



Faculty of Engineering



Sustainable Solution for Sludge Drainage Problem

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Introduction

Based on the state's direction in preserving the environment and sustainability approach in line with COP 27.

It is known that Egypt's share of water is about **55** billion m³/year of Nile River water. Potable and industrial water consumption represent around **8** billion m³/year. This amount passes through clarification and filtration processes in water treatment plants to remove organic and suspended solids pollutants from water which settles in the form of sludge.

The amount of sludge represents about **800,000** ton/year (**30%** solid concentration). Most of this amount is discharged into surrounding environment causing pollution specially to water resources.

Project idea

Summarized in how to solve the problem of sludge which resulting from siltation., especially for the silt/sludge which comes out from water treatment process for Potable and industrial water by reusing it in industrial applications



aiming to protect environment, maximize the usefulness, and preserving the agricultural area.

Aim of the work

Utilization sludge in industrial applications, preserving environment from the said source of pollution, add value and stop wasting of these huge amounts of sludge, stop dredging agricultural land and reducing siltation at front of High Dam.

Project methodology

- Determine stakeholders; (water treatment plants, red bricks factories, environmental protection agency.)
- Understanding manufacturing processing; Preparing raw materials and equipment (sand, sludge, cement, furnace, fuel, mould)
- Make survey for surrounding community (face to face meeting, field visits, remote connections...), determine the test methods and laboratories.
- Compare test results, doing preliminary economic study
- Analyze sludge samples in different laboratories to compare the sludge chemical composition against clay sample used in red brick industry.
- Project team awareness and training visits.
- Shaping molds manufacturing, production and testing of sludge bricks through the following tests:
 - Adsorption, compression, efflorescence and weighing test.

Conclusion:

Sludge bricks are characterized by the following advantages:

Eco-friendly to environment, more economic, less Energy consumption, less gas emissions and reduce agricultural land dredging.

Recommendations:

Firstly, this study is considered a prelude to subsequent projects to complete the required production systems and proposes the application in one of the existing factories where the advanced equipment for the



manufacture of the process of compression and mechanical suction is available aiming to improve sludge brick quality.

Secondly, this project will be considered as a base of the strategic project of siltation train in Egypt when established.