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Solid Waste Management in Cambodia

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Abstract:

Solid waste management consists of two sectors: the formal operation and the informal scavenging activities. Because scavenging contributes to solid waste management economically and environmentally and also serves as an occupation for some of the most impoverished in the city, recently it has become the focus of scholarly deliberation. A notion of integrating this informal sector of SWM into the formal one is proposed by different scholars. Though they appear to differ in terms of approaches and arguments, their proposed policies are place-based. This paper examines the situations of solid waste management, both the formal and the informal, in Phnom Penh city, and discusses the feasibility of integrating the informal scavenging into the formal management of solid waste. It raises questions about the possible unintended consequences when informal scavenging is integrated through such place-based approach.

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Solid Waste Management in Cambodia

By Keo Rathana

Conventional debates about urban solid waste management (SWM) no longer revolve around whether a city should use a disposal-based system or a recovery-based one. Cost-benefit analysis has shown that a recovery-based system, though it is more complicated, is more beneficial both economically and environmentally than to simply dispose the entire solid waste. Generally, solid waste (not including chemical or pharmaceutical waste) contains materials that can be recycled or transformed into ores or products of economic values, which should be extracted before it goes to the dump site or incinerator for disposal. This way a recovery-based system not only contributes to a city economically through the production of valuable recovered materials, but it also alleviates the environmental stress by largely reducing the original volume of solid waste through 'waste diversion', making the life of a garbage dump last longer or less energy is needed to incinerate the waste. The right question now is what should be the best type of recovery-based system for a city. Should it be a high-tech one or a low-tech one? What is the best way to coordinate the recovery activities and market the recovered materials? And how do we resolve the issue of informal scavenging activities in developing countries that usually obstruct the formal operations of SWM in a city?

Any quick-fix attempt to address these questions by 'wholesale' importing a solution from a different country to another, without taking into account the contextual complexity such as: the way how waste is generated, the composition of waste, the marketability of recovered materials as ores and composts, the socio-economic and political situation of the locality, public education and awareness, budgetary availability and so on, would become a major failure. Given limited financial resources in which the funding for the operations of SWM rely on foreign debts, developing countries could easily fall prey to such oversight leading to not only ineffective and inefficient SWM but also a waste of investment and financial debts. Since poor countries are poor both in terms of finance and human capital, they usually hire foreign consultants to analyze and make recommendations on SWM policy for their cities. Foreign consultants are hired using donors' money or state budget on a short

term basis. As a result, these consultants resort to their experience in other countries, usually developed ones, and propose the same solutions for the developing countries.

The case of SWM in Indonesia (1992) is very illustrative of this typical policy mistake. In Bandung municipality of West Java, it is estimated that 1,200 tons of solid waste is produced daily. The waste collection service is very uneven throughout the city, and the transportation of waste to the disposal sites varies according to the dry and wet season. During the rainy season, roads in some parts of the city are flooded forcing the waste collection trucks to use dry routes to the landfills located on higher ground. To resolve solid waste management issues, the Indonesian government hired a number of expatriate consultants to study the issues and make recommendations. The consultants then suggested a western type of SWM that was highly centralized and disposal-based. They introduced lidded plastic garbage bins and wheeled lidded cans for collection of waste at the market and households. The system was intended to be a 'close' one so as to prevent scavenging and to keep it clean. The handcarts for carrying garbage to the transfer depots were made wider to put large, demountable, lidded plastic trash cans. Later on, the consultants found out that the 'improved' handcarts were too wide for narrow alleys, and the contents of the plastic bins were dumped onto the ground alongside the fully loaded steel containers, after being scavenged, waiting for the trucks to come by and empty them up. Collectors loaded fewer bins onto the handcarts to save space for scavenged materials. The plastic bins suffered from broken hinges, lost lids, and broken wheels. The transfer depots were poorly designed that traffic flow and waste loading were disrupted. The capital cost of the operations was U.S. $9.2 million in which 83% of this came from an ADB loan. The annual payments of the loan were scheduled at almost U.S. $1 million per year. The financial burden fell on the shoulder of the municipality (Sicular, 1992).

Another problem with First-World style of SWM is that it is highly mechanized, which is intended to save labor and requires a lot of start-up capital and maintenance cost. The operations are designed to be closed and as subtle as possible without the need of public cooperation. People in the First World countries are usually very busy and don't want to be bothered with waste problems. On the contrary, living with waste and sanitary problems has been a matter of daily reality in the Third World societies. The states are usually poor in capital but rich in labor, thus making saving labor and spending capital inappropriate. In addition, scavenging is a type of self-employment and a safety net for the most impoverished

before they fall into criminal activities. On the other hand, scavenging goes in conflict with the formal mechanized operations of SWM not only for the sake of human safety but also to preserve the quality of the garbage when arriving at the processing plants. Therefore, scavenging is often negatively suppressed and perceived as a 'stumbling block' to the effectiveness of the formal operations of SWM.

However, trying to eliminate scavenging is criticized as depriving the most impoverished of their self-help means of survival, forcing them to fall into despair or criminal activities. Instead, the notion of integrating scavenging with the formal SWM is proposed (see Sicular, 1992; Medina, 1997; Nas et al., 2004; Wilson et al., 2006). But the question is to what extent can we actually do given the transitory and informal nature of scavenging?

This paper will discuss the answer to this question by looking at the solid waste issues in Phnom Penh city of Cambodia as a case study. The philosophy of this paper goes along with a Cambodian saying that reads "one should try to tailor the hat to fit one's head instead of trying to make one's head to fit the hat." I believe that it is necessary to first analyze the current situation of solid waste issues in the area before arriving at any conclusion.

The structure of this paper stretches into two main parts. Chapter one offers an analysis of the current municipal SWM. Discussions on the formal operations of waste collection and disposal are laid out. In addition, the weaknesses and strengths of the system are also included in this chapter.

Since scavenging is prevalent particularly in a developing country like Cambodia, in chapter two detailed analysis on the nature of scavenging and its socio-economic relationship will be discussed. It is important to note that scavenging activities also contribute to the removal of waste. In fact, it is a form of informal SWM that has not been officially recognized or integrated into planning. Recently, the issue of scavenging has become the focus of the contemporary debate, and the notion of integrating it into the municipal planning and formal operations of SWM is discussed. Therefore, it is worth studying scavenging carefully and deliberate if such notion of integration would be practical.

This paper concludes with discussions on issues concerning whether or not it is practical to combine the informal scavenging with the formal management of solid waste to improve the efficiency of SWM and at the same time to reduce urban poverty.

SECTION 1: FORMAL SOLID WASTE MANAGEMENT IN PHNOM PENH

Phnom Penh, the capitol city of Cambodia, is situated right on the confluence of the Mekong, Tonle Sap, and Bassac rivers. The city covers an area of 375 km^2 and is comprised of seven administrative khans (districts), 76 sangkats (communes), and 637 villages. The official census data posted on the Municipality of Phnom Penh's (MPP) website indicates that the population of Phnom Penh as of 2004 was 1,011,264 people with a growth rate of 3.92%, according to a demographic projection 2001-2010 (Cambodia, 2004). If the projection is correct, by 2008, the population of Phnom Penh will reach approximately 12 million. However, it is obvious that the recent economic boom has encouraged a much larger influx of migrants from all over the country to move into the city in search for employments and other economic opportunities, making the projection of 3.92% growth rate of Phnom Penh population outdated. Many other unofficial reports show that the current population of Phnom Penh is more than 2 million people ("Cambodia: Phnom Penh", 2008).

Given the population of Phnom Penh city in 1998, which was around 862,000 people, ("Phnom Penh History!" 2008), if the unofficial figure is correct, by 2006, the population was increased by more than 130%. This rapid growth of urban population puts a tremendous amount of stress on the demands for urban services. Like many cities in developing countries, the municipal government lacks the capacity to provide for adequate services, resulting in an uneven distribution of service delivery. One of the most visible sign of such inequality is the problem of SWM.

INSTITUTIONS INVOLVED IN SOLID WASTE MANAGEMENT IN PHNOM PENH

According to the environmental protection and natural resource management law, the Ministry of Environment (MOE) is entrusted with the responsibility to protect the environment by ensuring compliance with the environmental law, establishing proper guidelines for SWM and monitoring its operations at the national level. At the provincial/municipal level, however, a sub-decree on SWM was issued prescribing that waste

collection, transport, storage, recycling, minimizing and dumping in each province/city shall be the responsibility of the authority of that province/city. As a result, the MPP is in charge of the overall SWM in the city (Kum, Sharp, & Harnpornchai, 2005a).

The MPP created an agency to take care of this responsibility under its supervision, called the Phnom Penh Waste Management Authority (PPWM). According to the statute that gave birth to this agency, the PPWM has the mandate to either deliver the SWM services by itself, such as collecting and disposing, or contract out these services to private companies and monitor their performance (same source).

In 1997, the service of collection and disposal of solid waste in most parts of the city was contracted out to a private company called PSBK for a period of 50 years. Until 2002, another service provider called CINTRI took over the franchise contract from PSBK and monopolized the fee-based SWM in the city (Chhoeurn & Thida, 2006). In areas that are not covered by CINTRI, especially poor neighborhoods and squatters, where road access for waste collecting trucks are impossible or difficult to reach, SWM is provided for by PPWM, which is practically non-existent because of the lack of funding and public cooperation.

Other institutions that directly or indirectly involve in SWM at the national level include the Ministry of Planning (MOP) and the Ministry of Economy and Finance (MOEF) that are responsible for approving investment plans by sector, establishing and approving appropriate service tariffs, allocating government funds for investment projects, soliciting and organizing grants and loans financed by international financial institutions and donors (Kum, Sharp, & Harnpornchai, 2005a). The Ministry of Interior (MOI) is also involved when it comes to dealing with the issue of public order, police, or commune/sangkat councils. However, there was an instance that the MOI issued a monitorial order (Prakas) instructing all factories to report on their management of hazardous wastes and to treat and dispose of those wastes properly (Chhoeurn & Thida, 2006). The Ministry of Health (MOH), in charge of the general public health issues, and the Ministry of Public Work and Transportation (MOPWT) have also been involved in SWM issues at the national level.

Non-governmental organizations (NGOs) that are working on SWM include CSARO (Community Sanitation And Recycling Organization), COMPED, Handicap International, SEDO (Socio-Economic Development Organization), PRD (Partner for Research and

Development), World Vision, CLA (Cambodia Labor Association), URC (Urban Resources Center), Smile Pour Enfant (Smile for Children) (same source).

At the local level, SWM falls onto the shoulder of Department of Environment (DOE), Department of Health (DOH), and Department of Public Works and Transport (DOPWT) of each respective province/municipality. In the case of Phnom Penh city, PPWM is in charge of SWM.

The role of the commune/sangkat councils and the village chiefs in mobilizing grassroots level of community resources and cooperation for SWM should never be neglected. Since 2002, each commune/sangkat authority is democratically elected under the government's decentralization policy in the hope that competition among candidates would force out innovative policy for local development. Although there has never been any assessment to see if such goal is achieved, an survey conducted by the Asia Foundation shows that legitimacy and public trust on the commune/sangkat councils are remarkably high, and that the village chiefs continue to play an important role in disseminating information at the grassroots level (Ninh & Henke, 2005).

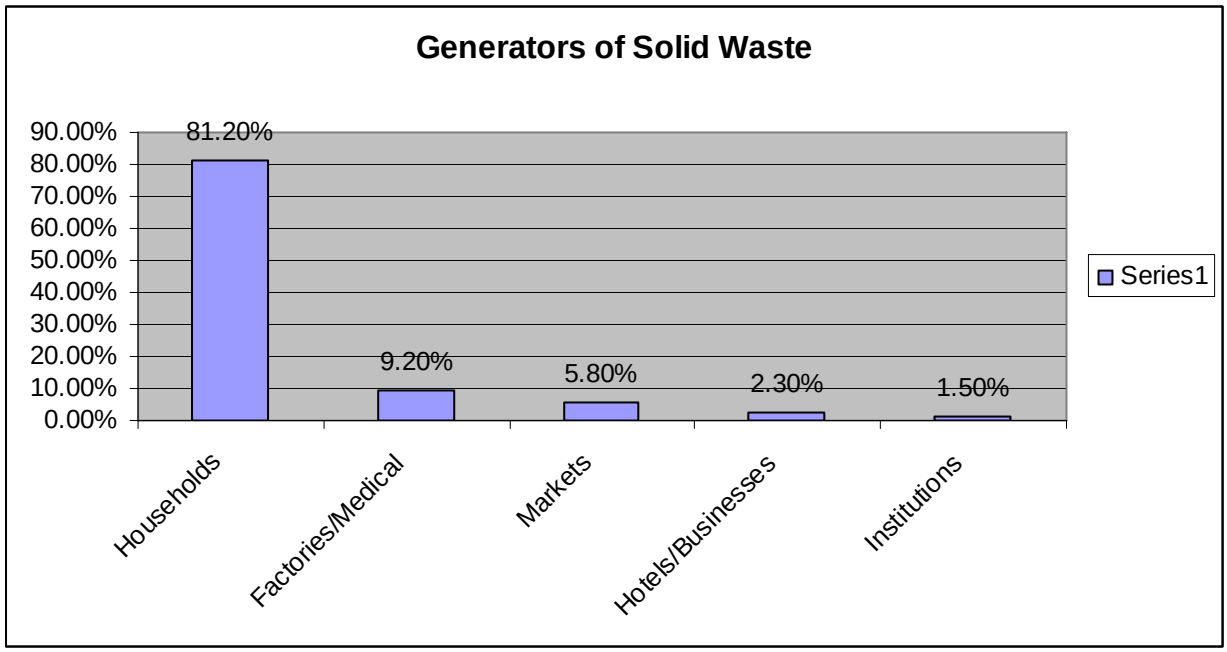
In developing countries where resources from the central government are scarce, cooperation from the public is necessary for an effective SWM. A pilot project initiated as a joint effort between the MPP and the Asian Development Bank (ADB) conducted in seven sangkats in Phnom Penh city to test if poverty could be reduced through sustainable self-help and community participatory processes shows that SWM becomes effective when the public is involved and cooperate in the process (Hakim, 2006). In this regard, the commune/sangkat councils and the village chiefs are the best channels for public involvement and awareness. In fact, the project team acknowledges that the success of such project depended heavily on the coordination of the local authorities. The detail of this project will be discussed later on in this chapter.

BASIC FACTS

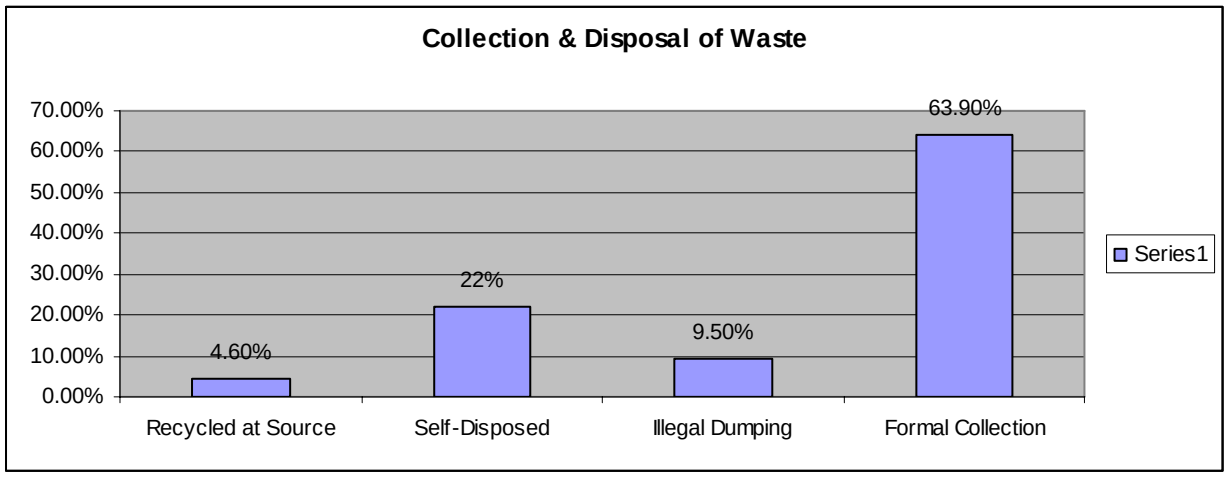
To manage waste effectively, one must possess a comprehensive understanding of its composition, the amount it is generated per day, who produces it, and what impact it has on the surrounding environment. Without a thorough knowledge of the characteristics of waste

in the area, planners can use the wrong techniques to manage it, the collection frequency can be too few or too often, and the way of disposing waste can be ineffective or even harmful.

According to the data posted on the UNDP Africa-Asia Eco-Partnership Programme's website, waste in Phnom Penh city is generated at around 906 tons/day during the dry season and around 875 tons/day during the rainy season, out of which only around 426 tons/day were collected. The majority of waste up to 81.2% is generated by households; 9.2% is produced by factories and medical general waste; 5.8% is market waste; 2.3% of waste comes from hotels and businesses; and institutional waste covers 1.5% (Chhoeurn & Thida, 2006).



Before solid waste reaches the municipal garbage dump, 4.6% is recycled at source. Generators dispose 22% of waste by themselves; 9.5% of waste is illegally dumped onto the streets, ponds, rivers or drainages. Only 63.9% of waste is collected and disposed of by the formal SWM operation performed by CINTRI and the PPWM (same source).



Solid waste in Phnom Penh city can be categorized into two main types: organic waste and non-organic waste. Non-organic waste usually can be separated into 3.8% of paper/cardboard, 13.2% of plastics, 1% of metal, 4.9% of glass, 0.6% of rubber/leather, and 11.5% of the 'other' elements (Kum, Sharp, & Harnpornchai, 2005a).

Characteristics of solid waste in Phnom Penh

Parameter	Value
Composition (% wet wt.)	
Organic waste	65
Inorganic waste	
Paper/cardboard	3.8
Plastics	13.2
Metal	1
Glass	4.9
Rubber, leather, etc.	0.6
Other	11.5
Moisture content (%)	50
Density (kg/m^3)	350–400
Calorific value (kcal/kg)	1000

(Inter-Consult, 2002)

GARBAGE DUMP

Waste is formally disposed of through dumping into an open dump called "Stung Meanchey Municipal Waste Dump" located in the southern part of Phnom Penh city. It

covers 100-acres (6 hectares) of land. Waste-collecting trucks drive down the site and dump its content openly. Wastes dumped into the landfill are not covered and/or treated properly. During the rainy season, the area is flooded, and the fetid water submerges the surrounding residential areas. The landfill gets a nickname called the "Smoky Mountain" because it constantly releases miasma of smoke into the air as a result of methane, created by rotten waste, burning the garbage. According to a New York Times article, around 10,000 people, out of which 600 are children, are working and living on the dumpsite and the surrounding area (Barboza, 2003). Chapter Two will explore scavenging in more detail.

To date, the dumpsite is overflowing. Because of the lack of funding to operate a new landfill, garbage continues to be dumped there. A new landfill area was studied and proposed to the MPP in 2003. However, problems associating with establishing a new landfill are (1) the plan fails to attract sufficient funding from donors, (2) the increase in transportation cost to and from the proposed landfill, which is located further away in Dang Kor district. According to an unpublished calculation of the future disposal cost when the new landfill is operational, it is estimated that the MPP will need to spend around $8 to dispose one ton of waste (Inter-Consult, 2002). In this rate, MPP will need to spend approximately $7,248 a day to collect and dispose all of the solid waste in the city. It is very unlikely that the MPP would have enough financial resources to do so. That is the reason why waste diversion is necessary to reduce the volume of waste to the minimum.

WASTE DIVERSION: RECYCLING AND COMPOSTING

At the present, there is no recycling plant to convert some of the materials in the waste for reuse purposes. Most of the recycling job is done through scavenging and itinerant waste buyers. Household waste generators sometimes separate some materials from their waste to be re-used or sold to itinerant waste buyers who go door-to-door buying recyclables. Some businesses, for instance drinking water companies, would collect their old bottles and containers for recycling purposes.

The PPWM is implementing a pilot project using low technology to convert waste into composts. Collected waste is manually separated into recyclable materials for sale at the end of the month, compostable materials for compost-making, and the left-over material for disposal at the dumpsite. Compostable materials are stored in bins with aeration tubes. It

takes three to four months for waste to be fully decomposed. Only then it is fed into another machine that separates it by particle size. Compostable waste materials are selected from mixed waste. The quality of the output composts is very high, thanked to the employment of low technology. The present composting coefficient rate is 9:1, meaning that 9 tons of compostable waste is needed to produce one ton of compost (Kum, Sharp, & Harnpornchai, 2005b).

Though the compost quality is high, the market for composts is still underdeveloped. The main reason preventing compost market from growing is the high price of compost sale. The current price is set at US$125 per ton of compost, five times higher than the reasonable market price (US$25/ton). The current sale price does not include profit. The PPWM set the current sale price equal to the current production cost. The production cost is high because it is based on the assumption that eight workers could sort about 500 kg of compostable materials from mixed waste, but in reality, according to an unpublished study by Inter-Consult in 2002, four workers could sort up to 700 kg of compostable materials from mixed waste in four hours. The assumption should be updated, and the production cost could be reduced as low as US$35 per ton of compost produced from mixed waste (same source).

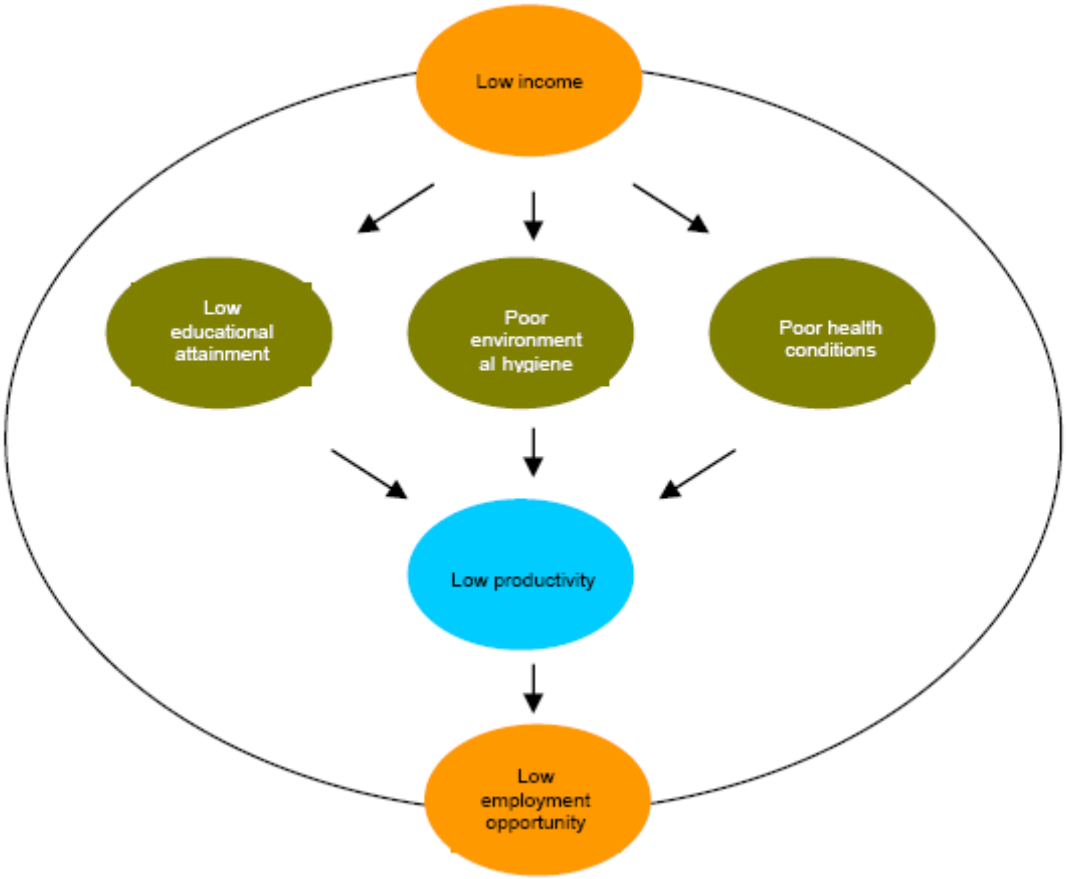
Source separation could even further reduce the production cost, but source separation requires participation of the generators i.e. the public. Kum Veasna argues that the public could be encouraged to participate in source separation through economic incentives. Source separation might not be possible in the short term. Even without the contribution of source separation, with as little as US$10 subsidy, the PPWM could bring the compost price down to the potential market price at US$25 (same source). However, evidence in the MPP-ADB pilot project shows that there are other factors that could also increase public participation such as building community ownership in SWM matters and raising public awareness of the environmental impacts on their livelihood.

THE MPP-ADB PILOT PROJECT: PARTNERSHIP FOR A CLEANER CITY

Financed by the Japan Fund for Poverty Reduction, the MPP-ADB pilot project started in September 2002 and was completed in November 2005 with a very positive result. The project was based on the belief that people are trapped in the ‘poverty cycle’, and to reduce poverty, the cycle needs to be broken through improving the environment, human

conditions and income generation at the individual, community and societal levels. The 'poverty cycle' can be explained in the following diagram.

The Poverty Cycle



(Hakim, 2006)

The target areas were poor communities in seven sangkats where the environment was heavily degraded due to poor SWM. At the first, the public's response was skeptical and lukewarm towards the project, but through people-centered approach, dialogues, persistency and trust building, the public became actively engaging and taking ownership of the matter. It is interesting to note that the amount of contribution in cash from the community is significantly high. Up to US$35,075 (or 99.16% of the amount pledged) was collected from the communities to spend on SWM and community infrastructures.

The core activities on the project focused mainly on SWM. It was believed that effective SWM would improve the environment. Good living environment would improve the human conditions. And ownership of SWM would create jobs and increase income

through recycling and composting. Unlike a top-down approach, in which a SWM company would do all the garbage businesses as subtle as possible, this kind of community-centered approach requires the participation of all stake holders. Such commitment was achieved through learning and participatory approach, public education and awareness campaigns, and persistent policy advocacy and dissemination of experience. As a result, all stake holders including the private sector, NGOs, the public and municipal government took part in the project.

The spin-offs from the project include a substantial increase in social capital, trust in community leadership (commune/sangkat councils) and municipal leadership, increase of property value as a result of improved living environment and beautification of the villages, and the development of a market for recovered materials from waste. This goes to show that the public is willing to participate and invest in improving their environment if there is a persistent effort in getting everyone involved and active public education/awareness campaigns.

ANALYSIS OF CURRENT SWM SYSTEM IN PHNOM PENH CITY

Two agencies are in responsible for SWM in the city: CINTRI Company and the PPWM. The PPWM is expected to provide SWM services to areas that are not covered by CINTRI. Usually, these areas are poor neighbourhoods and squatters where road access is difficult. Given the limited financial and human resources at the PPWM, SWM services in these areas are basically non-existent.

Even in areas covered by CINTRI, SWM is still far from being effective. As presented earlier, only around 64% of waste is collected and disposed of. Generally speaking, illegal dumping and uncollected waste remain a major problem in the city. They lead to many other social problems such as damage to urban infrastructures, including drainage blockages and flooded roads, health problems caused by fetid water, decrease of property value due to poor environment, and psychological stresses as a result of indecent living environment and bad odors. If examine closely, the problem of SWM in the city is caused by several roots:

Lack of Public Awareness and Cooperation

It is common to see people throwing away garbage from their vehicles onto the street, thinking it would just disappear either by cars running over it or somebody else cleaning it up. People would toss their trash into a river, lake or drainage, thinking the water flow would flush it away without realizing about the clogging problem. The problem of public cooperation could be solved by increasing public awareness through educational campaigns as demonstrated in the MPP-ADB pilot project described earlier. Mass media could be an important tool. Once the society recognizes and accepts that littering is a taboo, which could be developed through public education, the social norm could work much more effective and enforceable than regulatory penalties. This does not mean regulatory fines are not needed, but it is to say that regulations could be better enforced when the people accept that they are right and good for them.

Proper Storage System at Source and Transfer Depots

Kum et al. (2005) identifies the need for a sound storage system and suggests that standard containers should be provided. The problem of containers being stolen or used for other purposes than waste storage in developing countries is resolved by fixing the containers to a fixture or labelling the containers to make them recognizable (Kum, Sharp, & Harnpornchai, 2005a). However, I argue that as long as the containers are made of material valuable on the junk market, for instance steel or zinc, they will be in great demand, thus labelling them alone might not work. Plus, it could be expensive to produce them.

Standard containers are necessary, but they should be made from recycled or cheap materials, for example rubber from old tires, that they will not end up in the junk dealers' inventory. If valuable material is needed to ensure the endurance of the standardized bins, they should be fixed or chained. However, the investment cost requires for the production of good quality standard bins might constrain the municipal government or SWM company from seeking this option.

Collection trucks need wide paved roads for operation. As a result, poor neighbourhoods including slums and squatter areas are usually inaccessible for collection trucks. This makes manually operated carts or animal driven wagons useful in collecting garbage from households in the areas. However, these carts or wagons have limited range. Therefore, it is necessary to create transfer depots where the carts or wagons can transport

garbage to and temporarily store it there until the collection trucks come to pick it up and take it to the final dumpsite. Again, storage at these transfer depots should be closed and standard bins should be provided to avoid scattering of waste as a result of scavenging and to increase collection speed.

Waste Collection Schedule

People generally do not know for sure when the waste-collecting truck would come to pick up their trash. This is because collection schedule is not publicized. People usually pack their garbage in plastic bags or their own bins and leave them outside their residence. Oftentimes residents complain that their trash bags are scattered by scavengers or that their garbage is poured out on the ground and the bins are stolen. This type of problem intensifies the negative perception of the public on street scavengers (see Chapter Two below). In areas where standard bins are provided, for instance market places or transfer depots, it is common to see that rubbish is overflowing. The need to increase the storage capacity or the number of those bins is pressing.

SUMMARY

To improve SWM in Phnom Penh city, the socio-economic and political complexity of the local context must be clearly understood. Such complexity includes factors such as the characteristics of waste, rate of generation, source of generation, financial availability, public attitude, existing efforts in dealing with SWM issues, and so on.

Like many cities in other developing countries, the composition of waste in Phnom Penh is made up of a high density of moisture and a majority of organic materials. Combined with the hot and wet tropical climate of the city, waste decomposes rapidly. Therefore, treating waste (collecting and disposing) of this nature requires a different approach from the ones used in dry places or developed cities.

However, planners should be wary of any capital-intensive scheme since usually the financial capability of the municipality is too scarce to ensure sustainability. Phnom Penh is fortunate to escape such policy mistake, but employing low technology does not guarantee a successful or effective SWM. In countries where the central government is too poor to

provide efficient and effective SWM services, and privatization does not do any better like in the case of Phnom Penh city, transferring the responsibility to the communities through changing public attitude and increasing public awareness and cooperation could be the 'silver bullet' to the SWM problem. This approach has proven that not only SWM is improved at the community level, but spin-off effects such as increased social capital, higher income generation, more jobs, better property value, improved public health, trust and accountability in local authorities, and many others are also achieved.

SWM does not involve only in collecting and disposing of waste alone. Waste diversion such as recycling and composting should be seriously considered. Not only waste diversion can help reduce SWM cost through revenue from the sale of recovered materials and composts, but also it reduces waste volume to be dumped into the landfill, thus prolonging the lifespan of the landfill. There are preliminary efforts in trying out these concepts through some pilot projects, but such efforts have not been given any serious attention by the municipal government. Compost production cost is too high making compost sale price much higher than the market potential price, when in fact compost production cost could be made lower. If labour cost/productivity is re-evaluated and a small amount of subsidy is provided, the market for composts could be attractive given the high quality of composts produced using low technology.

Some non-organic materials could be recovered for recycling or used as ores. Heavy investment in recycling plants might not be feasible, but the market for recovered materials from waste is already in existent through the informal sector of the economy – scavenging and junk dealership. Since scavenging activities also contribute to the removal of waste, it generally considered as the informal sector of SWM. Scavenging is a widespread phenomenon in developing countries. Economic hardship forces the poor (might not be the poorest) to make use of whatever accessible to them. Communities are formed; markets for recovered materials are created; and the contributions that scavenging has to offer have become the focus of many governments and scholars.

SECTION TWO: INFORMAL SOLID WASTE MANAGEMENT – SCAVENGING

There are different forms of scavenging activities in an urban setting, but in this chapter, I would like to examine two different types of scavengers in Phnom Penh: street

scavengers and dumpsite scavengers. Street scavengers refer to children or adults roaming the streets of the city peeping into households or businesses waste containers, looking for saleable materials, edible food or any usable items. Some of them work alone, but oftentimes they work in pairs or occasionally in a group of three for better protection from street gangs or dogs. Dumpsite scavengers refer to those who reside and make a living on the municipal dumpsite by scavenging the garbage there for the same materials that street scavengers seek.

STREET SCAVENGERS

Street scavengers are often people from other provinces in the countryside coming to the city to look for jobs. Some of them are surprised to learn that it takes more than their labor to get into the garment factory jobs, for instance, kickbacks demanded by mid-level managers and the prerequisite skills needed for the jobs. Many of them seek construction work but only to find it too physically challenging as compared to scavenging, begging or other occupations. A life story of a former street scavenger reveals the following account:

> "As a young teenager, Sokhom thought he could help his parents escape poverty by finding work in the city. He left their small farm in rural Cambodia and found a job as a construction [worker] working in the capital, Phnom Penh. But the heavy labour was too difficult for him. Sokhom became one of the thousands of children living on Phnom Penh's streets, begging for food and sleeping on the ground because he couldn't afford to return home. Sokhom was in a terrible condition after months on the street. His life only improved only after he went to the Bamboo Shoots Center. There he received food, shelter, basic education and health care, and most importantly, was reunited with his family" ("Street Children: Sokhom's Story", 2006).

There are actually different kinds of street scavengers. The first category, which is the most common one, is the street children who were abandoned, left home for work like Sokhom, or are orphans whose parents died of HIV/AIDS. The second kind is families including parents and children who are living on a long term basis on the streets. Another group of street scavengers belongs to families who moved to the city to look for better economic opportunities, but ended up living on the streets on a temporary basis. They can always return to their home in the countryside whenever they feel that such decision is more

beneficial. It is estimated that there are from 14,000 to 20,000 street children living on the streets of Phnom Penh ("Country Specific Information: Cambodia", 2007).

Street children are vulnerable to abuse, drug and exploitation. In addition to rape, these poor kids suffer also from sex tourism. Although many tourists come to enjoy the beauty and the culture of the country, Cambodia is becoming a haven for pedophiles. The government and many organizations are working hard to prevent this tragedy, but these street children are helpless against extreme poverty and the lure of tourists' dollars.

SOCIAL PERCEPTION OF STREET SCAVENGERS

In general, street scavengers are not well received for several reasons. First, they prefer to work silently sliding along without being noticed. Their discrete nature makes them suspicious of theft and other misconducts. Second, many of these street scavengers are abandoned street children who are also glue addicts[1]. Third, most of the street scavengers are opportunists in a sense that they constantly look for saleable materials or anything that is valuable to them. These materials may also include the items that are not yet discarded as waste. Conflicts often arise when street scavengers misperceive an item as discarded waste and try to recover it, when in fact the owner is still using that item.

Another factor that also contributes to the negative social perception of street scavengers is that their scavenging activities, instead of contributing to waste removal in the neighborhood, make it even worse. This is because whenever they scavenge they only take what they want and leave the rest of the remaining waste scatter all over the place. Sometimes they even pour the waste out on the ground and take away the container. This makes the public and SWM workers angry because they are the ones ending up cleaning the mess.

STREET SCAVENGING AND SOLID WASTE MANAGEMENT

[1] Many of the street children are addicted to sniffing glues used in the construction work. The scent generated from these glues can be very addictive and could cause many health damages to the sniffers if use in a long term period.

The contribution of street scavenging in waste removal is limited. As argued earlier, although some materials are recovered from waste, the irresponsible scattering of waste caused by the activity makes it difficult for the SWM operation. It is found that collecting scattered waste on the street is more costly than collecting waste properly stored in a container (Flintoff, 1984). If waste at source is properly separated and kept intact, the yields at the designated processing sites, both in terms of recovered materials as junk and as composts, could be higher. Not only the contribution of street scavenging in SWM is insignificant, but also the vulnerability that comes along with this type of occupation including drug abuse, sexual exploitation, prostitution, crimes and other social problems out cost any benefit that street scavenging can offer. Therefore, I argue that street scavenging should be discouraged through measures such as:

1. A close system of waste storage at source should be in place to prevent scavenging. This could be achieved through the provision of low cost and close-lidded standard bins that are locked to a fixture.
2. The public should be encouraged through educational/awareness campaigns to participate in waste separation at source.
3. The local authority should work closely with the non governmental organizations in getting street children to proper shelters, food and education. A regulation should be in place and properly enforced.
4. Processing of waste for recovered materials as junk and as composts should only be done at the designated processing sites for higher yields and efficiency.

Since mechanized processing plants are inappropriate for a poor developing country like Cambodia given the high moisture of waste content, the lack of capital and the abundant supply of labor, the contribution of scavenging at the dumpsite should be considered.

DUMPSITE SCAVENGERS

It is estimated that around 10,000 people (Barboza, 2003) are living around the current municipal landfill called Stung Meanchey waste dump, also known as the “smoky mountain”, located in the southern part of Phnom Penh city. Some of them are from the city, but most came from the countryside looking for jobs in the city and ended up there. They live

in families. Adults and children alike work from dawn to dusk on pest-infested heaps of garbage, earning from US$ 1.00 to US$ 1.25 a day from selling recovered materials to middlemen who also have their outlet huts somewhere in the vicinity. The sum of all family members' earnings can be much higher than what they could earn in where they came from. According to a survey done by a JICA team, it is found that on average dumpsite scavengers can earn as much as US$ 40.5 per month, the same amount as the basic salary paid to garment factory workers (Kum, Sharp, & Harnpornchai, 2005b). However, the working condition at the "smoky mountain" is much worse than the working condition in a garment factory.

The municipal dumpsite got its nickname as the "smoky mountain" because it constantly releases miasma of smoke as the methane generated by the rotting garbage literally burns the waste day and night. Scavengers working on the dumpsite inhale the smoke every of their breath even when they are not working since most of them also sleep on the dump. Their shelters are made of cardboards and other materials found in the waste, which mainly serve as blinds rather than houses. At night, rats and other pests attack sleepers. Residents of the dump could hardly have access to clean water. Sometimes cleaning of dishes is done using fetid water surrounding the dumpsite. According to a New York Times article (Barboza, 2003), a Japanese study found that there are high levels of dioxin in the soil and large amounts of heavy metals in the metabolism of children working on the dumpsite. Dioxin, a result of burning chemicals, is a highly toxic chemical that can cause cancer.

Cleaning dishes in fetid water (Dakowicz, 2005)

In addition to the poor sanitary conditions, work on the dumpsite is dangerous especially when scavengers fight for fresh loads of garbage around the operating trucks and bulldozers. There are reports of fatal accidents involving trucks running over scavenging children. Seng Sagn, 53 years old, who is the commune chief of Stung Meanchey, a district in where the municipal dump is located, expressed his concern:

> "I'm worried about the health of the kids and accidents can happen to them any time when they are picking up trash. Trucks have run over some children and bulldozers have buried some kids under the trash" (Barboza, 2003).

As a result, scavenging at the dumpsite has been perceived as an obstacle to the formal operation of the SWM. Both the local authority and the private company in charge of SWM in the city have sought ways to get rid of scavengers; however, if properly facilitated, scavenging at the dumpsite can contribute significantly to SWM, jobs, businesses and increase of income for the most impoverished in the city.

HOW SCAVENGING AT THE DUMPSITE WORKS

Most of the scavengers at the Stung Meanchey landfill live and work on the dumpsite. Though some of them come from the city, they are usually homeless. Many of them come together in families, but those without any relatives would soon find ones by being informally adopted. This is probably because no one can make it alone on the dumpsite. A 13-year old boy, Phlork Veasna, reveals the following account of his life as a scavenger:

> "After my mother died in 2000, I lived with a man who knew my family. My life was garbage. Everyday I collected garbage at Smoky Mountain. I worried about the bullies there and that they would force me to become an addict. I always had to watch out for them. They beat me and took my money. Sometimes I slept at the dump with old people. I was very much afraid of ghosts. I earned about 1,600 riels[2] a day. I bought rice and food for my foster

[2] The exchange rate is 4,000 Riels per one U.S. dollar.

> father. When I couldn't earn money, my foster father and I had no food. He borrowed 60,000 riels ($20) from a garbage buyer. He had to pay a lot of interest on it. He had a swollen belly and foot. I was very lonely; I had no siblings. I never had money for clothes or flip-flops. I had two meals a day of rice and dried fish, sometimes with salt. I found things in the garbage to use – flip-flops, a t-shirt, a pair of pants. I washed only once a day because I had very little money to pay for water. I sometimes got diarrhea because I ate dirty food ..." (Veasna, 2007).

Small credit loans are necessary since scavengers sometimes need extra money for food, water, medicine or the tools of their trade. Buyers of recovered materials at the dumpsite are the ones who provide such loans. Payment of the loans can be made gradually through the selling of recovered materials to the collectors. Usually, scavengers would make their home on the site using whatever materials they can find in the garbage, but better constructed tents or houses are also available for rent. Usually, these middlemen are the ones in charge of this arrangement.

Materials recovered by scavengers are weighed and valued according to the quality of the materials. Highly contaminated materials are discarded. It is common to observe that the scale used in weighing the materials is not accurate, often favoring the dealer; however, scavengers also play their own trick in balancing their losses by sometimes soaking the materials wet or inserting a few stones to increase the weight. This type of transactions is done at the collectors' outlets at the dumpsite. At the end of the day, the materials are packed onto a truck and transported to a storage location before another transaction takes place.

Recovered materials loaded on truck (Dakowicz, 2005)

The market for recovered materials in Cambodia relies almost completely on the demand from Vietnam (Kum, Sharp, & Harnpornchai, 2005b). Collectors, who buy the recovered materials from scavengers, stock these materials temporarily at a storage location. Since the price of land or the rent is normally too high for collectors to make any profit, storage capacity sometimes is limited. Dealers from Vietnam purchase the recovered materials from local collectors in bulk and ship them to Vietnam either by trucks or by boats. It is common to find that before the recovered materials actually reach the factories in Vietnam, they often pass through several other complicated transactions.

CONTRIBUTIONS OF SCAVENGING

Generally, scavengers are seen as parasites of a city – an existence that reflects the dark side of a society: filthiness, loneliness, despair, poverty and anything else that people try to stay away from. On the contrary, the reality of scavengers is very much different. In stead of being lonely, scavengers usually have a family or groups to which they feel belong, and they need a network of people and a market to trade their products. If one takes the time to consider scavenging thoroughly, one can actually finds that it has many benefits to offer to a society.

First, scavenging as an occupation can serve as a safety net before the most impoverished of the city fall into crimes. These people usually do not have the skills or education required for most of the urban employments. Scavenging is a very low skill job, and it offers a very high flexibility in dropping in or out of the occupation. The earning is not very bad either if a scavenger works hard. Eliminating scavenging would deprive them off their self-help survival means, forcing them into desperate occupations such as prostitution, theft, and other crimes.

Second, scavenging contributes to the SWM of a city in terms of reducing the volume of waste. Generally speaking, waste is composed of organic and non-organic substances. In a developing country's setting, more than 50% of waste is of organic substances, which can be made into composts. Non-organic substances of waste are further reduced through scavenging. Materials such as paper, cardboard, plastic, metal, etc, are very much sought after, and they can be recycled. As a result, the volume of the remaining real waste that has to go to the landfill will be very much reduced, thus prolonging the lifespan of a landfill and relieving the environmental burden that our planet has to bear in decomposing waste.

Medina (1997) further suggests that scavenging serves the function as a supplier of raw materials for factories, reducing the need to extract and process virgin materials. Ores supplied by recovered materials are much cheaper, in terms of price and environmental cost, and are easier to process than virgin materials. Sometimes, recovered materials can also serve as an import substitute when the required virgin materials are not available in the country.

Last but not least, scavenging could contribute to the neighborhood economy through increases in income for the poor; stimulating the markets for recovered materials and other needs such as drinking water, food and shelter for scavenging workers; building up social capital through cooperation, trust and small credit loans; and increases in the property value as a result of a cleaner and more sanitized neighborhood, as shown in the MPP-ADB project earlier.

The downside of this kind of occupation is the poor working conditions, which if properly addressed could be resolved. Instead of fighting for fresh loads of garbage around the operating machinery, scavengers could be arranged to work at a safer place where the activity is facilitated in an orderly and efficient manner. The sanitation problems could be

improved, for instance, by providing gloves and masks to workers, access to clean water, and better housing. When the current open-uncontrolled landfill is closed and the new sanitary landfill is fully operational, scavenging can be organized in a way that is free from pollution. Given the benefits it has to offer, unlike street scavenging, I argue that dumpsite scavenging should be properly facilitated and organized.

SUMMARY

Scavengers in Phnom Penh city can generally be classified into two main groups: street scavengers, who roam the streets of the city looking for saleable materials in waste; and dumpsite scavengers, who live and work on the municipal landfill. The situations and challenges that these two groups face are very different from one another.

Street scavengers are not very well received by the majority society. This is because of the clashes that sometimes occur when street scavengers intentionally or unintentionally extract items or materials that are not yet discarded as waste. Drug problems, especially the addiction of glue sniffing, add up to the ill perception of street scavengers. Although scavengers at the dumpsite also have the same drug problems, they might not experience the same discrimination like street scavengers because they are living in a community that is isolated from the mainstream society, while street scavengers usually sleep along the corridors of someone else's home. In addition, street scavengers, particularly young children, are vulnerable to sexual exploitation and rape because of the lack of protection from families.

In relation with SWM, street scavenging activities actually pose obstacles to the effectiveness of waste collection. Irresponsible scattering of waste and, sometimes, the stealing of waste containers make the operation of waste collection more costly and more difficult. The nature of the activities is sporadic and disorganized, which contribute to the inefficient retrieval of recovered materials. Efficiency can be increased if the retrieval of recovered materials is done properly at a designated site, and source separation and integrity would make a big difference in the quality and quantity of the recovered materials. Therefore, street scavenging activities should be discouraged, and the government should take proper measures in caring for the street children.

On the contrary, scavenging at the dumpsite is an attractive occupation for the most impoverished in the city since the average earning is at the same level as the basic salary of a

garment factory worker. The problem of dumpsite scavengers is that the working condition is terrifyingly hazardous. In addition to the highly polluted environment at the dumpsite, the danger of being run over by waste-collecting trucks and bulldozers is very real, not to mention the high possibility of living with cancer as a result of Dioxin.

Nevertheless, the contributions of scavenging at the dumpsite are too significant to be ignored. In addition to the economic benefits including: jobs for people without adequate skills or education, economic stimulation at the neighborhood level, and supply of low price raw materials to factories, dumpsite scavenging can also contribute environmentally in terms of reducing the volume of waste, expanding the lifespan of a landfill, and alleviating the need to process costly and sometimes non-renewable virgin materials. Socially, dumpsite scavenging activities create a community that is based on trust, cooperation and mutual benefits. Therefore, social capital is increased.

The bottom line of my argument is that if dumpsite scavenging activities are properly facilitated in a manner that the dangers of the working condition are removed, there should be no question that this type of occupation is worthy of serious consideration. That being said, the notion of integrating scavenging into the formal operation of SWM appears to be quite plausible. To what extent is this notion feasible is further discussed in the following section.

SECTION 3: CONCLUSION

INTEGRATING SCAVENGING INTO THE FORMAL SOLID WASTE MANAGEMENT

The notion of integrating the informal sector of SWM into the formal one has recently become popular. Each scholar proposes different approaches to go about achieving this (see Sicular, 1992; Medina, 1997; Nas et al., 2004; Wilson et al., 2006). The reason why this idea is popular is because despite the detrimental health effects and some social issues involved in this kind of occupation (see Chapter Two), the socio-economic and environmental benefits that scavenging can contribute are too significant to ignore. That is why the desire to bring scavenging under formal managerial control is tempting because once the negative social and health effects are dealt with, scavenging can become a very healthy and lucrative business.

Sicular (1992) proposes that a scavenging cooperative, known as Garbage Industrial Estate (GIE) should be created with three possible interventions: 1) a separate cooperative that poses a direct challenge to the existing middlemen; 2) a cooperative that works along

side with the existing middlemen by including them in the board; and 3) an outside cooperative with as little interference as possible to the existing middlemen system that basically serves advisory functions, setting guidelines, and providing assistance to scavengers (Sicular, 1992).

Medina (1997) leans more towards creating a separate cooperative that competes directly with the middlemen. He suggests that a democratic cooperative could be created under the help of non-governmental organizations (NGOs) and/or community-based organizations (CBOs). The NGOs/CBOs play a critical role in mobilizing for political and public support through mass media and grassroots campaigns. However, Medina warns that opposition from the middlemen and negative attitude and subversive behavior from the local authorities have been the cause of cooperatives' failure in some countries, where patron-client relationship exists between them and the scavengers (Medina, 1997).

Nas et al. (2002) also argues that scavenging cooperatives or associations are crucial to break scavengers out of the 'poverty circle'. He lays out four levels of interventions: 1) factories/industry level of intervention, in which manufacturing factories advocate for the forming of scavenging cooperatives to ensure supplies of cheap recovered materials and to improve their socio-environmental conscious image; 2) middlemen level of intervention, in which buyers of recovered materials mediate between the scavengers and industry; 3) scavengers level of intervention, in which scavengers organize themselves into cooperatives/associations; 4) the level of interventions realized by international institutions or local governments. Nas gives examples of different levels of interventions in different countries. According to Nas, scavengers level of intervention has proven to be successful in Colombia, Brazil and Egypt, while other types of interventions have failed in other countries. Thus Nas differs from Medina in a sense that Nas seems to support the type of intervention that comes at the scavengers level (Nas & Jaffe, 2004).

Wilson et al. (2006) addresses the issue of integrating scavenging into the formal management from a participatory approach with an eye on the need to engage all stake holders including the local governments, the NGOs/CBOs working in the field, the private sector, and the scavengers. Wilson argues that to move scavengers out of the 'poverty circle',

they have to move up the scavenging hierarchy[3] in order to increase their income. The higher they climb, the less exploitative their situation is. However, the success of forming scavenging cooperatives, argues Wilson, depends on the collaboration among different actors including the government in changing their hostile attitude and repressive policies towards scavengers, the private sector in the willingness to shift their sources of supply of scrap materials and in providing credit to form micro and small enterprises (MSEs), and the NGOs/CBOs in providing for technical and social assistance such as capacity building through training workshops, schools for children of scavenging families, health centers, hygienic equipments, clean water and appropriate housing, etc. This type of approach is coined into a term called Public-Private Partnership (PPP), and has been successfully implemented in Sao Sebastiao, Brazil (Wilson, Velis, & Cheeseman, 2006).

Although these scholars propose different approaches, they all agree that forming scavenging cooperatives/associations is the first and most important step. Not only scavenging cooperatives/associations can boost scavengers' income, but also they can generate social recognition and support that are necessary in improving scavengers' status and political voice. These authors also agree that economic empowerment must not come alone, but social provisions such as schools, health centers, housing, clean water and many others should also come along to make the life of scavengers more humane and better off. The role of NGOs/CBOs can be significant in fulfilling these needs given the fact that local governments usually do not have sufficient fund for such provisions. Last but not least, all of these scholars emphasize the importance of changing negative policies and attitudes that the local authorities and the mainstream public have against scavengers. Unless scavengers are no longer viewed as 'sub-human' or the 'untouchable', it is very difficult for them to escape the trap that makes them equal to the rubbish they are working with.

The proposals to integrate scavenging into the formal operation of SWM, as planned by these scholars, are utopian ideals that rely on the comprehensiveness and creativity of the plans to attempt for the solutions to the conventional problems of the society. The problem is that different planners have different ideals, and they focus on spatial entities, i.e. communities, that are place based. It is difficult to make any policies or plans on scavengers

[3] Individual scavengers are located at the lowest level, followed by family-type scavenging units, and then recycling enterprises/cooperatives, and then craftsmen/middlemen, and then brokers/wholesalers/other processors, and manufacturing industries stay on the top.

people based because scavenging as an occupation is informal and unregistered. As a result, solutions seem to be proposed with a focus on a spatial area around the garbage dump.

The definition of place-based and people-based policies is given in Spencer's work (2004). People-based policies are aimed at individuals or households, while place-based ones target particular areas or neighborhoods (Spencer, 2004). Instances of people-based policies include tax credit for those who earn below a certain amount of money, food subsidies for the people who are marked as living under the poverty line, and other sorts of direct transfers of assets to individuals. Place-based policies can be seen in programs that invest in the infrastructures of a place or tax benefits to businesses operating in a particular area like the practice of Economic Zoning (EZ).

Attempting to resolve the problems related to scavenging from place-based policies as the ones proposed by the scholars described above could bring forth two possible scenarios. First, the area might continue to be segregated like what happened to many public housing projects in which the poor are concentrated and thus isolated from the mainstream society. It is found that spatially concentrated poverty has negative effects on individual residents and that antipoverty programs should be implemented not on either end of both extremes – people-based vs. place-based – but on an integrating approach of the two (Spencer, 2004). The second scenario portrays the possibility that the programs become so successful to the extent that scavenging becomes so lucrative (after it is highly subsidized). This would bring a boost of migration influx to the area in seek of scavenging opportunities, putting even more stress on the infrastructures and services in the spatial community. Then the question is how far can the policies go to catch up with the rapid urbanizing rate? When scavenging is formalized and becomes lucrative, then who to include in the cooperatives and who to exclude? What would happen to the new comers? The cooperatives would not be able to accommodate everyone as more new comers arrive. Then for those who are excluded, would not they become informal scavengers and compete against the now-formalized scavenging cooperatives?

Informal scavenging depends on market demand for scrap materials and access to waste. When the system remains informal, it is capable of adjusting itself in limiting the number of scavengers and what materials need to be recovered. The very fact that scavenging is a very low status and dangerous job deters many from seeking this occupation. As a result, the system maintains its equilibrium state in which the supply matches with the demand.

Wilson et al. (2006) rightly points out that low levels of economic development in developing countries force the poor to enter the informal sector of SWM (Wilson, Velis, & Cheeseman, 2006). Perhaps the solution to the issues related to scavenging is found in improving the macro economic development rather than focusing on scavenging itself. And perhaps what is informal should be best left informal.

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