

SUSTAINABLE UTILIZATION OF ELEPHANT WASTE: A CASE STUDY FROM PINNAWALA ORPHANAGE, SRI ANKA

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All solid waste and liquid waste sources at the Pinnawala Elephant Orphanage premises were investigated. Of the waste generations, elephant dung and elephant food waste as solid wastes and elephant urine and wash water from protection and care of elephants as liquid waste were found significant.

Composition of each waste category was analyzed. Composition of elephant dung was obtained through literature review. Composition of elephant food waste was obtained through investigation. Elephant urine was analyzed with a urine full report and also it was tested for Turbidity, Conductivity, pH, Nitrogen and Phosphorous. Wash water was also tested for BOD, COD, Turbidity, Conductivity, pH, Nitrogen, Phosphorous, Total *Coliform* and Suspended Solid.

Considering all the possible waste management options and related the other ground conditions composting was selected as the most suitable option for solid waste disposal and the proper soaking system for liquid waste disposal for Pinnawala. A pilot study was conducted in order to decide the raw materials mixture best suited to produce high quality compost. Elephant dung, cow dung, *Gliricidia*, saw dust, straw, elephant urine were selected as raw materials through 90 day the pilot study.

At the pilot study different sets of raw materials were arranged in to 06 basins labeled as A, B, C, D, E and F. Only elephant dung was used in setup A and both elephant dung and cow dung were used in setup B. Respectively elephant dung, cow dung, *Gliricidia* in setup C, elephant dung, cow dung, *Gliricidia*, saw dust in setup D, elephant dung, cow dung, *Gliricidia*, saw dust, straw in setup E and elephant dung, cow dung, *Gliricidia*, saw dust, straw and elephant urine in setup F were used. For each setup 1000 g of elephant dung, cow dung, *Gliricidia*, saw dust, straw were used and for the setup F 250 ml of elephant urine was used apart from the other raw materials. Throughout the period of 90 days all setups were maintained by regular watering and turning. Watering was done on the 12th day, 24th day, 38th day, 45th day, 67th day and 75th day and it was done using a spray bottle and at a time 100ml of water has sprayed for a sample. Watering frequency was the same for all piles. Turning was done on the 17th day, 32nd day and 60th day.

The compost piles were regularly monitored during the 90 days for temperature, pH and moisture content. Final compost samples were tested for their quality to check its

conditions to compare with the preferred optimum conditions that must be present to be effective, efficiency, plant fertilizer compost.

In elephant dung C:N ratio is high; 40. Therefore elephant dung alone cannot be used for producing efficient, effective plant fertilizer compost. Therefore in this study cow dung and *Gliricidia* have being selected mainly to supply N to the medium and thereby to, reduce the high C:N ratio of elephant dung. Saw dust, straw and elephant urine was used to supply necessary amounts N and P. After 03 months these samples were tested in the Department of Agriculture, Gannoruwa, Peradeniya to check whether they have gained the proper condition of compost with respect to; temperature, pH, moisture content, C:N ratio and C:P ratio and found the mixture F with elephant dung, cow dung, *Gliricidia*, saw dust, straw and elephant urine was the best.

The location for the compost production and the location to establish a proper soaking system will be selected from off-site near to the orphanage premises because the present space within the premises is sufficient only for the present number of elephants.