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ABSTRACT

The study aimed at the design,construction and performance evaluation of a model domestic wastewatertreatment plant was carried out. The treatment unit was a Waste StabilizationPond (WSP) comprised of one facultative pond, three maturation ponds, and a contactfiltration unit, all in series. The effluent of the WSP, after filtrationthrough clay media, had the BOD reduced to 15.4mg/l, from 356mg/L indicating a95.67% removal level. A Faecal Coliform (FC) count of the influent sample gave1x108 FC/100ml,. whereas the effluent gave 9 FC/100ml, which was 99.99% FCremoval. It was concluded that the effluent from the WSP is therefore suitablefor discharge to the environment. It also met the requirement of 25mg/L BODstandard of Federal Environmental Protection Agency (FEPA). A rice husk filtermedia was found to be non-promising earlier in the removal process. Thetreatment system can be recommended to private/public estates in order to havea more environmentally friendly discharge of domestic wastewater.

A study was conducted for theprimary treatment and management of waste water generated in 5 STAR hostels andresidential area and a waste water treatment plant was designed. The total wastewater generated in one day was estimated 3.6ML considering the projectedpopulation hostels and residential for the next 30 years. The variouscomponents of primary waste water treatment plant viz. screening chamber, gritchamber, skimming tank, sedimentation tank, active sludge tank and sludgedrying bed were designed considering the various standards and permissiblelimits of treated waste water. It was concluded from the study that in next 30years the predicted population will be 23,000 and estimated waste water will be3.6 MLD.

The receiving chamber ofdimension 4m x 2m x 1.5m, the coarse screen of dimension 0.6m x 5.3m, Gritchamber of dimension 5.2m x 3m x 1.3m, Primary sedimentation tank with diameterof 7m and depth 2.5m, trickling filter of diameter 15.5m and depth 2m, aerationtank of dimensions15m x 8m x 4m and sludge dry bed of dimensions 12.5m x 8mwill effectively treat the waste water at primary stage keeping the waste waterquality within the permissible limits.

It was recommeneded that thetreated water will be supplied for irrigating the crops on Research Farm andthe remaining sludge after treatment will be used as manure on Farm. The use oftreated water will reduce the ground water use and additionally the treatedsludge will be very useful for increasing the fertility of soil.

CHAPTER ONE
INTRODUCTION

As urban and industrialdevelopment increases, the quantity of waste generated also increases. Thesewastes pose a serious threat to public health when they are not readilydisposed off. When these wastes are removed by water carriage system, they aretermed wastewater. Wastewater is the used water or liquid waste of a community,which includes human and household waste together with street washings.Industrial waste and such ground and storm water may be mixed with it. The useof domestic wastewater for irrigation is advantageous for many reasonsincluding water conservation, ease of disposal, nutrient utilization, andavoidance of surface water pollution. Nevertheless, it must be borne in mindthat although the soil is an excellent adsorbent for most soluble pollutants,domestic wastewater must be treated before it can be used for crop irrigationto prevent the risk to both public and the environment.

This study aimed at designingand constructing a model waste stabilization pond and final contact

filtrationunit, for the treatment of influent domestic wastewater for environmentallyfriendlier discharge.
More than two billion peopleworldwide lives in regions facing water scarcity. Water scarcity alreadyaffects every continent and more than 40 percent of the people on our planet.By 2025, 1.8 billion people will be living in countries or regions withabsolute water scarcity, and two-thirds of the worlds population could beliving under water stressed conditions. Global water use has been growing atmore than twice the rate of population growth in the last century. About 1.1billion people do not have access to adequate water to meet their most basicneeds. Around 1.2 billion people, or almost one-fifth of the worldspopulation, live in areas of physical water scarcity, and 500 million peopleare approaching this situation **(FAO, 2003)**
Agriculture is the number-oneuser of water worldwide, accounting for about 69% of all freshwater withdrawnfrom lakes, rivers and aquifers. The daily drinking water requirement perperson is 2-4 liters, but it takes 2000 to 5000 liters of water to produce onepersons daily food.
Nigerias demand for water isgrowing at an alarming rate. Nigeria is surrounded by water bodies on the threesides, yet we face water shortage every year. The per capita water availabilityin Nigeria was 3450cu.m in 1951. By 2025 the annual per capita availability ofwater is expected to rise drastically from the current 1800cu.m per person to1200 – 1500 cu.m. The quality of available water is also fast deteriorating,over extraction of ground water has led to salt water intrusion into coastalaquifer. It has also resulted into presence of excessive fluoride, iron,arsenic and salinity in water affecting about 44 million people in Nigeria. Groundwateris facing an equally serious threat from contamination by industrial effluentand fecal matter as well as pesticides and fertilizers from runoff. Unlesspriority is given quickly to creating an infrastructure to assure availabilityof water, there may be no water to meet agricultural, domestic and industrialneeds of a population that has tripled in 50 years to one billion.

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