access to basic hygienic services. Furthermore, the majority of families lack an appropriate understanding of hygienic practices related to food, water, and personal hygiene, which has a severe influence on their nutritional health.

Nutritional status is an important aspect of growth and development and is the best predictor of children's overall well-being (Igbokwe, 2014). Environmental factors, as well as food intake, influence nutritional status. Children's nutritional status is critical since it influences their health, physical growth, development, academic success, and overall life progress. Childhood malnutrition may have a long term effect on their growth capacity and morbidity risk. Malnutrition is responsible for more than half of young children's deaths, with moderate and severe malnutrition accounting for three-quarters of death among children below five years of age (UNICEF, 2020). Preschool children are the most vulnerable segment of any community to malnutrition. Their nutritional state is a sensitive indicator of the population's health and nutrition. Malnutrition is responsible for more than half of deaths among under-five children in underdeveloped countries, where an estimated 230 million children are chronically malnourished (UNICEF & WHO,, 2020).

According to WHO (2022), about 1.7 billion people do not have access to basic sanitation facilities such as private toilets or latrines. Of these 1.7 billion people, 494 million defecates in public, such as in gutters, behind bushes, or in open bodies of water. It was reported that in 2020, 45% of global household wastewater was discharged without sufficient treatment. Furthermore, each year, 829 000 people in low- and middle-income countries die as a result of a lack of clean water, sanitation, and hygiene, accounting for 60% of all diarrhea deaths. Poor sanitation is considered to be the major cause of 432 000 of these deaths, as well as a substantial contributor to a variety of neglected ailments such as intestinal worms, schistosomiasis, and trachoma. Poor sanitation exacerbates malnutrition. Diarrhea is still a major killer, although it is usually preventable. Better water, sanitation, and hygiene might save the lives of 297 000 children under the age of five each year (WHO, 2022). Aside from the financial costs, a lack of hygiene has unquantifiable negative impacts. Its' mpacts on dignity, poverty, disability, safety, gender, and education indicate untapped human potential, which is borne disproportionately by the most vulnerable and disadvantaged individuals (WHO & UNICEF, 2020).

High rates of sickness and death among Nigerian pre-school children have been linked to a lack of access to basic sanitary facilities. Every year, approximately 70,000 children under the age of

five die as a result of their greater susceptibility to water-borne sicknesses. According to estimates, insufficient access to sanitation facilities accounts for more than 73% of the burden of enteric and diarrheal illnesses (UNICEF& WHO, 2020). The practice of open defecation and the use of inadequate communal latrines is often the result of a lack of access to suitable sanitation services. These practices put women and girls at danger of sexual assault and abuse in their local surroundings, especially in rural areas. Aside from the community, a lack of adequate waste disposal or sewage infrastructure may have an impact on the environment and contribute to disease outbreaks (WHO & UNICEF, 2015). Children may lose their lives as a consequence of contaminated water, insufficient sanitation, and poor hygiene. Every day, over 700 preschool children die as a result of diarrhea diseases caused by a lack of adequate water and sanitation facilities. It was ascertained that around 892 million people practice open defecation, with 61.5% utilizing unimproved toilet facilities such as hanging latrines, buckets, open pits, pit latrines without slabs, and pit latrines (WHO & UNICEF, 2017). Access to improved sanitary facilities does not only improve people's health, but also helps a country's economy since ill health has a negative influence on labor, productivity, and earning ability. According to data, children carry the lion's share of this health burden, accounting for 7% of overall illness burden and 19% of child morbidity and death worldwide (Bartram and Cairncross, 2020). According to Orimoloye et al. (2015), it is nearly hard to separate sanitary facility concerns from individual health and nutritional state. Access to adequate sanitary facilities is vital for preserving life and improving health.

Every child has the right to grow up in an uncontaminated and safe environment. Access to clean drinking water, basic toilets, and decent hygiene practices not only keeps children alive, but also gives them a better start in life. Despite the fact that the emergence of Corona virus emphasizes the importance of hands and overall body hygiene in sickness prevention, three billion people worldwide, including hundreds of millions of young children, lack access to good supply of soap and water for hand-washing (WHO, 2020). People in rural areas and low-income countries are the most vulnerable and afflicted (UNICEF, 2022). Sustainable Development Goal 6 aims to 'ensure the availability and sustainable management of water and sanitation for everyone' and covers Water, Sanitation and Hygiene related indicators such as population, open defecation and household access to basic sanitation services. Presently, progress toward this global goal has been marred by inconsistencies. In 2017, it was estimated that 758 million people lacked access

to safe drinking water, while 3 billion lacked access to essential hand-washing facilities at home (Wada et al, 2021).

In Nigeria, especially in traditional settlements such as Epe, the effect of physical planning authority is seldom felt owing to such organizations' limited capacity to monitor and assure the delivery of sanitary facilities in residential and non-residential constructions. Section 35 of the Town Planning fiat of 1992, for example, grants planning authorities the jurisdiction to enforce all rights and duties associated to a development permit. According to Owolabi (2019), most planning organizations failed in their roles owing to a lack of campacity inadequacy. Though, past research has investigated the significance of inadequate nutrition and sanitation, information focused on the interaction between the study's major variables is sparse in the study area. As a consequence, this study looked at the relationship between household sanitation practices and nutritional status of pre-school children aged 30-59 months in Epe Local Government Area (LGA), Lagos State.

Methodology

Study Design: The study adopted a community-based descriptive cross sectional survey design among residents of Epe LGA, Lagos State and was conducted from February 16, 2022 to March 16, 2022.

Description of Study Area: The study was conducted in Epe LGA which is one of the 20 Local government areas of Lagos State in southwestern part of Nigeria. It is located close to the Lekki peninsular. Towns and villages that constitute Epe include Ejinrin, Agbowa, Epe, Abomiti, Boluduro, Emito, Imamusa and Fowosodi. Epe local government covers a total of 965 square kilometres and witnesses two distinct seasons which are the dry and the rainy seasons. The average temperature of Epe LGA is 25o c while the area’s average humidity is 89 percent. Most of the dwellers are members of the Yoruba ethnic division. Yoruba language is widely spoken in the area while Islam is the major religion in Epe. Epe is a home of many colourful festivals which include the Eebi and Kiladolu festivals. Epe LGA is also home to several rivers and tributaries.

Population of the Study: The population of this study was 303, 655 (Lagos State Ministry of Science and Technology, 2006)

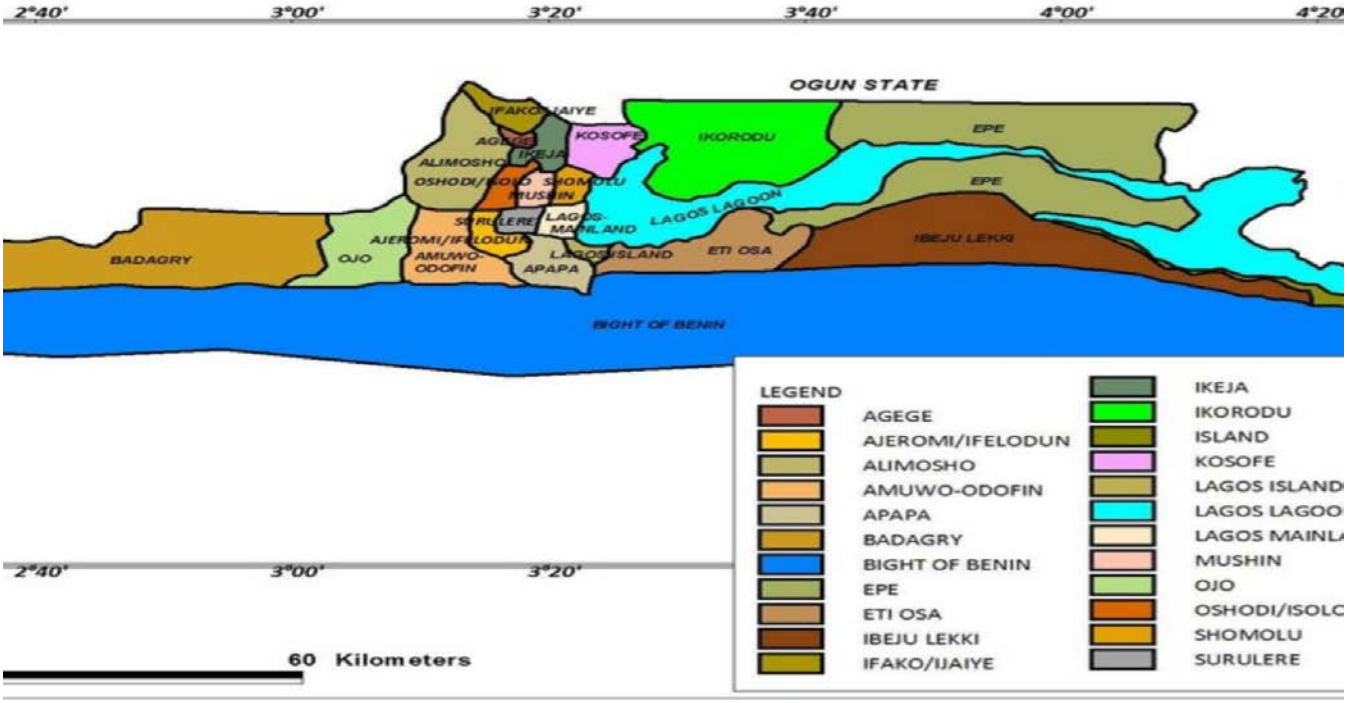

Figure1. The study area in Lagos state Source: Lagos state ministry of physical planning

Sample for the Study: The sample size for the study was three hundred and nine (309) members of households in Epe LGA consisting of under-five children and care-givers who were 18 years of age and above. Multi stage sampling technique was used to select the households for the study. At the first stage, Epe LGA was purposefully selected for the study because it is a traditional settlement. At the second stage, four villages were chosen from the Local Government area. The four villages selected were Odo-Rangushi, Eredo, Noforija and Mojoda. At the third stage, families with preschool children (30-59 months) were identified and purposefully selected. A house-to-house census was used to identify households with pre-school children.One hundred and three (103) households were discovered to have pre-school children. At the fourth stage, two caregivers from each identified households who were 18 years and above were selected. Hence, 206 caregivers and 103 pre-school children were selected for the study.

Instrument for Data Collection: Two instruments were used for data collection. These are structured questionnaire and anthropometric measuring scales. Anthropometric measurements (weight and height) were taken for all the children by the investigators with an assistant. The age

of the children were confirmed from the caregivers. Standard anthropometric measurement procedures were used as recommended by the World Health Organization (WHO, 2006). The entire data was checked for completeness, coded, entered into SPSS version 20 for window and cleaned. Anthropometric data were exported from SPSS to WHO Anthro version 3.0.1 for window and standard Z-scores were generated for nutritional status. The nutritional status indicators, weight-for-Height (WHZ), Height-for-age (HAZ) and weight-for-age (WAZ) were compared with reference data from World Health Organization standards. Children below-2 standard deviations (-2SD) of the WHO median for WHZ, HAZ, and WAZ were considered wasted, stunted, or underweight respectively. Cronbach's Alpha method was used to determine the internal consistency of the questionnaire which yielded an alpha value of 0.86.

Two hundred and six (206) copies of the questionnaires were distributed to the caregivers who were 18 years and above by the researchers. Efforts were made to ensure that the items were filled completely without omitting any of the needed information. All the copies of the distributed questionnaires were returned showing 100% return rate. All the children (103) were subjected to anthropometric measurements and recorded.

Method of Data Analysis: Data were analyzed using simple percentage and Pearson r. Pearson r was used to determine the relationship between household sanitation practice and the nutritional status (stunting, underweight and wasting) of preschool children. Values less than 0.05 were considered statistical significance levels.

A household is considered to have good sanitation practices if toilet facility is situated in the house with no sign of open defecation, if all toilet structures are cleanable, with a cover and not soiled with fecal material and if functional hand washing facility (with water and soap) is available near the latrine as well as proper dumping of refuse, solid and liquid waste disposal. If a home does not meet one or more of the standards for 'excellent sanitation practices,' it is deemed to have poor sanitation practices.

Ethical Consideration: The Lagos State Ethics Research Committee, Ministry of Health, granted permission to perform the study. Informed permission was gained from caregivers and participating community leaders. Throughout the study period, anonymity and confidentiality of information acquired were maintained. As a reward for their efforts, caregivers were given detergent sachets.

Results

Table 1: Socio-demographic Parameters of Participants (N= 309)

Variables	Number of participants (N=309)	Percentage (%)
Sex		
Male	141	45.6
Female	168	54.3
Age		
30-59 months	103	33.3
18-29 years	123	39.8
30-39 years	43	13.9
>40 years 40	40	12.9
Educational Status		
Nursery	103	33.3
Primary	35	11.3
Secondary	89	28.8
Tertiary	40	12.9
Adult education	27	8.7
No formal education	15	4.9

Forty-six percent (45.6%) of the study participants are males while 54.3% are females. Thirty-three (33.3%) of the participants were between ages 30 to 59 months, 39.8% were between ages 18-29 while 26.8% were above age 29. Majority (28.8%) of the caregivers had secondary school education, (33.3%) of the participants were nursery school pupils while 4.9% have no formal education.

Table 2: Caregivers' Sanitation Practices on Water

Variable	Number of subjects (N=206)	Percentage (%)
Source of water supply		
Borehole	121	58.7
Well/ stream/ river	2	0.97
Public faucet	53	25.7
Rainwater	30	14.5
Storage of drinking water		
Plastic covered container	100	52.9
Direct from tap	-	-
Clay pot	23	11.1
Sachet water	83	40.2
Method of water treatment		
Sedimentation	-	-
Chlorination	-	-
Filtration	-	-
Boiling	109	52.9

No treatment	97	47.0
Frequency of washing water storage containers		
Every week	79	38
Every two weeks	53	25.7
Every three weeks	34	16.5
Monthly	40	19.4

Data presented in Table 2 showed that the caregivers' sources of water supply include; borehole 121 (58.7%), stream/river/well 2(0.97%), public faucet 53(25.7%) and rainwater 30 (14.5%). Of the 206 caregivers, 100 (52.9%) store water in plastic containers with lids, store water in clay pot 23(11.1%), 83 (40.2) utilize sachet water. Majority 109 (52.9%) of the caregivers boil their water before drinking, 97 (47.0%) do not treat their water in any way before drinking. Thirty-eight percent (38%) of the caregivers affirmed that they wash their water storage containers on a weekly basis while others wash between 2 to 4 weeks.

Table 3: Household Sanitation Practice on Toilet

Variables	Frequency (N=206)	Proportion (%)
Types of toilet facilities		
Water closet	93	45
Pit latrine with cover	46	22
Squat flush latrine	41	19.9
Bucket latrine	-	
No toilet	26	12.6
Condition of toilet facility		
Shared with other households	93	45
Not shared	113	54.8
How often toilets are cleaned		
Daily	113	54.8
Once weekly	61	29.6
Once in a while	32	15.5
Availability of water in the toilet		
Always available	159	77.1
Not always available	47	22.8
Comfortability of toilet use		
Yes very comfortable	123	59.7
No, not comfortable	83	40.2
Alternative place of defecation for households		
Without toilet facilities		
Bush	17	8.3
Polythene	9	4.4
Container		

Table 3 shows the types of toilet facilities used among the participants. This include; water closet 93(45%), pit latrine with cover 46 (22%) and squat flush laterine 41 (19.9%). One hundred and thirteen percent (54.8%) of the households do not share toilet facilities with other households. About fifty-five percent of the households clean their toilets on daily basis, 159(77.1%) affirmed availability of water in their toilets and 123 (59.7) indicated that they are very comfortable with their toilet. Of the 26 subjects who indicated that they have no toilet facility, bush 17 (2.1%), polythene 9 (1.1%) were identified as alternative places of defecation.

Table 4: Hand Washing Practices among Caregivers

Variables	Frequency (N=206)	Proportion
Period when hands are washed		
Regularly (every two hours)	17	8.3
Before food	76	36.8
After food	107	51.9
After daily activities	34	16.5
After toilet	206	100
After handling children's excreta	206	100
Method of hand washing practice		
Water with soap or detergent	135	65.5
Water only	71	34.4
Availability of hand washing stations in the household		
Available	76	36.9
Not available	130	63.1
Availability of drainage system		
Available	119	57.8
Not available	87	42.2
Availability of waste storage facility		
Available	119	57.8
Not available	87	42.2
Presence of refuse dump		
Present	78	37.9
Absent	128	62.1
Offensive odour in the surrounding		
Present	27	13.1
Absent	179	86.9

Results on hand washing practice as presented in Table 4 shows that all the caregivers 206 (100%) practice hand washing after toilet use, after food 107 (51.9%) before food 76(36.8). Only 17 (8.3%) engage in regular hand washing practices. Majority 135 (65.5%) wash their hands with water and soap. Also, 130 (63.1) do not have hand washing stations in their households, 119

(57.8) of the households have waste storage facility. There was presence of refuse dump in 78 (37.9%) of the households, while offensive odour was absent in 179(86.9%) of the households.

Table 5: Nutritional Status of the Pre-school Children (N=103)

Nutritional status	**All**	**Male**	**Female**
Attributes	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**
Weight for age (WAZ)			
<-2	15(14.6)	6	9
Height for Age (HAZ)			
-3 to < -2	18(17.5)	8	10
Weight for Height (WHZ)			
-3 to <-2	23 (22.3)	12	11
Normal Nut. Status	47 (45.6)	23	24

Data presented in Table 5 shows that 14.6% of the children were underweight. The prevalence of stunting among the children was 17.5%. The prevalence of wasting was more (22.3%) among the children while 45.6% of the children had normal nutritional status.

Table 6: Relationship between Household Sanitation and Children's Nutritional Status

Variables		**Sanitation Practice**	**Nutritional Status**
Household Sanitation Practices	Pearson Correlation	1	.641
	Sig. (2-tailed)		
	N	206	.000
Nutritional Status	Pearson Correlation	.641	1
	Sig. (2-tailed)	.000	
	N	206	206

Table 6 presented the data analysis on relationship between household sanitation practices and the children's nutritional status. The table showed that the relationship between household sanitation practices and the children's nutritional status is moderately high and positive (r=.641).

Discussion of Findings

In the present study, caregivers indicated borehole 121 (58.7%) and public faucet 53 (25.7%) as the major sources of water supply. They also claimed that they boil their water before drinking. This means that half of the houses surveyed had an improved and stable water supply. Our results are congruent with those of Inah et al. (2020), who found that boreholes with hand pumps were the predominant method of water delivery for families in their study. Adequate water supply is needed for proper sanitation, which is necessary for healthy living. This supports Hutton and Chase (2017)'s argument that safe drinking water, good sanitation, and hygiene are critical to improving an individual's standard of living, including improved physical and environmental health, improved educational outcomes, time savings, and the assurance of lives lived with dignity.

According to our research, the majority of caregivers (45%) use a water closet, with pit latrines with covers coming in second (22%). This is hardly surprising considering that Epe LGA is a semi-urban zone with both new and historic structures. Pit latrines are widespread in both rural and semi-urban areas because of their inexpensive installation and maintenance costs. However, it was revealed that most residences' restroom facilities had poor hygiene requirements. Households that do not have toilets discharge waste feces in open fields (i.e. bushes and in polythene). Open defecation harms the ecology and pollutes water sources, increasing disease spread. It contributes to a never-ending cycle of illnesses and poverty. The countries with the highest frequency of open defecation have the highest number of pre-school child’s deaths (under-five years), has the highest levels of hunger and poverty, as well as enormous wealth disparities (WHO and UNICEF, 2020). According to the study results, the majority of households (54.8%) do not share toilet facilities with other families. Fifty-five percent (55%) of households clean their toilets every day, while the remainders do not. Furthermore, majority claimed there is water in their toilets, and 59.7% said their toilet is quite pleasant. Toilet facilities are critical for healthy life. Access to improved sanitary facilities, according to Bartram and Cairncross (2020), does not only improve people's health, but also helps a country's economy since ill health has a negative influence on labor, productivity, and earning ability. According to data, children bear the largest share of this health burden, with sanitation accounting for 7% of total disease burden and 19% of child morbidity and mortality globally (Bartram and Cairncross, 2020).

According to the poll, more than half of the caregivers store their drinking water mostly in plastic containers with lids, with less than half (38%) affirming that they wash their water storage containers on a weekly basis. This indicated that the households did not practice adequate sanitation. To avoid contamination and improve sickness prevention, water storage containers must be regularly and completely cleaned. Despite the fact that the majority of caregivers (52.9%) boil their water before drinking it, 47% do not. This might be hazardous to one's health. Venkatashiva et al. (2017) observed that two-thirds of the households investigated did not treat their water before consumption, which is consistent with the results of this research. The outcome is also similar with the findings of Inah et al. (2020), who showed that one-third of the families studied do not purify their water before use. Water-borne infections may be acquired by consuming water without first boiling or purifying it. Each year, around 70,000 children under the age of five die as a result of their heightened vulnerability to water-borne illnesses, according to the United Nations International Children Education Fund and WHO (2020). According to estimates, poor sanitation accounts for more than 73% of the burden of enteric disease and diarrhea sickness (WHO & UNICEF, 2017). Families' lack of a water treatment technique may also be connected to caregivers' views of water safety. This was confirmed by Kaoje et al. (2019), who discovered that 97% of their respondents believed the water source was safe to drink. Lack of knowledge about different water treatment processes may also prevent caregivers from treating water before use. However, boiling was a well known method of water purification. This has become one of the most common methods of water filtration in rural areas due to its simplicity, convenience, and cheap cost (Inah et al, 2020).

Findings on hand washing practice indicated that caregivers often wash their hands after using the toilet, with just a small percentage (8.3%) who engaged in frequent hand washing activities. Diarrhea and other diseases may occur as a consequence of poor hand-washing practices in both children and adults. Ordinioha and Owhondah (2018) discovered in their study that poor hand washing habits among their respondents were to blame for the high number of reported instances of pediatric diarrhea in the studied community. Globally, it is estimated that proper hand washing, water, and sanitary hygiene might have prevented 1.9 million deaths and 120 million disability-adjusted life years (DALYs) in 2016 (WHO and UNICEF, 2020). Due to diarrhea diseases and other disease conditions such as soil-transmitted helminth infections, malnutrition, trachoma, schistosomiasis, lymphatic filariasis, and those associated with inadequate wastewater

management practices, inadequate sanitation causes approximately 830,000 deaths and over 49 million DALYs (WHO & UNICEF, 2020).

In the present study, the prevalence of malnutrition was 14.6%, 17.5%, and 22.3% for underweight, stunting, and wasting, respectively. This might be owing to the children's caregivers' poor hygiene standards. According to WHO and UNICEF (2020), poor sanitation standards may lead to stunting in pre-school children via a number of processes such as diarrhea, helmith infections, and environmental enteric dysfunction caused by dirty environments, resulting in poor physical and cognitive development.

Our study showed a significant positive moderate correlation (r=.641) between household hygiene habits and children's nutritional health. Growing up in a clean and safe environment is every child’s right. Access to clean water, basic toilets and good hygiene practices keeps children thriving and gives them a healthier start in life. The Sustainable Development Goal (SDG 6) aims to ‘ensure the availability and sustainable management of water and sanitation for all" and comprises water, sanitation and hygiene -related indicators such as population, open defecation practice and household accessibility to basic water and sanitary hygiene services. Presently, the achievement of this global goal has been marred with inequalities. As of 2017, it was estimated that 758 million people were without access to safely managed drinking water services. Around 3.5 billion people lacked access to safe sanitation services, while 3 billion people had no access to essential hand-wash services at home. As a consequence, their nutritional and health conditions deteriorated (Wada et al, 2021).

Conclusion

Water, sanitation, and hygiene facilities are critical for maintaining a healthy lifestyle. Results from the present study suggested a lack of water supply among households, with only around half of the dwellings surveyed having a reliable and improved source of water supply. The majority of households engaged in poor sanitation practices, such as irregular hand washing and the use of unsanitary water storage containers. Malnutrition was found in 14.6%, 17.5%, and 22.3% of underweight, stunted and wasting children, respectively. There was a substantial positive link between household hygiene habits and pre-school children's nutritional health (underweight, stunting, wasting and normal nutritional status). Sanitation is an important factor in a community's nutritional and health condition. Poor household sanitation practices often contribute to a rise in negative health outcomes, notably, the severity of communicable diseases and child malnutrition.

Recommendations

Based on the findings from the study, it is recommended that:

1. Caregivers should devise measures to enhance home sanitation.
2. Community stakeholders should collaborate with the government at all levels to guarantee that all homes in their areas have improved and dependable water supply.
3. The local government council should raise awareness about the necessity of proper home sanitation.
4. Environmental health officials should frequently examine families to verify that all households have improved hygiene standards and, where appropriate, penalise any defaulters.
5. Physical planning authorities, via their development control agencies, should be sufficiently staffed and equipped in terms of persons and instruments to carry out development control and monitoring activities relevant to the supply and monitoring of sanitary facilities in buildings.

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