# Swachh Bharat

Sustainable Solutions for Managing India's waste

By

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It is very encouraging to see Mr. Modi use the bully pulpit of his office to address an issue that is a vital cog in the development of India. He mentioned *'gandgi*' (filth) in his Independence Day speech and now with his *Swachh Bharat* campaign he has indeed confronted the problem head-on. He has sown the seed-- it is now time to grow this into a national habit by putting the right systems and processes in place to manage waste.

India boasts some of the dirtiest cities in the world. The 2005 flash floods in Mumbai which caused massive economic damage and loss of life were attributable to clogged drains from garbage that littered the streets. The bubonic plague epidemic that hit Surat in 1994 was a harsh reminder of the results of negligence in the area of waste management. In less than 50 years the country has managed to pollute its major rivers to stagnant cesspools of garbage with little or no life form, undoing a millions of years of nature's bountiful work. In 2009, the then Minister of Environment said, "*Our cities are the dirtiest of the world. If there is a Nobel Prize for dirt and filth India will win it."*

Rising incomes and increasing urbanization are exacerbating India's waste problems. Average waste production per capita has increased by almost 50% in the last decade. It is estimated that India's 355 Class-1 cities (cities with a population of more than 1 lakh) currently produce about 188,000 tons of MSW a day. By 2025, this will increase to about 440,000 tons per day, a roughly three-fold increase in garbage in a country that is so woefully lacking a systematic and sustainable solid waste system today. Most Indian cities lack a systematic program for managing, recycling and disposing their Municipal Solid Waste (MSW). Currently only 55% of India's waste is collected. The rest, almost 85,000 tons per day or a staggering 31 million tons per year, does not get properly collected, recycled, or disposed. And sadly what is collected is often dumped in overflowing dump sites, open lots, or rivers and drains, with little regard for the environment.

Solid waste management situation in India is one of the most serious problems facing the country. The direct health costs, and the indirect opportunity costs from lost tourism and foreign investment, are estimated to be almost $ 2 trillion over the next decade. A 2009 study by the World Bank estimates that poor waste management practices and lack of sanitation costs India 6.5% of its GDP (about $54 billion) in health related costs alone. *The World Bank estimates that the economic drag from poor waste management practices in India could be over $500 billion over the next 10 years.* In addition, there are significant opportunity costs associated with lost foreign investment and lost tourism which could add another $1.5 trillion over the next decade. The embarrassment from the 2010 Commonwealth Games in which unhygienic living conditions for the athletes became a major issue almost guarantees that India may not get another significant major international event any time soon.

Unless these problems are addressed immediately, India's economic growth is certain to be threatened. And, if India wishes to be taken seriously as a major economic player, it has to devote substantial efforts to modernizing its waste management systems and to cleaning up its filth. Mother India has been defaced over the last 50 years and it's time to take serious stock of the situation.

Various excuses are served up for India's filth--poverty, over population, illiteracy, corruption, lack of funds, etc. None of these factors, however, can alone explain the reality. Thailand is a poorer country than India —yet Bangkok is cleaner than most Indian cities. Tokyo is more densely populated than Delhi but one can't compare the two cities in terms of cleanliness. Corruption plagues China too, but its major cities have international standards of cleanliness. And it is not lack of funds either—municipalities in India spend an average of Rs.2100 per ton of waste, compared to Rs. 2050 per ton in the UK. It is clear that the Indian MSW system is broken, inefficient, ineffective, and in immediate need of a serious overhaul.

Thankfully, India's MSW problems are solvable and the solutions are actually quite simple and doable. *And they can be solved for half the amount currently allocated in municipal budgets to solid waste management*. All that is needed is a good understanding of the solutions, and the will to make these changes. One of the authors has spent several years of research on hundreds of MSW systems in over two dozen countries—some successful and others in need of improvement. There is a common thread among successful MSW systems—they are privately managed, there is extensive use of automated equipment to handle the large volumes of waste, there are strict enforceable anti-littering laws, there is high public awareness and appreciation of the benefits of a clean environment, and citizens are stakeholders in the waste management system and willing to pay for good quality service.

All successful MSW systems have the following characteristics:

- *Waste Management is treated as a system consisting of collection, transportation, segregation, recycling/reuse, and disposal.* A system is the sum of its part and its success depends on each part working properly. If any part of the system is weak it affects the entire system. In India every part of the MSW system has glaring weaknesses resulting in the sum being worse than the parts. Poor disposal practices affect collection, poor segregation affects recycling, ineffective recycling affects disposal, poor transportation affects collection and disposal, and so on. As is typical of most governmental bodies, local municipalities apply piecemeal fixes to different parts of the system. Almost all municipal tenders are for 'waste collection' and not waste management. These efforts are almost always ineffective and a huge waste of money. Thousands of crores of tax payer money has been wasted by municipalities with almost nothing to show for it, yet they keep doing the same thing year after year. Repeating the same thing and expecting a different outcome is insanity.

- *Successful MSW systems are almost always public-private partnerships with private companies being the providers and Municipal bodies acting as enforcers.* Modernising India's antiquated waste management practices is possible *only* if the private sector becomes the provider, and municipalities act primarily as enforcers. Private companies bring technical expertise, new technologies, modern operating practices, trained manpower, efficiency and cost controls. Cost savings in the few Indian cities that have brought in private companies range from 40% to 70%. Municipalities should not be involved in providing any part of waste management. Instead of being the players their role should be that of umpires--focusing on enforcing anti-littering laws, creating public awareness against littering and polluting, and levying user/polluter charges.

- *All successful MSW systems are an organized industry using modern technology and mechanized equipment*. Successful MSW systems have very high (almost 100%) collection of waste at source with minimal unloading and reloading of garbage in its transportation to final recycling and disposal. This can only be done using highly efficient and automated equipment capable of handling large volumes of waste with minimal manual intervention. In contrast, manually powered tricycles and hand pulled carts still dominate waste collection in India; limiting the volume of waste that can be handled and the distance it can be transported. As a result, much of the waste is either uncollected and finds itself on the street or is dumped randomly in open lots. In some cities the collected waste is dumped into open community bins, or Dhalao's. These neighborhood 'transfer stations' are ironically located in the same community from where the waste is collected to be removed, and become a major source of waste pollution. They are a collection point for rag pickers, stray animals, rodents, snakes, and a breeding ground for mosquitoes. These community bins are completely redundant and unnecessary if the initial collection of waste is properly done using mechanised equipment capable of handling large volumes of waste, with modern transfer stations that permit the efficient transportation of this waste *away* from populated areas. We cannot manage a 21$^{st}$ century problem with 19$^{th}$ century equipment. Unfortunately the symbolic visual of our leaders using brooms to clean the street sends the wrong message. Firstly brooms is not going to get it done—there is just too much garbage to be picked up; and also it misses the vital point—what do you do with the garbage after you pick it up from the street. Without a comprehensive waste management system to process, recycle and dispose garbage picked up from the street will get dumped somewhere else.

- *The hallmark of a successful MSW system is that it is based on the 'polluter pays' principal.* Those responsible for producing garbage are also responsible for paying for its disposal. In India, garbage collection is either a 'voluntary' act where someone on a manually powered tricycle picks up the garbage for a small fee, or, it is the responsibility of the municipality and an expense item on Municipal budgets. Both these models are unsustainable. The voluntary

collection model breaks down because invariably a few households in the neighborhood do not pay to get their garbage collected opting instead to throw it anywhere they conveniently can. The municipale model also does not work because municipalities are often incapable of consistent execution, with the result that garbage piles up on the street. The only model that works is one in which users (households, shops, restaurants, hotels, offices, companies etc.) are required to pay for garbage disposal. This fee could be collected by the municipality and included as part of the utility bill, but it has to be required as opposed to be voluntary. In addition to providing the necessary finances to make the system effective and sustainable, the very act of being forced to pay increases awareness for waste reduction, and forces people to take ownership of the problem.

- *In successfully managed MSW systems, local municipal bodies impose severe penalties for littering.* In Indian cities, local municipalities waste substantial resources in providing waste management services, but invest few resources in enforcement of anti-littering laws. Street littering goes unchecked and most roadside shops do not have a garbage can for refuse. Why can't all roadside shops be mandated to keep garbage cans, and fined for littering? It is argued that they would bribe their way out--they might, but eventually even that expense would become a deterrent. Make it expensive to litter in India and much of the roadside garbage problem will be solved. The Delhi Metro system is an example of how the threat of fines and penalties keeps people from littering in the metro cars and platforms. Signs warning of severe penalties for littering, followed up with actual enforcement and fines, will go a long way in solving India's waste problems.

- *Successful MSW systems employ cutting edge technologies (almost always developed and deployed by private companies) to recycle and create a useful 'second-life' for much of the waste and to reduce the volume of waste going into the landfill*. Some Scandinavian countries have reached an almost zero-waste stage where all the waste generated is reused and recycled with almost nothing going to the landfill. In sustainable and successful MSW systems only about 10% of the waste collected ends up in the landfill. In India, almost 80% of the waste collected is dumped into open dumping sites. In a country with a shortage of land such practices are inexcusable and unsustainable. *But it is unlikely that things will ever change unless private companies are integrated into the process and given monetary incentives to deploy cutting-edge technologies.* Much of India's recycling is still carried out manually, using an informal network of rag pickers and middlemen. Everyone recognizes the inefficient nature of these practices and the urgent need to integrate this informal sector into a formal structure. Positive growth requires change, but little is ever done to change things because it is argued that rag pickers would lose out on opportunities to make a livelihood. This argument is ill-conceived because it assumes that rag pickers cannot (and should not) be retrained for better employment opportunities. Ironically, a study on rag pickers done by a group of social scientists found that almost 90% of them would rather be doing something

else than scavenging cesspools of garbage for a few rupees worth of recyclables. A growing economy like India's provides ample employment opportunities for retrained rag pickers. They deserve a better life too.

- *Another salient feature of a successful MSW system is in the final disposal of remaining waste.* All developed countries mandate modern scientifically-designed landfills to eliminate contamination of groundwater from garbage related leachate, and to capture useful methane gas generated by the degradation of garbage over time. The MSW Rules 2000 of the Government of India mandates such landfills, yet there are only 2 scientific landfills in the entire country. Much of the waste collected is either openly dumped or put into a "dumping" site which is often nothing but a hole in the ground in which garbage is piled randomly. The garbage is rarely ever covered, leading to severe problems with pests, bad odor, and significantly higher rates of air-borne infectious diseases and bacterial infections. In addition, there is the silent killer –the leachate that carries dangerous and carcinogenic chemicals into the underground water aquifers of all major cities. Imagine the human catastrophe if the underground water in a major city becomes heavily polluted. It is a definite possibility if action is not taken immediately to construct new generation landfills. The Okhla landfill in Delhi is a classic example of a poorly managed landfill. An EPA study found that the decomposition of organic waste in this landfill was generating a lethal amount of inflammable methane. If properly harnessed this same gas, instead of being a potential human catastrophe, could be harvested and converted to enough CNG to be able to run the city bus service for 2 years.

- *In successful MSW systems landfill space is maximized.* It is required that garbage be deposited into designated 'cells' which are covered every day with a layer of soil to prevent smell and pests. The geometry of these cells is carefully designed, and the waste is sufficiently crushed and compacted to maximize the 'air space' in the landfill. In successful MSW systems the average landfill rate is around 0.75 tons of waste per cubic yard of landfill space. In India, the landfill rate is 0.25 tons of waste per cubic yard. In other words, it takes almost 3 times the space to dispose of waste in India, a country with an acute shortage of land. Over the next 10 years India will need to landfill 840 million tons of waste, requiring almost 50,000 acres of land per year. Where is this land going to come from? With a small investment in proper technology, and thoughtful planning, this requirement for landfill land could be reduced to less than 2,000 acres per year.

- *In every civilized country filth and inappropriate waste are incompatible with an acceptable quality of life.* Citizens see tangible benefits associated with a clean environment and have a personal stake in ensuring cleanliness. In India, filth is an accepted way of life because a majority of people have not seen it any other way. Littering is a habit and an acceptable practice. Filth and garbage on the streets is accepted as a minor nuisance, and a sign of

municipal incompetence. There is no awareness of its significant health and environmental cost. This "littering" habit must be changed to a habit in which every citizen takes personal stake in the environment and the cleanliness of their surroundings. That is precisely what Mr. Modi is attempting to do with his Independence Day speech and his *Swachh Bharat* campaign--change the thinking and attitude on cleanliness. People must be made aware that garbage is not a governmental issue but an issue concerning every citizen. Every school should teach children about proper disposal of garbage—in fact school children should be taken on field trips to help clean up neighborhoods --if nothing else to shame elders into following suite. And penalties for littering should be severe enough to be strong deterrents. Habits can be changed. Everyone today habitually straps on seat belts in the car because not doing so carries heavy fines. Imagine this in a country where 10 years ago most new cars were made without seat belts.

As the saying goes:

*You sow a thought and it becomes an act;*
*You sow an act it becomes a habit;*
*You sow a habit and it becomes character*

- *Corporate involvement in developing public awareness programs to change the littering habit is a must.* The government has to persuade private companies to be more actively involved in socially responsible practices. In the US, for example, it is common practice for private companies to adopt sections of a road to ensure its upkeep. This practice can easily be adopted in Indian cities. In some cities like Chandigarh, for example, corporate sponsorship of 'roundabouts' is common and his can be extended to entire roads or communities. Corporations must be encouraged to run public awareness advertisements on TV that focus on environmental and cleanliness issues. Bollywood celebrities and high profile sports personalities can be enlisted to develop public awareness programs on cleanliness and proper waste disposal. In his Independence Day speech Mr. Modi urged corporations to use their CSR money to build toilets in schools. Within a week almost Rs. 1000 crores was allocated by major business houses towards this problem. Mr. Modi needs to do the same for solid waste, use the bully pulpit of his office to get cities cleaned.

India's MSW and sanitation issues need to be addressed on a war footing. The public health and environmental costs alone are staggering and it is inexcusable for the world's 4$^{th}$ richest country to have streets that resemble those of a third world country. We have a treasure drove of historic and heritage sites, and tourism is our largest service industry generating almost $100 billion a year. Yet we draw only 5.5 million foreign tourists, less than one-third the 18 million that go to Thailand every year. If we could clean up the country and get the trash and dust off the streets, tourism in India could be a $400 billion industry providing employment to millions and enough revenue to the treasury to wipe out the federal deficit. Plus the

enhancement in quality of life would be priceless. What good is an India growing at 7% if it cannot provide a clean environment and a decent quality of life for its citizens?

The time for excuses and dithering is over. Governments, both central and state, have to seriously and quickly understand the problems, cut out the red tape and bring in private companies with the expertise and knowledge to deliver the goods, start a massive campaign of public awareness and education, and enforce strict and penal anti-littering laws to change habits. With a sincerity of purpose, and 125 crore people lending a helping hand, we can clean up Mother India in 5 years and improve the quality of life for millions of our citizens, in addition to bringing in billions in tourism and foreign investment. Now that's a win-win manifesto a politician can run on.