ASSESSMENT OF ADOPTION OF WATER AND SANITATION PRACTICES BY RURAL DWELLERS IN NIGER STATE, NIGERIA

[1]Umar, I.S. and [2]Mohammed, U. and [3]Yakubu, D.H.
[1]Department of Agricultural Economics and Extension Technology, FUT, Minna
[2]Niger State Ministry of Agriculture and Rural Development, Minna
[3]Department of Agricultural Extension and Rural Development, UDU, Sokoto
umarsheshi@gmail.com

ABSTRACT

This study examined the adoption of recommended water and sanitation practices in Niger State, Nigeria. Multistage sampling technique was used to select 223 respondents for the study, using validated interview schedule with reliability coefficient of 0.86. Data collected were analyzed using descriptive statistics and regression model. Results showed that 51.29% of the respondents were within the active age range of 41-50 years, while 69.40% were male. The findings indicated that water and sanitation practices such as collecting water from protected sources ($\bar{x}$=2.89), storing water in clean containers ($\bar{x}$=2.73) and burning of garbage to control flies ($\bar{x}$=2.06) were widely adopted in the area. Some of the perceived effects of adoption of water and sanitation practices were reduction in medical bills, improved hygiene and increase in productive time for farming with 65.0%, 60.1% and 54.7% response rates respectively. Education, income and cooperative membership had positive significant influence on adoption of recommended practices at $P \leq 0.05$ probability level. Challenges to the adoption of water and sanitation practices were high cost of facilities, inadequate knowledge and cultural practice. Thus, it was recommended that more awareness should be created among respondents by Rural Water Supply and Sanitation Agency and agricultural/health extension workers through cooperative societies to improve level of adoption and change the cultural practice of open defection. It was also suggested that the respondents should be taught the use of local water purification methods, detergents and soaps to assuage the problem of high cost of facilities.
Keywords: Adoption, Practices, Rural dwellers, Sanitation, Water,

INTRODUCTION

In African, about 40 percent of the population lacks access to improved water and sanitation, while 19 percent and 52 percent, respectively lack access to improved water and sanitation in Asia. Other parts of the world such as Europe, America and Australia regions have higher rates of access to improved water and sanitation (World Health Organization/United Nation Children Education Fund/Water Supply and Sanitation Collaborative Council {WHO/UNICEF/WSSCC}, 2009). Nigeria has the highest population in African. But, the rapid population growth of Nigeria has not been accompanied by increase in the delivery of essential services like potable water supply, sewerage sanitation and collection/disposal of

solid wastes (Federal Ministry of Water Resource {FMWR}, 2010). Therefore, populace continues to use unsafe water and sanitation practices such as unsafe human excreta disposal (Open defecation), unsafe solid and liquid waste disposal as well as unsafe drinking water. Consequently, the unhygienic practices results in water and sanitation diseases such as malaria, dysentery, diarrhea, typhoid fever, scabies etc., which negatively affect farmer's productive time for farming.

In order to improve water and sanitation practices, Water Aid intervention was initiated in Niger State through Rural Water Supply and Sanitation Agency (RUWATSAN) to disseminate improved water and sanitation practices for adoption by rural dweller. The recommended practices were boiling of water before drinking, filtering and disinfecting water at point of use, storage of clean water in clean containers, collection of water from protected sources, defecating in toilets/latrines, appropriate hand washing behaviour and burning of garbage to control flies (Water Aid, 2009). In view of the effort made by the Water Aid and RUWATSAN in promoting safe water and sanitation practices, particularly in the rural areas, there is the need to examine the current level of adoption of the recommended water and sanitation practices to provide independent essential information for the government, implementing agency and partners or sponsors for planning, adjustment or replication of the intervention as the case may be. The specific objectives of the study are to: describe socio-economic characteristics of respondents; determine adoption of water and sanitation practices; determine perceived effects of water and sanitation practices; identify socio-economic factors influencing adoption of water and sanitation practices and ascertain constraints to adoption of water and sanitation practices.

METHODOLOGY

The study was carried out in Niger State, Nigeria located in Guinea Savanna ecological zone of Nigeria. The State lies between latitudes $8^022'$ and $11^030'$N and longitudes $3^030'$ and $7^020'$E. Annual rainfall of the State range from 1600mm in the south to 1100mm in the north with average monthly temperature range of about 23^0C to 29^0C. The major occupation of the people is crop and livestock farming (Niger State Geographic Information System, 2007). Multistage sampling procedures were adopted for the study. The first stage involved purposive selection of two Local Government Areas (LGAs) from each of the three agricultural zones in Niger State, based on the presence of Water Aid interventions. The selected LGAs are Gbako. Agaie Munya, Rafi, Agwara and Mashegu. The second stage also involved purposive selection of three intervention villages in each of the selected LGAs. In the third stage, 10% of the households were selected in each village using simple random technique. Total sample size of 223 was selected as respondents from a sampling frame of 2,230 established through the village heads. Content validity of the instrument for data collection i.e. interview schedule was ensured through consultation with experts and literature scan. The interview schedule which was further subjected to Cronbach's Alpha reliability test (0.86) was utilized by researchers and enumerators for data collection in February, 2017.

Data were collected on socio-economic characteristics, adoption of water and sanitation practices, perceived effects of adoption of water and sanitation practices on livelihood and constraints faced. Age and educational level were measured in years, while sex was measured as male or female. Similarly, household size, extension contacts, cooperative membership were measured in numbers and income was measured in naira. The adoption of the practices were measured using 3 points rating scale of always practice =3, rarely practices = 2 and not practice =1. In order to determine adoption, the values of the scale (1+2+3) were summed up to get 6 which was divided by 3 to get 2 (mean). Any recommended practice with a mean score of 2 and above suggests adoption and any practice with mean less than 2 was regarded

as not adopted. The perceived effects of adoption on livelihood were determined by asking the respondents to indicate the perceived effects of adoption on their livelihood. Constraints were determined by asking the respondents to indicate the problems they faced. Data collected for objectives one, two, three and five were analyzed using descriptive statistics (frequency, percentage and mean) while objective four was achieved using multiple regression analysis. The multiple regression is explicitly specified as follows:

$Y = a + b_1 x_1 \ldots \ldots \ldots b_7 x_7 + u$

Where:

Y = Adoption of water and sanitation practices (Total adoption score for all the recommended practices)

X_1 = Age (years)

X_2 = Education (years)

X_3 = Income (Naira)

X_4 = Extension contacts (Number)

X_5 = Household size (Number)

X_6 = Cooperative membership (Number)

X_7 = Gender (Male=1, female=0)

a = constant

b_1-b_7 = Coefficients

u = Error term

RESULTS AND DISCUSSION

Socio-economic Characteristics of Respondents

Result in Table 1 revealed that 51.29% of the respondents were within the age range of 41-50 years. The result suggested that more than half of the respondents in the study area were able boded people, which would be instrumental to the understanding and adoption of recommended practices such as that of water and sanitation, because of their medium ages. This finding affirms the report of Umar *et al*. (2009) which stressed that most of the farmers

in the rural area were within the age range of 40-50 years. Similarly, Table 1 indicated that only 32.33%, 22.42% and 18.97% of the respondents respectively attended primary, secondary and tertiary education. This result implies low level of formal education by the respondents. Thus, they may not appreciate the recommended water and sanitation practices for proper adoption. Table 1 also showed that 62.50% of the respondents had household sizes of between 6-10 members. The implication of this is that large households will exert more pressure on household facilities, which will lead to inadequacy of facilities and nonconformity to the recommended water and sanitation practices. In a related study, Umar *et al.* (2013) reported that majority of the rural farmers in Niger State had family sizes of 6-10 persons.

Furthermore, Table 1 revealed that 55.17% of the respondents had one extension contact per year. Implying that most of the respondents had low extension contact on water and sanitation practices. With low extension contacts, the respondents will not get the adequate information needed for the adoption of the recommended practices. Table 1 showed that 69.40% of the respondents were male; the remaining 30.60% were female. The result suggested that most of the household heads in the area were male. More so, Table 1 indicated that 60.36% of the respondents were members of the cooperative societies. The findings implies that majority of the respondents in the study area belong to more than one cooperative societies. Membership of many societies by the respondents is expected to expose them to more channels of information on improved technologies and practices. In addition, Table 1 should that the estimated annual income of 57.75% of the respondents ranged between ₦200,001- ₦400,000. The result suggested that the respondents were low income earners which may lead to low adoption of recommended practices due to inability to afford needed facilities such as disinfectants, soaps and detergents as well as building of latrines/toilets for adoption.

Table 1: Socio-economic characteristics of respondents

Socio-economic characteristics	Frequency	Percentage
Age		
21-30	8	3.45
31-40	18	7.76
41-50	119	51.29
51-60	80	34.48
Above 60	7	3.02
Formal education		
No education	36	15.52
Adult education	25	10.76
Primary education	75	32.33
Secondary education	52	22.42
Tertiary education	44	18.97
Household size		
1 – 5	59	25.43
6 – 10	145	62.50
11 – 15	28	12.07
Extension contacts		
Once	128	55.17
Twice	51	21.99
Thrice	31	13.36
Four times	22	9.48
Gender		
Male	161	69.40
Female	71	30.60
Cooperative society membership		
One membership	30	12.93
Two membership	140	60.34
Three membership	62	26.73
Income		
₦001 – ₦100,000	34	14.67
₦100,001 – ₦200,000	33	14.22
₦200,001 – ₦300,000	82	35.34
₦300,001 – ₦400,000	52	22.41
₦400,001 – ₦500,000	31	31.36

Adoption of Water and Sanitation Practices

Finding in Table 2 indicated that majority of the respondents in the study area adopted recommended water and sanitation practice of collecting water from protected sources ($\bar{x}$=2.89).The result also showed that the recommended practice of storing clean water in clean containers ($\bar{x}$=2.73) was widely adopted by the respondents in the study area. In the same view, the practice of burning home garbage and refuse to control flies, odour and littering of environment ($\bar{x}$=2.06) was adopted by the respondents. Adoption of those practices suggests that the respondents fetched water from protected boreholes and wells which are stored in pure tanks, drums and other storage facilities to prevent pollution and contamination. However, water and sanitation practices such as appropriate hand washing behaviours ($\bar{x}$=1.92), defecating in toilets and latrines ($\bar{x}$=1.77), filtering and disinfecting water at point of usage ($\bar{x}$=1.25) and boiling of water before drinking ($\bar{x}$=1.08) were not widely adopted in the study area. This finding is in consonance with the report of Kashmir Charitable Trust KCT (2008) which indicated low adoption rates for defecating in toilet/latrines, appropriate hand washing behaviours and filtering/disinfecting of water before drinking.

Table 2: Adoption of water sanitation practices

Practices	Mean
Collection of water from protected sources	2.89
Boiling of water before drinking	1.08
Disinfecting / filtering of water at point of use	1.25
Storage of clean water in clean containers	2.73
Appropriate hand washing behaviours	1.92
Burning of garbage to control flies	2.06
Defecating in toilets and latrines	1.77

Source: Field survey, 2017

Perceived Effects of Water and Sanitation Practices on Livelihood

Entries in Table 3 showed that adoption of water and sanitation practices reduced household expenditure on medication of 65.02% of the respondents, thereby saving more money for the procurement of farm inputs. Similarly, 60.09% of the respondents noted that adoption of recommended water and sanitation practices improved their personal and environmental hygiene, which consequently improved their health conditions, cleanliness and well-being. Furthermore, the respondents stressed that with the adoption of improved water and sanitation practices, there was a reduction in water and sanitation related diseases and by extension and implication reduction in illnesses and more labour/productive time for farming as reported by 54.71% of the respondents. This result validates the finding of Pruss *et al.* (2002) who reported that adoption of recommended water and sanitation practices leads to cost savings in medical expenditure due to reduced number of disease infestations.

Table 3: Perceived effects of adoption of water and sanitation practices

Perceived effects*	Frequency	Percentage
Reduction in medical bill	145	65.02
Improved hygiene practice	134	60.09
Increase in productive time for farming	122	54.71

Source: Field survey, 2017

* Multiple responses

Socio-economic Factors Influencing Adoption of Water and Sanitation Practices

The result of regression analysis in Table 4 revealed that formal education had significant positive influence on adoption of water and sanitation practices, this implies that higher educational attainment by the respondent would increase the likelihood of adoption of water and sanitation practices, because education increase access to information which facilitate adoption decisions. This finding concurs with that of Idrisu *et al.* (2010) who stressed that

education influenced adoption of improved practices. Similarly, income of the respondents had significant influence on adoption of water and sanitation practices. This relationship is expected because increase in income would enable the respondents to afford facilities such as soaps, disinfectants and latrines for proper adoption. Also, cooperative membership had significant influence on adoption; suggesting that membership of associations exposes respondents to information on water and sanitation practices and access to resources which facilitated adoption.

However, household size of the respondents had negative significant influence on the adoption of water and sanitation practices. This implies that the bigger the size of the household, the less the probability of adopting water and sanitation practices. This is not surprising because when the size of the household is large, more facilities like water, soap, detergents would be required to maintain good hygiene and sanitation in the household. Therefore, larger households would have more family members exerting more pressure on facilities thereby reducing adherence to the recommended water and sanitation practices. Furthermore, the R^2 value of 0.6206 implies that 62% of the variation in the adoption of water and sanitation practices was due to the independent variables included in this model.

Table 4: Socio-economic factors influencing adoption of water and sanitation practices

Socio-economic characteristics	Coefficients	T – ratios
Constant	15.04701	13.21
Age	-0.3593127	- 1.87
Education	1.260948	9.88*
Income	0.5778393	4.52*
Extension contacts	0.0676713	0.52
Household size	-0.8005996	-7.87*
Cooperative membership	0.2321966	2.25*
Gender	0.0106026	1.80
R^2	0.6206	
Adjusted R^2	0.6086	
F – ratio	52.81	

Source: Computed from field survey data, 2017
* Significant

Constraints to Adoption of Water and Sanitation Practices

From Table 5, challenges to the adoption of water and sanitation practices in the study area were high cost of kerosene/disinfectants (58.74%), inadequate knowledge on filtering/disinfecting of water (56.50%) and cultural practice (50.22%). This finding thus, implies that high cost of kerosene/disinfectants such as soaps and inadequate knowledge on how to filter and disinfect water were responsible for low adoption of disinfecting, filtering, boiling of water before drinking or using and appropriate hand washing behaviours. Also, the cultural practice of defecating in the surrounding bushes justifies the low adoption of the recommended practice of defecating in toilets and latrines as shown in Table 2. Earlier, Umar *et al*. (2006) found that high cost of input limited the adoption of recommended technologies and practices by rural farmers.

Table 5: Challenges for adoption of water and sanitation practices

Challenges*	Frequency	Percentage
High cost of kerosene and disinfectants	131	58.74
Inadequate knowledge on filtering and disinfecting of water	126	56.50
Cultural practice	112	50.22

Source: Field survey, 2017

* Multiple responses

CONCLUSION

Based on the findings of the study, it was concluded that 51.29% of the respondents fall within age range of 41-50years. Water and sanitation practices such as collection of water from protected sources, storage of water in clean containers and burning of garbage to control flies were widely adopted in the study area. Some of the perceived effects of adoption of water and sanitation practices on the livelihood of the respondents were reduced expenditure on medication, improvement in personal and environmental hygiene and increase in productive time for farming. Factors that had positive significant influence on adoption of water and sanitation practices were formal education, income and cooperative membership.

Challenges to the adoption were high cost of facilities, inadequate knowledge and cultural practice.

RECOMMENDATIONS

More awareness should be created on the adoption of practices such as boiling of water before drinking, filtering and disinfecting of water, appropriate hand washing behaviours and defecating in toilets/latrines by the RUWATSAN in collaboration with agricultural/health extension workers through cooperative societies, in order to improve their level of adoption and change the cultural practices of open defecation.

Inadequate knowledge was one of the challenge to adoption, thus the respondents should be adequately educated on filtering and disinfecting of water by RUWATSAN and health extension workers.

In order to assuage the problem of high cost of facilities which constrain adoption in the study area, RUWATSAN and Water Aid intervention should teach the rural dwellers the use of local water purification methods, detergents and soaps using herbs and ashes, which can be locally sourced and cheap.

REFERENCES

Federal Ministry of Water Resources (2010). Water supply and sanitation in Nigeria: Strategy for Sustainable Development. A presentation at Governor's seminar/Donor Conference held at Nicon Hilton, Nigeria, 4-5 December, 2010.

Idrisu, V.L., Ogunbameru, B.O. and Amaza, P.S. (2010). Influence of farmers' social-economic and technology characteristics on soyabean seeds technology adoption in Southern Borno State, Nigeria. *African journal of Agricultural Research* 5(2):1394-1398.

Kashmir Charitable Trust (2008). Knowledge, attitude and practice. Report on sanitation and hygiene Docstoc. Accessed from www.docstoc.com on 7th March, 2014.

Niger State Geographic Information System (2007). Background information. Retrieved in April 4th, 2013. From www.nigeris.com/about-nigerstate

Pruss, A., kay, D., Fewtrell, L. and Bartram, J. (2002). Estimating the global burden of disease from water, sanitation and hygiene at the global level, *Environmental Health Perspectives*, 110 (5):537-542.

Umar, S.I., Hamidu, B.M. and Iliyasu, Y. (2006). Adoption of improved rice production technologies in Lavun Local Government Area of Niger State. In: Madukwe, M.C., Olowu, T. A., Igbokwe, E. M., Garfouth, C. J. and Dube, M. A. (eds) *Changing Perspective in Extension Innovation System in Nigeria*. Proceedings of the 11[th]Annual Conference of Agricultural Extension Society of Nigeria, held at University of Agriculture, Abeokuta, Nigeria. 3rd – 6th April, 2006, pp.18-24.

Umar, I.S., Ndanitsa, M.A., and Olaleye, S. R. (2009). Adoption of improved rice production technologies among youth farmers in Gbako Local Government Area, Niger State. *Journal of Agricultural Extension,* **13 (1)** : 1-8.

Umar, I.S., Ndanitsa, M.A, Olaleye, R.S., Ibrahim, M. and Iliyasu, A.Y. (2013). Determinants of solid waste usage by farmers for crop production in Bosso Local Government Area of Niger State, Nigeria. *ATBU Journal of Technology and Educational Research,* **6 (1)** : 58-63.

Water Aid (2009). Wider impacts of water, sanitation and hygiene education projects, Issue sheet http://www.wateraid.org/documents/widerimpacts 2006. Pdf. Accessed on 5th April,2011.

World Health Organization/United Nation Children Education Fund/Water Supply and Sanitation Collaborative Council (2009). Global water supply and sanitation. Assessment 2009Report.Geneva/NewYork.http://www.who.int/water.sanitation.health/monitoring/globalassess/en/. Retrieved on 10th June, 2011.