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# Waste-to-Energy or Waste-of-Energy?

Social and Economic Impact Assessment of  
Waste-to-Energy Projects on Wastepickers near  
Ghazipur and Okhla Landfills in Delhi

A study by:



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Executive Summary	2
Chapter 1: Background	3
Chapter 2: Research and Methodology	7
Chapter 3: A Description of the Research Sites	8
Chapter 4: Findings and Analysis	12
Chapter 5: What Next?	17
References	20
Appendix I: Waste Recycling as a Sustainable Livelihood	23
Appendix II: Methodology, Questionnaires and Interview Outlines	26
Acknowledgements	28

## Executive Summary

Most research on waste-to-energy projects has assessed their environmental risks and potential adverse health impacts, but the social and economic impacts that these projects could have on communities have not been thoroughly assessed. This assessment examines the impact of the Timarpur-Okhla waste-to-energy project and a proposed waste-to-energy plant in Ghazipur, on three communities near Okhla and Ghazipur landfills in which many wastepickers reside. These communities have been chosen because waste that currently goes to the Okhla and Ghazipur landfills will be diverted to the Timarpur-Okhla waste-to-energy plant as early as July 2011 and therefore their access to waste will be reduced. This research uses the sustainable livelihoods paradigm to assess the social and economic impacts of this diversion of waste on three communities near the Ghazipur and Okhla landfills, and employs qualitative and quantitative methods in order to gain a comprehensive understanding of the political economy of these communities.

This research shows that almost all families in these communities establish complex livelihood strategies which are at least partially dependent on the informal recycling sector. Additionally, the findings confirm that Delhi's labor market is supply-driven, so laborers cannot simply change occupations in accordance with fluctuating demand. Wastepickers will attempt to offset a reduction in earnings caused by the diversion of waste by spending longer hours wastepicking, and by trying to collect waste from nearby communities. Importantly, this indicates that wastepickers will try and adapt to the reduction of waste by seeking access to waste in other ways such as increasing their mobility and collecting it from nearby colonies before it enters the formal value chain. Most wastepickers will not change occupations. Families will be forced to increase the number of people engaged in productive labor, and this will mean that children will reduce their time invested in education, or might even drop out of school in order to pick waste.

This report concludes by recommending policies that could ameliorate the stress on these communities, and thereby mitigate the impacts of waste-to-energy plants.

# Chapter 1: Background

While small and medium-sized cities have grown slowly or even registered declining populations in the past decade (Kundu 2011), megacities have grown rapidly. Delhi's growth in terms of area and population has been staggering; while the 2001 census reported Delhi's population to be 12.8 million inhabitants, its current population (including satellite cities such as Noida, Gurgaon, Ghaziabad and Faridabad) could be as high as 24 million (Dupont 2011). Solid waste management is increasingly becoming a major concern of policy makers, who are confronted with several dilemmas. These are: how to process increasing amounts of waste? As space is increasingly scarce and little space is available for landfills, how can the volume of waste be reduced? How can the government respond to public claims that it has had a poor record of waste collection and disposal (demonstrated by two Public Interest Litigations filed in the 1990s)? Furthermore, authorities, particularly in Delhi, associate efficient modern solid waste management (SWM) with becoming a 'world-class' city.

Three factors have played an important role in shaping these responses in the last decade.

## 1. The Municipal Solid Waste (Management and Handling) Rules, 2000.

These rules have laid down technical standards, identified institutional responsibilities and identified broad policy guidelines for solid waste. They have therefore enabled municipalities to benchmark their work, as well as turn to private operators to help fulfill these legal obligations.

## 2. The changing nature of privatization of SWM.

While private players have always played a role in municipal solid waste handling, most of these have been small, sometimes even informal (such as waste collectors or wastepickers, who have segregated and recycled waste). In the last 5-7 years, there has been a shift towards partnering with large corporate entities for solid waste handling, from doorstep collection to disposal technologies. This shift in managing waste has failed to take existing actors into account, such as wastepickers, waste handlers and other local players. Consequently, many of them have experienced a reduction in their livelihoods. This trend can be seen in many Indian cities, such as Delhi, Patna, Nagpur and Ahmadabad.

The case of Delhi demonstrates the impact of privatization on wastepickers. Prior to the wave of privatization in the waste sector in 2004, Delhi's waste was brought to neighborhood depots, called dhalaos, by local actors. Although its collection and disposal was legally the responsibility of municipal authorities, in practice approximately 100,000 waste recyclers collected Delhi's waste (approximately 7,500 tons per day), sorted it into various categories, and then sold it to recyclers (Chaturvedi and Gidwani 2010). Some of them were wastepickers, who were able to become entrepreneurs and move up the value chain and become traders who bought and sold waste in bulk. Not only did this informal system provide a livelihood to a significant segment of the urban poor, but it also incentivized recycling since wastepickers only earned money for waste

that they could sell to recyclers. Thus, Delhi's wastepickers were in fact the first link in the value chain of the recycling sector, and by one estimate their efforts offset the emission of 962,133 tons of greenhouse gases annually (Chintan 2009), which is about 3.6 times more than that saved by any waste project accruing carbon credits in India.

Wastepickers in Delhi experienced widespread displacement and loss of livelihoods as a result of the privatization of the waste management sector (Chaturvedi and Gidwani 2010). In the neighborhoods in Delhi where private firms were granted concessions to collect waste the informal sector was criminalized. Facing a complete loss of livelihood many wastepickers began collecting waste in parts of the city where waste management was not yet privatized, but this resulted in conflict among wastepickers over space and a loss of net earnings for the entire sector (ibid.). Wastepickers have been forced to adapt by increasing their mobility and trying to collect waste before it arrives at the dhalaos, which have come under control of waste management firms. This has closed an important avenue of social mobility since it is now much more difficult to move up the value chain and become dealers of waste. While the entire informal sector was negatively impacted, some populations were affected disproportionately - women, for example, were less likely to become formal employees of waste management firms than men as new kinds of work did not allow them the flexibility they required for child-rearing etc. Finally, in addition to these negative social impacts, the privatization of waste has had an environmental cost. Whereas the informal sector segregated 50-60% of waste which was later recycled, firms which are awarded concessions from the state are only required to recycle 20% of waste by the final year of their concession (Chaturvedi and Gidwani 2011).

## 3. The creation of incentives for capital-intensive SWM infrastructure through large-scale subsidies has resulted in a rejection of inclusive systems.

The shift to capital-intensive waste management is - in its current form - incompatible with labor-intensive methods historically employed in the informal sector and has resulted in a socio-technical regime that endangers the livelihoods of the urban poor (Chaturvedi and Gidwani 2010).

Moreover, waste-to-energy plants may come with an environmental cost. There is considerable controversy over the environmental impacts of incinerators and other thermal technologies, including waste-to-energy plants (see: Lorber et. al 1998; Miranda and Hale 1997; Psomopoulos et. al 2008; Stehlik 2009). Local grassroots organizations and NGOs from around the world who oppose to waste-to-energy plants have formed a global network called the Global Alliance for Incinerator Alternatives, which has amassed an enormous amount of data on the harmful environmental and health consequences of waste-to-energy plants ([www.no-burn.org](http://www.no-burn.org)). However, since waste-to-energy plants generate electricity by thermal treatment of waste, municipal authorities view this technology as a solution to the growing demand for energy as well as an effective solid waste management strategy.

Waste-to-energy is at the downstream end of the commodity chain, where solid waste is disposed. It requires dry waste with a high calorific value, such as paper, cartons, plastics and multi-layered packaging. However, many of these kinds of waste are also picked out by wastepickers and are

ultimately reprocessed. The wastepickers collect such waste at various places such as households, dhalaos and landfills. Waste will be diverted from landfills and sent directly to the waste-to-energy plants. Therefore, by incorporating waste-to-energy projects into Delhi's SWM strategy, wastepickers' access to waste will be jeopardized.

The Municipal Corporation of Delhi (MCD) issued tenders for two waste-to-energy plants in 2009. One of the plants was cancelled before construction began, but the tender for a plant at Timarpur-Okhla was awarded to Jindal Urban Infrastructure Ltd. Additionally, plans have recently been announced to build a waste-to-energy plant near the Ghazipur landfill that will supply energy to the Indira Gandhi International Airport. The Timarpur-Okhla plant is designed to process 2,000 tons of waste per day, and the Ghazipur plant is slated to process 1,300 tons of waste per day (Mahapatra 2011). Thus, a combined total of 3,300 tons of waste which is currently processed by wastepickers will be diverted.

The Timarpur-Okhla plant has engendered fierce resistance from nearby residents (Dasgupta 2011). Their key argument is that having already been victimized by a medical waste incineration plant that was built in the vicinity, they cannot accept the waste-to-energy plant in their neighborhood, as it will further compromise their health, quality of life and the immediate environment. Residents in nearby colonies have challenged the legality of the plant on the grounds that it was approved without adequate public discussion and that it violates a Supreme Court order restricting waste-to-energy plants to pilot projects. So far their efforts have been unsuccessful. According to the Union Environment Minister Jairam Ramesh, Okhla may not be a suitable location for the plant, and Delhi's Chief Minister Sheila Dixit has met with residents to discuss the project but she reiterated the MCD's claim that the plant will not have a negative environmental impact. While it is possible that residents could exert enough political pressure to force the authorities to cancel the project, it is likely that the plant will begin operating in July 2011.

Map of Delhi's landfills



As this report was going to print a proposal to enlarge the plant by 25-33% was made. A public consultation must be held before these plans are approved. Therefore, the exact amount of waste that this plant will burn is unknown.

Table 1: Snapshot of Delhi's landfills

S. No.	Name of Site	Location	Area (Ha)	Year Started	Waste received (TPD)	Zones supplying waste
1	Bhalsawa	North Delhi	21.06	1993	2200	Civil Lines, Karol Bagh, Rohini, Narela, Najafgarh and West
2	Ghazipur	East Delhi	29.16	1984	2000	Shahdara (South and north), City Sadar, Paharganj and NDMC
3	Okhla	South Delhi	16.20	1994	1200	Central, Najafgarh, South and Cantonment Board

From Delhi's CDP for JNNURM

## Chapter 2: Research and Methodology

In the event that the Timarpur-Okhla plant becomes operational in July 2011 and another waste-to-energy plant is built in Ghazipur in the medium-term, waste will be diverted from the Okhla and Ghazipur landfills. In order to assess how this would impact the poor who live in the surrounding areas, this research asks the following questions:

1. What role does wastepicking play in the livelihood strategies of the poor who live near the landfills from which waste will be diverted?
2. How would diverting waste from the landfills to the waste-to-energy plants affect the livelihoods of these communities, and in what ways, if any, could residents adapt?
3. What concrete steps have been taken to incorporate wastepickers in the waste-to-energy plants?
4. What role do children play in families' livelihood strategies, and how would the waste-to-energy plants affect the division of labor within families?

This research takes a rights-based approach to the sustainable livelihoods paradigm to answer the aforementioned questions. In order to combine a broad understanding of the overall political economy of the communities near the Ghazipur and Okhla landfills with an in-depth understanding of the significance of wastepicking in residents' livelihood strategies, an extensive survey was conducted as well as in-depth interviews with members of these communities. Approximately 10-15% of households were selected for in-depth interviews. Finally, a key informant in the public sector was interviewed. The details of the Methodology are described in Appendix II.

For an explanation of the 'sustainable livelihoods' paradigm see Appendix I. For a lengthy explanation of methodology as well as the survey and in-depth interview outline see Appendix II.

## Chapter 3: A Description of the Research Sites

As noted in Appendix II, this research employed mixed-methods in order to gain:

- A broad understanding of the demographics and political economy of each community, which is represented in Table 2. This data was gathered by conducting an extensive survey in each community.
- An in-depth understanding of residents' livelihoods and their dependence on the informal waste recycling sector at the scale of the family, which is represented in Table 3. This data was gathered by conducting in-depth interviews in each community.

Table 2: The three communities at a glance

	Ghazipur	Tughlaqabad	Okhla
Number of households*	234	45	56
Number of residents	1185	192	246
People working in waste	421	70	109
Number of children	690	88	50
Children who work in waste	179	10	22
Children who attend school	221	41	22

\* The number of households refers to the number we surveyed. Since we define a household as a cooking area, it was impossible to determine exactly how many we were unable to survey, but in Ghazipur approximately 10-15 households were not included, in Okhla less than 5 households were included and in Tughlaqabad roughly 10 households were not included.

Table 3: Degree of Dependence on Waste

	Ghazipur	Tughlaqabad	Okhla
Families whose only activity is wastepicking	6	6	8
One or more family members work in waste, but at least one person works in another sector	4	4	3
Families that supplement their income by working in the informal waste sector	1		1
Families that do not work in the waste sector but are indirectly dependent because their customer base is almost exclusively wastepickers	5		
Families that do not work in the waste sector and their livelihoods are not at all dependent on it	4	2	

## What does this research reveal about each community?

### Ghazipur

The community of Ghazipur is almost entirely dependent on the informal waste sector. More than a third of the residents work in the waste sector. Twenty-six percent of children work in the waste sector, while 32% attend school. Some children attend school during the day and collect or sort waste in the evening. Only 47 households do not have anyone working in the waste sector. However, many of these non-wastepickers own businesses that serve the needs of residents on a daily basis (i.e. tailor, barber, shop keeper, dhaba, pharmacist, etc.). Many of these entrepreneurs are former wastepickers, and only a very small number of individuals work outside of the community.

#### Box 1: Ghazipur families and their livelihood strategies

- Azzad and his wife are from West Bengal, but they moved to Delhi 8 years ago. They are in their late 20s and have two small children. The youngest is only 4 months old. They work as wastepickers and every day they go to the landfill at 4 am. They take their children along but they let them sleep on a spot on the landfill, and check on them periodically. They specialize in paper, and they have to earn an average of Rs. 150 per day, so they work until they have met this goal. A fire recently broke out in Ghazipur and their juggi was destroyed. They live with a neighbor while they save money to build a new home. Azzad cannot imagine doing anything other than pick waste, because it is the only occupation he has had in Delhi. If he cannot collect waste in the landfill he will try and collect waste in nearby colonies, but he is afraid this will be difficult because he will have to travel great distances.
- Mohammed has moved to Delhi with his wife and daughter from West Bengal ten years ago. Later they were joined by his in-laws. He got a job repairing sewing machines, and he had two daughters. His wife Majda suddenly became ill and died. Now his in-laws are too old to work, so he must support them and his three daughters. All three of the girls attend school, and Mohammed hopes they finish, but they are growing-up so they need to help support their grandparents. One of the girls does housework after school, while the other two leave for the landfill after they finish their homework. At 9 pm they return home with bags full of waste. If the amount of waste they can gather is reduced, they may have to work longer hours in the landfill or collecting waste in the surrounding communities, and this could mean that they would have to drop out of school.
- Suliman and his family moved from Kolkata to Delhi 12 years ago, and lived on the bank of the Yamuna River until they were evicted in 2006. They moved to Ghazipur and Suliman and his wife Seema started picking waste in the landfill. Suliman developed health problems and a doctor advised him against lifting heavy objects, so he began driving a cycle rickshaw in Anand Vihar. Sometimes he supplements the family income by hawking vegetables. They have two children and both are attending school. They want them to finish school, but if Seema's income is reduced they may have to enter the labor force.

### Tughlaqabad

The waste sector sustains this community's livelihood. Even the long-term residents who have managed to start small businesses are forced to supplement their income by occasionally picking or sorting waste. This community is near the Tughlaqabad fort, and this contributes to its dependence on the waste sector for two reasons. First, the community is isolated so residents do not have connections with local firms. Second, the businesses within the community are entirely dependent on the income generated by wastepickers because none of their customers are from outside the community.

#### Box 2: Tughlaqabad families and their livelihood strategies

- Jahangir and his wife have five children, and the entire family works in the waste processing sector. They are Bengali, but moved to Delhi from Assam ten years ago and have lived in Tughlaqabad ever since. Jahangir and his wife collect waste in the landfill and they sort it at home. A few years ago they expanded their business by renting a second juggi to store sorted waste. Two of their children attend school and the other three are very young. All of the children help sort waste in the evening. Jahangir has multiple identification documents from Assam, but he still cannot get a ration card in Delhi. Thus, this family is left to fend for itself and a reduction in waste could force the children leave school and enter the labor force. Jahangir said that if waste stopped coming to the landfill they would try to collect waste from colonies, but he is afraid that this would be difficult given the distance they would have to travel.
- Aseema and her husband moved to Tughlaqabad 5 years ago from Uttar Pradesh. They used to work in construction but their employer would not pay them on time, and sometimes he would not pay them at all. So they decided to open a dhaba and shop in their community. They made a comfortable livelihood during the first winter because everyone bought chai from them, but in the summer they were unable to support themselves. Some days they do not sell a single thing, so in order to supplement their income Aseema's husband collects waste in the landfill. Furthermore, they have a baby daughter now, so they have more expenses. Sometimes Aseema has to work in the landfill too. Her husband disapproves and feels guilty when she works in waste, but they have no choice.

### Okhla

The slum cluster closest to the Okhla landfill is in Tehkhand village. It is on railway land and borders a formal community. It enjoys a measure of recognition from the Government of Delhi, because a community map identifies it as a "hutment area," although its precise boundaries are unmarked. This community is relatively well-integrated into the local community. Many women work as domestic servants in nearby colonies, while many men engage in manual labor. Even many of the wastepickers have had a variety of work experience, as construction workers, painters, assembly line workers, etc., but they work in the waste sector by choice because they earn more than they would in the formal sector and they can work independently. Wastepickers with previous work experience in the formal economy were the least concerned with the prospect of a drastic reduction of waste.

## Box 3: Okhla families and their livelihood strategies

- Manu is 12-years-old, and he works full time as a wastepicker. One day he and his brother went to school and their names had been erased from the class roster. They started working in a factory but Manu did not like being inside all day, so he began going to the landfill to pick waste. Now he goes there daily, and he is able to earn up to Rs. 6000 per month. He wishes he could go back to school, because he does not like going to the landfill. In fact, he can remember living in West Bengal, before his family moved to Delhi when he was 4-years-old. He would like to move back there, but he worries that he will be unable to earn money there.
- Vaibhav grew up in West Bengal and began working as a construction worker as a child. When he got married, he and his wife Shweta moved to Delhi. They could not find a job in the formal economy so they began working as wastepickers. Neither of them liked working in the landfill, so after 8 years he started working as a cycle rickshaw driver. This work was also exhausting, so he saved money and after 4 years he was able to open a small shop. Shweta also left the waste sector and began working as a domestic worker in a nearby colony. They have three young sons and all of them work part-time as wastepickers. The children supplement the family's income, and now they earn a combined total of approximately Rs. 10,000 per month. Vaibhav has no idea what he would do if waste stops coming to the landfill, but most likely the children would have to look for waste in nearby colonies.

## Chapter 4: Findings and Analysis

This section is divided into three sections. The first section summarizes the main findings. The second section introduces three scenarios - reductions in waste of 10%, 33% and 50%, respectively - and the implications for the three communities are forecasted accordingly. The final section addresses each research question individually.

### 1. The Main Findings

- The livelihoods of the communities in Ghazipur and Tughlaqabad are entirely dependent on the waste management sector. Waste processing is the only income generating activity for many families, and it is the main source through which money enters these communities. Some residents who worked in the waste sector were able to save money over time and become entrepreneurs. Thus, many local businesses exist - especially in Ghazipur - which cater to the needs of residents, such as tailors, dry goods shops, pharmacies, barbers, dhabas, etc. Money percolates through the communities by way of these enterprises, but they could not exist if money did not enter the community via the waste management sector. In conclusion, the community in Ghazipur has a diverse and vibrant economy, but it is entirely dependent on the waste management sector. Tughlaqabad's economy is less diversified but it is equally, if not more, dependent on the informal waste management sector.
- While the level of dependence varies, almost every family in all three of these communities is in some way involved with the waste management sector. Most families have at least one member working as a wastepicker or supplement their earnings by sorting waste part-time. For example, it is common for children who attend school to spend one or two hours in the evening sorting metal waste, and this provides many families with an important source of supplemental income. Since many families are just barely able to subsist from month to month, this relatively small amount of income is crucial.
- Some residents who had formerly worked as wastepickers have been able to switch occupations or even become entrepreneurs. These people were mostly self-employed small business owners whose customers were almost exclusively wastepickers or their dependents. Thus, their livelihoods are indirectly dependent on the waste management sector. Many of them reported that if they are unable to continue operating these enterprises they would be forced back into the waste sector. Therefore, a reduction in waste would actually result in an increase in the number of wastepickers as former wastepickers will find their businesses impacted and revert back to the only other work they know.
- Most residents reported that they are unlikely to change occupations, even if waste is diverted from the landfill. Instead, they said they would try to adapt by increasing their mobility, and try to collect waste in neighboring communities. They also admitted, however, that this would make it impossible to maintain their current standard of living. Given the fact that most residents reported that they are currently unable to save money on a monthly basis, it follows that they would have to establish further strategies to supplement this loss in income. Unfortunately, the opportunity cost of keeping children in school may become too high and children could be forced to engage in productive labor for longer hours and possibly even full

time. This will impact not only their prospects for socio-economic mobility but also their health, as they will be exposed to various kinds of occupational hazards.

- In Ghazipur 26% of the children from the surveyed households work in waste, while 32% attend school. Some of the children attend school during the day and help sort waste in the evenings. Again, if the community's access to waste is limited, more children will have to spend more time working or leave school altogether and enter the labor force full time.

## 2. Building Scenarios

Out of approximately 7,500 metric tons of waste produced daily in Delhi, the combined capacity of the Timarpur-Okhla and Ghazipur waste-to-energy plants will be 3,300 metric tons. As these plants gradually scale-up to full capacity, their adverse impacts on the three communities will become increasingly severe.

Three hypothetical scenarios were forecasted in order to determine the extent to which each community would be impacted by a 10%, 33% and 50% reduction in waste, respectively.

### Scenario 1: Waste Reduced by 10%

If waste is reduced by 10% only the most vulnerable families will be severely affected. Families who have no other source of income and are barely subsisting are vulnerable to any shock, and they would find it difficult to adapt to a 10% reduction in waste. They would be forced to work longer hours gathering waste, and children would most likely have to assist in productive labor by assisting with sorting in the evening if they do not already do so. Since only a small number of families would be unable to adapt to this stress, the communities themselves would maintain their livelihoods.

### Scenario 2: Waste Reduced by 33%

A 33% reduction in waste would significantly impact Ghazipur and Tughlaqabad. While many people work in Ghazipur in an occupation other than wastepicking, only 18 people reported working outside of Ghazipur in a non-waste related occupation. In other words, waste is by far the most important sector for this community. Also, the people who are working in non-waste related occupations inside the community are typically indirectly dependent on the waste sector since their customers come almost exclusively from within the community. It follows that some of these business owners would be forced to adapt to this reduction in income by augmenting their income through the waste sector. Similarly, the families whose only source of income is the waste sector would be forced to adapt their livelihood strategies, and in many cases this would mean that children would have to engage in productive labor full-time. **A 33% reduction in waste would drive children out of schools and into productive labor, such as wastepicking in the landfills or sorting waste, particularly in Ghazipur and Tughlaqabad. This will almost certainly imperil their chances of socio-economic mobility, and increase the likelihood that they will become chronically poor.**

### Scenario 3: Waste Reduced by 50%

A 50% reduction in waste would devastate the livelihoods of Ghazipur and Tughlaqabad, and severely impact Okhla. While the survey data shows that Okhla is approximately as dependent on

the waste sector as the other two communities, the in-depth interviews showed that wastepickers are confident that they could work as laborers in the surrounding area. The main problems would be faced as people struggled to adapt, but this would be temporary. Thus, Okhla residents would experience hardships, but most families would be able to develop new livelihood strategies over time. Tughlaqabad is very isolated from the surrounding communities and its residents are almost entirely dependent on the waste sector. While there are some non-waste related enterprises within the community, only 5 people work outside of the community in a non-waste related occupation! Similarly, Ghazipur has an even more vibrant economy but aside from the waste sector, it is almost completely isolated from the rest of Delhi. Most families in these communities would find it impossible to adapt to the stress of a 50% reduction in waste. Undoubtedly, this would force all family members into productive labor, but the interview data showed that most respondents have no idea how they would find work that is not waste-related. In other words, essentially every able-bodied person in Ghazipur and Tughlaqabad would be forced to work in the waste-sector as a result of a 50% reduction in waste. Some families would be able to establish new livelihood strategies based on increased mobility and they would collect waste from surrounding colonies, but most families would be unable to travel the great distances required to augment a 50% reduction in waste. **Ultimately, a 50% reduction in waste would swell the ranks of Delhi's chronic poor, and children who currently live in these communities but do not pick waste would undoubtedly have to enter the labor force, most likely as wastepickers.**

## 3. Answering the four research questions

In this section, the research questions posed to understand the impact of the waste-to-energy plants on wastepickers are addressed.

1. What role does wastepicking play in the livelihood strategies of the poor who live near the landfills from which waste will be diverted?

This research confirms that most families are to some extent dependent on the waste sector. While many families have managed to diversify their economic activities, most family-level livelihood strategies still incorporate wastepicking. Given the fact that most families are below the poverty line and only barely able to subsist, the waste sector plays a crucial role in their overall well-being.

The waste sector plays a more important role in the overall livelihood of Ghazipur and Tughlaqabad, than it does in Okhla. Many wastepickers in Okhla were confident that they could find work in local factories or as construction workers, while wastepickers in Tughlaqabad and Ghazipur said that no alternatives were available to them. This is in part due to the fragmented nature of space in Delhi - this supports the findings of Mitra (2006) that labor markets in Delhi are supply driven. Laborers cannot simply switch between occupations. Instead, they choose their occupation based on their geographical location and social networks to which they have access. In other words, a person is likely to decide to work as a wastepicker if the landfill is nearby and her relatives also work as wastepickers, rather than travel across the city to work as a construction worker or domestic laborer.

2. How would diverting waste from the landfills to the waste-to-energy plants affect the livelihoods of these communities, and in what ways, if any, could residents adapt?



The diversion of waste will devastate the livelihoods of Ghazipur and Tughlaqabad, and severely strain the livelihood of Okhla. By focusing on livelihoods at the scale of the community, this research shows that the waste sector provides the main source of income for these communities. While many small businesses have opened in these communities to serve the daily needs of residents, the primary stream of money coming into these communities is through the waste sector. This is particularly true in Ghazipur and Tughlaqabad. In other words, if this source of revenue is diminished, these communities will suffer because money will stop percolating internally. Entrepreneurs who have opened small businesses could backslide into the waste sector. Therefore, as the waste sector shrinks, the enterprises whose customer base is primarily comprised of wastepickers may go out of business. Their owners would most likely resort to wastepicking since it is the only other occupation they have done. Ironically, the reduction in waste could result in an increase in the number of wastepickers, but all of them would find it difficult to subsist given the reduced amount of waste. Therefore, the waste-to-energy plants could result in the closure of an important avenue of social mobility, and doom hardworking individuals who have managed to start small businesses to chronic poverty.

3. What concrete steps have been taken to incorporate wastepickers in the waste-to-energy plants?

Currently there are no plans to incorporate wastepickers in the formal SWM sector. Private firms are not required to do so and to our knowledge their representatives have not approached any wastepickers as of yet. In the course of this research, one MCD official asked why wastepickers should be singled out to receive special treatment. "Wastepickers are not even in our language," he said, meaning that the state cannot 'see' them because it lacks a mechanism to disaggregate them from the urban poor in general (Scott 1998).

4. What role do children play in families' livelihood strategies, and how would the waste-to-energy plants affect the division of labor within families?

Children play an important role in families' livelihood strategies in all three communities. For example, in the evenings many children sort waste that their parents collected in the landfill during the day. In Ghazipur and Tughlaqabad the only productive labor in which children engaged was the waste sector. In Okhla some children worked outside of the community in small factories and workshops.

Many parents said that sending their children to school was a priority, and that they hope that they will not have to work in waste when they are adults. However, families that keep their children in school incur an opportunity cost. Families whose livelihoods are entirely dependent on the waste sector will suffer the most drastic reduction in income if the amount of waste arriving at the landfill is reduced, and they will be unable to bear the opportunity cost of leaving their children in school. Children in Okhla may work in factories and workshops, but children in Ghazipur and Tughlaqabad will most likely work in the waste sector. Thus, by reducing the amount of waste arriving at the landfills, the number of children working in waste is likely to increase.

## Conclusion: What does the study finally show?

This study shows that while there is scope for improving SWM in Delhi, waste-to-energy is a curious solution. A previous attempt to generate electricity through incinerating Delhi's waste at Timarpur failed, and the current initiative was decided upon with a complete lack of public participation. The state has an obligation to protect the most vulnerable citizens, but it has embarked on the dubious path of waste-to-energy without considering how this will affect Delhi's wastepickers. For years Delhi's waste management system was labor-intensive and wastepickers prevented the city from choking on its own waste. They should not be doomed to chronic poverty simply because capital-intensive SWM is currently in favor. This research shows that the informal waste sector is an important source of livelihood for individuals, families and communities. The importance of the informal sector is multiplied by the fact that Delhi's formal economy does not grow fast enough to absorb the urban poor, and families establish complex livelihood strategies that include a range of activities in both the formal and informal sectors. Most families living in Ghazipur, Okhla and Tughlaqabad derive some income from the informal waste recycling sector, therefore even families who are not full-time wastepickers are indirectly dependent on the sector. At the scale of the community, Ghazipur and Tughlaqabad are particularly dependent on the waste sector.

The waste-to-energy plants would destroy the sustainability of the livelihoods of the communities in Ghazipur and Tughlaqabad, and the Okhla community's livelihood would be significantly disrupted. The more waste that is diverted away from the landfills, the more marginalized these communities will become because their ability to adapt will become increasingly limited. Additionally, the waste-to-energy plants will close an important avenue of social mobility. Families used to be able to save money in order to send their children to school and open small businesses, but this will become increasingly difficult since the reduction of waste will make saving money virtually impossible and the opportunity cost of sending children to school will be too high. In other words, this study also points to a likelihood of increased child labor in a hazardous occupation. This would be a tragic outcome of any attempt to modernize SWM.

In some cases informal workers benefit from regulation while in other cases they attempt to avoid being governed (Anjaria 2006; Maloney 2004). This research shows that wastepickers would benefit from recognition from the state as a distinctive population, given the fragmented nature of urban space and the supply-driven nature of Delhi's labor market. Since they lack the social capital necessary to switch occupations and are restricted to certain areas within the city, authorities should not assume that they can easily adapt to a swift and significant reduction in income.

## Chapter 5: What Next? Recommendations

While wastepicking in its current form is hazardous to health and dignity, it offers the potential for a sustainable, well-paying and green livelihood if it is formalized and recognized in its upgraded form. However, it is clear that in their current form, capital-intensive methods of SWM such as waste-to-energy projects are incompatible with the informal waste recycling sector. This new socio-technical regime will devastate the livelihoods of those working in the informal sector if measures are not taken to help them adapt. While a labor-intensive SWM strategy based on recycling and composting would most effectively secure the livelihoods of wastepickers, the following recommendations could significantly reduce the vulnerability of wastepickers regardless of the SWM strategy that the MCD chooses to pursue. For years wastepickers have prevented Delhi from choking on its waste by collecting, transporting, sorting and recycling it. While it is unfair to suddenly prevent them from pursuing these very important activities, it is equally important to help them modernize and upgrade their work, so not only their livelihoods, but also their health and quality of life improve as they engage in decent work.

### 1. The state must 'see' wastepickers.

As noted above, the MCD has no way to identify wastepickers from other segments of the urban poor. Considering the positive impact that this population has on the environment, they should be identified and their work should be facilitated. The state could enlist the support of NGOs that work with wastepickers, in order to identify these 'green' workers. Once the state has a way to 'see' wastepickers, strategies can be developed to help them adapt to the new SWM system. In particular, policies should be implemented that adhere to national policies that take cognizance of the informal recycling sector, comprised of wastepickers, itinerant buyers, waste dealers and recyclers.

### 2. Include Wastepickers in any SWM Plan

This recommendation is being made keeping in two possible scenarios in Delhi.

#### Scenario 1 : Waste-to-energy plants will be scrapped in Delhi.

This scenario is the preferred one, and follows the established waste hierarchy which places reduction and recycling above waste-to-energy, incineration and landfills. Chintan believes that even if these plants are scrapped, wastepickers must be enabled to upgrade their livelihoods. This should be done in two ways:

- Build a Materials Recovery Facility space at the landfill entrance, and allow recovery of recyclable materials at this point by identified wastepickers.
- They must be incorporated into other aspects of SWM such as door-to-door collection. They must be given formal permissions and contracts, identity cards and elementary training, as well as help liaising with residents, and they should be allowed to retain the waste they receive from the households. This will ensure that wastepickers remain the first link in a chain of responsible and efficient SWM.
- Reduce space required by landfills by ensuring optimal segregation locally, through local sites allocated for waste segregation. Space for storage is also essential as it enables wastepickers to climb up the waste recycling ladder and sell waste in bulk at good prices.

#### Scenario 2 : Business as Usual. Waste-to-Energy Plants will continue to be built in Delhi.

This scenario assumes that the waste-to-energy plants will continue to be built and operationalized despite ongoing protests. Given the demonstrated vulnerability of wastepickers, Chintan recommends providing rehabilitation to the segments of the population affected by capital-intensive projects such as waste-to-energy, upgraded landfills and other similar undertakings.

As in the scenario above, wastepickers must be incorporated into other aspects of SWM such as door-to-door collection. They must be given formal permissions and contracts, identity cards and elementary training, as well as help liaising with residents, and they should be allowed to retain the waste they receive from the households. This will ensure that wastepickers remain the first link in a chain of responsible and efficient SWM. This should be a priority in any SWM plan, but especially if waste-to-energy plants are built because Chintan estimates that only approximately 50 wastepickers can be employed at each waste-to-energy plant.

Furthermore, by including wastepickers in improved door-to-door collection schemes that adhere to modern safety standards, the MCD can create a 'win-win' situation: wastepickers can enjoy uninterrupted livelihoods under safe working conditions while the city improves its SWM system.

### 3. The incorporation of wastepickers in solid waste management projects should be written into future tenders with precise specifications and performance standards.

The incorporation of wastepickers should be a requirement for private firms to be awarded tenders of any kind in the SWM sector. Human resource policies that incorporate wastepickers should be clear and there should be monitoring and evaluation of these policies by monitoring committees comprising a range of actors, including civil society groups.

The exception is recommendation number 2, which is specifically made in the context of the construction of waste-to-energy projects.

#### 4. Firms that voluntarily incorporate wastepickers should be recognized.

Some firms have partnered with wastepickers and give them all of their waste. Both the firms and wastepickers have thus far been satisfied by these arrangements. The firms that take this important step in reducing urban poverty, while simultaneously contributing to the vision of a clean and green Delhi, should be recognized.

5. Set up a monitoring mechanism for such inclusion through a monitoring body comprised of civil society organizations, private companies and government agencies.

## References

- Adam, C. and Harriss-White, B. (2007) From Monet to Mondrian: characterizing informal economic activity in field research and simulation models. In Harriss-White, B. and Sinha, A. (eds.) *Trade Liberalization and India's Informal Economy*, pp. 15-41. New Delhi: Oxford University Press.
- Agarwal, A. (1999). *Greener Pastures: Politics, Markets, and Community among a Migrant Pastoral People*. Durham: Duke University Press.
- Amin, M. (2009). Labor regulation and employment in India's retail stores. *Journal of Comparative Economics* 37(1): 47-61.
- Anjaria, J.S. (2006). Street hawkers and public space in Mumbai. *Economic and Political Weekly*. 41(21): 2140-2146.
- Baumann, P. (2000). Sustainable livelihoods and political capital: arguments and evidence from decentralization and natural resource management in India. Working Paper 136. London: Overseas Development Institute.
- Bauman, P. and Sinha, S. (2001). Linking development with democratic processes in India: political capital and sustainable livelihoods analysis. *Natural Resource Perspectives* 68: 1-4.
- Bebbington, A. (2007). Social movements and the politicization of chronic poverty. *Development and Change* 38(5): 793-818.
- Castells, M. and Portes, A. (1989). World underneath: The origins, dynamics, and effects of the informal economy. In Castells, M., Portes, A. and Benton, L. A. (eds.) *The Informal Economy: Studies in Advanced and Less Developed Countries*, pp. 11-40. Baltimore: The Johns Hopkins University Press.
- Centeno, M.A., and Portes, A. (2006) "The Informal Economy in the Shadow of the State." In Fernandez-kelly, P., and Shefner, J. (eds.) *Out of the Shadows: Political Action and the Informal Economy in Latin America*, pp. 23-48. University Park: Pennsylvania State University Press.
- Chari, S. (2004). *Fraternal Capital: Peasant-Workers, Self-made men, and Globalization in Provincial India*. Stanford, Stanford University Press.
- Chaturvedi, B. and Gidwani, V. (2011). The Right to Waste: Informal Sector Recyclers and Struggles for Social Justice in Post-Reform Urban India. In Ahmed, W., Kundu, A., and Peet, R. (eds.) *India's New Economic Policy: A Critical Analysis*, pp. 125-153. New York: Routledge.
- CPRC (2009) *Chronic Poverty Report 2008-9*. Manchester and London: Chronic Poverty Research Centre.
- Corbridge, S. and Harriss, J. (2001). *Reinventing India: Liberalization, Hindu Nationalism and Popular Democracy (Second Edition)*. New Delhi, Oxford University Press.
- Cross, J.C., and Pena, S. (2006) "Risk and regulation in informal and illegal markets." In Fernandez-kelly, P., and Shefner, J. (eds.) *Out of the Shadows: Political Action and the Informal*

Economy in Latin America, pp. 49-80. University Park: Pennsylvania State University Press.

Dasgupta, K.K. (2011, March 3). Going for the burn. *Hindustan Times*. Accessed April 10, 2011: <http://www.hindustantimes.com/News-Feed/columnsothers/Going-for-the-burn/Article1-669134.aspx>

de Haan, L.J. (2000) Globalization, localization and sustainable livelihood. *Sociologia Ruralis* 40(3): 339-365.

De Soto, H. (2002) *The Other Path: An Economic Answer to Terrorism*. New York: Basic Books.

Dupont, V. (2011) The dream of Delhi as a global city. *International Journal of Urban and Regional Research* 35(3): 533-554.

Farrington, J., Ramasut, T. and Walker, J. (2002) *Sustainable Livelihoods Approaches in Urban Areas: General Lessons, With Illustrations from Indian Cases*. Working Paper 162. London: Overseas Development Institute.

Foeken, D.W.J. and S.O. Owuor (2008) Farming as a livelihood source for the urban poor in Nakuru, Kenya. *Geoforum* 39: 1978-1990.

Ghertner, D.A. (2010). Calculating without numbers: aesthetic governmentality in Delhi's slums. *Economy and Society* 39(2): 185-217.

Glassman, J. (2006). Primitive accumulation, accumulation by dispossession, accumulation by 'extra-economic' means. *Progress in Human Geography* 30(5): 608-625.

Government of India, Ministry of Urban Employment and Poverty Alleviation and Ministry of Urban Development. (Date unpublished). *Jawaharlal Nehru National Urban Renewal Mission: Formulation of a City Development Plan*.

Harriss-White, B. (2005) Destitution and the poverty of its politics: with special reference to South Asia. *World Development* 33(6): 881-91.

Harriss-White, B. and Gooptu, N. (2001). Mapping India's world of unorganized labor. *Socialist Register* 37: 89-118.

Hart, Keith (1973) Informal income opportunities and urban employment in Ghana. *Journal of Modern African Studies* 11(3): 61-89

Harvey, D. (2005). *A Brief History of Neoliberalism*. Oxford: Oxford University Press.

igovernment (2010). "Balance between growth, ecological security must": fundamentalist view on development or environment may prove hurdle for the growth of the country, India's Forest and Environment Minister says. Accessed April 10, 2011: <http://www.igovernment.in/site/balance-between-growth-ecological-security-must-36687>.

Jha, S., Rao, V., and Woolcock, M. (2007). Governance in the gullies: democratic responsiveness and leadership in Delhi's slums. *World Development* 35(2): 230-246.

Kundu, A. (2011) Urban System in India: Trends, Economic Base, Governance, and a Perspective of Growth under Globalization. In Ahmed, W., Kundu, A., and Peet, R. (eds.) *India's New Economic Policy: A Critical Analysis*, pp. 57-75 . New York: Routledge.

Kundu, D. and Dibyendu, S. (2011). Redefining the inclusive urban agenda in India. *Economic and Political Weekly* XLVI(5): 55-63.

Lorber, M., P. Pinsky, Gehring, P., Braverman, C., Winters, D., and Sovocool, W. (1998). Relationships between dioxins in soil, air, ash, and emissions from a municipal solid waste incinerator emitting large amounts of dioxins. *Chemosphere* 37(9-12): 2173-2197.

Mahapatra, D. 2011. Delhi govt firm on waste-to-energy plants at Timarpur-Okhla, Ghzaipur. *Times of India* April 13. Accessed April 20, 2011: [http://articles.timesofindia.indiatimes.com/2011-04-13/india/29412984\\_1\\_waste-to-energy-plant-timarpur-okhla-waste-to-energy-projects](http://articles.timesofindia.indiatimes.com/2011-04-13/india/29412984_1_waste-to-energy-plant-timarpur-okhla-waste-to-energy-projects).

Maloney, W. F. 2004. Informality Revisited. *World Development*, 32(7): 1159-1178.

Marcoullier, D. and Young, L. (1995). The black hold of graft: the predatory state and the informal economy. *The American Economic Review* 85(3): 630-646.

Miranda, M. L. and B. Hale (1997). Waste not, want not: the private and social costs of waste-to-energy production. *Energy Policy* 25(6): 587-600.

Mitra, A. (2006). Urban informal sector and networks: a case study of Delhi slum dwellers. In Guha-Khasnobis, B. and Kanbur, R. (eds.). *Informal Labor markets and Development*, pp. 136-155. New York: Palgrave Macmillan.

Municipal Corporation of Delhi (2006). *City Development Plan Delhi*. New Delhi: IL&FS Ecosmart Limited.

Negi, R. (2010). Neoliberalism, Environmentalism, and Urban Politics in Delhi. In Ahmed, W., Kundu, A., and Peet, R. (eds.) *India's New Economic Policy: A Critical Analysis*, pp. 179-198. New York: Routledge.

Psomopoulos, C. S., A. Bourka, et al. (2009). Waste-to-energy: A review of the status and benefits in USA. *Waste Management* 29(5): 1718-1724.

Scoones, I. (1998). *Sustainable Rural Livelihoods: A Framework Analysis*. IDS Working Paper 72.

Scott, James C. (1998) *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven: Yale University Press.

Stehlik, P. (2009). Contribution to advances in waste-to-energy technologies. *Journal of Cleaner Production* 17(10): 919-931.

Sundaram, R. (2010) *Pirate Modernity: Delhi's Media Urbanism*. Oxon: Routledge.

## Appendix I: Waste Recycling as a Sustainable Livelihood

In order to assess the impact of the TOIWEF on the wellbeing of wastepickers, this research operationalizes the concept of sustainable livelihoods. The concept of livelihood is commonly used by development practitioners in an effort to problematize poverty, and determine precisely what factors increase vulnerability and imperil overall wellbeing. Early conceptualizations of livelihoods focused on marginalized populations in rural areas, and sought to evaluate their level of vulnerability based on their access to natural resources. A population's livelihood was considered 'sustainable' if it could maintain access to resources by adapting to shocks and stresses, which could be economic, environmental, political, etc., while not permanently depleting the natural resource base. Thus, 'sustainable' referred to both the security of a population's access to a resource, as well as the long-term viability of using the resource without depleting it. In the case of wastepickers, the sustainability of their livelihood refers to their access to waste as well as the continued existence of waste and the recycling sector itself.

The sustainable livelihoods paradigm has come under criticism for a number of reasons. First, many scholars argued that it suffered from a rural bias because of its focus on access to natural resources. Recent studies have shown that families develop complex livelihood strategies that span rural and urban space. For example, seasonal migration is a common practice in many parts of India, and this makes it difficult to classify people as agricultural laborers or urban-based wage laborers. Thus, rather than equate an individual's job with her livelihood, any study of livelihoods must conceive of livelihoods as comprehensive sets of activities undertaken by groups of individuals (families, villages, *juggi-jhodpri* clusters, kinship networks, etc.), in order to reduce vulnerability and improve overall well-being. Additionally, livelihood strategies can incorporate activities that span space and time (King 2011) - in India, for example, an individual could work as a seasonal agricultural laborer in Bihar and a cycle rickshaw driver in Delhi for the rest of the year. Moreover, complex livelihood strategies are often created by families (Foekken and Owour 2008), so in the above example, agricultural labor and cycle rickshaw driving could be complemented by diverse activities undertaken by family members.

Second, scholars have argued that access to resources is often not determined by absolute scarcity, but that certain groups are socially excluded from accessing them. This exclusion is often justified on legal grounds. David Harvey (2005) terms this legally sanctioned exclusion 'primitive accumulation by dispossession.' Frequently this occurs as rural areas become more closely linked with urban areas, and common property resources are privatized and subsequently enclosed (Agarwal 1999; Glassman 2006). Interest groups form as a result, in order to both resist dispossession and secure access to resources, and in the process they generate social capital by strengthening social networks (de Haan 2000). The struggle between interest groups over access to resources is inherently political, but most studies on sustainable livelihoods have underemphasized the importance of politics as a determining factor of resource-use (Bauman 2000; Bauman and Sinha 2001). The ability to make political claims is particularly important in urban areas (Farrington et al. 2002), where multiple interest groups commonly compete and negotiate for entitlements - state-sanctioned monopolies over resources - rather than scarce natural resources. Rather than focus on individual agency in the study of livelihood strategies, these authors

advocate a 'rights-based' approach to understanding livelihoods in urban areas, which focuses on "how, why and by whom such entitlements might be denied to the poor" (ibid.: vi). This framework is particularly applicable to the waste management sector in Delhi since the state favors the private sector by granting a monopoly over the collection and processing of waste, but there is no inherent scarcity of waste per se. This manufactured scarcity of waste creates a market for waste, which allows the private sector to accumulate capital, while simultaneously destroying the livelihoods of wastepickers who cannot gain access to waste.

The Chronic Poverty Research Centre (2009) reports that 34% of Indians live in chronic poverty, which is transmitted from one generation to the next, and economic growth alone is unlikely to reduce this figure (Bebbington 2007; Harris-White 2005). Rather than simply viewing poverty as asset deprivation, recent scholarship on chronic poverty focuses on how it is caused and reproduced through unequal political and social relationships (Bebbington 2007). If chronic poverty is viewed in this way, it follows that its reversal depends on addressing the underlying asymmetries of power that characterize these relationships. The study of both sustainable livelihoods and chronic poverty must address power dynamics between interest groups, and the social and political interactions that determine the distribution of resources/assets. This is particularly important in urban areas where common property resources are increasingly privatized and interest groups must secure entitlements from the state in order to gain access. Thus, in evaluating the sustainability of wastepickers' livelihoods, this research focuses on "how, why and by whom" access to waste is denied to them.

Only 7% of India's labor force works in the formal sector (Harris-White and Gooptu 2001). While many smaller cities in India have been unable to attract investment since launching the New Economic Plan in 1991, India's megacities have consistently attracted labor (migrants from rural areas) and capital (foreign investment) (Kundu 2011). Delhi has experienced rapid growth, and continues to attract both labor and capital. The formal labor market, however, has remained stagnant, and over the past decade 60% of migrants were absorbed by the informal sector (MCD 2006: 17 - 2). Some scholars lament the growth of the informal sector and assume that it is less efficient than the formal sector (Amin 2009). This argument is typically invoked by proponents of economic liberalization, but it rests on circular logic. They argue that labor regulations have discouraged investment and impeded growth of the former sector (Besley and Burgess 2004), which is undesirable because the informal sector does not offer workers as much security as the formal sector (Amin 2009). Their prescription for encouraging growth in the formal sector is to loosen labor regulations (Amin 2009). In other words, these people essentially argue that labor standards must be relaxed in order to improve labor standards! The truth is that the informal economy is much more complex, and it should not simply be caricatured as less efficient, less safe, less productive, or even less desirable, than the formal sector.

The concept of an 'informal' economy was introduced by Keith Hart in 1973 to describe petty traders in Accra, Ghana. Since the 1990s there has been an explosion of literature on the informal economy, and scholars now have a much more nuanced understanding of its origins, its relationship with the formal economy and the state, and why it persists in places that experience rapid economic growth. Rather than viewing the informal economy as a pre-capitalist, or pre-modern segment of the economy, scholars now view it as particular relation of production (Castells and Portes 1989). An informal economy could flourish for many reasons - a weak state may not have the capacity to regulate the market (Centeno and Portes 2006), but a predatory

state that over-regulates can create incentives for producers to operate in the informal sector (De Soto 2002; Marcoullier and Young 1995). Because the formal market is a social construction, its boundaries are constantly contested (Cross and Pena 2006). The dichotomy between formal and informal economies is also problematic for a number of reasons. First, many firms have at least some contact with the state (Harriss-White and Gooptu 2001; Adam and Harriss-White 2007). Producers may seek assistance from the state when it suits them and simultaneously remain informal - wastepickers and street hawkers have organized associations, yet they remain informal. Second, formal-sector firms may outsource work to the informal sector (Chari 2004). Finally, because the informal sector is seamlessly integrated into the local economy in many places, it provides cheap services and lowers the cost of living, so firms in the formal sector are able to offer their workers lower wages (Maloney 2004). In this sense the formal sector is supported by the informal sector, but this does not mean that the informal sector is inherently subordinated by the formal sector. Typically informal economies are highly regulated with informal mechanisms that reduce risk and uncertainty, and enforcement is commonly achieved through social institutions (Cross and Pena 2006). In other words, traders adhere to informal regulations in order to avoid censure within their community. All regulatory regimes incur a cost, but the cost of adhering to these informal regulations may be less than formal regulations (ibid.). Moreover, many laborers may prefer working in the informal economy, because of the flexibility it offers, the satisfaction of being self-employed, and there may not be tangible benefits to working in the formal sector (Maloney 2004).

While in Delhi the urban poor commonly live in informal housing and work in the informal economy, informal institutions regulate their communities (Jha et al. 2007) and the informal labor market is highly structured (Mitra 2006). Informal institutions serve to create a division of labor among populations and places, which restricts who can work in particular occupations and where economic activities can take place (ibid.). Since social networks informally regulate labor markets, the occupational choice of migrants depends on the social networks to which they have access - most recent migrants are unable to work in manufacturing, for example, because they lack the network connections and information that securing such a position requires (ibid.). Furthermore, the occupational choices of the urban poor are informally regulated by a spatial division of labor within the city (ibid.). Certain areas of the city are informally reserved for certain economic activities, and the high cost of mobility means that labor markets in Delhi are quite localized (ibid.). Thus, according to Mitra's (2006) study, supply-side push factors play a greater role in determining the allocation of labor resources than demand-side pull factors.

This portrayal of Delhi as a fractured labor market is in direct contradiction with the viewpoint of MCD officials, who view all unskilled labor as footloose and equivalent. When asked what wastepickers will do if their access to waste is restricted, one MCD official said: "If they are doing [wastepicking] there, if that space is closed, they will go there...We will ask them to shift their profession, to rickshaw pulling, construction, they can shift their duties...they can be promoted to other jobs. There is a requirement of such peoples in many fields" (personal communication 2011). In other words, the MCD views labor markets as demand-driven, and expects laborers to shift their occupation in accordance with the demands of capital. Thus, although research has shown that Delhi's labor market is fractured and supply-driven, municipal policy acts as if it is a vast labor market that is demand driven. This research examines the livelihood strategies of wastepickers in the context of this ongoing debate.

## Appendix II: Methodology, questionnaires and interview outlines

The community near the Ghazipur landfill is a juggi-jhodpri cluster, and 234 out of approximately 250 households were surveyed. The survey consisted of 11 questions from which household-level demographic and livelihood data were ascertained. Respondents were first asked how many adults/children lived in the household and their genders, how long they had lived there and where they had lived previously. Next they were asked what the members of the household's occupations were, if any of them worked as wastepickers, and whether or not any of them worked outside of the community. Thus, the survey provides a detailed understanding of the demographics of the community, and shows the relative importance that the waste sector plays in families' livelihoods. Moreover, by aggregating the data it is possible to determine how important the waste sector is for the entire community, which allows for an assessment of the impact of the waste-to-energy plants on the livelihoods of the communities (Scoones 1998).

In-depth interviews were carried out with community residents in order to provide an understanding of families' livelihood strategies, and in particular the importance of wastepicking therein. Residents with a broad range of occupations were sampled. Twenty interviews were conducted in Ghazipur, and out of this twenty approximately half of the respondents were wastepickers. Ten interviews were conducted in both Okhla and Tughlaqabad. While there were two sets of questions, one for wastepickers and one for non-wastepickers, this distinction was often difficult to make for two reasons. First, some people engaged in multiple income-generating activities including wastepicking, or they used to work as wastepickers, so they are essentially wastepickers and non-wastepickers. Second, the respondents typically answered for the family, so this was particularly difficult when the respondent was not a wastepicker but a family member was. In both of these cases respondents were asked questions for wastepickers and non-wastepickers.

Interview questions focused on respondents' occupations - how they entered their current occupation, how long they have been working in their current occupation, and if they planned to do anything else in the future. Particular attention was given to people who had worked as wastepickers in the past, but have switched occupations, in order to see how they were able to exit the waste sector. Then respondents were asked how much they earn per month, how much they spend on various necessities, and how much, if any, they save per month. The next set of questions, for both wastepickers and non-wastepickers, regarded the children residing in the household. They were asked if the children went to school, and whether they engaged in productive labor. Finally, they were asked if they would ever have to work as wastepickers, either as adults, or in the immediate future if the family's income was suddenly reduced.

By combining the survey with in-depth interviews, the data demonstrates the relative importance of wastepicking vis-à-vis other sectors of the economy. It shows the extent to which the economy of the community is connected to the economy at large and through which sectors. In other words, even if residents engage in a wide range of activities, if the only way they are able to earn money outside of the community is through wastepicking, this shows that the community itself is dependent on the wastepicking sector because without this inflow of capital the community-based businesses would quickly lose their customer base. Thus, this mixed methodology not only indicates how the waste-to-energy plants will impact the livelihoods of wastepickers, but it also

A "household" was defined as a cooking area, so a single household could potentially include multiple families. There are approximately 250 households in Ghazipur, but only 234 were surveyed. An exact count could not be determined because in the cases where people refused to participate or were not home, it was impossible to establish whether they shared a cooking space.

shows how these communities at-large are impacted. Additionally, the results can inform the debate surrounding Delhi's labor market by showing the extent to which the urban poor can choose their occupation, and the extent to which their choices are determined by supply-side or demand-side factors.

Finally, the data from these interviews was augmented by information gained from interviewing a key stakeholder in the public sector. He was asked what role he envisions for wastepickers in the waste-to-energy plants in particular, and the solid waste management sector in general. He was also asked what policy mechanisms have already been established, if any, to formally incorporate wastepickers in waste-to-energy plants.

### General survey questions:

1. How long have you lived here?
2. What state are you from?
3. How many people live in this home?
4. How many males?
5. How many females?
6. How many people work as wastepickers?
7. How many children live here?
8. How many children go to school?
9. Does anyone have a job other than wastepicking? [if yes record what it is and go to the next question]
10. Is their job outside of the community?

### In-depth interview outline:

#### 1. Personal details

How long have you lived here?	What state are you from?	Number of inhabitants in the home?	Male	Female	How many people work as wastepickers?
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#### 2. Livelihood issues

- a.) How much money do you earn per month?
- b.) How much money do your family members earn per month?
- c.) Do any of them go outside of the community to work (ie, in construction, as domestic help, etc.)?
- e.) Are you able to save any money per month?
- f.) How much did you spend last month on:

Rent:

Food:

School Fees (if applicable):

Transportation (if applicable):

\*Family' was defined as a unit that pools resources and consumes collectively. This does not necessarily mean that resources are distributed equitably within families, however, and further research is needed in order to understand how some family members, such as girl children, could be considerably more vulnerable than others.

Healthcare:

Other major expenses (list):

#### 3. Questions for wastepickers only

- a.) How many hours per day do you collect and segregate waste?
  - b.) How much waste do you gather on an average day (in kg)?
  - c.) From where? (the landfill, door-to-door collection in residential neighborhoods, or do they have agreements with businesses, etc.?)
  - d.) Who do you sell it to, and is the buyer located in the community?
  - e.) How much do you earn per kg (distinguish between different materials):
5. Questions for families that have children

Number of Children	How many children work as wastepickers?	How many children go to school?	How many children stay at home but do not pick trash? What do they do?
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- a.) Do children only go play after school, or do they help with the housework?

For non-working children:

- a.) Did the children ever have to work to earn money?
- b.) Do the children help you with domestic chores?

For working children:

- a.) Do you sometimes worry that you will have to send your children to work?
- b.) How much money would you have to lose every month before you would be helpless enough to make your children go to work?
- c.) What would you do if waste stopped coming into the landfill?

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**Chintan** works for environmental justice in partnership with people and groups from diverse sections of society. Our focus is on ensuring equitable and sustainable production, consumption and disposal, and also on ensuring green jobs, security and dignity for the urban poor.

Our initiatives include research, campaigns, building capacity among those engaged in recycling, and creating awareness about the need for reduced consumption and better waste management among the middle and upper classes.

While all of Chintan's work is anchored in grassroots partnerships with organizations of the urban marginalized like waste-pickers and kabaris, we also work closely with policymakers, students, parents, teachers, elected representatives, municipalities, Resident Welfare Associations (RWAs) and the police.

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