CHAPTER 6
BUSINESS GROWTH AND PERCEPTION OF POLICY CHANGE

Pollution is an outcome of market failure. This can be rectified to some extent by treating goods or bads as excludable\textsuperscript{35} and rival\textsuperscript{36} in nature. Solid waste can be made excludable by making it affordable for the waste generators to dispose it off. Similarly, by creating a demand for the waste from the waste processors, it can also be converted into a rival good. This combination helps rectify the market failure that leads to creation of this waste in the first place. Also, considering the Pigovian thought of requiring regulatory costs and inputs, the market failure can be addresses as opposed to the Coasian approach of letting the market arrive at its own equilibrium point, which has not happened so far (Kolstad, 2006). This chapter contains a cross case analysis of the transcribed data collected from the participants. The various themes shown hereunder emanate from the analysis of this transcribed data.

CONTEXT AND NEED FOR WASTE MANAGEMENT

Waste management and social change

Efficient SWM projects could contribute to solving social and environmental problems faced by cities and towns. A large number of respondents cited the need for social and environmental improvement as the major objective and trigger point for starting their businesses. One of the respondents mentioned:

\textsuperscript{35}Excludable goods are those which feasibly and practically allow selective consumption of the goods. This logic also applies to a bad. Hence, solid waste is excludable if avoiding consumption of the same is feasible and practical.

\textsuperscript{36}Goods are considered to be rival in nature if the consumption by one person reduces the amount for consumption for others (Kolstad, 2005)
'I realized that Coimbatore had a power shortage of four to five hours a day and the municipal solid waste was giving a lot of stench in a school which we support. So we decided to do municipal solid waste to energy after doing a lot of research.'

Noticing a large amount of kitchen waste coming from a corporate canteen was the inspiration for another entrepreneur in this area. He noticed that this was collected by waste collectors and dumped in a landfill. Instead, this waste could have been composted and used to enrich the soil in nearby areas where farmers would be the biggest beneficiaries. Thus, the respondents’ road to environmental action and improvement began from a simple observation and his sensitivity to the surroundings.

One of the biggest advantages from waste management in addition to the improvement in the environment, is the boost to the social sector and provision of employment and livelihood to the lower strata of society. By supporting these firms, a large number of jobs are created which provides income and helps improve standard of living of the poor and underprivileged section. A major part of the informal sector workforce in waste collection is from the poor and economically backward section of society who are economically exploited and socially ostracized because of the perception about their work. While there are some bodies and organizations that try to work for this section of society, they have their limitations due to the sheer volume of the waste and also due to their own inability to scale their operations. In addition, there are no legal benefits or social security available to the workers as the SWM industry is not fully established and recognized. By considering the SWM industry as a full-fledged and formal industry segment, these workers can be integrated into regular society and can also benefit from industrial laws which could help in improving their standard and quality of living. However, even with the given restrictions, industries in SWM have
contributed to improving the life of these workers as mentioned by some of the entrepreneurs.

Literature also shows that a viable Environmental Goods and Services (EGS) industry can be one of the reasons for the competitiveness of other industries further upstream and downstream (Bilsen et al., 2009). It is also a major factor in the positions of trade advantage and social stability (Sinclair-Desgagne, 2008).

**Importance of land in SWM system**

Inefficient handling of waste can create negative externalities in other industries such as Tourism Industry in addition to the direct environmental problems. As some respondents stated that there could be reduction in tourism since tourists are put off by the dirt and lack of hygiene they observe in India. Competitive countries such as Thailand are able to attract more tourists partly due to the cleanliness and hygiene maintained in the country, which helps them earn more foreign exchange due to their efficiency in managing waste.

Lack of attention to SWM by municipal corporations could result in enriching contractors involved in SWM. One respondent said that if private waste handlers charged a tipping fee for receiving the waste from the municipal corporation, they would in turn only dump it into landfills and charge for the same. Eventually the corporation pays for having the waste dumped into landfill sites, something that could have been done by it in the first place. This approach also does not help to change the perspective of waste as a resource and treat it as a rival good.

Solid waste is sometimes disposed by dumping in water bodies such as lakes and ponds which can create an ancillary problem. This exacerbates the water logging situation during
monsoon season as these bodies which previously used to collect excess rainwater and prevent flooding are now unable to do so. One respondent articulated this issue:

‘They found the best way to land filling. They forgot that the water is more important, that they use all these ponds and lakes and all these places to fill up with garbage and close it.’

India is a country with a large population but the land available per capita is relatively low. There is a constant pressure on the available land resources for living and development purposes. Improper waste management can lead to usage of precious land as landfill areas. This land, if not used as landfills could have been used for other socially beneficial reasons such as hospitals, parks, recreational facilities, etc. Although land filling as a disposal method has low initial costs, it has a number of serious side effects including air and water pollution resulting in diseases, stench and odour, release of methane (which is a greenhouse gas and also explosive in nature), and scarcity of suitable sites as landfills.

One of the respondents noted that Mumbai alone generates about 20,000 tons of waste per day and that about 240 hectares of land was used to manage this waste. The cost of this land was about Rs. 4000 to 5000 crores. This also highlights the fact that scarce monetary resources, which could be used in more productive areas such as healthcare or education are being diverted for unproductive uses in the form of landfills. Even if the amount of land required is reduced by half, it could potentially free up to Rs. 2000 crores of value which could benefit the population immensely. Another respondent informed:

‘Waste generation in India could be as much as 0.6 kilograms per person per day. India has only one-third the land space required when it comes to finding suitable locations for final disposal. India’s rapid population growth only magnifies the problem.’
According to him, the choice is between waste disposal and human development. There is a huge pressure on existing land from the burgeoning population, a large part of which lives in abject conditions due to the shortage of land.

**Solid waste as a rival good**

Natural resources are limited but their efficient usage can help define economic growth. The usage of these resources creates waste which is normally absorbed through natural processes. However, when the amount of waste exceeds the natural absorption capacity, there is a degradation of environmental quality. One way of dealing with the waste generated from the usage of natural resources is to view this waste as another form of resource, or as a rival good. Most of the firms mentioned that when the waste generated is capable of being monetized, it has a major impact on the behaviour of waste generators. They would now hesitate to throw it away and would instead look for ways to sell it or convert it into another usable product. One of the respondents said:

‘The government should rather encourage industries by supporting them by creating a demand for this waste. Once they create a demand for this waste, because the industry that is processing it is making money out of it, it automatically solves the government’s problem.’

The importance of waste management is very high since a major portion of a municipal corporation’s revenue is spent on activities related to waste management be it for collection, segregation, transporting or processing. It was also seen by Dechezlpretre and Sato (2009) that the social benefits of environmental regulations, particularly in terms of improved health, may result in a beneficial cost-benefit ratio.
There is immense scope for private sector participation in the field of SWM. The advantages of having private sector participation are higher flexibility in staff related matters and faster decision-making, increased efficiency in technology innovation and utilization, and increased accountability of performance and customer satisfaction which could also lead to performance incentives. This was also observed in studies by Unnisa (2014), Zhu et al. (2008) and Massoud and El-Fadel (2002). Providing an efficient SWM system for recyclable wastes could help waste generators get a better price on selling the same. This could create a further incentive to recycle the recyclable waste and thus reduce the overall pollution.

**Information asymmetry leading to corrupt practices**

One of the features of operational environment of SWM systems in India is the existence of corruption. As some respondents mentioned, there are bodies who are more interested in spending the amount budgeted for SWM, without too much concern about the outcome of the activity. These lobbies were also instrumental in blocking the use of new technologies in order to maintain their own activities. There were some very candid views on this issue by one respondent:

‘There have been a few attempts to bring in other technologies to put inside the dumping ground and try to do something but those plans haven’t run for a single day. Like, thousands of crores have been wasted and the Deonar dumping ground in Mumbai is just like that.’

The private contractors are paid tipping fees on a tonnage basis for picking up the waste from collection centres in the city and transport it to the landfill or other waste management area. Since the payment is based on the quantity of waste, there is a concern of weight being manipulated.
The SWM industry also depends on the usage of its output by other sectors of industry. For example, units engaged in converting waste into fuel or gas need to have the requisite demand from users of the specific fuel or gas.

There have been instances, where the firms have received a good response from the government machinery, thus increasing their confidence in the system. The quick response could be the outcome of the government understanding the importance and value of a good and efficient SWM system to the country and environment. The firms with this experience were hopeful of increasing their presence multiple times. One respondent spoke of his experience:

‘We applied to the government and they said yes, approval is given, single window. We've got all the clearances now. We are waiting for the financial closure. Financial closure would happen in the course of the next 10-15 days’ time.’

Therefore, evidences show that there is a way to avoid the corruption if the state machinery has the will power to support the SWM industry.

**OPERATIONAL CHALLENGES**

**Information asymmetry among stakeholders**

Waste management involves a large number of different stakeholders and the citizens are considered co-responsible together with the local bodies. Identification of these stakeholders and their responsibilities is essential to establish an efficient and effective system as is also the information flow amongst them.

It is already mentioned in the previous chapter that the lack of awareness has created several problems related to soil, diseases, natural environment, etc. This is in addition to the spoilage
of aesthetics and increase in air pollution due to the release of gases while the waste decomposes in the open. One respondent had a view on the lack of awareness:

‘Majority of them were under the notion that waste is something that needs to be handled by the municipal corporation. Once when we give the waste out to them, it is none of our concern what they do with it.’

Awareness among waste generators can be inculcated in multiple ways. Consumer education is one of the preferred routes and may be successful in case of waste generators who are relatively more sensitive about the need for waste management. It may not be as effective with those who are less concerned about the after-effects of their business or activity on the surrounding environment. Another route to generation of awareness could be by communicating the message of value inherent in waste. Realization about the economic value of the waste being generated can possibly generate movement towards segregating the waste in a manner that provides maximum economic benefit. The impact of shifting the responsibility of SWM to municipal corporations is that the waste generators give away the opportunity of deriving economic benefit from their own resource to the local authorities.

Awareness can also be inculcated through government policies, which can include incentives and penalties as in the case of cities such as Pune or Bangalore, where fines are imposed on littering and dumping of waste, and rebates are given for actions leading to self-management of waste.

Increased awareness among waste generators can also create better business opportunities for the SWM firms. A number of respondents gave credit to the Swachh Bharat Abhiyaan, initiated by the central government, in creating an increased level of awareness among the
waste generators. They said that the same message coming from a public figure such as the
Prime Minister made a huge impact on the effectiveness of its implementation.

‘So you know a lot of people who were refusing to even open an eye, once when they had
a message coming out from a person like Mr. Modi everyone started to sit up and you
know, start to give it a thought that yes, something needs to be done about that.’

While the launch of movements such as the Swachh Bharat Abhiyaan have led to more
awareness as mentioned by the respondents, there is a long way to go in terms of achieving
complete awareness. The incorporation of this awareness into people’s day-to-day lives is yet
to happen on a large scale. The success of these events can only be judged over a longer
time-frame. However, from the perspective of the firms in SWM, these events mark the
beginning of a possible change in mindset of the people. Hence, if there are sincere and
sustained efforts from the government’s side, the firms would be justified in calculating the
business growth potential.

Non-segregation reduces the efficiency of SWM

Non-segregation is an important reason for the inefficiency of waste management systems. It
can happen at the time of waste collection in addition to waste generation. There are a
number of reasons for the non-segregation at the waste collection stage. One is that the
collectors are not trained or educated about the need for keeping the two fractions segregated.
Troschinetz and Mihelcic (2009) also supported the fact that education of Municipal Solid
Waste Management (MSWM) personnel in collecting waste efficiently was the primary
factor influencing recycling in developing countries. Secondly, the collector is interested in
the weight of the waste and not the quality, since the payment is on the basis of tipping fees,
which is in turn based on the quantity of waste collected. Thirdly, the waste collector and
waste processor are different or there is a lack of coordination between the two, which could lead to the collector being indifferent to the fact that mixing the segregated waste would lead to a reduction in efficiency of the waste processor.

**BUSINESS GROWTH PROSPECTS**

In this section, the perception of the respondent-firms about the business growth prospects of SWM is analyzed. The importance of government policies and other resources are explored here.

**Government policies as catalyst for business growth**

Firms in the area of SWM measure their success and growth prospects through reorders and referrals by satisfied clients to new and prospective clients. This concept of customer referrals is necessary and crucial for them since the industry itself is quite new and does not have a clear identity in the eyes of government bodies and credit providers.

Government policies need not only be in the area of direct intervention such as subsidies and soft loans. Indirect support, for example, as evidenced by the ‘Swachh Bharat Abhiyaan’, has been found to be very useful by proactive entrepreneurs. These movements by the government help increase awareness among the people which could then lead to growth in demand for the products and services of SWM firms.

Simultaneously, with the government policies becoming stricter in activities such as segregation and waste dumping, many firms see a huge scope for growth of business since these activities contribute to their success in a big way. A large number of respondents did not stress too much on government handouts or financial aid. Instead, they were looking for a policy intervention that modified the segregating behaviour of waste generators.
This represents a positive mindset whereby the industry is confident of its ability to survive and sustain itself over a longer period of time. The firms are also willing to take long-term risks by asking for waste management contracts up to 20 years so that they are ensured of continuous and uninterrupted supply of material. They do not appear to depend on government aids and subsidies, which could possibly take away their competitiveness and long-term perspective. Their main expectation is the push from government agencies in addition to their own efforts to create awareness among the general population to form segregating habits and recognize the value inherent in waste. This approach also shows that they are willing to invest for the future of their business and not focus on low hanging fruits in the form of aids and grants alone. The advantage of this approach is that there would be a positive cycle being created whereby the people reduce the burden on municipal corporations for waste management and instead force the local bodies to spend more on other important areas such as healthcare or education.

Firms which deal with specific waste such as hospital waste, which is hazardous and strictly regulated, observe lesser scope for quick growth since they are restricted by the number of hospitals in the district or region.

The scope for growth for SWM firms depends on the quality of the products and services, and their future demand. With the concept of decentralization of waste management becoming more acceptable, firms with reliable and efficient technology anticipate good growth in terms of sales and profits. One respondent commented about the organic waste to biogas business:
‘It has the best ROI in renewable business. Three years you get your money back, you put INR Three Crores you get your money back in three years. So no other renewable business has such beautiful ROI because gas is expensive, it is imported.’

**Growth and capital requirement**

One of the drivers of sustainability of firms in the area of SWM is the utility of the end product. Outputs such as oil and biogas have high utility value and even at the strategic level of national security, they have huge potential to save precious foreign currency and dependence on other nations. Given the critical importance of these products, some of the respondents felt the need for soft loans and other financial support systems.

Some of these firms are into complicated activities like producing fuel oil for furnace use, but the same can also be further distilled to come out with petrol and diesel substitutes which are sulphur free and hence less polluting. One respondent said:

‘*The next step is that we are going to start fractionating the value added hydrocarbons. Ultimately, when you say fuel for furnaces, it is the lowest product after distillation like crude oil.*’

The capital cost of such downstream facilities is very high and so, support from capital providers by providing capital at lower rates becomes necessary. Government policies regarding the production of such fuels without differentiating the raw material used for this production can become a challenge. For example, fuel made out of imported crude oil and that from plastic waste are treated at par by policymakers and the safety standards and tariffs on both are the same. Conventionally, tax incentives have mostly been to encourage supply of EGS. Mann and Hymel (2006) also observed that these tax incentives could also be used to encourage demand for environment friendly machines, products, energy, etc.
The SWM industry requires resources in the form of skilled personnel, appropriate equipment and infrastructure, proper maintenance and operation. For a modernized sustainable system, there is a need for the financial support of the central government, the interest of local bodies, the participation of the service users or waste generators and the proper administration of the funds. A major factor affecting the growth of SWM firms is the availability of capital at reasonable rates of interest. With the scope of SWM increasing in the country and lesser number of firms in this area, there is a huge scope for growth. Biogas itself has a huge potential and the government is considering starting Build-Own-Operate-Transfer (BOOT) projects with private firms. However, the capital providers in India do not seem to have a positive outlook on firms in this area. One respondent narrated his experience with Canadian banks:

‘For BOOT projects, you need multimillion crores which we don't have the capability nor the banks are supporting any green company, green venture. Whereas in Canada and other places, green ventures are charged with the lowest of interest rate.’

Hence, there is a strong need for industry recognition by the government to enable the SWM industry to take up the opportunity for growth. Most respondents believed that the capital should not come from the government alone but could flow from sources such as private equity, venture capital funds, CSR funds, and so on. The government’s role should be restricted to creating a level playing field for the SWM firms so that there is public confidence in their operations and their future. Public private partnerships (PPP) could be one of the outcomes of such measures by the government.

Capital providers may not be very confident about SWM firms possibly due to the defaults in such projects in the past. This could be rectified by recognition of the industry followed by
strict monitoring and regulation norms, which could deter firms from fraudulent and dishonest activities. These activities and negative performance of some firms affect the functioning of firms that are doing good and productive work.

Another crucial factor affecting the growth and sustainability of SWM firms is the assurance of a steady supply of raw material, i.e. solid waste from the municipal collection centres. One respondent stressed on the need for long-term contracts to assure the firms of continuous supply of raw material. The agreements made by the government bodies with SWM firms should be for a longer term so as to justify the large amounts of capital being invested and also the large payback period of the projects. A long-term contract also demonstrates the confidence and faith in the firms who have been contracted to manage the waste. It provides an incentive to the firms to work hard and efficiently to make the most of the tenure of the contract, the benefits of which would be received by the people as well through environmental and social benefits. This move can help the local bodies to reduce their own costs such as tipping fees since the firms, through the sale of energy and byproducts, would become profitable after a few years into the contract and may not need external revenue support. A corollary support move on the part of the government could be an agreement to purchase the power generated by these firms over a period of time at a pre-decided rate, which would again give the firms a long-term motive to process waste more efficiently.

Porter and Van der Linde (1995) also found that one of the principles of regulatory design which can promote innovation, productivity and competitiveness in the EGS industry is sense of stability and predictability conveyed through the regulations and ensuring they stay in place for a long time.
Some respondents stated that the most important aspects to long-term survival and sustainability were good products, services and customer experience. While these requirements are applicable to any other business as well, these requirements are critical for SWM firms since these firms have credibility challenges and customers do not have a very clear idea of what to expect in the long run from these firms.

A market driven approach is considered superior to regulation in being able to control pollution, mainly due to two reasons. There is a loss of faith in the government efficacy in SWM and secondly, there have been technological advances in the industry. These two factors have shifted the onus on policymakers to do their job effectively. Consumer oriented practices by the SWM firms could encourage healthy competition within the industry and drive them to innovative ways and means to improve and further their business. This in turn could make the business more cost efficient and effective. Ellerman (1999) also found that the effect of technological innovations is expected to create dynamic efficiency, which would lead to lower costs in the industry.

**Shift in strategy from B2B to B2C increases the efficiency in SWM**

When faced with the risk of losing a few large clients who generate a major portion of the revenues, some firms plan to diversify from the B2B mode into the B2C mode, which can be seen as another form of decentralization. The aim of this shift in strategy is to protect their total revenues and also spread the revenues evenly throughout the year. For this, the firms are willing to diversify their product and services portfolios and look to forward integration of their activities. For example, a firm which was subcontracting in collection and transportation of waste for another firm was able to shift to manufacturing of biogas and other related products in addition to doing its own collection. This move gave it the freedom to leverage
their own competencies and strengths rather than being dependent on the contractor for their revenues and activities. The SWM firm is currently looking at producing bio-CNG for household use and also manufacture of alternate liquid fuel to replace kerosene. Both these products synchronize with the push from the central government for reduction of use of wood and smoke creating fuel in rural areas. This move has unlocked a lot of value for the firm which is now on an expansion mode.

Some firms engaged in collecting the raw material in the form of dry waste on a retail business do not find the concept of B2C as value-adding due to the quantity of material and economies of scale. For example, going from door-to-door to collect a small amount of dry waste does not make economic sense given the price of a kilogram of the material in comparison with the collection charges.

‘Our costs are very high in operations. I would put it this way-going to individual households for 500gms or one kg does not make sense because my micro-entrepreneurs otherwise would not make money,’

For such firms, decentralization at a higher level is desirable where all the requisite waste is collected at a local area or ward level.

The firms engaged in producing oil from plastic waste do appear to have a strategic position in the market. However, their end product also makes them vulnerable to the price fluctuations in the international market and the level of price protection given by the Government in India. These factors would affect their profit margins as well as their future growth. While the cost of collecting the plastic waste and processing it into fuel remains unaffected by international prices, the selling price of this refuse derived fuel is sensitive to changes in international prices. In times when the international crude oil prices are low, the
fuel manufacturers are compensated for their losses whereas the price difference is not reimbursed to the Refuse Derived fuel (RDF) manufacturers.

Working with one fraction of solid waste can lead to the realization of the synergistic potential of other fractions as well. Some respondents who were processing organic waste management spoke about the scope of inorganic waste management as well. This thought came from their experience of collecting mixed waste, segregating it at their level and selling the remaining waste to the respective recyclers. The process inspired them to think of the possible synergies and cost efficiency if they could process all fractions of waste. The output of the inorganic waste management system, like gas, could also be used as a fuel to improve the efficiency of the organic waste management system. This could also make them less affected by the non-segregation of waste at source, since they would be capable of doing it at their level. It would help hedge their activities by enabling them to have multiple product and client portfolios.

**Strategies to address the issue of efficiency in waste management**

Since consumer awareness is a strongly felt need, many firms have not waited for the government to take up consumer education initiatives. They have proactively taken up such initiatives through multiple means and channels. Some have reached out to housing societies and residential complexes to educate them about the need and benefits of segregation while some have started creating awareness among children through school programmes. One firm has started creating awareness through social and electronic media about the economic benefits a waste generator can get if proper segregation is done. These measures appear to be small but can help the cause of waste management by their innovative approach and cascading effects.
Exploring new avenues to raise capital

Some firms in this area are proactive by not waiting for government policies and subsidies but instead by raising capital from private equity funds and companies such as Intellicap, Patni and Pidilite by depending on the altruistic motives of these organisations.

While such instances are few, there is a need for more such funding given the shortage of government interventions to set right the anomaly. These are firms which have established themselves through their good reputation, practices and systems. However, it does highlight the fact that a new entrant in this area without any background or history may be at a disadvantage as compared to a new entrant in a conventional industry. Some firms have been able to access international funding sources such as UN agencies and Exim Bank of China due to their contacts and their credibility built up over the years.

The respondents mentioned that getting such funding and at such low interest rates from Indian banks would have been very difficult. Some of these firms have taken the initiative and tried forming small pressure groups to present their case to the government to give them a formal industry status and create a level playing ground for firms engaged in solid waste management. One respondent said:

‘But yes, you know, we are in the process of forming out an association and pitching it out to the government in a much larger way saying that we’re actually doing something good across over here.’

Other firms have gone still further and have started funding their downstream activities, such as those of the micro entrepreneurs who help them collect waste. If these micro entrepreneurs had tried on their own, it might have been extremely difficult due to their size and also their preoccupation with their own activities. Medium to large firms in this area could combine
their funding requirement and try to raise more funds which could lead to more competitive lending rates. These firms have embraced new technology and made their own systems and cost structure more efficient. They have also introduced technology into the working of the semi-organized and unorganized operations downstream to make it a win-win situation for both.

**POLICY SUGGESTIONS**

**Recognition and regulation of SWM industry**

One important suggestion was to create a specific nomenclature in the industrial classification for the SWM industry. Currently, these firms are classified as machine manufacturing, consultancies and similar generic categories. This makes it difficult for policies to be formulated for all firms falling in this category. Hence, policy making should first start with deciding the separate sub-classification of the SWM industry. One respondent highlighted this problem:

‘I've gone to Industries Commissionerate they don't understand what we are doing.... there is no category for it.’

Most respondents supported the decentralized system of waste management. One respondent was of the view that this industry should not run on the regular business model of giving waste management contracts to firms which quoted the lowest price since safety and security of the environment could be jeopardized. His perception was that if left to run on the lowest-price model, some firms could possibly cut corners which might not be the best option in the long run. He suggested having a regulatory body to oversee the functioning of this industry, which would be independent of government as well as industry influences. The closest example is of the Comptroller and Auditor General (CAG), which audits government
activities and revenue and expenses, reports directly to the President and is free of any undesirable interference or bias. Another example could be the Lokayukta body at the state level. This model can not only weed out inefficient and dishonest firms in the industry but would provide a level playing field to the remaining firms. The National Green Tribunal (NGT) drew praise from some respondents for the unbiased and independent work being done in the area of environment management and protection. One of the respondents mentioned:

‘They have formed something known as National Green Tribunal which clears these matters very quickly rather than waiting for a long period of time.’

Due to the vast scope of environmental activities before it, the focus of the NGT has the potential of being diverted. A body which is dedicated to SWM could be formed on the same lines and with a more effective outcome.

A majority of the respondents were of the view that there should be a healthy competitive environment in the area of SWM to generate better results. For this, proper working environment and infrastructure needs to be created by the government and once that is in place, firms could be invited to take part in the SWM activities. For example, minimum waste processing costs could be fixed by the government and bidding firms could be prohibited to breach that floor while bidding for contracts. This discourages firms from employing cost cutting activities which can defeat the purpose of allocating the project to the firm. Similarly, if the transportation and processing facilities are to be provided by the government, the same should be identified and be available for use before starting the process of allocating projects.
Negative taxation and product costs as a tool for promoting SWM

There were suggestions from some respondents to remove or reduce certain taxes on products such as petroleum products, bio-gas, fertilizers, etc. which emerge from the SWM system. One respondent said:

‘The central excise and taxes should be waived off on plant and machinery. We have ended up paying Rs. 1.2 crores in excise duty and taxes on the plant.’

These exemptions would help reduce the cost of the output as compared to similar products derived from normal production processes. The reduced cost could encourage more participants to convert the solid waste into consumable products. It will help them to come up with value added products. Similarly, duties on machinery required to run the SWM systems could also be reduced or removed to reduce the capital cost of such firms. Subsidies could be for either capital or operating purposes or even both in some cases. The highly capital-intensive sub-sector of the industry was keen on capital subsidies, whereas the labour intensive section expecting operating subsidies. One respondent spoke about sourcing his raw material from the unorganized sector which helped in improving the life of the suppliers involved. These individuals were not registered with the local tax department due to the small amount of activity and that created a problem for the respondent. The suggestion was to exempt such small suppliers from bureaucratic procedures.

The current tax laws provide some benefits to SWM firms through tax exemption of profits from organic waste management business, cent percent depreciation for plant and machinery for this business and so on. However, these benefits help only at a certain level of activity and profits. For example, the profit exemption clause can only help those firms making profits. The firms could be provided more tangible benefits such as reduced duties on
imported machines and technology and local indirect tax benefits. These would help bring the cost of production down and make the product more competitive in the market when compared to similar products made from polluting processes. In the aforementioned case of waste suppliers not having the required registrations, rules could be modified to allow them to sell the raw material to the SWM firm without having tax registration.

The above discussion encompasses the broad principle of negative taxation that could be followed by the government while deciding the form of benefits to be passed on to the firms in this industry. Douglas (2002) and Ligthart (1998) also stated that incentives such as subsidy schemes and specific deductions for conservation activities could prove highly effective in reducing pollution.

**Carrot and stick approach to policymaking**

One of the main forces behind the creation of demand for EGS is environmental regulation. Each policy instrument has the capacity to determine the size and number of firms in the industry. Environmental regulation also aims at ensuring that firms and households internalize the environmental and social impacts of their decisions. To attain this objective, the best regulatory instruments need to be selected in the optimal mix. These instruments are broadly classified into two categories: the command-and-control or prescriptive instruments, and economic incentives or market-based ones.

The most widely practiced broad policy principle is the use of incentives together with penalties, also known as the ‘carrot and stick policy’. People who segregate or manage their own waste should be rewarded in through tax deductions or other benefits. Those who mix waste or pollute indiscriminately should be penalized severely to deter its reoccurrence and also reinforce positive behaviour. For example, Pune Municipal Corporation gives a rebate
on property tax for any complex that handles its own waste in situ. Buildings which are rated by the Indian Green Building Council (IGBC) are given benefits including tax rebates, additional Floor-Area ratio (FAR) and reimbursement of capital costs in some places like West Bengal, Chandigarh, and National Capital Region (NCR).

The ‘stick’ part of the policy entails that anyone not following environmental norms would not only stand to lose the aforementioned benefits but would also be penalized as per the current norms.

**Need for long-term vision in policy making**

The need for regulation is to be balanced with the avoidance of short sighted or unscientific policies that may not have the desired effect on public hygiene and cleanliness in the long run. For example, one of the respondents spoke about a recent policy in Mumbai:

> ‘Recently, there was a stupid policy in Mumbai which says one lakh square feet should have in situ product. How is one lakh square feet connected to waste? It should not be. Kilograms of waste, not square feet.’

The objection was that a smaller area could also hypothetically generate a larger amount of waste depending on the nature of usage of the space. Hence, the appropriate metric for deciding enforcement of the waste management rule should have been the amount of waste generated in kilograms instead of area. In the short run, certain environmental regulations can negatively affect employment and productivity in the EGS industry, in addition to not bringing about the desired environmental change as supported by Jaffe et al. (1995).

Similarly, an earlier rule in respect of bio-medical waste laid down that whichever clinic treats 1000 patients a year was mandatorily be required to have waste management
arrangements in place. Since many clinics did not keep records, it was difficult to enforce this policy. Further, this has been amended as being applicable to those who generate any amount of bio-medical waste irrespective of the number of patients and area. One of the respondents also mentioned about the way waste was supposed to be disposed of:

‘This hospital waste, whatever they generate as bio medical waste, they segregate and give it to us. The categories they are broadly divided into eight to ten categories. That category wise they collect the waste in a colour coded bag and they hand it over to us. For treatment we have an incineration, auto-clean and shredding process. Whatever is disposable goes to the auto-clean. After the disinfection, it will be shredded into the powder and it will be sent to the reuse of non-medical purpose.’

Another firm’s director was critical of the way new waste management techniques were funded without proper evaluation and scientific backing. There is research being done in the area of treating plastic waste and using it in road construction as a substitute for bitumen to some extent. However, this process also has technical issues such as difficulty in estimation of how much plastic waste has been used in the construction and what was the long-term impact on the quality of the road. Before committing to such policies, further research and pilot projects could help identify the optimal areas for investment of public funds. One respondent highlighted an interesting feature of policy, which was creating more problems that solving them:

‘Making the plastic bag of a higher micron with plastics becomes easy to recycle. But once you are making the bag thicker by adding calcium carbonate and other exterior materials, recycling becomes difficult.’

This suggests that policy interventions with the best of intentions can sometimes prove to be detrimental to the environment due to unseen factors. It makes sense to have policies keeping
in mind not only the production and usage stages but also the disposal and recycling stages so as to ensure that the waste cycle is not affected.

**Success of policy adoption depends on the culturally accepted SWM practices in Indian context**

A developing economy faces increased pressures of urbanization and industrialization. Hence, in comparison to a developed economy, it may choose to invest more in environmental infrastructure development in the form of solid waste and wastewater management. While there are examples of successful SWM policies in other countries, one respondent cautioned about adapting these techniques to the Indian context without considering the local culture. Success stories from abroad could be viewed from the context of the Indian cultural environment before their adaptation in India. For a wealthy and energy self-sufficient country, incineration of waste with lesser energy recovery could be considered as an acceptable model. One respondent articulated:

‘So disposal also, yes, plays a very important role and which is where we need to have effective disposal mechanisms wherein we are able to extract maximum value out from it rather than just burning it and using it for electricity.’

This incineration model does away with the need for segregation at source and the mixed waste could be processed as it is. However, its benefits are constantly debated due to the release of toxic gases during the process. It is also high in capital cost and maintenance cost and needs proper segregation to ensure a low moisture stream of waste into the process as supported by Kaushal et al., (2012). However, in a developing country such as India, segregation is necessary since it helps unlock value of the different fractions of waste and helps extract maximum energy out of each segregated fraction. There exists an old and well accepted practice of segregating waste in households in India. For example, most households
keep old newspapers, plastic milk bags and metal waste aside for selling to local recyclers, who come to their doorstep to buy this waste. This culture could be reinforced and segregation of other waste fractions could be added to the daily practice. Emphasis should be given on the need for segregating the wet and kitchen waste also in order to enable composting and production of biogas, which would give these households another small stream of revenue in addition to the existing revenue from paper, plastic and metal waste.

Also, simple incineration releases some amount of toxic gases into the environment in addition to using fuel for the process. In a country like India where there is a lot of sensitivity towards the waste management process which creates negative externalities, any creation of odour or gaseous emissions due to incinerations could lead to unrest among the affected people.

Due to the multifaceted nature of SWM, waste management projects cannot be undertaken by focusing on technology alone. An effective system combines technology with environmental, socio-cultural, legal, institutional and economic linkages to enable the overall system to function, which is also supported by Guerrero et al. (2012).

In some countries, the awareness among the citizens is so high that it would be difficult to litter on the streets without someone objecting to the same. In India, petty littering is more acceptable and any rule penalizing it would face stiff public opposition. However, rules relating to non-segregation of waste at source could be deemed as more acceptable and possible to enforce.
Success of Effective Policy Support Depends on the Contextualization of the Action for Environmental Change

Effective and strong enforcement of regulations is necessary since that is where ‘the rubber hits the road’. For this, better understanding of the relationship between the enforcement agency and the EGS firm is imperative. Proper regulations backed by a viable incentive policy need to be followed up with strict implementation. Most respondents mentioned that at present, there are certain beneficial policies available in the statutes, but the same are not being followed up or executed effectively. There is a number of reasons for the poor execution of these policies viz. lack of focus, non-prioritization, corrupt practices, etc. One of the respondents stated:

'Maharashtra Pollution Control Board-so pollution control boards are, they are already there but there's nobody who is coming and checking things.'

For environmental policies and innovation to be effective, it would need to have the backing of the EGS industry, the public as well as the policymakers. When these factors come together, it may have a potentially threatening effect to many established traditional industries in their present forms, who would also strongly oppose these policies. Hence, as Ekins (2010) mentioned, strong policy support is an integral part of environmental change.

Effective environmental regulation is long-term in nature and tries to use phase-in periods to encourage innovation of useful technologies. There needs to be avoidance of hasty and knee-jerk solutions. Also, the regulations need to convey a sense of stability and predictability by ensuring that they would be in place for a longer period.

The major reason why rules are not being implemented efficiently appears to be the lack of focus from both the government as well as the citizens. A large number of people may not
even be aware of the existence or contents of the Solid Waste Management Rules currently in place. This allows the local bodies to be lax about the implementation since there is little pressure from the citizens and the regulatory bodies are equally detached from the seriousness of the rules. This situation leads to increase of corrupt practices, misuse of funds and worsening of the waste management scenario. This could be rectified to some degree if there is a political will and action from the top levels to improve the situation. Hence, the two-pronged approach to ensure proper implementation of rules is to increase awareness about waste management among the people and also by adoption of a more proactive stand by the government bodies such as concerned ministries and pollution control boards. One respondent related an example of the positive will regarding implementation of waste management rules by the government:

'The central pollution control board, a few years back, in 2005, you know, we had these diesel generators which were there in place and you know ten years back if you recollect, a diesel generator installation. But today, that is not the case, because the government came out with rulings and they also meant to enforce that saying that there are certain norms, certain sound norms that you have to achieve.'

This demonstrates that if the government has the intent, it can resist pressure from powerful lobbies to bring in the required environmental transformation.

These examples help understand that while implementation is extremely important to allow good policies to reach their logical conclusion, it may not always happen so. Apathy and lack of awareness on the part of the citizens and lower prioritization on the part of local bodies lead to good legislations being good only on paper and never reaching the intended goals. However, the two illustrations above also prove that where the government has firm intent
and good legislature in hand, it can implement any good move without being pressurized by any lobbies with vested interests.

**Decentralized WMS Preferable**

Decentralized waste management systems are those wherein the waste is processed at the level of the waste generator or at an aggregate level marginally higher than the generator. For example, a residential complex or office complex could install waste management systems to take care of the waste generated by their members. It could even be at a higher level such as at the locality or municipal ward level. The current process of encouraging the public to segregate solid waste at source and dispose it directly through the informal network needs to be encouraged for efficient SWM in India.

When the entire waste is managed by the municipal corporation or any other local government body such as the panchayat or the village council level, it is said to be a centralized waste management system. Currently the default management system is the centralized one, whereby most of the local bodies allocate a major portion of their annual budgets for this purpose. The most common ways of handling waste by local bodies is through landfills followed by open incineration.

Decentralization has been suggested the way forward by most respondents since that would not only take the burden off the municipal corporations, which is widely seen as inefficient in handling this work, but it would also lead to consumer awareness and unlocking of value inherently possessed by waste. One of the respondents mentioned in this context:

‘*We came across a decentralized concept and today looking at the kind of waste that we are generating all across, it was not possible for us to keep sending our waste to central locations and expect process treatments and everything to happen out over there.*’
One more advantage of reducing the intervention of local bodies in waste management is the reallocation of public land and funds from waste management activities to important focus areas such as healthcare, education and recreational facilities. Local bodies are aware of this situation and some are trying to encourage decentralization by way of different schemes and incentives. The Solid Waste Management Rules 2016 incorporates the principle of decentralization and have included penalties for certain large waste generators for not handling their own waste in situ. Various local bodies provide property tax rebates for installing these facilities within the premises of the waste generator. The objective of such moves by local bodies is to encourage waste generators to handle as much waste as they can. Only the remaining portion needs to be taken care of by the local bodies. This reduces the burden on local bodies to a great extent and also helps spread awareness among the people through the economic benefits of waste management.

Decentralized waste management systems provide an opportunity to SWM firms to prove themselves and build up their reputation by doing good work. For example, some firms provide end-to-end solutions including waste audits, supply of processing units, maintenance, and collection of end product from the system. Waste generators could engage the services of such firms to take care of their waste and in return could be compensated by the government in the form of higher Floor Area Ratio (FAR) or rebates in property tax. This would be in addition to contributing their efforts in cleaning the environment and providing indirect employment opportunities in the process. The decentralized approach can help reduce pollution caused by trucks and other transport vehicles, which are used to transport waste from local collection centres to landfills or processing areas.
There is a counterview that decentralization could create chaos and confusion in the waste management scenario and could lead to inefficiency in the system. A decentralized approach requires more space in total as compared to a centralized processing unit and each decentralized unit could have different processes and efficiencies.

A centralized approach involves one firm engaged in processing the entire waste collected by the municipal corporation at a single place. The collection could either be done by the corporation or could be outsourced to private parties. In a centralized process, the advantage is that since the processor and collector are the same or at least connected and are interested in processing the waste to maximize energy recovery. They would ensure that the waste is segregated at source. They would also ensure that the segregated waste is not mixed and is transported to the processing facility without contamination and in the most efficient manner. If the waste processing unit is not capable of handling any particular fraction of the waste, the firm has the option of selling it to recyclers and generating additional revenue. For the government bodies, it becomes easier to deal with a single entity as opposed to multiple smaller entities and it also makes it attractive to purchase the energy or power generated as a result of the processing.

Separate Policies for Bulk Waste Generators Required for Efficient SWM

A large portion of the solid waste is generated by a small number of waste generators such as manufacturing industries, hotels and restaurants, and office complexes. Having a separate policy for these bulk waste generators could take care of a large quantity of the total waste generated and reduce the workload of local bodies. As part of policy initiatives, corporates and offices could be asked to prepare a solid waste disposal policy before setting up operations and should be held accountable for the same. Such provisions could lead to a
substantial reduction of the amount of solid waste flowing into the municipal corporation processing units. In addition, it is also beneficial to the waste generator since it entails only the initial capital outlay and a small operating cost that provides them output in the form of biogas or compost, both of which can be used in their own premises.

Another policy initiative suggested was if one had to use a polluting raw material, the components of that material could be regulated such that only recyclable material would be used. When this product becomes part of the waste cycle, there would be a ready market in the form of recyclers, thus reducing the role of municipal corporations. Essentially, the existing recycling market becomes the base for deciding the input material for the products being currently produced. The recycling industry also needs to be regulated so that recycling firms do not create pollution as a byproduct of their activity. For example, currently they segregate and use the fractions of waste that they require and throw away the remaining waste, which is not useful to them. Washing and cleaning the waste plastic before recycling can create water pollution if this waste water is not treated before discharging. Hence, there is a need for the recycling industry as well as to be included under the SWM or EGS industry classification and brought under the ambit of regulation.

**Proximity of Processing Units to Source of Raw Material brings Efficiency in SWM**

Setting up a SWM plant comes with its own unique set of problems: one being the availability of land with clear titles and reasonable cost, another being the objections from people surrounding the area due to the fear of constant and unbearable odour and toxic gases. To address these genuine concerns, one respondent had a suggestion that the industries be located on the landfill site itself:
'Government grant could be in the form of equipment- that could be a 50-50 kind of a thing. The grant should be given by the government for the company to set up facility at the landfill site. So the government tends to benefit out of that facility because the landfill site is not overburdened by dumping of garbage.’

The above suggestion implies that there would be no need for additional land for the SWM firms and the municipal corporation could also get additional revenue in the form of lease payments from the business for using part of the landfill site. Further, there would be no objections since the processing unit is on the landfill site, which is mostly situated away from residential areas and general population.

Regulations, in order to be effective, need to focus more on the process. Collection of solid waste and its transportation from collection centres to centralized processing units could be a major factor giving rise to transportation costs, logistical hurdles, bureaucratic challenges, and so on. This is another reason for waste management units to be allowed to set up their processing plants on the municipal landfill sites. This would ensure a smooth supply of the raw material and also reduce pollution caused by transporting vehicles. One respondent made a suggestion that with the government notifying Special Economic Zones (SEZs) and Export Processing Zones (EPZs), the landfill sites and the surrounding areas could be notified as Waste Processing Zones wherein there would be only firms processing and recycling different fractions of waste and the output could be partly purchased by the government.

Since most categories of waste processors are in the same complex, it unlocks synergies by collecting waste in bulk, segregating it and distributing it to different processors in the same complex. This would also ensure that there is little pollution moving towards the residential areas which would be situated at a distance from these special zones. It could also help regulate and monitor the activities of firms in the notified zone and ensure that the waste is
being processed efficiently and effectively. In addition, it would reduce the government’s burden of providing land for land filling activities and help divert funds towards activities such as healthcare, education and social development. Porter and Van der Linde (1995) also suggested that instead of prescribing the path to be taken for SWM, regulations could have the effect of using best what is available.

**Effect of Increased Awareness on Local Authorities**

A large number of the respondents highlighted the need for regulating the waste generators’ behaviour as the key factor for ensuring their own business. This would be in addition to creation of more awareness about the effects of pollution, which could consequently lead to more hygiene and cleanliness. One of the respondents argued:

> ‘They have to have an in situ STP. They have to have an in situ waste converter machine. They should have their own rain water harvesting.’

In this context, Porter and Van der Linde (1995) suggested that well designed regulations can lead to heightened awareness about the extent of pollution and its harmfulness and can also point out potential resource inefficiencies and scope for technological innovations. In India, waste management has largely been perceived as the responsibility of the local government bodies with minimal effort expected from the waste generators. This attitude has led to apathy among the waste generators and also ignorance about the requirements and processes of waste management (Asnani, 2008). As a result, government bodies have struggled to deal with the huge amount of waste being generated and poor practices in SWM have developed over the years. The need for awareness stems from the 3R concept whereby the waste generators need to recycle waste, reuse certain fractions and also reduce waste generation. Even the waste which is generated can re-enter the economic cycle by virtue of the unlocking
of economic value of that waste. It can help improve the economic condition of the waste generator by fetching some financial value by considering the waste as a regular product with some economic utility.

At the bulk waste generators’ level, awareness can be created by allowing or encouraging them to use their CSR funds to manage solid waste. For example, a manufacturing concern could divert some of its CSR funds to a solid waste processing unit that manages not only the waste generated by the manufacturing unit but also the waste of the surrounding areas, thus reducing the burden on the local body, creating some employment and also creating environmental positive externalities as part of its social contribution. This move of diverting CSR funds would provide finances to the firms without any direct intervention from the government, which is also not burdened with the duty of directly financing the industry.

As part of the carrot and stick policy, it could be made mandatory for new offices and business establishments to provide in situ waste management facilities. This would not only help improve the environment but also create more awareness since the office or shop owners would get a monetary benefit from the process and lead to a reduction in the rent or maintenance costs.

A move to create more awareness as suggested by one respondent was to include the duty of segregation in the list of basic duties as laid out in the Constitution of India. The essence of this suggestion was that this would enable stricter legal enforcement. It would help inculcate the habit of segregating waste into organic and inorganic fractions. The justification for such a drastic move was the possibility of strategic benefits such as reduction in the import of crude oil (mainly due to the conversion of plastic waste into fuel) and moving towards self-sufficiency in electricity and power sectors. The role of judiciary in helping this cause was
mentioned by one of the respondents wherein further construction around the dumping ground was linked to maintenance of these areas. This is in line with the Pigovian approach to environmental planning where the regulator needs to create an intervention through a cost to rectify the market failure. The Coasian approach of the market rectifying the failure on its own may become an important factor once this industry gains prominence.

**Environmental Policy and Capital Generation**

Capital adequacy and funding has been a common requirement stated by most respondents and one of the possible solutions also outlined by them is the use of Corporate Social Responsibility (CSR) spending by corporates in the area of SWM. This would enable more BOOT operations and also encourage small businesses to expand and reap the benefits of scaling operations. This could be followed up with assurances by the government to SWM firms to purchase the surplus output of the waste management processes such as electricity, gas, compost and so on. Provision of land by government at reduced rates for the purpose of setting up of facilities could reduce the direct need for funds for the SWM firms. One respondent suggested that MNCs that create waste should support projects that help manage the waste.

While the municipal corporations are not known to be highly efficient in their waste management activities, there is an acknowledgment of the fact that they have a large amount of infrastructure at their disposal in the form of vehicles, machinery, etc. One respondent proposed that in order to overcome the problem of capital to buy assets for SWM firms, the corporations could explore the option of allowing these firms to take over the existing machinery at the book values, which can lead to improvement of utilization of assets. This would not only lead to reduction of need of capital by the SWM firms but could also improve
the finances of the corporation. The assets would also be maintained due to their utilization, instead of being left idle. These points are supported by Dervojeda et al. (2013) who said that for developing the market for EGS firms, reducing barriers to technology transfer along with the development of capital markets for these industries are requisites.

An important factor coming from the suggestions from respondents is that funding for firms in SWM need not come only in the form of soft loans or direct grants and subsidies from the government. In fact, these methods of financing could encourage misutilization of funds and also attract firms with doubtful intentions. Instead, providing land at reduced rent for firms actually doing their work, sharing of assets solely for the purpose of waste management, encouraging corporates invest their CSR funds in such firms, etc. could be more encouraging for firms who are committed to their work and are deserving of such funds.