Drinking Water Cost And Its Impact on Living Standard in Pallikuda Gramaniladhari Division (Kn/65) of Kilinochchi District, Sri Lanka

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Abstract - The main objective of this study is to identify the drinking water cost that how to affect on the people living standard. Especially cost of drinking water dominates a major part of expenses for households in Pallikuda GN division. Thus, in the year of 2016 data has been employed for this cross sectional analysis. Stratified and random sampling technique was used to get exactly unbiased data for scrutinized in this study. The regression model were fitted and estimated in this study. As with the correlation analysis, there is average positive correlation level which is 0.520 between total cost for gathering drinking water and income. The P value 0.000 also conform that this is nicely fitted. And also R2 is 0.27 which means that approximately 27% of variance in expenditure of gathering drinking water is explained by income. Furthermore, there is high positive correlation which is 0.820 between total expenditure for gathering drinking water and family members and correlation is highly significant at the 0.01 level. The regression also appears highly strong and it has R2 value that 0.673 explains to 67 percentage of factors which influences between family member and total expenditure for gathering drinking water. As further analysis there is low positive correlation between total expenditure for gathering drinking water and distance between home and drinking water source. The study highly insists the need for adapting new and effective projects for solving drinking water problem which enhance people's living standard.

Key words - Drinking water, Expenditure, Income, Living standard

I. INTRODUCTION

Water plays a role in all sectors of the economy and is essential in achieving sustainable development and reaching the Millennium Development Goals (MDG)(UN-water global annual assessment of sanitation and drinking-water (GlAAS) report, 2012). Water is an essential component of environment that helps organisms to sustain life. Although two-thirds of our world's surface is covered by water, about 97% of it is salty. Of the approximately 3% that is not salty, 70% is frozen, which leaves only 0.75% available for the survival of all living creatures outside of the sea.(World

wildlife Report) In this few percentage of water is using day to day for human well being, economic activities, sustain environment development and other activities.

Even though, some countries of places are naturally suffering to get adequate water. On the other hand excessive usage of water by human, that also creates such problems as water shortages, water sanitation, drought and etc. As this result by 2015, 1800 million people will be living in countries or regions with absolute water scarcity and two- third of the world population could be under stress conditions. Around 1.2 billion people, or almost one-fifth of the world's population, live in areas of physical scarcity, and 500 million people are approaching this situation. Another 1.6 billion people, or almost one quarter of the world's population, face economic water shortage (where countries lack the necessary infrastructure to take water from rivers and aquifers) (UN-water, FAO, 2016). Further nearly 1 billion people in the developing world don't have access to it. 66% of Africa is arid or semi-arid and more than 300 of the 800 million people in sub-Saharan Africa live in a water-scarce environment. According to WRI report estimates that Middle East comes from the fact that it harbors 14 of the 33 likely most water stressed countries in 2040. The statistics include nine countries that are considered "extremely highly stressed": Bahrain, Kuwait, Palestine, Qatar, United Arab Emirates, Israel, Saudi Arabia, Oman and Lebanon.(Andrew Maddocks, Robert Samuel Young and Paul Reig , 2015).This kind of important that was induced to initiate to celebrate "world water day" by UN in the year of 1993.

As not exceptional in Sri Lanka also has been facing the water problems in such areas. According to UN global analysis in 2014, Srilanka is remaining 6% of the population consume water by purchasing it from vendors who transport water in very unsanitary plastic containers, by walking more than two km, or from rivers, streams or unprotected wells. Poonakary DS division among other DS division in Kilinochchi district is much facing the drinking water problems as long as period. In this research conducts in Pallikuda GN division as particularly in Seviar thooddam and Seddiyar tharaively which are identified as saviorly affected area. Therefore this study is important to analysis in this area and researchers of

such suggestions which can be considered by the government and non government origination for further development.

II. RESEARCH OBJECTIVES

Objectives of this study can be classified as main objectives and sub objectives.

1. Main objective

- To identify the drinking water cost that how to impact on people living standard.

2. Sub objectives

- To identify the relationship between total cost for drinking water and family income
- To identify the relationship between total cost for drinking water and family members.
- To examine relationship between total expenditure for gathering drinking water and distance from drinking water source.
- To suggest recommendations to consider by the government and NGOs.

III. METHODOLOGY

Even though drinking water problems in Poonakary Divisional Secretariat have been analyzed by some researchers, there is lack of quantitative analysis. Particularly has not yet been any researches related to drinking water cost and its impact on living standard, Pallikuda Grama Nildhari division.

1. Data collecting tools

Both primary and secondary data have been employed to analysis in this study. Questionnaires have been used as main source to collect data. A structured self administrated likerd scale questionnaire has been employed as the data collection instrument because the structured questionnaire method has had number of advantages such as diminishing a researcher's bias during collection and data analysis (Skinner et al., 2000). The secondary data have been employed for this study from statistical report and resource profile of Poonakary Divisional Secretariat division, books, and conference proceedings.

2. Sampling Method

The researcher selected the household families of Pallikuda GN division (KN/65), Poonakary DS division. In this area most of places has been facing water and sanitation problem as long as period. Some places which far from sea level is currently facing the drinking water and sanitation problems. The Pallikuda GN Division consists of 843 households with the population of 2953.(Resource profile of Poonakary DS ,2017) Among these households, the place of Seddiyartharavely and Seviyarthooddam which is mostly suffer from gaining drinking water without access of water resource and having 150, 75 households respectively.

Stratified and random sampling technique has been used for the study under two hundred and twenty five household families. According to the two hundred and twenty five household families are divided as two division and further that villages are again divided three division by income, number of persons having in a family and distance from water source. Twenty percent selected from the total population. Thus the sample size is 46 households and 15 households from Seviyarthooddam and 31 households from Seddiyartharavely. Therefore 15 households were selected by income level as 5,10 from each villages respectively and 15 household were selected by number of person having in a family (1 to 4 and above 5) as 5,10 from each villages. further other 16 households were selected by distance from water source as 5,11 from each villages. Total 46 household family was finally randomly selected among the total population of 225. Stratified and random sampling technique was used to get exactly unbiased data for scrutinized in this study. Quantitative approach has been used to scrutinize this study. In the year of 2016 data has been employed for this cross sectional analysis.

3.Tools and model specification

The analysis was exacted with the use of regression model, descriptive statistic. Further statistical package for social sciences (SPSS) has been employed for this analysis.

Model

Yc: f(X_1, X_2, X_3, X_4, X_5, X_6…………. X_n)

Yc: Expenses on drinking water for gathering

X_1: Income level

X_2: Number of family having in a family

X_3: Distance from drinking water source

X_4: Drinking Water supply from Pradesha sabha

X_5: Household is getting drinking water from private

X_6: Household is getting drinking water as individually

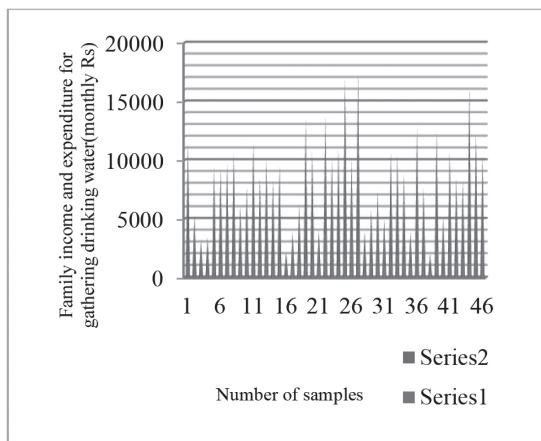$$Yc = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + Ut$$

In accordance with model, Expenses on water for gathering(Yc) which is dependant variable. others (X_1, X_2, X3, X_4, X_5, X_6) independent variables. Income level, family members, consuming water, distance, Pradeshs sabha water supply, household is getting water from private, household is getting water as Individually are determinants of expenses of water.

IV. RESULT AND DISCUSSION

1. Relationship between total expenditure for gathering drinking water and income

In this research area of people's livelihood mainly depend on fisheries and they are involving in this field traditionally

therefore peoples level of income also low than another occupations. Even though, they have forced to spend certain amount of money for gathering drinking water due to scare of water resources. According to the Poonakary Divisional secretariat Resource profile in 2016 which pointed out Pallikuda GN division also requires the water sources in the water scare places. 800 families has been beneficiating by common well in Pallikuda GN division and also 843 families are expected the pipe line to fill up of their water requirement. (Resources Profile of Poonakary Divisional Secretariat, 2017

Coefficients^a

Model		Unstandardized Coefficients		Stan-dard-ized Coef	t	Sig.
	B					
		Std. Error	Beta			
1	(Constant)	606.918	261.445		2.321	.025
	Family income	.133	.033	.520	4.043	.000

a. Dependent Variable: Total Expenditure for gathering drinking water

Source: Survey data by respondants

Source: Survey data by respondents, 2017
Figure 1 total expenditure for gathering drinking water and income

Accordance with the figure 1, the series 1 implies that the total expenditure for gathering drinking water and series 2 implies that the level of income by families. In this figure clearly define that a certain part of money goes to expenses for gathering drinking water.

As with the correlation analysis, there is average positive correlation level which is 0.520 between these variable. The P value 0.000 also conform that this is nicely fitted.

Model	R	R Square	Adjusted R Square
1	.520^a	.271	.254

Table 1 :Relationship between total expenditure for gathering drinking water and income (model summary)

In accordance with model summary of above regression, R2 is 0.27 which means that approximately 27% of variance in expenditure of gathering drinking water is explained by income.

Table 2 : Relationship between total expenditure for gathering drinking water and income (Coefficients values)
As with the coefficient, The model become as
$Y = 606.918 + 0.133X_1$
     (0.025) (0.000)
Y is indicating total expenditure for gathering drinking water and X_1 is implying level of income in a family. If increase the income level in a family by 1000 Rs there is approximately 133 Rs of expenses will be increase for gathering drinking water facility. As matter of facts, if P value of corresponding variable less than 5% (0.05). The particular variable is significant to explain the dependent variable. Accordingly, the P value of income of 0.000 is less than 5% implying highly significant to explain the expenses.

2. Relationship between total expenditure for gathering drinking water and family members
There is high positive correlation which is 0.820 between total expenditure for gathering drinking water and family members and correlation is highly significant at the 0.01 level which also implies that 99 percentage of relationship between these variable is correctly

$R = 0.820$ $R^2 = 0.673$ P value=0.000
$Y = 104.844 + 327.681X_2$
     (0.540) (0.000)
The above analysis leads to a number of observations of importance. The regression appears highly strong and it has R^2 value that 0.673 explains to 67 percentage of factors which influences between family member and total expenditure for gathering drinking water. Above model Y refers total expenditure for gathering drinking water and X_2 implies number of family member. Thus the model clearly defines that if increase one person in a family where 327. 681 rupees of monthly expenditure for gathering drinking water also will be increase. Significant value also refers the highly significant in this model. Beside the constant significant value 0.540 is

not significant which implies constant amount of expenditure is not influence in this model.

3. Relationship between total expenditure for gathering drinking water and distance between home and drinking water source

As further analysis there is low positive correlation between total expenditure for gathering drinking water and distance between home and drinking water source.

Model summary

Model	R	R Square	Adjusted R Square
1	.252ᵃ	.064	.042

Table 3: Relationship between total expenditure for gathering drinking water and distance between home and drinking water source (model summary)

In accordance with table 3, R^2 is 0.064 which means that approximately 6% of variance in expenditure was influenced by the factor of distance. P value of distance from water resource of 0.09 is higher than 5% implying which is insignificant to explain variable association.

$$Y = 411.371 + 247.805X_3$$
$$(0.549) \quad (0.09)$$

Y refers total expenditure for gathering drinking water and X_3 is implying distance from drinking water source by kilometer. Even the model also implying that if 1 kilometer of distance from water resources increase that make to spend money also will be increase by approximately 248 Rs for gathering drinking water. Because of water scarcity that induce the demand for water by rupees and distance for water resources makes the transportation cost thus cost of drinking water is affect the living standard.

V. CONCLUSION AND RECOMMENDATION

1 findings and conclusion

This cross sectional study has mainly focused on how much affect the drinking water problem on the people's living standard. The study has been carried out with adapting to the quantitative approach by using a sample survey. Objectives are scrutinized with descriptive statistics and regression models with the help of SPSS software.

Main objective is that identify the drinking water problem that how to affect on the people living standard. Specially expenses for gathering drinking water dominates a major part of expenses for households of pallikuda GN division.

As the result of analysis which clearly express that there are certain amount of income goes as expenses for gathering drinking water. Therefore they cannot access any other income generation activity like home gardening and level of consumption and investment also may be low due to certain amount of water expenses was fixed.

In statistically the finding is that there is average positive correlation level which is 0.520 between these variable. And also R2 is 0.27 which means that approximately 27% of variance in expenditure of gathering drinking water is explained by income. If increase the income level in a family by 1000 Rs there is approximately 133 Rs of expenses will be increase for gathering drinking water facility. So It can be conclude that the expenses for gathering drinking water which affect the people living standard.

Sub objectives also examined that relationship between total expenditure for gathering drinking water and family members. Therefore the result revealed that there is high positive correlation which is 0.820 between total expenditure for gathering drinking water and family members. the model also clearly defines that if increase one person in a family where 327.681 rupees of monthly expenditure for gathering drinking water also will be increase. So finally it can conclude that highly related the expenses for gathering drinking water and family members.

Another objective also analyzed and the finding is that there is low positive correlation between total expenditure for gathering drinking water and distance between home and drinking water source. Even the model also implying that if 1 kilometer of distance from water resources increase that make to spend money also will be increase by approximately 248 Rs for gathering drinking water. Thus here also relationship which is clearly proved.

As with the findings it can be conclude among these variables, number of family members were mostly influenced in the expenditure for gathering drinking water.

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2 Recommendation

Water projects include wells, tanks and rain catchment systems, which provide a reliable source of water that is safe to drink. It is not just the practical systems being implemented that make a difference, though providing training in hygiene ensures that the water and the village remain clean and healthy.

Within these project mainly consider to implement the sub projects such as repairs of common Wells, reconstruction and construction of common Wells and reconstruction and construction of Tube wells can be constructed in the good water places for easy access to get good water without making any cost.

Water supply project (pipe line water) also can be implemented to each and every household unit by Water supply and drainage board with government consideration which provides a reliable source of water that is safe to drink no need for anyone to spend their days walking to collect water but it will be make an expensive to every household for initiation cost and monthly water bill payment. Anyhow Community can manage better living standard than previously.

Rain water harvesting is also one of the solution here. Rain water harvesting system for households and school can be implemented with the support of NGOS likes Lanka rain water harvesting forum and build rain water harvesting tank and will conduct awareness programs, training programmes on Operation and Maintenance of rain water harvesting system for students teachers and the individuals within the community.

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