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A Review on EcoSan (Ecological Sanitation)

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Abstract: In today's world about 2.4 billion people from urban and rural areas do not have suitable access to sanitation services. In upcoming 20 years, it is estimated that a surplus of 2 billion will get migrated to urban areas, probably in developing countries, necessitating sanitation. Still greater than 90% of sewage in developing countries is discharged unprocessed polluting water bodies. Traditional sanitation ideas are neither ecofriendly nor cost-effective for developing countries. Ecological Sanitation (EcoSan) is a sanitation system having a cycle of sustainable closed-loop system, which winds up the breach between sanitation and agriculture. The EcoSan technique is resource minded and characterizes a universal approach towards ecofriendly and economically healthy sanitation. The primary goal is to close water and nutrient cycle with minimum expenses on energy and material to subsidize a sustainable development. Human excreta is treated as resource and are generally handled on-site and treated off-site. The nutrient contents in excreta are reutilized by using them in agriculture. EcoSan is a complete methodology. Single practices are only measures to termination and may range from near-natural wastewater treatment techniques to compost toilets, uncomplicated domestic installations to complex, mainly decentralized systems. These technologies are not ecofriendly but only in relation with witnessed environment. They are chosen from complete range of available conventional, traditional and modern techniques merging them to EcoSan system.

Keywords: EcoSan, sanitation, sewage, ecological, nutrient.

I. INTRODUCTION

EcoSan that is Ecological sanitation is a method of sanitation provision which goals to securely reuse excreta in agriculture. EcoSan is a method, rather than technology regarded by a wish to "close the loop", primarily for the organic matter and nutrients among agriculture and sanitation in a secured way. One of the goals is to reduce the utilization of non-renewable resources. EcoSan system when appropriately designed and controlled deliver a hygienically safe system to transform human excreta into nutrients to be returned to the soil. The meaning of EcoSan is to concentrate on the environment, health and resource characteristics of the sustainable sanitation. Thus EcoSan system can be employed in an ecological way and have a durable potential for sustainable sanitation.

II. METHODOLOGY

EcoSan is centred on the orderly application of reusing and recycling of nutrients and water as hygienically secure, closed-loop and complete substitute to traditional sanitation solution. EcoSan system facilitates the recovery of nutrients from human excreta and urine for advantage in agriculture, thus assisting to preserve soil fertility, guarantee food security for upcoming generations, recover bioenergy and reduce water pollution. They confirm that water is economically used and recycled in a secure way to the utmost possible extent for the purposes such as groundwater recharge and irrigation. EcoSan has led to more interest in sanitation field. When sanitation products are reutilized, huge care has to be taken due to its risk of developing environmental and health hazards. Large scale sewerage systems have number of drawbacks. Huge investments are required, operational and maintenance costs are very high, also enormous water consumption is done and huge volume of waste products are generated which may be uneconomical to treat. Secondary problems arise in the cities where different kinds of wastes are disposed of in the same sewer, which creates a mixture that is difficult to treat and process. Ecological sanitation can be implemented in both rural as well as urban areas. In almost all traditional sanitation systems, enormous amount of nutrients are wasted. This can result in minimized soil fertility and may also create a need to buy and use chemical fertilizers. Thus implementing Ecological sanitation has a very large benefit.

III. DESCRIPTION OF PROBLEMS

- A. Need of more water for flushing faeces and urine.
- B. Unavailability of sanitation services in undeveloped areas.
- C. Unavailability of water due to rapid and steep hike in population.

IV. INNOVATIVE SOLUTIONS

Some innovative solutions (composting materials) can be used to increase the efficiency of the EcoSan systems, and they are as follows:

A. Wood Ash

In regard to use wood ash as composting material, it is noticed that all the biological, physiochemical factors showed significant reduction, primarily the faecal indicator microbes are like E.Coli. The E.Coli existed till six months are thereafter slowly reduced and was absent after eight months.

B. Dry Soil

Dry soil is used for the treatment of human faeces for composting as part of research. The Carbon Nitrogen ratio is found to be reduced throughout the whole composting period due to the carbon losses in the decomposition process. Organic matter and organic carbon of this composting materials is high. Remarkably the nutrient values of the total nitrogen, total potassium and total phosphorous indicated a lower level in the initial stage of composting but ultimately registered a high value during the final stage of the composting. Additionally microbes like E.Coli and salmonella become completely absent after six months. Finally concluding that by using dry earth as a composting material the biological, nutrients and physiochemical factors demonstrated good results as manure.

C. Lime Powder

Using lime powder as a composting material the moisture level of composting material increased which was less before its adding. The moisture level showed an increase of 2.4% after ten months. The moisture level was recorded highest during the sixth month which was about 3.9% resulting from addition of lime powder.

V. CONCLUSION

- A. Decreased effluents to the receiving bodies like rivers, lakes, sea, etc. Preserves valuable resources instead of wasting them.
- B. Reduces the expenses and dependability on chemical fertilizers.
- C. Increased household food security and everyone can afford cheap and organic fertilizers.
- D. Employment generation in the field of sanitation and agriculture.
- E. Improves sanitation system and also creates healthy and pleasant living environment.
- F. The principle of Reduce, Reuse and Recycle gets implementation due to EcoSan.
- G. EcoSan facilitates sustainable agriculture and maximized food production.

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