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SUSTAINABLE BIODIGESTIVE TANK FOR FAMILY AGRICULTURE

Janáira Rocha Campos

State University of Piauí, Campus Alexandre
Alves Oliveira
Parnaíba-PI

Valdinar Bezerra dos Santos

Teacher Advisor at the State University of
Piauí, Campus Alexandre Alves Oliveira
Parnaíba-PI

Leticia Martins Silva

State University of Piauí

Antônio Adolfo de Souza Costa

State University of Piauí

Francisco Leônio da Silva

University State of Piauí

Marcos Antonio Oliveira da Costa

University State of Piauí

Abimael Caldas de Andrade Silva

University State of Piauí

Nancy Waquim Martins Miranda

State University of Piauí

Mikaelli Maria da Silva Vieira

State University of Piauí

Lohane Daniely De Sousa Silva

State University of Piauí

Ana Carolina Nascimento Teixeira

State University of Piauí

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Abstract: This report shows the experience in three Demonstration Units of the implementation of a biodigester septic tank, since some families do not have any type of septic tank system, and to alleviate this failure, several residential and rural sanitation techniques have emerged, aiming at the treatment of sewage in a small scale and with less time, using a biodigester septic tank, which does not pollute groundwater, making use of the effluent as organic fertilizer, aiming to promote basic sanitation and the use of natural resources in a sustainable way.

keywords: biodigester, Basic sanitation, Sustainable.

CONTEXT

The precariousness of basic sanitation in rural areas of Brazil is due to the existence of enormous social inequality due to the lack of priority in public policies or even the very culture of the person who lives in rural areas, who do not see basic sanitation as a priority for their health.

Brazil has approximately 31 million inhabitants living in rural areas and isolated communities, according to data from the Brazilian Institute of Geography and Statistics (IBGE – PNAD 2013). Of this population, only 22% have access to adequate sanitation services and the reality shows that there are still almost 5 million Brazilians who do not have a bathroom, that is, they defecate in the open (EMPRABA, 2017).

The present experience was initiated through a rural extension project at the State University of Piau , in a settlement located in the North of the State of Piau , Parna ba. The Cana  settlement is made up of families settled by INCRA since 2012. The project aims to implement demonstrative pedagogical units with an agroecological basis, aiming to help the community to grow in the social, economic and environmental

spheres, respecting its principles, knowledge and improving its techniques.

The experience was initially based on knowledge of the reality of the settled families, an activity carried out through a participatory rural diagnosis (DRP). After carrying out the diagnosis, it was found that most families in the settlement did not have septic tanks and their physiological needs were performed in the area considered in the plots as non-cultivable area (area of native vegetation), which also implied in precarious conditions. sanitary conditions of these families and subject to numerous diseases.

From this reality, we sought to meet the need to solve this problem in the settlement, where families are needy and for that an alternative system of low-cost sanitary sewage treatment was planned, which we called “Rural Biodigester Septic Tank”. The construction of these septic tanks was intended to improve basic sanitation conditions in the settlement, in order to raise people’s awareness, showing the importance of sanitation to reduce and avoid possible diseases. In addition, the team prioritized as a goal to start agroecological production activities in some lots, only after solving the identified problem. The settlers were informed that the project aimed not only at agricultural production without the use of agrochemicals, but also at improving the social environment of the settlement.

DESCRIPTION OF EXPERIENCE

The project was based on the implementation of a biodigester septic tank using drums and an impermeable box, called an evaporator box, a social technology that is easy to build and environmentally sustainable.

Biodigester septic tanks are an excellent alternative for basic sanitation for family farming areas and can contribute to local development. After all, the biodigester system has a triple function: it prevents

diseases, protects the water table (well water) and produces a quality organic fertilizer (EMBRAPA, 2010).

Three Pedagogical Demonstration Units for Family Agriculture (UDPAF) with an agroecological base were chosen for the installation of the cesspool, located in the Canaã Settlement, object of work of the Nucleus of Study in Agroecology - NEA-CAJUÍ.

The pit was built with three 200 liter drums, these drums are prepared with connections between them. In the first drum, a connection was placed at a distance of 7 cm from the edge with an inlet of 100 mm and a reduction to 75 mm and an outlet at 9 cm with a connection of 75 mm. The drums were connected at 50 cm from each other, with 75 mm PVC tubes, with a long curve inside the 75 mm drums, connected to another tube 60 cm in size. (Figure 1).

At the end of the last drum, add two outlets with 75 mm PVC pipe, both with an angle of 45° and insert the evaporator box with a volume of 1m³, built of "taipa and waterproofed with a mass of cement and sand in the proportion of 4 :1. (Figure 2).

After coating the evaporator box with the cement mass, the bottom was filled with 06 tires so that the tubes from the last drum fit inside the first tire. In the remaining spaces of the box, stones, shavings, boulders, a 50% shade net were added and in the most superficial part (20 cm before the surface) a mixture in the proportion of 1:1 of soil plus rice husk, forming a filter for material retention and creating conditions for planting a banana tree (Figure 3).

The connection between the toilets in the bathrooms and the biodigester tank was made with a 100 mm pipe measuring 8 meters in length. In the middle of the distance between them, a check valve was installed, in order to insert the fresh manure necessary for the

initial process of feces fermentation. The natural fermentation procedure takes place in the drums and to start this process it was necessary to insert a mixture of 50% water and 50% fresh cattle manure into the check valve. The purpose of this process is to increase microbial activity and biodigestion efficiency.

At the end of the assembly, the drums were covered with soil, leaving only the lids uncovered in order to prevent them from being exposed to the sun for greater durability.

RESULT

The technology of using the biodigester septic tank in canisters is easy to implement, durable and sustainable by using canisters as recyclable material, avoiding contamination of the environment and, mainly, changing the life habits of the settlement's residents, since before they they performed their physiological needs outdoors with a predisposition to soil pollution, water table and were susceptible to the most varied diseases. Contaminated water due to lack of minimum sanitation can generate a series of diseases in human beings, and can even cause death. Numerous harms to human health are caused by feces, urine and other waste that can be found in the most precious liquid for life – water (EMBRAPA, 2010).

The sustainable vision is undoubtedly an important function of this project and can be used as a septic tank for families with precarious sanitary conditions and one of the first steps towards a healthy life is to have their sewage treated.

The improvement of the settlers' social well-being was possible through the technology under study due to the degree of satisfaction reported to the entire team. The social contribution of this report is the dissemination of the problems and possible solutions of the installation of biodigester tanks in rural areas of family farming. In



Figure 1. Preparation of the drums for fitting the pipes



Figure 2. Installation scheme of the Biodigester Pit



Figure 3. Coating of the evaporator box

this publication, the intention is for other researchers and owners of rural areas to adopt the exits and surroundings described in this report.

Further studies are still needed to verify which components are present after the entire

biodegradation process and throughout the filtration process, which demands further studies of the product generated in the evaporator box.

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