Sanitation Status of Income Groupings of the Sustainable Development Goals: Implications for the Attainment of Target 6.2

Odafiwotu Ohwo

ABSTRACT

The use of safely managed sanitation services (SMSS) has been recognized as fundamental to maintaining good health and prevention of diseases, especially diarrhea. This study assessed the sanitation status of income groupings of the Sustainable Development Goals (SDG) and its implication for the attainment of target 6.2. The descriptive cross-sectional research design was adopted, which involved harvesting of retrospective data from the Joint Monitoring Programme (JMP) report for 2021 on household SMSS and open defecation (OD) of the SDG income groupings “(low-income, lower-middle income, upper-middle income & high-income)” that were disaggregated for rural and urban (RU) areas. The findings revealed that the chances of the global population attaining the sanitation targets by 2030 was very slim, as none of the income groupings was projected to reach 100% coverage of SMSS by 2030. The provision of SMSS increases progressively from the low-income to the high-income groupings and from the RU areas. OD was more prevalent in the rural area of the low-income and lower-middle income countries. Therefore, achieving the sanitation component of target 6.2 will require an annual growth rate of SMSS of about six folds of current rates, especially in the low and lower-middle income classes.

Keywords: Income Groupings, Open Defecation, Safely Managed Sanitation, Sustainable Development Goals, Target 6.2.

I. INTRODUCTION

The quest by the global community to eradicate poverty, inequalities, achieve peace and prosperity, protect our planet and people’s rights and dignity led to the adoption of “Resolution 70/1- Transforming our world: the 2030 Agenda for Sustainable Development,” by the United Nations General Assembly (UNGA) on September 25, 2015 (United Nations, 2015). At the centre of the 2030 Agenda is the “17 Sustainable Development Goals (SDGs)”. The UNGA believed that our world would be transformed positively if the SDGs are achieved. One of the 17 goals, SDG 6, focuses on “ensuring availability and sustainable management of water and sanitation for all by 2030” (WHO & UNICEF, 2017). SDG 6, target 6.1 focuses on “achieving universal and equitable access to safe and affordable drinking water for all,” while target 6.2 aims at “achieving access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations” (WHO & UNICEF, 2017). Therefore, achieving both targets 6.1 and 6.2 will go a long way to achieving SDG 6, which implies the “provision of safe drinking water, sanitation and hygiene (WASH)” for the world population, irrespective of geographical location, socioeconomic, gender and cultural status.

The attainment of SDG 6 is very important because adequate WASH services have long been recognized as fundamental to healthy living, prevention of stunting, reduction in school absenteeism, cognitive development, prevention of diarrhea (especially among children below the age of 5) and other preventable diseases and death (Diarrhoeal Diseases Collaborators, 2017; Roche et al., 2017; Ohwo, 2019; Ohwo & Omidiji, 2021; Zerbo et al., 2021; Hosking et al., 2022). Stressing the importance of WASH services, the WHO (2022) founds out that inadequate drinking water and sanitation are responsible for the death of 829,000 people annually in developing countries, which represents 60% of deaths due to diarrhea. The report further noted that adequate WASH services could prevent the death of 297,000 children below the age of five annually. Hence, much effort has been directed towards achieving sustainable WASH services globally. From 1990 till 2020, WASH services have improved significantly world-wide. For instance, 2.6 and 2.1 billion people had access to improved drinking water sources and adequate sanitation facilities from 1990 to 2015, respectively (WHO & UNICEF, 2015).
While from 2015 to 2020, the proportion of the world population with access to “at least basic water services” increased from 88 to 90%, and 73 to 78% for “at least basic sanitation” within the same period (WHO & UNICEF, 2021).

Despite the gains associated with adequate WASH services, a lot of gaps still remain to be filled to provide the world population with sustainable WASH services, especially sanitation. For example, in 2015 the terminal year for the "Millennium Development Goals (MDGs)”, about 2.4 billion people still lacked access to adequate sanitation facility, hence the world failed to meet the 77% target for sanitation, as only 68% of the global population had access to improved sanitation by 2015, while 13% of the world population still practiced open defecation (OD), the lowest in the sanitation rung (WHO & UNICEF, 2015). Considering the fact that sanitation services lagged behind water services, this study focused on the assessment of sanitation status of income groupings of the SDGs.

Although some progress has been recorded in sanitation provision since the commencement of the SDGs, however, the rate of progress seems to lag behind expected growth if the global sanitation target is to be achieved. For example, in 2020, only 78% of the world population had access to “at least basic sanitation,” while 6% of the people still practiced OD (WHO & UNICEF, 2021). Using the SDG monitoring indicator for sanitation (6.2.1), only 54% of the global population had access to SMSS in 2020 (WHO & UNICEF, 2021). This means that 46% (about 3.6 billion) of the world population still uses either basic, limited, unimproved or OD. A further analysis of the use of SMSS shows that the global average is not evenly distributed among the different SDG sub-regions or income groupings. In addition, disparities in sanitation services also exist between countries, rural and urban (RU) areas, gender, education and other groups (Osei et al., 2015; Armah et al., 2018; Wang et al., 2019; Prakash et al., 2022). This situation further cast doubt on the attainment of the global target for sanitation by 2030.

Studies have shown that sanitation services are less provided in rural area than urban area, among the poor than the rich and among the uneducated than the educated (Ohwo & Odubo, 2021; Belay et al., 2022; Ohwo & Ndakara, 2022), which clearly revealed that some people are being left behind on the march to the actualization of the global sanitation targets by 2030; even though target 6.2 sets out to eliminate disparities in sanitation services. In some cases, the gap in service is so wide between groups, that bridging the service gap will require committed efforts and huge financial resources to actualize. For example, in 2015 and 2020, sub-Saharan Africa (SSA) sub-region recorded the lowest sanitation coverage of 30% and 33%, respectively for “at least basic services;” while Australia and New Zealand had >99% for both 2015 and 2020. This produced a service gap of 69 and 66% for 2015 and 2020, respectively (WHO & UNICEF, 2021). Considering the slow pace of growth of only 3% from 2015-2020 for “at least basic sanitation” in SSA, it will be a miracle to eliminate the wide service gaps between SSA and Australia and New Zealand (the best performing sub region), talk less of achieving 100% coverage for SMSS by 2030, as 18% (197 million) of the population in SSA practiced OD in 2020 (WHO & UNICEF, 2021).

It should be noted that between and within the SDGs regional groupings, wide disparities in sanitation services exist. For example, in 2015 and 2020, urban sanitation services for “at least basic” were better than the rural sanitation in the SDG sub-regions, except Australia and New Zealand that had no disaggregated data for RU areas. Similarly, the proportion of the population practicing OD in the various sub regions was also more in the rural than the urban area (WHO & UNICEF, 2021). Wealth differentials in sanitation service are other dimension of disparity worth mentioning. A study by Armah et al. (2018) reported that rich urban households were over 200% more likely to use basic sanitation than poor urban households. This is a case of intra-urban disparity, which also exists in the rural area, state and sub-regions. Therefore, the task of carrying everyone along and eliminating existing disparities in sanitation services among the global population is huge. This situation calls for more studies to investigate and analyze the various dimensions of sanitation disparities from different perspectives. Such analyses would expose the gaps that need to be filled and areas that need urgent fix and attention to ensure that the global population is moving in the same direction to actualizing the global sanitation target.

In order to have different perspectives and in-depth insight on the progress on global WASH services towards the attainment of SDG 6, the JMP reports usually provide disaggregated data on sub-regional groupings, national, rural and urban, rich and poor, and income groupings. The World Bank income groupings of: “low-income, lower-middle income, upper-middle income and high-income” was adopted by the JMP report. The sanitation status of the income groupings was further disaggregated for RU areas. Although studies (Buckley & Kallergis; Hyun et al., 2019; Odagiri et al., 2021; Meili et al., 2022) have been conducted on sanitation services at different scales and dimensions with various interesting outcomes, however, the author has not seen any study conducted on the sanitation status of income groupings of the SDGs. This study will therefore help to reveal the sanitation status of the SDG income groupings and determine whether significant progress has been made in the quest to achieve target 6.2 from 2015-2020.
Therefore, the following hypotheses were tested in the study:

i. There is no significant difference in the proportion of the national population using SMSS in the SDG income groupings in 2015 and 2020.

ii. There is no significant difference in the proportion of the national population using OD in the SDG income groupings in 2015 and 2020.

II. MATERIALS AND METHODS

A. Data Collection

The study was aimed at the analysis of sanitation status of income groupings of the SDGs and its implication for the attainment of target 6.2. The study used the descriptive cross-sectional research design based on retrospective data retrieved from the 2021 JMP report (WHO & UNICEF). The report contains updated households’ WASH data from 2000-2020, with special focus on progress from 2015-2020 (5years into the SDG era). The WASH data were estimated for global, regional and national categories, which were further disaggregated for RU areas. This study however collected only household’s SMSS and OD data, which facilitated comparison of sanitation service levels across the SDG income groupings.

In order to have a comprehensive analysis of the sanitation levels across the income groupings, the 179 countries that were classified by the World Bank and captured in the JMP report for 2021 were classified into the four SDG income groupings, using the country classification by income (per capital gross national income, GNI), which was carried out in June 2020, by the World Bank (United Nations, 2021). This was done because the JMP report did not classify the countries according to their respective income groupings but adopted the World Bank income classifications to produce the WASH data for the respective income groupings. The classifications of the 179 countries show that low-income countries were 29; lower-middle income, 49; upper-middle income 47 and high-income 54. In order to select a representative sample for each of the income groupings, only countries that had sufficient data for SMSS and OD were sampled. The sample size was 66 countries, which were distributed as follows: low-income, 13; lower-middle income, 21; upper-middle income, 18 and high-income, 14. In each of the sampled countries, the disaggregated data for SMSS and OD for national, rural and urban were collected and used for the analysis. Also collected, were the combined sanitation data (safely managed & OD) for each of the four classified income groupings, which were used to compare the sanitation services across the sampled countries and the combined income groupings for 2015 and 2020, respectively.

B. Data Analysis

The harvested data on SMSS and OD in the sampled countries and respective income groupings were analyzed using both inferential and descriptive statistics. The descriptive statistics involved the use of tables (for data presentation) and percentages (proportion of the population in the respective countries and income groupings) using SMSS and OD, respectively. The inferential statistic (t-test) was used to test the stated hypotheses, using the statistical package for the social sciences (SPSS), version 15. In order to project the 2030 national sanitation status (safely managed & OD) for each of the income groupings and the sampled countries, the annual rate of service change was used to estimate the likely coverage of SMSS and OD, which revealed the countries and income groupings that seem to lag behind toward the march for the actualization of target 6.2.

III. RESULTS AND DISCUSSION

A. SMSS in the SDG Income Groupings from 2015 -2020

The level of SMSS in the SDG income groupings was analyzed using the respective disaggregated data for rural, urban and national. The SDG 6.2.1 monitoring indicator, proportion of the population using SMSS was adopted to compare the sanitation coverage across the income groupings (see Table 1). The data in the table revealed that in 2015, the low-income group recorded the least coverage of SMSS of 16 and 19% for RU areas, respectively; while the best coverage of 56% (rural) and 87% (urban) was recorded for the high-income group, which produced a gap of 40% (rural) and 68% (urban) between the low-income and high-income categories. The data suggest that service levels increased from the low-income to the high-income class in the RU areas, except in the upper-middle income class, where the service level (27%) was lower in the rural area than the 38% in the lower-middle income class. Also, the national figures (combined proportion for RU areas) show that service levels for SMSS increased progressively from the low-income (17%) to the high-income (85%) class, which produced a service gap of 68%. This clearly demonstrates that wealth differentials are a major determinant of access to SMSS. These findings agree with the assertion that urban poor households are 227% less likely to have access to improved sanitation than their urban rich counterparts (Armah et al., 2018).
The data also show that the proportion of coverage for SMSS were better in the urban centre than the rural area in all the various income groupings except in the lower-middle income class, as the rural coverage was 38% as opposed to 37% in the urban area. The lowest service gap between RU areas in 2015 was one per cent, which was measured in the lower-middle income class, while the highest service gap of 31% was recorded in the high-income class. This shows that disparity exist between RU areas irrespective of the income class, which collaborate the findings of previous studies (Roche et al., 2017; Adams & Smiley, 2018). Because of the disparities that exist between the RU areas in the income groupings; relying on the world average coverage for SMSS may be misleading; as such averages masked the wide service gap between the income groupings (Ohwo & Agusomu, 2018). This may create a wrong impression of the service levels in the various income classes. For instance, in 2015, the estimated world national coverage for SMSS was 47%, which was higher than the corresponding figures for low-income, lower-middle income and upper-middle income groups, but lower than the 85% for the high-income group. Similar situations were also experienced in the RU areas. This is why reliance on global averages may be misleading as extreme figures (low or high) affect global averages, which may not be a true reflection of what exist in reality in the respective countries in the various income classes as shown in Table II.

Although the 2015 SMSS for the low-income class were 17% (national), 16% (rural) and 19% (urban), however, the service levels in the sampled countries in this class vary widely. For example, the national coverage ranges from 6% in Ethiopia to 32% in Gambia; while rural coverage ranges from 3% in Ethiopia and Guinea-Bissau to 33% in Gambia, and the urban coverage ranges from 9% in Mali to 41% in Somalia. These figures clearly demonstrate intra service disparities among the countries in this income category. Other studies have also reported inter and intra country disparities in sanitation services (Osei et al., 2015; Ohwo & Ndakara, 2022). Despite the general low national, rural and urban coverage in the low-income group, some countries (Ethiopia, Togo, Chad & Madagascar) within this category have performed very poorly and deserved special attention to scale up their service provision for SMSS. If this is not done, a large proportion of the population in these countries may be left behind and constitute threats to the actualization of target 6.2.

The level of SMSS among the sampled countries in the lower-middle income category was better than what was measured among the low-income class. For example, the service range for national among the sampled countries in the lower-middle income category was 11% (Ghana) to 63% (Egypt & Bhutan), which was far higher than the low-income range of 3-33%, but lower than the ranges for upper-middle income (12-76%) and high-income (79-99%) classes, respectively (see Table II). These ranges further confirmed that service coverage increased progressively from the low-income to the high-income classes, as the lowest range value (79%) for the high-income class more than doubled the highest range (33%) for the low-income class. Similar trends were also recorded in RU areas in 2015.

Although this study has shown that sanitation services were better in the rural area than the urban area in 61.1% of the sampled countries in the upper-middle income class, however, in the other income categories, the urban area had better services than in the rural area but at different levels. In the low-income, lower-middle income and high-income classes, urban sanitation services were higher in 84.7%, 52.4% and 100%, respectively in the sampled countries. It should be noted that countries (Lithuania and Slovakia) in the high-income class recorded the lowest disparity (13%) in SMSS between RU areas, while the highest disparity (42%) was measured in China (upper-middle income class). In the lower-middle income and low-income classes, the disparities were 33% (Tunisia) and 28% (Niger), respectively.

In order to achieve the global target for sanitation by 2030, there must be rapid yearly growth in service provision in each country in the respective income groupings; unfortunately, this is not the case. Considering the proportion of the population using SMSS in 2015 (the base year for the SDG monitoring) in the various income groupings, it was apparent that the expected rate of annual growth to achieve target 6.2 should range from one per cent (high-income class) to 6% (low-income class). However, the data in Table I suggest otherwise; as the 2020 coverage for the low-income category were 18% (national), 17% (rural) and 20% (urban). This translates to a 0.2% annual national growth rate from 2015-2020, which is a far cry of the expected minimum of 6% annual growth rate in service provision. It is therefore not surprising that using the national annual rate of change from 2015-2020, the projected coverage for SMSS would be just 20% by 2030.
in the low-income class. This clearly shows that most countries in the low-income class will fail to meet the sanitation target by 2030. For example, only Somalia among the sampled countries had one per cent annual growth rate on service provision from 2015-2020, with a projected national coverage of 42% by 2030. All the other countries had below 0.9% annual growth rate. In fact, three countries (Gambia, DRC & CAR) had negative growth rates, which means that the proportion of the national population with SMSS reduced from 2015-2020. Similar observations were also made for DRC and CAR for “at least basic sanitation services” from 2015-2020 (Ohwo & Ndakara, 2022). The country with the lowest projected national coverage by 2030 was Ethiopia, with just 5% (see Table II).

In the lower-middle income class, there was appreciable increase in the provision of SMSS compared to the situation in the low-income category from 2015-2020. From the data in Table I, the national coverage increased by 6% (38-44%), with an annual national growth of 1.20% from 2015 to 2020. In spite of the improvement, however, the current growth rate still falls below the expected projection, as only 56% of the population in the lower-middle income class would have access to SMSS by 2030 (see Table I). By implication, many countries in this income class will likewise miss the target 6.2 just as with the low-income class. For instance, only 9 (42.9%) of the sampled countries in this income class had an annual national growth rate of one per cent and above in service provision from 2015-2020, with Algeria and Zimbabwe recording negative growth. In all, only 6 (28.9%) of the sampled countries had a projected 2030 coverage of 70% and above. The country with the lowest (16%) projected national coverage was Algeria, while Tunisia had the highest estimated coverage of 95% by 2030 (Table II). This simply means that all the countries in the lower-middle income class would most likely miss the 2030 sanitation target just like the case with the countries in the low-income category. These findings confirm the assertion that current service levels had to quadruple to achieve set sanitation targets in some sub-regions by 2030 (WHO, UNICEF, 2021).

The upper-middle income class recorded higher national and urban coverage of 54 and 62% than was measured in both the low-income and lower-middle-income classes, which showed that sanitation services tend to improve progressively from the low to high income class in the respective countries. Similarly, the recorded annual national growth rate of 2.00% and projected national coverage of 74% in SMSS in this region from 2015-2020 were also higher than both the low-income and lower-middle-income classes (see Table I). However, the analysis of the sampled countries in this income category presents a different scenario. For example, only 2(11.1%) of the sampled countries had one per cent and above national annual growth rate, while 5(27.8%) of them experienced negative growth rate, from 2015-2020. In all, 4(22.2%) of the sampled countries recorded 70% and above projected SMSS by 2030, with China expected to have 100% at the rate of annual national coverage of 3.6%. The high annual growth rate in service provision in China, coupled with her high population, accounts for the 2.00% annual growth rate recorded for the upper-middle income class, considering the fact that 27.8% of the sampled countries experienced negative growth. This explains why it is inappropriate to rely only on average global, regional and other broad groupings to analyze progress on WASH services, since very extreme figures (either low or high) tend to mask the realities in many of the countries of such groupings. By implication, the recorded average coverage for the upper-middle income class does not truly represent the realities in some of the sampled countries in this income class.

The high-income class still maintained the highest coverage in SMSS at the national, RU areas in 2020 as it was in 2015 (Table I). However, the national service gap between the upper-middle income class and the high-income class reduced from 41 to 33% from 2015-2020, due to the 0.40% annual national growth rate in service in the high-income class compared to the 2.00% in the upper-middle income class. Despite the high recorded national coverage of 85% for 2015, and 87% for 2020, in the high-income class, the projected 2030 coverage was 91%, which fell short of the expected 100%. Although the high-income class just like the other income groupings have been projected to miss the 2030 sanitation target, however, 4(28.6%) of the sampled countries (Austria, Israel, Lithuania & Switzerland) were projected to achieve 100% coverage of their respective population by 2030. Since the national annual growth rates in SMSS range from 0.2-2% in the income groupings from 2015-2020, it is therefore not surprising that the t-test result ($t = 1.852$, $p = 0.161$, $\alpha = 0.05$) of the first hypothesis shows that there was no significant difference in the proportion of the national population using SMSS in the SDG income groupings in 2015 and 2020. This implies that not much progress has been made in providing SMSS across the SDG income groupings, which could impact negatively in attaining target 6.2.

B. OD Practice in the SDG Income Groupings from 2015 -2020

An important component of target 6.2 is to end OD globally by 2030 because of its negative consequences such as pollution of drinking water sources, impairment of cognition, stunting, diarrhea, worm infestation, school absenteeism, and harassment of girls and women when seeking for a convenient place to defecate, especially at night (Van Houweling et al., 2012; Galan et al., 2013; Mara, 2017; Ameyaw & Odame, 2017). These associated consequences have led to the classification of OD as the worst form of sanitation; hence it is placed at the bottom rung of the sanitation ladder. By implication, one of the first fundamental steps towards achieving adequate sanitation is to eliminate OD practice; hence it was specifically mentioned in target 6.2.

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Global efforts to eliminate OD have yielded great dividend, as the number of the world population practicing OD reduced from 1.3 billion (21%) to 673 million (9%) from 2000-2017 and reduced further to 6% by 2020 (WHO & UNICEF, 2019; 2021). However, the reduction was not evenly distributed between RU areas, countries, income groupings or sub-regions. In 2015, the proportion of the population practicing OD varies across the income groupings. From Table III, it is evident that the proportion of OD practice at the national level reduced progressively from the low-income class (24%) to the high-income class (<1%), with a service gap of 23%. Similar trends were also recorded in RU areas, where the proportion of OD practice decreased from 32% (low-income) to <1% (high-income) and 6% (low-income) to <1% (high-income), respectively. Similar findings were also recorded by Ohwo and Odubu (2021).

The data in Table III also show that OD was more rampant in the rural area than the urban area in the income groupings, except the high-income class, with equal proportion of <1%. This finding agrees with the assertion that 92% of those practicing OD live in rural area (WHO & UNICEF, 2021). The gap in OD practice was more pronounced in the low-income class (26%), where the rural proportion was 32%, as against the urban 6% prevalence. The gap in OD prevalence decreases progressively towards the high-income class where both the RU areas have equal proportion (<1%) of OD practice. Similar patterns were also experienced among the countries in the respective income groupings. For example, in 2015, OD was more prevalent in the rural area of all the sampled countries in the low-income and lower-middle income classes. The highest disparity in OD practice in the low-income class was measured in Niger, with rural prevalence of 83% and urban prevalence of 14%, which translates to a service gap of 69%. In the lower-middle income class, Djibouti recorded the highest disparity of 62%, with rural OD prevalence of 65% and urban prevalence of just 3%. The wide gap in OD experienced both at the low-income and lower-middle income classes were drastically reduced and completely eliminated in the upper-middle income and high-income classes, respectively. In fact, only two countries (Ecuador & Suriname) recorded disparities in rural and urban OD practice in the upper-middle income class, with both countries having 9% and <1% prevalence rate in the RU areas, respectively. In the high-income class, disparity in OD practice has been eliminated completely between the RU areas in all the sampled countries (see Table II).

Five years into the SDGs (2015-2020), some progress has been made in OD reduction globally. However, the highest reduction was measured in the lower-middle income class that incidentally had the second highest level of OD practice in the RU areas. OD reduced from 28% to 17% (11% reduction), while the high-income class remained largely unchanged, which incidentally had the lowest OD prevalence of <1% in both the RU areas. Using the annual national change in OD practice from 2015 to 2020, it was projected that the low-income class would have 9.5% OD prevalence by 2030, while the other three income groupings would be OD free (see Table III). In the various income groupings, the data in Table II, suggest that only 38.5% and 42.9% of the sampled countries were projected to be OD free in the low-income and lower-middle income classes by 2030; while all the countries in the upper-middle income and high-income classes were projected to be OD free by 2030 (see Table II). However, the t-test result ($t = 1.894, p = 0.155, \alpha = 0.05$) of the second hypothesis revealed that there was no significant difference in the proportion of the national population using OD in the SDG income groupings in 2015 and 2020. This means that the rates of OD reduction in the respective income groupings and countries were not appreciable from 2015-2020 and cannot guarantee total elimination of OD globally, especially in the low-income class. This study has however demonstrated that OD practice seems to be highly influenced by place of residence (rural or urban) and wealth status of households, as the rich and the urban dwellers tend to have better access to SMSS and less practice of OD.

### Table III: Percentage of the Population Practicing OD in SDG Income Groupings

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<tbody>
<tr>
<td>1</td>
<td>Low-income</td>
<td>24</td>
<td>32</td>
<td>6</td>
<td>19</td>
<td>26</td>
<td>4</td>
<td>-0.95</td>
<td>9.5</td>
</tr>
<tr>
<td>2</td>
<td>Lower-middle income</td>
<td>19</td>
<td>28</td>
<td>5</td>
<td>11</td>
<td>17</td>
<td>2</td>
<td>-1.79</td>
<td>0.0</td>
</tr>
<tr>
<td>3</td>
<td>Upper-middle income</td>
<td>2</td>
<td>4</td>
<td>&lt;1</td>
<td>1</td>
<td>3</td>
<td>&lt;1</td>
<td>-0.25</td>
<td>0.0</td>
</tr>
<tr>
<td>4</td>
<td>High-income</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>-0.00</td>
<td>0.0</td>
</tr>
<tr>
<td>5</td>
<td>World</td>
<td>10</td>
<td>19</td>
<td>2</td>
<td>6</td>
<td>13</td>
<td>&lt;1</td>
<td>-0.76</td>
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Adapted from (WHO & UNICEF, 2021)

### IV. Conclusion

The study has demonstrated that the chances of the global population attaining the sanitation target by 2030 is very slim, as none of the income groupings was projected to achieve 100% coverage of SMSS by 2030 due to their respective current annual growth rate in service provision. However, the chances of missing the global sanitation target were highest in the low-income class followed by the lower-middle income, upper-middle income and high-income classes, respectively. Although all the income groupings were projected to miss the sanitation target, however, five of the sampled countries (China, Austria, Israel, Lithuania &
Switzerland) are set to achieve 100% coverage of safely managed sanitation for their respective population by 2030 all things being equal. It is also doubtful that globally OD will be totally eradicated by 2030, as the low-come class was projected to have 9.5% of her population still practicing OD by the target year. In fact, only 42% of the sampled countries in the low-income and lower-middle income classes were projected to be OD free by 2030. This means that all income groupings, especially the low-income and lower-middle income classes have to commit more efforts, resources and innovative strategies to provide their respective population with SMSS by 2030. Achieving the sanitation component of target 6.2 will require an annual growth rate of SMSS of about six folds of current rates. Since the study has asserted that access to adequate sanitation services is largely influenced by location and wealth, therefore more attention should be paid to the rural area and low-income households and countries in developing strategies for sanitation provision, so that the current disparities in service provision can be abridged and everyone carried along on the march to achieving target 6.2 by 2030.

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CONFLICT OF INTEREST

Authors declare that there is no conflict of interest.

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