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Transforming Ganges to be a Living River through Waste Water Management

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Abstract : By size and volume of water, Ganges River basin is the biggest among the fourteen major river basins in India. By Hindu’s faith, it is the main ‘holy river’ in this nation. But, of late, the pollution load, both domestic and industrial sources are deteriorating the surface and groundwater as well as land resources and hence the environment of the Ganges River basin is under threat. Seeing this scenario, the Indian government began to reclaim this river by two Ganges Action Plans I and II since 1986 by spending Rs. 2,747.52 crores ($457.92 million). But the result was no improvement in the water quality of the river and groundwater and environment even after almost three decades of reclamation, and hence now the New Indian Government is taking extra care to rejuvenate this river and allotted Rs. 2,037 cores ($339.50 million) in 2014 and Rs. 20,000 crores ($3,333.33 million) in 2015. The reasons for the poor water quality and stinking environment even after three decades of reclamation of the river are either no treatment/partial treatment of the sewage. Hence, now the authors are suggesting a tertiary level treatment standard of sewages of all sources and origins of the Ganges River basin and recycling the entire treated water for nondomestic uses. At 20million litres per day (MLD) capacity of each sewage treatment plant (STP), this basin needs about 2020 plants to treat the entire sewage load. Cost of the STPs is Rs. 3,43,400 million ($5,723.33 million) and the annual maintenance cost is Rs. 15,352 million ($255.87 million). The advantages of the proposed exercise are: we can produce a volume of 1,769.52 million m³ of biogas. Since biogas is energy, can be used as a fuel, for any heating purpose, such as cooking. It can also be used in a gas engine to convert the energy in the gas into electricity and heat. It is possible to generate about 3,539.04 million kilowatt electricity per annum from the biogas generated in the process of wastewater treatment in Ganges basin. The income generation from electricity works out to Rs 10,617.12million ($176.95million). This power can be used to bridge the supply and demand gap of energy in the power hungry villages where 300million people are without electricity in India even today, and to run these STPs as well. The 664.18 million tonnes of sludge generated by the treatment plants per annum can be used in agriculture as manure with suitable amendments. By arresting the pollution load the 187.42 cubic kilometer (km³) of groundwater potential of the Ganges River basin could be protected from deterioration. Since we can recycle the sewage for non-domestic purposes, about 14.75km³ of fresh water per annum can be conserved for future use. The total value of the water saving per annum is Rs.22,11,916million ($36,865.27million) and each citizen of Ganges River basin can save Rs. 4,423.83/ ($73.73) per annum and Rs. 12.12 ($0.202) per day by recycling the treated water for nondomestic uses. Further the environment of this basin could be kept clean by arresting the foul smell as well as the 3% of greenhouse gages emission from the stinking waterways and land. These are the ways to reclaim the waterways of Ganges River basin from deterioration.

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