Waste-econ program

Gender and the waste economy Vietnamese and International Experiences

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Introduction

This book presents a collection of papers from a workshop held in Da Nang, Vietnam on February 21, 2002 on gender and the waste economy. The waste economy consists of all formal and informal economic activities and all paid and unpaid activities associated with the management of waste. Such activities include income from employment in the waste sector, income from selling and processing waste material, internal management of household wastes, expenditures on waste collection and disposal, and expenditures on waste clean-up. A healthy waste economy maximizes economic benefits while minimizing economic and environmental costs.

A gender perspective on waste management is important for a number of reasons. First, many occupations in the waste economy are gendered, meaning that they are dominated by men or women. Second, the gendered nature of waste work means that men and women tend to have different exposures to health risks, different incomes, and different social status in their work. Third, women have domestic duties that usually include primary responsibility for waste management in the household. Fourth, women's responsibility for childcare often restricts their mobility and the time that they have available to participate in the waste economy. Finally,

women and men tend to have different social networks and different decision-making authority within the home, which can affect the ability of both women and men to influence decision making on household or community waste management.

Researchers from Vietnam, India, the Netherlands, and Canada made presentations at the February workshop. Nearly 40 participants attended the workshop from northern, central and southern Vietnam. The participants included waste-economics researchers, instructors, and managers from universities, government organizations and the Vietnam Women's Union.

The workshop papers focused on the role and contributions that women can play in the waste economy; constraints and obstacles and even pressures that women and children are often confronted with in this field; relevant policy solutions proposed to raise public awareness of the role of women and children in the waste economy; and supporting policies to enable women to improve their knowledge of environmental sanitation.

The first paper in this volume by Maria Muller and Anne Scheinberg uses gender analysis and a framework based on integrated sustainable waste management to investigate opportunities for increased employment in a modernizing urban waste economy. They examine how such opportunities can be created without disrupting the existing informal waste and recycling services and how to use the informal sector's expertise in any new initiatives. Using examples from a

number of lower income countries, they illustrate how gender and gender relations play a significant role in the waste sector, both in service-based waste management activities (related to payment for waste management services) and in commodity-based waste management activities (related to trading waste materials or items). They conclude with several suggestions for strengthening the informal sector and allowing both women and men to participate fully in a modernizing waste economy.

In India, the 1994 "plague" in Surat was partly caused by poor waste management practices and was a wake-up call for city officials responsible for waste management. In the second paper in this book, Almitra Patel describes the rise of concern about waste management problems in Indian cities and some of the innovative policies and programs that have been introduced to deal with these problems since 1994.

In the third paper, Dang Kim Chi provides an overview of women's involvement in waste management in Vietnam at the point of waste generation, during collection, as recyclers, and as waste pickers at landfills. She concludes that women play a significant role in the management of waste but cautions that the health risks experienced in some of these roles are very high. She suggests that more attention should be paid to raising women's awareness of waste-related environmental protection.

In the fourth paper, Tran Thi Huong focuses on waste economies at the ward or neighbourhood level in Vietnam. She first examines the potential for waste separation at the

source (in other words, at the household level and in public areas), collection of recyclable and reusable items, and local composting of organic waste. She also identifies key priorities for improving waste management at the ward level. She then reviews women's roles in waste management at the ward level and concludes that although their contribution is very significant, women often encounter difficulties in participating in waste management activities because of time limitations, health conditions, and potential risks from waste-related work. She recommends that efforts be made to raise public awareness of the need for all communities of men and women, young and old, to share the responsibilities of effective waste management.

The next two papers provide case studies of the role of women in waste collection in Hai Phong City and Ho Chi Minh City. Doan Thi Phuong Loan and Nguyen Thi Anh Thu examine collection (and recycling) of waste by the informal sector in Hai Phong City. They identify several economic, environmental and health problems facing women involved in waste collection and illustrate how the Hai Phong City Women's Union is working towards addressing these problems. They conclude with several proposals for improving the working conditions and livelihoods of women working as waste collectors and recyclers.

The paper by Pham Gia Tran explores the role of women in community-based waste collection in Ho Chi Minh City. Community-based collection is a method of organized waste collection run by local residents. The author introduces the paper with a short description of domestic waste collection

systems in Ho Chi Minh City and then analyses the working conditions faced by female community-based collectors. He concludes with a comparison of the advantages and disadvantages of community-based collection by women and men and makes recommendations for improving their working conditions and livelihoods.

In the final paper, Catherine Chalin, Huyen Nguyen and Huy Nguyen apply the theory of the determinants of health to examine the health problems faced by women and child waste pickers at two landfills in Vietnam. Their research links health conditions to socio-economic variables such as education, living conditions, and gender. They find that waste pickers face a wide variety of health problems and that waste pickers' perceived health status declines with age. In their conclusions, the authors make recommendations similar to those found in several of the other papers in this volume. They call for subsidized training programs for female waste pickers and subsidized child care and education programs for their children. They also recommend introduction of hygiene awareness and reproductive health programs.

The papers in this volume will be useful for researchers and others interested in gender issues and in waste management. The book will also be of interest to waste management professionals, upper level university students, and members of non-government and mass organizations.

We would like to thank the following people for their assistance in organizing the February workshop: associate Prof., Dr. Phan Quang Xung, President of Da Nang University, Prof. Dr. Bui Van Ga, Rector of Da Nang College of

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GENDER-LINKED LIVELIHOODS FROM MODERNISING THE WASTE MANAGEMENT AND RECYCLING SECTOR: A FRAMEWORK FOR ANALYSIS AND DECISION MAKING

Maria Muller
and
Anne Scheinberg

Introduction

This paper asks two basic questions:

1. Does the modernisation of the urban waste sector, especially the development of waste removal and recycling systems, offer opportunities for improved livelihoods? What are the economic characteristics and gender dimensions of those livelihoods?
2. If the goal is to create socially productive, sustainable livelihoods for women (and men), is the urban waste system a good place to look for those livelihoods? What do economic and gender analyses indicate about choosing the path for creating those livelihoods, and how can the insights be placed in service to development?

WASTE, a non-profit organization of advisors on urban environment and development, has been working on waste

management in poor and disadvantaged communities for a long time. Some of the most active organizations in these kinds of communities are involved in community clean-up, waste collection and recycling. According to David Wilson of the United Kingdom, the status of urban waste management can be used as a proxy for the general level of social development of municipalities or communities – it is a good indicator (Whiteman et al. 2001). At WASTE, we turn this insight on its ear: we have found that the development of the urban waste service and recycling sector is a reliable and interesting trigger for development, and that the skills acquired in working on the waste system serve community members well as they move to political, institutional, and economic development.

One reason that the urban waste sector can do this is that the resources there – that is the waste materials – are usually unclaimed, in societies where all other sources of resources are already allocated, and/or the commons is no longer available. Women and men who work with waste as waste pickers and waste buyers have identified a resource – waste materials – which is not forbidden to them. This partially explains why it is often the most economically or socially disadvantaged groups who end up extracting valuable materials from the waste stream. These groups may not have houses, or access to land, or water rights, but urban waste is available to them.

We would like to begin our paper with a bit of economic analysis about the kinds of livelihoods that we have observed in the urban waste sector, because we will base any future interventions on these forms. We observe that there are two different kinds of economic activities in the urban waste

sector, which have quite different economic, gender and social characteristics. We have called these service-based and commodity-based activities. We also recognise a third category of value-based activities, but we will not discuss those here. We give here a short introduction to each.

Service-Based Waste Management

Service-based waste management is related to a payment for a service, and usually this service is removal of waste, litter, latrine sludge or excreta. Service-based activities are usually paid for by the unit of work, that is, by the hour, by the curb-metre swept or by the household served.

Who pays? In service work, the client for the service is some kind of beneficiary, one who gets the benefit of the service, or usually, one whose waste gets removed or street gets cleaned. Sometimes this legal or natural person has to pay directly for the service himself, but more often the municipality pays on behalf of its citizen-clients, and they pay through taxes or a general fee.

What do we know about service-based activity?

- It is usually very badly paid.
- There are lots of hidden costs, which put the enterprise or individual at financial risk.
- Health and safety risks are not compensated.
- The enterprise is dependent on the municipality or the household for payment, and often this payment does not come on time or in full.

The enterprise is vulnerable to being displaced by the "development" activities of donors or the formal city authorities

When we talk about modernising urban waste systems, we are usually talking about introducing or modernising a service relationship when we are discussing:

- Street sweeping
- Residential or commercial waste collection
- Industrial or urban cleaning
- Separate collection of recyclables
- Latrine-emptying or gutter and sewer cleaning

In fact, most of the activities related to environmental protection, urban modernisation and privatisation, and urban upgrading are activities in the urban service sector.

Commodity-Based Waste Management

Commodity-based economic activity is based on trading items or materials for a price. The price is usually paid per kilo or ton, but sometimes also for specific items, like glass bottles or car batteries. The payment is based entirely on the value of the item or material i.e., its commodity value. In the case of waste materials, this commodity value is derived from the original value-added of the item being disposed, and the activity of recycling or recovery is based on capturing this residual or retained value.

Prices for commodities are not usually set locally, but are set by the world marketplace, particularly the prices for paper and metals. So the local buyers are "stepping down" from a global price, to allow for the collection, handling, storage and transport of the materials to the nearest or most advantageous buyer.

Commodity-based enterprises and organisations rely on goods trading to survive. Trading is their "core business", so

in cultures where men do the trading, one may expect to find recyclables traders to be men. In East and West Africa, where women do the trading, one may also expect to find junk shop owners who are women.

Because of this connection to the global commodities trade, even small, very localised commodity-based enterprises are operating in a high-risk environment. There is the potential to realise high revenues at the level of junk shop owners and recycling workshops, but there is also high risk of losing. This often results in a situation in which waste pickers or itinerant buyers are contingent labour, without fixed employment, and in addition, with low and uncertain rates of return on their labour.

Modernising the Waste and Recycling Sector

Waste management policy is now undergoing a modernisation to what is called "integrated waste management." This transition is also underway in many countries of the south such as Vietnam. One of the main characteristics of this shift is the addition of recycling and composting to the generally accepted formal waste management system.

In this paper, we develop and present a framework for analysis of the potential to strengthen or create livelihoods in the waste management sector, particularly as this relates to the modernisation of recycling. This is a conference about gender and waste: we use gender analysis as one of the tools in constructing this framework, but our paper is not only about gender analysis. We also use analysis based on the framework of integrated sustainable waste management (ISWM), using

insights based on many years working with the informal waste and recycling sector.

The principal question that this paper is designed to answer is this one: how do we introduce recycling that is modern and meets the needs of modern or modernising waste management systems, such as might be found in medium-sized cities here in Vietnam, without disrupting the informal waste service and recycling activities that already exist? How do we improve the livelihoods of the informal sector, and make use of their expertise and experience? The ISWM model in Figure 1 presents the main elements of a modernising system.

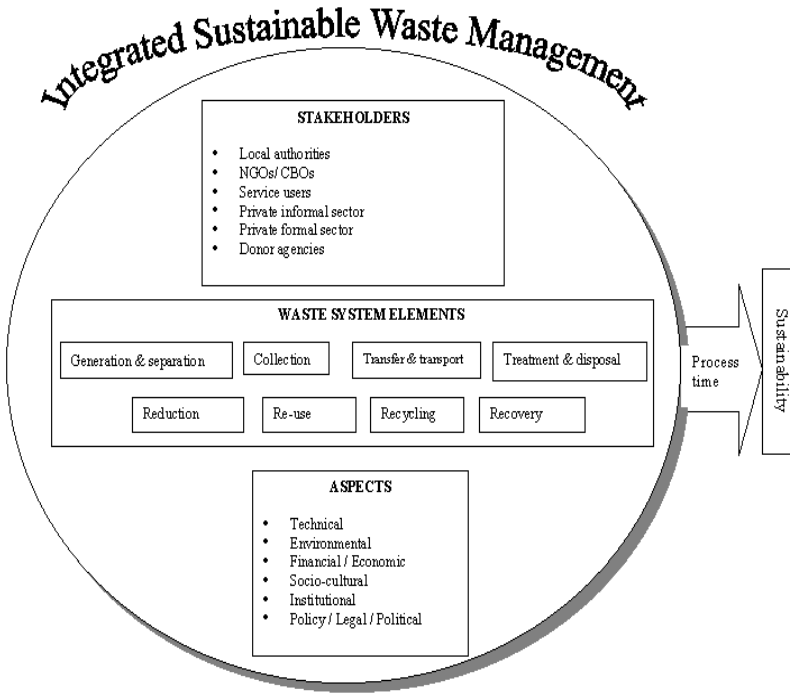

Figure 1. The ISWM model

Gender Analysis and the ISWM Approach

The first principle of integrated sustainable waste management is to understand the existing system before intervening. Following the principles of ISWM, we start the modernisation process by thoroughly analysing the existing situation. We seek out the micro and small enterprises (MSEs) and individuals who are already earning some or all of their livelihood from waste, and we analyse what they are doing, and attempt to understand its impacts – both good and bad.

- What kind of activity is happening? Are these MSEs and individuals involved in service-based or commodity-based activities? This basic observation is then followed by a technical, financial-economic, environmental, socio-cultural, institutional and policy/legal/political analysis.
- We propose in this paper to also include a gender analysis of these waste activities. The purpose of making a gender analysis is to ask how gender relations affect the efficient operation of these waste management activities; and to assess what equal or unequal chances women and men have to improve their livelihood through the modernisation of the waste management sector. Other gender questions will receive little attention in this paper, such as those referring to the effect of waste management activities on the daily lives of women and men; and to the strengthening of women's relative social position in society. We use a questioning style: after asking a number of frequently asked questions about service-

based and commodity-based waste activities, we offer observations and examples that make gender influences evident.

Understanding Service-Based Waste Activities from a Gender Perspective

What is the nature of the service relationship? Specifically, what are the dependency relationships in urban service work? The MSEs providing waste removal services depend on their clients for payment. Although in many cities individual households and private offices pay the service charges, it is the local government that determines the amount of charges that MSEs may demand. In that case, the MSEs have to deal with several clients on a policy level and on a practical, day-to-day level in order to keep their enterprises viable. In contrast, the local government becomes a single powerful client when it has a contractual relationship with MSEs to remove household waste or street litter within a defined area, whether a neighbourhood or a stretch of curb side. In that case, local government has the power to impose the conditions of the contract unless the MSE leaders know the full costs of service operation and are able to negotiate from that position. It is also risky for MSEs to be dependent on only one source of payment.

The gender question is, whether women-led MSEs are in the same position as men-led MSEs to deal with the two types of clients, households and government officers. Do they receive the same moral support, do they have the same training, or the same contacts in the government and community

networks? Are the positions at the municipality, especially those in urban waste management, occupied by men or women? And how does this affect the relationship with the MSE as service providers?

One can imagine that women, especially those with low social status, feel uncomfortable to enter men's offices to discuss inadequate contracts or difficulties in getting payment. To boost self-confidence and safeguard personal security women often prefer to go in a small group.

Easy personal contact between men can lead to a good business contract between parties, as was observed in Dar es Salaam, Tanzania. In 1998 the first contracts for street cleaning were issued to several MSEs led by women, and one MSE led by men. Although officially all contractual rates of payment were the same, the male-headed MSE was able to negotiate a much better contract than the others (personal communication by chairwoman of one MSE). Why did the men have this success? Did they have more self-confidence? Did they have better knowledge of the real costs of service delivery and have better negotiating skills? Or was there the shared notion that men's work is 'more important', since men are the sole supporters of their families? Obviously this notion is untrue, as women, especially in the lower and middle income groups, contribute a large share of household income.

Does the waste removal service appear to be consistent with traditional roles of men and women? Does it build on, or challenge, socially accepted notions of what women and men should be doing? In most societies it is considered part of

women's domestic role to clean and remove waste from the house, whether it is discarded materials, food leftovers, children's faeces, or litter and dust from the compound. That women should clean the streets in their role as community caretakers, appears a “natural” extension to their domestic role. In some communities women are respected and officially celebrated for their voluntary community work. The other side of this coin is that women are often not regarded for paid community work, while people refer to the notion that “paid work is men's work.”

A stark example of this attitude comes from a MSE in Ouagadougou, Burkino Faso. The community leaders insisted that men be hired for the waste collection work, "as women had to stay home and look after the children" (Arsens, 1998). The men proved to be unreliable and careless workers who quit the job as soon as they had other work. Women were then hired “as an experiment.” The women performed the waste removal work to everybody's satisfaction, motivated by their desire to make full use of this rare opportunity to earn regular money, albeit under very difficult conditions.

Do unequal gender relations affect the willingness to pay for services? More specifically, when households pay directly for the waste removal service (instead of through municipal taxes), are these users more willing or likely to pay women service providers or men providers? It is assumed here that the bills are collected personally by going from house to house. Although payment for services seems a simple financial transaction, in reality it is embedded in a social

context of reliability, authority and recognition of the value of the service rendered. In one neighbourhood of Dar es Salaam, for example, it was recognised that bills should be collected by a team consisting of a young person, man or woman, accompanied by an older woman, for maximum social authority.

In Bangalore, India, the project team had different experiences as illustrated:

> "The core group of residents in the first neighbourhood were all retired men, members of a welfare association. They did not willingly participate in the door-to-door mobilisation process, and thus community participation in door-to-door garbage collection remained poor. In another neighbourhood members of a women's club engaged in community mobilisation. This was a business locality and although people were rich enough, there was resistance to pay the meagre amount of Rs 10 per household per month to a waste collector. Here, men controlled money and as they perceived door-to-door collection as a women's initiative, they did not take it seriously. In the next area both men and women were mobilised and the core group in this area is the most vibrant and innovative one. I do not completely subscribe to the point that just because it has both men and women's participation it is active. But I do believe that it may have played an important role. Other factors, for example, socio-economic background or the community as a group, history of community efforts do play equally important roles" (Shah 1998).

How do internal household dynamics affect willingness to pay for services? Who decides on the service payment,

husband or wife? This refers to the general gender questions of who controls household expenditure; and whether women have the right to use their self-earned income according to their own assessment of what is necessary. When husband and wife each have responsibilities for specific household expenditures, and thus keep separate budgets, under whose responsibility does the waste removal service fall?

Gohar (1998) observed that since women in Quetta, Pakistan do not have their own income to pay for the service, they rely on the men to give them extra money to pay for it, or they save from the already meagre household budget available to them if at all. For this reason, men are in control of what services the family can have access to.

An example from Bamako, Mali, illustrates the intra-household mechanisms, as told by a wise old man. Suppose the husband decides that the household should pay for garbage collection. Then there are several possibilities:

- He pays for it himself.
- He may tell his wife that she should pay from her own income, e.g. from market trading.
- He may tell his wife to pay, even if she has no independent source of income.
- Or the wife pays from her own income, although the husband has not given approval (Muller 1998).

Understanding Commodities-Based Waste Activities from a Gender Perspective

As Furedy noted in 1990, the majority of the thousands of

waste pickers on any dumpsite are adult women and children (Furedy 1990, Hunt 1996). What are the reasons for this inequality? One of the processes at work is that of the vicious cycle of poverty in very poor families. It is known that in most cities at least 30% of all households are headed by women who are the sole income earners, and that the majority of very poor families are headed by women (the feminisation of poverty). In very poor households the income that children can earn is absolutely necessary, and so if mothers are working at the waste dump, they will train their daughters in waste picking. When the girls get only very limited school education (maybe less than boys) and do not acquire the skills required for other jobs, one can expect that they will continue their working life at waste picking (Huysman 1994).

One could look at this positively, and hypothesize that intensive on-the-job training on the dump, equips a woman (or a man) for a career as a buyer or dealer in waste, having become part of a social network that makes a business out of waste and controls the waste flow in the city.

Are there gender divisions of “rights” to certain materials? And do men and women waste pickers and collectors earn the same income when they work at the same sites? There are certainly gender-related rights in the recycling sector. Women tend not to be permitted access to higher-value materials like metals or paper, but focus on textiles, plastics and the like, while materials relating to vehicles such as automobiles, motorcycles, bicycles, animal carts, appear to be more likely to be recovered by men.

It would be interesting to see if women are permitted to work

with compost. As it is often "traditionally" not being recovered, it may be considered “gender-neutral”, and provide substantial opportunities for women.

An interesting survey done in Hanoi provides an insight into the different income levels earned by social categories (Degregorio 1997)

Table 1. Daily income, expenses and saving by origin of recyclers, working in central Hanoi, the municipal composting plant and the municipal landfill in Hanoi (in US $)

	Daily income			*Daily expenses*			*Monthly savings*
	Low	*High*	*Aver.*	*House*	*Food*	*Other*	
All recyclers	0.67	2.61	1.41	0.23	0.46	0.23	23.22
From Provinces	0.62	2.06	1.29	0.20	0.43	0.21	22.63
Female	0.59	1.89	1.19	0.22	0.38	0.26	22.21
Male	0.70	2.48	1.53	0.14	0.56	0.17	23.67
From Hanoi	0.86	4.99	1.88	0.73	0.61	0.25	25.89
Female	0.71	2.47	1.57	0.00	0.44	0.28	23.88
Male	0.98	7.06	2.14	0.73	0.73	0.24	27.47

Survey data, Michael Digregorio (1997)

Table 1 shows that:

1) Recyclers from two rural provinces earn less than those living in the suburbs of Hanoi;
2) Women in each category earn less than men;

3) Women have a smaller range of income than men.

Assuming that both men and women work full time, we may conclude that women work with less valuable materials. Another possible explanation of the income difference is that women do not work full time, as they have to divide their time between their 'jobs' as housewife, mother and waste picker.

An example from Hyderabad, India, where men earn nearly twice as much as women in the recycling sector, provides an ideologically coloured explanation.

> "Women earn between Rs.18-40 per day while men earn Rs. 40-70. In glass: women earn Rs.20, while men earn Rs.30 (child Rs.15) per day; and in plastics women earn Rs. 25-30 and men Rs. 35-40 per day. The logic behind the price difference is due to men doing 'hard' labour, namely carrying the waste while women get less for sorting out the waste"(Snel 1998).

The logic could easily be reversed, resulting in a pay increase for women: women use expertise and skill for sorting, while men 'merely' use physical labour. This reasoning also has a gender bias.

Are scavenger men and women concentrated at the landfill, or do they scavenge transfer stations (sidewalk depots) as well? What is the concentration of women or men at these different points? Given the intense competition for waste materials, one would expect that gender inequalities also exist with respect to the best places to obtain high-value materials. Transfer stations, being closer to the source of the rejected

materials, are the preferred places for waste picking, more so than the dump or landfill, which is at the end of the chain of rejection. The most powerless people end up there for scavenging, among which are the women. This is an hypothesis which has to be verified.

What determines the weak negotiating position of the waste pickers and collectors especially of women, vis-à-vis the junk shop owners? Lack of basic skills is one of the problems. Can waste pickers, men and women, read the weighing scales and can they calculate the amount of money due to them? (Furedy 1992, Huysman 1994). No they cannot, if they have little or no formal education. Are waste pickers able to use independent sources of information, for example to check the information of the junk shop owner that "market prices have dropped"? No they cannot, unless they are part of an organisation or group that gives them that information. Another problem is that some junk shop owners or dealers control a section of the dump, including the waste pickers and their collected materials. This control prohibits waste pickers from selling for the highest price to another dealer. Certainly, women are not able to move freely with their collected materials to other dealers.

This raises the issue of whether it would be feasible for workers to organise themselves to strengthen their position vis-à-vis waste dealers, the Municipality, and the general public. In Belo Horizonte City in Brazil, for example, waste pickers have formed an association. They were supported by a religious NGO. When the City Cleansing Department started a selective handling and treatment system of solid

waste several years later, they found the waste pickers' association a ready partner (Dias 2000). An interesting question arises whether men and women are members of the same association.

Are traders and junk shop owners men or women? How does this relate to the sex of traders in general? Or in other words, is trading in a modern urban setting consistent with socially accepted notions of what women and men should be doing? In East and West Africa, for example, women are engaged in small scale trading, and one also finds some women who are the recognised head of a junk shop business. In the Philippines, one finds similar examples: in Bauan, fifty percent of the junk shops are owned by women. The first conclusion is therefore, that trading in these countries is socially accepted for women.

However, women traders do face obstacles, as is illustrated in an example from Ghana, where women have an age-long tradition of small- and large-scale trading.

> "The waste enterprises are mostly owned by men, with very few owned by women. The women started with loans from friends or family. The men also start with similar loans except that they could get bigger sums of money because they are considered to have better collateral. Therefore they deal in the sort of waste that gives quick and big returns on investments. In the bottles trade in Ghana, you will find women dealing with sales for reuse. Obviously their incomes aren't big and their expansion of operations is limited by several factors. Lack

> of financial support, no major industries to buy from them (lack of appropriate markets) and the women also lack the managerial skills due to low education if any at all. The women have little access to technology because they are limited to only recovery of the material that can still be used or to retail and warehousing" (Samson 1998).

Yet another factor determining business expansion is the attitudes towards risk and security in business. Research has shown that small-scale traders, and especially women, place a high value on a secure and stable income (Everts 1998). They will not put their present business at risk through expansion, but prefer to diversify into different small-scale activities.

This attitude (or business acumen) has saved an MSE providing a waste removal service in Dar es Salaam from collapse, when they lost their municipal cleaning contract. They had already diversified to the collection, cleaning and sale of recyclables.

Summary of Gender Aspects in Waste Management

The previous section has indicated how gender plays a role in the waste sector, just as it does in other sectors of society. No systematic research has as yet been undertaken to substantiate these observations made in real life situations. Nor is the presentation exhaustive, and other gender factors are likely to affect the operation of waste strategies as well. The gender factors of the previous section are summarised as follows.

- Social networks are very important social instruments in public and economic life, as well as in the waste

sector. As in all societies, these networks are dominated by men, and it is difficult for women to obtain positions of influence and decision- making on policy and practical matters. Women use their own social networks of family members and friends (including men) to try to influence practices and obtain access to resources like contracts and loans.

- Low-paid waste work as employment of the lowest level, is socially acceptable for women when it is consistent with a "tradition" of women doing unpaid cleaning in public places. However, it is sometimes used as an argument to exclude women deliberately from the more profitable waste work.
- Women are respected for their voluntary cleaning of public places, yet at the same time they are despised for working with waste materials.
- Women earn less with scavenging and waste collection than men when: 1) gendered rights permit women access only to low-value materials at the least profitable places; 2) women spend less time at waste work than men, because they also have duties as mother and housewife.
- As women earn less, they also save less.
- Women are less mobile than men because of their duties at home.
- Both men and women waste workers need more basic skills, training and access to information. It is to be expected that women and men, girls and boys have slightly different needs in this respect.

- Where men control household expenditure, they determine whether households will pay for the waste removal service and thus for a clean environment.
- Small-scale traders, particularly women traders, prefer risk-avoidance entrepreneurship as a strategy for improving their livelihood.

Conclusion

This paper has addressed the issue of increasing employment opportunities in the urban waste sector in a sustainable manner, as well as the ability of both women and men to take advantage of these work opportunities. The paper has focused on small-scale, mostly informal activities, carried out by women and men who often are organised in some form of micro or small enterprise (MSE). As cities grow and as more people adopt a higher level of consumption and discard more used materials, the amount of waste will continue to grow. The demand for waste removal services and the supply of recyclable materials will thus increase. This does not automatically mean that individuals and MSEs in the informal waste sector will be assured of increased employment and income. Much depends on government policies and strategies and on the power of national and international private companies. The latter aims at capturing the waste market rather than at maintaining employment for thousands of people.

What has to be done to assure at least the continuation of employment and income for women and men from small-scale waste work? Our approach is two-fold, to strengthen the

informal waste sector, and enable women and men workers to make full use of the opportunities.

First, to strengthen the informal waste sector, it is desirable that government and the general public recognise the valuable contribution of the people engaged in removing, collecting and recycling waste materials in terms of economic development, environmental health and social development. It is further necessary that government recognize that the public sector alone cannot be responsible for urban waste management, and that residents as well as the private sector have responsibilities. Accordingly, the authorities should consider all actors in the informal waste sector as stakeholder groups with legitimate interests, who are able to coordinate with government in implementing its overall waste strategies. In this new policy climate, government authorities and stakeholder groups will together assess what activities can be undertaken to strengthen the informal sector and, where feasible, to integrate it with the formal sector.

It may be feasible, for example, to organise garbage removal in a complementary manner, whereby the MSEs become responsible for primary removal and the local authority for secondary removal and final disposal. A contract will formalize and legalize the agreement. Or, another example of integration, it may be feasible to assure a stable demand for recyclable materials, by strengthening the linkages between enterprises in the recycling sector, such as between waste pickers, itinerant buyers, middle dealers, and industries as buyers of recyclable materials.

Second, to enable people and MSEs to participate fully in an

expanding sector, gender sensitive measures can be taken. Service MSEs, for example, may be able to increase efficiency by taking out a loan for investment in equipment. The organisation that provides loans should be aware of the gender-specific conditions that make loans accessible for women as well as men. Moreover, MSEs will be in a better position to collect service charges from customers if they adopt a gender-sensitive approach, suitable to their neighbourhood. It is also necessary that women and men be enabled to negotiate contracts that offer realistic terms of work and payment conditions.

For people in the recycling sector, increasing their margins will be achieved through economies of scale. It will come from aggregation of materials and sales to a higher placed dealer in the purchasing chain. And it will come from adding some activities (e.g. accurate sorting and cleaning) that are usually carried out at a higher level. To increase one's scale of operations, not only financial investment may be required, but also mobilisation of extra human resources. Waste pickers may pool their resources to rent storage space and transport, and they will engage women and children for (unpaid) assistance. Women usually have greater difficulty in mobilising these resources than men. Nevertheless, as even irregular forms of cooperation enable waste pickers and collectors to earn more, it is worthwhile to investigate how such cooperation can be strengthened in a gender-sensitive way. It may develop into a formal association.

In conclusion, we believe that before allowing a private, high-tech company to intervene and disrupt the present

operation of the waste sector, it is absolutely necessary that the government understands what the existing situation is, regarding waste removal, recovery of valuable materials, and income generation for a large number of people and their families. Then the government can make an assessment and a prediction of the likely effects of the intervention and assess whether these are favourable from several points of view.

The investigation will also reveal what measures are necessary to equip men and women to continue and expand their waste work. Municipal social departments and non-government organisations can promote such developments by designing appropriate, gender-sensitive support.

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WASTE MANAGEMENT PRACTICES AND POLICY IN INDIA

Almitra H. Patel

Introduction

Women, whether they work within the home or outside, are expected in most societies to do the cooking, which generates the biodegradable wastes that decay most readily and cause the greatest problems if uncollected. Women bear the brunt of caring for family members with waste-related illnesses caused by flies, rats, polluted water and smoking waste piles. Women have to make up for the missed days of school caused by such illnesses, and manage the home with less of everything when sick wage earners have to stay home. And women, to survive, are most often the ones to forage for scraps and recyclables from waste dumps.

Sadly, policies in most societies are made by men who do not think about or care about these burdens, because the State usually does not have to bear the real costs of sickness, absence and missed schooling, and economists choose not to account for these costs in their national budgets.

Yet there is hope. Men, women, and children too, if they

choose, have the opportunity to manage waste within the home and mitigate many of the problems associated with poor waste management. Some of India's best practices are described below. What the State needs to do is to recognize, support and reward such efforts. This is what many citizens in India are trying to achieve.

Waste is Wealth

In India's villages, and other rural economies, raw food waste is worked into the soil around plants or coconut trees, or added into a backyard pit with the straw bedding from cattle-sheds, to decompose naturally into compost that is fully used in the fields every monsoon. Cooked food is rarely wasted, and is fed to livestock. Until plastics came along to replace leaf or paper packaging, this ancient practice of returning nutrients to the soil was sustainable, profitable and nuisance-free.

The problem of waste developed as villages grew larger, and began to dump their waste in compost heaps away from their homes, on the outskirts of the village, generally beside the footpaths for ease of disposal and collection before planting. Archaeologists and anthropologists today excavate such ancient "middens" for clues to what early man grew, ate and threw away. As villages have grown into towns and cities and urban clusters, these habits have led to our streets being used not just for traffic, but also as a place to dump waste at all hours, and, if and when it is collected, being thrown just outside the city limits, often into the backyard of the town or village next door.

Before the age of plastics, packaging and industrialization, urban waste was still valuable: bullock-carts bringing produce into town would collect and return with city waste for their fields. But modern mixed waste is useless. Plastics render the land less fertile or even uncultivable, yet cities continue to dump on the outskirts as before. These discarded piles become no-man's land. Here stray dogs, feeding on waste piles, turn feral and attack rural livestock. Flies and rats abound. The stench of large rotting piles affects everyone. Yet surprisingly, there is little official protest. Village leaders do not defend their territory from such "official" ravaging by the larger "government" of the city next door, or have tried and seen the futility of it. When the problem becomes huge and begins to encroach on private village lands, it leads to conflicts such as stone throwing and tire slashing of vehicles that bring out such waste from the city. Then waste lies uncollected within the city, and is thrown into open gutters and storm-water drains which are mostly open sewers because of administrative apathy.

The 1994 "Plague": A Wake-Up Call

This is what caused the "plague" in Surat in September 1994: choked storm drains and heavy rains during high tide in this west coast city flooded rat burrows, and the rodents came up and out into the population. Very few people died, but migrant workers fled the city, and there were huge economic losses for Surat and for India as the United Kingdom refused landing rights for our airplanes for a while. It was a wake-up call for India. Soon after, a new and dedicated municipal

commissioner, S. R. Rao, worked to build a team of motivated and efficient city officials and sweepers that transformed India's dirtiest city into its cleanest in eighteen months. His motto was: "A city is only as clean as its dirtiest areas", so that is where he began his work. Meanwhile, across the country, on the east coast, the filthy city of Calcutta was quietly and steadily cleaned up by Commissioner Asim Barman, whose motto was: "The best way to keep streets clean is not to dirty them in the first place." He used the city's regular cleaning staff and their usual wheelbarrows to collect waste door-to-door and remove the street dustbins that were magnets for filth.

Public Interest Litigation in the Supreme Court

A 100-city Clean India Road Campaign, led by Captain J. S. Velu and myself after the plague, highlighted many good examples like these, but also revealed the enormous problem of cities across India without proper dumpsites. This experience led to my filing of PIL (Public Interest Litigation) No. WP 888/96 in the Supreme Court, asking all the states and union territories to follow hygienic waste management practices. In 1998, the court appointed a committee of eight, including four of the country's best city managers, three central government officials and myself, under the Ministry of Urban Development. We prepared an interim report that was presented for discussion at four one-day workshops in the north, south, east and west of India, to which a total of 400 city officials from our 300 cities of over 100,000 population were invited for comments.

Supreme Court Committee Report

The feedback from these workshops was included in the March 1999 report of the committee constituted by the Hon. Supreme Court of India, titled *Solid Waste Management in Class 1 Cities* which has become a widely accepted "bible" of waste management practices in the country. The Supreme Court had this report circulated to the 300 Class 1 cities of every state and it was widely endorsed. This great success was because it was a report written by city managers for city managers, not by consultants or academics or outside "subject experts."

The 100-page report covered, in 13 chapters, not just the technical aspects of managing various types of special wastes, but also administrative and institutional aspects of capacity building, management information systems, financial, health and legal aspects, public awareness, the constitution of a technology mission, and time-limited recommendations for cities, states and central governments on all these inter-related aspects. This paper will deal only with the basic principles recommended for waste management, and describe some successful strategies.

Waste Management Rules

At the same time, India's Central Pollution Control Board prepared waste management rules based on this report and discussions with our committee. At the court's direction, these were issued by the Government of India's Ministry of Environment as the country's first *Municipal Solid Waste*

(Management and Handling) Rules 2000, issued under the Environment Protection Act 1986. This is now a mandatory blueprint for action by all urban local bodies having populations of 20,000 and over. Once citizens realize its potential, this is a powerful weapon in the hands of the public to enforce compliance, hygienic waste management, and responsible behaviour on the part of both elected and appointed city managers. However this also puts a responsibility on the public who generates the waste in the first place.

Waste Management Policy

Broadly, the report and rules recommend, as an ideal scenario to be achieved, the keeping of source separated waste until the time for daily doorstep collection of "wet" food wastes. "Dry" recyclables are to be left to the existing informal sector. Doorstep collection of "wet" food wastes is to be done in four-six-bucket carts which are emptied directly into trucks, to avoid double handling of waste. This biodegradable waste is to be composted, and only compost rejects and inert (construction) waste is to be land filled.

India's cities are still a long way from achieving this goal everywhere, but there is a great effort in many places to put in place one or more of these systems. For example, many cities are stopping the purchase or replacement of roadside bins, and are in fact removing them in areas where doorstep collection is done.

India's Best Practices for Waste Management

In Calcutta, 80% of house-to-house collection has been

achieved in residential areas at no extra cost to citizens, using only existing municipal sweepers since 1995. They cover two "beats" by moving in pairs with a wheelbarrow. One pushes the cart and blows a whistle at each gate at a fixed time daily, while the other empties waste-bins into it, and they exchange duties on alternate days. Commercial establishments are not cooperating so well: only 60% do. There is no waste separation. Waste pickers forage at the transfer-points or landfill.

Private groups are doing doorstep collection for payment in many communities. They collect Rs 15-50 (US $0.30 to $1.00) per month per household for this service. It is a system that has evolved spontaneously in many cities, and NGOs in at least six south Asian countries have found this to be a very successful method. Where other services are offered, like night-patrolling for security, or bill-payment services for power and water and telephone, residents are willing to pay far more, even up to Rs 200 per month (US $ 4.00).

Doorstep collection is most successful in slums. Cities usually make the mistake of thinking that rich or upper-middle areas will not feel the pinch of such small monthly collections. However, they are always the most unwilling group to pay this, so such attempts often fail and municipalities get discouraged. Slum-dwellers, neglected everywhere, understand and appreciate the monetary value of cleanliness and are most willing to cooperate and pay willingly.

Temporary take-away bins work in extremely crowded slums where handcarts cannot move through the lanes. At

Mumbai's Prem Nagar slum, stackable plastic bins are made available from 8:00-10:00 am at every gully corner and inner-lane crossing. From 10.00-11:00 am, these are emptied into waiting municipal trucks and then stacked in a central place till next morning. Nobody minds a dustbin at their door for just two hours a day, and they are used in a very disciplined way. Residents pay Re 1 per head per month, with a maximum of Rs 5 per household per month (US $0.10), to support the local cleaning boys, who are paid Rs 1,500 per month (US $30) for four hours' work. Cooperation by slum-dwellers was 50% from the first month.

In Ahmedabad, the door-to-door bell carts have a special frame that can hold four to six 25-litre containers which can be directly emptied, when full, into waiting trucks or dumper placers, avoiding manual handling of waste which was formerly lifted off the street and into trucks.

Nashik is a city without dustbins, as trucks move from one street corner to another directly receiving waste from each household at fixed times. Loaders receive waste bins from residents, or fetch them from outside some houses where people are away at work. This is very popular with residents and cost effective for the city, but results in a lot of fuel wastage and pollution if the trucks keep their engines idling for seven-ten minutes while waiting at each road crossing. This system is ideal for smaller towns where tractor-trailers can be used.

Surat has spotless dumper placers and surroundings because of "pin-point beats", in which sweepers must take personal

responsibility for the cleanliness of their stretch of road and any dustbins or dumper placers in their stretch. These rest on paved areas, slightly higher than the road, and slope towards a drain opening nearby. This system works only because of the extreme dedication of Commissioner S.R. Rao and the fine work ethic he initiated. In almost every other city, dustbins are surrounded by a huge permanent area of filth.

Waste separation at source is vital but difficult. Bangalore has opted for this as its official city policy. The entire sweeper force has been trained and sufficient four-bucket handcarts have been donated by the corporate sector to cover 50% of the city which is served by the city's own sweepers. New contracts for the remaining 50% of the city now specify doorstep collection of source-separated wastes as part of the cleaning and transport contracts. Cooperation has been 20% in the first year. One drawback is that city sweepers keep the clean saleable recyclables for themselves, leaving less for traditional waste pickers. Also, residents seeing their source-separated "dry" and "wet" waste go from the handcarts into the municipal trucks without twin partitions, and often without any plans for separate offloading at a waste buyer, followed by the dumpsite, wonder if their efforts are worth it and get discouraged. This problem is currently being addressed in ten pilot wards in Bangalore, through direct linkages of apartment complexes with waste pickers.

Weekly doorstep collection of dry wastes is done in Ahmedabad by an NGO initiative, SEWA (Self Employed Women's Association). The SEWA cooperative is made up of individual women, vegetable vendors, rag pickers and stall

owners who have a hotline to ensure punctual collection and solve absenteeism and crises. No money is paid or asked for. The waste pickers get their earnings from the higher value, clean and unmixed waste.

Doorstep collection of both dry and wet wastes is done for a fee at Pune, a major city south of Mumbai (formerly Bombay), by a 5,000-member rag pickers' union. They keep the dry waste for sale and dump the wet waste into municipal bins or into a nearby composting site if available. The rag pickers do not seem interested in learning composting skills and trying out an additional source of income.

Coorg District, in the State of Karnataka in the south of India, was cleaned up by having all schoolchildren bring dry recyclable wastes weekly from home to school, where an NGO arranged for its purchase by a waste buyer visiting regularly every week. Funds collected were used for eco-club activities for the classes.

Public Participation and Cooperation

The Coorg experiment proved that mothers will do for their children what they will not do for rag pickers or the environment: keep dry wastes separate for their kids to take to school. Under the existing program for SUPW (Socially Useful and Productive Work), required in all schools today and for which marks are given, all children at the start of term are required to prepare and hang at home a decorative bag for collecting dry waste. These are later brought in for a school exhibition. Local NGOs can help arrange for waste buyers to regularly visit the schools to collect this waste. Thin plastic

bags must be brought to school, for donation to the local jail etc. for weaving but not for sale, so that parents do not go out and buy or demand more plastic bags than required.

Pimpri-Chinchwad Municipal Corporation has an effective low cost public awareness campaign. Every letter or bill going out of the municipality has one of several rubber-stamped messages on it, like "Do not litter", "Use the bell cart", "Keep dry wastes separate from food wastes" etc. Children in municipal schools have to get their parents to sign not just the monthly mark-sheet but also a checklist of similar items every month. It is an effective reminder.

Calcutta has distributed five-lakh bookmarks to all schoolchildren of Standard 6 and upward. On the bookmarks is a Year 2000 calendar and a brief civic message on separating dry and wet waste, using bell carts, not littering etc.

Spotless streets are seen in Chandigarh, where residents take pride in personally sweeping and washing their half of the road in front of their homes, every morning. There is personal responsibility by each property owner for the cleanliness of the pavement and road in front of their properties.

It is worth framing by-laws that require each and every ground floor commercial establishment to keep its frontage clean up to and including the curbside drains. This will also curb unauthorized pavement encroachments that keep returning after clearing.

Handling of Special Wastes

Calcutta has a separate charge of Rs 20 per handcart of debris

or of garden waste to be collected from households. The handcarts circulate after the regular morning door-to-door round, and the city has separately designated places for disposal of their contents.

Street Food Waste Management

Surat ensures that every small shop has a wastebasket and uses it, and that every mobile food cart has a shelf, basket or canvas slung beneath it to collect the wastes it generates. Cart owners must take their waste out of the area daily to a designated spot.

Tender coconut shells are collected in Bangalore in cycle rickshaws (when not in use for school children), and delivered to police quarters to be dried for heating water. Rs 10 per day are collected from the coconut vendor as well as the police families.

Sugarcane juice waste, bagasse, is generated in most of the large cities in India. In Bangalore, it is purchased on Saturdays by the poorest, for heating Sunday bath water and cooking. The stalls may be licensed by the municipality if owners agree to store their bagasse within their wooden box stands until collected by a separate waste collection service for transport to a paper recycler or to slums needing fuel. The license fee should also cover the cost of waste collection.

Hotel Food Waste

In Bangalore and parts of Mumbai, pig farmers pay nominal or even significant sums to hotels for the right to collect their

food wastes. Non-vegetarian food waste is preferred. Tea leaves, coffee grounds and citrus peels should be kept out of waste intended for pigs, to get better prices for the waste.

At Vijayawada, leftover hotel food goes to a charity night shelter. This helps to bring in street children for baths and a little education. Twice daily, three containers containing mixed vegetable leftovers, mixed rice and mixed liquids (dal, rasam, sambhar) are picked up in a pushcart by one of the children and kept in a fridge until the next mealtime. Children pay Re1 (US $0.02) per meal for good nutrition. In Delhi, 12 five-star hotels are participating in a highly organized version of the same idea: waste food for the needy, e.g. in orphanages.

Market Waste

In Calcutta, every truck bringing produce into the market area has to pay a clean-up fee. It is collected from the drivers/owners as they wait in a queue to enter the market. Trucks must unload goods in the market and also bring out any straw, baskets, boxes and packaging to be put in waiting tractor-trailers at the exit. Only consumable produce is left behind for sale.

Stall-to-stall waste collection keeps Pune markets clean. All stall owners must keep a small basket handy for damaged fruit or vegetables or onion peels etc. Every hour, a sweeper with a handcart moves along the stall lanes, emptying the little waste collection baskets into it and taking it to a large container outside, which is then auctioned to local goat

breeders or dairies. Dry packaging waste is not allowed to be put into the same wastebaskets. It is collected separately, once a day.

Commercial Street Waste

This is usually privately managed. For example, the Hardware Merchants' Association at Bangalore pays Karuna, an NGO of women waste pickers/slum dwellers, an annual fee (recovered from its members) for keeping their busy Godown Street litter-free all day. Streets are swept twice daily, seven days a week.

Offices should not mix carbon paper with their other paper waste. Separate carbon paper collectors recycle this for fine carbon powder in many cities. Waste pickers now litter large areas of the city, sorting carbon out of the paper waste.

Decentralized Composting

Decentralized composting not only achieves waste minimization, but also saves on transportation costs for cities, which are mostly bankrupt and depend on state government grants to survive. It is the most cost effective and nuisance-free method of handling waste.

Neighbourhood composting of segregated wet wastes is done in the middle income Joshi Lane in Mumbai. Dustbins have been removed, the street lined with flower pots, and a couple of handfuls of vegetarian food waste from all of the few apartments along the lane are added to each pot daily. One can return to the first pot in 15-30 days. This has had the

unexpected benefit of preventing littering and open defecation in their beautified lane. The dry waste is collected separately and taken away by privately employed women who sweep the apartment stairs and parking lots.

Composting is done on site at 400 housing societies and apartment complexes in Mumbai with the help of a special municipal officer who is highly dedicated to promoting and supporting these private initiatives, which Mumbai calls ALM or Advanced Local Management. This has reduced wastes to 10% of the former levels. Pune is setting targets for each zonal office to set up five new decentralized composting initiatives each month, and the commissioner monitors progress monthly. However, making compost is usually far easier than finding buyers for it. The city must help by buying the compost from such decentralized efforts and using it in its own parks and gardens.

The problem of finding buyers for compost has been creatively solved by a Pune lady. Her soil-free terrace garden, using only garbage, has inspired thousands of other families. The joy of growing things, by adding household food wastes into pots that never overflow, and harvesting fresh flowers, fruit and vegetables, has to be seen to be believed. There is a deep spiritual need in city dwellers for growing plants and working with soil, that can be a powerful motivating force for such waste minimization. Even if no profit is made from the sale of compost, it is worth promoting for its cost savings to the city. Composting of waste in the Tihar Jail in Delhi saved the institution Rs 1.6 million (US $32,000.00) in garbage clearance costs and added Rs 0.8 million (US $16,000.00) to

the prisoners' welfare fund through compost sales. Another jail and a zoo in Bombay have carried out similar initiatives.

City waste minimization regulations should insist that institutional waste must be composted on site at large hospitals, colleges, clubs, hostels, wherever there is room. Elite luxury spaces make urban land scarce and unaffordable for housing the poorest, so they must take on some social responsibility to enjoy this privilege.

Coir pith from coconut fibre is very effective for low capital and low operating cost composting. At Kuilapalyam (a border village in the southeast state of Maharashtra), near Auroville (a township of international followers of a spiritual cult in the former French colony of Pondicherry), raw garbage is purchased in cartloads from the Pondicherry garbage dump and piled in 20ft x 20ft x 3 ft high heaps, in a tamarind grove near the village huts. These heaps are covered with a 15 cm layer of coir pith purchased from coconut fibre rope makers. Left undisturbed for months till the next planting season, the coir dust forms an insulating blanket which keeps in heat, moisture and odor, and keeps out flies and animals. This method can be adopted wherever coir pith is available, but well segregated organic waste is a must. This method cannot be used for mixed wastes containing plastic or toxic items like torch cells, button cells, insect spray cans etc. These will ruin the soil when compost containing such contaminants is used. Inoculating the waste with composting bio-culture before covering it with coir pith will accelerate decomposition to a 50-day cycle requiring a

very small area, and chain link fencing is necessary to keep dogs away from bones in fresh garbage.

At Aligarh and Hyderabad, private meatpacking firms are successfully composting slaughterhouse wastes. In Calcutta, chrome-free tannery fleshings are made into compost which is in high demand by tea gardens. A new plant on a three-acre site at the Calcutta disposal yard will be operational in six months.

Waste Sanitizing

Vasco da Gama city in Goa had no waste-processing site but effectively sanitized its open dumps and made them entirely nuisance-free. The sanitizing process is based on the application of biocultures to initiate composting and turning and aeration of the heaps to minimize odor and kill pathogens and viable weed seeds. Sanitizing of large collection points or transfer points saves on transport costs. During a month-long experiment in Delhi, garbage was sprayed twice daily with compost-promoting biocultures and left uncleared. At the end, the stabilized odor-free garbage was carted away in just six trucks, compared to the 30 required for daily clearance each month. Residents were happy with the results.

Hospital Waste Management

This is a specialized subject too vast to be covered here. India passed Biomedical Waste (Management & Handling) Rules in 1998 which have timetables for compliance that are forcing hospitals to address this issue. Basically, the secret of

success is not to mix different wastes. Food waste from patient and nurses' canteens can be composted, plastics autoclaved and shredded, and "sharps" like needles and glass collected separately and buried. Only infectious waste and human body parts require incineration, in twin-chamber incinerators to ensure that all outgoing flue gases are exposed to temperatures above 1,100^{o}C.

Composting as a Waste Processing Policy

Large scale composting has become possible in India by adopting the principle of first composting the mixed waste, as received, by arranging it in aerobic windrows and spraying it with composting biocultures. The heap of raw garbage loses odor and rapidly builds up heat. Temperatures of 55-70^{o}C are recommended to kill germs and weed seeds and evaporate the moisture, so that the heaps are eventually reduced to 50-60% of their original volume and are sufficiently free flowing and earthy to be sieved for removing unwanted items. Care must be taken to water the heaps frequently so that temperatures do not rise to the extent that the heaps catch fire and produce only smoke and ashes. Good yard management is vital and leachate should be absent or minimal. In the rainy season, any leachate can be collected and re-circulated onto the top of the windrows as a rich microbial soup. The moisture evaporates since the heaps are hot in all seasons, and its solids add to the compost.

After three to five repeated turnings of the windrow heaps (with a front-end loader or excavator) over a period of 45-60 days, the soil-like material is ready for sieving (except in the

monsoon, unless covered to keep it free flowing). The sieved compost can be supplied loose (bagging is expensive and necessary only for brand image) for use in agriculture, horticulture, forestry, and re-vegetation of mining overburden and reclamation of saline soils.

Compost is not a substitute for chemical fertilizers. The two need to be used together, for integrated plant nutrient management. The main advantage of "city compost" is not so much the 1-1-1% N-P-K it contains, as the micronutrients and rich microbial content that dissolve the minerals in soil for uptake by plants and makes the root systems healthy and pest resistant. When urea alone is used, only 20% is absorbed by plants and 80% runs into the soil to cause nitrate pollution of wells and groundwater. Compost acts as a sponge and makes all of the urea and synthetic fertilizers available for use by crops. Without organic manures, soils lose their fertility and become barren in a generation. In combination, chemical fertilizers and organic manures give 2.5 times the yields of either one alone, without declining yields. The main reason the Supreme Court Committee recommended composting of biodegradable waste as the method of choice for processing city waste was not just to save landfill area, but to return to the soil sustainability that cities take away from it.

Large Scale Compost Plants

Since changing public habits and promoting household waste management is so time-consuming and difficult, large centralized compost plants are currently the most preferred

option for municipalities trying to comply with the deadlines and conditions of the Waste Management Rules. Over 20 such plants are operating or in the pipeline. Garbage is supplied free to a municipal or state site leased out at nominal rates for 30 years to a private compost operator who builds, owns and operates it as a BOOT (Build, Own, Operate, Transfer) plant. The plant is usually transferred to the municipality after a 10 – 30 year period when it reaches the end of its useful life in terms of space, maintenance, cost recovery and profit harvesting. The problem with this plan is local resistance by neighbours fearing loss of property values. This is less so when the plant is constructed by the city and given out on an operating contract for a fee based on the sales value of compost produced. Management by the municipality or government bodies has proved highly unsatisfactory, with the compost plants degenerating to smoking open dumps as before.

With either of these arrangements, the return on investment is slow, ranging from seven to ten years, and operators are finding it difficult to market their compost without encouragement from the State Agriculture Department, which needs to popularize its use through demonstration plots and field trials.

Waste to Energy Options

Biomethanation of waste is acceptable because it is not a "burn" technology that can generate deadly dioxins and pollute soil, water and air. However, because it is so difficult to shred mixed municipal waste and the process requires so much energy, it is more suitable for sewage and possibly for

large canteens or convention centers with reasonably uniform food waste streams.

Incineration of municipal wastes has been a disastrous failure in developing country cities and should be resisted at all costs. There are powerful lobbies trying to market this disposal system via aid agencies and consultants, because complying with clean air laws is making them prohibitively costly in their own countries and they are being banned or phased out in many places. In India, for instance, the capital cost for a compost plant of 100 tons a day of waste is Rs 20 million (US $400,000 versus Rs 130-160 million (US $2.5-3.2 million) for a waste-to-energy plant. The generated electricity is also not economically feasible as the capital cost investment for a one-megawatt plant for thermal or hydro power is Rs 40-60 million (US $800,000 – 1.2 million), compared to Rs 140-150 million (US $2.8 – 3.0 million) for a municipal waste-to-energy installation.

Another more important reason for totally refusing this option is that developing country waste (where peas are eaten fresh and not from packages) has a very high moisture content. More energy is spent in removing this water than can be got from burning the waste. Our caloric value is very low. To raise this caloric value, we would have to deprive thousands of poor waste pickers of the right to remove combustible recyclables from the waste stream. In Timarpur at Delhi, a Rs 41 crore (US $8.2 million since 1 crore equals 10 million rupees) waste incineration plant ran for just six days before being shut down forever because the dust in the garbage was jamming and wearing out the conveyor screws.

Now, more than thirty years later, the city has been unable even to give away the plant free to someone to operate it.

Encourage Waste Recycling

Recycling of "dry" wastes provides employment to about 1-2% of a large city's population, often the poorest women and children. The street waste pickers and those on the open dumps are usually loyal to a particular waste buyer who provides 10-20 of them with sorting space and protection from police harassment. Their loyalty is bought by loans, at rates which make payback long and arduous. In large cities, there are two-three tiers of waste buyers, all very well organized and specializing in specific wastes. Some waste buyers in Bombay have kept a pay phone near their shop so that members of the public can call them up and ask for someone to collect bulky wastes. Waste picking and trading is far less common in smaller cities, which in fact suffer from a lack of recycling facilities in their vicinity.

There is a great need for official support to this unappreciated activity that saves at least 10-15% in transportation costs daily to the city, adding up to millions of rupees a year. Several policies have proved helpful: starting a dialogue to find out the needs of this sector, issuing ID badges to street waste pickers who desire them (through NGOs or police, to prevent harassment), providing them with sorting and storage space in a low area such as below a flyover bridge, and providing a doorstep pickup service for post-sorting rejects to be taken away from slum houses or waste buyer's yards, so that these do not end up clogging the storm drains.

At the macro level, it is worth mapping, within the state or even nationally, the location of major recyclers of specific wastes and encouraging the filling of perceived gaps. Policies are needed to help this waste-reducing and partially pollution-abating industry to become legitimate, through designated recycling eco-parks, concessional power rates and low or no sales taxes. Village industry agencies should help identify or develop clean, low-cost recycling technologies. Banks should be encouraged, or at least permitted, to advance loans against raw material stocks. They would like to be able to have their materials insured against fire like anyone else. India has many NGOs working to improve their lot at the lowest levels but not at these policy levels.

An Indian national is patenting a successful way to introduce shredded waste plastic film into bitumen for road improvement. The improved road qualities of polymer-modified bitumen are well known. Using waste carry bags would increase the price of such waste and make their collection viable for waste pickers. Laboratory results are encouraging, but months have been wasted in trying to get permission to officially lay a test stretch at no extra cost. It will be a couple of years before highway specifications will include the use of shredded film or banks get around to financing this revolutionary idea. Such official apathy discourages innovation in the recycling field, and funding and aid agencies are so tied down by their own dated guidelines for lending that they too are useless as a source of venture capital for taking forward and field-testing such new and progressive ideas.

Conclusion

Unrecycled waste quantities in developing countries are increasing exponentially. Calling a material "recyclable" is meaningless unless recycling is actually done. Thin plastic bags and PET bottles of mineral water and soft drinks clog India's drains and sewers. Unrecycled waste also causes monsoon flooding, littering of the peri-urban landscape, and affects water percolation and seed germination. Tetrapaks are made into hardboard in dozens of countries, but not in India. Styrofoam continues to be used for shipping goods though it is banned elsewhere. No world-class recycling technology has yet come to India because it still has no laws enacted to require this. It is a moral tragedy that in most developing countries, many multi-national corporations use cheap and dirty practices that their home countries stopped tolerating over a decade ago. Consumers pay for such corporate profits through city taxes for cleaning up the new one-time use wastes, or in health costs, filth or eco-damage.

Hence, there is urgent need for new legislation and market strategies that promote product stewardship, producer responsibility and waste minimization. This is the next battle to be fought in India. Both Europe and North America have numerous examples of such legislation (see www.raymond.com) that developing countries can study and adopt before it is too late. A simple solution is to restrict entry of new industries to the country only to those who bring in the same recycling and product life-cycle policies and standards that are in compliance in the West.

WOMEN'S ROLE IN WASTE MANAGEMENT IN VIETNAM

Dang Kim Chi

Introduction

The industrialization and modernization of Vietnam have created favorable conditions and opportunities for the economic development of the country, integrating Vietnam into the global economy and culture. This growth, however, also involves threats to the environment, which are caused by wastes originating from development activities. The threats posed by waste are one of the issues that generate the most concern from communities in Vietnam. These threats require strict management and control in order to protect the environment and ensure sustainable development of the country.

Waste and scraps are created as a byproduct of everyday life activities in residential areas, offices, schools, hospitals, commercial centers, industrial areas and construction sites. Waste volumes vary based on a number of factors such as the growth and extent of production, population increase, urbanization, improvement of living conditions, as well as the improvement of education and living standards. There are

different kinds of wastes, which can be classified by their physical properties such as solid, liquid and gaseous wastes or according to their origins of generation and discharge such as industrial, residential, construction or agricultural sources. Wastes can also be classified by the extent of risks and dangers that they can cause to human lives. Some characteristics of hazardous wastes are that they may be inflammable, explosive, corrosive or reactive. The classification of wastes depends on the purpose and requirements of waste management and control. Usually wastes are classified by their sources or by their likelihood to cause risks. At present, the daily quantity of waste generated in Vietnam is estimated at approximately 49,000 tons per day. This waste can be categorized as follows (Nguyen and Nguyen 2001):

Industrial waste 26,877 tonnes/day

Domestic waste 21,828 tonnes/day

Waste from hospitals 428.75 tonnes/day

Total discharged wastewater 3 million m^3/day (estimated).

Among the various kinds of wastes (such as solid, liquid or gaseous), solid waste has become the biggest environmental concern in large cities, towns and industrial zones. In July 1999, the Government of Vietnam approved a strategy for solid waste management in cities and industrial zones in the country effective until 2010. The objective of this strategy is to gradually establish a comprehensive system for solid waste management and control. In addition, there are regulations on the management and control of harmful wastes, which were

issued at the same time as Decree 155/1999/QD -TTg of the Prime Minister, dated July 16,1999 (Government of Vietnam, 1999). The management and control of solid wastes should cover all stages from generation to disposal.

As part of the management of its solid waste, each country should develop policy and regulations for reducing harmful effects on the environment. The involvement of people and communities in this process is important. It is evident that women play several important roles in waste management activities. The section that follows will describe these roles in detail.

Women's Roles at Generation Sources

Management of waste at source is an effective method to reduce waste volumes. Waste reduction brings economic benefits because this process reduces the costs of waste collection and disposal.

Sources of industrial wastes. These include factories, enterprises and industrial zones. Proper identification of waste sources is important because it helps in selecting the right technology and solutions to reduce waste quantities. In recent decades, the application of cleaner production methods has been one of the positive innovations in waste reduction. It has proven effective in reducing environmental pollution as well as in increasing economic efficiencies. A number of industries, such as the chemical industry, the pharmaceutical industry and the textile and dyeing industry, are the sources of wastes that cause harmful effects to the environment. It is important to note that a high percentage of women are

employed in these industries. For instance, in the chemical industry, especially in factories which produce consumable goods such as plastic appliances, cosmetics, cleaning materials, and processed rubber products, female employees account for more than 50% of the workforce. Similarly, more than 80% of employees in the leather and footwear industry, 70% in garment factories and 60% in pharmaceutical industries are women. In general, in joint ventures with foreign investors specializing in making garments, leather and footwear, processed foods and electronics, women account for more than 75% of the workforce. Most female employees are of child-bearing age and are raising children. Moreover, most industrial enterprises are rather old with minimal pollution control equipment. In addition, women working at these enterprises possess little education and perform bottom-level work or services. They suffer from a high probability of exposure to harmful wastes. Being exposed to harmful wastes and working in a polluted environment for long hours have resulted in many harmful effects on women's health and well being, including risks such as premature delivery, miscarriages or deafness. According to the results of a survey carried out by the Institute of Science for Labour Protection over a period of three consecutive years, women who work in industrial zones suffer irregular menstruation at the rate of 81.8% after 15 years of working. This medical problem is related mainly to their working environment and conditions. Therefore, it should be made clear that the application of new technology to reduce waste, the optimization of production processes, the replacement of old equipment, the implementation of strict internal management and control, and the immediate

discovery and resolution of technical failures and break-downs are all effective methods to gradually reduce potential exposure to wastes and minimize threats to women workers' health. Besides the commitment of management and leadership at factories and production enterprises to this process, it is necessary to keep in mind that cleaner and safer production only comes into existence when there is awareness among employees who work directly on production sites. Hence, women who work in female-dominated industries play very important roles in reducing waste at industrial sources, thus contributing to improved working conditions and to a safer environment

Table 1. Female workers' health in the textile industry

(1,300 workers surveyed)

Disease	Rate of infection (%)
Otolaryngology	42.53
Chest ailments, oppressive feeling	60.7
Headache	43.38
Blurred vision	32.7
Female disorders	42.11
Articulation disorders	31.27
Eye infections	14.93

(Source: Tran Thi Lan 2000)

Sources of domestic wastes. Domestic wastes are related to human living activities and originate in residential areas. All women are involved in housework in their families and therefore most domestic waste goes through women's hands.

Women clearly play a pivotal role in managing sources of domestic waste. If domestic waste is properly stored and collected, hygienic and aesthetic conditions can be improved, resulting in better community health. If every woman in a family understands how to collect and separate wastes at source for reuse and recycling, the amount of waste can be significantly reduced. In many developed countries like Germany, the Netherlands, France and Sweden, separation at source has been in place for a long time and proved effective and economically efficient. To establish such practices in Vietnam, we should promote education to improve women's knowledge about reducing and properly separating waste. In recent years, management of plastic waste (PE, PP, PVC, HDPE and LDPE) has become an urgent matter. If all women are well aware of the need to reduce this kind of waste, they may change their purchasing behavior and replace their use of plastic bags or other products with items made of environmentally-friendly materials which are easily degradable and non-toxic. In this manner the amount of waste generated will be significantly reduced, easing the financial burden for collection and disposal.

Non-industrial sources of toxic waste. These include medical wastes originating from hospitals, sanatoria and medical clinics. Such waste consists of dressings, compresses and injection needles, body parts, used toxic chemicals, as well as radioactive waste. In the health care sector, women account for more than 70% of total employees. Women are involved in all activities that create medical wastes as doctors, nurses, analysts, pharmacists, etc. The efficient use of dressings, compresses, chemicals and other medical supplies, which can

help to reduce waste, therefore depends on women employees in the health-care sector. In addition, there are other harmful wastes that originate from agricultural activities, such as residual pesticides found in packages and lids for chemical containers dispersed over farm fields, ditches and irrigation canals, ponds and gardens. If farming women are conscious of collecting wastes and following strict procedures regarding the use and preservation of materials, this will contribute to the reduction of wastes and help prevent harmful impacts to themselves, their families and the surrounding environment.

Roles of Women in Collecting and Classifying Wastes

At the moment, the collection of waste originating in the urban and industrial areas of Vietnam is the responsibility and obligation of urban environmental companies. These companies collect and move waste by using simple tools and equipment, which partly explains the low efficiency of these operations. (Table 2)

Table 2. Solid wastes collected at urban areas

City	Collection Efficiency (%)	City	Collection Efficiency (%)	City	Collection Efficiency (%)
Ha Noi	65	Vinh	60	Da Nang	66
Hai Phong	64	Viet Tri	30	Bien Hoa	30
Ha Long	50	Hue	60	Vung Tau	70
Ho Chi Minh City	70-75				

(Source: Nguyen Khac Kinh and Nguyen Hoa Binh 2001).

In many towns and districts of Vietnam, there is no entity to collect solid wastes, or even a place for waste disposal. In larger towns and cities, wastes are collected on roads and streets and then moved to disposal sites or to waste processing enterprises. In most factories and industrial entities there is no place and/or procedure for solid waste processing. As a result, solid wastes are collected by urban environmental companies and then moved to the common disposal sites of the city. In enterprises specializing in the collection and treatment of wastes, the majority of workers are women. They do the job of collecting wastes on roads and streets, and then moving it to collection points. Women account for 60-80% of the total number of employees in urban environmental enterprises (Dang Kim 2001). Therefore, they play a very important role in collecting wastes. Poor awareness regarding waste treatment and hygiene habits, however, has made the work of collecting waste very difficult because wastes are often thrown everywhere in the street. Solid wastes collected and gathered by urban environmental companies are always mixed up with other kinds of wastes such as domestic and industrial wastes and also hazardous solid wastes. In addition, since the working tools used by women such as trolleys and shovels are very basic, much human labour is required for the task of waste collection. These working conditions mean that workers are being directly exposed to solid wastes and obviously their health is greatly affected. They are very often exposed to dust levels that are 3 to 7 times higher than the allowed standard (Dang Kim 2001), as well as hydrogen sulfide and ammonia gas, disease-causing microorganisms

and parasites, all of which can cause sickness in the workers. For instance, in Hanoi, waste collection workers suffer from bronchial and respiratory disease at the rate of 36.8%. Similarly, the rate of infectious pneumonia among them is 74.3 times higher than that of workers who do not endure exposure to solid wastes. Facial and skin diseases and female diseases also affect these workers. In addition to working in environments that are so dangerous to their health, women's incomes are very low and they are provided with minimal protective equipment and safety gear. Also, the attitudes and opinions of the community towards these female workers are often not appropriate. If there is no awareness about the importance of conforming to occupational health and safety requirements, the workers suffer and also act as intermediaries for transmission of diseases to their children and other family members.

In addition to the collection of solid wastes by urban environmental companies, there are a large number of people in the informal sector who earn a living by collecting and recycling wastes. They are itinerant buyers who come to households to collect and buy reusable wastes, litter and scraps such as used paper, glass bottles, plastics, aluminum (empty beverage cans), iron and copper scraps. They are generally poor and jobless women, except for some men who buy heavier wastes. Most of these workers are migrants to cities from rural areas and their average age is from 25 to 40. They are primary breadwinners who carry the burden of providing for their families. All waste and scraps bought are resold to solid waste processing entities (directly or

indirectly) as production materials. This collection and gathering of wastes and scraps therefore reduces the amount of solid wastes that needs to be land filled. The reduction of hard-to-break-down wastes makes the next processing steps less difficult, which means that providing support to the collection and gathering of solid wastes has an effective impact on the collection and treatment of wastes. Waste pickers are involved in separating wastes themselves to sort out reusable wastes. The number of waste pickers and itinerant buyers in Hanoi is estimated to be about 6,000 and the majority of them are women.

Women's Roles in Recycling Wastes

One of the important steps in the processing and management of solid wastes is the selection of solid wastes for use as materials to make new products. It is considered a preferable method for better and more effective management of solid waste, a method which encourages economic efficiency by saving resources rather than using original materials. Moreover, this process also contributes to reducing the amount of solid wastes to be processed or treated, thus saving areas for disposal and reducing the negative effects on the environment.

In many developed countries, much attention has been paid to recycling activities. In Vietnam, the treatment and recycling of wastes and scraps for reuse was started only a few decades ago. Initially, these activities were, generally speaking, not centrally organized and took the form of small-scale household activities. From them developed new trade village

communes such as Minh Khai plastic-recycling village (Hung Yen province) and Trieu Khuc Trung Van (Ha Noi), paper recycling in Phong Khe, Phu Lam (Bac Ninh) and Da Hoi iron- recycling village (Bac Ninh) (Dan Kim 2001). Most of these recycling villages are small-scale and use old equipment and facilities, resulting in low productivity and poor quality products. This, however, is compensated for by the labour flexibility in trade villages that makes use of farming labour during idle times and the lower cost labour of old and young people (Degregorio et al. 1999).

Generally, the recycling process (metal, paper, plastic, etc.) in these villages is mainly carried out by men, while the responsibility for waste collection, sorting and washing rests with women. Some simple, repetitious activities, such as paper sorting, cutting, separating nylon and paints from the paper, plastic sorting and cutting and washing nylon packs, brushing rust and so forth are always done by older women. In small households however, women take care of sales and purchases and the management of daily production and spending for machines and the supervision of hired workers. Young women may work as accountants or assist their mothers in buying and selling. Thus women play an important role in recycling work at trade villages at both the managerial and direct labour levels. In spite of the benefits resulting from this involvement, however, the existence and development of these villages have caused negative impacts on the surrounding environment due to the backward technology and old equipment and machines that are being used. Moreover, the quality of water, air and solid wastes in these villages is rapidly deteriorating (Degregorio et al.

1999). The environmental pollution resulting from the combination of production and living sites has resulted in increases in the rate of infectious diseases. The rate of respiratory, eye, skin, digestive system, nervous system and gynecological diseases is usually higher among women living in those villages than among people in other areas (see Table 3). This is a warning that women living and working in trade villages specializing in recycling wastes are at a high risk caused by polluted environments. Note that female waste workers suffer from gynecological diseases at higher rates compared to other women. Women in Da Hoi and Minh Khai are affected at even higher rates.

Table 3. Gynecological diseases found in the three recycling villages: Phong Khe (paper), Da Hoi (iron) and Minh Khai (plastic)

Disease	Waste Worker group (%)			Others (%)		
	Da Hoi	Phong Khe	Minh Khai	Da Hoi	Phong Khe	Minh Khai
Genital Itching	27.45	4.65	11.1	9.63	5.5	8.86
Leucorrhoea	37.25	11.05	34.92	20.74	13	26.6
Colic	41.18	19.19	36.51	18.52	16	24.1
Irregular menses	39.22	11.63	11.1	8.15	1.6	10.1

(Source: Degregorio et al. 1999)

Women's Role in Waste Processing

After being collected and sorted, wastes may be reused or

recycled, and the residual may be sent to waste disposal places. This section describes three common waste disposal measures. They are:

Bio-fermentation to produce organic fertilizer. At present, Ha Noi and Ho Chi Minh City authorities have constructed two centralized facilities to carry out pilot projects of this measure. However, there are still some difficulties in the sorting processes, leading to low quality of the produced fertilizer and poor marketability (Nghiem 2000).

Incineration. This measure is widely applied in many developed countries, but its cost is still rather high because it requires treatment of air emissions that contain various elements harmful to the environment. Ha Noi and Ho Chi Minh City's authorities have built incinerators at the local hospitals where there are large amounts of hazardous wastes.

Landfills. At present, land filling is the method for waste treatment applied in most urban areas in Vietnam. However, almost all disposal sites' conditions are not up to the required environmental standards. Landfill sites are open and cause pollution to both ground and surface water, as well as to the soil and surrounding air. This is known to be the case in the Nam Son disposal site in Ha Noi, Thuy Phuong in Hue City and Go Cat waste site in Ho Chi Minh City (Nghiem 2000). The latter has just been opened with new technology to protect the environment. At these waste sites in Vietnam, as well as in some other Southeast Asian countries, there are a great number of waste pickers. These are poor, jobless people who come from big cities every day to make a living by

collecting reusable and recyclable wastes from these huge garbage heaps. They can find metals, plastic, paper and rubber wastes for recycling or organic wastes for fertilizer fermentation. This issue has led to the development of slums right behind the sites as shelters for poor collectors. Almost all collectors are women and children. In Hanoi, together with collecting waste on streets and at waste sites, 15% of wastes are gathered for reuse or recycling, accounting for 180 – 270 tonnes of recycled materials daily (Nghiem 2000). Thousands of people, most of them women, take part in collecting and buying scrap materials. This may be a positive activity, but their direct contact with wastes at dumpsites using simple tools without any protection is dangerous to their health. Many have died or become disabled because of tetanus infections and other incurable diseases. It is necessary to understand that this is a most harmful environment for poor women and children who are taking risks to earn a living in this way.

Conclusion

In Vietnam, women play a significant role in the management and control of wastes, including collecting, sorting out, recycling and treating them for reuse. They interact with waste in many situations at work, in offices, in shops, in service centers and in their housework. They are the main work force in the collection, purchase and sorting of waste. Therefore, we must recognize that their participation in both waste management and direct labour at trade villages is significant. Women are major participants in activities of waste management and control. This involvement, however,

has adverse impacts on their health because daily contact with toxic wastes can lead to various diseases, in particular diseases affecting fertility. Therefore, women's potential, rights, responsibilities and also their risks in waste-related operations are very high. Working in any position as workers in factories, employees in offices, housewives and reproducers in their homes or waste collectors they should be aware of how to actively participate in environmental protection activities to minimize wastes, collecting and saving reusable materials by applying precise techniques. This will lead to effective self-protection from negative health impacts caused by wastes. In addition, it will indirectly contribute to the sustainable development of Vietnam by reducing damage to the environment.

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WOMEN AND WASTE ECONOMY ACTIVITIES AT THE WARD LEVEL

Tran Thi Huong

Introduction

In daily activities (domestic work, production, entertainment, etc.) people and their cities consume large quantities and varieties of natural resources (fuel, energy, food and foodstuff, fresh water, etc.) and also generate considerable quantities and varieties of wastes. If not managed in a proper manner, these wastes can generate pollution, create adverse impacts on community health and degrade cities' landscapes, threatening their sustainable development. Therefore, society's responsibility is to effectively manage and dispose of all kinds of wastes.

Wastes contain many components that can be reused or recycled through various methods of treatment that will prevent environmental damage and bring about economic benefits. "Waste but not waste". This is the meaning of the waste economy.

In solid waste management policy, the 3RV-E model represents the purposes and management policies of the

waste economy in order of priority. They are: Reduce, Reuse, Recycle, Validate and finally, Eliminate.

In order to achieve economic, social and environmental targets, waste management must be implemented in a synchronous and integrated manner in terms of legislation, technology, organization, policy and finance at all governmental levels. These activities need to be integrated into society and practiced by all community members. This report will focus on women and waste economic activities at the ward level.

Waste Economy Activities at the Ward Level

The ward is a basic unit of urban society in Vietnam. It is not only a fundamental unit in settlement construction planning, but also a basic (the smallest) administrative unit in urban management. Hence, the ward is directly affected by human activity and faces many environmental problems as a consequence of wastes generated by humans. The ward unit is based on social factors, using organic relationships between individuals, family and society in the settlement unit to organize and guarantee the comprehensive and sustainable development of the community, as well as of each individual and family.

At the ward level, the family – the basic unit of society – not only represents the most complete and clearly defined relationship between people, but also between people and the environment. Within the family, all human activities, all components of the ward such as the interior household

(kitchen, toilet and other parts) and the exterior household (road, courtyard, garden, market places, shops, schools, kindergarten, nursery schools, infirmaries, people's committee office, wastewater treatment plant, etc.) are sources of waste generation. People reside and maintain all of their living activities within these areas. Therefore, in order to protect the environment and themselves, people (each individual and the community as a whole) have to accept the responsibility to handle all kinds of wastes in an economic and ecological manner with the best interests of people and the environment in mind. While planning is important, in some areas, for different reasons, many people spontaneously take part in waste economy activities (collection, buying, selling and even recycling of waste in their living areas). These activities have a strong impact (both positive and negative) on communities, and these impacts need to be studied and addressed by relevant local authorities and by the whole society.

There are many waste economy activities at the ward level but in the near future we should focus on the following areas:

- Waste separation at source (household and public areas).
- Recovering all kinds of waste materials that can be reused or recycled.
- Implementing a pilot project on organic waste treatment at the ward level (by household and residential blocks).
- Taking part in the effective management of waste collection and transportation systems at the ward level.

- Promoting education for improving public awareness on environmental protection, waste management, as well as the waste economy, in order to change patterns of waste generation.

Waste Separation at Source (in Household and Public Areas)

In the ward area, wastes consist mainly of domestic wastes from households, market places, commercial services, streets, grounds, schools, nurseries, kindergartens, etc. Among these, household waste comprises 60% of the total waste.

Domestic wastes contain various components such as organic matter (leaves, foods, vegetable residues, etc.), recyclable inorganic wastes (paper, plastic, glass, metals, etc.) and other inorganic wastes (coal residues, fragmented soil, sand and construction wastes, etc.). There is a high percentage of organic matter in the composition of waste in Vietnam (40–60%, and sometimes even more, reaching 80% in some cites). According to statistical data from 1998, the organic waste content in some selected urban centers in Vietnam is: 51% in Ha Noi City, 40.1% in Ha Long City, 50.58% in Hai Phong City, 41.25% in Ho Chi Minh City and 31.5% in Da Nang City. By separating organic wastes at the source, the following economic and environmental benefits can be gained:

- Guaranteed environmental sanitation as a result of organic waste separation before the decomposition stage occurs, actively preventing environmental pollution.

- Usage of organic waste as a source of raw material for composting plants and inorganic wastes as a source of recyclable materials for manufacturing enterprises.
- Reduction of waste volumes that need to be transported for disposal, thus saving landfill space.
- Creation of more income from wastes that still have value.

If waste separation is done well, we will not only recover wasted materials that can be reused and recycled, thus reducing natural resource exploitation, but we can also improve the quality of composting products.

Source separation (at household and public places) in the ward area, however, needs to be well organized, promoted and mobilized through a pilot project. It also requires the active participation of people and close guidance from the ward administration. Therefore, the important role of Women's Unions and other public-based organizations in the ward in mobilizing and encouraging people's participation needs to be recognized and promoted. Women are key participants who play a decisive, central role in waste management because they themselves are housewives who have direct experience and good waste management practices. While implementing waste management strategies themselves, they can also mobilize, demonstrate and guide other people in the implementation process.

Waste separation at source has not been formally implemented in Vietnam, but, with the assistance of the

informal sector, waste in the urban areas is generally separated into two categories:

- Recyclable domestic wastes (plastic, wastepaper, glass, metal, etc.) collected and purchased by itinerant buyers and waste pickers.
- The remaining domestic waste collected by the Urban Environmental Company (URENCO).

For various reasons, waste needs to be separated at its source in the near future. Domestic wastes, depending on the local circumstances, should be classified into two or three categories:

- Waste materials that are reusable or recyclable.
- The remaining wastes for disposal.
- If there is a composting plant in the local area, organic wastes should be classified as a source of raw materials for composting fertilizer.

Obviously, if wastes were not separated at source we could face many difficulties such as environmental sanitation problems and a low economic efficiency in waste management.

Organizing for Reusable and Recyclable Waste Collection

Reusable and recyclable waste collection can be best implemented at the ward level because this is the location of waste generation. Experience shows that the more reusable and recyclable materials can be collected at source,

the less will be the negative impacts from waste picking in dump sites.

Up to now, many people have had their own established habits of separating recyclable materials (including plastics, glass, metal scraps and paper, etc.), which they then sell to itinerant buyers. There are, however, many inconsiderate people who dispose of all kinds of wastes at waste collection points. Therefore, when waste pickers are sorting through and collecting recyclable materials at these sites, this causes sanitation problems, thus undermining the beauty of the city. In order to gradually reduce waste picking activities at residential areas and dump sites, waste needs to be separated at source, and recyclable and reusable material recovery activities also need to be well organized. Waste can be separated within households. Recyclable and reusable materials could also be collected at the household level through itinerant buyers or the ward's services. Hence, a collection service should be introduced at the ward level with the responsibility of collecting recyclable and reusable materials by buying, exchanging, or through voluntary contributions, and then transporting them to the buyers of reusable and recyclable materials. Women's Unions can get involved in the management of this service with the purpose of job and income creation for poor women, but it is imperative to guarantee environmental sanitation and protection of their health.

It should be mentioned that only recovery activities, and not recycling activities, should be carried out at the ward level. Therefore, recycling enterprises or recycling depots that exist

in some wards need proper planning and good organization in order to reduce negative impacts on the environment as well as on the city's life, beauty and sanitation. In our opinion, waste recovery activities should be made legal and must be integrated into local waste management systems. Registration and work licenses for those who meet all environmental sanitation and labor safety standards should be permitted in order to protect them and to encourage their contributions to society. Often associated with heavy pollution, waste recycling facilities need to be planned and relocated from the inner urban areas to out-of-town areas.

Experiments in Local Composting of Organic Waste

The high percentage of organic matter in domestic waste can be composted into compost fertilizer. Within the ward's space, provided there are large enough grounds and gardens as well as green trees, organic wastes need to be composted into bio-fertilizers that can be applied to trees in the ward area. With local composting, the need to transport waste over long distances to composting facilities will be minimized. In cases where wards do not have enough space, organic waste from waste separation processes could be transferred to centralized composting plants.

Taking Part in an Effective Management of Waste Collection, Transportation Systems at the Ward Level

Waste storage, collection, transportation and treatment systems are indispensable elements of the urban infrastructure. At the ward level, these systems transfer

wastes from their sources to collection points and treatment facilities in order to ensure environmental sanitation and prevent impacts that adversely affect living conditions. Therefore, everyone must take responsibility for the active management of technical systems in coordination with the local ward administration. Two important waste management goals at the ward level are:

1) Effective management of waste sources and the volume of waste in the ward area; and
2) Coordination with other professional organizations to completely collect, and rapidly and neatly transport, all kinds of waste from the ward to treatment plants or disposal facilities.

In order to implement the above-mentioned goals, the following activities need to be done at the ward level:

- Investigate and forecast the volume of wastes (wastewater, solid waste, air emissions) that are generated in the ward area.
- Properly plan the network for waste collection and transportation, as well as all facilities and supporting equipment. Regularly investigate and plan for ways of improving and upgrading these facilities in priority order by using State funding and people's contributions (with people's participation and supervision).
- Formulate regulations on urban sanitation (commitments between households, civil groups and the ward administration; contracts between sanitation

service groups for wastewater and solid waste, and the ward administration).

- Investigate and develop guidelines on waste collection and separation for markets, commercial services, stores and restaurants and common spaces that are considered the most "adverse" points for waste collection.
- Widely propagate knowledge and skills on waste management, and mobilize and organize training courses on waste classification, environmental sanitation and self-management commitments in residential areas.
- Improve the health conditions of environmental sanitation workers who are directly exposed to all kinds of wastes and their adverse impacts.
- Establish a close relationship among service management units of drainage companies, urban environmental companies and the ward people's committee (through environmental groups, construction and public order units and other community-based organizations at the ward level) in order to coordinate and supervise waste management activities.

The Role of Women in Waste Economy Activities at the Ward Level

The ward is a socio-economic unit in urban areas that comprises households and residential areas. In each family, women, while they may not be the house owner and the

major income earner, always have an important role and fulfill many functions and responsibilities in the family, and society-at-large. These responsibilities often relate to environment and waste in the following ways:

1) As reproducers and direct caregivers for the next generation, women cherish their husbands and children and have strong impacts on their children's personalities. Thus, their actions and words have an impact on other family members. From that perspective, women may actively mobilize their family members, relatives and neighbors to implement waste economy activities at the family and ward levels.

2) As housewives with industrious characters, women actively organize their family lives, guide their children to tidy their home, to improve the cleanliness of the kitchen, to maintain the drainage system and the toilet and to dispose of waste properly. Because of the role that they play in their homes, women can effectively implement waste economy activities.

3) As householders, women not only actively contribute to their families' income generation activities but also apply thrift to the management of their household. In the home, women separate as many items as possible for recycling and reuse. This is a good practice and serves as a basis for implementing further waste separation at the household level in ways that bring many benefits to the family and to society.

Reality shows that with any of their roles, women always have responsibilities to their family and society. They not only actively take part in waste management activities themselves, but also educate and mobilize family members and the whole community to take part in those activities. Today, women also have opportunities to study and improve their knowledge while playing an increasingly important role in their family. Therefore, women can participate in scientific and technological advances that help to effectively implement policies. These are the basic conditions for women's involvement in the waste economy.

The Global Conference on Women and Environment, held on November 4-8, 1991 in Florida, United States, included 218 reports on successful women's projects in the field of the environment, out of which 51 projects involved waste (nine projects on drainage, three projects on environmental clean up, four projects on composting, eight projects on hazardous waste management, six projects on solid waste management, twelve projects on recycling and nine projects on waste education). Through involvement in these projects, women actively take part and play an important role in changing the patterns of waste generation, reuse, recycling and disposal. All of the above activities contribute to the value and effectiveness of the waste economy.

In Vietnam, with a sense of initiative and creativity, the Vietnam Women's Union and provincial women's unions such as Ha Noi, Ho Chi Minh City, Da Nang City and Hue City, have organized many successful waste management projects. In particular, the Ha Noi Women's Union advised

the city's government to initiate a campaign called "For the healthy environment" telling people: "Women and the capital's people, don't litter and throw rubbish and wastes on streets and public spaces". In these activities, women and Women's Unions at the ward level play an important role.

Recently, in a research project on "Women's Involvement in Environmental Management at the Ward Level", Hanoi Architectural University and partners have carried out some case studies at Kim Lien ward (Dong Da district) and Phu Thuong ward (Tay Ho district) in Ha Noi City. Through these studies, the Women's Union at the ward level played the role of advisor, cooperating with the ward administration to successfully initiate and organize many environmental and waste management activities, in which women were the major force and played an important role. The results of the project include the following:

- 70% of women in Phu Thuong ward and 80% of women in Kim Lien ward were considered active participants in environmental and waste management activities.
- The ward Women's Union had an active role in coordinating the ward people's committee and other departments and unions in the ward area in order to organize and maintain waste management activities (supervise sewer improvement and street clean up, maintain women's self-management of the streets, etc.).
- The Women's Union actively initiated and developed an environmental action and waste management plan

for the ward that included communication and mobilizing people to take part in environmental sanitation activities such as family waste basket procurement, dredging sewers and gutters, and weekly clean up of streets.

- A close relationship was established between the Women's Union and the waste collection group of Urban Environmental Company No.4 in order to coordinate and implement waste management as well as securing a commitment to improving environmental sanitation. Women's Union members regularly visited and mobilized environmental groups and provided support in sanitation control and in improving service quality.
- Some households were mobilized to experiment with waste separation and organic waste treatment by use of effective microorganisms (E.M).
- A civilized and courteous lifestyle in the ward area was promoted with awareness of sanitation regulations, and financial and labor contributions to improve the sewer and road systems.

The above activities affirmed women's indispensable role in environmental management activities at the ward level. Specifically, their roles include:

- Organizing communication, mobilization and education activities in order to improve public awareness on environmental protection, waste management as well as the waste economy.

- Experimenting with waste separation at the household level.
- Recovering all wasted materials that can be reused or recycled (in the form of buying, exchanging or voluntary contribution at the ward level).
- Experimenting with and implementing organic waste treatment at the ward level.
- Taking part in the management of waste collection and transportation systems at the ward level.

The contribution of women to waste economy activities at the ward level is potentially very significant. In practice, however, women often have many difficulties in participating due to limitations related to time, health condition and funding for promotional and education programs, as well as due to potential risks from waste-related activities. Therefore, the responsibilities for work and for social affairs have to be shared by the two genders in the family. Women have a very heavy work burden. They not only work in offices and in other places outside the home, but are also responsible for housework and are a major force in environmental and waste management activities. These difficulties will be a burden to women if they do not receive support and responsibility-sharing from the rest of the community. Thus, positive public opinions need to be developed and encouraged so that the entire community of men and women, young and old can share the responsibilities of effective waste management.

Conclusion

Vietnamese women are the pioneers and the core of many

social movements. They contribute to the country's development and protection as well as to economic and environmental protection activities in remarkable ways. Women can play an important and active role in waste economy activities at the ward level if they receive proper support from the authorities and active participation by the public. However, there are still many difficulties for women in waste economy activities that need to be studied and resolved.

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HAI PHONG WOMEN INVOLVED IN WASTE COLLECTION OCCUPATIONS AND ENVIRONMENTAL PROTECTION

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Introduction

Hai Phong City includes inner urban areas, namely Hong Bang, Ngo Quyen, Kien An and Le Chan districts and has important tourist destinations such as Do Son Beach and Cat Ba Island. As of 2001, the city had a population of 1.723 million, of which, the urban population accounts for 34% (or 0.584 million), and this figure is projected to reach 2.142 million by 2020 when the urban population will increase by 63%.

The urban population of Hai Phong City has tended to grow rapidly. The growth rate increased to 4.2% in 2000 from 1.56% in 1985, 2.7% in 1993, and 3.7% in 1995 (Hai Phong City Statistics Office 2000). Population growth and industrial development often result in an increase in municipal solid waste (MSW) generation. For example, the city generated 1,123 m^3 per day in 1995 (Hai Phong City 1998), and it is estimated that this rate could reach 2,452 m^3 per day by 2010.

A comparison of the city's solid waste generation amounts by sector indicates that municipal solid waste (MSW) is ranked first, followed by industrial waste, as presented in Table 1. The city's current waste collection capacity only accounts for 75% of waste generated at present.

Table 1. Solid Waste Generation in Hai Phong City

Total daily solid waste generation	3,027 m^3
Municipal waste	566 m^3
Industrial waste	312 m^3
Hospital waste	13 m^3
Collected wastes	850 m^3

(Source: Pham Van Ninh et al.1999)

Collected waste is disposed of by burying at dumpsites where recoverable materials are then "selected" by waste pickers. Most collected solid wastes are not separated and as a result, industrial and medical solid wastes are buried together with MSW. A significant volume of waste that the Hai Phong Urban Environmental Company (URENCO) is unable to collect is thrown into rivers, canals and gullies or dumped randomly in alleys or open places in the outskirts of the city.

In addition to the formal waste collection force of URENCO, there have been local population groups involved in waste collection as waste pickers for a long time in the city. According to available statistics provided by the Hai Phong

Women's Union, this brigade numbers close to ten thousand. They collect recoverable materials and their collection is not only confined to Hai Phong City but has expanded to the neighboring provinces such as Quang Ninh and Hai Duong. Their business has also developed from waste collection to trade in waste, and there are many people involved in the waste trade, which is diverse. Some traders buy recoverable materials in Quang Ninh and Hai Duong provinces, and these are resold in Hai Phong City or vice versa, and even in Hanoi and China. The majority of informal waste collectors (including waste pickers and traders) are women and girls.

Waste picking and trade activities have provided the pickers and traders with a relatively stable income. However, their income varies. Those traders who have investment capital earn a higher income than the pickers. If a picker earns VND 10,000 (US $0.65 U.S.) on average, a trader may earn twice or three times this amount. This is a significant additional income for those involved in waste collection as most of them are farmers who are heavily dependent on low income farming on limited arable areas in the outskirts for their livelihood.

To date, arable land has become more limited since several rural areas have now been included in the urban sector (for example Trang Minh commune in Kien An district has now become an inner urban ward). In this context, waste collection has become more economically significant for the collectors.

Besides, it is waste picking and trade activities undertaken by

local farmers, which effectively help increase the city's waste collection rate and reduce the burden of overloaded waste volumes on the existing landfills, and significantly reduce the volume of persistent and/or non-degradable waste in the environment (including nylon, scrap iron, rubber tires and tubes, aluminum cans, radio receivers and television set components made of plastics).

Hai Phong City's waste collectors are poor and often illiterate or semi-literate people who do not understand how to protect their family members' and their own health and the environment. Furthermore, for the purpose of their livelihood, they continue their business disregarding poor and risky working conditions, and as a result, encounter many environmental and health problems.

Environmental Issues Facing Women Involved in Waste Collection

Effective management of waste generation at source is a proactive measure to reduce waste volumes and results in much more economic benefits by reducing all costs incurred in waste collection, transport and treatment stages, and minimizing environmental pollution. It can be said that women play a very important role in waste collection and waste management. However, there have been many environmental and other problems, which need to be addressed.

First, the health of waste pickers and their family members and neighbours is badly affected by the polluted surrounding

environments caused by collected wastes that have been accumulated in piles nearby their homes.

Daily, upon return home from work, those pickers who have no capital immediately re-sell their collected wastes to local dealers to cover their daily expenses and provide money for the next day's business. Others who are more affluent can accumulate collected materials for a certain period before reselling at a higher price to local dealers. However, because of limited space for waste storage and because of a poor awareness, they pile up collected waste everywhere at home, in gardens and on yards near to ponds and wells that provide their drinking water supplies. As a result, their drinking water supplies and foods are likely to be contaminated with toxic substances released from these accumulated waste piles. They are unaware of potential impacts caused by toxic substances released from the piles of wastes with which they live, and on the health of their family members, neighbors and themselves through the contaminated foods they eat and water that they drink and wash with every day.

According to a recent survey by the city's health sector, waste pickers, collectors and recycling workers have been infected with various diseases, namely eye- and skin-related diseases (itch, scabies, ringworm, and others), bronchitis and oto-rhino-laryngological diseases. Many women have also been infected with gynecological diseases. The first periodic health examination statistics of Trang Minh ward, Kien An district revealed that 65 –75% of local women have suffered from gynecological diseases.

Second, women and child waste pickers scavenge the materials with rudimentary tools such as iron hooks, and transport collected or purchased materials home by bicycles and/or panniers. Those who have bicycles can go a distance of about 10-15 km away for waste collection. Most local farmers involved in waste picking occupations work without personal protective gear. They select and gather with bare hands or with iron hooks whatever materials, nylon bags and papers they select and thus, they are exposed daily to toxic substances and pathogenic bacteria. Under tropical conditions, bacteria multiply rapidly in wastes accumulated at normal temperature, and this is a potential pathway through which waste pickers are likely to be exposed to skin, eye and intestinal pathogens.

Third, Hai Phong female owners operate their waste recycling units with limited capital and obsolete recycling equipment and without any pollution control and treatment facilities, resulting in adverse impacts on surroundings.

In Trang Minh ward (Kien An district) and Trang Cat and Hong Thai communes (An Hai district) waste recycling units primarily recycle waste nylon and plastics, and they mainly operate rudimentary equipment such as plastic cutters and molding machines which are only capable of low productivity and generate high heat. Because no mechanized washing facilities are available, most washing activities are handled manually. As a result, in the work environment, temperature and noise levels are high, and water bodies in the surrounding areas are contaminated with the polluting substances discharged from washing activities. Toxic

emissions released from plastic melting and molding processes are also not treated. These, together with the lack of protective gear for recycling workers, have created more adverse impacts on the workers' health.

Fourth, waste pickers earn very low incomes, particularly those who have no capital. Those junk buyers and recycling operators without capital cannot buy recoverable materials in large volumes. Therefore materials collected are immediately sold at a lower price. In addition, they have no experience in sorting of recoverable materials and all the materials are sold in bulk and this is one reason why their labor cost is so cheap.

Some junk buyers and recycling operators have established their own recycling workshops. However, their income is still lower because they operate rudimentary recycling engineering and facilities to produce low quality goods in combination with lack of facilities and marketing skills. As a result, there are many constraints and challenges facing them and their families.

Fifth, women and children involved in waste collection occupations have lower levels of educational attainment and environmental awareness. This can be partly attributable to economic constraints that prevent these children from continuing their education. The other reason is due to a belief that "men outweigh women", and as a result, most local families have invested in educating their sons, and many women and girls have had no access to education but learn instead how to do waste picking to earn income for their families.

In localities where waste pickers live, no short-term training courses or awareness campaigns on environmental sanitation and protection have so far been organized. This is partly due to lack of financial resources and expertise as well as undue attention by local authorities.

Roles of Hai Phong City Women's Union for Women Involved in Waste Collection Occupation

At the present time, the Hai Phong City Women's Union is working towards and has achieved several goals that help women involved in waste collections. These include:

- To educate and convince women and children to fulfill their obligations, and monitor and protect their legitimate rights. To implement these tasks, the union has organized a number of training courses on environmental sanitation communication, and provided them with consultations on health protection and change in attitude toward environmental protection.
- To coordinate with the city's health sector to provide free health examinations and medical treatment for local women who are involved in waste recycling and are exposed to extreme difficulties.
- With its prestige, the union has provided guidelines for women's unions at grassroots levels to obtain mortgage loans from the bank to develop their household economies. Each household has borrowed from one to three million dong as seed capital with which they buy and store recoverable materials, and

have the opportunity to separate them for higher-priced sales, leading to a step-by-step improvement in their economies.

Proposals for Promoting Women to Develop Waste Collection and Recycling Occupations and Strengthen Environmental Protection

Waste picking, trade and recycling activities are still a primary economic source for poor households to earn income, although there have been many difficulties and constraints facing them. Women involved in waste recycling occupation in Hai Phong have significantly contributed to facilitating the utilization of recoverable materials in large volumes for producing consumer goods locally, resulting in economic savings for the city. It is local women who have created additional jobs for surplus laborers in their communities and families, contributing significantly to the construction of their home villages.

To ensure their family's economic livelihood, they have experienced a hard life and overcome many difficulties in waste picking and collection activities, and therefore they are proud of themselves and the role they play in their household economy. Their status has been much improved in their families and in society as well. From the waste recycling work, some of them have become owners of small sized enterprises and participated in the city's networks of goods circulation and distribution. Thus they strive to be equal to men in all aspects of societal life.

Waste collection is an extremely important and necessary

stage in a waste management system. This requires waste pickers and collectors to be more cautious, meticulous and patient. And at the same time, waste economists, waste pickers and recycling workers need to improve their knowledge of all relevant aspects such as environmental sanitation and health protection; waste sorting skills and processing expertise and techniques; marketing and client relations skills, and others.

For the above-mentioned reasons, we have several recommendations, as follows:

1) Training of a team of communication practitioners (from members of the city women's unions at all levels) in the fields of environmental sanitation; waste economics; waste management strategy and plan development; and relevant communication materials and tools should be provided for grassroots level unions.
2) Training and awareness should be raised among local political leaders in order to change their attitude and advocate improved working conditions, labor protection, and work environment for female waste pickers and recycling workers.
3) Female waste pickers and recycling workers should be provided with improved access to credit to collect and buy recoverable materials in larger volumes; they should be entitled to technical training courses for strengthening their traditional processing practices, and from which a diverse and lively economy could be created in the market of waste economy.

4) An effective public health service run by qualified and advocacy physicians, and medical workers should be provided for people involved in waste economy occupations to improve their health.
5) An association of waste collectors should be established.
6) A solid waste recycling facility should be constructed to help strengthen the demand for recycled materials, encourage the waste pickers and help them to become waste economists.

Conclusion

In the process of waste collection, sorting and recycling in craft villages, waste pickers have become waste managers. The role of women can be visibly seen from all the stages ranging from management activities to fieldwork.

However, women's health is likely to be affected by adverse impacts due to their exposure to wastes. Therefore, we are looking for support to be given by agencies and authorities at all levels, and experts to form a team of women involved in the waste economy with the goal of helping them to successfully achieve, equitable comfortable and happy Vietnamese families.

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THE ROLE OF WOMEN IN DOMESTIC WASTE COLLECTION: A CASE STUDY OF COMMUNITY-BASED FEMALE WORKERS IN HO CHI MINH CITY

Pham Gia Tran

Introduction

Despite their spontaneous formation, the community-based waste collection system, as well as the networks of recycling and recycled product sales in Ho Chi Minh City, have proven to be good initiatives that help to process a great amount of solid waste daily. These initiatives are important in the present context of Vietnam because pollution is a serious problem, and a reliable and synchronous society-wide system of collecting and recycling waste is still lacking. Though community-based female waste collectors are not numerous, they share a valued achievement. Many difficulties, however, such as health, competition and old-age welfare, confront these workers today. This paper will examine the difficulties and make a number of suggestions for improving workers' health care, employee rights, health education and environmental education capacity.

Terminology

In order to avoid misunderstanding, some waste management concepts used in this paper are explained as follows (See Figure 1):

- Community-based collection is a method of organized waste collection that was founded by residents in a typical area. In some cases, it can be called "people-founded", but it will be referred to as "community-based" in this paper.
- Meeting points or rendezvous points are places where manual dustcarts or tricycles gather to collect waste from passing waste collection trucks that transport waste to transfer points or to the city's landfill. These mobile points, which lack stable structures, are only operational from 5:00 PM-10:00 PM.
- Transfer points are larger waste areas with stable structures where waste can be kept for longer periods of time.
- Landfill is the final deposit point of a waste-carrying vehicle.

An Overview of Domestic Waste Collection in Ho Chi Minh City

Ho Chi Minh City is Vietnam's biggest economic and cultural centre with over five million residents, hundreds of regular visitors and many economic production units. For years, the problem of waste has been an urgent priority in the

city. Recently, thanks to the city's economic development, the consumption patterns and life styles of the urban community have changed and citizens' living standards have risen, with consumer goods becoming more plentiful and diversified. Consequently the amount of waste generated has risen at a rate exceeding that of the population growth as illustrated in Table 1.

Figure 1. Collecting and transporting domestic waste in Ho Chi Minh City

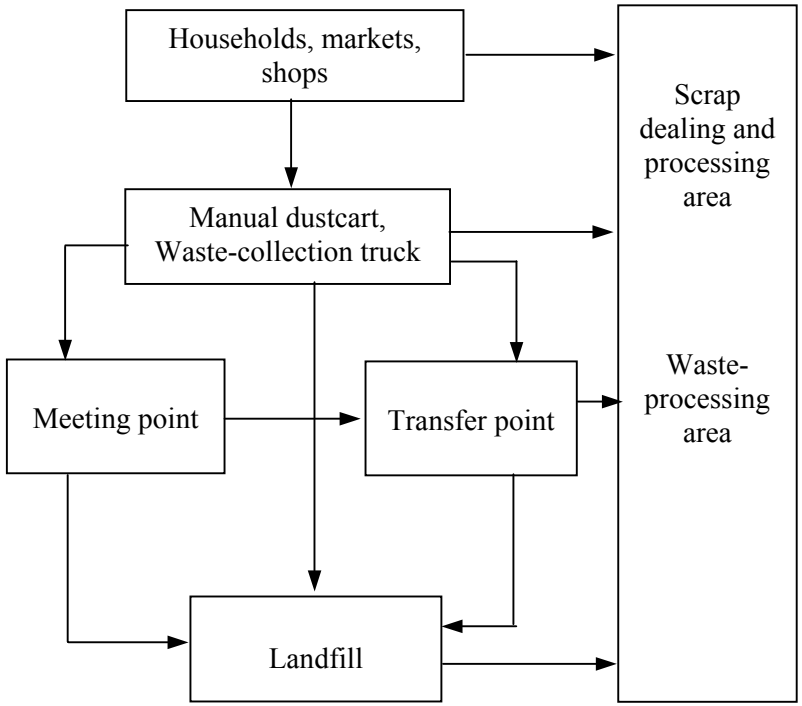

Table 1. Daily and annual quantity of collected and transported waste in Ho Chi Minh City

Year	Population	Quantity of collected and transported waste	
		Daily (tonnes)	Annually (tonnes)
1991	4,259,000	1,346	491,182
1992	4,426,000	1,689	616,406
1993	4,582,000	2,297	838,834
1994	4,694,000	2,754	1,005,417
1995	4,741,000	3,585	1,307,619
1996	4,852,000	3,674	1,341,014
1997	4,935,000	3,105	1,132,239

(Source: Ho Chi Minh City Department for Transport and Urban Public Works, 1998).

The estimated quantity of waste collected in 2001 was 4,500-6,000 tonnes/day (CENTEMA, 2001). Domestic waste accounts for approximately 70-75% of the total waste collected.

There are four major groups that collect the city's domestic waste: environmental workers, community-based collectors, garbage pickers and scrap-iron dealers. Among these, the second group, community-based collectors play the leading role. For instance, a case study under Project 415 (urban upgrading and clean up of Tan Hoa - Lo Gom Channel in Ho Chi Minh City) shows that community-based collectors serve

100% of households in Tan Binh District and 60% in the Tan Hoa - Lo Gom Channel area in District 6. Besides helping to clear up waste stagnation, pickers and collectors also sort waste, which is mixed with scrap due to not being sorted at the source, and bring it back into the scrap recycling process to turn it into useful productive materials.

Environmental workers and community-based waste collectors. These are the two major forces that collect all the domestic waste in the city. According to CENTEMA (Center for Environment Management and Technology Application Research), in 1998 there were 3,075 environmental workers and 2,818 individual collectors working throughout the city. Environmental workers are responsible principally for households located along the streets, while individual collectors cover alleys and side streets.

Professional garbage pickers. Most "professional" garbage pickers are poor illiterate children and middle-aged or elderly women who face economic difficulties. They can be easily recognized by their shabby clothes, dirty sacks on shoulders and steel hooks in hands, wandering from one dustbin to another to collect any saleable items that they can find. (Nowadays it is also possible to see some men on bicycles with a steel hook and two sacks at the back cycling about in the streets and living quarters for scrap). Unlike environmental workers, "professional pickers" live fully on the income from collecting and selling scrap.

Scrap-iron dealers. These dealers walk about the city's alleys and side streets to purchase scrap from various sources.

Most of the walking scrap-iron dealers are women with simple working facilities: a rattan frame held at the ends of a carrying pole, a weigh scale and a humble capital of 50,000-100,000 VND ($US 3.30 – 6.60). According to the study of "Women in scrap collecting and recycling areas in Ho Chi Minh City" (1996), in 1995-1996 there were about 4,000 women, 48.5% of whom were 25-40 years of age, living on scrap metal recycling. They come from poor working class families and often live together in hamlets with colleagues. Their low education and lack of professional training have made it necessary for them to remain in that job. Every day these women have to walk for 7-8 hours to earn an average amount of 20,000-30,000 VND ($US 1.30 – 2.00) for their living. The principal socio-economic characteristics of the three groups of community-based collectors, scrap-iron dealers and waste pickers are shown in Table 2.

Table 2. Statistical table of comparison on the principal social and economic characteristics of three groups in Ho Chi Minh City

Features	Collecting groups		
	Community-based collectors	Scrap-iron dealers	Waste pickers
1. Age	96.7% are 16-60	96.7% are 16-60	87.1% are 16-60
2. Under 16 years	0.0%	0.0%	12.9%
3. Literacy	6.7%	10.0%	25.8%
4. Gender			
Male	73.3%	20,0%	45.2%
Female	26.7%	80.0%	54.8%
5. Education	46.7% primary	53.3% primary	45.2% primary

6. Previous occupations	34.7% workers and 26.9% farmers	64.3% farmer and 17.8% workers	48.4% lack of profession 16.1% at school
7. Part-time jobs	13.3%	0.0%	16.1%
8. Working seniority	40% work for more than 10 years and 36.7% for 6-10 years	60% work for less than 5 years	40% work for less than 5 years
Number of samples	30	30	31

Source: Study of sample survey on social and economic features of collecting groups, ENDA Vietnam, 2001.

Female Laborers in Community-Based Waste Collection: Working Conditions

1. Owning operating areas

Most owners of community-based collection areas are self-employed, collecting on waste lines or operating collection areas. A survey in Ho Chi Minh City found that 90% of collectors are employers of collecting waste lines and the other 10% are employees. Employees often get a monthly salary or have to share their income from collecting waste with the employers at a rate ranging from 40-60%. The employers provide bicycles and distribute areas that they own and manage to collectors. Female workers usually inherit the profession of waste collection from their family or work in waste collection to help their husbands. Colleague-couples often strive to find additional collecting lines (to buy back or work for other employers) for further income.

2. Working time

Waste collection work demands a seven-day commitment from the collector. Collectors do not have a day off even on holidays (except on Tet holiday). They usually start working at 3:00 AM and complete their work at 9:00 or 10:00 AM. Others work from 6:00 AM until 12:00 noon. The average working time is five hours/day and the maximum is ten hours/day. The duration of the working day depends on the number of households in the collection area and on the waiting time for carrying waste to meeting points or transfer points. Besides the working hours mentioned above, female laborers spend the rest of their time doing housework and sorting the collected waste in order to find scrap to sell to scrap-iron dealers. In the evenings their work does not end. At that time, they take care of their children and help them with their studies.

3. Work intensity

The waste collection steps followed by female workers are the same as the steps followed by men. These steps are: collecting waste from all households located in the working areas, sorting and carrying waste to meeting points or transfer points for waste-collection trucks and cleaning up these rubbish dumps. Both female and male collectors are in charge of a similar number of residential households. On an average, each collector is responsible for 140-200 households, or at least 80. Collectors use tricycles, carts, lambrettas or manual dustcarts to carry garbage. Two collectors usually use one manual dustcart, which can carry 400-600 kg of garbage. One

cart on average can collect 800-1500 kg/day, depending on the number of trips. The average distance from households to transfer points or meeting points for one collector to walk is 7 km/day.

4. Work and income

The average monthly income of a collector who has his or her own cart is 1,500,000 VND ($US 100.00), while 700,000 VND is the average income of collectors renting carts from employers. This income is generated from waste collecting fees paid by households and from selling sorted scrap such as plastic, paper and metal. Colleague-couples can serve more households because they usually work individually (each with one cart of his or her own or rented from others). Thus, collectors can bring jobs to other family members. In Ward 15 of Binh Thanh District, female collectors are the principal supporters of their families. For many collectors, sorting scrap is a source of extra income. They sort the garbage poured into their dustcarts, identify any saleable items and put them into their sacks, which can be seen hanging from their manual dustcarts or tricycles. The average monthly income from selling scraps is 300,000-500,000 VND ($US 20.00 – 35.00) per capita. However, most male and female collectors think that their work does not have the prospect to develop and that in the future fewer and fewer people will choose this occupation for the following reasons:

1) There is less income from selling scrap because of decreasing quantities of scrap

2) The waste collection fee has not been increased over the past years

3) Collectors find this work harder, while income does not get higher.

Advantages of Community-Based Female Collectors' Operation

1. Effectiveness

Community-based collecting forces that include women have made a considerable contribution to the effective cleaning-up of the city's waste in cases where the regular waste collection workers fail to serve all the residential areas. Together with members of the Women's Union, Red Cross Organization and Youth Union, these women work as positive local environmental curators. Female collectors in Ward 15 Binh Thanh District often remind households not to throw waste into the canals or on the road and encourage them to use plastic bags and dustbins for garbage. Environmental education for the community is an effective measure to improve residents' awareness of issues related to waste. Due to their busy work schedules, urban citizens do not pay adequate attention to environmental issues and are not fully aware of potential diseases caused by environmental pollution. Because the waste collectors' work is specifically concerned with clearing up of wastes from households every day, they are considered potential local environmental educators.

2. Level of activity

Female collectors in Ward 15 Binh Thanh District are often dynamic in setting collecting fees for households. Through negotiations, residential communities and collectors agree on a fee that is proportional to the amount of waste generated. An average fee in Ward 15 is 7,000 VND/household/month (while in other wards in Ho Chi Minh City it is 10,000 VND/household/month). Collectors allow very poor families to pay whatever they can or to enjoy the service free of charge. This measure expresses a flexible, reasonable attitude that takes into account the financial abilities of people in the community, but managing organizations have yet to set a specific framework for waste collecting fees.

3. Working responsibilities

A field study of the EPFL-SDC Project (development program between the Swiss Government and the Vietnamese Polytechnic University) and Project 415 implemented in Ward 15 Binh Thanh District showed that female collectors work much more responsibly than men. They work with much more regularity than men and usually co-ordinate with local residents and residential group leaders in checking which residents do not use this service and in ensuring punctual waste collecting times, in keeping streets tidy and in settling emerging problems during the implementation stages. Over the past years, waste collection has not been done in some areas where it was previously done. One of the reasons leading to this failure is irregular collection and lax supervision. This deterioration has important consequences

for the communities living along the canals where residents have a bad habit of dumping waste into the waterways. Regular waste collection and environmental education are good measures to help local people overcome this habit.

Disadvantages of Community-Based Female Collection

1. Occupational heath

Women are able to work diligently and industriously. However they are usually not capable of doing hard physical work like pushing dustcarts to rubbish dumps or passing waste from carts to trucks. The occupational-specific characteristics of the work environment and the fact that it is full of dust, rubbish, disease germs and noxious substances, put collectors who come into contact with these substances at a higher risk of getting diseases. Health care and disease prevention, therefore, should be a major priority. Research by ENDA Vietnam (2001) shows that 80% of collection workers believe that their job has detrimental effects on their health. They declare that they often get flu, high temperatures, aches and pains, swelling and itching, tuberculosis, stomach aches, diarrhea and bronchitis. The community-based hygiene association, as well as the community-based waste association recommend that collectors use protective equipment (such as gauze masks, boots, gloves) while working, but not everyone uses these items as they find them hot and uncomfortable to work with. The rate of workers who do not use protective gear reaches up to 86.7%. In addition, most of the laborers do not take

annual health check ups. Health-care awareness by workers is therefore still low.

2. Job competition

The working areas of community-based collectors are complex and difficult to control. The waste-collection line of a collector is spontaneously formed: the first-comer contacts households to organize waste collection. After this, he considers the area his own and later can sell it to others. The ownership of a waste-collection line is acknowledged only through hand-written contracts or oral negotiations. Sometimes there are two or three collectors working together in the same area, and there is still inequality in the fee collection. Thus, competition among collectors is unavoidable. In such unorganized competitive environments, women usually face more disadvantages than men. The only way for them to sustain their work is to ask the local authority and the residential community for interference on their behalf. At present some of the ward people's committees have managed to restore waste collecting order at localities by making local collectors register their small businesses and develop management principles designed to prevent them from doing business along waste collection lines already covered by others. These measures make it possible to ensure regular collecting, signed stable contracts with households, and fee collection as previously agreed in the contracts.

3. Changing jobs

The collection of waste brings women an income that is not

lower than other jobs, but is associated with some of the following problems:

- By spending most of the time working and looking after their health, women do not have time to improve their education or to do another part-time job to improve their income.
- The hard physical work of waste collection is not suitable for women's physical constitution.
- Garbage collection is not suitable work for women when they get older.
- Income from collecting scrap tends to fall because the unstable material resources become rare and the scrap market is small and unstable.

Thus, the question "is collecting waste a short-term or a stable, long-term job for women?" needs to be investigated. When asked about their intention of changing jobs, almost all women reply negatively, giving the following reasons:

- They are used to this work and have high seniority in it.
- For older women, it is difficult to find another job.
- With income from waste collection, women can afford monthly household expenses while other jobs may bring lower income.
- Women do not have skills to do any other work or to have other jobs.
- Being immigrants without permanent domiciliary register and with low education levels, it is difficult for women to find jobs.

Another important reason why some female workers prefer this work is because they can control their living or do not have to live dependently. When they get older, these women can help their husbands to collect waste fees and scrap or they can save money that will help them to start a small business.

4. Forms of occupational social organization

The only form of occupational organization for community-based waste collectors is community-based health associations that operate under waste-specialized organizations of the city's districts. Members of these associations can enjoy some privileges like assistance in the difficulties that they encounter in life, settlement of working disputes, a chart of truck numbers and the use of transfer points for a small fee. Nevertheless there is still not any special standard or social allowance for female members. The CEP Fund project under the City's Labor Federation, finances community-based collectors in District 11 to buy new carts or to fix the old ones and offers workers some health care services.

Only when women are state environmental workers can they enjoy benefits such as maternity leave, medical insurance and convalescence allowance for the harmful working environment, and a year-end bonus or bonus for plan completion. Therefore it can be said that although both groups work in the same field, community-based collectors have fewer advantages than state environmental female workers.

Conclusion

Based on the information discussed above, some recommendations are proposed as follows:

1. Improving working conditions

At meeting points, manual dustcarts need to be designed in an appropriate size with hooking capacity to waste collection trucks in order to lessen the human-power needed to pass waste from carts to trucks (this technique has already been applied in some districts). This requires improving the self-made carts of collectors. The Government can assist collectors by providing them with credit to improve their carts.

Maintain the punctuality of the waste collection time of trucks at meeting points and transfer points to avoid excessive waiting times and traffic jams and to reduce the strong smell of sewage and waste.

For the long term, a more reasonable rearrangement of meeting points and transfer points needs to be considered in order to reduce the collectors' walking distance from households to rubbish dumps.

Sorting waste at the source is also a fundamental measure to reduce waste volumes. This measure not only yields social benefits (material and power saving, pollution minimization, reduction of waste filling areas) but also decreases the hard physical work required of the collectors.

2. Laborers' health care

Waste collection work results in significant harmful effects to

health. Thus, workers in community-based collecting forces should be recipients of social health-care benefits. Assistance should be free of charge or payable through loans with low interest and payment in installments. The immediate measure required is for community-based health associations to co-ordinate with the district's medical offices on the provision of health care.

3. Rights of employees

One long-term measure recommended is to integrate the community-based collecting force into the regular system. This force can be employed as state workers and managed by the district's companies of urban construction works. The proposed integration will help this force to be formalized and to operate more effectively and synchronously, which is appropriate to a force operating in the biggest industrial city of the country. Once they are employed in the regular system, community-based collectors can enjoy higher social standards and employees rights. In the meantime, community-based health associations should concern themselves with the health of their female members and develop social allowance policies for these members.

4. Occupational health education.

Community-based health associations should organize regular training courses for their members on occupational disease risks to health and on the important role of using protective gear while working.

5. Improving environmental education capacity

Community-based collectors have the potential to become environmental advocates at the localities of their work. Thus they need to improve their environmental knowledge and skills through training courses. These workers also need to become more educated about how to avoid hazards and bad practices in their own work.

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ISSUES RELATED TO THE HEALTH OF WOMEN AND CHILDREN WASTE PICKERS IN VIETNAM

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Introduction

Population growth, urbanization, globalization and economic development have major interactive impacts on health, especially the health of women and children (Table 1, Sachs 2001). There is substantial research to show that the distribution of income in a society determines the health of all citizens in that society (Meeker-Lowery 1995, Werner and Sanders 1997). The larger the size of the gap between the rich and the poor, the less healthy will be the society.

In other words, population health is determined by the gap between the rich and the poor. This gap is caused by social, political and economic factors, not necessarily by the presence or absence of disease. Bacteria, viruses and vectors do not recognize borders between poor and rich, educated and non-educated, waste pickers and those exposed to the air they breathe and the ground they use. The health of all citizens is jeopardized when the health of one group is compromised or ignored.

Table 1. Life expectancy and mortality rates, by country development category (1995-2000)

Development Category	1999 Population (millions)	Annual Average Income (US dollars)	Life Expectancy at Birth (years)	Infant Mortality (deaths before age 1 per 1,000 live births)	Under Five Mortality (deaths before age 5 per 1,000 live births)
Least-Developed Countries	643	296	51	100	159
Other Low-Income Countries	1,777	538	59	80	120
Lower-Middle-Income Countries	2,094	1,200	70	35	39
Upper-Middle-Income Countries	573	4,900	71	26	35
High-Income Countries	891	25,730	78	6	6
Sub-Saharan Africa	642	500	51	92	151

Source: *Human Development Report 2001, Table 8, and CMH calculations using World Development Indicators of the World Bank, 2001.*

Studies of waste pickers in India, a country with a large rich-poor gap, have shown that tuberculosis and dysentery are among the most common diseases of poor waste pickers (Cointreau-Levine 1998). The entire population, rich and poor, is at risk when these diseases are present in significant numbers.

There are signs that highly contagious diseases, such as tuberculosis and dysentery, are present in Vietnamese waste pickers (Nguyen 2001). The alarming increase in tuberculosis, especially among recent Vietnamese immigrants to Canada (Haslem 1999, personal communication), may be a sign that the disease exposures of poor people in Vietnam are infiltrating other socio-economic groups.

Women and children bear disproportionate health burdens related to their economic positions and their environment. This can have a serious impact on the future of any nation, in terms of lost productivity, reproductive wastage, congenital problems and cost of care. For example, there is increasing evidence that women who work and/or live in and around hazardous waste sites bear children who are at greater risk for congenital, physical, emotional and developmental problems (Dolk et al. 1998).

An increase in reproductive problems among female waste pickers may be related not only to toxic exposures, but also to the conditions of exploitation and abuse which many face. When women get sick, the entire household is affected because they bear the brunt of child and household care, as well as contributing to family income. The impact on national, social, economic and health goals are obvious.

The theoretical construct of the determinants of health (CIAR 1991, Evans et al.1994) draws a relationship between health and poverty, income, social status, gender, education, employment and other social variables such as exposure to violence, abuse and neglect. Because population health is

affected more by social, political and economic factors than by the presence or absence of disease, major improvements in population health can be made through fair and equitable national policies on housing, income security, gender equity and education. Ideally, in developing comprehensive national policies on health, ministries of health should work closely and cooperatively with ministries of housing, education, social services, economic development, environment, transportation and other ministries related to social welfare.

Findings From Surveys Done at Dong Thanh and Nam Son Landfill Sites, Vietnam

The construct of the determinants of health provided the rationale for survey research that was done at the Dong Thanh landfill site in Ho Chi Minh City. It also influenced the observations made at other landfill sites, including the Nam Son landfill in Ha Noi. This paper will use a population health approach to the data and will provide some suggestions for future directions based on this approach.

With the participation and help of the National Institute of Science and Technology, Policy and Strategy Studies (NISTPASS) and the Youth Research Institute (YRI), medical students from the University of Toronto surveyed the health of 41 waste pickers in Ha Noi and 11 in Ho Chi Minh City. The waste pickers in these surveys ranged in age from approximately ten years of age up to mid-fifty (average in Nguyen *et al*, 2000 was around 29 years of age). They worked, on average, eleven hours per day, mostly from late

afternoon to early morning (during the times that the dump trucks deposited fresh waste). Most worked a six- to seven-day week. They said that they earned, on average, 30,000 VND per day (US $2.00). This is comparable to the findings of Digregorio (1997).

Gender distribution of waste pickers among those surveyed was fairly evenly divided, especially among older pickers and the very young (Nguyen et al. 2000). Males in their twenties were not seen too often at the dump sites, suggesting that they may have had other jobs or roles in the family economy.

Most waste pickers lived near the dumpsites in overcrowded rooms or shanties. Most walked to work, although a small percent (32% in Nguyen et al. 2000) had bicycles which were used for other business and family matters. While some of the housing was substandard, some waste pickers had built substantial houses, although these were often near the dumpsites.

The average education of waste pickers was around three years, with most having some minimal level of literacy and numeracy. The majority of waste pickers over 30 years of age were married. They had, on average, three to four children who were born during the time their mothers picked waste. Many infants stayed with their mothers while they worked. Many children did not have time or space to play and few participated in formal education programmes. This was especially true for migrant worker children, less so for children of local (resident) waste pickers.

There was no source of water at the dumpsites (and many did not have a safe source of water in their homes). There was no shelter from rain, heat or sun, nor was there a clean, separate place to prepare and eat food safely. During the day, local farmers released their livestock to feed on the vegetation growing on the landfill. These animals were vectors for human parasitic diseases. The presence of dogs, rats and other animals on the landfill site presented constant danger to the waste pickers from vector-borne diseases and bites.

The health survey results are remarkably consistent between surveys. All waste pickers were exposed to mosquito bites, although none reported diagnosed cases of malaria or other diseases related to such bites. The data on their health complaints, however, are suggestive of these diseases. Accidents and injuries, including stab wounds from unprotected exposure to sharp objects, were the most common causes of infections, absence from work or inability to work. Coughs and headaches were frequently reported, as were gastro-intestinal, muscular and dermatological problems. Most waste pickers did not wear adequate protective clothing or footwear while they worked. They all agreed that their health status deteriorated quickly as they aged.

It is important to note that most waste pickers diagnosed and treated themselves without formal (i.e., professional) medical or health investigations or prescriptions. None of the waste pickers in Nguyen et al.'s study (2000) had been examined by a physician in the past six months. Self-treatment can increase the risk of contagion, delay intervention and increase the cost of care when individuals spend their scarce resources

on inappropriate (and often useless) treatment. Nguyen et al (2000) reported that a waste picker said that if he was wounded on the job, he would grab a rag from the dump, wrap his wound with it and continue working. Another said he would put lemon juice on it when he got home. Others said they would lick the wound and continue working. Table 2 presents a summary of symptoms reported by the waste pickers.

Table 2. Self-reported health problems *(adapted from Nguyen et al. 2000*)

Health Problem	Percent of Total (N= 41)
Mosquito bites	100%
Laceration, bruises, fractures (from work-related injuries and accidents)	98%
Back pain (which waste pickers attributed to the constant bending motion required to search for waste)	75%
Upper respiratory complaints (coughs, shortness of breath)	58%
Gastro-intestinal complaints (stomach aches, diarrhoea, bloody stools)	29%
Headache	28%
Skin problems (rash, pruritis, irritation, scabies)	24%
Muscle soreness	17%
Joint pain	10%
Vision/hearing problems	10%
Other: (pinworm, animal bites, parasites, lice, injury and/or death related to being buried underneath garbage being unloaded from trucks).	9%

Waste pickers perceived that their health status deteriorated with age - more so than their non-waste picking peers. This was true for Nguyen et al.'s (2000) sample of 41 waste pickers and Nguyen's (2001) in-depth interviews with 11 families (see Tables 2-5).

Table 3. Perceived health status according to age group ***(taken from Nguyen et al, 2000)***

Age (years)	Perceived Health Status **Poor**	Perceived Health Status **Fair**	Perceived Health Status **Excellent**
10-17	2	9	0
18-21	1	6	1
30+	18	4	0

Table 4. Health status compared to people of similar age ***(adapted from Nguyen 2001)***

WASTE PICKER					**NON-WASTE PICKER**				
Much worse	Slightly worse	Same	Slightly better	Much better	Much worse	Slightly worse	Same	Slightly better	Much better
32%	50%	18%	0%	0%	0%	10%	40%	20%	10%

Table 5. Health status compared to one year previous ***(adapted from Nguyen 2001)***

WASTE PICKER					**NON-WASTE PICKER**				
Much worse	Slightly worse	Same	Slightly better	Much better	Much worse	Slightly worse	Same	Slightly better	Much better
47%	52%	0%	0%	0%	9%	20%	38%	8%	26%

The major reason people became waste pickers was poverty (a major determinant of health - Evans et al. 1994 and others). Their health problems and risk exposures related to waste picking can therefore, be largely attributed to poverty and the need for daily survival. Their living conditions during the time they were picking waste were substandard and consisted of temporary, crowded one-room units. They were constantly exposed to polluted air (especially from methane gas produced at the waste site) and contaminated water and soil.

Migrant workers suffered more than local waste pickers. On every health indicator, migrant workers and their families were at the lowest end of the scale. Their children had less education than the children of local waste pickers (Nguyen 2001). Migrant workers and their families were not entitled to compensation from the government for the health problems related to living near the landfill site.

While the samples surveyed by Nguyen et al. (2000) and Nguyen (2001) did not have a disproportionate number of female pickers over male pickers, the health impact of waste picking was felt most acutely by female waste pickers. If it was not their own personal health that suffered, it was the health of their children or other family members. In every case, women carried the largest burden for caring for children and other sick family members, sacrificing their own needs to meet the needs of their family.

Discussion

The findings clearly demonstrate the robustness of the theoretical construct of determinants of population health (Evans et al. 1994). Female and child waste pickers, and especially migrant waste pickers, are among the poorest of the poor in Vietnam. They lack adequate housing, employment skills and opportunities to break out of the poverty cycle. Women waste pickers carry the largest consequent burden of poverty through their multiple roles as wage earners, child-bearers and family care givers. Their health is severely compromised by their circumstance of poverty and inability to acquire even the most basic necessities of life (e.g., secure housing, safe toilet facilities, nutritious and uncontaminated food, appropriate medication and health services, safe drinking water, access to education and training, child care and respite from the daily grind of family needs).

The findings of O'Leary (1998) in Cambodia showed that infrastructure support for maintaining the health of all

citizens was an important factor in population health. He concluded that new policy and legislative strategies were needed to address issues arising from economic development and rapid population growth (and consequent rapid rise in the number of poor people who did not have access to the benefits of development). There was a need for policies to link and/or integrate health, education, housing and social services. He stated: [There is a] "clear link between health problems, levels of poverty and occupations. Lack of adequate preventive measures increase risk of illness [for all citizens]."

O'Leary (1998) proposed setting up waste picker centres for both social development activities and for community-based environmental improvements. The centres would be places where waste pickers could receive education and training, health care, sanitary services (e.g., showers for cleaning up after working on dump sites), counselling and support for seeking alternative ways of earning income.

Birley and Lock (1999), citing Listorti (1996) concluded that: "44% of the disease burden would be strongly affected by infrastructural interventions." These interventions included improved housing, vector control and drainage, improved water supply and waste management, health care and education. Management of health hazards, especially water, soil, and decontamination of food crops, were important related issues for the health of the entire population.

There are several substantive issues which have not been

addressed in this paper, but which are nonetheless important to include in future policy, planning and research. Reducing work place, household and traffic accidents would contribute to length of productive work life and improve the quality of life for those most vulnerable to injury. Because women have multiple and essential roles within the family (such as care giver, wage earner), the entire family welfare is jeopardized when they are injured and/or disabled. There needs to be infrastructure support to help injured and sick workers, especially female workers.

Children are the future of any nation. They need to receive an education that will help them contribute to society as productive citizens. They need to be given time and space to play and make friendships with their peers. When children are disenfranchised, bored and unable to find meaningful employment, they are at high risk for turning to criminal and other antisocial activities such as drug and alcohol abuse. Mental health and child development supports need to be well integrated into the health infrastructure.

Recommendations and Suggested Directions

Management of health hazards, especially those arising from water, soil, and crop contamination are important to the health of all citizens. Health-impact assessments of economic, environmental and/or social interventions are also important. Reducing work place, household and traffic accidents, with infrastructure support for sick, injured and/or disabled workers would contribute to length of productive work life and improve the quality of life for those most

vulnerable to injury. In addition, there is a need for psychological, counselling and mental health services for those at the lowest end of the socio-economic scale, especially women and children.

Subsidized training programmes for female waste pickers and subsidized childcare and education programmes for their children would help offset the health burden to society. Improved awareness of hygiene and health issues among waste pickers would increase their understanding and use of appropriate medical and health services. Integrated reproductive health programmes (including family planning), education/training, and income generation would provide options for women waste pickers and their families. Coordination of social, education, health (including mental health), housing, environmental and economic policies and programmes, with affordable, high quality services brought close to where people live and work, would set a direction for economic prosperity in a just and equitable society.

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