

Addressing the sanitation service chain in Ghana: Bio-digester toilet system

Over eighty (80) participants at the 93rd edition of the National Learning Alliance (NLLAP) meeting resolved to engage households and local government authorities to prioritize the provision of household toilets with the opportunity offered by the Bio-digester toilet system. The simplicity with which the various presenters and the Greater Accra Metropolitan Area Sanitation and Water Project (GAMA-SWP) staff explained the biodigester toilet technology convinced participants about the effectiveness, equitability and sustainability of biodigester toilet which promises to contribute to accelerate Ghana's improved sanitation delivery to everyone living everywhere in Ghana.

The Greater Accra Metropolitan Area Sanitation and Water Project (GAMA-SWP) led the 93rd edition of NLLAP held on 31st March, 2022 at the Coconut Groove Hotel in Accra, under the theme, "Addressing the sanitation service chain in Ghana: Bio-digester toilet system". The purpose of the learning event was to share more general knowledge and details of bio-digester technology manual to stakeholders and advocate for its extensive use and future review. The forum was also to let stakeholders know future plans for addressing the sanitation service chain of the bio-digester toilet system.



Background and Context

Poor environmental sanitation and limited availability and use of household toilet constitute a huge challenge in Ghana. Only 25% of Ghanaian households have access to basic toilet facilities, while more than five million people practice open defecation in Ghana, according to the 2021 population and Housing Census. With increasing urbanization, many communities are no longer able to use rudimentary latrines as pertains in rural communities and the sector has been in search for improved and affordable toilet technologies that also meet the environmental, social and other conditions of especially low-income households.

The Bio-digester toilet technology, though a recent innovation in Ghana, is fast becoming the preferred toilet option by many urban households, while several government and NGO-led sanitation projects in urban communities also seem to be comfortable with the new technology. From a virtually unknown option in 2010, the 2021 census reports indicates that there are about 130,251 bio-digester toilets nationwide, with a greater portion (74,758) of them being used in the Greater Accra Region alone. The GAMA SWP has provided over 35,000 bio-digester toilet facilities in the Greater Accra Metropolitan Area and over 1,200 in the Greater Kumasi Metropolitan Area.

While the bio-digester continues to attract both duty bearers and households, there have been stakeholder concerns that some artisans and service providers may have been providing sub-standard products that can lead to both social and environmental

problems in the future. On account of this, the Ministry of Sanitation and Water Resources, through the GAMA Sanitation and Water Project and in collaboration with partners, has developed a manual to guide the proper construction of the bio-digester toilet technology.

The Biodigester Technology

Biodigester is a biological toilet system in which faeces and flush water are collected in a container and composted by an aerobic degradation process. The technology operates based on aerobic processes with the principle of vermicomposting.

The biodigester toilets can be used by households, commercial toilets and for institutional use. GAMA-SWP however is focused on the household toilets under this current project. The biodigester toilet is expected to provide decent toilets to households and contribute to solving challenges with provision of improved toilets in Ghana. A maximum of 10 people per standard digester in a household is the ideal size. The **main components** which make the system functional are bulking material, porous media, concrete panels, air gap and porous beams. To design a biodigester toilet, important factors to consider include: where the final effluent from the digester will go (effluent management), number of users, type of bulking material available (coconut coir or wood chips).

HIGHLIGHTS

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The biodigester has some advantages over the traditional septic tank toilet. Small Land size/space is required for biodigester toilet as compared to a bigger space required for septic tank. With 0.6meter deep you can fix a biodigester whereas septic tank

requires a minimum of 3 meters depth below ground level. Also, biodigester has low maintenance budget with a relatively small frequency of emptying when constructed and used well; whereas frequent dislodging with cash payment required for septic tank toilet, particularly areas with high water table.

Experiences of Biodigester Toilet

The GAMA-SWP has provided over 34,000 biodigester toilets in Greater Accra Region from 2016 to 2022. In less than one year (November 2021 to March 2022), Greater Kumasi area has been provided with 1,200 biodigester toilets. So far, over **289,600** people are using and benefitting from improved toilets use in various low-income communities. The Sanitation Engineer of GAMA-SWP, Mr. A. Gyasi, highlighted the experiences and observations by GAMA-SWP over the past seven years. He indicated that the densely populated nature of most low-income communities such as Ashaiman, Chorkor, Nima and Mamobi in the heart of Accra make space requirement a crucial issue. As a result, the biodigester toilet is becoming a good and 'useful friend' to low-income communities in urban areas. The average price of between GHC 1,200 to GHC 2,000 has also made the biodigester toilet affordable to low-income households.

Ing. Gyasi's presentation related the theory to practice of use of biodigester toilets in the various low-income urban communities such as Ashaiman, Nima, Maamobi, Chorkor that have benefitted from, and using the biodigester toilet. He **summarized** the experiences of GAMA-SWP as follows:

- Getting the number of users right. Maximum of 10 users for the standard digester and maximum of 20 users for the large digester is the appropriate requirement. It has been found out that households that exceed the maximum number of users experience challenges such as slow digestion and faster accumulation of sludge - leading to frequent emptying.
- Avoid waterlogged/poor draining soils
- Education on use, operation and maintenance. GAMA-SWP and SPIs provided toilet use instructions.
- Householders were continually entreated to avoid putting pads, plastics, and other non-biodegradable materials.
- The biodigester must be constructed properly since poorly constructed biodigesters have difficulty treating effluents and pose usage problems
- Seeding of the biodigester

Future Plans on Biodigester

The experiences so far points to a bright future with a high possibility of increased adoption and use of the biodigester toilet technology. This aspiration can however be attained if the following measures are adopted:

- Address the entire sanitation value chain: This includes

solutions for emptying and transport, options for either standalone or mixed treatment and implementing business solutions for entire service chain

- Intensification of publicity and marketing of the biodigester technology option
- Train more sanitation entrepreneurs and re-tool more SPIs to promote and be readily available to construct biodigester toilets for households

The launch of the biodigester manual by the Hon. Minister of Sanitation and Water Resources on 30th March, 2022, and the unveiling of it at the NLLAP paves the way for wider potential uptake, with numerous benefits and opportunities for landlords, tenants, MMDAs to take advantage and ensure people install biodigester toilets for use.

Participants Contributions

Participants had the opportunity to interact, make contributions and also ask questions for clarifications. The key relevant issues were:

- The lifespan of a biodigester toilet: It depends on the human element and usage, the area of functionality and the design parameters. Generally, it can last between 10-20 years if the user adheres to the specifications. For example, 10 people for standard digester.
- Managing biodigester toilet in a clay soil and also rocky areas: one should consider adding bio sand filter to aid in the effluent management process. Also, other factors may be considered.
- Other issues raised and discussed by participants was the issue of odor management from biodigester toilets.
- Additionally, the issue of user education was highlighted by participants. "Intensification of user education on biodigester toilet is critical" In response it was noted that users should avoid dropping pads, diapers, condoms, napkins, cement paper and other foreign materials which can clog the system. Users were entreated to avoid using excessive amount of chemicals to wash the toilet as more chemical concentration destroy the microorganisms.

Way Forward

Participants at the learning session admitted that the biodigester technology has a great future with promising prospects for turning the sanitation fortunes of the country. GAMA-SWP project staff were encouraged to engage proactively with Metropolitan and Municipal Assemblies to intensify community education and sensitization on the biodigester technology for uptake by landlords. To help consolidate the gains made on biodigester, the Ministry of Sanitation and Water Resources was entreated to revisit and re-introduce the technology applicability framework (TAF) which will review all variants of biodigester and other emerging sanitation technologies and ensure they are in tune with sector policies and approaches and not at variance with national sanitation policy.

NLLAP is a WASH sector multi stakeholder platform with the overall goal of improving sector learning and dialogue. It is hosted by the Ghana WASH Resource Centre Network (RCN). The platform offers learning and sharing opportunity for sector players as one of the practical approaches to improving sector engagements/sharing with the long term aim of achieving a knowledge driven WASH sector that delivers quality and sustainable services in Ghana. NLLAP meetings take place on the last Thursday of every month (with modifications when necessary) and are open to all interested parties. The discussions of each NLLAP meetings can be found on the RCN website www.washghana.net.

If you are interested to propose a topic for a meeting please contact us on,
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