Solid waste management is a vital factor that affects socio-economic upliftment in developing parts of the world as in order to fulfill sustainable development any country must be able to effectively manage its wastes that causes minimum pollution. Improper solid waste management poses several health hazards. There has been a persistent problem caused by urbanization and that is of increment in pollution levels on the globe. All spheres can be adversely affected due to rapid industrialization if their residues are not managed properly. The levels of residues emitted by every household have now increased by manifolds as there is a rise in feed demand and overall global census. The ultimate fate of these residues is into the dumpsites of municipality that are disposed off at sanitary landfilling sites subsequently. Sometimes these residues are unable to reach their final end point due to lack of facilities and snag in resources. This ultimately results in severe impairment of human health and the environment in general. The improper handling of these residues may lead to epidemics. These effluents if left open invites predators and pathogens that cause foul smell and result in unsanitary condition that adds to health issues in the society. Therefore, mitigation measures to reduce generation of solid wastes in excess levels must be taken into consideration. Furthermore, the concept of sustainability in agriculture is not feasible once the pillars of agriculture that are its resources are limited or polluted. The agriculture cannot be termed as sustainable if it does not lower the economic crisis of farmers. The only remedy to these problems is addressing the needs of the farmers by farming in organic manner that helps facilitate sustainability in agriculture. Therefore, during the first phase of the present studies collection of organic domestic wastes was done followed by its selective segregation wherein removal of plastics, metals and stones was done. The shredded organic wastes were than mixed with absorbing material of raw dust, Bioculum culture and thereafter thorough chopping and mixing of these wastes were performed in Organic waste converter (OWC). Experiments conducted on composting technologies proved that strategic constituents required by lands can be supplied in form of wastes that are organic in nature. After processing of the organic wastes in the OWC the final materials were used to form the compost heap. The compost heap was then allowed to compost aerobically for 30 days. The elemental analyses of the MSW compost indicated that it had many essential constituents therein to ensure effective growth of plants. It is a common fact that each crop requires different nutrients. However the compost obtained during the present studies can be used for a large range
of crops and very less fertilizers needs to be applied with it. The composting technology was studied from January 2012 to December 2012. The chemical properties, micronutrient analysis and $E_4/E_6$ ratio of compost and its residue were studied. The pH, EC (Qs/cm), Organic Carbon (%), Nitrogen (%), Phosphorus (%), Potassium (%), Sodium (%) and C:N ratio obtained during the period from January 2012 to March 2012 was 7.04, 1221, 22 %, 1.04 %, 0.0216, 0.26, 2.8 and 22 respectively. The moisture (g/100g), chloride (%), carbonate (%), bicarbonate (%), nitrate (%), CaCO3 (%), TDS, sulphate (%) were obtained as 14.10, 0.0212, 1.08, 1.04, 1.14, 0.0210, 56, 0.0214 respectively. Also, micronutrient analysis suggested appropriate amounts of mineral nutrients in the developed organic manure. The obtained Iron, Manganese, Zinc, Copper, Ca (%) were 0.89, 34.9, 101, 21.9, 2.6, 1.7 respectively. Furthermore, the ratio of $E_4$ to $E_6$ was assessed spectrophotometrically to estimate the compost Bio-maturity and that was found to be around 24-32 days.

The next phase of composting technology was studied from April 2012 to June 2012. The chemical properties, micronutrient analysis and $E_4/E_6$ ratio of compost and its residue were studied. The pH, EC (Qs/cm), Organic Carbon (%), Nitrogen (%), Phosphorus (%), Potassium (%), Sodium (%) and C:N ratio obtained during the period from April 2012 to June 2012 was 7.05, 1222, 23 %, 1.05 %, 0.0217, 0.27, 2.9 and 23 respectively. The moisture (g/100g), chloride (%), carbonate (%), bicarbonate (%), nitrate (%), CaCO3 (%), sulphate (%) were obtained as 16.14, 0.0213, 1.09, 1.05, 1.15, 0.0211, 0.0215 respectively. Also, micronutrient analysis suggested appropriate amounts of mineral nutrients in the developed organic manure. The obtained Iron, Manganese, Zinc, Copper, Ca (%) were 0.90, 34.9, 102, 21.9, 2.7 respectively. Furthermore, the ratio of $E_4$ to $E_6$ was assessed spectrophotometrically to estimate the compost Bio-maturity and that was found to be around 24-32 days. Thereafter, the composting technology was studied from the period July 2012 to September 2012. The chemical properties, micronutrient analysis and $E_4/E_6$ ratio of compost and its residue were studied. The pH, EC (Qs/cm), Organic Carbon (%), Nitrogen (%), Phosphorus (%), Potassium (%), Sodium (%) and C:N ratio obtained during the period from July 2012 to September 2012 was 7.03, 1220, 21 %, 1.03 %, 0.0215, 0.25, 2.7 and 22 respectively. The moisture (g/100g), chloride (%), carbonate (%), bicarbonate (%), nitrate (%), CaCO3 (%), TDS, sulphate (%) were obtained as 18.09, 0.0211, 1.07, 1.03, 1.13, 0.0209, 55, 0.0213 respectively. Also, micronutrient analysis suggested appropriate amounts of mineral nutrients in the developed organic manure. The obtained Iron,
Manganese, Zinc, Copper, Ca (%) were 0.88, 34.8, 100, 21.8, 2.5, 1.6 respectively. Furthermore, the ratio of E\textsubscript{4} to E\textsubscript{6} was assessed spectrophotometrically to estimate the compost Bio-maturity and that was found to be around 24-32 days. The last phase of composting technology studies was carried out from the period October 2012 to December 2012. The chemical properties, micronutrient analysis and E\textsubscript{4}/E\textsubscript{6} ratio of compost and its residue were studied. The pH, EC (Qs/cm), Organic Carbon (%), Nitrogen (%), Phosphorus (%), Potassium (%), Sodium (%) and C:N ratio obtained during the period from October 2012 to December 2012 was 7.06, 1223, 24 %, 1.06 %, 0.0218, 0.28, 2.9 and 24 respectively. The moisture (g/100g), chloride (%), carbonate (%), bicarbonate (%), nitrate (%), CaCO3 (%), sulphate (%) were obtained as 12.14, 0.0214, 1.09, 1.06, 1.16, 0.0212, 0.0216 respectively. Also, micronutrient analysis suggested appropriate amounts of mineral nutrients in the developed organic manure. The obtained Iron, Manganese, Zinc, Copper, Ca (%) were 0.91, 34.9, 103, 21.9, 2.8 respectively. Furthermore, the ratio of E\textsubscript{4} to E\textsubscript{6} was assessed spectrophotometrically to estimate the compost Bio-maturity and that was found to be around 24-32 days. The composting technology trials conducted during the entire year of 2012 conclude that the E\textsubscript{4}/E\textsubscript{6} ratio of the compost extract during all the phases showed increment till the twenty fourth day and that suggests a reduction in density of organics. After this period starting from twenty fifth day the ratio of E\textsubscript{4} to E\textsubscript{6} subsequently reduced. This confirms that maturity has been attained between 24-32 days. Moreover, the chemical properties and micronutrient analysis conducted during all the phases suggest that the obtained organic manure was qualitatively appropriate to be adopted as cost effective fertilizers. Therefore, it can be envisaged that sustainability can be attained in agriculture by means of processed manure that are organic in nature. Since the process uses raw materials that are mainly solid refuse its maintainence and operations costs are low as no cost affair technology is required. These refuse need to be just compiled into stacks and allowed to decompose. The constituents of the obtained manure is determined by the nutrients present in the refuse used and after entire decompositon the obtained mature compost can be applied for a variety of purpose like it can supply important essential nutrients to lands and for plant growth. It serves as an excellent source of organic manure. The application of the processed wastes to compost and its use as soild amendments is popular worldwide. It is a complete clean energy solution and causes less environment pollution. Thus, it is recommended that more and more development of such eco-friendly organic technology must be encouraged.
Another important aspect of effectively managing solid refuse is transforming them to energy. Thus, a part of current study also aimed to develop In-house Biogas digester that can process domestic food wastes into biogas. The model was based on the floating drum digester type Biogas generation model. The main digester tanks were made from 200 liter capacity plastic drum. The volume of gas generated in each of the units was measured from lift of the floating dome. Quality of gas was analyzed using Orsat apparatus for Carbon dioxide content and Methane content by volume. The entire experiments of biogas generation in developed model were carried out from January 2013 to February 2013. During each month initially the solid waste analysis was carried out that had to be fed in the developed In-house Biogas digester. Analysis was done to detect the presence of additives and preservatives. The waste composition analysis was done and month-wise measurement of Biogas in the developed In-house biogas model was carried out. The month-wise analysis of additives and preservatives suggest that there was no detection of preservatives and adulterants in food wastes fed as raw materials into developed In-house Biogas model during each month from January 2013 to December 2013. The monthly tests were performed in order to detect additives and preservatives like Urea, Boric acid, \( \beta \)-Naphthol, Benzoic acid, Salicylic acid, Hydrogen peroxide, Formalin and Carbonates. Furthermore, the month-wise composition analysis of solid wastes that was used as intake materials in biogas digester was performed. The obtained results during January 2013 for Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals were 75.5, 1.87, 3.4, 18.03, 110.2 and 1.2 respectively. The generated biogas in the developed model was measured on a daily basis during January 2013 and it is concluded that at average ambient temperature of 32.56°C, the average digester temperature remains consistent at 36.63°C and at this point of time, the average pH value will remain at 7.2 in the digester and the peak volume of biogas i.e., 64.83 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 56.23%. Therefore, the January 2013 results indicate that about 129.66 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor.

Thereafter, results obtained during February 2013 for Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals were 75.6, 1.88, 3.5, 18.04, 110.3 and 1.3 respectively. The generated biogas in the developed model was measured on a daily basis during February 2013 and it is concluded that at average ambient temperature of 31.5°C, the average
digester temperature remains consistent at 35.63°C and at this point of time, the average pH value will remain at 7.06 in the digester and the peak volume of biogas i.e., 63.76 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 57.26%. Therefore, the February 2013 results indicate that about 127.52 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor. Furthermore, results obtained during March 2013 for Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals were 75.4, 1.86, 3.3, 18.02, 110.1 and 1.1 respectively. The generated biogas in the developed model was measured on a daily basis during March 2013 and it is concluded that at average ambient temperature of 31.56°C, the average digester temperature remains consistent at 35.63°C and at this point of time, the average pH value will remain at 7.07 in the digester and the peak volume of biogas i.e., 64.43 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 55.53%. Therefore, the March 2013 results indicate that about 128.86 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor. Moreover, measurement of generated biogas on daily basis in the developed In-house biogas model carried out during April 2013 for Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals had resulted in their respective values as 75.7, 1.89, 3.6, 18.05, 110.4 and 1.4 respectively. The generated biogas in the developed model was measured on a daily basis during April 2013 and it is concluded that at average ambient temperature of 34.56°C, the average digester temperature remains consistent at 38.5°C and at this point of time, the average pH value will remain at 7.31 in the digester and the peak volume of biogas i.e., 66.76 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 57.53%. Therefore, the April 2013 results indicate that about 133.52 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor.

Moreover, results obtained during May 2013 for Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals were 75.2, 1.85, 3.2, 18.01, 110.0 and 1.0 respectively. The generated biogas in the developed model was measured on a daily basis during May 2013 and it is concluded that at average ambient temperature of 30.56°C, the average digester temperature remains consistent at 34.63°C and at this point of time, the average pH value will remain at 7.09 in the digester and the peak volume of biogas i.e., 64.16 liters will be generated in the developed...
In-House Biogas Digester, wherein the average amount of generated Methane gas will be 54.56%. Therefore, the May 2013 results indicate that about 128.32 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor. Thereafter, results obtained during June 2013 for Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals were 75.8, 1.90, 3.7, 18.06, 110.5 and 1.5 respectively. The generated biogas in the developed model was measured on a daily basis during June 2013 and it is concluded that at average ambient temperature of 35.63°C, the average digester temperature remains consistent at 39.63°C and at this point of time, the average pH value will remain at 7.45 in the digester and the peak volume of biogas i.e., 67.56 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 59.23%. Therefore, the June 2013 results indicate that about 135.12 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor. Furthermore, results obtained during July 2013 for Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals were 75.2, 1.84, 3.1, 18.00, 110.3 and 1.3 respectively. The generated biogas in the developed model was measured on a daily basis during July 2013 and it is concluded that at average ambient temperature of 31.00°C, the average digester temperature remains consistent at 33.7°C and at this point of time, the average pH value will remain at 7.24 in the digester and the peak volume of biogas i.e., 62.96 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 52 %. Therefore, the July 2013 results indicate that about 125.92 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor.

Thereafter, analysis carried out during the month of August 2013 and the subsequent result obtained suggest the Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals as 75.9, 1.91, 3.8, 18.07, 110.6 and 1.6 respectively. The generated biogas in the developed model was measured on a daily basis during August 2013 and it is concluded that at average ambient temperature of 36.53°C, the average digester temperature remains consistent at 36.76°C and at this point of time, the average pH value will remain at 7.19 in the digester and the peak volume of biogas i.e., 67.03 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 56.63 %. Therefore, the August 2013 results indicate that about 134.06 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor. Thereafter, measurement of
generated biogas on daily basis in the developed In-house biogas model carried out during September 2013 for Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals had resulted in their respective values as 75.9, 1.92, 3.9, 18.09, 110.7 and 1.8 respectively. The generated biogas in the developed model was measured on a daily basis during September 2013 and it is concluded that at average ambient temperature of 34.43°C, the average digester temperature remains consistent at 36.13°C and at this point of time, the average pH value will remain at 7.14 in the digester and the peak volume of biogas i.e., 65.6 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 55.9%. Therefore, the September 2013 results indicate that about 131.2 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor. Moreover, analysis carried out during the month of October 2013 and the subsequent result obtained suggest the Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals as 75.6, 1.82, 3.45, 18.06, 110.6 and 1.4 respectively. The generated biogas in the developed model was measured on a daily basis during October 2013 and it is concluded that at average ambient temperature of 32.93°C, the average digester temperature remains consistent at 36.43°C and at this point of time, the average pH value will remain at 7.27 in the digester and the peak volume of biogas i.e., 63.9 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 55.36%. Therefore, the October 2013 results indicate that about 127.8 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor.

Furthermore, results obtained during November 2013 for Moisture, Total Protein, Total Fat, Total Carbohydrate, Calories and Minerals were 75.6, 1.84, 3.8, 18.02, 110.8 and 1.6 respectively. The generated biogas in the developed model was measured on a daily basis during November 2013 and it is concluded that at average ambient temperature of 34.53°C, the average digester temperature remains consistent at 36.9°C and at this point of time, the average pH value will remain at 7.12 in the digester and the peak volume of biogas i.e., 68.1 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 57.5%. Therefore, the November 2013 results indicate that about 136.2 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor. Thereafter, analysis carried out during the month of December 2013 and the subsequent result obtained suggest the Moisture, Total Protein, Total Fat, Total Carbohydrate,
Calories and Minerals as 75.2, 1.89, 3.2, 18.08, 110.1 and 1.4 respectively. The generated biogas in the developed model was measured on a daily basis during December 2013 and it is concluded that at average ambient temperature of 33.4°C, the average digester temperature remains consistent at 36.06°C and at this point of time, the average pH value will remain at 7.09 in the digester and the peak volume of biogas i.e., 65.2 liters will be generated in the developed In-house Biogas digester, wherein the average amount of generated Methane gas will be 55.63 %. Therefore, the December 2013 results indicate that about 130.4 liters Biogas can be generated by only one kg of food refuse as raw material when it is fed in the built biogas reactor. Thus, trials conducted during the year 2013 indicate that the developed In-house Biogas model was efficient for the generation of Biogas and can be adopted as economically viable option for effective management of solid wastes with wide acceptance. The model is very cheap, small capacity biogas generator that can be easily installed at our House. It costs merely Rs.842/- only with high uptake capacity of our domestic wastes and technical expertise is not mandatory. Moreover, it requires less space and maintenance. Thus, it is a model that can be readily acceptable and affordable at rural-scale and is environment friendly technology.

The third phase of the present studies had targeted to resolve a dual problem that was observed in industries i.e. of waste water treatment and fly ash waste management especially from thermal power plants. Most of the industries treat their industrial waste water in the effluent treatment plants that is a costly affair. Furthermore, the disposal of fly ash wastes generated in thermal power plants is problematic. Fly-ash wastes are generated due to the CFBC operations is thermal power plants. They are hazardous as they comprise of various fatal toxics like strontium, boron cobalt etc to name a few. Due to these factors it has less applicability to be used as a raw material for cement industries. Therefore, attempts to develop a cost effective Reed bed technology were done. The design of the Reed beds facilitated reuse of fly ash wastes as raw material for its construction. The model was effectively designed to treat domestic as well as industrial waste water. Significant results were obtained with *Pennisetum typhoides* (Bajara) plant as beds for model construction. The developed model was tested with domestic waste water treatment during the year 2012 and with industrial waste water collected from three different industries during the year 2013 for its efficacy. The domestic waste water treatment of 45 days in the developed model during January-February 2012 indicated high efficiency of the developed model as the Chemical demand of oxygen, Biological demand of oxygen, Total suspended
solids, and pH of outlet readings was significantly reduced to 84, 0, 98, 7.0 respectively as compared to the inlet readings of 281, 193, 192, 7.2 respectively after the treatment in the developed Reed bed model. Also, results obtained during the treatment period from March-April 2012 showed positive results as the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was significantly reduced to 85, 0, 99, 7.1 respectively as compared to the inlet readings of 282, 194, 193, 7.3 respectively after the treatment in the developed Reed bed model. Also, the model was tested to treat domestic wastewater during May-June 2012 and was concluded that it significantly reduced the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings i.e., 83, 0, 97, 7.0 respectively, as compared to the inlet readings of 280, 192, 191, 7.1 respectively the waste water was treated in the developed Reed bed model.

The domestic waste water treatment of 45 days in the developed model during July-August 2012 indicated high efficiency of the developed model as the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was significantly reduced to 86, 0, 100, 7.2 respectively as compared to the inlet readings of 283, 195, 194, 7.4 respectively after the treatment in the developed Reed bed model. Also, results obtained during the treatment period from September-October 2012 showed positive results as the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was significantly reduced to 82, 0, 96, 7.0 respectively as compared to the inlet readings of 279, 191, 190, 7.0 respectively after the treatment in the developed Reed bed model. Also, the model was tested to treat domestic waste water during November-December 2012 and was concluded that it significantly reduced the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings i.e., 88, 0, 101, 7.3 respectively, as compared to the inlet readings of 284, 196, 195, 7.5 respectively the waste water was treated in the developed Reed bed model. Thus, it is concluded from the research trials conducted during year 2012 that the developed Reed bed technology has potential to serve the dual purpose of effectively managing solid wastes refuse and treatment of liquid effluents.

Furthermore, effluent samples from three different industries were treated in the developed model during the year 2013. The samples from Everest food industries, Rajkot, Gujarat, India, i.e., Sample 1, Adani foods Pvt. Ltd. Rajkot, Gujarat, India, i.e., Sample 2 and Balaji Wafers Pvt. Ltd. Rajkot, Gujarat, India, i.e., Sample 3 were treated for 45 days in the
developed model and outlet readings for the wastewater sample were recorded for all the samples. The results obtained showed a significant difference between outlet readings to that of the inlet readings for all wastewater sample. The research trials conducted during January-February 2013 indicate that for Sample 1, Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 128.9, 0, 138.2 and 7.8 respectively as compared to the inlet readings of 445, 369, 234.2 and 8.4 respectively after the treatment in the developed Reed bed model. Similarly, for sample 2 the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 116.2, 0, 118.9 and 7.4 respectively as compared to the inlet readings of 431, 360, 210.6 and 8.0 respectively after the treatment. Furthermore, significant results were also obtained for sample 3 as the Chemical demand of Oxygen and Biological demand of oxygen, Total suspended solids, and pH outlet readings was found to be 118.7, 0, 126.2, 7.3 respectively as compared to the inlet readings of 416, 354, 216.9 and 8.6 respectively after the treatment in the model. Moreover, the industrial waste water treatment was also done during March-April 2013 in the model and it was observed for Sample 1 that the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 129.0, 0, 138.3, 7.9 respectively as compared to the inlet readings of 446, 370, 234.3, 8.5 respectively after the treatment in the developed Reed bed model. Similarly, for sample 2 the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings of the sample was found to be 116.3, 0, 119.0 and 7.5 respectively as compared to the inlet readings of 432, 361, 210.7 and 8.1 respectively after the treatment. Furthermore, significant results were also obtained for sample 3 as the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 118.8, 0, 126.3, 7.5 respectively as compared to the inlet readings of 417, 355, 217.0 and 8.7 respectively after the treatment in the model.

The research trials conducted during May-June 2013 indicate that for Sample 1, the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 127.8, 0, 138.1, 7.7 respectively as compared to the inlet readings of 444, 368, 234.1 and 8.3 respectively after the treatment in the developed Reed bed model. Similarly, for sample 2 the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings of the sample was found to be 116.1, 0, 118.8,
7.3 respectively as compared to the inlet readings of 430, 359, 210.55 and 7.9 respectively after the treatment. Furthermore, significant results were also obtained for sample 3 as the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 118.6, 0, 126.1 and 7.3 respectively as compared to the inlet readings of 415, 353, 216.8 and 8.5 respectively after the treatment in the model. Moreover, the industrial waste water treatment was also done during July-August 2013 in the model and the results indicate that for Sample 1, the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 118.6, 0, 126.1 and 7.3 respectively as compared to the inlet readings of 418, 356, 217.1 and 8.8 respectively after the treatment in the designed model.

The industrial waste water treatment was also done during September-October 2013 and was observed for Sample 1 that the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 128.8, 0, 138.4, 8.0 respectively as compared to the inlet readings of 447, 371, 234.4, 8.6 respectively after the treatment in the developed Reed bed model. Similarly, for sample 2 the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings of the sample was found to be 116.4, 0, 119.1 and 7.6 respectively as compared to the inlet readings of 433, 362, 210.8 and 8.2 respectively after the treatment. Furthermore, significant results were also obtained for sample 3 as the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 118.9, 0, 126.4 and 7.6 respectively as compared to the inlet readings of 418, 356, 217.1 and 8.8 respectively after the treatment in the designed model.
readings was found to be 128.66, 0, 136.8, 7.4 respectively as compared to the inlet readings of 442, 366, 233.8, 8.1 respectively after the treatment in the developed Reed bed model. Similarly, for sample 2 the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings of the sample was found to be 115.8, 0, 118.4, 7.0 respectively as compared to the inlet readings of 428, 356, 210.2 and 7.6 respectively after the treatment. Furthermore, significant results were also obtained for sample 3 as the Chemical demand of oxygen, Biological demand of oxygen, Total suspended solids, and pH of outlet readings was found to be 118.2, 0, 125.8 and 7.0 respectively as compared to the inlet readings of 416, 350, 216.6 and 8.2 respectively after the treatment in the model. Thus, the results obtained during research trials conducted in the year 2013 showed a significant difference between outlet readings to that of the inlet readings for all industrial wastewater samples. Thus, it is concluded that the developed technology has potential to serve the dual purpose of solid waste management and industrial waste water treatment.

The efficiency of the developed Reed bed technology was calculated to be 72%. It is envisaged that Fly ash wastes can be very effectively used as raw materials for construction of Reed beds and the model has potential to clean effluents from a variety of sources with high efficiency. Moreover, model developed during the present studies can be adopted as alternative technology to the currently practiced effluent treatment technologies that has high operating costs, complex construction materials and design, requiring high maintenance, high manpower and automatic control for continuous observation as compared to the developed Reed bed technology. Moreover, effluent treatment technologies are applicable only at the industrial levels and require more space than the Reed beds. They can be problematic to install in regions having less number of localites. Also, need of the day is to have a treatment technology for effluents that can be affordable by farmers and can be easily accepted at rural scale. Thus, it is concluded that Reed bed technologies are inevitable as there are certain limitations of the currently practiced treatment technologies. Reed bed technologies must be encouraged further as it is effective environment friendly technique that can manage effluents plus treat domestic cum industrial waste waters. Finally, as everyone is a part of the solid wastes generation problem, hence everyone must also be a part of the solution to proper wastes management. The solution depends on collective human actions and efforts. Therefore, everyone must work towards the Zero Wastes and Zero Pollution future.