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Influence of Family Size of Urban Dwellers Waste Disposal Practices in Central Senatorial District of Cross River State, Nigeria

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Abstract

The purpose of this study was to examine the influence of indigenous practices on forest conservation in Calabar Education Zone of Cross River State, Nigeria. The specific purpose was to: determine the influence of cultural practices and traditional agriculture on forest conservation. Two research questions directed this study. Two null hypotheses were tested in this study. The study adopted a survey research design. Multi-stage sampling technique was adopted for this study. The population of this study comprised 605,281 inhabitants in the study area. The sample for the study comprised 394 adult inhabitants in the study area. Data were collected using a questionnaire titled "Indigenous Practices and Forest Conservation Questionnaire" (IPFCQ). The instrument validated by three research experts, was constructed into three major sections: section A focused on Demographic data, section B focused on sub- variables under Indigenous Practices and section C focused on Forest Conservation based on a four-point likert-type scale. The reliability of the instrument was determined with Cronbach Alpha reliability method which gave reliability coefficient which ranged from .82 to .88. The data collected were analysed using Simple Linear Regression and tested from .05 level of significance and the result reveals that there is a significance influence of cultural practices and traditional agriculture on Forest Conservation in Calabar Education Zone of Cross River State, Nigeria. Based on the result of the study the researcher concluded that cultural practices and traditional agriculture promote forest conservation. On the strength of the conclusion. It was recommended that government of Cross River State should design strategic measures to incorporate indigenous practices for the conservation of forest resources in the study

	area and beyond. The purpose of this study is to investigate how family size of urban dwellers influence waste disposal practices in Central Senatorial District of Cross River State. In order to accomplish this, one hypothesis was formulated based on the research question raised to guide the study. Literature was reviewed based on the variable under study. The researchers employed survey design in this work. A total of five hundred and seventy-three (573) adult inhabitants (male and female) of all socio-economic status residing or carrying out one form of economic activities or the other in the study area were used as the sample for the study. The main instruments for data collection was a 30 item questionnaires titled influence of family size of urban dwellers and waste disposal practices questionnaire. The data obtained from the questionnaire was duly coded and subjected to statistical analysis of One Way Analysis of Variance (ANOVA) and fishers post hoc test. The hypothesis was tested at .05 level of significance. It was concluded that urban dwellers family size significantly influences solid waste disposal in the study area. Based on the findings of the study, it was recommended that family planning programme should be made available by the government. To encourage people to reduce the number of children they produce which will subsequently reduce the high rate of solid waste generation and disposal.

Introduction

Improper solid waste disposal has become one of the major problems confronting Cross River State in recent times. Unsustainable solid waste disposal has been one of the major causes of diseases and epidemic outbreak in the state. Indiscriminate waste disposal has not only become an eyesore to passersby but has also become a threat to the aesthetic value of the environment and human health and wellbeing. Improper solid waste dumps are seriously defacing the beauty of the state. Indiscriminate waste disposal can easily be observed in most parts of the state. Both men and women dump their refuse in the drainage thereby blocking the drainage system which consequently results to erosion and flooding. It has become common sight to see traders display their wares/goods beside heaps of waste that has accumulated over a period of time. These wastes produce offensive odour and becomes breeding ground for rodents, pest and disease causing insects. The air becomes polluted and could bring about outbreak of epidemic like cholera and other airborne diseases.

Inhabitants of diverse educational level, occupation and income level engage in this indiscriminate and unsustainable waste disposal. Most of these inhabitants engage in waste burning which emits dangerous gases and chemicals into the atmosphere which depletes the

ozone layer leading to dangerous rays of the sun reaching the earth with consequent excessive heat, chicken pox, dehydration etc. Generally, due to unsustainable or improper solid waste disposal and collection system, Cross River citizens are faced with serious negative environmental impact. The need for inhabitants of different age groups, sexes, educational level, occupation and income level to develop positive attitude and participate actively in effective solid waste disposal has become imperative. In view of the unhealthy state of the environment due to indiscriminate waste disposal, the government through its ministry, agencies and departments has anticipated to solve these challenging issues by provision of waste bin to households, general distribution of dustbins at strategic places in all the eighteen local government areas and periodic evacuation of the waste, yet people dispose their waste into gutters, backyards, roadsides, nearby bushes and uncompleted buildings. Government has also made provision for daily sweeping of major roads, cleaning of drains and maintaining the green areas by periodic clearing of grasses around areas of major roads of urban centres of the study area. The problem of unsustainable solid waste disposal has remained unabated despite these efforts by the state government through it waste management agencies.

The negative attitude of some inhabitants of the study area at the waste disposal site is worrisome. Instead of emptying their waste into the bins provided, young people and adults do so on the ground surrounding the bins. Often times, the waste bin becomes so filled that it overflows in the surrounding around it, causing a blockage on the road which makes it impossible for vehicles to ply those areas.

In order to create awareness among people on the need for sustainable waste management in Cross River State, researchers have conducted and published series of materials on the danger of unsustainable waste management, yet to no avail. The media stations (radio, television, internet etc) have also taken a lead in the campaign to sensitize the citizens on the problems associated with poor waste disposal, but nothing seem to have changed. It is against this backdrop that this study seeks to ascertain the influence of urban dwellers Family size on solid waste disposal practices in central senatorial district of Cross River State, Nigeria.

Literature Review

Family size is an important variable in determining the amount of household waste disposal. Family size as a research variable refers to the overall people living in the same house. Previous studies (Khan, Kumar & Samadder, 2016, Trang, Dong, Toan, Hanh& Thu, 2017, Sankoh, Yan &Conteh, 2012, Sujauddin Huda, Hosque, 2016, Afon & Okewole, 2007, Hong, 2019 and Suther& Singh, 2015) showed that family size had a positive influence on solid waste generation and disposal rate while it is apparent for more members of a family to generate more waste. Researchers described the phenomenon of "group living" and common consumption of the family as the household operates as a unit and most of the food items are shared. Therefore, the fewer amount of food crumbs, leftovers and packaging, waste will be produced (Ojeda- Benitez, Vega &Marqueze Montenegro, 2008, Gu, Wang & Chen, 2015). On the contrary, many studies have also supported the negative relationship between the family

size and waste generation rate and disposal (Meizah, Obiri-Danso,QuzLi, Xie, Sui, Yang & Chen, 2009, Thanh, Matsiri& Fujiwara, 2019, Ogueleka, 2019 and Bolanne & Ali, 2017, Irwan, Basir& Watanabe, 2012).

Gu, Wang and Chen (2015) conducted a survey of composition and generation rate of household wastes in Beijing, China. They observed that information on both quantity and composition of residential waste is important for the effective planning of household waste handling infrastructure. Sample communities were selected by integration of five indices including family population, income, age and basis for ten day. The result showed that the generation rate of household waste was 0.23kg 221kg/m^3 and the moisture content was approximately 50%. Household waste consisted of kitchen waste, paper/cardboard, plastics, textiles metals, glass and other waste.The proportion of each waste was approximately 69.3%, 9.8%, 6.8%, 0..6% and 2.78 respectively. Pearson product moment correlation statistics was used to analyze data obtained. The result revealed that there is negative relationship between family size and solid waste generation and disposal.

The implication of the above findings is that family size influence waste disposal negatively. Ogueleka (2019) conducted a survey on household waste composition and quantities in Abuja, Nigeria. The purpose of the study was to evaluate the quantities and composition of household solid waste generation in Abuja within different socio-economic groups. The waste from 74 households across different socio-economic levels in Abuja were collected, weighted and classified on a daily basis for seven days in February 2019. The result showed that the average daily per capital household waste generation is 0.634kg/capital day. The characteristics of solid waste in Abuja are typical for the developing cities and dominated by organic waste. Household waste consisted of 63.6% organic waste, 97% paper, 8.7% plastics, 3.2% metal, 2.6%, glass 16%, textile and 10.6% others (unclassified) and the bulk density was 240kg/m^3. The study revealed a statistically significant difference between family size and daily per capita household waste generation in high income group: a slight significant different between household size and daily per capita household waste generation in medium income group and no statistically significant difference between family size and daily per capita household waste generation in low income group.

In another study conducted by Bandura, Hettiaratchi, Wirasinghe (2017) on relation of waste generation and composition to socio-economic factors: a case study of sub-urban municipal area in SrilankaThe purpose of the study was to determine the amount of waste generated and the composition of waste stream based on field surveys and determine the related socio-economic factors. A database was developed that included information on the quantity and composition of waste generated in a sample of households in the study area over a time period. The collected data to various socio-economic factors, over 400 sample households were selected for the study using a stratified random sampling methodology based on municipal wards and property values. A technique that considers both the number of households in a

particular income group (property value range) and the standard deviation of property, values within a given income group was used to determine the appropriate sample size for each municipal ward. Through category and regression analyses, the quantities of waste and waste composition were related to several socio-economic factors.

Irwan, Basir and Watanabe (2012) carried out a study on relationship between affluence and household municipal solid waste arising in Putrajaya. The purpose of the study was to determine current per capita residential municipal solid waste generation rate, affluence and family size. Three discrete housing neighbourhoods in Putrajaya were selected as the areas under study. To capture varying socio-economic levels, the selected study areas consist of bungalow, semi-detached and terraced houses. Primary data was obtained by door-to-door weighing of MSW for12 consequent days which makes up a sampling phases over a 1-year period. A face-to-face survey was then performed on all households under study to obtain relevant socio-economic data. From the analysis done, it was found that generally, family size has an inverse relationship on municipal solid waste. The implication of the above findings is that, there is a negative relationship between family size and solid waste generation and disposal.

Another study was conducted by Bolaane and Ali (2017) on sampling household waste at source: lessons learnt in Gaborone. The purpose of the study was to report the results and experiences of sampling household waste at the source of generation in Gaborone, Botswana. The average generation rate in kg capita per day and percentages of various components of waste in Gaborone were determined using a statistically designed household sampling survey. The survey covered 47 households with different socio-economic characteristics over 21 days with 893 samples obtained. The result showed that the average waste generation rate for Gaborone was 0.33kg capital per day. Contrary to common belief, the waste generation rate was found not to be directly related to household income.

Khan, Kuma and Samadder (2016) conducted a study on impact of socio-economic status on municipal solid waste generation rate. The purpose of this study was to report the assessment of solid waste generation based on different socio-economic parameters like education, occupation, income of the family, family size et. Survey research design was adopted for the study. A well-structured questionnaire was used for data collection. The survey was meant to identify the different socio-economic groups that may affect the solid waste generation rate and composition. ANOVA was the statistical tool employed for data analysis. The result revealed that the average waste generated in municipal is 0.41kg/capital/day and that there is a positive influence of family size on solid waste disposal. The implication of this result is that the larger the family size, the larger the quantity of waste generated and disposed.

Trang, Dong, Hanh and Thu (2017) carried out a study on the effect of socio-economic factors on household solid waste generation and composition, a case study in Thu Dau Mot, Vietnam. The purpose of the study was to determine the socio-economic factors influencing the waste

generation of households in the city by using ordinary Least square (OLS) regression. 300 sampled households were selected for the study by using stratified random sampling technique. The result indicated that the average household waste generation in this study was 0.76 kg/household/day. These wastes comprised of six categories of waste with the largest component of organic waste (67%). The effect of income household size and environmental concern on household solid waste generation is statistically significant at 1%. This study suggests new insights concerning the role of socio-economic characteristics in affecting the generation of household waste in Thu Dau city, Vietnam.

Mohammed, Liu, Zena and Sylvia (2020) carried out a study on determinants of household solid waste generation and composition in Horns City, Syria. The purpose of the study was to evaluate the generation and composition of household solid waste in Hons City, Syria. The study presented factors influencing the waste generation rate and the waste composition. The study was carried out in 300 families from four zones in Horns City, and three sampling stages were conducted during the study duration which started in July 2017 and ended in February, 2019. Pearson product moment correlation statistics, simple regression and multiple regression were used to analyze data obtained through questionnaire as instrument for data collection. The result revealed that an average of 0.68kg/per day solid waste generated was calculated for the entire study area in Homs City. Also the data analysis presented that organic waste constitutes the largest component in the waste mixture (69.1%) followed by plastic (10.6%), Inert materials (87%), paper (46%), textile (2.5%) metal (1.2%), glass (4%) wood (0.6%) and hazardous materials (1.6%). The multiple linear regression result showed that the adjusted R^2 value was found to be 0.557, 0.839 and 0.709 for the waste per generation per capita of the daily household organic waste generation and the daily household packaging waste generation respectively. Also according to Pearson's coefficient values, a positive correlation was found between household waste generation and monthly income (r=0626) household size (r=0.37) and age of household head (r=0517). Whereas a negative correlation was found between household waste generation and educational level of the household head (r=0.649).

The implication of the above result is that there is a significant positive relationship between family size and solid waste generation and disposal. Indeed family size actually influences solid waste disposal.

Sankoh, Yan and Conteh (2012) conducted a study on a situational assessment of socio-economic factors affecting solid waste generation and composition in Freetown, Sierra-Leone. The purpose of the study was to assess the socio-economic factors affecting solid waste generation and disposal in freetown. The survey research design was adopted for the study, the questionnaire was the instrument used for data collection and Pearson product, moment correlation statistics was used for analyzing the data. Structured questionnaire were administered with respect to these socio-economic factors in four (4) selected constituencies of the city. These were the most populated constituencies that generated 70% of the total

quantity of solid waste in the city. Therefore, they are suitable samples of the study area. The rate of waste generation was determined by using door-to-does approach in five (5) selected households from each constituency through sorting and weighing of solid waste respectively. Solid waste generation was determined by using door-to-door approach in (5) selected households from each constituency through sorting and weighing of waste respectively. The independent variables were family size, education and income level. The data obtained were subjected to statistical analysis to determine relationship between independent variable and dependent variables. The results showed that the solid waste generation and composition in Freetown was significantly affected by average family size, employment status, monthly income and number of rooms occupied by households.

Sujauddin, Huda and Hoque (2016) carried out a study on household solid waste characteristics and management in Chittagong; Bangladesh. The purpose of the study was to investigate per capita waste generation by residents, it's composition and households' attitudes towards waste management at Rahman Niger Residential Area, Chittegong, Bangladesh. They involved a structured questionnaire and encompassed 75 households from five different socio-economic groups (SEGs) low (LEGs) lower middle (LMSEG), middle (MSEG), upper middle (UMSEG) and high (HSEG). Waste generation was 1.3kg/household/day and 0.25kg/person/day. Household solid waste (HSW) was comprised of nine categories of waste with vegetable food waste being the largest component (62%) vegetable food waste increased from HSEG (47%) to the LSEG (88). By weight 66% of the waste was compostable in nature. The generation of household waste was positively correlated with family size ($rxy=0.236.p<0.05$) education level ($rxy=0.244$, $p<0.05$) and monthly income ($rxy=0.671$, $p<0.01$) of households. The study revealed that there is a significant influence of family size and other sub-independent variable and waste disposal.

In another study conducted by Afon and Okewole (2007) on estimating the quantity of solid waste generation in Oyo, Nigeria, the study established waste multipliers that could be used in conjunction with population figure of a city to estimate the quantity of solid waste generation in developing world. Oyo, a traditional city of Nigeria was the study area. Two sets of data were collected through the questionnaire instrument. The first was the information on the socio-economic attributes of residents obtained from 648 households through questionnaire administered using a systematic random sampling technique. The second was the measurements of waste generated in 256 of the households for a week in each of the 12 months of the year. The study established that 23.3% of the residents surveyed have educational qualifications beyond secondary school. With 51.21% engaged in occupation requiring very little or no formal education and 50% were in the low income group. The daily per capita solid waste generation was 0.29kg. The highest (9.8%) and lowest (65%) of the annual quantities were produced in October and February respectively. The study further established that the organic component of waste generation was 75.4%. The result of the regression analysis R2 significant at 0.01 showed that income, household size, social status, occupation, education and session of the year explained 88.8% of waste generation in Oyo. It was established that

50.90 tonnes of solid waste were generated per day in the city in 2005 and daily generation in the year 2008 estimated to be 55.20 tonnes. The study concluded that with an average annual population growth of 1.3 acres of land will need to be legally acquired annually, implying that 10.92-19.68 hectares will be required as dumpsite(s) over the next 26-30 years. The study of Afon and Okewole was relevant to this present study due to it estimation of solid waste generation. Also, family size was a sub independent variable in the study.

Hong (2019) carried out a study on the effect of unit pricing system upon household solid waste management, the Korean experience. The purpose of the study was to explore the impact of price incentives under the unit pricing system on household solid waste generation and recycling in Korea. Simultaneous equation model was employed considering the feedback effect between total waste generation and recycling. Estimation results using 3017 Korean household survey data indicate that a rise in waste collection fee induces households to recycle more wastes. However, this effect is partially offset by decreases in source-reduction efforts due to the feedback effects, resulting in relatively lower price elasticity of demand for solid waste collection services. This implies that household demand for solid waste collection services will not decrease much with additional increases in the collection fee, unless further recycling incentives such as more frequent recyclable pickup services are accompanied. Again, the study of Hong (2019) was relevant for review in this present study due to the fact that it investigated the effect of unit pricing system upon household solid waste management.

Also, Suthar and Singh (2015) conducted a study on household waste generation and composition in different family size and socio-economic groups: a case study, sustainable city and society. The purpose of the study was to estimate the quantity and quality of household waste in terms of socio-economic groups and family size in Dehradun city, India. A total of 144 households were selected from 11 major blocks of the city and household waste quantification and characterization were analyzed for different blocks/colonies. The household waste generation in the city ranges from 24.5 to 4147.1g/day. The average household waste quantity in household was estimated 2.67.17g/day (80=38.13, n=144), the food kitchen waste the major constituent (80% of total weight) of household waste in the city followed by Polythene and Plastic (=7%), paper (=6%), cardboard (=2%), glass/ceramic scrap (=11%) and other miscellaneous items (e.g, clothes, silt, dirt, rubber, all=4%). The household waste and composition varied significantly among different socio-economic groups in the city. The maximum household waste generation was higher followed by middle and lower income groups. The household generation and disposal shows positive correlation with family size ($rxy=0348$, $p<0.01$). On the basis of obtained data set, it was concluded that household waste can be a potential resource for energy and manure production if proper waste management system is designed for the city. The study of Suther and Singh (2015) was found relevant for review in this present study based on investigation on household waste generation and composition in different family size and socio-economic group.

Research Methodology

Survey research design was adopted for this study. Survey design is utilized when a research is focused on obtaining and analysing data from a few subjects considered as a representative of an entire population in line with an investigated phenomenon. The research area for this study is Cross River State, Nigeria. The state lies between latitude $4^{o}28^{I}$ and $6^{o}55^{I}$ North of the equator and longitude $7^{o}50^{I}$ and $9^{o}28^{I}$ East of the Greenwich Meridian within the tropical rainforest belt of Nigeria, it shares boundaries with the republic of Cameroon in the East, Benue State in the North, Ebonyi and Abia State in the West, AkwaIbom state in the south west and Atlantic Ocean in the south. The population of this study consists of all urban residents in the study area (Cross River State). The target population had people between 18 to 65 years considered as active population, residing in urban areas in Cross River State, who are either gainfully employed, self-employed, business men or women, farmers, unemployed and others. According to the Cross River State Bureau of Statistics (2020) the projected population of the selected urban areas is 69,826. The researcher adopted multi-stage sampling procedure comprising of (purposive, simple random and proportionate sampling technique) for the study. In the first stage, simple random sampling technique was used to select six local government areas from the 18 local government areas in Cross River State. Purposive sampling technique was then applied to select six urban communities from each of the local government areas selected. Proportionate sampling technique of 0.82% was used to select respondents from the population. The sample for this study comprised 573 respondents that were drawn from the urban centres. The sample comprised of both male and female between the age range of 18-65 years.

The instrument used for data collection is a questionnaire titled “Urban Dwellers Family size and Solid Waste Disposal Practices Questionnaire” (UDFSSWDPQ). The questionnaire was constructed by the researcher under the close guidance of the supervisors and one expert in test and measurement from Faculty of Arts and Social Science Education, University of Calabar. It has sections A and B. section A handled the respondents demographic data of sex, age, educational level, occupation, and family size while section B contained 5 items and response option of always (A), often (o) sometimes (s) and never (n) that elicit response from self-concept (item 1-5), attitude (item 6-10) and the study dependent variable (item 10). To ensure that the items selected for inclusion in the questionnaire were capable of eliciting relevant response, the researcher presented the designed questionnaire to two research experts from the department of educational foundation for scrutiny and approval. The instrument was certified valid after the scrutiny. To determine the reliability of the instrument a pilot test was carried out using fifty (50) respondents from the study area that were part of the actual study. Cronbach alpha reliability estimate was used to determine the reliability of the instrument. The reliability coefficient of the instrument was from .82. This study involved the collection of data through a questionnaire which was administered to the respondents by the researcher and 3 research assistants who were trained by the researcher.

Results and Discussion

Ho:2

Waste disposal is not significantly influenced of family size of urban dwellers on their solid waste disposal. The independent variable in this hypothesis is family size categorized as 1- 5 persons per household, 6-10 persons and 11 persons and above, while the dependent variable is waste disposal. To test this hypothesis, one-way analysis of variance (ANOVA) was used and the result is presented in Table 1.

Table 1

One-way analysis of variance result of the influence of family size on waste disposal in Cross River State

Variable	N	$\bar{x}$	S.D
1-5 persons	130	30.1875	2.95148
6-10 persons	96	29.0882	3.37566
11 and above	347	28.5839	3.28866
Total	573	28.9692	3.29276

Source of variation	SS	Df	MS	F	Sig.
Between Groups	160.372	2	80.186	7.629*	.001
Within Groups	4404.227	570	10.511		
Total	4564.600	572			

*significant at p<.05 F-crit=3.00

The analysis of variance (ANOVA) in Table 1 shows that the calculated F-ratio is 7.629 (F=7.629, p<.05). Since p(.001) is less than p<(.05), it implies that family size indeed significantly influences waste disposal. Hence, the null hypothesis is rejected. Since F-ratio is significant, a post hoc test was conducted and the result is presented in

Table 2

Fishers LSD result on the influence of influence of influence of family size on waste disposal in Cross River State.

Variable	1-5	6-10	11 and above
1-5	1.60356	-1.60356	-50429
6-10	-1.826	-.50429	1099263
11 and above	.50429	1.09926	.50429
MSW =10.511			

Where a= group means along the principal diagonal
b= group means differences above the principal diagonal
c= critical t-values below the principal diagonal
*= significant values

The result as presented in Table 2 showed that the mean difference between 1-5 and 11 and above is greater than 6 -10 and 11 and above etc. This implies that the higher the family size the more they generate waste and the higher the rate of waste disposal leading to environmental degradation.

Discussion of findings

The result of this hypothesis revealed that family size of urban dwellers has significant influence on solid waste disposal with the finding suggesting that the higher the number of household members the more solid waste generation and disposal. The basis for this result could probably be attributed to the premise that the size of the family determines the quantity or amount of resources consumed and solid waste disposal or could it be premised on the expansion in family size and increasing population with resultant increase in land cultivation to meet the increased demand for food hence increasing solid waste generation and disposal.

The finding is in agreement with Gu, Wang and Chen (2015), who noted that larger families have higher subsistence needs which necessitate them to consume more environmental resources. They further revealed that there is a significant negative relationship between family size and solid waste management or disposal.

From the above findings it implies that increase in population has been a major factor in solid waste generation and disposal. More so, because the urban dwellers' patterns of consumption is high which ultimately results in increasing solid waste disposal due to large family size. Growth in population would mean more dependence and pressure on environmental resources. The increase in population as indicated from the result of the findings affirmed that as the size of the family (household) increases, the population tends to increase. This means that with increase consumption of environmental resources in the research area (Cross River State), there is equally high rate of solid waste generation and disposal.

Conclusion

From the result of this study, it was revealed that urban dwellers family size significantly influences solid waste disposal in the study area. This implies that each of the variables in one way or the other contributes to solid waste disposal which need to be addressed. It is the researchers firm believe that for this environmental problem to be addressed, certain mitigating measures must be taken thus; Sex as a demographic variable that influences solid waste disposal can be addressed if women are empowered through adequate training that enlighten them on proper solid waste disposal practices likewise the men.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. More effort should be made by the government to empower women with adequate knowledge that will help them dispose their solid waste properly thereby enhancing environmental sustainability.
2. Environmental literacy education should be made compulsory to all ages and all level of education to reduce the age influence on the solid waste disposal to further promote a hygienic and sustainable environment.
3. The government should organize public enlightenment campaigns that will affect every occupation to sensitize the public on proper waste disposal practices.
4. Family planning programme should be made available by the government. To encourage people to reduce the number of children they produce which will subsequently reduce the high rate of solid waste generation and disposal.

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