"Wealth and contraception: the case of women in Kenya"

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Abstract

This paper uses household survey data to analyze the effect of wealth on the utilization of modern contraception[1] for a woman in Kenya. The analysis confirms that wealth disparities contribute to inequalities in the utilization of modern contraception among women. The type of wealth held by a woman affects differently her use of modern contraception: a modern woman[2] is more likely to have access to modern contraception than a woman holding traditional wealth[3]. Indeed, modern wealth and traditional wealth have an opposed effect on the use of modern contraception. Moreover, women holding traditional wealth or living in poor conditions are mainly living in rural areas. These findings underscore the importance of implementing measures at the county level to support an improved access to modern contraception for *rural* women.

1   Introduction

The London Summit on Family Planning in 2012 took place to ensure that the world's poorest women have the same access to contraceptives as women in high-income countries. This event launched the Mondial movement FP2020 allowing 120 million women in 69 poorest countries to access modern contraception by 2020.

Between 1980 and 2017, the fertility rate decreased from 6.6 to 4.5 children per woman on average on the African continent[4]. Other continents have also experienced this decline trend attributable to various socioeconomic factors, over the past two centuries. In Africa, this decline in the birth rate is almost due to proactive family planning policies, but the fertility rate remains high (Fall et Ngom, 2007). To reduce fertility rate, governments need to implement doubled actions: actions on demand, by changing birth control standards, and actions on contraception supply by improving access to information, products, and services. These are all elements that should help curb the

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[1]According to the World Health Organisation, modern contraception is sterilization, hormonal and barrier methods, emergency contraception, breastfeeding and standard cycle methods. We will discuss on this definition later.

[2]A modern woman holds modern wealth i.e all goods and services acquired in a modern economy characterized by market exchanges (Garenne, 2015).

[3]Garenne (2015) defines traditional wealth as goods which are not acquired by money exchange, but which are associated with prestige and social status.

[4]"Fertility rate, total births per woman - Sub-Saharan Africa", the World Bank.

continent's population growth.

Gobopamang and Halima (2002) argue that fertility level is a causal factor of the degree of development. A high population growth seems difficult to reconcile with the satisfaction of sustainable development goals. Because Africa is a continent that suffers from underdevelopment and instability, controlling for fertility became a major concern for African Governments and led to an international commitment on Family Planning to increase the contraception prevalence rate.

However, the contraception prevalence rate remains relatively low in Africa[5]. The causal relationship between the standard of living of the household and the contraceptive practice of a woman is explained by Congo (2005) as follows: "if a woman lives in the best conditions, then she will adapt behaviors favorable to contraception". Indeed, poor living conditions fosters women to have many children as a means to ensure a more secure future and escape from misery, or women living in poor condition cannot afford modern contraceptive methods (Nouetagni, 2010).

Kenya is an example of a Sub-Saharan country that has made significant progress in increasing access to family planning services in recent years, while its population has doubled in 25 years. As a result, the number of children per woman decreased from 6 to less than 4 between 1990 and 2014[6]. In addition, this country shows a relatively high modern contraceptive prevalence rate which increased from 39% in 2014 to 58% in 2021.

One important feature about Kenya is that it is one of the most unequal countries in Africa. In 2015, more than 36.1% of the population lives below the poverty line according to the World Bank. Another important feature is that Sub-Saharan Africa has a high rate of female economic activity: they make up nearly 43% of the labor force[7]. According to the International Monetary Fund, almost two-thirds of these women are employed in agriculture which represents a major contribution to the Kenyan economy. In the non-agricultural sectors, most of them are employed as self-employed in the informal sector. It is only in informal paid employment that their proportion takes over.

This led to ask us whether a Kenyan woman wealth has an impact on her use of contraception.

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[5]The average contraceptive prevalence rate in Africa (22%) is less than half that of South Asia (53%) and less than a third that of East Asia (77%) (the World Bank, 2009).

[6]"Fertility rate, total births per woman - Kenya", the World Bank.

[7]"Labor Force, female (% of total labor force) - Sub-Saharan Africa", the World Bank.

Studying the population of women in Kenya allows us to be in a context where contraception prevalence rate has increased thanks to the commitment and means employed by the Kenya Government, and to be in a country where the poverty rate is still important. A study conducted by Gakidou and Vayena (2007) showed the relevant result that poor women were less likely to use contraception than average women in their country.

Because the main resources of a woman in Africa are not financial, it is complex to evaluate the level of wealth of a woman in Kenya. Therefore, Michel Garenne (2015) has presented an indicator of wealth adapted for developing countries. This indicator considers two relevant forms of wealth. He calls them modern wealth and traditional wealth. Modern wealth corresponds to goods and services that are acquired in a market modern economy such as a feature of the home, equipment, energy source, transportation, or services. The traditional wealth corresponds to goods and services generally produced without a monetary exchange such as food production, livestock, building and artisanal production from natural elements, unpaid services within the household. Livestock as traditional wealth helps to define social status and prestige in local society according to Baroin and Boutrais (2008). Michel Garenne's major finding is that modern wealth is strongly negatively correlated with fecundity parameters in the sense that more modern wealth corresponds to a lower fecundity level, whereas traditional wealth is positively correlated with fecundity parameters.

In this paper, we explain the effect of wealth on the utilization of modern contraception by running logistic regressions. The probability for using modern contraception is explained by three types of variables. Variables that represent modern wealth and variables representing traditional wealth for a woman in Kenya according to the definition of Michel Garenne (2015), but also caracteristics of the woman that should influence her use of contraception. We found that modern wealth variables have positive effects on the probability of using modern contraception while traditional wealth variables and poor living conditions have negative effects on the probability of using modern contraception. In addition, the construction of a modern woman according to the definition of Michel Garenne (2015) illustrates the positive correlation between modern wealth and use of modern contraception.

After this general introduction which presented the research topic and the problematic, the thesis is

structured around three chapters. The first chapter deals with data documentation. After the presentation of source of the data, the sample selection, and an explanation of transformation of some variables, a descriptive analysis and a selection of variables are set out. The chapter 2 displays the two different logistic models we used. Both explain the probability to use modern contraception relatively to modern wealth variables, traditional wealth variables and control variables. What differentiate the two models is the clustering at the sub-national level in the second model. The results of data analysis and their interpretation are presented in the chapter Results in two points: the average marginal effects of the model 2 on the probability to use modern contraception, and level and trends of the predictive probability to use modern contraception for a modern woman compared to a non-modern woman. Based on the literature review and the country context, the results of the study are interpreted and put into perspective in the conclusion.

2   Data documentation

Our data set is sourced from the website IPUMS Global Health which provides integrated international health survey data for research and educational purposes. Specifically, our dataset is derived from the Performance Monitoring for Action (PMA) surveys series, fielded by the Bill and Melinda Gates Foundation and Johns Hopkins University. Over the period from 2014 to 2021, approximately 8.000 Kenyan women were surveyed each year, resulting in a total dataset of around 60.000 women. Data has been collected in the context of Family Planning 2020 goals, by local enumerators from households and women of childbearing age.

2.1   Sample Selection

The PMA data include female respondents, household members, female non-respondents. For the purposes of our analysis, we focused on female individual respondents. To ensure data consistency, we only kept non-pregnant women to avoid the inclusion of pregnant women who may not be using contraception due to their pregnancy rather than a deliberate choice. The absence of duplicates enabled us to assign a unique identifier (ID) to each woman. In addition, because of the lack of

data on 2016, we dropped this year.

2.2 Transformation of variables

We transformed some variables of our original data. Firstly, for variables on the main walls (WALLS), roof (ROOF) and floor (FLOOR) material, we create a dummy which take into account whether the woman has "structured" walls, roof or floor. Each variable is a dummy, the construction is presented in Tables 2, 3 and 4.

Secondly, as explained in Tables 5 and 6, we consolidated various levels of drinking water sources (DRINKINGWATER) into broader groups (e.g. "Piped water outside dwelling" and "Public tap/standpipe" were merged into a single category). Similarly, we combined different types of main toilet facilities (TOILETTYPE) into broader levels (e.g. "Bucket or pan" and "Hanging toilet or hanging latrine" were grouped under "Rudimentary facilities").

Thirdly, because the number of goats is a variable which take extreme values, we added a new variable LOG_GOAT, the logarithm of the variable GOATNUM + 1.

2.3 Descriptive statistics

In our sample, we observe that 48.38% of women use modern contraception in 2021. Relatively, according to FP2020, 58% of women in Kenya used modern contraception in the same year. Additionally, in our sample, 66% of women live in rural areas in 2021, compared to 72% for the entire country of Kenya in 2021. On average, each woman in our sample has 2.38 children. However, this number is lower than the national average in Kenya, which was 3.4 children per woman in 2021. This divergence can be explained by the fact that our sample includes a significant proportion of younger women as shown in Figure 4, and younger women have typically fewer children than older women. Moreover, 95.8% of women in our sample having no toilet facility are living in rural areas, as well as 78.9% of women owning livestock, which is part of traditional wealth.

2.4 Selection of variables

To ensure that variables are relevant, we checked the frequency of the values for each variable and we removed any outliers with a significant disparity between the two value. For landline telephone (HHPHONE), 864 women have one against 58.403 who do not, so we dropped this variable from the regression variable as well as we dropped (CAR), (FRIDGE), (HORSENUM) for the same reason.

We ran a first regression and we only obtained an analysis on 1.516 observations because the sample contains a lot of missing values for some variables. We did not have enough values for variables (HANDWASH), (DESIRELASTCHIL), (PREFTIMECH), (FERTPREF), (NBCHILDRENFIRSTUSE) and (WORK). By removing them we obtained a regression on 34.832 women.

3 Econometric model and estimation

The purpose of our analysis is to estimate the probability of using or not modern contraception. As defined by the World Health Organisation and the FP2030, United Nations Foundation, modern contraception is sterilization, hormonal and barrier methods, emergency contraception, breastfeeding and standard cycle methods. From our point of view, it is difficult to consider the two last methods as modern methods. Nevertheless, only 1.16% of the women in our sample are using them, therefore we decided to follow this definition. However, herbs, charms and vaginal douching are not counted as contraceptive methods as they have no scientific basis in preventing pregnancy.

3.1 Model 1

We use a logit model because our explained variable (MCP) is a dummy. At first, this model was a *naive* model: we took into account every selected variables. Then, we removed the non significant ones such as (BIKE), (COWBULLNUM), (CHICKENNUM), (FLOOR), (BED) and (TV). Additionally, to capture the non linear effect of the age on the probability of using contraception, we decided to divide this variable into 5 bins and to compare the effect of each level with the reference which is being between 15 and 19 years old.

Then the model 1 is defined by:

$$\mathbb{P}(mcp_i = 1 | X_i) = \frac{1}{1 + e^{-X_i'\beta}}$$

Where:

$$X_i'\beta = \beta_0 + \beta_1 \text{drinkingwater}_i + \beta_2 \text{toilettype}_i + \beta_3 \text{walls}_i + \beta_4 \text{roof}_i + \beta_5 \text{elec}_i + \beta_6 \text{mobphone}_i + \beta_7 \text{motorcycle}_i$$
$$+ \beta_8 \text{radio}_i + \beta_9 \log \text{goat}_i + \beta_{10} \text{sheepnum}_i + \beta_{11} \text{education}_i + \beta_{12} \text{marstat}_i + \beta_{13} \text{healthcenter}_i$$
$$+ \beta_{14} \text{urban}_i + \beta_{15} \text{year}_i + \beta_{16} \text{birthevent}_i + \beta_{17} \text{age\_bins}_i$$

And *drinkingwater*, *toilettype*, *education*, *marstat*, *age_bins* are composed of several categories.

3.2 Model 2

Although we used robust standard errors in the Model 1, standard errors could be biased due to serial correlation. Kenyan counties (regions) have a lot of power in terms of policy implementation. The Model 2 captures this information by clustering standard errors at sub-national level in order to control for the independence of standard errors. Therefore second model is exactly the same as the Model 1 with clustered standard errors at the sub-national level.

4 Results

We analyze only the results of Model 2 because it is the most complete and realistic one.

4.1 Model 2

The Figure 1 shows the results associated to the significant variables of the Model 2. Firstly, all control variables have a positive impact on the probability of using a modern contraception. We can state that, ceteris paribus, a woman who is currently living with a partner has a probability of using a modern contraception 32.4 percentage points higher than the probability of using a modern contraception of a woman who has never been married. Secondly, regarding variables

with a positive average marginal effect, we notice that most of them are linked to modern wealth: *has structured walls, has structured roof, has electricity, has a motorcycle* and *has a radio*. This finding is consistent with prior literature: Garenne (2015) found that modern wealth is negatively correlated with the fecundity rate. In our study, having a structured roof, compared to having no structured roof, increases the probability of using a modern contraception by 6.5 percentage points, ceteris paribus. In parallel, Congo (2005) showed that a woman living in comfort conditions will adapt behaviors favorable to use contraception. We can link our result with Congo's result by stating that having a structured roof is typically a sign that a Kenyan woman is living in good conditions. Thirdly, we find that two variables of Model 2 characterizing the traditional wealth i.e (SHEEP) and (LOG_GOAT) have a negative average marginal effect. An increase by 1% in the woman's number of goats decreases her probability of using contraception by 2 percentage points, ceteris paribus. In the same way, owning one more sheep reduces the probability of using modern contraception by 0.5 percentage points, ceteris paribus. Once again, these results are in line with results of Garenne (2015) pointing out that traditional wealth is positively correlated with the fecundity rate. In addition, absence of toilet facility is a clear sign of poverty for a household. In our study, ceteris paribus, a woman with no toilet facility in her house has a probability of using modern contraception that is 9 percentage points lower than that of a woman living in a house with a flush toilet, this result is supported by Gakidou and Vayena (2007): poor women are less likely to use contraception than average women in their country. Fourthly, there are some strange effects for the two levels, pit latrine and composting toilet, of the variable (TOILETTYPE). Indeed, having one of these two categories of toilet (composting and pit latrine) compared to having flush toilet, increases the probability of using a modern contraception, ceteris paribus. This finding could be linked to the large number of woman living in a house with pit latrine (91%), in comparison to the few number of woman living in a house with composting toilet (1%) or flush toilet (16%). Finally it is important to point out that almost all average marginal effects associated to wealth variables (modern and traditional) are smaller than all average marginal effects of the control variables. We have to highlight the fact that our control variables could be correlated to the modern wealth (for instance, women with a better level of education are in majority living in urban areas, a factor

linked to modern wealth).

Figure 1
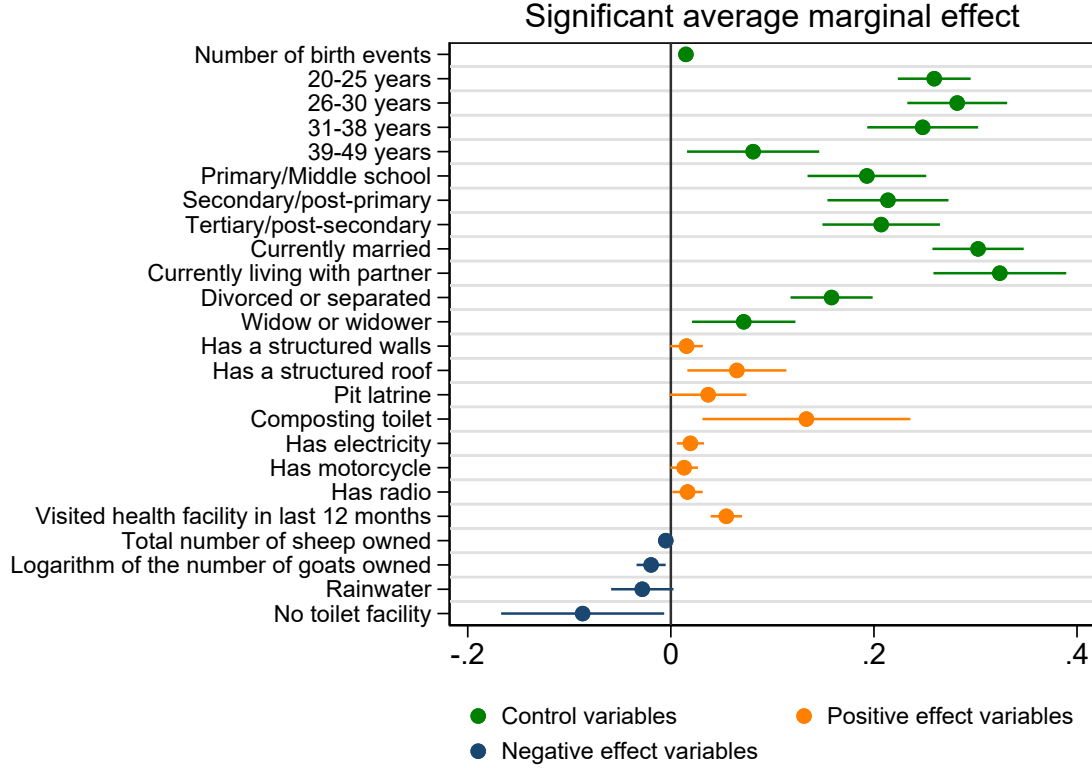
4.2 Creation of a modern woman

We create an archetype of a modern woman to compare the difference in contraception use between what we can define as women with modern and non-modern wealth. Based on the literature, we define a modern woman by having at least a fridge or electricity or the highest level of education (she has been to University). The Figure 2 shows the evolution across time of the proportion of modern women and non-modern women using modern contraception. Firstly, the proportion of modern women using modern contraception is higher than the proportion of non-modern women for all years. In addition, the increase in the proportion of modern women using modern contraception over time is largest than the increase in proportion of non-modern women using modern contraception. Thence, based on the Model 2, we computed the predicted probabilities of using modern contraception for modern women and non-modern women. We find that the predicted

probability of using modern contraception is statistically higher at 95% level confidence in 2015, 2020 and 2021 for modern women than for non-modern ones (Figure 3).

Figure 2
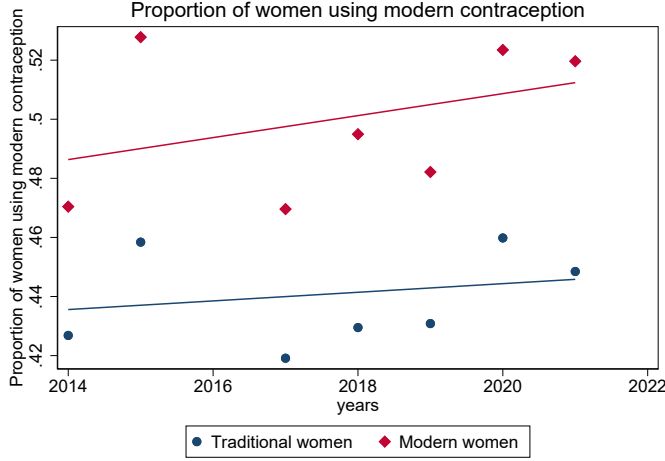
Figure 3
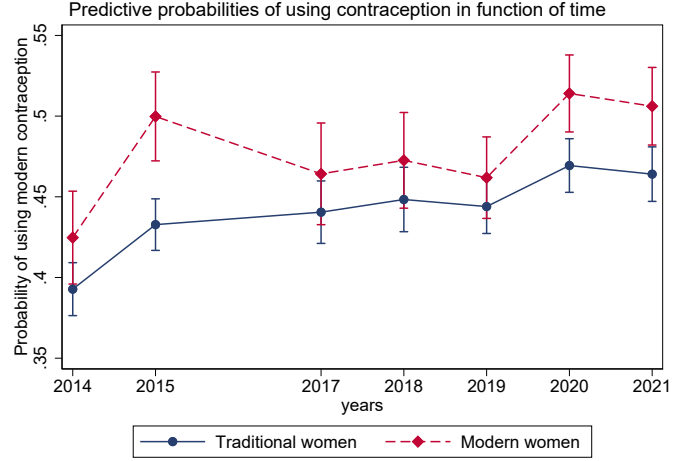
5 Conclusion

Using indicators of modern wealth and traditional wealth is particularly relevant for our study to understand in what way wealth affects the use of contraception. It shows an opposite correlation sign with the use of modern contraception. Moreover, inequalities in the use of contraception remain between poor and rich women. These findings underscore the importance of implementing measures at the county level to support improved access to modern contraception for rural women which mainly hold traditional wealth or live in poor conditions. Limitation of this project is that variables depicted by the definition of Garenne (2015) of a modern woman are missing in our construction of the modern woman. Biased information are also due to an under representation of the 47 Kenyan counties in our sample, while family planning is disparately implemented among counties. To go further, computing various wealth indicators and analyzing their distinct impacts on the utilization of modern contraception could be a compelling avenue of investigation. Implementing a randomized control trial experiment in Kenya could prove advantageous to enhance the analysis of wealth's effects by distributing an equal amount of money to both wealth and poor groups of women. The outcome should manifest as an increase in the utilization of modern contraception among poor women.

6 References

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7 Appendix

7.1 Variables

Table 1: Specification of the IPUMS PMA data extract

Dummy variable	Label	Selection
MCP	Use modern contraception	Drop No respondents
DESIRELASTCHILD	Wanted last child	Drop
HEALTHCENTER	Visited health facility in last 12 months	
HANDWASH	Place to wash hands	Drop
PREGNANT	The woman is pregnant	Drop No pregnant
FERTPREF	Prefer to have another child or no more children	Drop
RADIO	Has radio	
MOTOCYCL	Has motorcycle	
MOBPHONE	Has mobile phone	
HHPHONE	Has landline telephone	Drop
FRIDGE	Has fridge	Drop
ELEC	Has electricity	
CAR	Has car	
BIKE	Has bike	Drop
BED	Has bed	Drop
TV	Has TV	Drop
URBAN	Living in an urban area	
WORK	Has done work other than own housework in last 12 months	Drop
CP	Use contraception	Drop
TCP	Use traditional contraception	Drop
WALLS	Has structured walls	
FLOOR	Has structured floor	
ROOF	Has structured roof	
HIGHEDUC	Has a Tertiary/post-secondary school level	

Categorical Variables	Label	Categories	Selection
MARSTAT	Marital status	10=Never married	
		21=Currently married	
		22=Currently living with partner	
		31=Divorced or separated	
		32=Widow or widower	
TOILETTYPE	Main toilet facility	1=Flush or pour flush toilet	
		6=Pit latrine	
		9=Composting toilet	
		10=Rudimentary facilities	
		12=Other toilet facility	
		20=No toilet facility	
DRINKINGWATER	Main source of drinking water	1=Piped water inside dwelling	
		2=Piped water outside dwelling	
		4=Modern groundwater sources	
		5=Traditional groundwater sources	
		9=Rainwater	
		10=Other source of drinking water	
PREFTIMECH	How long would like to wait until next child	1=Months	Drop
		2=Years	
		3=Soon	
		4=Infertile	
		5=Other	
EDUCATION	Level of education	1=Never attended	
		2=Primary/Middle school	
		3=Secondary/post-primary	
		4=Tertiary/post-secondary	
SUBNATIONAL	Subnational region	40401=Bungoma	Drop
		40402=Kericho	
		40403=Kiambu	
		40404=Kilifi	
		40405=Kitui	
		40406=Nairobi	
		40407=Nandi	
		40408=Nyamira	
		40409=Siaya	
		40410=Kakamega	
		40411=West Pokot	
AGE_BINS	Group of women by age	1=15-19 years	
		2=20-25 years	
		3=26-30years	
		4=31-38 years	
		5=39-49 years	

Numeric variables	Label	Selection
SHEEPNUM	Total number of sheep owned	
HORSENUM	Total number of horses, donkeys, or mules owned	Drop
GOATNUM	Total number of goats owned	
LOG_GOAT	logarithm of the total number of goats owned + 1	
COWBULLNUM	Total number of cows or bulls owned	Drop
CHICKENNUM	Total number of chicken owned	Drop
BIRTHEVENT	Number of birth events	
NBCHILDRENFIRSTUSE	Number of living children at first use of FP	Drop
AGE	Age	
SCORE	Index for wealth	Drop
WEALTHQ	Quantile index of wealth	Drop
YEAR	Year	Drop

Table 2: Transformation of Main exterior wall material

Variable	Value	Indicator
WALLS	No walls	0=Has no structured walls
	Cane, palm trunks	0=Has no structured walls
	Earth/mud/dirt/soil	0=Has no structured walls
	Bamboo with mud	0=Has no structured walls
	Stone with mud	0=Has no structured walls
	Plywood	0=Has no structured walls
	Reused wood	0=Has no structured walls
	Cardboard	0=Has no structured walls
	Uncovered adobe	0=Has no structured walls
	Other	0=Has no structured walls
	Cement/concrete	1=Has structured walls
	Bricks	1=Has structured walls
	Cement blocks	1=Has structured walls
	Wood planks/shingles	1=Has structured walls
	Stone with lime/cement	1=Has structured walls
	Covered adobe	1=Has structured walls
	Metal sheets	1=Has structured walls

Table 3: Transformation of Main roof material

Variable	Value	Indicator
ROOF	No roof	0=Has no structured roof
	Thatched roof	0=Has no structured roof
	Dung, mud	0=Has no structured roof
	Other	0=Has no structured roof
	Corrugated iron	1=Has structured roof
	Tin	1=Has structured roof
	Asbestos	1=Has structured roof
	Tiles	1=Has structured roof
	Cement/concrete	1=Has structured roof

Table 4: Transformation of Main floor material

Variable	Value	Indicator
FLOOR	Earth	0=Has no structured floor
	Dung	0=Has no structured floor
	Wood planks	0=Has no structured floor
	Palm/bamboo	0=Has no structured floor
	Other	0=Has no structured floor
	Parquet/Polished wood	1=Has structured floor
	Vinyl/Asphalt	1=Has structured floor
	Ceramic Tiles	1=Has structured floor
	Cement	1=Has structured floor
	Carpet	1=Has structured floor

Table 5: Transformation of Main source of drinking water

Variable	Value	Indicator
DRINKINGWATER	Piped into dwelling/indoor	1=Piped water inside dwelling
	Piped water outside dwelling	2=Piped water outside dwelling
	Public tap/standpipe	2=Piped water outside dwelling
	Tube well or borehole	4=Modern groundwater sources
	Protected dug well	5=Traditional groundwater sources
	Unprotected dug well	5=Traditional groundwater sources
	Protected spring	5=Traditional groundwater sources
	Unprotected spring	5=Traditional groundwater sources
	Rainwater	9=Rainwater
	Tanker truck	10=Other source of drinking water
	Cart or bicycle with small tank	10=Other source of drinking water
	Surface water	10=Other source of drinking water
	Bottled water	10=Other source of drinking water
	Sachet water	10=Other source of drinking water

Table 6: Transformation of Main toilet facility

Variable	Value	Indicator
TOILETTYPE	Flush or pour flush toilet to piped sewer	1=Flush or pour flush toilet
	Flush or pour flush toilet to septic tank	1=Flush or pour flush toilet
	Flush or pour flush toilet to pit latrine	1=Flush or pour flush toilet
	Flush or pour flush toilet to elsewhere	1=Flush or pour flush toilet
	Flush or pour flush toilet to unknown	1=Flush or pour flush toilet
	Ventilated improved pit latrine	6=Pit latrine
	Pit latrine with slab	6=Pit latrine
	Pit latrine without slab or open pit	6=Pit latrine
	Composting toilet	9=Composting toilet
	Bucket or pan	10=Rudimentary facilities
	Hanging toilet or hanging latrine	10=Rudimentary facilities
	Other	12=Other toilet facilities
	No Facility/Bush/Field	20=No toilet facility

7.2 Descriptive statistics

Table 7: Number of individuals per year

Year	Number of individuals
2014	8,183
2015	9,394
2016	5,973
2017	5,913
2018	5,720
2019	9,549
2020	9,377
2021	9,531
Total	63,640

Figure 4
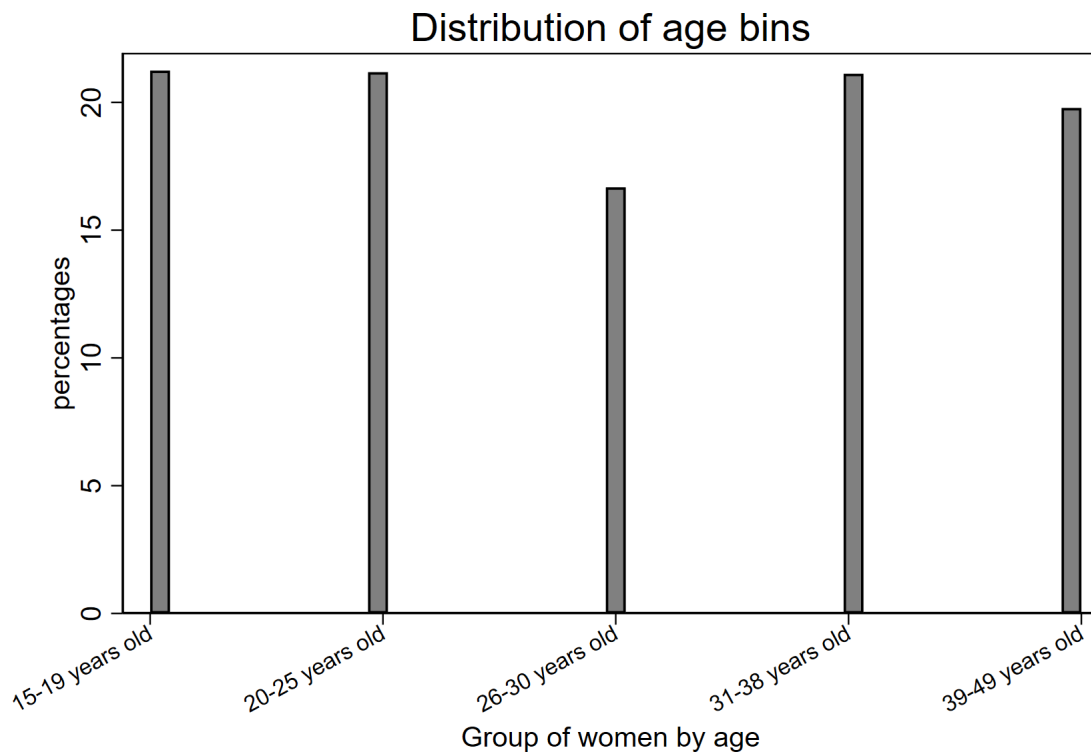
Table 8: Quantitative variables, simple statistics

	Sum	Mean	SD	Min	Max	N
Age	1555234	28.87	9.61	15	49	53,872
Number of living children at first use of FP	61,394	1.82	1.84	0	20	33,661
Total number of cows or bulls owned	26,961	0.73	2.05	0	163	36,698
Total number of chicken owned	329698	9.19	26.36	0	1,200	35,881
Total number of goats owned	77,292	2.10	5.11	0	150	36,744
Total number of horses, donkeys, or mules owned	7,396	0.20	0.76	0	30	36,724
Total number of sheep owned	28,216	0.77	2.64	0	75	36,686
Number of birth events	127680	2.37	2.32	0	18	53,834

Figure 5
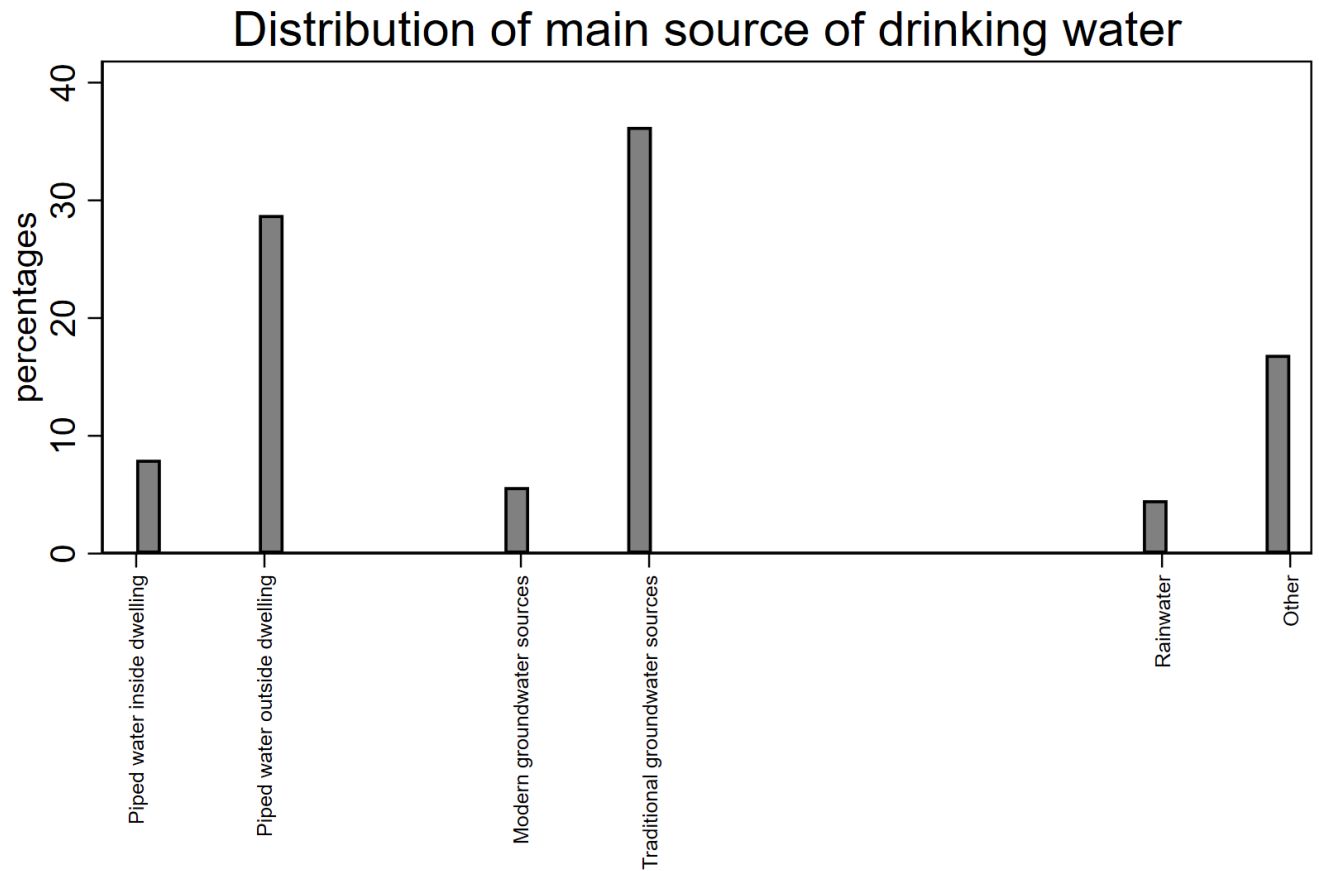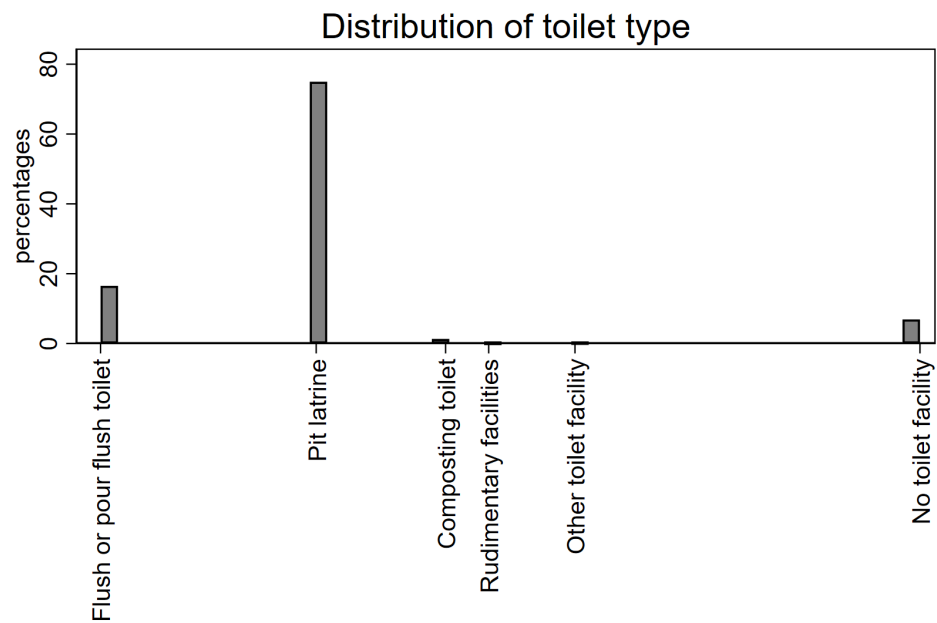
Distribution of main source of drinking water

Figure 6

Distribution of toilet type

Figure 7

Marital Status Distribution

Figure 8

Distribution of the education level

Figure 9

Birthevent distribution
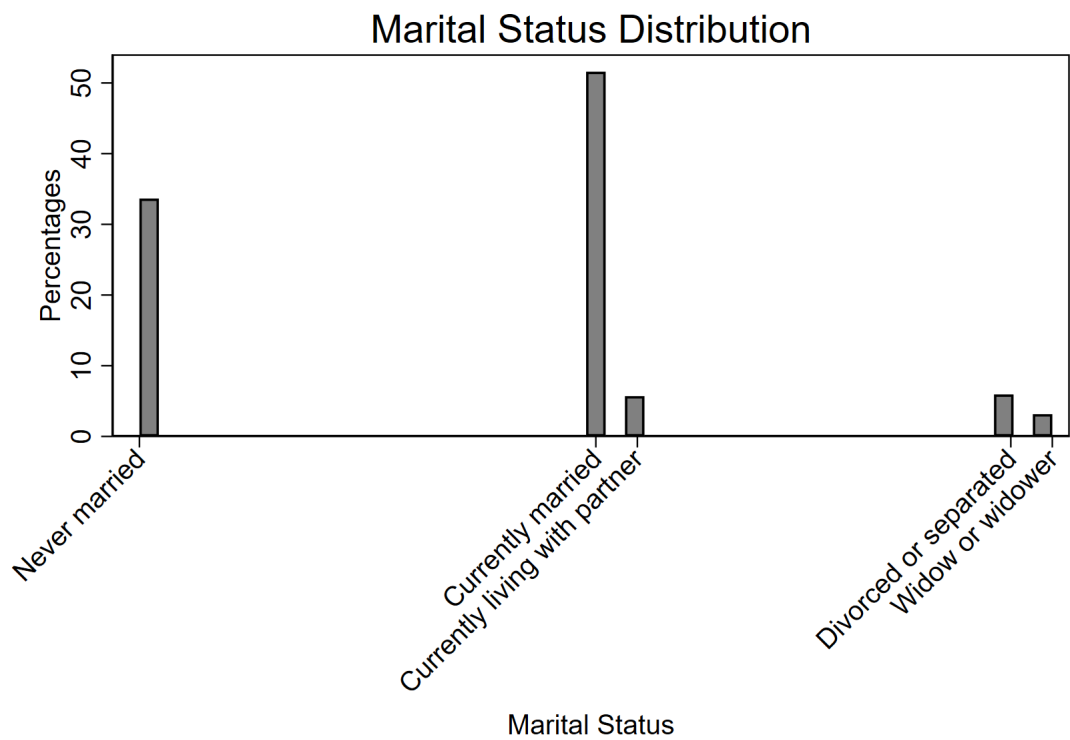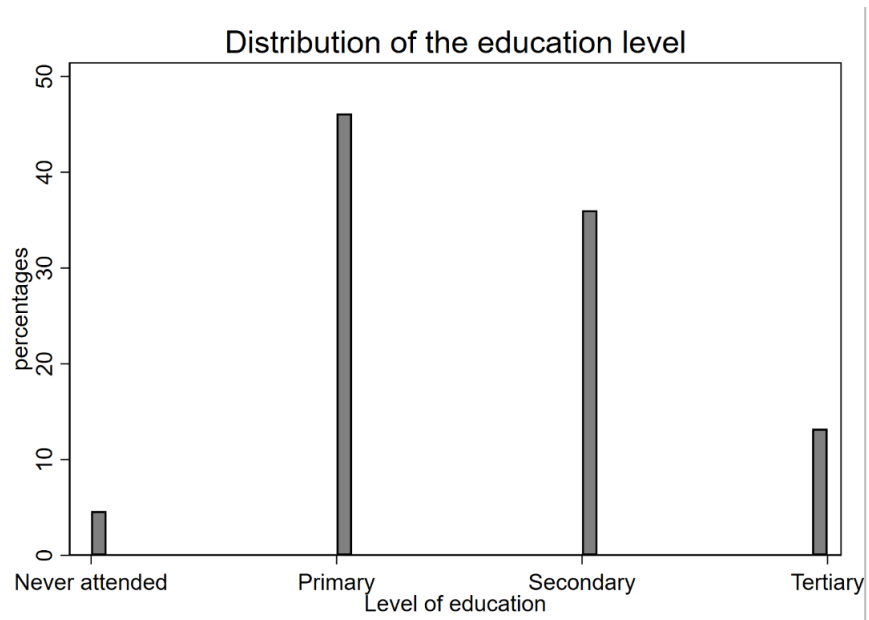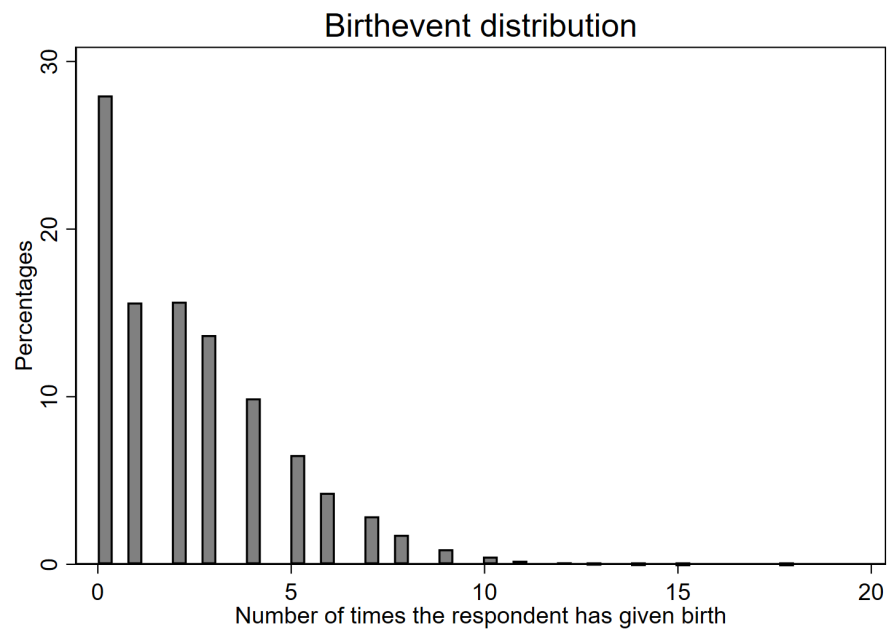
Table 9: Descriptive statistics: binary variables

Variable	Freq.	Percent
Modern contraception		
0	28,709	53.29
1	25,163	46.71
Living in an urban area		
0	34,633	64.29
1	19,239	35.71
Has fridge		
0	50,465	93.69
1	3,396	6.31
Has bed		
0	2,508	5.56
1	42,582	94.44
Has bike		
0	44,871	83.31
1	8,990	16.69
Has motorcycle		
0	49,024	91.02
1	4,837	8.98
Has car		
0	51,549	95.71
1	2,312	4.29
Has electricity		
0	32,524	60.39
1	21,337	39.61
Visited health facility		
in last 12 months		
0	20,817	38.65

Table 9 :Descriptive statistics: binary variables

Variable	Freq.	Percent
1	33,044	61.35
Has radio		
0	15,325	28.45
1	38,536	71.55
Has structured walls		
0	26,538	49.26
1	27,330	50.74
Has structured floor		
0	30,790	48.38
1	32,851	51.62
Has structured roof		
0	4,190	7.78
1	49,681	92.22
Has landline telephone		
0	53,069	98.53
1	792	1.47
Has TV		
0	27,005	58.25
1	19,359	41.75

7.3 Econometric results

Table 10: Logit results

Use Modern contraception	(1)	(2)
Number of birth events	0.081***	0.081***
	(0.009)	(0.019)
15-19 years	0.000	0.000
	(.)	(.)
20-25 years	1.315***	1.315***
	(0.048)	(0.089)
26-30 years	1.427***	1.427***
	(0.058)	(0.118)
31-38 years	1.259***	1.259***
	(0.059)	(0.137)
39-49 years	0.434***	0.434**
	(0.064)	(0.176)
Total number of sheep owned	-0.027***	-0.027**
	(0.006)	(0.011)
Logarithm of the number of goats owned	-0.106***	-0.106***
	(0.016)	(0.039)
Never attended	0.000	0.000
	(.)	(.)
Primary/Middle school	1.084***	1.084***
	(0.071)	(0.180)
Secondary/post-primary	1.196***	1.196***
	(0.076)	(0.182)
Tertiary/post-secondary	1.159***	1.159***
	(0.084)	(0.175)
Never married	0.000	0.000

Table 10 : Logit results

	(1)	(2)
	(.)	(.)
Currently married	1.478***	1.478***
	(0.043)	(0.114)
Currently living with partner	1.580***	1.580***
	(0.062)	(0.161)
Divorced or separated	0.806***	0.806***
	(0.067)	(0.100)
Widow or widower	0.386***	0.386***
	(0.081)	(0.135)
Has a structured walls	0.084***	0.084*
	(0.029)	(0.045)
Has a structured roof	0.355***	0.355***
	(0.051)	(0.134)
Piped water inside dwelling	0.000	0.000
	(.)	(.)
Piped water outside dwelling	0.043	0.043
	(0.065)	(0.077)
Modern groundwater sources	-0.079	-0.079
	(0.079)	(0.119)
Traditional groundwater sources	0.083	0.083
	(0.065)	(0.090)
Rainwater	-0.153*	-0.153*
	(0.080)	(0.086)
Other source of drinking water	0.040	0.040
	(0.069)	(0.083)
Flush or pour flush toilet	0.000	0.000
	(.)	(.)

Table 10 : Logit results

	(1)	(2)
Pit latrine	0.198***	0.198*
	(0.055)	(0.104)
Composting toilet	0.730***	0.730**
	(0.118)	(0.290)
Rudimentary facilities	0.000	0.000
	(0.302)	(0.317)
Other toilet facility	-0.604**	-0.604
	(0.299)	(0.494)
No toilet facility	-0.475***	-0.475**
	(0.079)	(0.228)
Has electricity	0.105***	0.105***
	(0.032)	(0.038)
Has mobile phone	0.128***	0.128
	(0.037)	(0.089)
Has motorcycle	0.072*	0.072*
	(0.039)	(0.037)
Has radio	0.090***	0.090**
	(0.030)	(0.041)
Visited health facility in last 12 months	0.298***	0.298***
	(0.026)	(0.043)
Living in an urban area	0.119***	0.119
	(0.032)	(0.093)
YEAR=2014	0.000	0.000
	(.)	(.)
YEAR=2015	0.269***	0.269***
	(0.045)	(0.050)
YEAR=2017	0.247***	0.247**

Table 10 : Logit results

	(1)	(2)
	(0.052)	(0.114)
YEAR=2018	0.288***	0.288***
	(0.052)	(0.101)
YEAR=2019	0.249***	0.249**
	(0.045)	(0.103)
YEAR=2020	0.446***	0.446***
	(0.044)	(0.101)
YEAR=2021	0.410***	0.410***
	(0.045)	(0.108)
Constant	-4.508***	-4.508***
	(0.119)	(0.232)
Observations	36633	36633

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11: Average marginal effect

	(1)	(2)
Number of birth events	0.015***	0.015***
	(0.002)	(0.003)
15-19 years	0.000	0.000
	(.)	(.)
20-25 years	0.259***	0.259***
	(0.010)	(0.018)
26-30 years	0.282***	0.282***
	(0.012)	(0.025)
31-38 years	0.248***	0.248***

Table 11 : Average marginal effect

	(1)	(2)
	(0.012)	(0.028)
39-49 years	0.081***	0.081**
	(0.012)	(0.033)
Total number of sheep owned	-0.005***	-0.005**
	(0.001)	(0.002)
Logarithm of the number of goats owned	-0.019***	-0.019***
	(0.003)	(0.007)
Never attended	0.000	0.000
	(.)	(.)
Primary/Middle school	0.193***	0.193***
	(0.012)	(0.030)
Secondary/post-primary	0.214***	0.214***
	(0.013)	(0.030)
Tertiary/post-secondary	0.207***	0.207***
	(0.014)	(0.030)
Never married	0.000	0.000
	(.)	(.)
Currently married	0.303***	0.303***
	(0.009)	(0.023)
Currently living with partner	0.324***	0.324***
	(0.013)	(0.033)
Divorced or separated	0.158***	0.158***
	(0.014)	(0.021)
Widow or widower	0.072***	0.072***
	(0.016)	(0.026)
Has a structured walls	0.015***	0.015*
	(0.005)	(0.008)

<div align="center">

Table 11 : Average marginal effect

</div>

	(1)	(2)
Has a structured roof	0.065***	0.065***
	(0.009)	(0.025)
Piped water inside dwelling	0.000	0.000
	(.)	(.)
Piped water outside dwelling	0.008	0.008
	(0.012)	(0.014)
Modern groundwater sources	-0.014	-0.014
	(0.015)	(0.022)
Traditional groundwater sources	0.015	0.015
	(0.012)	(0.017)
Rainwater	-0.028*	-0.028*
	(0.015)	(0.016)
Other source of drinking water	0.007	0.007
	(0.013)	(0.015)
Flush or pour flush toilet	0.000	0.000
	(.)	(.)
Pit latrine	0.037***	0.037*
	(0.010)	(0.019)
Composting toilet	0.133***	0.133**
	(0.021)	(0.052)
Rudimentary facilities	0.000	0.000
	(0.056)	(0.059)
Other toilet facility	-0.110**	-0.110
	(0.052)	(0.086)
No toilet facility	-0.087***	-0.087**
	(0.014)	(0.041)
Has electricity	0.019***	0.019***

Table 11 : Average marginal effect

	(1)	(2)
	(0.006)	(0.007)
Has mobile phone	0.023***	0.023
	(0.007)	(0.016)
Has motorcycle	0.013*	0.013*
	(0.007)	(0.007)
Has radio	0.016***	0.016**
	(0.005)	(0.008)
Visited health facility in last 12 months	0.055***	0.055***
	(0.005)	(0.008)
Living in an urban area	0.022***	0.022
	(0.006)	(0.017)
YEAR=2014	0.000	0.000
	(.)	(.)
YEAR=2015	0.049***	0.049***
	(0.008)	(0.009)
YEAR=2017	0.045***	0.045**
	(0.009)	(0.021)
YEAR=2018	0.053***	0.053***
	(0.009)	(0.018)
YEAR=2019	0.046***	0.046**
	(0.008)	(0.019)
YEAR=2020	0.082***	0.082***
	(0.008)	(0.018)
YEAR=2021	0.075***	0.075***
	(0.008)	(0.019)
Observations	36633	36633
Standard errors in parentheses		

Table 11 : Average marginal effect

	(1)	(2)
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$		