource. Cutting short the preservation of a resource is truly a matter of one's own wills that is not backed with any reward. Although the ones who would often express strong condemnation over the unrestricted use of resources would reach a conclusion that raising voices for promoting the concept of conservation of resources is of no use. Consequently, all these struggles lead nowhere. The predicted aftermath of all these courses of action therefore will be a collective disaster.[1]

Water is the basic necessity of life, so water quantity and quality both are essential for life. Especially, the clean drinking water is necessary for the preservation of life in general and human life in particular. But mismanaged water resource in the recent past has triggered the phenomena of natural catastrophes, such as climatic change, heat waves, droughts, devastating floods, shrinking rivers and rising oceans. Serious environmental damage, the industrial development, unnatural and uncontrollable urban growth and the devastation of forests are some of the factors that are causing the polar ice to melt abnormally. The third world countries cannot afford to sit back in chairs and study the phenomena for we are also faced with the problem of melting glaciers; that cause the torrential rains and floods killing thousands of people and rendering millions homeless. Moreover, in country like Pakistan due to lack of planning no new dams have been built in the recent past, partly due to lack of priorities and partly due to vested political agendas. In the developing country like Pakistan, due to lack of planning and control of the government agencies, the population (that has been tagged to

[1] Kysar, Douglas A. "Some Realism About Environmental Skepticism: The Implications of Bjorn Lomborg's The Skeptical Environmentalist for Environmental Law and Policy." *Ecology LQ* 30 (2003): 223.

be extremely ignorant) are polluting the existing lakes, canals, ponds and rivers by throwing the sewage line therein. This has not only brought the deterioration in the general health of the public but has negatively affected the aquatic life as well. The trout that is known as an icon fish of the clean icy waters has almost become extinct. The above mentioned phenomena in reference to Pakistan has constrained the successive governments to divert their resources on non-developmental expenditures , whereby billions of rupees and funds are diverted to the construction of destroyed infrastructure in the flood affected areas and rehabilitation of internally displaced people (IDP'S). Moreover in this matter major chunk of national GDP is spent on health sector. Thus draining the resources unnecessarily. However, the problem to be addressed is not only that of contamination but it is that of straining water resources as a consequence of overpopulation.

According to the general facts being highlighted, water typically serves to be a public good as it is being provided, often, free of cost and on the basis of equality. However because of these two major principles, it is being treated in a mismanaged and disorganized form. Because of an extreme careless attitude it is prone to the threat of getting finished. This dilemma is not a problem seen in the rural areas only but the educated lot and well off communities residing in the urban cities of Pakistan is habitual of practicing the same activity time and again. Education and awareness, both have gone in vain, while exhibiting an attitude truly of rational kind. Analyzing only one of the sources, the tap water, where liters and liters are being subjected to wastage on daily basis in a single household unit. Drinking and pure water obtained from the wells can be seen splashed on the floors for no apparent reason. Because of urbanization and population explosion, the sewage pipes have somehow mixed and had become interconnected with the fresh water supply because of which tons and tons become contaminated with the viral and bacterial particles. This water again gets wasted or if consumed leads to chronic ailments. However the same doesn't happen with the crystal looking, mineral containing and a seal packaged water acquired from the grocery stores. Only because the consumer pays for it, every drop that the bottle contains is consumed with great care. It is being assured that not even a milliliter of it goes to waste. It is not only handled properly but the remaining is saved for days even. This striking difference arises not because of the fact that mineral water is often consumed by the higher income groups or the educational lot but because that the customer is charged for every drop he consumes of it. Therefore it can be concluded that it's not the education or the awareness programs that lead to such drastic differences in attitudes, but it is the cost benefit analysis that serves to be the root cause of such behavioral changes.

This prestigious asset has been wasted profusely by all sectors on routine basis without any qualm. Water is wasted on daily basis which produces bad impact on future. Due to urbanization and socio economic development water supply reduces which has severely threatened the living conditions. According to UN Environmental Program, the current shortage affects 400 million people and this situation will worsen as the ratio will rise to 4 billion till 2050. Water is wasted in various ways like agriculture, industries, houses, public and private institutions (Public Places). Mostly, it is observed that people use water in thoughtless manner, as it seems abundant like an air. The true value of water cannot be realized until water shortage affects us directly. Whether it's the inefficient flooding of farm fields, industries and houses, people waste water in many ways. Agricultural wastage is in the form of extra irrigation of cultivated area, while industries extra usage of water during manufacturing process from initial stage up to final production. Houses are the places in which household utilizes water directly for needs, which leads to wastage of water such as doing the dishes, toilets, washing clothes, car wash, tap leakages, sewage line leakage**,** pipe line leakage, watering gardens, using sprinklers, fountains, bathing, shaving, using hot water, swimming pools, preparation of food and running water etc. One of the major sources of water wastage in the form of over washing and cleaning as well as in the form of leakages of taps and pipelines.

Methodology:

To study the behavioral approach of people towards water leakage and water wastage control, model was designed. The model given below was used for explaining behavior of people towards water leakage and wastage.

Model Specification

$$B_{PWLC} = \beta_0 + \beta_1 AF + \beta_2 FS + \beta_3 PH + \beta_4 Age + \beta_5 Aw + u_i$$

B_{PWLC} = Behavior of people towards water leakage control (Conservation of water)
AF = Attitude of family members towards water wastage/ leakage
FS = Attitude of friends and surrounding people towards water wastage/ leakage
PH = Past history of water shortage issue
Age = Age of the respondents
Aw = Awareness of respondents about water scarcity

Questionnaires Design and Construction of Variable

The data was collected through detailed questionnaire; our main target was to cover household in the study area. The current study was conducted to observe water leakage and wastage control. The universe of the study was those area present on bank of river Kabul in Pakistan in Khyber

Pakhtunkhwa. For this purpose 400 questionnaires were distributed among households in different part of the study area. A detailed questionnaire was design to conduct survey in study area. It consists of two different sections, section A was about the personal information of the respondents, section B of questionnaire was about the behavior of people towards water wastage and leakage control. Section "A" of the questionnaire consists of general information related to respondents of household, which include gender, age, level of education, monthly income of household, family size of household, economic and employment status of household were part of this section. Section "B" of the questionnaire is about the behavior of people towards water wastage and leakage control strategies. In this section respondents were asked about the importance of water for life, noticing of water leakage and water wastage at the time of consumption. Attitude of family members, and friends towards observation of water wastage and leakage. History of respondents water shortage, age of respondents, and awareness about water scarcity was the key information required for the survey purposes in the questionnaire.

Behavior of people towards water leakage is dependent variable in model. Behavior of people was measure through different variables which include personal observation of water leakage, during water consumption in case of washing, cleaning, and drinking. The respondents were asked to answer this information with Yes = 1 or No = 2. If they observe water leakage and wastage then what is their response towards that leakage and wastage control. When they respond to control leakage that was Yes = 1 and if No = 2. Further, it was also measured what is the response of family members of house towards water wastage and leakage control, have you ever discussed the current shortage and future scarcity problem of water. The respondents were given different options which were categorized with 1,2,3, and 4. The other variable was also related to the surrounding of respondent that was about attitude of friends towards water wastage control. The respondents were give different option i.e. 1,2,3 and 4. Similarly, behavioral aspect was also calculated from the past history of the respondents in case of water shortage. The question was asked about past history of water shortage in any case during washing, cleaning, and drinking, this question was to answer with Yes = 1 or No = 2. Age of respondents was also considered as an important variable for the measurement of behavior. Behavioral changes with aging of the respondents; this question was open without having any options. Proper knowledge regarding water scarcity, and awareness of people about water scarcity in the study area was treated as an independent variable.

Results Behavior of People Towards Water Conservation

This study was conducted in order to appraise the individual consumption pattern of water and its relation with conservation of water. Whether they cooperate to reduce water consumption or every individual wants to maximize their own utility by more consumption of water. For this researcher conducted survey in different parts of Khyber Pakhtunkhwa through which river Kabul passes. Consumption of water in household is for washing, cleaning, bathing etc, thus households were considered in the survey in which different individuals were interviewed through a detailed questionnaire. Detailed demographic information of the respondents was integral part of survey to appraise the behavior of individuals, which was covered in section "A" of the questionnaire.

Table. 01 Household Behavior towards Water Wastage and Leakages

Perception of Respondents about Water	Agree (%)	Neutral (%)	Disagree (%)
Importance of water for life	89	11	zero
Do you think water as scarce resource	67.75	14.25	18
Wastage of water as problem of Pakistan	49	30.75	22.75
Water shortage problem face in past	36.25	43.25	20.52
Observe Water Wastage	25.75	20.25	54
Observe Water Leakage	49.25	33	17.75
Complaint for Repair of water Leakage	19	23.25	57.75
Responsibility Shifts after Complaint	72.25	16.25	11.51
Personal efforts to Repair Water Leakages	15.75	32.75	51.5

Source: Author Field Survey Results 2016

The main objective of the study was to assess the perception of respondents about water importance and its wastage. Therefore, it was necessary to know the perception of respondents about importance of water for human life. About 89 percent of the respondents were of the view that water is important component for their lives. This result shows that people in the study area are highly aware of water importance in daily life. Water as a common pool resource is essential part of universe, but due to over usage and exploitation of these resources there is continuous decline in the quality as well as quantity of resources. The respondents were asked about scarcity of water resources. 68 percent of the respondents of the respondents were agreed to the statement asked from them that water is a scarce resource in the study area. As matter of fact, the respondents were further asked about their view about water wastage as a problem of Pakistan. 49 percent of respondents considered water wastage as a main problem in Pakistan, which clearly

shows importance of study in an area. Water sources are continuously decreasing. Although, water crisis is present in this part of the world and respondents were asked about water shortage problem faced by them in their daily routine life. 36 percent of respondents who agreed that they faced water shortage problem in their daily routine. This result shows that rare number of people in the study area knows the real importance of water in case of future shortage. The attitude of individuals towards water can easily be judged from their perceptions. Therefore, it was necessary to reconsider this approach by asking about their personal observation. The respondents were asked whether they had ever noticed any form of water wastage in their daily routine life. 26 percent respondents were agreed that they have noticed water wastage; the low percentage of water wastage observation shows the careless behavior of the respondents towards water as a key component of their daily lives. The respondents were further asked about leakage of water at home. The respondents' behavior at home and public place can be judged from the information received through this question. Whether the respondents have ever noticed water leakage at home? Majority of the respondents replied with positive response that is 49 percent had observed water leakage problem at home, while some respondents replied that they had observed it sometimes. However, there were respondents who had never observed water leakage problem. Further the respondents were asked about the real action taken to repair water leakage problem at home. Some of the respondents replied that they took quick action for the repair of water leakages. While majority respondent's perception was that sometimes they show quick response, if water leakage is of high wastage. However, to small leakage they don't give that much importance at home. Similarly, there were respondents who never give importance to these leakages at home. The respondents were further asked about time to spare for water leakage repair. There were respondents who thought that they could spare five to ten minutes for repair of leakages, while some respondents could spare fifteen to twenty minutes. However, there were also respondents who could spare more than twenty minutes for the recovery and repair of water leakages. Further, the respondents were interviewed about the complaint (mean passing information to head of household or some department available for quick recovery of water wastage) for the repair and maintenance of water leakage. 19 percent of respondents were agreed that they complaint after observation of water leakages. It shows that majority of the respondents do not consider leakages as water wastage and they always want to be free riders.19 percent of respondents were cooperative in nature. The respondents were further asked to suppose if they were in situation of water leakage problem, and after complaining to the concerned department about water

leakage, whether their responsibility ended with lodging of complaint? 72 percent of respondents replied positively that their responsibility ended.

Further the respondents were interviewed that how much time, money, and labor they could contribute to stop leakage. Therefore, the respondents were asked that besides complaint to the concerned authority, whether they make some personal efforts to stop leakages of water. 16 percent made some personal efforts in the form of monetary and non-monetary terms for the solution of leakage problems. 33percent respondents agreed with the view that they sometimes do efforts for the repair of leakage, while 51 percent have never made any effort both monetary and non-monetary for quick repair of water leakage to stop wastage. The respondents were asked that how could they conserve water. Who will be responsible for over consumption and wastage of water? There were four different options given in question and every individual has to select the most responsible amongst the options. Interestingly, nobody among the respondents considered self-responsible for water wastage and leakage control. 65 percent of respondents viewed that other members in our community were responsible for the over consumption and water wastage through leakage. 29 percent of respondents replied that there were organizations for water management, therefore, according to their perception. It is the sole responsibility of those organizations to take care of proper management and monitoring of water wastage and leakage of taps and pipelines.

Regression Analysis of People Behavior towards Water Leakage Control (Conservation)

The following table shows the result of multiple regression model used to estimate the effect of different determinants on the behavior of people towards water leakage control and conservation of water. Before estimation of model, different diagnostic tests were applied to the data to know the nature of data and whether it was free from econometrics problems or there exist problems in the data. The age and education showed significant relationship with the behavior of people towards water leakages control, while positive and insignificant association is shown with past history of individuals who faced water scarcity problem. The individuals surrounded by family and friends who are aware of water scarcity issue in study area and importance of water, their attitudes towards water leakage control were also positively significant.

The value of R square is 0.74 which shows that it is a good fit model. Independent variables i.e. age, education level, past history of water shortage, family members' attitude and friends' attitude towards leakage control are highly related to behavior of individuals in control of leakage. The F value shows overall significance of the model which is 8.474 with the significance value of which shows that overall model is highly significant. The model clearly shows that behaviors of people towards water leakage control were explained. All the variables were significant except past history

of water shortage problem faced by respondents and their attitude towards leakage observations. Age and education variables were significant, which show that behaviors of people towards leakage control changes with age and level of education.

Behavioral change towards water wastage and leakage control was estimated by analyzing different independent variables. All the indicators were significant at 0.05, which clearly shows the validity of model. Model strongly suggests that increase in age of respondents their concern about control of water wastage and leakage is high, behavioral change was easily observed with aging. Furthermore, it was also explained from this result that young people are less concern about water wastage and leakage as compared to elder people. Because with the aging people are more curious about water conservation, they had learnt from experience in their lives, besides this it also shows that aged people know the future prospect of water crisis, which shows that they are highly concerned about their upcoming generation problem. Educated class leads to conserve water more as compare to that of illiterate community in the society. High percentage of educated people in community means that they have more information about importance of water and water as a scarce resource. Therefore, the community in which percentage of educated people is high so conservation of water is high as compare to the community wherein the level of educated people are either less or not present. This clearly shows that people who face water shortage in past do not bring change in their behavior towards water conservation. This shows the people behaviors do not change with the crisis/shortage face by them in past, so their past history have no impact on the behaviors of individuals. Surrounding of people was mostly observed that it had positive effect on behavioral changes. Attitude of consumer towards water wastage and leakage control was significant, which means that those respondents whose family members are conscious about water as a scarce resource try to conserve water more frequently as compare to those households whose family members do not consider it as important issue. Therefore, consumers whose family and close circle discuss water shortage and related issues had always brought changes in their behaviors as compared to those respondents whose close circle and friends never discussed the water crisis in the study area.

Table.02. Estimates of Behavior of Public towards Water Leakage Control (Conservation)

Explanatory Variables	Coefficients	Standard Error	Significance Value
Age	0.156	0.065	0.017
Education	0.168	0.071	0.019
Past History	0.184	0.326	0.573
Attitude of Family Members	0.604	0.062	0.000
Attitude of Friends and surrounding	0.015	0.060	0.004
Constant	0.941	0.698	0.178
F-statistic	8.4749		
R-squared	0.742		
Adj R-squared	0.722		

Source: Author Estimation Survey Results 2016

The households were further asked about their favorite political party, which they wanted to vote in coming election, to rank water conservation problem in the manifesto for the election from most important to least important. The other points included provisions of health facilities for all citizens of the country at their door step, free education for all the citizens, development of infrastructure which included building of roads, bridges, fast communication networks, elimination of corruption, vocational training, vocational education, improvement in ethical values, economic growth, economic development, freedom of speech, equality before law, and justice for all. Interestingly, all the points were the main problems of our country. However, no single respondent considered water conservation as one of the most important problem of Pakistan to rank it on the top of their manifesto. There were only two respondents who thought that political parties should consider it as the second main issue of Pakistan. 07 considered it as the third important issue of Pakistan. Similarly, 14 considered it as fourth important issue of Pakistan. 21 considered it fifth most important issue of Pakistan. 27 considered it sixth important issue which should be placed in the manifesto of the political parties in the upcoming elections. 33 respondents considered the issue to be placed in political parties manifesto on seventh position. While 36 respondents were such that they thought that political parties needed to consider it to place the issue in their manifesto on eighth position. While 39 respondents thought that it should be placed on number ninth in the manifesto of their favorite political parties. 42 respondents were of the view to give it tenth position in the coming general election.

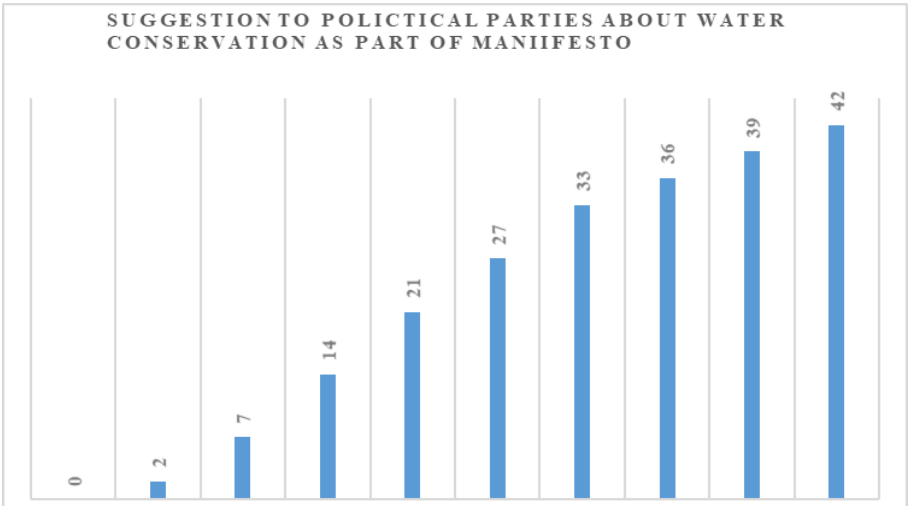

Figure. 01. Suggestion to political parties about water conservation as part of manifesto

Conclusion

A multiple regression model was designed for the measurement of different determinants to estimate the behavior of people towards water leakage control and water conservation. The results revealed that age and education showed significant relationship with the behavior of people towards water leakages control and conservation of water. Insignificant association is shown with past history of individuals, who faced water scarcity problem, which means that previous history of water shortage problem did not bring changes in the behavior of respondents. The individuals surrounded by family and friends, whose attitudes towards water leakage control were also positively significant. In short the model interprets that behavior of people for water leakage control and conservation depends upon the respondents' education, age, past history, time, and attitude of families and friends surrounded by respondents. Water crisis in Pakistan can also be overcome through behavioral aspect of consumer. As already known that underground natural resources are not unlimited. Over and above exploitation of these resources may led the country into more serious position, therefore as need of the day individual as well as collective efforts are required to overcome the crisis. Government agencies and community level awareness regarding water shortage are need of the day.

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