

**SOLID WASTE MANAGEMENT – A CASE STUDY OF
WASTE-PICKERS IN DELHI**

*Dissertation submitted to the School of Social Sciences,
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the award of the degree of*

MASTER OF PHILOSOPHY

BIKRAMADITYA KUMAR CHOUDHARY



**Centre for the Study of Regional Development
School of Social Sciences
Jawaharlal Nehru University
New Delhi-110067
India
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DEDICATED

TO

WASTE-PICKERS



जवाहरलाल नेहरू विश्वविद्यालय
JAWAHARLAL NEHRU UNIVERSITY
Centre for the Study of Regional Development
School of Social Sciences
New Delhi-110067

CERTIFICATE

I, Bikramaditya Kumar Choudhary, certify that the dissertation entitled "SOLID WASTE MANAGEMENT - A CASE STUDY OF WASTE-PICKERS IN DELHI" for the degree of MASTER OF PHILOSOPHY is my bonafide work and may be placed before the examiners for evaluation.

(BIKRAMADITYA KUMAR CHOUDHARY)

Forwarded by

(PROF. ATIYA HABEEB KIDWAI)
SUPERVISOR

(PROF. S.K. THORAT)
CHAIRPERSON

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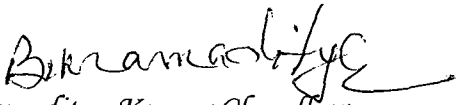
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For any drawback in this dissertation, if any, I alone am responsible for it.


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List of Abbreviations

| | |
|-------|--|
| AAI | Airport Authority of India |
| ACORD | Asian Centre for Organisation Research and Development |
| AE | Auto Engineer |
| ASI | Assistant Sanitary Inspector |
| CB | Cantonment Board |
| CPCB | Central Pollution Control Board |
| CSE | Conservancy and Sanitation Engineering |
| DDA | Delhi Development Authority |
| IIT | Indian Institute of Technology |
| ILO | International Labour Organization |
| JNU | Jawaharlal Nehru University |
| MCD | Municipal Corporation of Delhi |
| NCR | National Capital Region |
| NDME | New Delhi Municipal Corporation |
| NEERI | National Energy Engineering Research Institute |
| NGO | Non-governmental Organizations |
| SLF | Sanitary Landfill |
| SRC | State Reorganisation Commission |
| SS | Sanitary Superintendent |
| SWM | Solid Waste Management |
| TERI | Tata Energy Research Institute |
| UT | Union Territory |

Chapter: One

INTRODUCTION

Cities are considered as 'the mothers of economic development'¹, not because people are smarter in cities, but due to the conditions of density of population as well as of urban occupations and their varying character. There is a 'concentration of needs' in cities, and greater incentives are available to address problems in ways that have not been obtainable to address them before.²

Cities, in this sense need to be kept liveable for the larger number of people who are required to perform as means for the production system as well as are ready to, and capable of, consuming the produced goods and services. The concern of the 'world community' against the increasing unhygienic conditions of a particular city or urban space as a whole is therefore 'rational'. This makes urban planning – concerned primarily with spatial and land use dimension for the future; and urban management – concerned with the immediate operation of a large range of public services that affect urban conditions, of the utmost importance.

Urban development should be environmentally conscious and the law should facilitate the integration of environmental consideration into development process as the urban development process has a long-lasting and complex impact on the physical characteristics of the city and its surroundings. Appropriate resource conservation and a good environmental management ought to be an important aspect of human development. It obviously includes the betterment of physical environment of cities.

1 E. W. Soja, (2000) '*Postmetropolis: Critical Studies of Cities and Regions*', Blackwell Publishers, Oxford, pp.14.

2 *ibid*

In this background, United Nations conference on human environment in 1972 proclaimed that defence and improvement of the human environment, both natural and human, have become imperative for peace and development.³

For better urban environment, a group of urban services like water supply, drainage, roads, electricity, public transport, a proper waste disposal system etc. should be available to its inhabitants. It may also include health and education as part of social infrastructure. Management of physical environment of city includes three constituents: management of waste material, the control of pollution and the maintenance and appearance of public area. At this point, management of solid waste material is the focal point of the study.

1.1 WASTE AND ITS MANAGEMENT

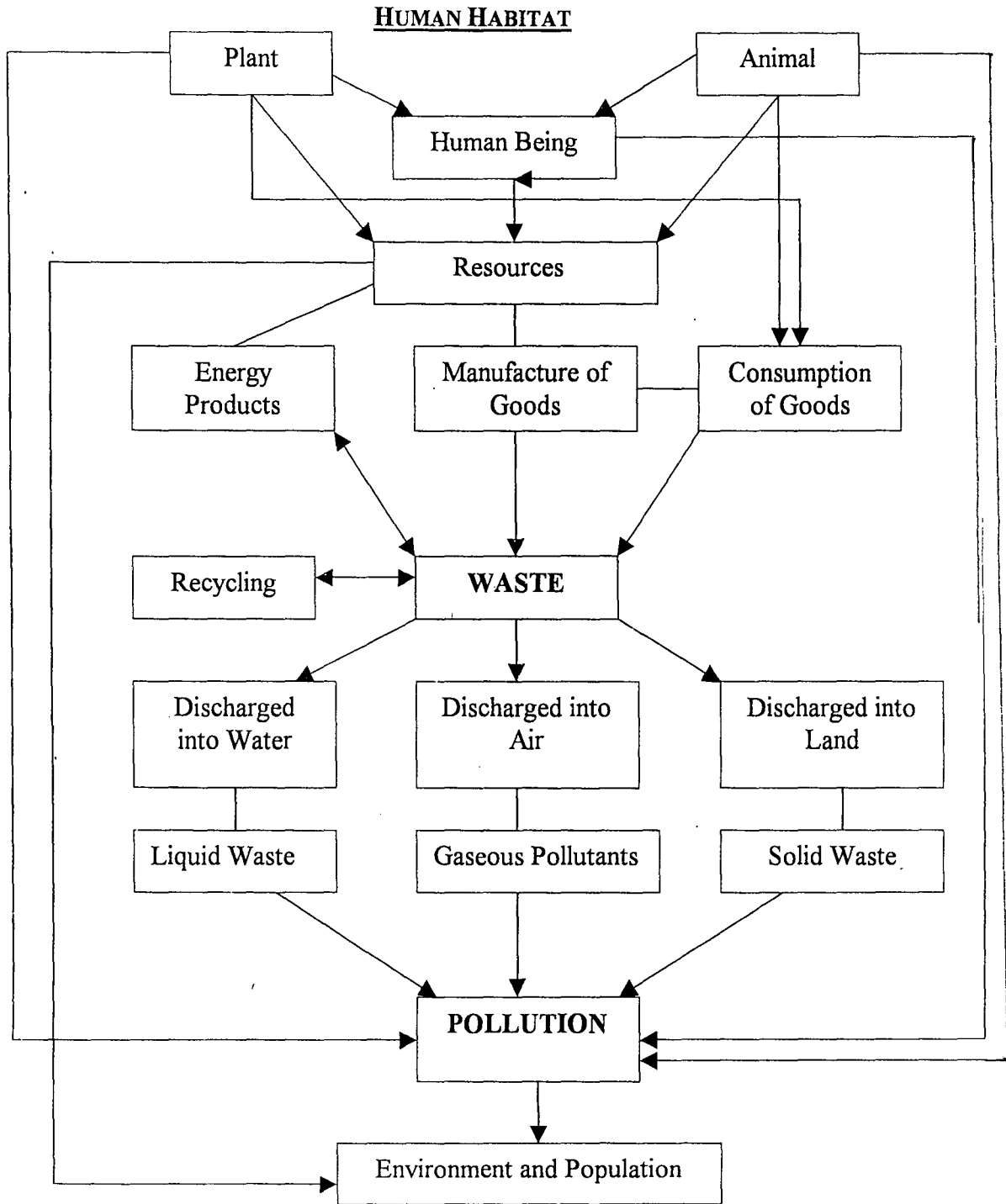
It is natural that certain materials are discarded after use due to everyday functioning of all systems from small (like human body) to large (like industrial estates) in any human settlement. These materials, generically known as waste can be solid, liquid or gaseous and are the result of various activities of human beings, animals and plants (Figure 1.1).

Gaseous waste includes Carbon dioxide (CO₂), Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂) and other pollutants spread in surrounding air. Liquid form of waste refers to the used waste and residual chemicals that flow into the nearby water-bodies and is known as liquid pollutant. These two types of pollution are commonly, referred to as 'Air-pollution' and 'Water-pollution' respectively. The third type that is less discussed yet more fatal is the solid waste. This includes refuse from households, hazardous and non-hazardous waste from industrial and commercial establishments, refuse from institutions, market waste and street sweepings.

3 J. Amos (1993) 'Planning and Managing urban services' in N. Devas, and C. Pakodi, (eds.) *Managing Fast Growing Cities*, Longman, pp. 135

Figure 1.1

SCHEMATIC DIAGRAM REPRESENTING WASTE AND POLLUTION IN



Solid waste is something the owner no longer wants at a given place and at a given point of time. It is any discarded material- organic as well as inorganic that is abandoned by or is disposed of or burnt or after being accumulated, sorted or treated before it is abandoned. The term solid waste encompasses any garbage, rubbish, refuse or sludge from a waste water treatment plant or other discarded material from industrial, commercial mining or agricultural operations or community activities.⁴

Despite having no market value for the owner, solid waste, acts as a resource for some people since it provides a means of livelihood to about one percent of workforce in the metropolitan cities of the third world countries.⁵ Apart from generating employment opportunities, it also works as a source of raw material for the recycling industry. Therefore, solid waste may be considered a 'resource', as according to Zimmerman's famous dictum 'resources do not exist, they become'.

We all produce waste in nearly everything we do. The quantum of solid waste released is directly related to the level of household income, family size and level of education. In general, per capita waste generation in India is quoted to be around 350 grams in urban area, which can vary from 250 grams in small towns to 650 grams in metropolises like Chennai.⁶ If the nation – wide per capita waste generation in India of about 350 grams is multiplied by the urban population of

4 PHD chamber of commerce and industry (2001) '*Solid waste management: A brief Overview*', in a paper presented in Workshop on Managing Solid Waste: Public and Private Interventions, 30th Jan, 2001.

5 S. Saha (2001) '*Urban Growth and Solid Waste Management*', in a paper presented in the Workshop on Managing Solid Waste: Public and Private Interventions, 30th Jan, 2001.

6 CPCB (2000) '*Status of Solid Waste Generation, Collection Treatment and Disposal in Metro Cities*' CPCB series: CUPS / 46 / 1999 - 2000.

217 million, the overall generation of municipal waste in urban areas is estimated to be around 76 million tonnes per day.⁷

The generated waste can have three ultimate destinations: 'formal collection for land filling', 'informal waste recovery for recycling' and in the worst 'uncollected waste'. Uncollected waste can have disastrous impact on the human health and habitat like the plague of 1994 in Surat. To save human beings from this type of epidemic in future, proper 'solid waste management' is indispensable.

Solid waste management is a discipline associated with the control of generation, storage, collection, transfer and transport, processing and disposal of solid waste in a manner that is in accordance with the best principles of public health, economics, conservation and other environmental consideration responsive to public attitude.⁸

Solid waste management is a part of public environmental installation. It is not only a physical infrastructure but also serves the purpose of social infrastructure. A good solid waste management system facilitates the market transaction and helps in increasing labour productivity through better living environment.

Waste for centuries has been disposed of by simply throwing it away or burning it. Modern man with exposure to awareness of environmental protection has begun to think of improved methods for the collection, efficient and adequate handling and proper disposal of solid waste. High explosion of population and rapid growth of industries has increased the complexity of solid waste management. In developing countries, a large proportion of municipal fund is spent on waste collection and this leaves 'safe disposal' of waste in a deplorable

7. Bhattacharya (1997) 'Solid Waste Management', *Yojna*, Vol. 41, No. 8, pp. 28-34.

8 H. S. Bhatia (2001) '*Solid Waste Management: a Basic Approach*', presented in Workshop on Managing Solid Waste: Public and Private Interventions, 30th Jan.

condition. Still, it has been noticed from the existing literature that in the developing countries Municipal Bodies are not able to collect the entire waste.

1.2 WASTE-PICKING IN THE PROCESS OF SOLID WASTE MANAGEMENT

While the citizens remain indifferent, blaming the municipal authorities, the backlog of waste remains uncollected on the roadsides, which poses many problems physical as well as social. It attracts large number of waste pickers who retrieve recyclable waste. Estimates show that in the third world cities about 1 to 2 percent of the workforce is estimated to be engaged in these activities and the informal labour force in this sector known as waste-picker or rag-picker collect 12 to 15 percent of the total generated waste in urban areas.⁹ In Bangalore, the informal sector claims to collect about 15 percent of the total municipal waste going to the dump sites.¹⁰ For, Bagota (Columbia), it was estimated that 30000-50000 people earn their livelihood from collecting recyclable waste. In Karachi, the informal sector reduces municipal waste collection by 10 percent,¹¹ while for Mexico; waste-pickers are estimated to remove 10 percent of the municipal waste.¹² Apart from reducing burden of municipalities in the developing countries, waste-pickers also provide some 60 percent of the waste papers (raw material) to the paper industry. Paper industry generates one third of the raw material from the waste papers.

Waste picking strews the waste around bins and exposes the waste pickers to direct contact with the decaying materials. Waste pickers play an important role in protecting the environment but expose their own individual health to hazardous

9 S. Saha (2001) *op. cit.* 5.

10 I. Baud and H. Schenk, (1994) '*Solid Waste Management: Models Appraisals and Linkage in Bangalore*', Manohar, New Delhi.

11 S. M. Ali and et al., (1993) '*Informal Sector Waste recycling*', Paper presented at 19th WECD Conference on Water, Sanitation, Environment and Development, Accra, Ghana, pp. 135-55.

12 Bartonne, (1991) '*Private Sector Participation in Municipal Solid Waste Service: Experience in Latin America*', *Waste Management and Research*, Vol. 9, pp. 495-509.

conditions. Notwithstanding this danger, the role of waste pickers has not been institutionally supported or recognized. Even the actual number of people engaged in this profession is not recorded. Except a few individual studies here and there, there is no concrete source of information on the appropriate number of labour force in waste picking in metropolises.

1.3 AIMS AND OBJECTIVES

The present study is focused on a specific target group i.e. 'waste pickers', operating in the metropolitan city of Delhi. Limited information and the deplorable condition of this section of the population evoke several unanswered questions. Alternatively, the pathetic living condition which stands up in sharp contrast with the privileged 'others', has generated the quest to understand the economic feasibility and social viability of this profession. It is important to comprehend the entire solid waste management process in the urban areas.

This has led us to identify the following objectives as crucial in the understanding of the waste-pickers as well as the waste disposal process in Indian cities:

1. To analyze the socio-economic conditions of city-life that generates marginalised groups in labour strata like waste-pickers.
2. To study the target-group i.e. the 'waste-pickers' and their socio-economic problems and prospects in the urban context.
3. To understand the economic viability of waste picking and the response of the society towards this profession and to the waste-pickers.
4. To evaluate the role of NGOs and urban local bodies in the upliftment of the poor condition of the waste pickers.
5. To identify the city-level network of solid waste management on a zonal basis in Delhi.

6. To assess the future prospects of waste picking as a profession in the city of Delhi.

1.4 METHODOLOGY

It is imperative to have knowledge of formal waste collection system and informal waste recovery process to understand the mechanism of the solid waste management process. The city of Delhi which is formally served by different municipal bodies like MCD (Municipal Corporation of Delhi), NDMC (New Delhi Municipal Corporation) etc., also depends on a large number of individual waste-pickers who reduce the burden of urban local bodies and in the process relieve the city from the uncollected waste.

Collecting data on solid waste generation and collection is not an easy task as MCD hardly releases any systematic data on the status of solid waste. In this study, data on solid waste collection (zone-wise) has been collected from the daily report of MCD documents as they have allowed me on a special request to take the restricted information for research work. It has been given in the form of number of trucks disposed from each zone to different SLF (Sanitary Landfill) sites. Temporal data on yearly basis is provided by the MCD on the collection of solid waste.

As far as generation of solid waste is concerned, it has been estimated on the basis of the 'Report of NEERI' (National Energy Engineering Research Institute), where they have estimated per capital solid waste generation (It includes all types of waste generated in the city). For, Delhi per capita generation was 0.449 kg per day until 1994 and increased to 0.475 kg per day during 1966. In the year 2000, the report of CPCB (Central Pollution Control Board) provided the latest estimation of NEERI, which placed the value of solid waste generation as 0.67 kg for NDMC area and 0.6 kg for MCD area.

Based on the above estimate, total quantity of generation of solid waste for various zones as well as for different years in Delhi has been estimated.

The data on collection efficiency of different countries has been taken from the report of CPCB while the 'State of environment – 1995', has become the source of data for major Indian cities.

Waste collection from various zones of Delhi and from MCD for year 2000 has been calculated on the basis of the data provided by the authorities of MCD in March -April 2001.

Field investigation is the only alternative a researcher has in carrying out an empirical study due to unavailability of data with respect to the contribution of the informal sector as well as the living conditions of the 'contributor'. Personal observation and in-depth interview with a structured questionnaire has been the prime source of information for this type of study. Interviews, which are a flexible and adaptable way of finding things out, were taken by the researcher in the study.

Fieldwork helped in the study of the waste-pickers and their culture in their habitat. Fieldwork has been the main tool in the analysis of the contribution of waste pickers and their socio-economic status / condition.

For the analysis of the habitat of the waste-pickers, the questionnaire was impregnated with queries related to their familial and social background, previous occupation (if any), educational qualifications, level of income (past and present), response towards society and this profession etc. (Appendix 1). A close-ended questionnaire has been used with given choices to the respondent. Since, open-ended questions are more helpful to gather in-depth knowledge about the individual respondent, for the case studies open-ended questionnaire have also been administered.

This method provided a general and representative picture of the situation. Various case studies have also been incorporated to illuminate, enrich and bring life to the findings of the study.

The technique of sampling has been chosen to represent the target groups. It is an important aspect, here, as it is closely linked to the 'external validity' or generalizability of the pronouncement of the enquiry. The samples have been

selected on the basis of convenience and specific need of the study. Purposive sampling has been adopted because of unknown size of the 'population'.

Initially, a total of one hundred waste pickers were interviewed from various parts of Delhi. The results of the chosen sample were tested with 10 percent of sample size. The wide selection of the sample, therefore, has been representative except for two variables – 'place of origin' and 'family background'.

To understand the 'economics' of waste picking, ten dealers and five whole-sellers were also interviewed separately

1.5 LIMITATIONS IN THE ADOPTED METHODOLOGY

The involvement of the researcher in the affair of the society often raises certain methodological and moral limitations. The following study, too, has its own limitation, which have to be taken into consideration for proper apprehension of the existing scenario.

Factories – Recycling units have been ignored as they have been shifted to the outskirts of the city following the judgement of honourable Supreme Court.

Purposive sampling is often been accused of not bring representative of the reality due to assumed unspecificable biasness of researcher's judgement in selecting the sample. In this study, attempts have been made to minimise this biasness by selecting the sample from various parts of the city.

The estimates of the generated waste for each zone have been made on the basis of NEERI's per capita estimation for Delhi as whole. These estimates are approximate in nature and are not in a position to capture the quantity of generated waste by the floating population in zones dominated by commercial establishments.

The social and political insecurity among the target group (i.e. 'waste pickers') has often restricted the fieldwork due to their reluctance to interact with the researcher.

1.6 REVIEW OF LITERATURE

A sociological analysis of urban problems brings out a distinctive viewpoint that emphasizes socio-economic forces in their cultural and historical settings. The present study tries to view the contemporary urban crisis not as something inherent in urban life but as a confluence of the two key factors: poverty and unemployment within a 'generally affluent' society.

1.6.1 URBAN PROBLEMS

As the centres of industrial capitalism, cities have been under various form of criticism. Marxist scholars have not criticised city *per se* but have associated the problems of city-space with those of capitalism¹³. It is not the city that is held responsible for the poverty and squalor of urban proletariat, but the capitalist mode of production.¹⁴ This school of thought believes that material life determines the general character of social, political and spiritual process of life.¹⁵

The city has been conceptualized as a setting for capital-labour relation¹⁶ and the conflicts in cities were explained in the framework of capital-labour tensions.¹⁷ Within a general modal of urbanization, Gordon tries to demonstrate

13 R. A. Walker (1981) 'The Theory of Suburbanization: Capitalism and Construction of Urban Space in the United States', in Dear, et al. (eds.) *Urbanization and Urban Planning in Capitalist Society*, pp. 34

14 P. Saundrers (1993) *Social Theory and The Urban Question*, Routledge, London and New York.

15 K. Marx (1970) 'A Contribution to the Critique of Political Economy', Progress Publishers, Moscow, pp. 20.

16 D. M. Gordon (1984) 'Capitalist Development and the history of American Cities', in L. Sawers (eds.) *Marxism and Metropolis*, Oxford University Press, New York.; G. L. Clark (1981) 'The Employment Relation and Spatial Division of Labour: A Hypothesis', *Annals of Association of American Geographers*, Vol. 71, pp. 412-24.

17 E. Mingione (1981) *Social Conflict and The City*, Basil Blackwell, Oxford; M. Castells (1977) *The Urban Question: A Marxist Approach*, Edward Arnold, London; D. Harvey (1978) 'The Urban Process Under Capitalism', *International journal of Urban and Regional Research*, Vol. 2, pp. 101-131.

how industrial suburbanization was partly a response to the increasing power of the working class within the city.¹⁸ Castells sees the city as a scene of contradiction between competing classes and interests. In the arena of 'collective consumption' he distinguished between urban struggle and urban social movement. He argued that urban struggle for collective consumption becomes movement under the dominance of working class.¹⁹ In his writings Castells considered and tried to redefine urban sector as an autonomous object, while the problems in urban space can rarely be seen in isolation with the problems of non-urban space.²⁰ For, Harvey city is an arena of conflict between a landed fraction of capital (i.e. built environment) and labour.²¹ He was more interested in analysing production and reproduction of built environment and simplified the social conflicts and contradictions raised by capitalist built environment. The conflict between capital and labour is the main dialectical characteristic of all capitalistic social formation because the two parts are complementary and yet have inevitably contrasting interests.²² While, labour had some potential assets in the megalopolis, the giant city was so vast and disarticulated that it ought to have been inhospitable for the labour.²³

1.6.2 INFORMAL SECTOR

With the advent of advance / late capitalism, conflicts do exist in the city – space, but not remained confined to capital and labour only. In present form wage labourers are not in direct conflict with capital rather they are competing with the unemployed and underemployed labour force. This leaves people in a condition

18 D. M. Gordon (1984) *op. cit.*, 16.

19 M. Castells (1977) *op. cit.*, 17.

20 E. Mingione (1981) *op. cit.*, 17.

21 D. Harvey (1978) *op. cit.*, 17.

22 E. Mingione (1981) *op. cit.*, 17.

23 E. Hobsbawn (1987) 'Labour in the Great City', *New Left Review*, No. 166, pp. 43

where they are either unemployed or doing some petty jobs.²⁴ Increasing automation reduces the amount of labour force in a production system. This along with structural adjustment – deregulation, decentralization, labour flexibility; leads to informalization of the labour market.²⁵ Identification of the informal sector in an economy started in the middle of nineteenth century and continued rather increased with new dimension over time.²⁶

In the third world countries a subordinate peripheral mode of production is recognized along with a central mode of production.²⁷ In the third world 'peripheral economy'²⁸, where a quarter of the population is still living under the condition of absolute poverty, rise of informal sector is on the cards. The function of the informal sector is to service the formal sector and it is totally dependent on the formal sector for its existence, though this relationship may not be direct and visible to all.²⁹ In the recent past, the third world cities have witnessed the emergence and growth of downgraded manufacturing sector more frequently, but

24 A. Kundu (1997) 'Trends and structure of employment in 1990s: Implications for urban growth', *Economic and Political Weekly*, June 14, 1997, pp. 1399-1405; A. Kundu (1998) 'Employment in the Informal Sector', *The Indian Journal of Labour Economics*, Vol.41, No. 3, pp. 476-481. A. C. Kulshreshtha (1998) 'Informal Sector in India :Concepts and Estimated Issues in the context of the system of National Accounts' , *The Indian Journal of Labour Economics*, Vol. 41, No.3, pp. 449-55

25 R. K. Sharma and Satish Kumar (1998) 'Informal Sector - Irregularity and vogueism: An Overview', in M. S. Ramanujam and et al. (eds.) *Employment Promotion in the Urban Informal Sector*, New Age Publications, Delhi.

26 J. Weeks (1975)' ' Policies for Expanding Employment in the Informal Urban Sector of Developing Economies', *International Labour Review*, Vol. 111, Jan.-Feb., pp. 1-132.; S. V. Sethuraman (1976) 'The Urban Informal Sector: Concept, Measurement and Policy', *International Labour Review*, Vol.114, No. 1 July-Aug., pp. 69-81; T. C. Mc Gee (1976) '*The Urbanization Process in the Third World*', Bell and Sons, London.

27 M. Pacione (2001) '*Urban Geography: A Global Perspective*', Routledge, London and New York.

28 'This mode of production consists of two interrelated parts: a capitalist sector integrated in to the world economy, and a range of petty capitalist forms of production oriented more towards the domestic economy'; in M. Pacione (2001) pp. 476.

29 R. K. Sharma and et al. *op. cit.*, 25, pp. 57.

the extent of informal sector does not end here and a number of low level petty jobs like 'waste-picking' has come into the light.

1.6.3 WASTE PICKING

Waste picking is one of the marginalized informal activities for the poorest sections of the society. Two reasons together: inability of local bodies to collect entire waste and prevalence of acute poverty along with unemployment determines the extent of this profession in various cities across the third world countries. At present up to 50 percent of municipal budget are spent on solid waste management in the developing countries. Still, waste officials are not able to manage this problem efficiently due to lack of funds. On an average about 50 percent of the urban waste is normally collected in developing cities.³⁰ Beukering has examined social implication of informal waste collection and incapability of municipal bodies in collecting solid waste in cities of developing world.³¹

The role of waste picking in solid waste management has been recognized as it accepts a part of the burden of the municipalities in the developing countries.³² They also provide raw material to the recycling industry in the developing countries.³³ In one of the study in 1988, the role of waste-pickers in Curitiba, a city of Brazil was emphasized. The informal collectors of waste i.e.

30 S. J. Cointreau-Levine (1989) 'Solid Waste Recycling: Case Studies in Developing Countries', *Regional Development Dialogue*, Vol. 10, No. 3.; P. V. Beukering, (1997) 'Waste Recovery in Bombay: A socio-economic and environmental assessment of Different waste management options', *TWPR*, Vol. 19, No. 2, pp. 163-188.

31 P. V. Beukering and et al. (1998) 'Waste Paper Recovery in Mumbai', in P. V. Beukering and V. K. Sharma (eds.) *Waste Paper Recycling and Trade in India*, Scientific publishers, pp. 76

32 P. V. Beukering (1997) *op. cit.* 30; A. Rosario (1994) 'Decentralized Solid Waste Management Approach' Paper presented at 20th WEDC Conference: Colombo, Sri Lanka.

33 L. Holland (2000) 'Recycling domestic waste: A proxy for environmental sustainability', *International Journal of Sustainable Development and World Ecology*, Vol. 7, No. 3, pp. 271-276.; J. Highfill, and M. McAsey, (2001) 'land filling' versus 'backstop': recycling when income is growing', *Environmental and Resource Economics*, Vol. 19, No. 1, pp. 37-52.

waste-pickers contribute to the process of solid waste management and to the supply to the recycling industry by collecting, sorting and selling recyclable waste material to buyers.³⁴

1.6.4 SOCIAL ASPECT OF WASTE PICKING

Socio-economic and health related issues connected with recovery and trade of waste have attracted the attention of scholars since 1980.³⁵ Their concern is about the health problems, social alienation etc. that the rag-pickers have to face on a regular basis.³⁶ Relationship between the different informal sector activities in the public system has been an important area of various studies as it not only reflects the social relations amongst various groups but also shows the interplay of the economy at different levels.³⁷ Ali in his study reveals a negative relationship between waste-pickers and middle level traders but argued that inspite of negative relation the system provides an assured market for the collected waste.³⁸ Being a labour intensive activity, waste-picking tend to be an integral part of solid waste management in urban areas. Waste-pickers play an

34 M. Huysman (1994) 'Waste Picking as a survival Strategy for Women in Indian Cities', *Environment and Urbanization*, Vol.6, No-2, Institute of Wetland Management and Ecological design (1999) 'Recycling of solid waste in Calcutta', Nodal Research Centre, Calcutta, 95, Vol. 22, No-2, 1999, pp. 1 - 22.

35 S. C. Chakarborty (2000) 'A Research Report on Informal Economy of Solid Waste Disposal in the City of Calcutta', Ekta Ecological Foundation, Kolkata, pp. 10.

36 L. Chikarmane, and Lakshmi Narayan (2000) 'Formalizing Livelihood: Case of waste pickers in Pune', *Economic and Political Weekly*, Oct 7, pp. 3639-42.; C. Furedy, (1994) 'Solid Wastes in the Waste Economy: Socio-cultural Aspects', paper presented at the Workshop on The Waste Economy, National Institute for Scientific and Technical Forecasting, University of Toronto, and International Development Research Centre, Hanoi, Viet Nam, August 22-25.

37 S. M. Ali (1997) 'Integration of the official and private informal practices in solid waste management', Ph. D. thesis, Loughborough University, Leicester; R. Dhanalakshimi and S. Iyer (1999) 'Solid Waste Management in Madras city - 1994', Pudhuvazhvup Pathippagam, Chennai.

38 S. M. Ali (1997) *op. cit.* 37.

important role in environmental protection and conservation apart from being a constituent to economic productivity.³⁹ A sizeable population is involved in this activity and they work under unsanitary conditions in the absence of civic regulations and institutional support.

Women and children form especial groups within waste pickers, as they are more prone to health problems and also to the exploitation.⁴⁰ Socio-economic conditions create a vicious cycle of infection, disease and poor health among the women rag-pickers. Huysmann (1994) reveals that inspite of predominance of men in the informal recycling sector, women and children from the lower section dominates street picking.⁴¹ This is because of their social background characterised by low caste and low level of education. They are underestimated and poorly paid.

1.6.5 ECONOMIC ASPECT OF WASTE-PICKING

It is not easy to examine economic performance of informal sector in solid waste management partly due to unavailability of official records and partly due to the fact that actors do not want to answer about economic aspect of the profession properly to the researcher. Nevertheless contribution of waste-pickers in the recycling economy through supplying raw material is well recognized.⁴²

39 P. V. Beukering, (1997) *op. cit.* 30; L. Chikarmane and *et al.* (2000) *op. cit.* 36.

40 M. Huysmann (1994) *op. cit.* 34, C. Pathare, and L. Lingam (1995) 'Women's Occupations and Reproductive Health: Research Evidences and Methodology', Paper presented at a work shop on 'Women's Occupational Reproductive Health Hazard: Research Evidence and Methodology' 23-25; A. N. Singh (1999) 'Problems confronting Child Rag pickers in Slums', *Indian Journal of Social Work*, Vol. 60, No. 2, pp.260-271.

41 M. Huysmann (1994) *op. cit.* 34

42 P. V. Beukering and *et al.* (1998) *op. cit.* 31; L. Holland, (2000) *op. cit.* 33; J. Highfill *et al.*, (2001) *op. cit.* 33; S. Sundari and K. K. Saradha (2001) 'Domestic and Commercial Solid Waste management', *Indian Journal of Social Work*, Vol. 62, No. 1, pp.67-89.

Economic performance of the informal sector in waste management has been analysed. Waste-pickers make remarkable contribution to the waste trade and recycling economy in large cities like Bangalore, Calcutta, and so on.⁴³ The linkage between the management of solid waste and recycling of waste materials has also been studied. It has been found that when both of these are put together they tend to improve the overall environment of the city.⁴⁴ As recycling is increasingly being recognized as a green activity, it can be used as a model to encourage individuals to engage in similar activities.⁴⁵

A study in Mumbai has considered ways to increase the recyclable waste in metro cities. It has been demonstrated through a simulation model that informal recovery seems to be cost-effective and environmentally optimal and needs limited investment than the introduction of western system.⁴⁶ It is revealed that most of the waste was recyclable or potentially recyclable in the cities of the developing world and a proper recycling programme will benefit by greatly lengthening the life of the existing city dump.⁴⁷

1.6.6 SOLID WASTE MANAGEMENT (SWM)

There are enormous writings on the entire disposal system of solid waste, municipal conservancy services, the ways of improving the performance of local bodies and so on. Solid waste management has been an emerging and engaging area of study, yet picture is often confusing as information available in public

43 A. Bose and I. Blore (1993) 'The Economics of Solid Waste Management in Calcutta', *Nagarlok*, Vol. 25, No. 2, pp. 32-38.; C. Furedy (1994) *op. cit* 30; C. R. Dutta, (1995) 'The role of the urban poor for re-use of materials from Calcutta's garbage', *Science for Society*, Calcutta.

44 C. R. Dutta (1995) *op. cit* 43; P. V. Beukering (1998) *op. cit* 32; Holland, L. (2000) *op. cit* 33; Sundari, et al., (2001) *op. cit.* 42.

45 L. Holland, (2000) *op. cit.* 33, pp. 274.

46 P. V. Beukering and et al. (1998) *op. cit* 32

47 S. O. Benitez and et al. (2000) 'The Potential for Recycling Household Waste: A case Study from Mexicali, Mexico, *Environment and Urbanization*, Vol. 12, No. 2, pp. 163-173.

domain is either scanty or scattered.⁴⁸ Many of the studies have tried to fill the gap in India and else where in the world and many of them have been of use for researchers to carry out further researches. The studies in this field have often remained technical and authors have discussed the composition of waste in different cities, its background of generation, the process of dumping, problems related with the system and so on.⁴⁹

The nature of the problem has often been quantified in terms of the gap between generation and collection of solid waste. Some solutions too have been suggested in form of 'source separation', 'composting of biodegradable waste' and so on.⁵⁰ The structure and the role of authorities and agencies that are concerned with solid waste management (SWM), and the current situation of SWM in Indian cities has also been studied for Bangalore, Hyderabad, Madras, Surat and other Indian cities⁵¹.

Recycling and reuse has been found as one of the strategies to overcome the problem of managing solid waste. NEERI (1996) prepared a report on the status of solid waste management in Delhi and showed the composition and

48 S. Venkateswaran (1994) 'Managing Waste: Ecological, Economic and Social Dimensions', *Economic and Political Weekly*, Vol. 29, No. 45/46, pp. 2907-11.; A. P. Jain et al. (1994) 'Solid Waste Management in India', Paper presented at 20th WEDC Conference: Colombo, Sri Lanka.

49 P. S. A. Sundaram, (1983) 'Solid Waste Management: Present Status and Future Prospects', *Nagarlok*, Vol. 15, No. 1, pp. 37-45.; I. Baud, and H. Schenk (1994) 'Solid Waste Management: Models Appraisals and Linkage in Bangalore', Manohar, New Delhi.; Jain, et al. (1994) *op. cit* 50; S. C Chakarborty. (2000) *op. cit* 35; G. Mohapatra (2001) 'A New Approach in Solid Waste Management: Case Study of Surat Municipal Corporation', *Spatio-Economic Development Record*, Vol. 8, No. 5, pp. 41-49..

50 C. R. Dutta (1995) *op. cit* 43; N. Mitra, and T. Gupta, (1995) 'Evaluation of strategy for participation of private enterprise in management of market garbage at Falpathi in Calcutta', Nodal Research Centre, Calcutta and West Bengal Pollution Control Board, Calcutta; Beukering, (1998) *op. cit* 33; J. R., Ni and et al. (2001) 'Total waste-load control and allocation based on input-output analysis for Shenzhen, South China', *Journal of Environment Management*, Vol. 61, No. 1, pp. 37-49.

51 P. S. A. Sundram (1983) *op. cit.* 49; A. P. Jain and et al. (1994) *op. cit.* 48; G. Mohapatra (2001) *op. cit.* 49

generation of waste in different parts. It showed the gap as well and advocated for safe disposal so that ground water does not get contaminated.⁵²

There is a dynamic relationship between rapid economic development, water-pollution and waste load allocation in different economic sectors.⁵³ It has found that the current waste disposal system in Indonesia is able to collect about 60 percent of the total generated waste and source separation is one of the methods that can increase the share of recycling so that collection can be increased.⁵⁴ Source separation and on site collection of waste has been pointed out as the most effective way that can help in reducing the quantity of solid waste. It will also provide clean raw material for recycling industry.⁵⁵

A computer model generated and developed as a method for analysing on-site collection systems of waste materials separated at the source of recovery.⁵⁶ This model shows reduction in the emissions. Thus, the model proved to be a suitable tool for strategic planning of solid waste management and this model can be applicable to other regions. It has been revealed that there can be three types of policy incentives: command – and – control regulations, social – psychological incentives and economic incentives for reduction in the quantity of solid waste.⁵⁷ The success of these incentives in various parts of the world has been

52 Solid Waste Management in MCD Area (1996) Phase - 1 Report, National Environmental Engineering Research Institute, Nagpur, June 1996

53 J. R. Ni and et al. (2001) *op. cit.* 50.

54 S. Supriyadi, et al. (2000) 'Solid waste Management Solution for Semarang, Indonesia', *Waste Management and Research*, Vol. 18, No. 6, pp. 557-566.

55 V. Sudhir (1997) 'Approaches to Sustainable Solid Waste Management in Urban India: A Critical System Perspective', *Nagarlok*, Vol. 29, No. 1, pp. 1-13.; Supriyadi, et al. (2000) *op. cit* 54; D. C. Taylor (2000) 'Policy incentives to minimize generation of municipal solid waste', *Waste Management and Research*, Vol. 18, No. 5, pp. 406-419.; J. H. Tanskaneu (2000) 'Strategic Planning of Municipal Solid Waste Management', *Resource, Conservation and Recycling*, Vol. 30, No. 2, pp.111-13.

56 J. H. Tanskaneu (2000) *op. cit.* 55.

57 D. C. Taylor (2000) *op. cit.* 55.

demonstrated by the changes in the attitude and behaviour of agencies and individual householders towards generation and disposal of waste.

1.6.7 PRIVATE PARTICIPATION IN SOLID WASTE MANAGEMENT

Answer to all problems related to the planning and management of solid waste are tried to be located in the frame work of privatization. Privatisation that started in late 1980s with the transfer of state owned enterprises to private owners has been the political creed of 1990s. It was closely accompanied by the contracting out of an increasing array of public services – from rubbish collection to road repairs.⁵⁸

Solid waste management did not remain aloof and a number of studies suggested privatization of solid waste management services in third world countries and also in India. For instance, in the aftermath of the 1994 plague outbreak in Surat, a former Municipal Commissioner of Bombay, when considering options for dealing with mounting rubbish in India's cities, suggested that with local authorities 'should.....think of privatizing garbage collection and disposal'.⁵⁹ With continuing poor financial wealth of municipal bodies in Indian cities ..., the need for privatization of municipal waste management is urgent.⁶⁰ Privatization of solid waste management in other Indian cities has been suggested as the way it has been done in Bangalore.

A critical review of privatization has been provided by Lee.⁶¹ He argues that still there are people who can not afford to pay for basic services in the Asian cities. He took examples from certain Asian cities like Bangkok, Seoul, Rajkot etc., where basic services have been privatised. He questions the very 'proclamation of efficiency'. Moreover, the sewerage system and waste disposal

58 Y. F. Lee (1997) 'The privatization of solid waste infrastructure and services in Asia', *TWPR*, Vol.19, No. 2, pp. 139-161.

59 India Today, 31 October, 1994).

60 P. S. N. Rao (1994) 'Privatisation in Solid Waste Management' *Nagarlok*, Vol. 26, No. 1, pp. 67-75.

61 Y.F. Lee (1997) *op. cit.*, pp. 58.

are unsuitable for direct charging on the basis of intensity of use because charging could lead to charge avoidance practice which would create health hazards.⁶²

1.7 ORGANIZATION OF CHAPTERS

The first chapter introduces the theme of the study. The theoretical perspectives of the concept of urban space, informal sector and the process of waste-picking have been highlighted in the second chapter. In the subsequent two chapters, the roles of formal and informal sector in the solid waste management have been discussed. The fourth and fifth chapters include the discussion on the characteristics of the target group i.e. 'waste-pickers'. The role of NGOs has been highlighted in the next chapter. This is followed by conclusions and recommendations.

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62 J. Amos, (1992) 'Planning and Managing Urban Services', in N. Devas and C. Rakodi (eds.) *Managing Fast Growing Cities*, Longman, pp. 134-52

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Chapter: Two

THEORISING URBAN SPACE, INFORMAL SECTOR AND THE PROCESS OF WASTE PICKING

Urbanization has often been said to be associated with industrialization and economic growth of a region and country.¹ Cities have been considered as organizers of economic, cultural and political space on the one hand and as centres of innovations and their subsequent diffusion to other regions on the other.² Therefore, urban centers are the locale of opportunities for entrepreneurs as well as a seedbed of democratic change.³ A plethora of literature exists documenting a positive association between the processes of urbanization and industrialization. Economic growth and accumulation of wealth is an obvious outcome of industrialization, which in turn promotes excess of production for mass consumption. Cities provide concentration of population, which contains a greater variety of skills and resources. Urbanization in demographic sense stands for a proportion of total population that lives in cities and towns with hope of better living conditions. Majority of them have moved out of the rural hinterland and constitute the proletarian mass of workers in urban areas. But, along with this it also provides incentives, favourable conditions and promotes values that are complimentary to entrepreneurship and industrial growth. In the process cities act as nodal points of unprecedented inflow of resources, commodities, services, finance, capital, labour, and wastes from its vicinity. Meaning thereby, the cities are an ensemble of physical, social and economic entities that are constantly

¹ B. S. Butola (1995) 'Urbanization and Under-development in the North-Eastern India', in J. B. Ganguly, (ed.) *Urbanization and Development in North-East India: Trends and Policy Implications*, pp. 40

² J. Schumpeter, (1979) '*Capitalism, Socialisms and Demography*', S. Chand and Company Ltd., New Delhi.

³ A. H. Kidwai (1997) '*Theoretical Essays in Urban Research*', Indian Council of Social Science Research', New Delhi, pp.28

interacting with each other and consequently influencing their respective local and regional settings through the development of some and creating wide variety of physical, social, economic and environmental problems to the rest. In the developing countries the study of such processes of spatial and social differentiation has become an imperative.

2.1 CITIES AS SPATIAL REALITY

Cities large or small, local or global, north or south have become the principal material expression of contemporary human civilization as they offer substantial benefits over other forms of settlements.⁴ These benefits are appropriated by the people in power to strengthen the node of capitalism over society through restructuring the capital market on one hand and deregulating labour market on the other hand. These are places with particular socio-economic characters that sustain and perpetuate distinctive patterns of social and economic behaviour amongst the residing population.⁵ In economic sense these are either 'generative' (Hoselitz, 1954)⁶ for the economic growth of the region or 'parasitic' detrimental to the prosperity of rural population and environment through draining the countryside of people and resources (Wellisz, 1971)⁷. For the sociologists, cities are (the places) made better than others (in this country i.e. United States) primarily and chiefly by getting able and good people as residents.⁸ Thorndike finds income as the second cause of happiness as "good people - rich

⁴ M. J. Dear (2000) *'The Postmodern Urban Condition'*, Blackwell Publishers, Oxford, United Kingdom, pp. 7

⁵ D. Clark (1996) *'Urban World / Global City'*, Routledge, London and New York, pp. 5

⁶ B. Hoselitz (1954) 'Generative and Parasitic Cities', *Economic Development and Cultural Change*, pp. 278-294.

⁷ S. H. Wellisz (1971) 'Economic Development and Urbanisation', in L. Jakobson and et al. (eds.) *Urbanisation and National Development*, Sage Publications, California, pp. 39-56.

⁸ Thorndike (1939) *'Your City'*, Harcourt, Brace and Co., New York, pp. 22, in D. M. Smith (ed.) *The Geography of Social Well-Being in the United States: An Introduction to Territorial Social Indicators*, McGraw Hill, pp. 31-32.

or poor, earning little or more are a good thing for the city, but more they have and earn the better".⁹ A critical review of the present trends too indicate that increasing number and size of cities are emerging as highly attractive and acceptable forms of settlement to most people. This trend is guided by the principle of 'more you get the better you are' and majority of the people are finding themselves unfit for the race of capital accumulation, though, paradoxically they are in the hope that some day they will also be a part of 'the same race'. Urbanization, once seen as a form of population distribution; is a product of a deep seated and persistent process, which enables and encourages people to amass in geographical space.¹⁰ It is regarded as an agent that propels radical, cultural and social changes in a society and subsequently transforms it from 'traditional' to 'modern' modes of organization. For making such a choice 'rationalization of behaviour' is justified on the principle that economic rationality dominates all other forms of rationality including family bond and 'extra economic relations' as the co-ordinates of human rationality. In the words of Reissman, urbanization is social change on a vast scale and a means of bringing in irrevocable changes that alter all sectors of society.¹¹

Taking city as spatial reality rather than 'social' or 'ecological' entity; a different but more reflective picture emerges. This approach emphasizes the importance of material condition over the cultural superstructure. As highlighted by Castells that space is society in itself rather than reflection of society and spatial forms (*here, Urban*) will be produced, like the other objects, by human actions. Economic activity and production relation are the most important among different human actions as economic structure is the real foundation of society and legal and political superstructure arises on that. Marx in his early writing on capital formation and social behaviour argued that the mode of production and material life conditions of people forms the basis for the existence of the over

⁹ Thorndike (1939) *op. cit.* 8, pp. 67

¹⁰ D. Clark, (1996) *op. cit.* 5, pp. 2.

¹¹ L. Reissman (1964) '*The Urban Process: Cities in Industrial Societies*', Glencoe, pp. 154.

lying superstructure including the social, political and intellectual life.¹² Relationship between the dynamics of capital accumulation and production of the built environment plays a crucial role in establishing the link between locational behaviour, changing patterns of employment and interdependent social change there of.

Cities in this backdrop are visualized as an expression of the capitalist mode of production that is earmarked by the tendency of capital to get over concentrated. Accumulation of capital in the last century has deeply changed the structure of the labour market and the processes that it involves. Disappearance of so called 'Industrial Reserve Army' due to stagnation in the industrial occupation and employment with an increase in the employment in the service sector have been the hallmark of capitalist development in this period. Nevertheless, they continue to express, articulate and perform the interest of the dominant class according to a given mode of production and to a specific mode of development.¹³ The city and general well-being are antithetical to each other. A small number prospers at the cost of many in these cities. Thus, a contemporary city presents a picture of contrasts. It represents the 'leading edge of civilization'; on the other hand, it also witnesses all that is undesirable in a 'civilized society'. In a nut-shell a city is an epitome of problems and major contradictions of the modern times.

2.2 PROBLEMS OF URBAN ENVIRONMENT

With the initiation of unwanted phenomena like crime, vice, mental illness, prostitution, family disorganization etc. in cities; social scientists started looking at the problems for itself and their roots as well. Cities were being seen as the producer or at least contributor to the development of social problems. Problems especially social problems do not exist *per se*, rather they become a problem when a group of persons present a case against a particular condition

¹² K. Marx (1970) 'A Contribution to the Critique of Political Economy', Progress Publishers, Moscow, pp. 20.

¹³ M. Castells (1983) 'The City and the Grass Roots', pp. 4

(say for example slums) and offer some solutions (like resettlements) for its change. Problems like the spread of slums and diseases increase in infant mortality rate in some sections and other related socio-economic and environmental problems are not exceptional in the cities.

To a social scientist, a social problem or for that matter any problem, (because all problems have a social dimension) is a condition that is dangerous or undesirable because it violates some important values, certain standard of the way things should be done and the possibilities it offers to rectify for honouring the established norms. A problem is not a condition in itself rather it is the disparity between our estimates of the way things are and our notions of the way the things ought to be.¹⁴

The dynamics of the existing dominant modes of production reveals that the accumulation of wealth is largely responsible for major realignment of social structure resulting in the creation of two main social classes i.e. the capitalist, who invests and makes profit and the worker who sells his labour to the capitalist in return of wage. Clark sees accumulation of wealth through manufacturing, exchange and consumption (industrial capitalism) as the primary cause of urban growth and urbanization. This type of urbanization, based on accumulation of wealth, encourages concentration of labour that is diversified in skills and has nothing to survive except through selling their labour power.

There stands a commitment to a project that Marx once described as the 'entanglement of all people in the net of the world market'; its principle object is to deliver an exploitable global proletariat into the hands of capital. This does indeed involve drawing the poorest of the world's population into the workforce, providing basic health and education, and focussing particularly on young women- lending the process its emancipatory tinge. But, the largest part of this strategy, in which its central logic is

¹⁴ E. Wolf (1971) 'Social Problem of Urban life', in S. E. Seasore, and R. McNeill, (eds.) *Management of Urban Crisis*, The Free Press, New York., pp. 147

*betrayed, is to deny the poor any alternative, and to create a 'reserve army of labour' that will enforce the disciplines of capitalist labour- markets across the greater part of humanity.*¹⁵

The classical conception of capitalism as conceived by Marx has undergone some fundamental changes along with the change in attitude of capitalists and also the structure of labour market. Capitalists are no longer interested in reducing wages through traditional methods rather they make labourers pay more through the concept of collective consumption. On the other hand it has changed the potential 'urban social movements' into 'urban struggle'. Consequently, labour has become much more competitive among themselves and also with the unemployed that is ready to get into their places where they (unemployed) see more profits than being involved in petty production. However, it is only a partial explanation to the capitalist basis of the formation of cities because the concept of collective consumption only offers certain necessary explanations and it can hardly be called sufficient for providing explanations to the entire production system.

With transition to advance capitalism, global economy has got transformed into flexible accumulation that explains rapid increase in the service sector of an economy.¹⁶ Contemporary urbanization process especially under structural adjustment regime is largely capitalist in their nature, though there are symptoms of some qualitative changes particularly after the inception of transport and communication revolutions. Consequently, both landscape and people are homogenized to facilitate large-scale production and consumption.

Urbanism in its current form is a consequence of interaction and interception between local and inter-local flows of material and information under a rapidly converging global economy that is driven by the imperatives of

¹⁵ P. Cammack (2002) 'Attacking the Poor', *New Left Review*, pp. 125-134.

¹⁶ M. Pacione (2001) '*Urban Geography: A Global Perspective*', Routledge, London and New York, pp. 48.

flexism.¹⁷ Under late capitalism, industrial wages tend to be inversely related to the rates of unemployment and under-employment of workers in various sectors and they feel less united and become competitive among themselves and with the unemployed since they no longer play the role of an 'industrial reserve army'.¹⁸

Most often scholars tried to explain the phenomena of unemployment through rapid growth of population, but surprisingly its nature is more complex and it emanates from the very process of economic development that is increasingly collaborating with the forces of globalization on the one hand and imposing structural changes upon the traditional structure¹⁹ on the other. With increasing mechanization of agriculture, the rural areas are progressively becoming incapable of absorbing ever growing labour force. The conditions of small and marginal farmers have become quite precarious under such circumstances. They find hardly any other way but to sell their land in order to meet the overhead costs of mechanized forms of agriculture. These people along with the labour force released from agriculture are migrating to near by towns and cities including the metropolitan cities in search of employment but unfortunately they hardly get anything except frustration and disappointment because there they encounter numerous others that have migrated from the rural areas to these towns under similar circumstances in search of better opportunities of survival and are trying to avert 'poverty'. "The process, which creates capital relations, can therefore be nothing than the process that divorces the workers from the ownership of the conditions of his own labour; it is a process which operated two transformations whereby the social means of subsistence and production are turned into capital, and the immediate producers are turned into wage-labourers."²⁰ It is therefore not the city that is held responsible for the poverty and

¹⁷ M. J. Dear (2001) *op. cit.* 4, pp. 157.

¹⁸ E. Mingione (1981) '*Social Conflict and the City*', Basil Blackwell, Oxford, pp. 56-57.

¹⁹ H. Nagpal (1996) '*Social Work in Urban India*', Rawat Publications, New Delhi and Jaipur, pp. 39-40

²⁰ K. Marx (1967) *Capital*, Progress Publication, Vol. 1, pp. 873

squalor of the urban proletariat, but the capitalist mode of production itself.²¹ Although, manufacturing industries continue to develop their production capacities, their goal is now achieved mainly through increase in labour productivity rather than additional labour.

2.3 THE INFORMAL SECTOR

Contemporary urbanization especially in the third world is characterized by tertiarization of its functions on the one hand and over concentration of workers that can be identified either as unemployed or under-employed on the other. Moreover, overconcentration of such populations in cities breeds its own social tensions including tendency of social desegregation and decentralization of social conflicts and other social problems. The economy of cities in the third world is simultaneously based on two dichotomous types. More often this dichotomy is recognized in an urban economy in a framework of 'firm type' and 'bazaar type'²², 'protected' and 'unprotected' sector²³, 'the rich' and 'the poor' sector²⁴, 'upper circuit' and 'lower circuit'²⁵ and so on. Well-being of individuals and households in these economies in its turn is dependent on their position within this dual-sector economy.

The greatest division in the present-day labour market is between the employed and the unemployed. Economic restructuring that is earmarked by deindustrialization, tertiarization, accelerating automation in manufacturing as well as in services; the 'demand of 'skilled labour' according to new international

²¹ P. Saunders (1989) *'Social Theory and the Urban Question'*, Routledge, pp. 25.

²² C. Geertz (1963) *'Peddlers and Princes'*, Chicago University Press, Chicago.

²³ D. Mazumdar (1976) *'The Urban Informal Sector'*, *World Development*, Vol. 4, pp. 655-679.

²⁴ J. Weeks (1975) *'Policies for Expanding Employment in the Informal Urban Sector of Developing Economies'*, *International Labour Review*, Vol. 111, pp. 1-132.

²⁵ M. Santos (1979) *'The Shared Space'*, Methuen, London.

division of labour etc. has contributed to the growth in unemployment in capitalist economy. In the third world 'peripheral economy'²⁶, where a quarter of population is still living under the condition of absolute poverty (i.e. below officially defined poverty line) visible unemployment has not been rampant in these cities as unemployment is a luxury and poor people can hardly afford to remain unemployed. Their weak position in striking bargains in their favour against their powerful employer always subjects them to work below minimum levels of their biological survival i.e. under the terms and conditions of utter destitution.

The evidences of the patterns of capitalist development in recent times reveals that majority of these less developed countries have experienced slow growth of wage-earning employment in spite of rapid growth of output. This evidence also reveals that in most of the cases total labour force greatly exceeds in size over the official enumerated wage-earning labour force in each country. In economics this is defined as the so called surplus labour force, which is unable to get entry in the modern formal sector of the economy (characterized by large scale of operation, high level of technology, capital intensive, skilled labour etc.) This large mass of workers usually work in the other sectors of the economy - commonly known as the 'informal', 'unorganized', or 'traditional' sector. Kieth Hart²⁷ coined the term 'informal' and used the formal-informal dichotomy in the study of a migrant group (The Frofras) in an urban area of Nima in Ghana. The two were distinguished on the basis of wage earning and employment. He used different terms such as 'informal income generating activities', 'urban proletariat', 'petty capitalism', 'unenumerated sector', 'unorganised sector' and

²⁶ 'This mode of production consists of two interrelated parts: a capitalist sector integrated into the world economy, and a range of petty capitalist forms of production oriented more towards the domestic economy'; M. Pacione (2001) *op. cit.* 17, pp. 476.

²⁷ Hart's study was published in '*Journal of Modern African Studies*', March 1973, PP 61-89. An earlier version of this was presented to the 'conference on urban employment in Africa' in September 1971 in university of Sussex.

'self-employed individuals' as interchangeable with informal sector. Nevertheless, he neither recognized the existence of wage-earning workers in the informal sector nor did he identify the criteria on the basis of which the self-employed in the two systems could be distinguished.

Before, Hart, it was Machado and Antonio (1971), though, not in a widely known work, which made a distinction between the occupational opportunities offered to the urban workforce in the two sub-systems- 'formal' and 'informal'. According to them, the informal sector comprises of the jobs, which are offered by individuals who purchase the services generally for a short duration and on an irregular and temporary basis.

The International Labour Organization (ILO) Mission to Kenya (1972) defined that sector as informal, where youths were engaged without choice. Though, the previous ILO Mission (1971) to Sri Lanka had already accepted that many people do not get the job they are looking for and this leads to psychological frustration among the youths. The mission identified characteristics such as, unregulated market, reliance on indigenous resources and low level of technology etc., which distinguish the informal and formal sector.

The concept was further articulated with greater clarity in mid seventies when John Weeks (1975) in his study made the observation that the distinction between formal and informal sector is based on the organizational characteristics of exchange relationship and the position of economic activity. Informal sector operates outside the system of regulation of government and its benefits. Thus, it has no access to formal credit institutions and sources of transfer of foreign technology.²⁸ According to Weeks, due to its limited access of resources the informal sector is characterized by small-scale operation, labour intensive techniques, low level of income and indigenous ownership.²⁹ In this backdrop the informal sector is identified as the source of employment for urban poor. The

28 J. Weeks, (1975) 'Policies for Expanding Employment in the Informal Urban Sector of Developing Economies', *International Labour Review*, pp. 27-29.

29 Ibid.

universe consisting of informal sector enterprises is indeed a larger one compared to that covered by the conventional definition used by statisticians for collecting data for establishments.³⁰

The popular view regarding informal labour is that they are primarily those petty traders, street hawkers, shoeshine boys and other underemployed mass of workers that reside and earn their living on daily basis (visibly employed but in real sense unemployed and suffering from various kinds of tensions) in the streets of large and medium level cities in the third world countries. In urban area the informal sector includes rag-pickers, construction workers, domestic servants, home based workers and other such workers most of whom are contract or sub-contract labourers. In a nut shell the phenomenon of the informal sector has been defined as the 'working poor involved in the production of goods or services, whose activities are not recognized, recorded, protected or regulated by the public authorities'.³¹

With the structural adjustment programmes in the offing deregulation, decentralization, labour flexibility and price distortion are on the cards. Under the changed situation more and more people are supposed to get involved in different types of jobs for their livelihood, that are not governed by any regulation of the Government. Moreover, these workers do not get any protection of job, wages and health from their employers. On the contrary, they are also subjected to economic and extra economic exploitation carried out by their temporary employers. The situation is more alarming in the developing countries. The emergence of a downgraded manufacturing sector is an example of such informalization and it is becoming more frequent and common in the third world countries. Paradoxically the extent of informal sector does not end here. A number of service based activities like shoe shining, showing *Tamasha* (localized art of earning money by entertaining people), selling water at entertainment places

³⁰ S. V. Sethuraman (1976) 'The Urban Informal Sector: Concept, Measurement and Policy', *International Labour Review*, pp. 69-81.

³¹ International Labour Organization (1995), '*Employment Promotion in the Urban Informal Sector*', in a national seminar held at IAMR under the sponsorship of ILO on 14-15 December.

etc. too fall under the ambit of informal sector in the developing countries like India.

Table: 2.1

Types of Informal Activities in the Third World Urban Economy

| <i>Activity</i> | <i>Examples</i> | <i>Customary location</i> | <i>Persons per operation</i> |
|--------------------------|--|---|---|
| Home Industry | <i>Manufacture</i> (food for vending, clothing, and handicraft) <i>Services</i> (washing and ironing) <i>Trading</i> (retail) | Own household | Predominantly female, including unpaid family labour (1-3) |
| Street Economy | <i>Trading</i> (Food sales, vending, Waste-pickers) <i>Services</i> (shoe shining, portering, transport, entertainment) | Street: ambulatory, but also fixed location. | Both men and women and children (1-3), including some unpaid family labour. |
| Domestic Services | Maids, Nannies, Cooks, Gardeners, Chauffeur. | Employer household, including live-in arrangement for some staff. | Several per high income household, both men and women. |
| Micro-enterprises | <i>Manufacture</i> (shoes, tailoring, metalworking) <i>Services</i> (electrical and radio repair, plumbing, car repair) <i>Trading</i> (waste recycling) | Rented space, but may also operate out of own home | Owner-manager, plus several employees (fewer than 10; average 3-50) |
| Construction work | Day labourer, carpenters, bricklayers, electricians | Onsite | Individually recruited for specific projects. |

Source: Modified after J. Friedmann (1992)

Friedmann has classified different types of informally organized market-oriented activities in the third world urban economy. He included different types

of activities ranging from manufacturing to independent services like electricians to domestic services in this category. However, he failed to recognize the role of the poorest of the poor who are earning their livelihood from the garbage i.e. through waste-picking and related activities such as waste-trade, waste-recycling and so on.

It is quite visible that the nature of enterprises is changing under advanced capitalism. Highly mobile capital and commodity flows outsmart geographically fixed labour markets. This has resulted into a global polarization between labour and capital.³² But, it will be too simplistic to limit the extent of polarization to these two only. On the contrary, there exists a fierce de-segregation in the labour market, which depends on the forces like institutional barriers, the characteristics, credentials and resources of the individual, which determine the control as well as access to highly differentiated job market. In turn the labour market too structured in every modes of production³³ and contributes in generating socio-spatial variation in poverty and affluence.

2.4 WASTE PICKING AS MARGINALIZED INFORMAL ACTIVITY

Human societies are necessarily involved in three interrelated production processes: (I) the production of the means of production; (II) the production of the means of subsistence; and (III) the reproduction of labour-power on a daily and generational basis.³⁴ Any worker in general will not work if he fails to meet these three types of production. These set the minimum level of continuation that limits the willingness of a worker to work.

³² M. Dear (2000) *op. cit.* 4, pp. 157.

³³ Third world urban economy identifies the following categories of labour in a disaggregated labour market: protected wage-work, competitive regular wage-work, unprotected wage-work, self-employed and family labour and marginal activity. See, Pacione, M (2001) 'Urban Geography: A Global Perspective', pp. 481.

³⁴ W. Seccombe (1983) 'Marxism and Demography', *New Left Review*, Vol. 137, pp. 29.

However, in case of poor people the wage or income always may not be sufficient to carry out all the three productions. These people will work even if they are able to meet one or two, because if they leave this occupation then they have to beg. Waste-picking is a socially and economically marginalized activity, yet a waste-picker has comparatively higher level of self-respect than a beggar. To avoid begging and loss of self-respect, they will continue to work in the hazardous condition at higher health risk and at a wage/income that is often less than the minimum level of subsistence.

Poor people lack resources. This is perhaps the single reason that makes most of the workers in the informal sector vulnerable to accept highly unfavourable working conditions including low and unprotected wage-work. Consequently, they are left with little option other than choosing the self-employment in the marginal activities like waste picking. This particular activity involves low returns and high health risks. But, ironically, waste picking continues to be one of the few ways and means through which the new migrants, runaway children, women and elderly in the cities of the developing world feed their families. It is but obvious that people earning their livelihood through waste collection constitute the poorest section of the urban population in the developing countries.³⁵

As an activity, waste picking does not need formal training. It needs very little capital and at the same time it does not have access to formal credit market. Moreover, as far as the urban authorities are concerned, this particular activity does not have even a formal recognition from them. Most often, there exists a conspicuous omission about their numbers in most of the records of an urban body or for that matter economic census of a country. The above characteristics make this profession entirely an informal one both theoretically as well as empirically. The waste pickers emerge from low socio-economic groups and live in a condition of utter poverty and deprivation.

³⁵ A. C. Macqueen (1987) '*Work from Waste: The Garbage-Comber of Delhi, India*', Submitted to the Department of Environment and Resource Planning, University of Waterloo, pp. 14.

Waste-pickers generally do not own the means of production rather they are found to be concerned only with the last two namely production of the means of subsistence and reproduction of labour-power. Reproduction of labour-power is a two-stage phenomenon. The first is that they should earn enough to feed themselves and should be capable to reproduce for the next day's work. The next is that they should reproduce intergenerational meaning so that, their sons and daughters should replace them. For this they should achieve an economic condition in which they are able to bear children.³⁶

Even though they are able to carry out the two types of reproductions, the demographic expression of social exploitation is somehow ignored in most of the cases. Many of the waste-pickers live single as they do not have enough to secure a minimally stable household space. Those who are able to reproduce intergenerationally, the cost of bringing up their siblings is not realized. The parents are unable to maintain the cost of children and they enter the labour market at an early age and get exposed to the hazardous conditions, which reduces the upper age limit of being in the workforce. The cost of sustenance in that period is not being taken into account here. Besides, waste-pickers should be entitled for the maximum insurance from the system. On the contrary, even their job is not secure in the sense that it suffers from any non recoverable disease like lung cancer, which is not uncommon among them; they will have to return to the village.

The role of government or local bodies is marginal or negligible in waste recovery and the market forces mainly guide this informal sector. In the process they contribute in keeping the urban environment livable. People are working in these types of inconsequential jobs at the risk of their health and also at the cost of their life. But ironically, the informal waste collection that is detrimental to the health and life of the workers continues to flourish because it accepts and absorbs

³⁶ W. Seccombe (1983) *op. cit.* 34, pp. 31.

the migrants and marginalized 'unskilled' workforce that are considered less suitable for getting work in the so called modern formal sector.

2.5 CONCLUSION

On the basis of the forgoing discussion following conclusion can be drawn:

1. Characteristics of urban labour market are fast changing with the introduction of 'cyber workers' for multinational firms who are working overnight in the developing countries and find themselves 'privileged' rather than 'exploited'.
2. Capital is acquiring a global character and labour is increasingly becoming Flexible and unregulated. In these circumstances, the informal sector is growing in the cities.
3. The nature of informal sector has changed from what it was in 1970s. The range of informal sector is from managers of a 'multinational firms', (on the top) to shoe-shine boys and garbage-combers (at the bottom-most position) of our urban environment.
4. Waste-picking is a marginal activity which involves low returns and high health risks.
5. Waste-pickers are unable to meet the three necessary production processes of (i) the production of the means of production; (ii) the production of the means of subsistence; and (iii) the reproduction of labour-power on a daily and generational basis.
6. Poor people who lack resources are earning livelihood from waste-picking because they are able to meet one or two of the above mentioned productions. They have no other alternative but to shift to begging for survival if they leave this occupation.

Chapter: Three

SOLID WASTE MANAGEMENT IN

THE FORMAL SECTOR

Waste management is a prominent basic amenity and service for the living population. It is also essential for efficient functioning of the city and its economy. There is a high degree of interdependence between these services and the management of the cities. Waste-picking has thus become a subject of much study and experimentation in terms of planning and management of urban areas.

No city can develop without managing its waste especially the solid waste. In most of the cases, urban local bodies owe the responsibility of making these facilities available and accessible to all of its citizens. As per our constitution, subjects like water supply, sewerage, sanitation, solid waste management, etc. are state subjects. After adaptation of the seventy fourth constitutional amendment act, urban local bodies have been given greater autonomy in planning and designing the basic amenities and services. It is therefore the prime responsibility of the state government and urban local bodies to plan, design, execute, operate and maintain waste management systems.

3.1 DELHI AS AN URBAN ENTITY

Delhi is one of the most discussed and documented cities in India right from its origin in mythological antiquity (Indraprastha in Mahabharata). The capital city of India, present Delhi, is the seventh city in succession. It owes its origin to the Mughal and the British eras and has witnessed maximum number of construction and deconstruction of 'states' through changing empires. Delhi, while facing the major challenges of survival, growth or development, has always changed its spatial structure. This is the process through which it has come back from the ruins every time. In its vast expanse and size, it enfolds many cities and sub-cities.

In contemporary Delhi, two parts of the city are clearly identifiable- the old city of Shajahanabad created by the Mughals and the modern city of Lutyen's Delhi, a creation of imperial architectural excellence. The former, classified as a slum (in one of the Master Plans) functions as the wholesale commercial hub of the city and has been given the status of cultural heritage in the Master Plan of 1961, on the other hand, the later is the locus of political and administrative activities.

3.2 GROWTH OF DELHI

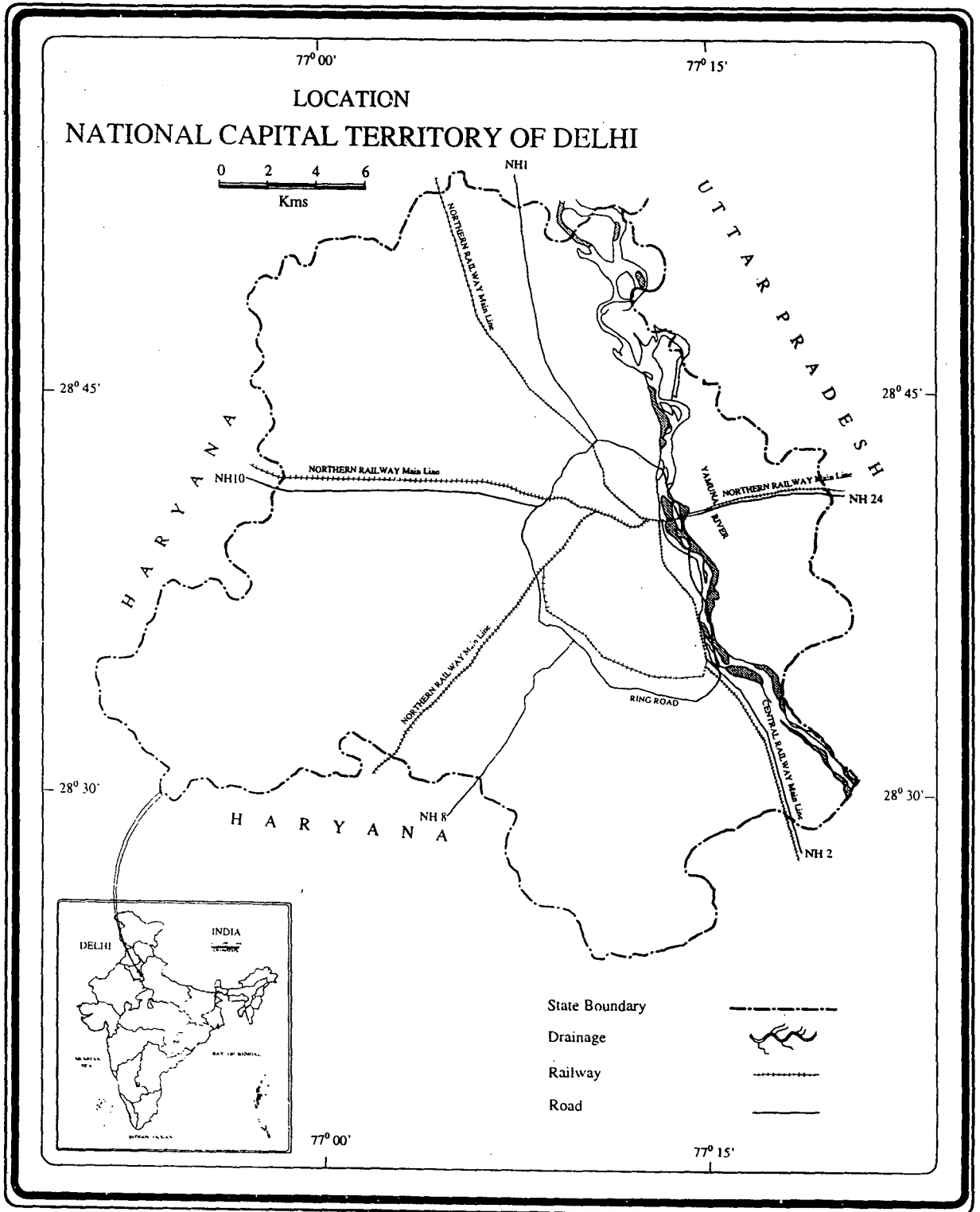
Delhi has been amongst one of the fastest growing cities in terms of population as well as in terms of area. It was spread over an area of only 205 sq. kilometres in 1971 and expanded to 248.7 sq. kilometres by 1981. This expanse in the area of the city was mainly attributed to the incorporation of villages. At present, Delhi sprawls over an area of 1483 sq. Kilometres between $28^{\circ}24'17''$ North and $28^{\circ}53'24''$ North latitude and $76^{\circ}50'24''$ East and $77^{\circ}20'37''$ East longitude¹ (Map: 3.1).

The city is flanked by districts of Ghaziabad (Uttar Pradesh) in the East, Rohtak (Haryana) in the West, Sonipat (Haryana) in the North and Gurgaon (Haryana) in the South. The National Capital Region (NCR) notified as a schedule to NCR Planning Board Act, 1985, covers an area of 30,242 sq. kilometres consisting of the National Capital Territory of Delhi (1483 sq. kilometres), portions of Haryana (13,413 sq. kilometres), Uttar Pradesh (10,853 sq. kilometres) and Rajasthan (4493 sq. kilometres) surrounding Delhi.

Until 1971, Delhi Municipal Corporation, New Delhi Municipal Committee and Delhi Cantonment Board constituted urban Delhi. However, in the census of 1981, 27 new census towns were included, which increased the area to 591.85 sq. kilometres from 446.26 sq. kilometres in 1971. The number of such entities went up to 29 during the census of 1991; which increased the

¹ Municipal Corporation of Delhi (1995) 'Civic Guide', Delhi, in A. Ghosh (2000) 'Solid Waste Management in Delhi: An Exploratory study a local government - communities interface', Indian Social Institute, New Delhi.

Map No. 3.1



area to 1483 sq. kilometres. The present expansion of Delhi also included 3 statutory towns and many villages.²

Consequently, the city has spatially grown by approximately six times between 1971 and 1996.

Table 3.1

Area and population of municipal authorities in Delhi 1991

| Name of Authority | Area (sq.kms) | Population (millions) |
|--|---------------|-----------------------|
| 1. Municipal Corporation of Delhi | 1397.30 | 8.99 |
| (a) Urban | 599.60 | 8.04 |
| (b) Rural | 797.70 | 0.95 |
| 2. New Delhi Municipal Committee (Urban) | 42.70 | 0.09 |
| 3. Delhi Cantonment Board (Urban) | 43.00 | 0.09 |
| 4. National Capital Territory of Delhi | 1483.00 | 9.37 |
| (a) Urban | 685.30 | 8.42 |
| (b) Rural | 797.70 | 0.95 |

Source: Census of India, Registrar General of India, 1991

3.2.1 POPULATION

Delhi, which became a million-city only in 1951, has witnessed a phenomenal population growth during past few decades due to multifaceted development of the city as an administrative, commercial, industrial and service centre. The population of the city almost doubled during 1941-51, from 0.91 million in 1941 to 1.74 million in 1951. This was attributed to

² B. Mishra, R. B. Singh and A. Mallik (1998) 'Delhi: Housing and Quality of Life, in R. P. Mishra and K. Mishra (eds.) *Million Cities of India: Growth Dynamics, Internal Structure, Quality of Life and Planning Perspective, Sustainable Development Foundation, New Delhi, pp. 182-196.*

unprecedented influx of refugees from Pakistan during 1947-48 when the country faced partition. The next decade recorded 52.44 percent increase. Despite serious efforts to diffuse the refugee population to other parts of India, growth of the city continued unabated. In 1971, its population stood at 4.06 million and reached to 6.2 million in 1981 and 9.4 million in 1991. The provisional data of census 2001 records Delhi's population as 10.2 million. Since 1951, the population of the city has been growing at the rate of 51 to 53 percent in each successive decade. The average annual growth rate has though declined from 4.58 percent in 1971-81 to 3.79 percent in 1981-91, the total size of population in Delhi is increasing continuously.

Table 3.2

Growth of population in Delhi 1901-2001

| Year | Population | | | Percent Variation | | |
|------|------------|-------|-------|-------------------|-------|--------|
| | Total | Urban | Rural | Total | Urban | Rural |
| 1901 | 4.06 | 2.09 | 1.97 | - | - | - |
| 1911 | 4.14 | 2.33 | 1.81 | 2.0 | 11.7 | -8.10 |
| 1921 | 4.88 | 3.04 | 1.84 | 18.0 | 30.7 | 1.70 |
| 1931 | 6.36 | 4.47 | 1.89 | 30.3 | 47.0 | 2.70 |
| 1941 | 9.18 | 9.66 | 2.22 | 44.3 | 55.5 | 17.50 |
| 1951 | 17.44 | 14.37 | 3.07 | 90.0 | 106.6 | 38.30 |
| 1961 | 26.59 | 23.59 | 2.99 | 52.4 | 64.2 | -2.6 |
| 1971 | 40.66 | 36.47 | 4.19 | 50.9 | 54.6 | 40.10 |
| 1981 | 62.20 | 57.68 | 4.52 | 54.0 | 58.16 | 8.00 |
| 1991 | 93.70 | 84.27 | 9.43 | 50.64 | 46.10 | 108.63 |
| 2001 | 10.20, | | | | | |

Source: Compiled from Primary Census Abstract, Census of India, Registrar General of India 1991.

The growth of population of Delhi has been attributed to natural growth as well as migration from rural areas and other towns. The national capital, Delhi, attracts about 70,000 migrants every year.³ As a characteristic of a metropolitan city it has people from all parts of India and abroad and all

³ S. Nangia and S. Thorat (2000) 'Slums in a Metropolis: The Living Environment', Shipra, pp. 13.

walks of life. Nevertheless, since 1961, more than half of the increased population was added from the other states of the country with Uttar Pradesh accounting for 26.5 percent of migrants, Haryana and Punjab for 20.58 percent, Rajasthan for 6.5 percent and other states for 44.4 percent.⁴

The population of Delhi Municipal Corporation (now known as Municipal Corporation of Delhi or MCD) has doubled between 1971 and 1991. While, in the NDMC area, the population in 1981 and 1991 was recorded less than the population of 1971. The MCD area has been witnessing a very fast growth of population, with its rural segment accounting for much of this increase. The rural area of MCD has recorded a growth rate of 109.86 percent during 1981-91, while urban rate had a growth rate of just 49.28 percent over the same period of time. It is important to note here that rural area under the MCD is urban in all sense except in terms of municipal laws and by-laws as also observed by the honourable Supreme Court. Consequently people found it comparatively easier to stay or settle down in the technically rural area which has lower density. The population density of Delhi has increased from 4170 persons per sq. kilometres in 1981 to 6343 persons per sq. kilometres in 1991. When we desegregate the MCD area, the urban segment of MCD has the highest density as 13,464 persons are living in one sq. kilometre as against the density of 7050 persons per sq. kilometres in NDMC areas.

The Delhi Cantonment Board covers about 43 sq. kilometres of the total area of Delhi, but the population of cantonment was only one third of NDMC area. NDMC serves only 3.2 percent of Delhi's population spread over an area of 42.74 sq. kilometres (2.22 percent of Delhi's total area).

MCD caters to the need of 95.8 percent of Delhi's population and provides basic services to the 94.22 percent of the total area. Rest 1 percent of population is under the cantonment board.

⁴ B. Mishra, R. B. Singh and A. Mallik (1998) op. cit. 2, pp. 191

3.3 BRIEF HISTORY OF THE MUNICIPAL BODY

Way back in 1862, British Raj created Delhi Municipal Commission for civic administration. At that time the city was confined to an area of 2 sq. miles and had only 1.21 lakh inhabitants. Large-scale industrial and commercial expansion generated the constant increasing demand of public services between 1863 and 1874. In 1875, the Delhi Municipal Commission was replaced by Delhi Municipal Committee, which functioned for almost half a century. The committee consisted of 21 members, six of which were government officials and rest included Europeans, Hindus and Muslims. The Delhi Municipal Committee was classified as class I in 1881 and started having elected members (12 out of 21) from 1884.

Delhi was recognized as a province in 1912 and the creation of the province in 1912, the constitution of the commission in Delhi was altered. In 1921, the constitution of the Delhi Municipal Committee was again revised and the city was divided into 12 wards. It was only in 1946, that the city had the opportunity to have an elected president. The committee was reconstituted in 1951 and members were elected by adult franchise.

Delhi was given the status of Part 'C' state in 1956. The State Reorganisation Commission (SRC) recommended, abolishing the statehood of Delhi and the creation of an autonomous Municipal Corporation for the entire Union Territory of Delhi. As per recommendations of SRC, Delhi became Union Territory (UT) on November 1, 1956. There were as many as five Municipal Committees, five Notified Area Committees, a Cantonment Board, a district board and four ad-hoc authorities for water supply and sewerage, transport, electricity and land development. All of them were merged together except New Delhi Municipal Committee (NDMC), the Cantonment Board (CB) and the Municipal Corporation of Delhi (MCD) came into existence on April 17, 1956. Now it is divided into as many as 134 wards, and has a council of 134 elected and five nominated members.

3.4 ORGANISATIONAL SET-UP OF THE MUNICIPALITY IN DELHI

It is necessary to look at the existing organizational structure of Delhi municipal department that is responsible for solid waste management, to assess the efficiency or lacuna of the system. Solid waste collection in Indian cities has been a labour intensive activity and Delhi is not an exception. The Conservancy and Sanitation Engineering (CSE) department has a total of 38,113 safai karmacharis who are directly involved in the field operation. Besides, there are 1,483 workers at the supervisory level and 667 drivers. The entire process of solid waste management in MCD is under the purview of the Deputy Commissioner of CSE (Conservancy and Sanitation Engineering). The whole work is executed at different levels and by different categories of the staff. The organisational structure for solid waste management in MCD is illustrated in figure: 3.1.

There are two directors (CSE) – one for Trans Jamuna area and the other for the rest of MCD area. They are assisted by three joint directors who are assigned to different zones, and supporting staff. In every zone (12 zones at present), a Sanitary Superintendent (SS), assisted by subordinate staff, carries out the work of collection and transportation of solid waste and reports to the concerned joint director. Administratively, the Sanitary Superintendents work under the Zonal Assistant Commissioners / Additional Deputy Commissioners. Complaints regarding collection work are received by Zonal Assistant Commissioners / Additional Deputy Commissioners and forwarded to the Sanitary Superintendents, who carry out these redresses.

Solid waste management along with sewerage and drainage activities is entrusted to the Director (CSE) who in turn is assisted by the engineering staff. The latter devotes more time in solving sewerage choking and other related problems faced by the old sewerage system in the city. Hence they are not able to give adequate attention to SWM activity. They depend on the conservancy staff for the operation of the solid waste management system.

These two important activities, therefore, have different professional orientations. The system of placements / promotions has no consideration to

the professional requirement or the existing population pressure that leads to systematic problem including lack of co-ordination.

The waste transportation vehicles are maintained in the zonal workshops. The AE (Auto Engineer), who is incharge of the workshop, is responsible for the maintenance of vehicles. At the same time the responsibility of loading, transporting and unloading of the vehicles lies with the Assistant Sanitary Inspectors (ASIs). They are not technically qualified for these operations. Consequently, the vehicles are not optimally utilised.

3.5 DELINEATION OF ZONES IN DELHI FOR WASTE COLLECTION

MCD at present is divided into 12 zones for effective administrative control and efficient provision of basis services (Map 3.2). The basis for their delineation is a mixture of cultural and economic factors along with their location in terms of core and periphery. Nevertheless, manpower distribution in the different zones is not based on the size of population catered by each zone, as there is no correlation between the deployment of staff and the population served (Table 3.3). It is noticeable that there is a large variation in the ratio of supervisory staff to their subordinates in different zones. A partial explanation for this is given as sweeping staff in MCD are deployed on the basis of area to be swept.

Management of solid waste in the 12 zones is executed at different levels and by categories of staff under the purview of the Deputy Municipal Commissioner (CSE). The provision of CSE staff is 3.32 persons per 1000 residents (1996). In addition to the regular residents, Delhi has a daily floating population of 10-15 lakh. When this large floating population is considered the manpower provision per 1000 persons is within the range of 2-3 persons (NEERI, 1996). The provision of staff in the different zones is based on arbitrary decisions, resulting in an unequal distribution of available manpower.

Map 3.2

MUNICIPAL ZONES OF DELHI

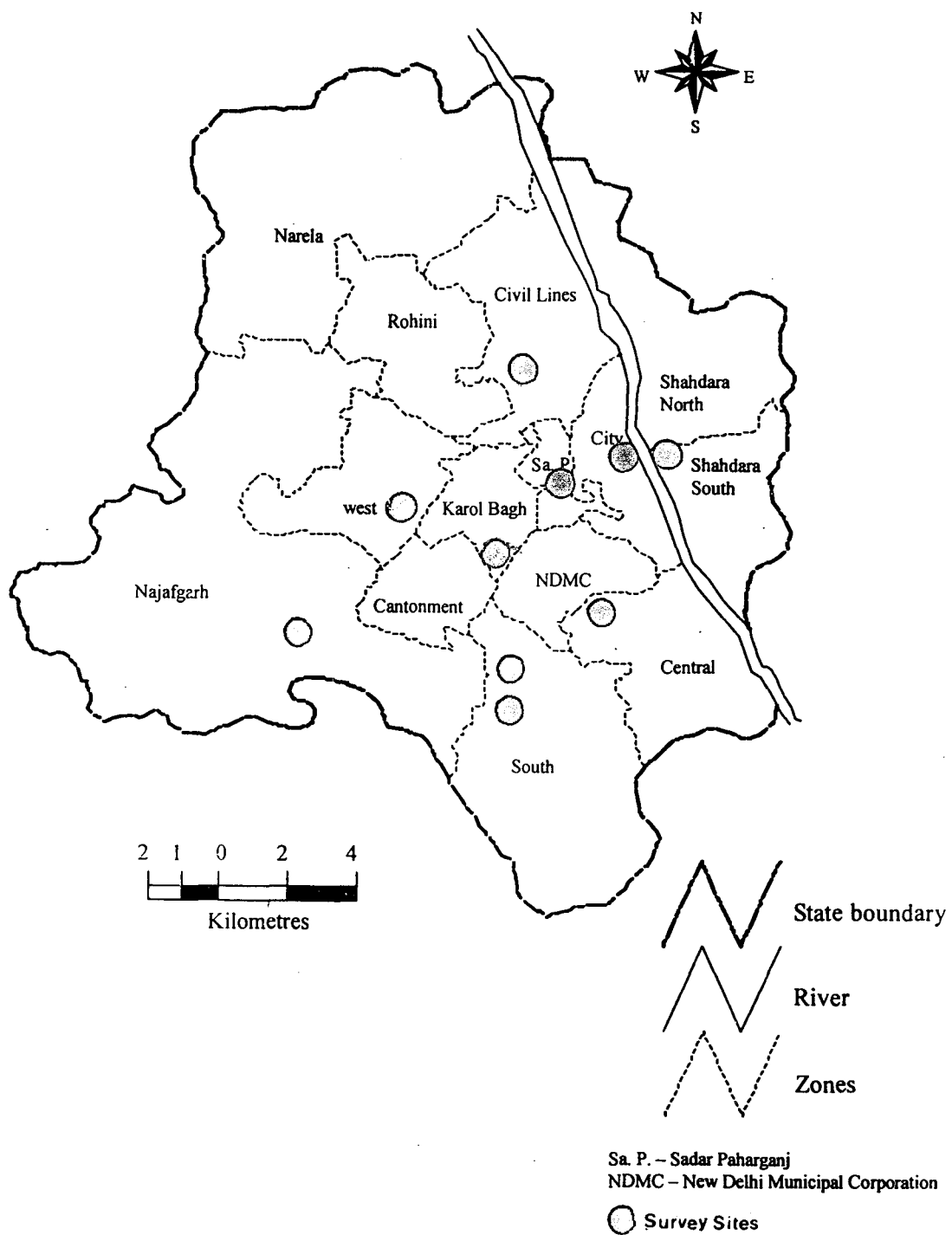
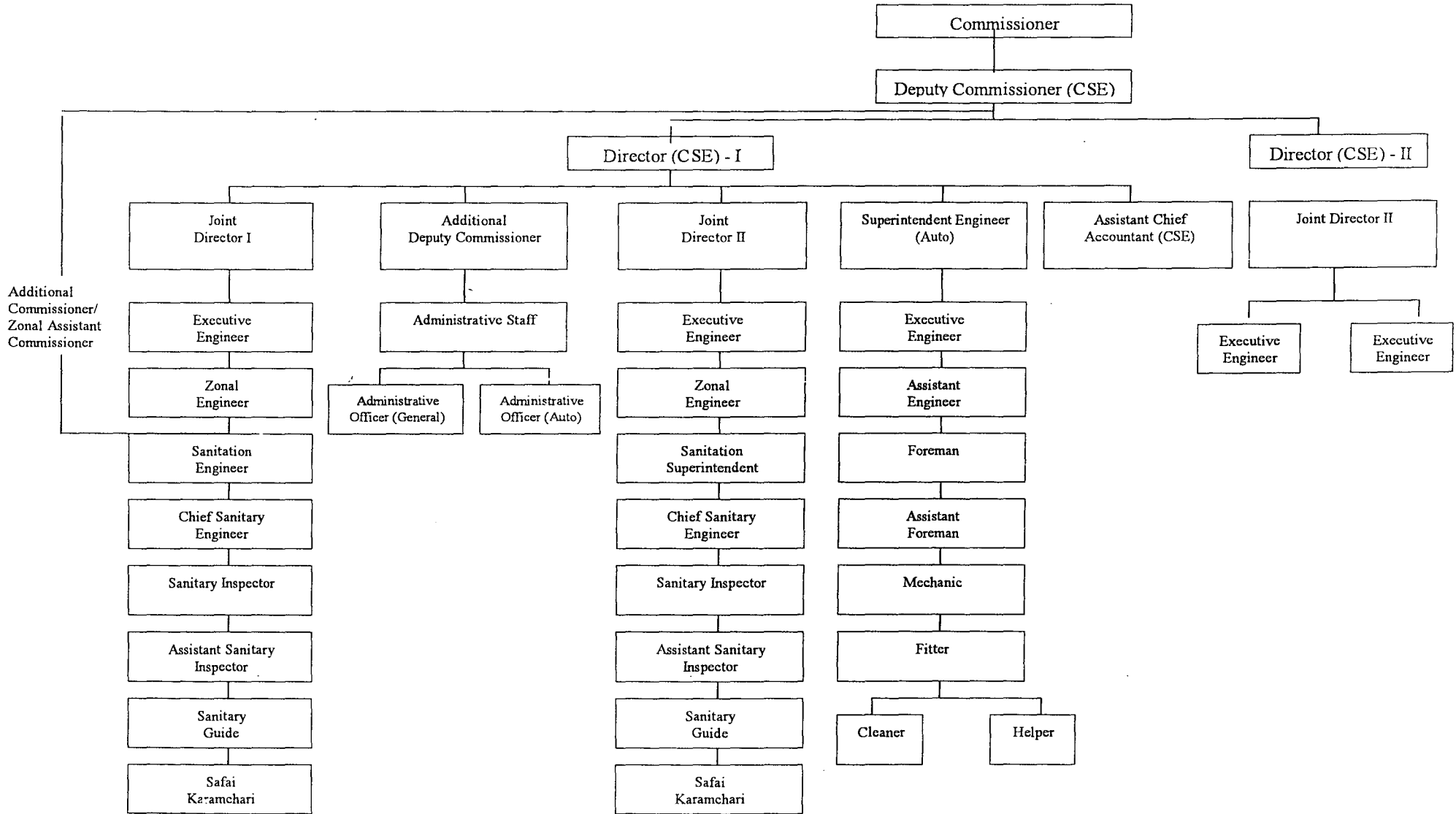


Figure: 3.1 Organisational Structure of the CSE Department



Source: NEERI, 1996

Table -3.3

Distribution of Municipal staff engaged in solid waste management in various zone - 1996

| Zone | Population 1996 | Staff | | | | | | | No. of SKs Population | SK/ ASI | ASI/ SI | SI/ CSI | CSI/ SS |
|---------------|--------------------|-------|-----|-----|-----|-----|--------|--------|--------------------------|------------|------------|------------|------------|
| | | SS | CSI | SI | ASI | SG | SK | Driver | | | | | |
| City | 5,40,896 | 2 | 4 | 21 | 44 | 28 | 1,428 | 54 | 2.64 | 19.83 | 3.14 | 7.0 | 2.0 |
| Central | 8,11,995 | 2 | 2 | 16 | 46 | 54 | 2,892 | 53 | 3.56 | 28.92 | 6.25 | 8.0 | 2.0 |
| South | 13,48,961 | 2 | 3 | 19 | 63 | 33 | 5,091 | 85 | 3.77 | 53.03 | 5.00 | 6.33 | 1.5 |
| Karol Bagh | 6,08,228 | 2 | 2 | 17 | 50 | 66 | 2,889 | 56 | 4.75 | 24.90 | 6.82 | 8.5 | 1.0 |
| Sadar P. Ganj | 5,21,841 | 1 | 2 | 14 | 33 | 40 | 1,301 | 55 | 2.49 | 17.82 | 5.21 | 7.0 | 2.0 |
| West | 13,41,849 | 2 | 4 | 30 | 46 | 83 | 4,340 | 73 | 3.23 | 24.24 | 5.96 | 7.5 | 2.0 |
| Civil Lines | 8,22,206 | 2 | 2 | 21 | 72 | 84 | 3,707 | 66 | 4.50 | 36.40 | 7.33 | 4.5 | 2.0 |
| Shahdara (S) | 12,99,410 | 2 | 4 | 18 | 72 | 60 | 4,805 | 68 | 3.69 | 36.40 | 7.33 | 4.5 | 2.0 |
| Shahdara (N) | 13,77,503 | 2 | 3 | 15 | 51 | 52 | 3,865 | 53 | 2.80 | 37.50 | 5.72 | 5.0 | 1.5 |
| Rohini | 12,02,224 | 3 | 3 | 17 | 61 | 39 | 3,660 | 48 | 3.04 | 36.60 | 6.60 | 5.0 | 1.0 |
| Narela | 3,40,294 | 1 | 1 | 5 | 14 | 30 | 1,360 | 11 | 4.00 | 30.90 | 8.80 | 5.0 | 1.0 |
| Najafgarh | 12,67,806 | 2 | 3 | 15 | 64 | 34 | 2,775 | 45 | 2.19 | 28.32 | 6.53 | 5.0 | 1.5 |
| MCD 1996 | 1,14,93,213 | 23 | 33 | 208 | 616 | 603 | 38,113 | 667 | 3.31 | | | | |
| MCD 1998 | 1,22,81,400 | 23 | 33 | 208 | 616 | 603 | 38,113 | 667 | 3.31 | | | | |
| | + | | | | | | | | | | | | |

Source: Solid Waste Management in MCD Area (1996) Phase - 1 Report, National Environmental Engineering Research Institute, Nagpur, June 1996.

3.6 COMPOSITION OF SOLID WASTE IN DELHI

Quantity of waste generated in the city was estimated about 1633304 tonnes in 1990-91 and increased at a level of about 3256880 tonnes during 1998-99. The characteristics of waste constitute an important element in effective planning and designing of the collection, processing and disposal of solid waste management systems. In a city, different types of activities are concentrated in various places like residential colonies, hospitals, markets and other commercial area will generate different types of solid waste. On the basis of a study in 1996, the physical characteristics of waste in different areas were estimated as:

Table: 3.4

Physical characteristics of municipal solid waste in MCD area

| Components | HIG ¹ area | MIG area | LIG area and slums | Market area | Commercial area | Industrial area | Mixed waste |
|-----------------------------------|--------------------------|--------------|-----------------------|----------------|--------------------|--------------------|----------------|
| Biodegradable | 44.45 | 39.96 | 36.39 | 58.09 | 38.54 | 16.1 | 38.60 |
| Paper | 7.25 | 5.01 | 4.48 | 5.13 | 7.92 | 8.9 | 5.57 |
| Plastic | 6.76 | 6.17 | 5.28 | 4.86 | 7.81 | 7.13 | 6.03 |
| Metal | 0.34 | 0.30 | 0.35 | 0.11 | 1.46 | 0.2 | 0.23 |
| Glass & crockery | 1.05 | 1.12 | 1.84 | 0.40 | 3.02 | 0.66 | 0.99 |
| Bio-resistant ² | 14.84 | 13.41 | 13.32 | 8.25 | 16.45 | 25.1 | 13.87 |
| Inert ³ | 35.31 | 34.03 | 38.34 | 23.16 | 24.79 | 42.77 | 34.71 |
| Total recyclable waste | 30.24 | 26.01 | 25.27 | 18.75 | 36.66 | 41.99 | 26.69 |

Source: Solid Waste Management in MCD Area (1996) Phase – 1 Report, National Environmental Engineering Research Institute, Nagpur, June 1996.

¹ HIG - high income group, MIG - middle income group, LIG - low income group areas, the concept has been taken from the formal housing schemes and other areas have also been put in this classification.

² Bio-resistant includes leather, rubber, bones and other synthetic materials

³ Inert matters includes ashes, dust, construction waste and so on

About 39 percent of the mixed waste⁴ material in Delhi is biodegradable and about 35 percent of the generated waste is composed of inert matters. These two constitute about 74 percent of total generated waste, rest is recyclable waste. In Delhi only 26.69 percent of generated waste is recyclable or reusable and has the potential to attract different types of waste-pickers. In the industrial area proportion of recyclable and reusable waste is higher than all other categories and works out to be about 42 percent of total generated waste. The proportion of this is lowest in the market area that is about 19 percent only. Different groupings of residential areas generate different types of waste. HIG areas produce comparatively higher proportion of recyclable waste except glass and crockery than the other two i.e. middle income area and low income areas.

3.7 FORMAL WASTE COLLECTION

With the boost in population, it is natural to record a proportionate escalation in generating the waste. The changing consumption pattern of the urban population has resulted in a comparatively faster growth of waste generation especially of the solid waste than the increase in population.

Table 3.5, depicts that during the observed period population has shown a growth of about 41 percent, while, generation of solid waste has increased at a rate of about 100 percent. Though, quantity of collected solid waste has augmented at a much faster rate (about 122 percent), yet collection efficiency has improved only by a small fraction of about 12 percent.

The performance of MCD provides a complex picture when we consider the situation of solid waste collection in the city over a period of time. Only 47.5 percent of generated solid waste was collected by MCD in 1990-91, which consistently increased up to 71.3 percent in 1996-97. The performance has not improved only due to the need of a clean city for foreign investments, or motivation of local bodies to serve the residing population better but also because of public intervention through the High Court and the

⁴ Mixed waste indicates an average of waste from all parts of Delhi.

Supreme Court which has put pressure on the municipality to cater public health in a better manner.

Table 3.5

Solid Waste Generation and Collection in MCD - (1990-1999)

| Year | Population ¹ | Solid waste Generated ² (in tonnes) | Solid waste Collected ³ (in tonnes) | Collection Efficiency ⁴ (in %) |
|---------------------|-------------------------|---|---|--|
| 1990-91 | 9420644 | 1633304 | 775412 | 47.5 |
| 1991-92 | 9939000 | 1723174 | 840694 | 48.8 |
| 1992-93 | 10339000 | 1792524 | 983657 | 54.9 |
| 1993-94 | 10749000 | 1863608 | 1075346 | 57.7 |
| 1994-95 | 11172000 | 1936946 | 1201856 | 62.0 |
| 1995-96 | 11915000 | 2065763 | 1265562 | 61.3 |
| 1996-97 | 12470000 | 2161986 | 1542185 | 71.3 |
| 1997-98 | 13040000 | 3193692 | 1914389 | 59.9 |
| 1998-99 | 13298000 | 3256880 | 1728304 | 53.1 |
| Decadal growth rate | 41.16 | 99.4 | 122.89 | 11.79 |

Source: (1) Directorate of Economics and Statistics, Delhi, 1999.

(2) Estimated on the basis of the per capita generation quantity provided by NEERI in 1996.

(3) Compiled from the daily logbook of the department of 'Conservancy and Sanitation Engineering', MCD.

In 1993, Supreme Court gave directions to the municipal corporation of Delhi about deteriorating solid waste management (SWM) system and in September 1994, there was an outbreak of Plague in Surat. In this background several steps were taken to improve the SWM system. During 1991-92, the municipality was able to collect only 48.8 percent of generated solid waste but in the year, just after the outbreak of Plague in Surat (1994-95) it could collect 62 percent of the urban solid waste in Delhi. During the year 1996-97 (after the Supreme Court's directive, to submit the report to the Court) it further enhanced its capacity and collected 71 percent of urban solid waste. But in successive years it has gone down, as during 1997-98 it could collect only 59.9 percent of the generated waste.

During 1999, the estimated waste generation was 8,203 tonnes and despite intervention of the High Court and regular monitoring, the clearance / disposal was limited to 4,885 tonnes.⁵ This means the efficiency was limited to about 59.5 percent. However the report of Central Pollution Control Board's (CPCB) Counsel on garbage disposal system in Delhi reveals that out of the 6000 tonnes of garbage generated everyday, only 4000 tonnes are collected and the rest gets accumulated (Presented in the High Court on 24-2-1999)⁶, this puts the efficiency figure as 66.6 percent.

Table: 3.6

Growth rate of population, solid waste collection and collection efficiency 1990-91 to 1998-99

| Year | Growth rate of population (in %) | Growth rate of solid waste collection (in %) | Growth rate of collection efficiency (in %) |
|--------------------|----------------------------------|--|---|
| 1990-91 to 1991-92 | 5.5 | 8.4 | 2.8 |
| 1991-92 to 1992-93 | 4.0 | 17.0 | 12.5 |
| 1992-93 to 1993-94 | 4.0 | 9.3 | 5.2 |
| 1993-94 to 1994-95 | 3.9 | 11.8 | 7.5 |
| 1994-94 to 1995-96 | 6.7 | 5.3 | -1.3 |
| 1995-96 to 1996-97 | 4.7 | 21.9 | 16.4 |
| 1996-97 to 1997-98 | 4.6 | 24.1 | -16.0 |
| 1997-98 to 1998-99 | 2.0 | -9.7 | -11.5 |

Source: Computed from the data provided by

(1) Directorate of Economics and Statistics, Delhi, 1999.

(2) Compiled from the daily logbook of the department of 'Conservancy and Sanitation Engineering', MCD.

Looking at the growth rate of population and the quantity of solid waste collected, it can be argued that growth rate of solid waste collection is much faster than the population growth. From table 3.6, it is evident that, collection of solid waste has remained quite high when compared with that of

⁵ S. K. Rohilla, and S. P. Bansal (2001) 'Delhi's solid waste Management: Emerging scenario', Paper was presented in the Workshop on Managing Solid waste: Public and Private Interventions on 31st Jan.

⁶ Times of India, 25 Feb. 1999

population growth. The year of 1997-98 remained an exception, when solid waste collection process experienced a negative growth of 9.7 percent. Despite this, collection efficiency has not shown a continuous increasing trend and had a negative growth during years of 1994-95 and 1996-97. In the year 1997-98 when collection process has shown a negative growth it is not surprising to see the same trend in terms of collection efficiency (Table 3.6). It is noted from the given data that the trend-line of collection efficiency has continuous crests and troughs (Chart: 3.1). Crests are seen in the year 1994-95 just after the outburst of plague in Surat and again in 1996-97 the year when National Engineering and Energy Research Institute was submitting phase wise report to the apex court. The years following the crest have experienced a trough.

3.8 ZONE WISE COLLECTION

After analyzing the generation and collection of solid waste in the city it seems imperative to have a look on the spatial pattern of generation and collection. Table: 3.7 present the quantity of solid waste generated and collected from each zone on a daily basis for the year 1996.

It is noticed that during 1996 Rohini was the largest contributor to the total collected waste, though it does not show the highest percentage in terms of efficiency. Minimum quantity of solid waste has been collected from Narela during the year, and it does fall in the category of zones, where collection efficiency has been lowest. On the other hand, in terms of generation Sahadra North generated maximum quantity of solid waste (654 tones) closely followed by South (641 tones) and West (637 tones) zones. The quantity of collection for different zones has been shown through the maps which reveal the lower level of collection in peripheral zones (Map 3.5, 3.9). Collection efficiency has been highest in central zone followed by city zone, where it is above 90 percent. Only these two zones have shown a collection efficiency of more than 90 percent. Collection efficiency of west zone is lowest during the year and only 38 percent of generated solid waste could be collected from this zone. The comparative picture of the collection efficiency in different zones of Delhi has been shown through map (Map 3.6, 3.10).

Chart: 3.1
Collection efficiency of MCD (1990-91 to 1998-99)

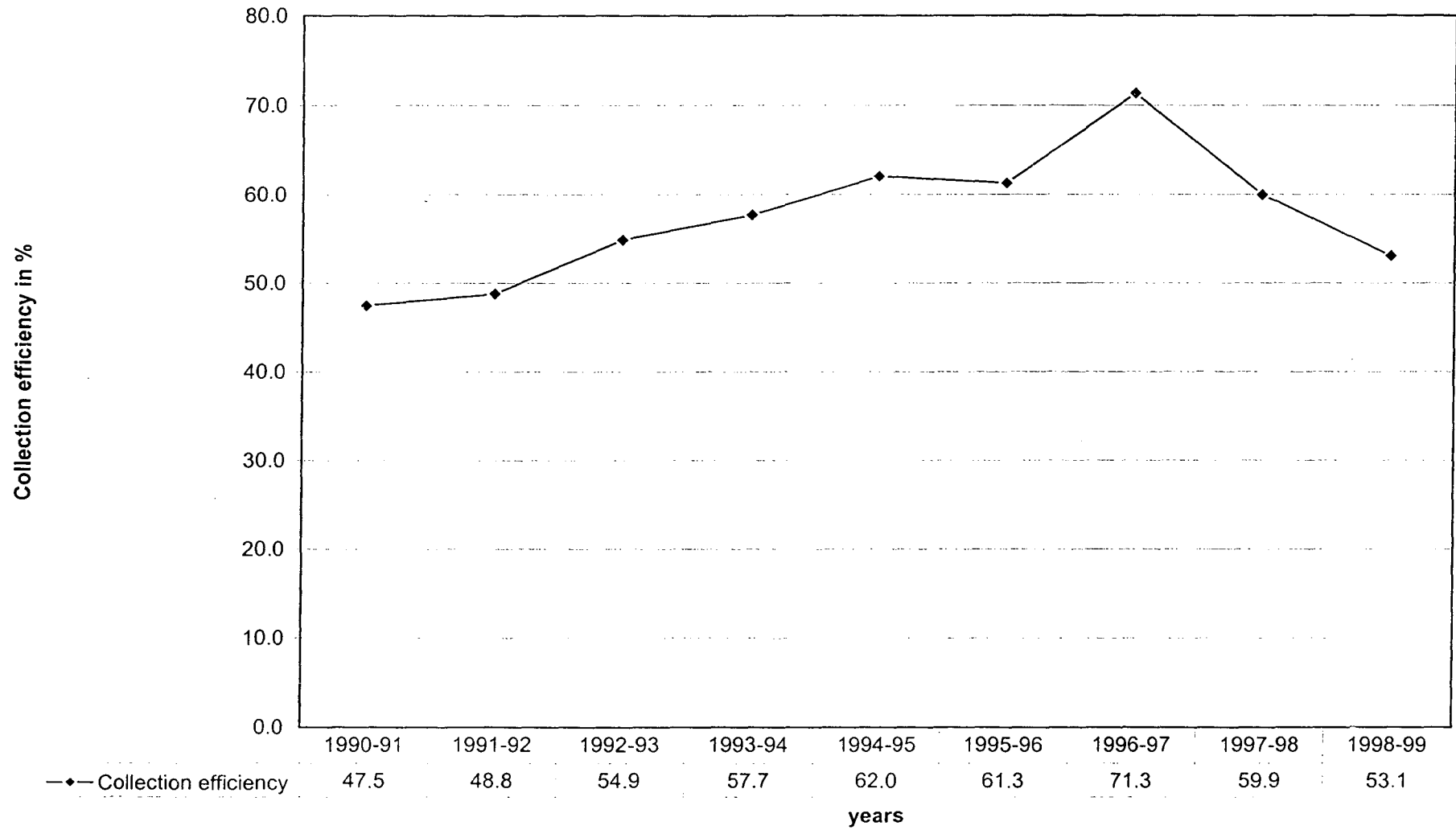


Table: 3.7

**Quantity of solid waste generated and collected in different zones of
MCD – 1996**

| Zones | Population ¹ | Solid waste generated ² (per day in tonnes) | Solid waste collected ³ (per day in tonnes) | Percentage of solid waste collected to total generation ⁴ |
|-----------------|-------------------------|---|---|--|
| City | 540896 | 256.93 | 241.30 | 93.92 |
| Central | 811995 | 385.7 | 364.00 | 94.37 |
| South | 1348961 | 640.76 | 418.02 | 65.24 |
| Karol Bagh | 608228 | 288.91 | 209.36 | 72.47 |
| Sadar Paharganj | 521841 | 247.87 | 209.36 | 72.47 |
| West | 1341849 | 637.38 | 241.63 | 37.91 |
| Civil Lines | 822206 | 390.55 | 305.76 | 78.29 |
| Sahadra North | 1377503 | 654.31 | 276.64 | 42.28 |
| Sahadra South | 1299410 | 617.22 | 320.32 | 51.9 |
| Rohini | 1202224 | 571.06 | 426.56 | 74.7 |
| Narela | 3402914 | 161.64 | 98.28 | 60.80 |
| Najafgarh | 1267806 | 602.21 | 265.72 | 44.12 |
| MCD | 11493213 | 5459.28 | 3550.49 | 65.04 |

Source: (1) Directorate of Economics and Statistics, Delhi, 1999.

(2) Estimated on the basis of the per capita generation quantity provided by NEERI in 1996.

(3) Compiled from the daily logbook of the department of 'Conservancy and Sanitation Engineering', MCD.

(4) Computed from 2 and 3.

The same scenario is prevailed through the year 2000 as well. After exploring through the data it seems the tendency of MCD is that it often tries to collect more wastes from those zones where quantity of waste generation is reported high. During the year 2000, maximum quantity of solid waste was collected from Sahadra North, as it generates maximum quantity of solid waste (Map 3.8). MCD has increased collection from Sahadra North zone from 276.64 tonnes in 1996 to 551.53 tonnes in 2000. With this, its efficiency improved from a poor of 42 percent to an average of 55 percent. Rohini stood second in terms of collection but its efficiency went further down from 74 percent in 1996 to 58 percent in the year 2000. In 2000, collection efficiency

of outskirts zones like Narela and Najafgarh (34 and 33 percent) went down. The total collection from these zones has also gone down. On the other hand, condition of City zone has improved, even when collection efficiency of MCD as a whole has deteriorated from 1996 to 2000 (from 65 percent to 57 percent) and about 99 percent of total generated waste has been collected in City zone. More than 80 percent of total generated waste is collected from Central zone and Karol Bagh. While less than 50 percent of generated waste has been collected from the zone of Sahadra south and west zone apart from Narela and Najafgarh.

Table: 3.8

**Quantity of solid waste generated and collected in different zones
of MCD – 2000**

| Zones | Population ¹ | Solid waste generated ² (per day in tonnes) | Solid waste collected ³ (per day in tonnes) | Percentage of solid waste collected to total generation ⁴ |
|-----------------|-------------------------|---|---|--|
| City | 649178 | 389.51 | 387.42 | 99.46 |
| Central | 973411 | 584.05 | 491.17 | 84.10 |
| South | 1617897 | 970.74 | 492.62 | 50.75 |
| Karol Bagh | 729253 | 437.55 | 367.53 | 84.00 |
| Sadar Paharganj | 625770 | 375.46 | 288.88 | 76.94 |
| West | 1609498 | 965.70 | 403.12 | 41.74 |
| Civil Lines | 985735 | 591.44 | 382.86 | 64.73 |
| Sahadra North | 1652240 | 991.34 | 551.53 | 55.63 |
| Sahadra South | 1558553 | 935.13 | 439.43 | 46.99 |
| Rohini | 1441703 | 865.02 | 503.12 | 58.16 |
| Narela | 408029 | 244.82 | 83.16 | 33.97 |
| Najafgarh | 1520308 | 912.18 | 306.66 | 33.62 |
| MCD | 13782976 | 8269.79 | 4697.5 | 56.8 |

Source: (1) Directorate of Economics and Statistics, Delhi, 1999.

(2) Estimated on the basis of the per capita generation quantity provided by NEERI in 1996.

(3) Compiled from the daily logbook of the department of 'Conservancy and Sanitation Engineering', MCD.

(4) Computed from 2 and 3.

Analysis of collection efficiency over the time reveals that the zones hosting affluent people as residents, show better collection percentage and a

mismatch can easily be viewed in the zones, which are on the outskirts or are having squatter settlements. The analysis of zone-wise population percentage to total population and their share in total waste collection provides a clearer picture in this regard. The percentage for population and waste collection in different zones has been set in Table: 3.9.

Table – 3.9

Percentage of population and collection of solid waste from different MCD zones: 1996 and 2000

| ZONES | 1996 | | 2000 | |
|-----------------|--------------------------|--------------------------|--------------------------|--------------------------|
| | Percentage of population | Percentage of collection | Percentage of population | Percentage of collection |
| City | 4.71 | 6.8 | 4.71 | 8.25 |
| Central | 7.07 | 10.25 | 7.07 | 10.46 |
| South | 11.74 | 11.77 | 11.74 | 10.49 |
| Karol Bagh | 5.29 | 5.9 | 5.29 | 7.82 |
| Sadar Paharganj | 4.54 | 5.9 | 4.54 | 6.15 |
| West | 11.68 | 6.81 | 11.68 | 8.58 |
| Civil Lines | 7.16 | 8.61 | 7.16 | 8.15 |
| Sahadra North | 11.91 | 7.99 | 11.91 | 11.74 |
| Sahadra South | 11.31 | 12.08 | 11.31 | 9.35 |
| Rohini | 10.46 | 12.01 | 10.46 | 10.71 |
| Narela | 2.96 | 2.77 | 2.96 | 1.77 |
| Najafgarh | 11.04 | 7.48 | 11.04 | 6.53 |
| MCD | 100 | 100 | 100 | 100 |

Source: (1) Directorate of Economics and Statistics, Delhi, 1999.

(2) Estimated on the basis of the per capita generation quantity provided by NEERI in 1996.

(3) Compiled from the daily logbook of the department of 'Conservancy and Sanitation Engineering', MCD.

(4) Computed from 2 and 3.

The table portrays that in 1996, Najafgarh zone had 11.04 percent of total population while, only 7.48 percent of solid waste was contributed to the total collected waste in Delhi. Whereas, in 2000 the situation has worsened and only 6.53 percent of total collection has come from Najafgarh, and it still consists of about 11 percent of total population. Notably, collection efficiency of this zone is 44 percent only, against the 65 percent of Delhi's collection efficiency. The zones like 'City' and 'Central', where collection efficiency is

more than 90 percent, has higher share in percentage collection than the percentage of total population residing in these areas (Table :3.9).

This analysis reveals that process of solid waste collection in different zones is not based on the size of population residing in the different zones, in other words on the quantity of waste generated in various zones. This is not something amazing, as one can easily notice a significantly higher investment in per capita terms and better maintenance of various facilities in relatively better off areas.⁷ The entire network by its very design tends to be discriminatory against low income colonies and squatter settlements.

Though collection efficiency for Delhi as a whole is around 60 percent but inter-zonal sharing informs us that only 30 to 40 percent of total generated waste is collected from some of the zones. As zones can not and should not be seen as segregated or isolated, the poor collection efficiency in any of the zone even on the outskirts may cause the outburst of severe health hazards like the plague of Surat.

3.9 COMPARISON WITH OTHER CITIES

Delhi has been compared here with other Indian cities in terms of solid waste generation and collection.

On the basis of the data in table 10, collection efficiency amongst Indian cities is highest in Bombay⁸. About 97 percent of total generated waste was collected in Bombay during the year 1994. This is quite comparable with the cities of other developed countries for the year. The cities of Ahmedabad, Bhopal and Madras were able to collect more than 90 percent of generated solid waste during early 1990s. This is not a bad state of affairs as far as solid waste collection is concerned.

Though, the data on solid waste generation is based on old estimation, yet comparison is valid as all estimation is for the same period. Collection

⁷ A. Kundu (1993) '*In the Name of Urban Poor: Access to Basic Amenities*', Sage Publications, Delhi, pp. 76-77.

⁸ Bombay is colonial name for Mumbai. In 1995 government renamed the city as Mumbai.

efficiency of Delhi in 1990 was only 48 percent, which went up to 54 percent in 1992-93. At present (in 2000) its collection efficiency is recorded as 56 percent. The collection efficiency of Delhi is still poor and even in Indian context presents a gloomy picture.

Table 3.10

Status of solid waste generation and collection in major cities

| Major cities | Solid waste generated (per day in tonnes) | Solid waste collected (per day in tonnes) | Collection efficiency (in percentage) |
|--------------|--|--|--|
| Ahmedabad | 1200 | 1080 | 90.0 |
| Bangalore | 1800 | 1225 | 68.1 |
| Bhopal | 621 | 300 | 93.5 |
| Bombay | 3200 | 3100 | 96.9 |
| Coimbatore | 175 | 113 | 64.6 |
| Delhi (1996) | 5459 | 3550 | 65.0 |
| Indore | 120 | 100 | 83.3 |
| Kanpur | 2142 | 1500 | 70.0 |
| Kochi | 230 | 170 | 52.2 |
| Lucknow | 600 | 600 | 83.3 |
| Madras | 1819 | 1637 | 90.0 |
| Madurai | 310 | 160 | 51.6 |
| Pune | 1000 | 700 | 73.0 |
| Trivendrum | 120 | 75 | 62.5 |
| Vadodara | 321 | 193 | 60.1 |

Source: State of Environment: 1995, India

The level of collection of solid waste in Delhi has been compared with different countries of world as well. Table: 3.11 reveals that the western countries like Germany, Switzerland etc. collect more than 90 percent of generated solid waste. Collection efficiency of other countries like France and United Kingdom is around 80 percent. From south-eastern countries Thailand is able to collect 90 percent of its generated solid waste.

Table 3.11

Status of solid waste collection in different countries

| Countries | Collection efficiency (%) |
|-----------------|---------------------------|
| United Kingdom | 88 |
| France | 80 |
| The Netherlands | 87 |
| Germany | 90 |
| Switzerland | 90 |
| Italy | 70 |
| Thailand | 90 |
| India | 59.7 |
| | |
| Delhi 1996 | 65.04 |
| Delhi 2000 | 56.80 |

Source: Control of Urban Pollution, CUPS/46/1999-2000, CPCB

In comparison, India is collecting only about 60 percent of its solid waste. Collection efficiency of Delhi, which was 65 percent in 1996, has gone down to 57 percent in the year 2000. It has been estimated that it will go down further. With the present capacity of the civic bodies limited to handling of the quantum of solid waste, the present gap of 40 percent is likely to increase to 44 percent in 2001, 59 percent in 2011 and 64 percent in 2021 AD.⁹

3.10 DISPOSAL OF SOLID WASTE IN DELHI

The safe disposal of waste remains a problematic area, as most of the third world countries divert larger proportions of funds towards collection of solid waste. The cost of collection in India tends to be a very large part of overall solid waste budget. The city of Ahmedabad with three million population and 1260 tonnes of solid waste per day, spends 85.8 percent of its budget on collection, 13.4 percent on transportation and only 0.8 percent on

⁹ S. K. Rohila and S. P. Bansal (2001) *op. cit.* 9.

final disposal.¹⁰ The solid waste in Delhi is disposed off at three disposal sites viz. Gazipur, Bhalsawa and Okhla. Solid waste from the existing 12 zones is taken to these three disposal sites on a daily basis. It is interesting to note that safe solid waste management is not limited to the disposal of garbage only. Agenda 21 declares that environmentally sound waste management must go beyond safe disposal or recovery of waste and seek to address the root cause of the problem by attempting to change unsustainable pattern of production and consumption.¹¹

3.11 PROBLEMS OF WASTE MANAGEMENT

The problems involved in solid waste management are enormous mainly in terms of estimation of future needs of the large quantity of solid waste disposal. It is evident that previous few decades have witnessed a dramatic change in the pace of urbanization in the developing countries like India. The demographic features like natural increment of population and rural to urban migration have resulted in a substantial increase in urban population particularly in metros like Delhi.

The changing consumption pattern of increasing urban population has started the process of deterioration of urban environment in many ways. Due to lack of space for dumping, solid waste has become a problem for most of large metropolitan areas throughout the world. Unplanned development and locations of activities in the lately urbanized parts of the cities of the third world countries often make collection process more difficult.

Western countries are more concerned in preventing solid waste from going to the disposal sites. The industrialized societies adopted the well known waste management hierarchy – waste prevention, reuse, recycle, energy recycle, and disposal. The developing countries have also tried to

¹⁰ A. P. Jain and G. B. Pant (1994) '*Solid Waste Management in India*', paper presented at 20th WECD Conference: Colombo, pp. 2.

¹¹ J. Amos (1992) '*Planning and Managing Urban Services*', in Devas, N. and Rakodi, C. (eds.) *Managing Fast Growing Cities*, Longman, pp. 137.

enforce a similar regime for solid waste management system but the configuration differs.¹²

However, due to lack of finance, the developing countries have not been able to concentrate on things other than collection and disposal. It is not uncommon to find that 30 to 50 percent of staff and resources are being utilized by local bodies for these operations. Despite this, most urban areas in the developing countries are plagued by acute problems related to solid waste management. Shortage of expenditure at municipal level has made them selective in approach in terms of providing services. Local bodies tend to concentrate and provide better services to posh localities. On the other hand, the rest of the city especially densely populated slums and squatter settlements remain neglected.

A progressive decline has been noticed in the standard of services with respect to collection and disposal of municipal solid waste. In many cities nearly half of the solid waste generated remains unattended, giving rise to unsanitary conditions especially in densely populated slums which in turn results in an increase in morbidity. The collection and safe disposal of municipal solid waste is absolutely necessary for the preservation and improvement of public health. Meanwhile it is not irrelevant to point out that in managing the waste, account must be taken of what power exists for the enforcement of standards, what financial resources are available for the operation of waste collection and disposal and what system and procedures are most cost-effective.

3.12 SOLID WASTE MANAGEMENT AS 'PUBLIC SERVICE'

Being a waste, public finance has been the major source of investment in this sector. Urban local bodies as a general practice undertake the task of solid waste service delivery, with its own staffs, equipments and funds. Solid waste management in the cities of the third world countries under the existing

¹² Schall, (1995) '*Does the Solid Waste Hierarchy Make Sense? A Technical, Economic and Environmental Justification for the Priority of Source Reduction and Recycling*', New Haven, Yale University, from P. V. Beukering (1997) '*Waste Recovery in Bombay: A socio-economic and environmental assessment of Different waste management options*', *TWPR*, Vol. 19, No. 2, May, pp. 164.

system of local bodies has been inefficient in most of the cases. This has guided many to talk about privatization of these services in the developing countries on the pattern of Western nations.

The privatisation, which started in late 1980s with the transfer of state owned enterprises to private owners, has been the political creed of 1990s.¹³ Most governments have turned to privatisation as a way to overcome shortfalls in urban infrastructure and services and the move came in the form of contracting out of an increasing array of public services – from rubbish collection to road repairing.

For instance, in the aftermath of the 1994 plague outbreak in Surat, a former Municipal Commissioner of Bombay, when considering options for dealing with mounting rubbish in India's cities, suggested that local authorities 'should... think of privatizing garbage collection and disposal'.¹⁴ Most proponents of privatisation are quick to point to 'introducing efficiency' and mobilizing private investment to justify the involvement of private sector in urban environmental infrastructure and services. With continuing poor financial wealth of municipal bodies in Indian cities on the one hand and ever increasing urban population, urban activities and consequently urban waste, on the other, the need for privatization of municipal waste management is urgent.¹⁵

While 'the public enterprises' can easily be designated as inefficient; private ownership has not always been geared to promote efficiency. Karp provides a case of water supply company in Maco (Asia) which has been privately owned since the 1920s and is managed as inefficiently as many public run utilities.¹⁶

Most of the arguments for or against privatization of urban services are based on the experiences from the developed nations where urban services

¹³ Lee (1997) 'The privatization of solid waste infrastructure and services in Asia', *TWPR*, Vol.19, No. 2, pp. 139.

¹⁴ *India Today*, 31st October, 1994

¹⁵ P. S. N. Rao (1994) 'Privatization of Solid Waste Management', *Nagarlok*, Vol. 26, No. 1, p. 72.

¹⁶ J. Karp (1995) 'Water, Water, Everywhere', *Far Eastern Economic Review*, June 1, pp. 54-58.

are a 'mature system', 'universal coverage' has been achieved, and 'user-free' concept has been accepted and concerns with cross-subsidy between social groups have become less imperative.¹⁷ On the other hand urban infrastructure and services in the developing countries are characterised by deficiencies such as partial coverage and inadequate cost recovery.

Nevertheless, the most important reason to rethink the concept of privatizing urban environmental services in these cities is an increasing number of persons in urban areas who are unable to pay for the services and infrastructure. The incidence of urban poverty in many Asian countries is endemic with 20 percent to 86 percent of urban population falling below the official poverty line.¹⁸ Above all, sewerage system and waste disposal system have been found unsuitable for direct charging on the basis of intensity of use since charging could lead to charge avoidance practice which would create health hazards.¹⁹

3.13 SCOPE FOR INFORMAL COLLECTION

The limited resource of municipalities in the developing countries for solid waste management increases the need for cost-effective options to manage urban waste. Parallel with the formal waste collection authorities, informal collection of waste for recycling and reuse is a typical feature in most of the cities in the developing countries. The guiding principal behind this practice is partly the incidence of chronic poverty and partly the notion that all the waste need not be disposed off into the environment and some waste can be recycled or returned to the production cycle. Solid waste often is understood as the result of using disposable items by the modern materialistic societies, instead of reusing and recycling of using reusable items.²⁰

¹⁷ Lee, (1997) *op. cit.* 17, pp. 141

¹⁸ *ibid*, pp. 157

¹⁹ J. Amos (1992) *op. cit.* 15, pp. 137.

²⁰ S. Sundari and K. K. Saradha (2001) 'Domestic and Commercial Solid Waste management', *Indian Journal of Social Work*, Vol. 62, No. 1, pp.68

In the western countries separation of solid waste is done at the source of generation and this provides clean materials for the recycling industry. In the developing countries like India this process is not followed at least at the formal level. Often some households and certain enterprises separate recyclable matters before dumping the waste and sell these materials to street hawkers or specific vendors. From here the material enters the recycling stream. Additional recycling of waste is also practiced by the Safai Karmcharis during the waste transportation activity. This, though, is not an institutionally recognized process.

Recycling not only reduces the amount of waste to be discarded but also provides a means of livelihood to a major portion of urban population. A very widespread and frequently overlooked source of cash in underdeveloped societies is scavenging (collecting, reusing and / or selling waste). This general occupation is highly correlated with the nature of the economy in developing nations. Availability of resources is limited in most of these nations, thus wherever resource enters the production cycle should be conserved to as great extent as possible.²¹

Municipalities in the developing world seem to be ignorant of this fact and rarely recognize the benefits of waste recycling and recovery. Their attention, in the field of municipal solid waste management, mainly lies in 'end-of-pipe' solution, such as the improvement of landfill practices. This casual attitude of municipalities towards recyclable waste in these cities facilitates the waste recycling process and provides a blinking light to the poorest section of the population in the form of employment.

3.14 CONCLUSION

The above analysis demonstrates that

1. Delhi presents a gloomy picture in terms of solid waste management in comparison to the other cities of India. It generates about 8000 tonnes of

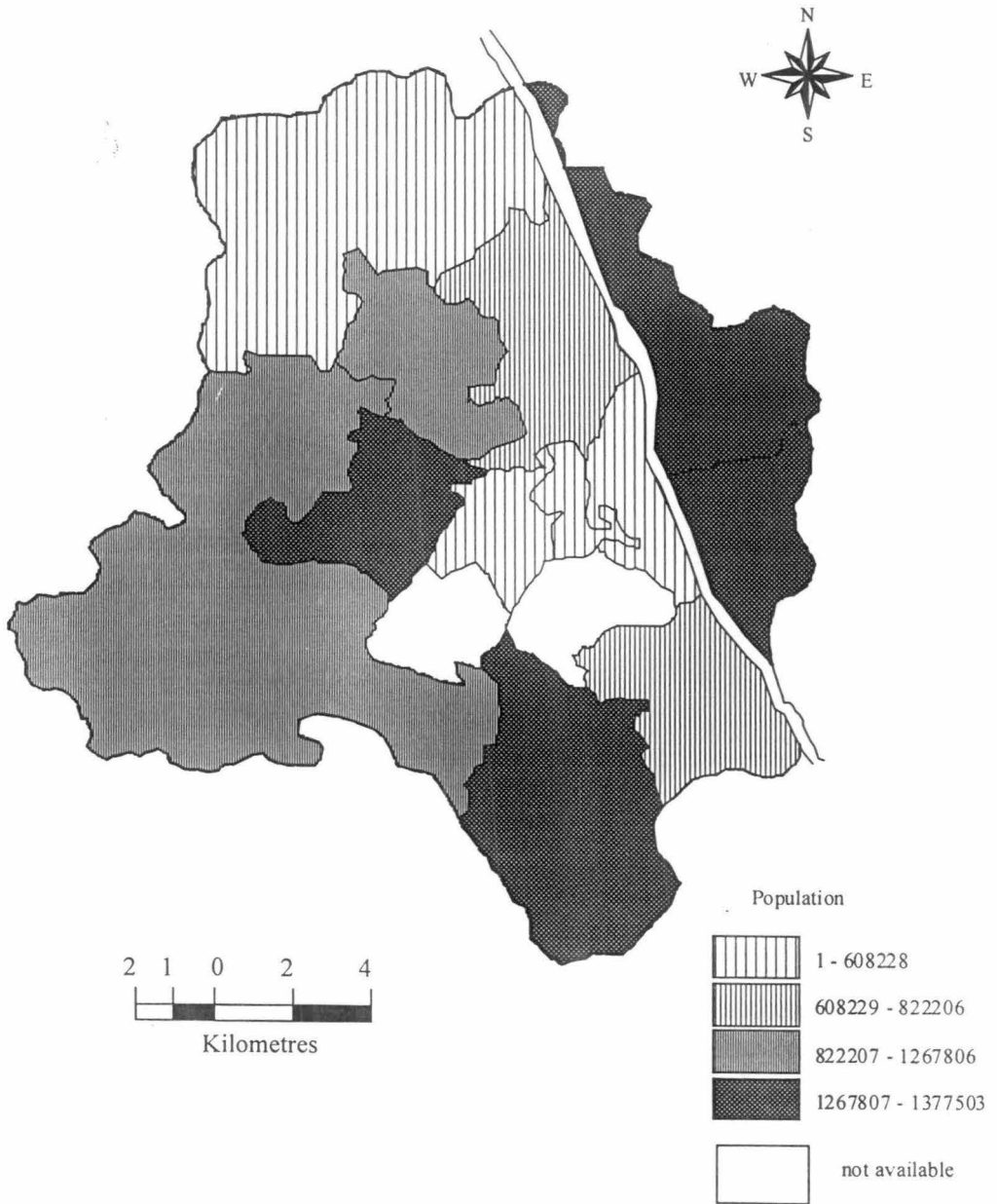
²¹ A. C. Macqueen (1987) '*Work from Waste: The Garbage-Comber of Delhi, India*', Submitted to the Department of Environment and Resource Planning, University of Waterloo pp. 12; taken from Eames and Goode (1973)

solid waste per day and municipal bodies are able to collect only about 60 percent of the generated waste.

2. With increasing commercialization and industrialization, it is natural that generation of waste has grown at a much faster rate than the growth of population.
3. Quantity of collection of solid waste has increased overtime, but the rate of increase has not been consistent. However, collection efficiency has decreased especially in the zones that lie on the peripheries.
4. The zones with affluent population are served in a better way than the peripheral zones. Collection efficiency in the zone like City and Central is about 90 percent as against the zones of Narela and Najafgarh where it is as low as 40 percent.
5. The benefits of 'R-trio' i.e. recovery, reuse and recycling, have not been formally recognized in the management of solid waste in the city, though one fourth of the generated wastes is recyclable in nature.
6. The capital city of India is going to face more problems in the management of solid waste in the near future with the increasing commercialization, industrialization and resultant population growth.
7. In this situation, when municipal bodies are not able to manage the solid waste effectively in developing countries, rise of informal sector activities is an evident phenomenon.
8. In most of the developing cities, solid waste is considered as a solid asset, which is recovered directly or indirectly through informal stages for reuse and recycling.
9. Delhi too is dependent partly on informal sector activities for the proper clearance (collection and disposal) of solid waste from the city.

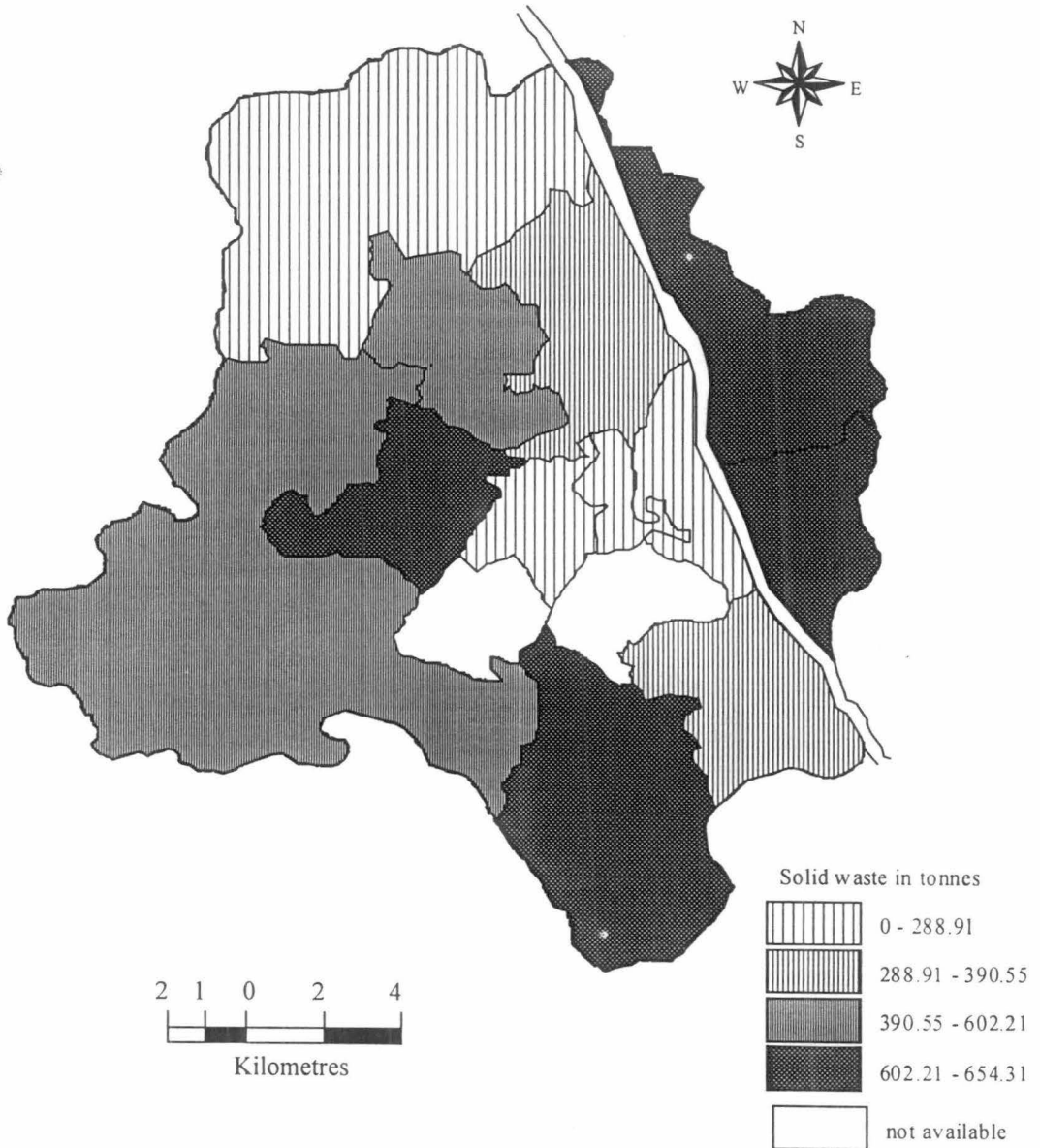
Map 3.3

DISTRIBUTION OF POPULATION - 1996



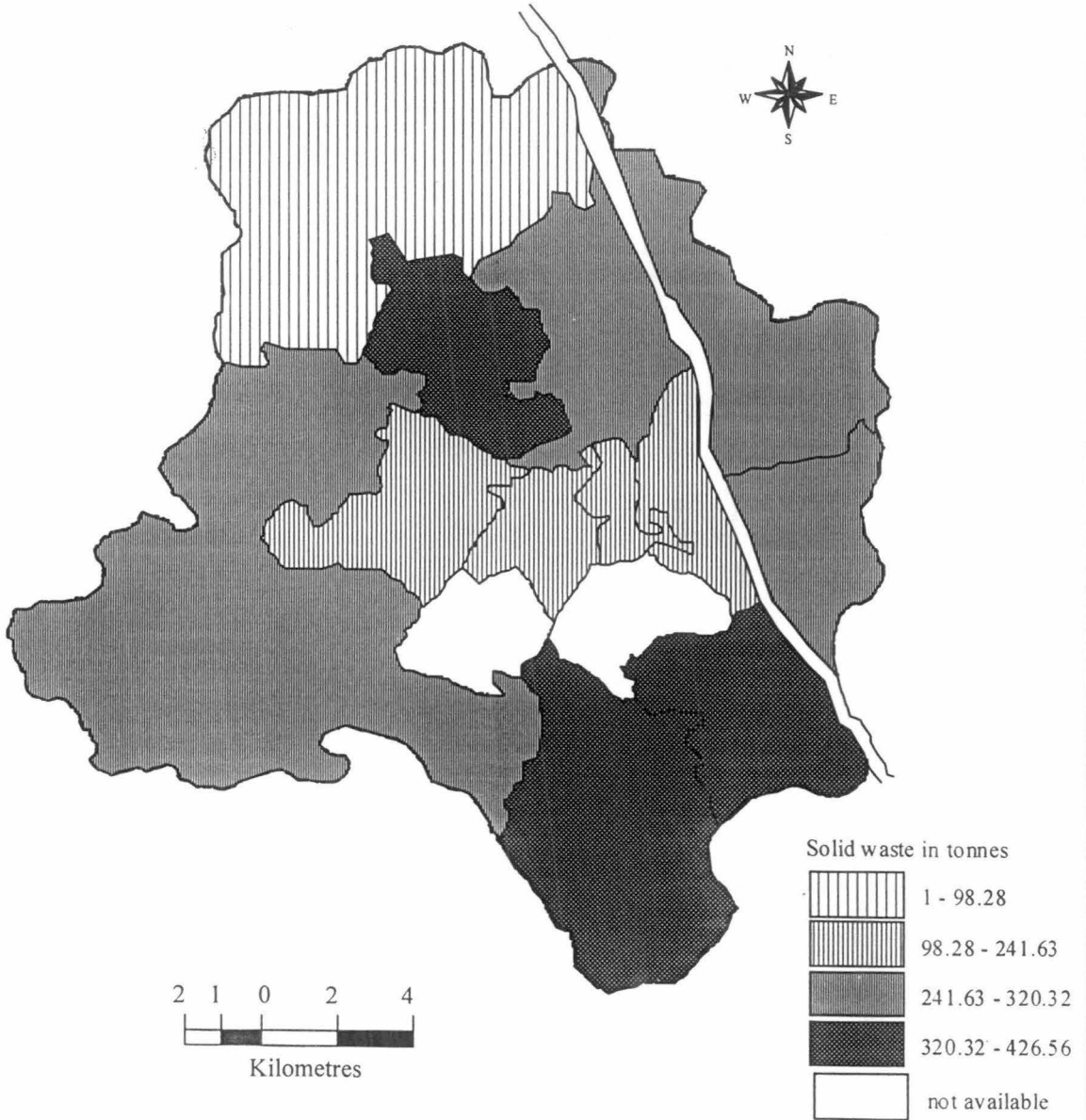
Map 3.4

SOLID WASTE GENERATION - 1996



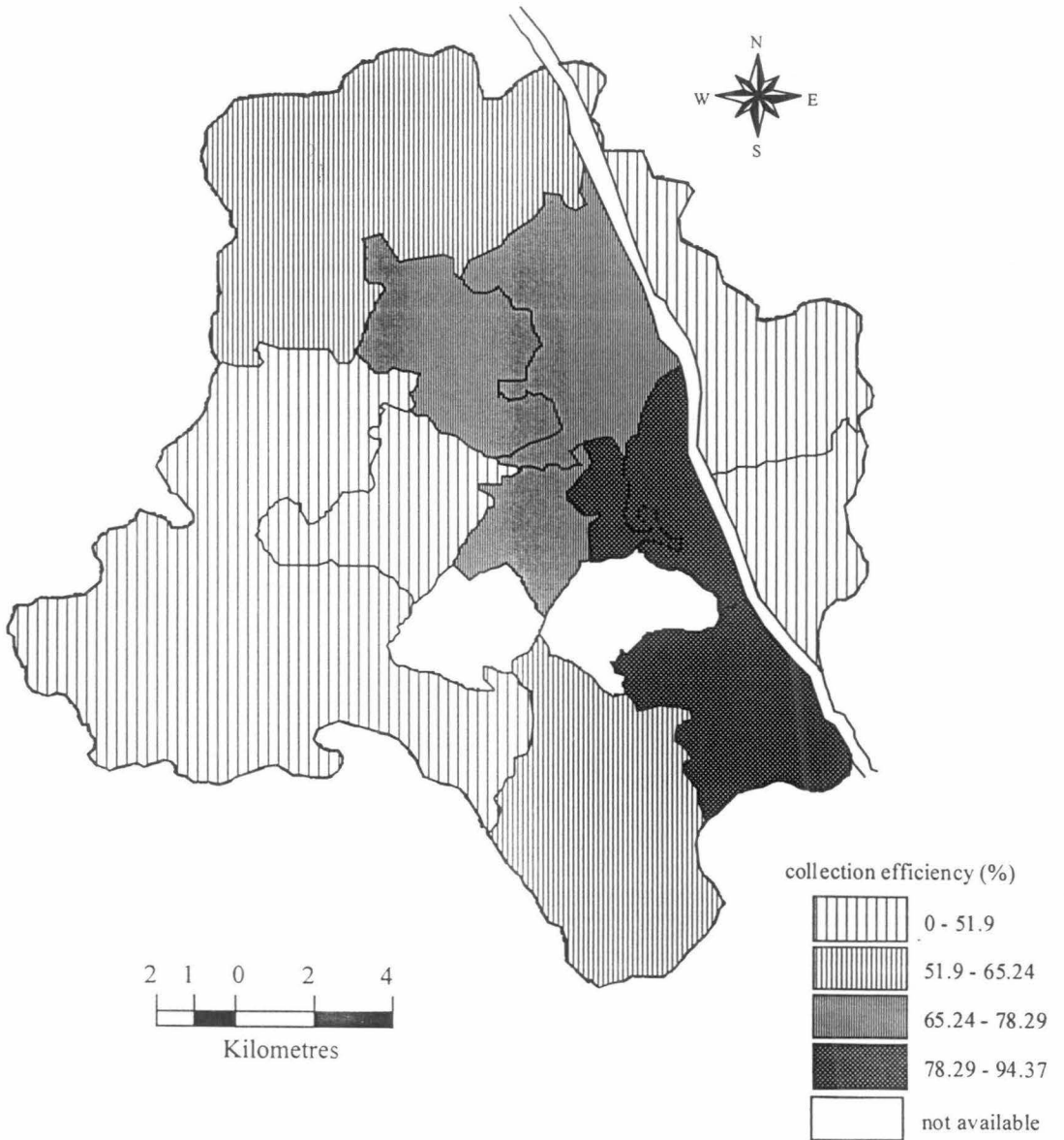
Map 3.5

SOLID WASTE COLLECTION - 1996



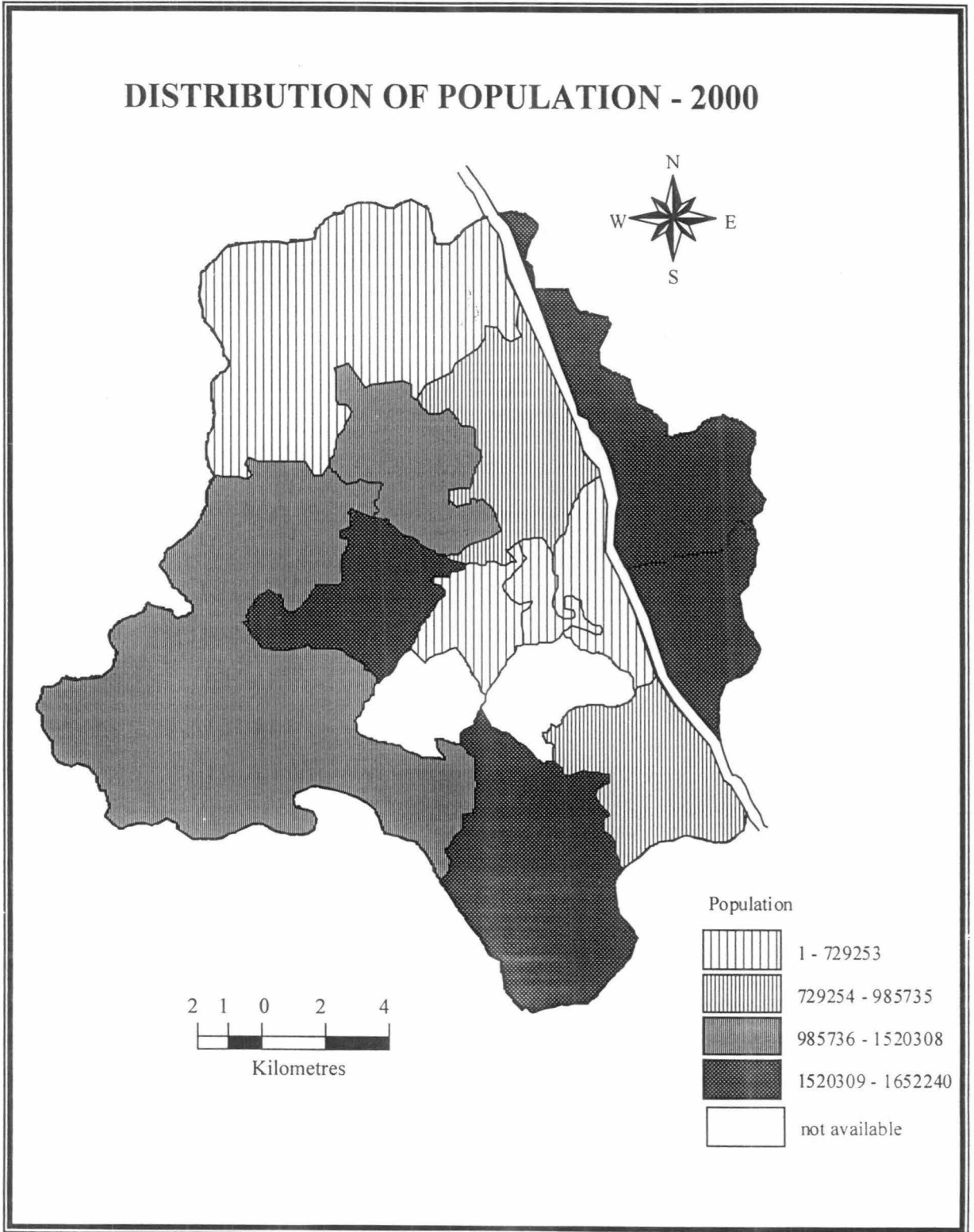
Map 3.6

COLLECTION EFFICIENCY - 1996



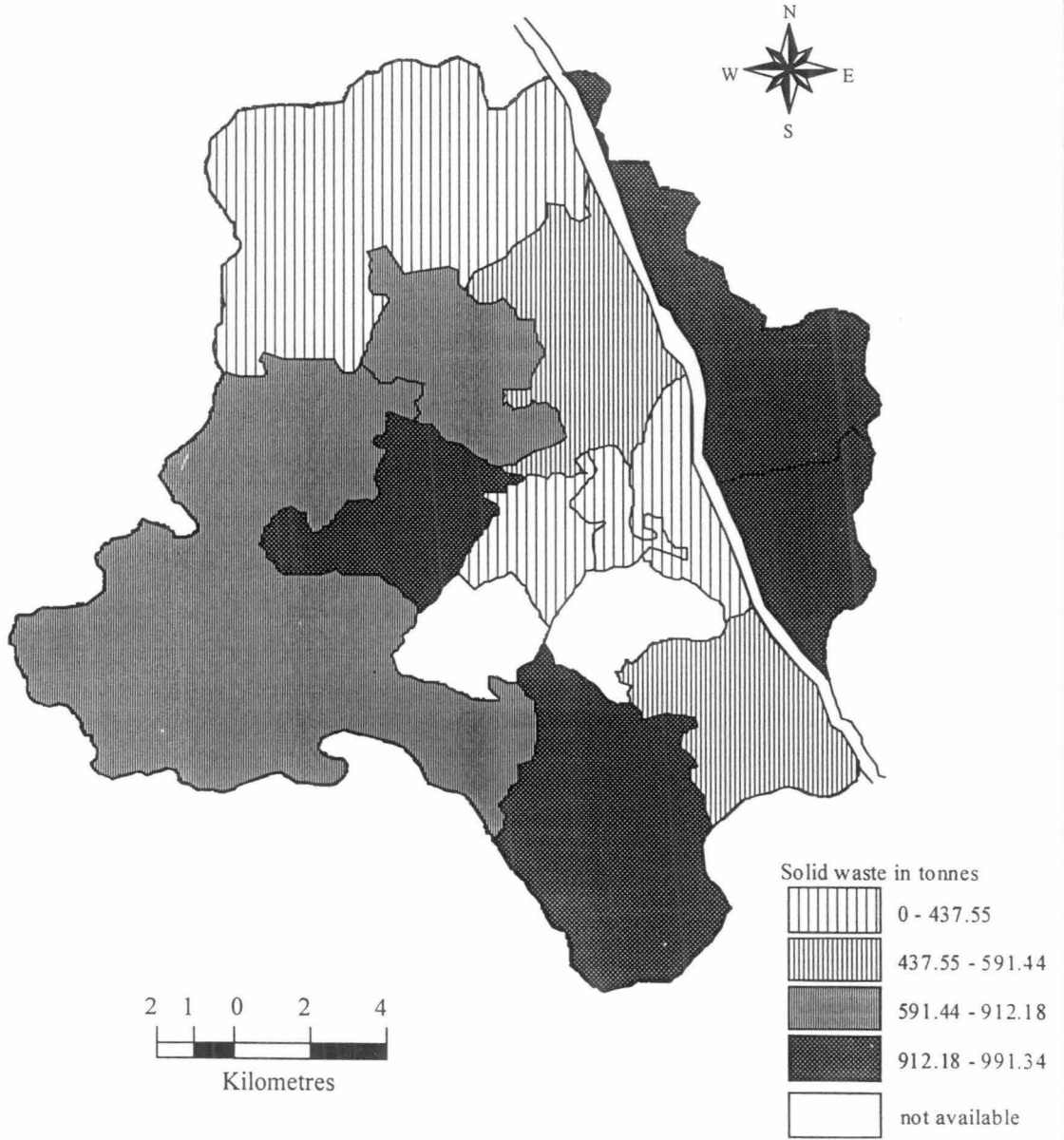
Map 3.7

DISTRIBUTION OF POPULATION - 2000



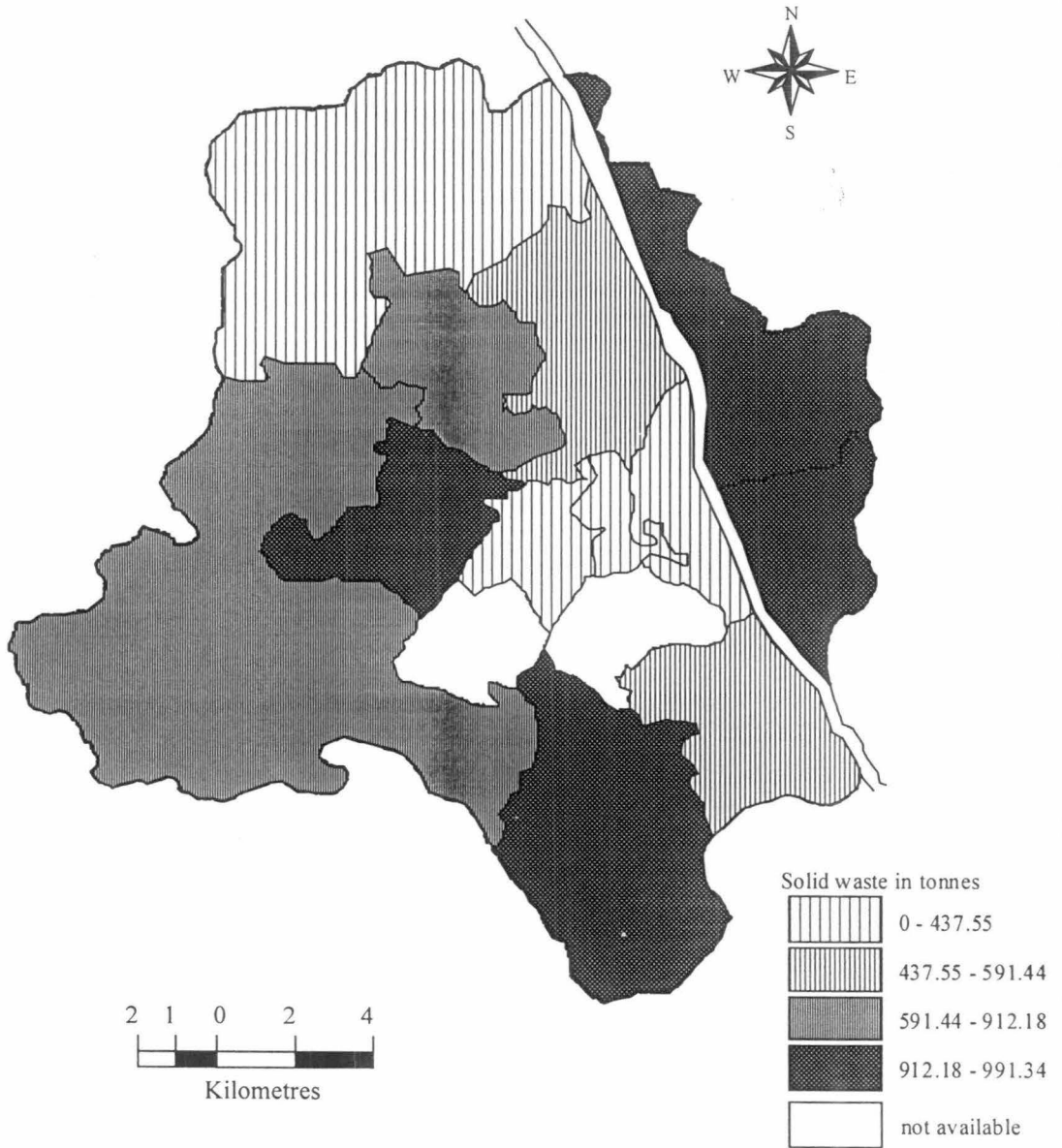
Map 3.8

SOLID WASTE GENERATION - 2000



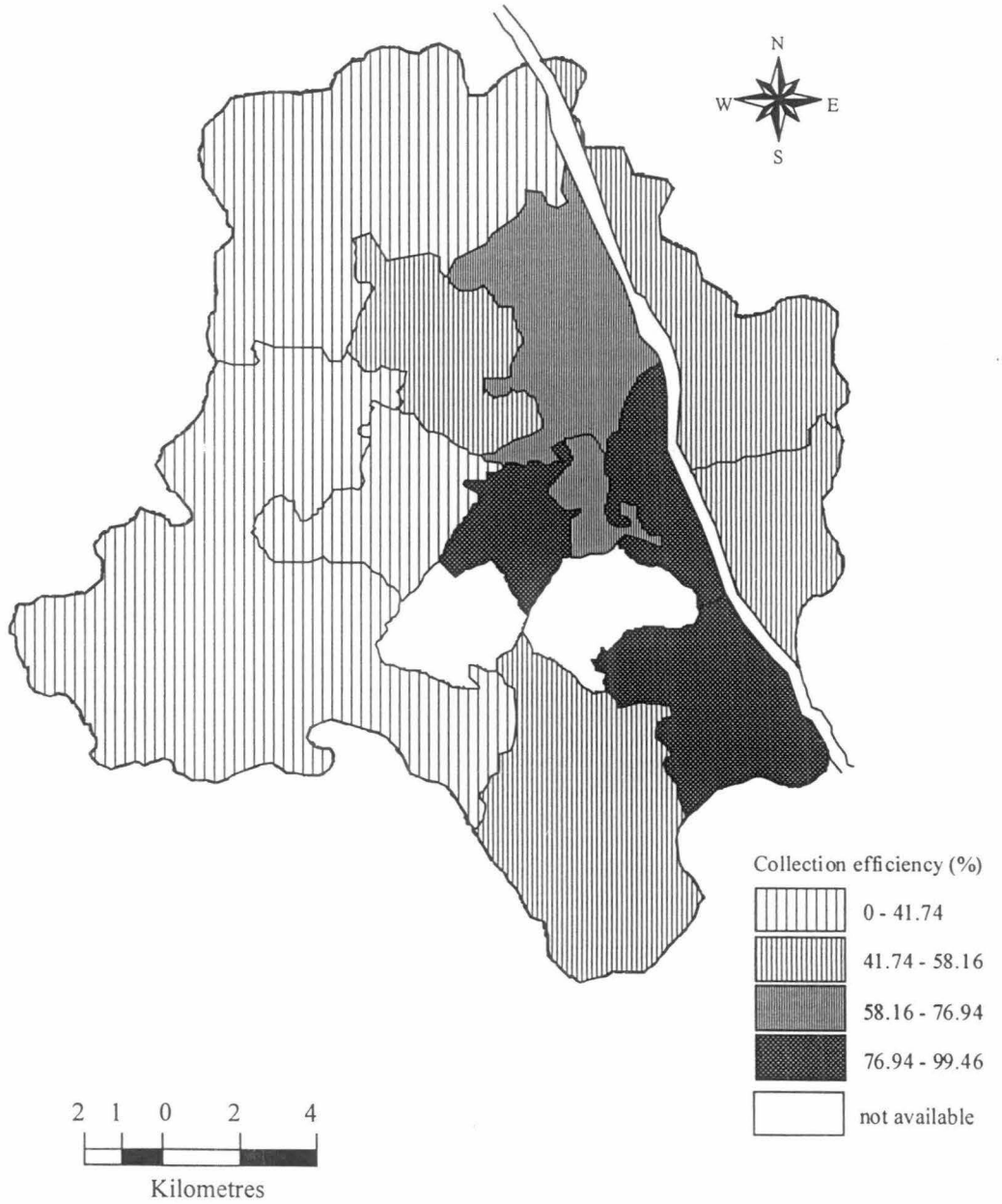
Map 3.9

SOLID WASTE COLLECTION - 2000



Map 3.10

COLLECTION EFFICIENCY - 2000



Chapter: Four

SOLID WASTE MANAGEMENT IN THE **INFORMAL SECTOR**

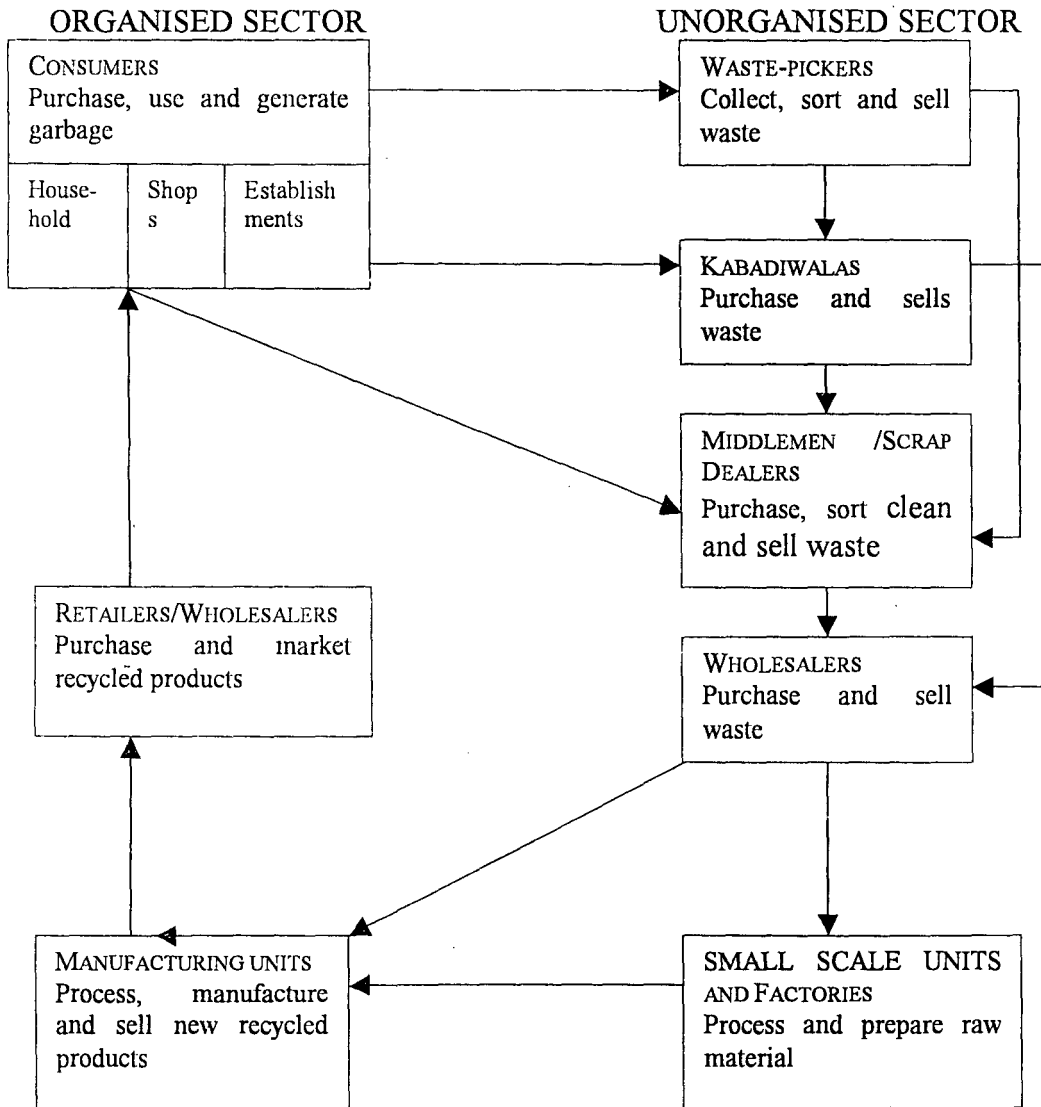
Inability of municipal bodies to collect entire waste in urban areas of the developing countries provides the ground for waste-picking. This available opportunity is capitalized by the 'thrown out' population of rural areas which migrates to the large cities in the hope of a breakthrough that will end all their misery. With the continuous flow of people to the large cities the activity of waste-picking continues and in fact grows in the cities of the developing world despite numerous problems to the actors of this profession.

The pace of urbanization in India has outstripped that of industrialization. As employment in organized manufacturing as well as service sector is almost at the saturation point, 'overpopulation' in cities has led to increase in unemployment, poverty and consequent underemployment. Moreover the overpopulated rural areas due to lack of resources and opportunities, are forcing their unemployed poor to the cities. Instead of high-quality industrialized and well-organized functions in the restructured economy, more and more people have little work to do in contemporary labour market and are compelled to turn to the informal sector. Even the informal sector is incapable of absorbing all the jobless people within its old defined boundary. Consequently people are working in petty jobs at the risk of their health and at the cost of their life. Informal waste collection accepts migrants and marginalized people who are 'unskilled' and are not capable of getting modern formal jobs. This activity, however, also accepts a part of burden of the municipalities by collecting wastes in large and medium towns.

4.1 VARIOUS ACTORS IN WASTE-PICKING

Figure 4.1

VARIOUS ACTORS IN WASTE RECOVERY AND RECYCLING PROCESS IN DELHI



Once solid waste is disposed off outside the premises by households or establishment, it becomes the property of the municipalities; the exact delimitation of ownership remains vague. Nobody collects biodegradable waste

from the dumping grounds or from the community bins but there are a number of takers for the recyclable and reusable waste. Various actors in the waste retrieval and recycling process are often regarded as squatter settlements on the waste. Without having any social security, they have evolved informal rights to the solid wastes that are either dumped in various places or are littered in the street. These actors ultimately become a means of supply of raw material to the formal manufacturing units.

Different types of waste-pickers (*Khatte-Wala*) and itinerant buyers (*Kabadiwala*), who come directly in contact of waste, are known as the first owners of the waste. Moreover, there is a fundamental difference between these two types of owners of waste. The first i.e. waste-pickers collect the reusable or recyclable waste from various places like from roadsides, from sanitary landfill sites, from dumping grounds etc. without paying anything except their labour power. One study estimated the number of waste-pickers as one lakh in the city of Delhi.¹ The material they collect can include anything that has a market value like waste paper, broken glass, bottle caps, polythene and other plastic, small nuts and bolts, scrap metal and so on. Waste-pickers spend their working hours in combing the pavements, streets of the residential colonies, market places etc. in search of any salvageable waste.

The later i.e. itinerant buyers retrieve the recyclable material from the households or establishment in return of a 'payment'. They also take anything that has market value but the product which itinerant buyer purchase is fresh in comparison to that of waste-pickers. These two supply the collected material at the next stage i.e. to the dealers (*Thekedar*) of different types.

The small traders are also of different types. The dealers those are usually found to be on the entrance of the various slums, purchase waste from waste-pickers and get the sorting done in their godowns. They operate from within the

1 A. C. Macqueen, (1987), 'Work from Waste: The Garbage-Comber of Delhi, India', Submitted to the Department of Environment and Resource Planning, University of Waterloo pp. 19.

slums and usually do not pay regular rent for the land. The other types of dealers are those, who purchase sorted recyclable material from itinerant buyers. Wholesalers purchase different types of recyclable materials like paper, plastic, glass etc. and sell either to small scale units, which process these materials and prepare new raw materials or directly to the factories which process these recyclable materials and manufacture new recycled products.

4.2 TYPES OF WASTE-PICKERS IN DELHI

Waste-picking has been identified as a new phenomenon in the city culture, where the high cost of raw material has brought towards a spontaneous demand for recycling of waste. It has been estimated that about 1.5 to 2 lakh people are dependent on this activity. Waste-pickers are known by different names like rag-pickers, scavengers, garbage-combers etc. at different places. In Delhi they are commonly known as '*Khatte-wala*' i.e. those who work in the *Khatta*, which is local term for a pit. Delhi like other cities in the developing countries is served by a number of waste-pickers along with the conservancy staff of the municipality. Yet garbage combers in Delhi are said to present a shadowy figure with little past and less future.²

From the field survey done for the present study we find a different picture, where garbage-combing seems to be a necessary evil in the city at least in the peripheral zones. However, the observation that "garbage-combers do not make up an easily-defined group but a fluid collection of individuals and families eking out a difficult living in the hard largely inflexible world of Delhi's pavement"³, stands true. Waste-pickers consist of both men and women and are assisted by a considerable number of children. A marked difference between male and female waste-pickers in terms of their place of work and mode of transportation used for waste-picking has been recognized. People in different

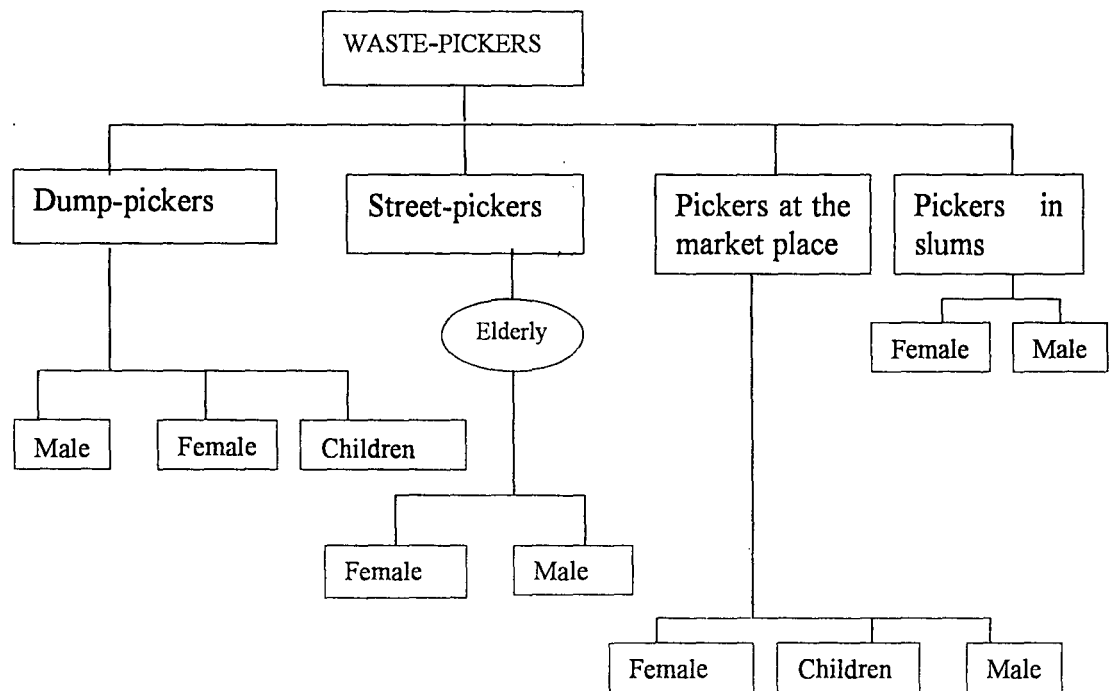
² A. C. Macqueen, (1987) 'Work from Waste: The Garbage-Comber of Delhi, India', Submitted to the Department of Environment and Resource Planning, University of Waterloo pp. 22.

³ *Ibid*, pp. 22.

age-group were found working at different places, like children usually work on dumps while females were found mainly in the streets and on the market places (Figure: 4.2).

Figure 4.2

DISTRIBUTION OF WASTE-PICKERS IN VARIOUS CATEGORIES



On the basis of their work place, waste-pickers can be categorized into the following types:

- (i) Dump-pickers
- (ii) Street-pickers
- (iii) Waste-pickers at the market place
- (iv) Waste-pickers in slums

4.2.1 *DUMP-PICKERS*

They are mainly involved in the waste picking in municipal dumps or other community bins that are located either on the road sides or in the residential colonies. They usually do not walk along the railway line or roadsides in search of waste. Number of children in this type of waste-picking is considerably high, as they are not interrupted by the residential welfare associations or the presidents. They either work along with their families or pick waste independently.

4.2.2 *STREET-PICKERS*

They are mainly comprised of men and women. Proportion of women in this type is more than of men because men do not find residential colonies as a thriving place for getting recyclable waste. Presence of the elderly was most common among street pickers. Children are rare in the streets of residential colonies because they are sometimes accused of theft and other misdoings.

4.2.3 *WASTE-PICKERS AT THE MARKET PLACE*

Presence of whole families is the most common feature of this type. Mainly women and children pick waste in the market, while male members of the family generally work at dumps and come in the evening to help in the transportation of the collected waste. They are involved in waste-picking due to insufficient income from the male members. Usually they were found hopeful about their future with the argument that they will send their children to school once they are able to generate sufficient income. Children are allowed by shopkeepers to pick in these places as they often help in cleaning the shops or the frontage of shops.

4.2.4 *WASTE-PICKERS IN SLUMS*

These types of waste-pickers are fairly concentrated in slum areas and rarely leave the slum and go to dumps in the nearby colonies for waste-picking.

Men, women and children are found in this category. Males who work as dump-pickers go to slums for a short period during their working hours mainly on days when they come back early after their work. This category of waste-pickers consists of new migrants who are trying to enter into this profession or waiting for any other job in the market. Quite often semi-skilled persons who have come from the village and are staying with relatives are found in this category, as they do not want to become burden on their hosts.

4.3 THE FIELD SURVEY RESULTS

A total of one hundred waste pickers were interviewed from various parts of Delhi. For the analysis of the habitat of the waste-pickers, the questionnaire was impregnated with queries related to their familial and social background, previous occupation (if any), educational qualifications, level of income (past and present), response towards society and the profession of waste-picking etc. The results of the chosen sample were tested with 10 percent of sample size. The wide selection of the sample has been representative except for the two variables – ‘place of origin’ and ‘family background’. To understand the ‘economics’ of waste picking, ten dealers and five whole-sellers were also interviewed separately.

4.4 DEMOGRAPHIC AND SOCIO-ECONOMIC PROFILE OF WASTE-PICKERS

An analysis of the socio-economic characteristics of a group often helps to decipher issues that are to be examined in this part of the work. Socio-economic circumstance of a family determines the fate of the siblings, their health status, and their possible nutrition level, probability of their enrolment in school and various other factors. Earlier studies have shown the impact of the prevailing low level of living on the waste-pickers and their families’ economy in the metro cities of the third world countries. Different parameters of socio-economic dimension directly or indirectly determine the process of development of waste-pickers.

4.4.1 AGE DISTRIBUTION

Waste-picking as an activity receives labour force from all age group and across gender. It is not uncommon to find children of the age of 5 to 7 years with a sack on their back in the street of Delhi. Similarly one can find an old man even at the age of 60 year combing waste, so that he can feed himself.

Table 4.1

Distribution of waste-pickers according to their age

| Age-group (Years) | Percentage of waste-pickers |
|-------------------|-----------------------------|
| 5 – 10 | 10 |
| 10 – 14 | 13 |
| 15 – 29 | 40 |
| 30 – 44 | 23 |
| 45 – 59 | 11 |
| 60 and above | 3 |

Source: Field Survey, November – December 2001

The proportion of waste-pickers from each age group is not same and the profession is dominated by people in young age-group (i.e. youths aged between 15 and 29 years). At present about 40 percent of the total waste-pickers in Delhi are from this age-group. The next largest proportion of waste-pickers is from the age group that forms the most productive span of human life i.e. 30 to 44 years. 23 percent of waste-pickers in Delhi are from this age-group. These two groups together, account for about 63 percent of the total waste-pickers in the city. The high proportion of migrants in the age-group of 15 to 44 is in consonance with the age and sex selective migration from the rural areas to large cities. The lower proportion in the age group of 30 to 44 do suggests that with the longer period of stay in the city they tend to get more information about the available jobs and gradually progress to better quality of jobs.

Children between 5 to 9 years constitute 10 percent of the total waste-pickers in Delhi. They are generally found to be working with their family especially with the female members. Some of them pick waste independently and help the family with their little income. Grown-up children i.e. between 10 to 14 years are also engaged in waste-picking in the dumps for their own survival. This group makes up only 13 percent of the total waste-pickers and is dominated by 'run-away children'. Children of waste-pickers or traders in this age group are usually found to be in schools or in the village.

About 11 percent of the waste-pickers are from the age group of 45 to 59 years. Majority of workers in this section are females, as they find other casual work tiring and feel comfortable in walking through the streets of residential colonies. Physically weak males in this age group also respond in the similar way and those who do not have loyal dependents are engaged in this work. The lowest proportion in the process of waste-picking is from elderly i.e. old age people who are above 60. They are engaged in this profession due to lack of family support.

4.4.2 CASTE COMPOSITION

Caste in the Indian society is a reality and is reflected in the composition of the waste-pickers. The present study examines the possibilities for different caste to get into the profession of waste-picking and the role of caste hierarchy in determining social and occupational mobility especially amongst lower caste.

Various studies show that disgraceful occupations are generally taken up by the people of lower caste in both rural and urban areas. Scavenging is one such job that has been traditionally performed by the *Bhangis* in the villages in the form of carrying night soils.⁴ In the metropolitan areas waste disposal activities are mainly performed by this caste along with other traditionally untouchable castes like Dome, Raidas, Jatav etc. in the formal sector as well as in the informal

⁴ B. Pathak, (1991) 'Road to Freedom: A Sociological Study on the Abolition of Scavenging in India', Motilal Banarsidas Publications, Delhi.

sector. This is applicable in the case of conservancy staff (sweepers, sewage-cleaner etc.) employed by the municipalities as well as in the case of waste-pickers and itinerant buyers.⁵

Table 4.2

Caste composition amongst the waste-pickers

| Name of the caste | Number of waste-pickers | Name of the caste | Number of waste-pickers |
|-------------------|-------------------------|-----------------------|-------------------------|
| Jatav | 7 | Yadav | 1 |
| Baghel | 4 | Kumhhar | 2 |
| Pal | 1 | Burman | 2 |
| Haldhar | 2 | Shekh | 2 |
| Dheevan | 1 | Jat | 2 |
| Kevat | 2 | Chaddha | 1 |
| Kushwaha | 1 | Rajput | 1 |
| Raidas | 2 | Other Scheduled caste | 12 |
| Bhaira | 1 | Not known | 20* |

* Mainly children respondents

Source: Field Survey, November – December 2001

Majority of the actors in the process of waste recovery in Delhi comes from the lowest strata of the social hierarchy. A substantial proportion of them are from traditional *Bhangis*; the caste responsible for cleaning the surroundings. Eighty percent of the total waste-pickers in Delhi are from Hindu community and the rest are Muslims. Caste structure of the Hindu community reveals dominance of *dalits* (untouchables), which account for 60 percent of the total waste-pickers who have reported their caste. Twenty percent of the waste-pickers (majority of them are children) in Delhi either do not know their caste or do not like to reveal it. Presence of upper caste in the reported group was almost absent. It is quite likely that those who do not reveal their caste identity belong to the upper castes

⁵ L. Chikarmane, and Lakshmi Narayan (2000) 'Formalizing Livelihood: Case of waste pickers in Pune', *Economic and Political Weekly*, Oct 7, pp. 3639

and are aware of the indignity attached to this occupation. However one Rajput and two Jats were found in the profession of waste-picking in the street of Delhi.

In India caste plays a dominant role in choosing a profession. It seems that untouchables in Indian society due to their limitation to the access to education find little option than to indulge in scavenging, cleaning and related activities. The situation has not improved substantially at least for the majority in this category despite being designated as 'Scheduled Caste' and having constitutional provision for reservation in government jobs. They may be working under municipalities as regular sweeper or under big corporate houses as daily wage workers for cleaning purposes or independently as waste-pickers. Rag-pickers are hated and shunned for this dirty job. It is a clear denial of social justice and a manifestation of rank traditionalism in society.

The assumption gets strengthen when we look at the pattern of caste among itinerant-buyers or small traders. Existence of upper caste and other backward castes in those occupations do suggest that they are also involved in the process of waste recovery and recycling.

4.4.3 EDUCATION LEVEL

Education can be of great strategic importance in the process of development as educational achievements of disadvantaged groups can increase their ability to resist oppression, to organize politically and get a fairer deal.⁶ India's achievement in promoting even basic education has been limited despite passing of 50 years since independence. Still a policy for compulsory primary education to all could not be achieved for various reasons.

Consequently poorer section of the society like waste-pickers remained uneducated and stayed away from its potential benefits. In Delhi the present study finds that 54 percent of the waste-pickers are illiterate. 38 percent of them are

6 J. Dreze and A. Sen (1995) 'Basic Education as a Political issue', *Journal of Educational Planning and Administration*, vol. 9, pp. 2.

literate but could not complete more than 5 years of schooling. Only 8 percent of them have completed more than 8 years in school.

Table 4.3

Education level of the waste-pickers in Delhi

| Level of education | Percent of waste-pickers |
|--------------------|--------------------------|
| Illiterate | 54 |
| Primary | 38 |
| Matric | 8 |
| Intermediate | 0 |
| Graduate | 0 |

Source: Field Survey, November – December 2001

In waste-picking the level of education has little impact on daily earning, yet the potential of getting a better job based on different levels of skill and with professional training gets diminished. The classical human capital theory proposes that skill and experience determines the earning of an individual. The earning behaviour in labour surplus low income economies depend as much on the demand as on the supply side condition that is influenced by access to education.⁷

The waste-pickers, who left schools, were asked about the possible causes of dropping-out at various stages of education. Majority of them (about 60 percent) responded that they could not continue education mainly due to poverty. It has also been cited as a reason by the illiterates for not getting any education or not attending school at any level. Poverty has been rampant in rural India and many parents find themselves incapable of sending their sons / daughters to school. Government support has not been effective on this front inspite of certain steps being taken to spread primary education to the masses.

⁷ S. Acharya (1996) 'Access and Return to Education: Analysis for Maharashtra', *Journal of Educational Planning and Administration*, vol. 10, pp. 395.

Table 4.4

Reasons for dropping-out of school among the waste-pickers in Delhi

| Reasons for drop-out | Percentage of waste-pickers |
|----------------------|-----------------------------|
| Poverty | 60 |
| Not interested | 12 |
| School not available | 2 |
| Others | 24 |
| Did not answer | 2 |

Source: Field Survey, November – December 2001

About 12 percent of waste-pickers reported that they were not interested in going to school and that is why they were illiterate. The effect of surroundings seems to be responsible for demotivating these children. The majority of the children in these localities were not able to go school due to poverty. Consequently, those who could afford also could not continue schooling because of being outcast among the peer group. Only a few (2 percent) waste-pickers, mainly the elderly revealed unavailability of school in their region as the reason for not studying. About 24 percent of waste-pickers reported other various reasons for not being literate or dropping out of the school. About 2 percent of them either were not sure about the reasons that led them to be illiterate or did not answer the question.

Table 4.5

Relationship between family-size and level of education

| Level of education | Size of the family | | | | |
|--------------------|--------------------|-------|-------|--------|--------------|
| | Up to 2 | 3 – 4 | 5 – 6 | 7 – 10 | More than 10 |
| Illiterate | 4 | 8 | 9 | 5 | 3 |
| Primary | 1 | 19 | 7 | 3 | 1 |
| Matric | 1 | | 1 | 1 | |

Source: Field Survey, November – December 2001

Level of education of the waste-pickers does not seem to affect the family size. It is known that education of mother has a direct impact on the size of a family. In this study no female waste-picker was found literate. This partly explains the diagonal correlation between education and family size. Besides, it has been known to us that in case of males, access to higher education only show a direct impact on the family size.

4.4.4 FAMILY BACKGROUND

Family background here implies the socio-economic status of the family from which an individual waste-picker has come. It provides certain justifications about an individual who is engaged in the process of waste retrieval and recovery. Family background of a person often becomes a potential factor in search of a particular type of job and the probability of getting that. It often demarcates the array of people, whose descendants are compelled to work in unhealthy conditions to feed themselves and their families. A poor person's child can not be a pilot or a computer engineer or for that matter it will be pretty difficult for him / her to get a white collar or blue collar job in present day's labour market.

Waste-pickers can not be from well-to-do families and none of the observed waste-pickers belong to this category. The occupation of the family has been varied as wide as possible in the lower level jobs. However, they are mainly from the families that have been traditionally involved in agriculture either as labourers or as marginal farmers for their subsistence in the rural areas. Due to mechanization of agricultural processes and land consolidation in western Uttar Pradesh, Haryana, etc.; small and marginal farmers were left with no option than to sell out their land and become labourer in the urban market.

Some of the waste-pickers have come from the families that have been engaged in traditional services to villagers like Mali (Gardener), Bhangi (Scavenger), Badai (Carpenter) and others. With the growing consciousness about their social position they decline to do Begari (free service to the dominant caste of the village) and prefer to migrate to urban areas in search of something 'better'.

A fairly good proportion of waste-pickers have come from the families that have or had members working in various types of factories. Their children are in this profession because their parent's income is insufficient for running the family. A few of the waste-pickers have come from the families of the Rag-picker's which means their father or mothers have been in this profession earlier also.

4.4.5 MIGRATION PATTERN

Urban market in the Third World countries has been overflowing with manpower. Yet, they are continuously receiving poor and unemployed people from the rural hinterland. These migrants sustain themselves by working under 'inhuman' and 'subversive' condition. Waste-picking is one of these activities that have been taken up by the new migrants in the metropolitan cities.

Table: 4.6

Pattern of migration among the waste-pickers in Delhi

| Place of origin | Percentage waste-pickers |
|-----------------|--------------------------|
| Uttar Pradesh | 51.4 |
| West Bengal | 29.7 |
| Bihar | 9.4 |
| Others | 5.4 |
| Not known | 4.1 |

Source: Field Survey, November – December 2001

The pattern of migration among waste-pickers does show similarity with general characteristics of migration as well as satisfy general laws of migration. Maximum people have migrated in the hope of better economic opportunities and are influenced by the idea of potential life-time income. This is why they do not mind working even under inhuman conditions for a short duration.

The migrants have come from different states of India as well as from neighbouring countries. Majority of the migrants have come from Uttar Pradesh and West Bengal. These two account for about 81 percent of the total migrants.

People from other states like Bihar, an out-migrating state do not have the maximum share in this profession amongst migrants. The large number of Bengali migrants does seem an exceptional feature. A further analysis on the basis of their response to subsidiary questions does suggest that they might not be migrants from West Bengal. It seems that these 'Bengali migrants' might be from the neighbouring countries and have come to Delhi for various reasons. A good number of migrants from West Bengal belong to the Muslim community.

Table: 4.7

Reason for migration among waste-pickers in Delhi

| Reason for migration | Percentage of waste-pickers |
|----------------------|-----------------------------|
| Employment | 64 |
| To join family | 9 |
| Run away child | 14 |
| Others | 11 |

Source: Field Survey, November – December 2001

Employment was the main cause of migration for more than three-fourth of the respondents. Family problem, land problem and health have been prominent reasons for migration among the rest of the respondents. Some of the young have reported that they have just left home due to one specific reason (like being accused of theft, or prohibited from playing etc.) and came to Delhi not as determined destination but as accidental end.

Table: 4.8

Number of years of migration in this activity in Delhi

| Duration of stay in years | Percentage of waste-pickers |
|---------------------------|-----------------------------|
| Less than 5 | 48 |
| 6 to 10 | 20 |
| 11 to 15 | 15 |
| More than 15 | 17 |

Source: Field Survey, November – December 2001

Majority of the migrants in this occupation are new to the city of Delhi. About 48 percent of the respondents have been living in Delhi for less than five years. 20 percent of the waste-pickers were found living in the city for more than five years but less than 10 years. About 15 percent of the waste-pickers were found to be working for more than 10 years. This group mainly consists of female members of the families that have been indulged in this activity for more than 10 to 15 years. About 17 percent of the waste-pickers reported that they were staying in Delhi for more than 15 years. They are mainly elderly who were working elsewhere and came to this profession due to old age or different type of illness.

4.5 AMENITIES AVAILABLE FOR THE WASTE-PICKERS IN DELHI

4.5.1 HOUSING OF THE WASTE-PICKERS

Availability of shelter is a basic human need which comes just after food and clothing. Like food and clothing, housing is a highly visible dimension of socio-economic status of people. The effects of poverty on housing in most of the cities of the third world countries can easily be demonstrated. In these cities, much of the population occupies the most rudimentary forms of shelter like the archetypical shanty hut on public land and often even worst form of housing. In India more than half the urban household occupies only a single room, the occupancy of which goes as high as 4.4 persons per room.⁸ In Greater Bombay about 77 percent of household with an average of 5.3 persons live in one room.⁹ Even this one room is not legally available to the majority of urban population in the cities of the Third World countries. Since they can not afford the cheapest legal house or apartment, most citizens have no choice but to build, buy or rent on illegal dwelling.¹⁰ In India 21.3 percent of urban population was reported to be

⁸ A. Gilbert and J. Gugler (1982) *'Cities, Poverty and Development: Urbanization in the third World'*, OUP, pp. 82.

⁹ R. P. Mishra (1998) *Million Cities of India*, pp. 375-6.

¹⁰ M. Pacione (2001) *'Urban Geography: A Global Perspective'*, Routledge, London and New York, pp. 497.

living in slums in 1991, while, in Delhi about 26.5 percent of the population was living in slums.¹¹

Poor housing in the third world countries begins as some kind of 'spontaneous accommodation' that has been constructed through self-help.¹² Despite increase in household income the poor form of housing continues due to evident threat of eviction by municipal and government authority.

In Delhi the squatter settlements are bound to be demolished in near or distant future. Still people are staying in the squatter settlements with the hope that with some political power they can get their squatter notified and they will be entitled to get a piece of land if demolition takes place.¹³

The form of squatter dwellings and their location varies in cities according to their stage of development of the metropolis and the way they are projected to and are interacting with the outside world. In the initial phase most cities have squatter communities in their central areas adjacent to the major manufacturing employment sources. With periodical demolition and eviction these squatter settlements tend to move towards periphery. They then get located on the outskirts of the city or on the wastelands within the city like on both sides of big drains, or along railway lines, or in low-lying areas behind the large residential colonies and so on. Delhi has all types of squatter settlements having different number of waste-pickers and one to five *Thekedars*.

11 S. Nangia and S. Thorat (2000) '*Slums in a Metropolis: The Living Environment*', Shipra, pp. 25.

12 Concept of 'spontaneous accommodation' is based on the legality of land on which dwelling exists and the finance that is needed in the construction of house; in A. Gilbert and J. Gugler (1982) pp. 87

13 Delhi has four categories of slums notified slums, unauthorized colonies, resettlement colonies, and squatter clusters. Under slum clearance programme during 1960-75 the MCD/ DDA has allotted small plots and offered financial help for construction of modest house.

None of the waste-pickers own houses in other than slums and squatter settlements. They either spend nights at pavements or in *Rainbasera*¹⁴ or in 'illegal dwellings'. In the squatter settlements and slums, waste-pickers were found staying in a typical housing pattern. Some of them used to sleep in the *godown* (store) of the *Thekedar*. Some *Thekedars* separated the living space from the space where waste is stored. They usually did not directly charge rent from the waste-pickers, yet in some cases waste-pickers reported the payment of rent for living space to the *Thekedar*. Even when they did not take direct money in the form of rent, they used their (waste-picker's) labour power in the process of sorting and through other indirect way waste-pickers pay more to the *Thekedar* than they would have paid for their facilities in the dwelling (the economic dimension of this relationship is explored in the next chapter). Some of the waste-pickers do not sleep in the *godowns* and stay in the rented houses in the slums and squatter settlements. These types of waste-pickers were found to be living with families and did not feel like staying in the *godowns*.

Female waste-pickers do not live alone in the *godowns*. They stay either with the husband and children in the same *Juggi*¹⁵ alternatively elderly women rent separate *Juggis* adjacent to the son's or other relative's dwelling in the squatter settlements and live independently.

4.5.2 BASIC SERVICES AVAILABLE TO THE WASTE-PICKERS

The responsibility of water supply and sanitation / sewerage disposal for both poor and the rich in the urban areas lie with local bodies and the state

14 *Rainbasera* is a shaded place near Bus stations, Railway station, large shopping-complex, and other places of public utilities. They were generally constructed by some social organization, or Non-governmental organization. Usually these places are free but some times some user-charges (like one rupee for one night) are charged to the person who spends night under these shades. Sometimes government has also been found constructing these *Rainbasera*.

15 *Juggi* is a local name for squatter settlement in Delhi that is constructed through self-help and with rags,

government. Some times central government invests capital in various projects like slum up-gradation programme in a particular city. One can easily find a significantly higher investment in per capita terms and better maintenance of the facilities in relatively well-off areas.¹⁶ Most often poor people of the slums and squatter settlements live without the basic services like 'safe drinking water' and 'proper sanitation'. Slums either have open drains (like in the slum of R. K. Puram, Sector- II or disposed water gets accumulated (in many slums like Kusumpur Pahari, Mayapuri Slum, etc.) near them.

The waste-pickers in Delhi or for that matter at anyplace are most often deprived of safe drinking water, proper sanitation and other basic services. They draw water either from cemented pots constructed near the sole 'public tap' or from the van of *Jal Nigam* sent by the municipality. The water-van does not come daily. It comes only if from last three or four days the sole 'public tap' remained dry. They are found living along the open drain or near waterlogged areas which have been the breeding ground for many diseases. Flush toilet in their house is a nightmare for many rather all (in this case) of the waste-pickers. They usually use the public toilet (where available), which is not free from user-charge. Where these public toilets are not available they often go to the open space adjacent to their abode. This does not necessarily push to the conclusion that they are dirty people and want to live in the pathetic environment. Rather they are in most cases option-less.

The unavailability of basic services to the majority of waste-pickers makes them more prone to various communicable as well as non-communicable diseases. This hampers the continuity of their work and compels them to plunge in the cycle of indebtedness

¹⁶ A. Kundu (1993) '*In the Name of Urban Poor: Access to Basic Amenities*', Sage Publications, Delhi, pp. 76.

4.5.3 UTILIZATION OF BASIC URBAN SOCIAL SERVICES BY WASTE-PICKERS

Socio-economic status is the most obvious factor that determines a person's access to basic amenities such as adequate housing, safe drinking water and so on and also his or her exposure to physical environmental threats. This often decides the health risks of an urban resident, because health often has been related with the prevailing physical surroundings. Need for the utilization of 'social services' comes in a person's life after the fulfillment of basic needs.

Waste-pickers are in the most cases non-users of basic urban services like health care services or education. Access to sanitation and running water, for example, is closely related to income and education levels. They usually live in juggis, where sanitation and other basic facilities are either nonexistent or exist in a pathetic condition. Waste-pickers with their little income can not afford housing in any other better place. They do not utilize the facilities like open space, parks, theaters and so on. In the urban system they remain like rural beings.

4.6 REASONS FOR CHOOSING WASTE-PICKING AS A JOB OPTION

'No body here is with his own choice. They all came in this profession under one or the other type of compulsion. Who will want to come? Do you want to come to this job? No! Certainly not ...' - Says one of the waste-pickers during the field interaction.

About 52 percent of the total respondents have no other alternative but to adopt waste-picking for regular income to run their families. This category includes people who have been working at different places and were compelled to leave due to various reasons. Factory workers and daily-wage workers revealed unavailability of jobs in the labour market as the reason to be unemployed. They are unemployed not because they can not run the machine rather there are no more machines in the production system that needs them. In the era of increasing automation in manufacturing and services these semi-skilled workers are shown the door that leads to these kinds of petty jobs.

Table: 4.9

Reasons for choosing waste-picking as a profession

| Reasons | Percentage of waste-pickers |
|----------------------------|-----------------------------|
| No alternative available | 52 |
| Economically more reliable | 25 |
| Others | 16 |
| Not answered | 7 |

Source: Field Survey, November – December 2001

About 25 percent of the waste-pickers who were surveyed opined that the profession of waste-picking is economically more reliable than the work they were doing earlier. Some of the waste-pickers under this category were working in petty manufacturing sector before starting waste-picking. Paradoxically, majority of waste-pickers answered in favour of working in other professions even at comparatively lower economic returns. It seems that the expected lower returns visualized by the waste-pickers in 'other jobs' (where they are ready to go) is higher than what these people were getting in their previous jobs that they have left.

About 16 percent of the respondents cited other reasons like poor health, old age, harassment by the employer etc. for adopting this as a strategy for survival. Children were dominant among the group that reported harassment from employer as the reason to come to this profession. Some of the females, who have come to this profession, were working as maid-servants. They came here partly due to lower wage-rate and harassment by the employer. About 7 percent of the waste-pickers either did not respond or were not in a position to recall the reasons that led them to come to this occupation.

4.7 AVERAGE NUMBER OF YEARS IN THIS PROFESSION

Majority of the people are in this job for not more than 5 years, though a few were found to be engaged in waste-picking for more than 40 years.

About 57 percent of the waste-pickers are in the profession for less than 5 years. If the children are taken out then also about 50 percent of the waste-pickers are doing the job for not more than 5 years. A partial explanation of the phenomenon can be provided by the following two reasons. The first one is the concept of 'stepping stone' that means the new migrant starts with petty jobs like waste-picking and in the long run with more information about labour market in the city they tend to graduate to better jobs (this commonly prevails in the age-group of 15-29). On the other hand, incapability due to poor health of the waste-pickers can be the second and more probable reason to leave the job and go back to their native place (more common for people in the age-group of 30-44).

Table: 4.10

Average number of years in this profession

| Number of years Age-group | Less than 5 | 5 – 10 | 10 – 15 | More than 15 | Total |
|-------------------------------|-------------|--------|---------|--------------|-------|
| 5 – 9 | 10 | | | | 10 |
| 10 – 14 | 8 | 5 | | | 13 |
| 15 – 29 | 21 | 13 | 3 | 3 | 40 |
| 30 – 44 | 15 | 3 | 1 | 4 | 23 |
| 45 – 59 | 3 | | 3 | 5 | 11 |
| More than 60 | | | | 3 | 3 |
| Total number of waste-pickers | 57 | 21 | 7 | 15 | 100 |
| Percentage of waste-pickers | 57 | 21 | 7 | 15 | |

Source: Field Survey, November – December 2001

About 21 percent of the waste-pickers reported that they are in the job for more than 5 years but less than 10 years. 15 percent of the respondents do reveal that they were working as waste-pickers for more than 15 years. Age wise distribution does not get concentrated in any particular group's favour. There seems to be people in waste-picking for more than 15 years from the age of 20

through the age of 60. Upward mobility from waste-picking is restricted in a certain sense and waste-pickers are found to graduate to *Kabadiwala* or small traders in the long run. Some of them work as daily wage labourers for certain duration. This type of mobility is limited to the age-group of 15 to 29 and 30 to 44 because after the age of 45 they do not find themselves physically fit for hard manual labour like construction workers or porters and so on. They do return to the waste-picking activities or go back to their native place.

4.8 PREVIOUS EMPLOYMENT OF THE CURRENT WASTE-PICKERS

People usually try for an upward mobility in the occupational structure. Despite being one of the professions in the lowest strata of the occupational arrangement, waste-picking attracts large number of people in its realm. It is, thus, important to look into the types of occupation that were available to and exercised by people before coming to the ambit of waste-picking.

Table: 4.11

Previous employment of waste-pickers and the reason for leaving it

| <i>Previous employment</i> | <i>Factory worker</i> | <i>Agricultural labourer</i> | <i>Vendors / hawkers / shopkeeper</i> | <i>Sweeper</i> | <i>Tailor/weaver</i> | <i>Servant</i> | <i>Rickshaw-puller</i> | <i>Total</i> |
|--|-----------------------|------------------------------|---------------------------------------|----------------|----------------------|----------------|------------------------|--------------|
| <i>Reasons for leaving</i> | | | | | | | | |
| <i>Economically more reliable</i> | 10 | 7 | 4 | 2 | 2 | | 1 | 26 |
| <i>Cheated and beaten</i> | 2 | | | | 1 | 2 | | 5 |
| <i>Factory closed or shop demolished</i> | 3 | | 2 | | | | | 5 |
| <i>Poor health</i> | 2 | | | | | | 2 | 4 |
| <i>Others</i> | | 1 | 1 | | | | | 2 |
| Total number* | 17 | 8 | 7 | 2 | 3 | 2 | 3 | 42 |

* 50 waste-pickers directly came to the profession and 8 waste-pickers did not respond

Source: Field Survey, November – December 2001

Majority (52 percent) of them reported to not having any other alternative to feed themselves and their families. More interestingly 25 percent came in this

job as they thought it economically more reliable. Table 4.11 shows the previous employments that were available to the waste-pickers in Delhi.

About 8 percent of the waste-pickers did not answer about their previous employment but did say that they had nothing to do and thus came to this profession. Majority of factory workers left the job because it was economically not viable. It is not a healthy sign to note that in a country that is going through structural change waste-picking is more economically reliable than working in a factory. Some regulation in terms of minimum wage seems a must in the informal sector, which provides jobs to about 70 percent of the urban labour force. Some of them did report about closure of the factory and the incidence of cheating by the employer. Agricultural labourers also find waste-picking economically more sound. The argument has been supported by others like rickshaw-pullers, hawkers, vendors and so on. The prevailing condition in the contemporary labour market compelled them to take up this activity as there was recession in most of the economy or the earnings were too low to work and sustain.

4.9 CONCLUSIONS

1. Waste-pickers and itinerant buyers along with dealers and traders form the lower level network in the informal recovery and recycling of waste.
2. Different types of waste-pickers work at various places. Female waste-pickers operate either in the streets of residential colonies or at the market places. Dumping towns are the prime location for the children to work.
3. The demographic aspects of these waste-pickers reveal that majority of them are from the age group of 15 to 29 years.
4. Social profile of the waste-pickers shows similarity with the earlier studies. Majority of them belong to the scheduled castes with very low level of education. Incidence of drop-out has been high in case of family members of the waste-pickers. Chronic poverty has compelled their children to work from the young age.

5. Economic expectations have been the main force for the migration. Majority of the migrants are from the states of Uttar Pradesh and West Bengal. A large proportion of Bengali migrants belong to Muslim community.
6. Majority of the waste-pickers live in some form of spontaneous settlements like slums and squatter settlements. A large proportion of them sleep in the godowns of the *Thekedars*. They have been deprived of minimum basic needs like safe drinking water and sanitation. Their access to basic amenities and social infrastructure has been limited.
7. Waste-pickers are doing this job as nothing better is available to them in the urban areas. They are the new migrant, who come to the cities in hope of a breakthrough in economic as well as social sense. Majority of them are new to the profession and hope to get a better job in the long run.

Chapter: Five

WASTE-PICKERS AND THE OUTSIDE WORLD

With the expansion of the capitalist system during the last half-millennium, more and more outlying regions were incorporated into the world economy, which is run through major urban centres.¹ Rural population from the vicinity of these urban centres is drawn into newer activities, which produce for the urban markets and are subjected to political control from the cities. Even the petty producers of goods and services are linked to the global markets directly or indirectly. This process has been traumatic for many such producers as they lose the assets in different forms and become the tools as well as victims of subjugation from the employer or immediate seniors in independent the production or trade practices.

Waste-pickers have been suffering from such subjugation. They are usually not aware of the various forward linkages of the waste recovery process. Still, they are directly affected from the market price, which is often a result of global phenomena. If not a direct one, the impact of global phenomena has been affecting the interest of waste-pickers in the cities of the Third World countries indirectly. Export and import of goods as well as duties and subsidies on these items are decided by the political structure of the country but its repercussion is felt by the lowest in the work strata like waste-pickers. A case in point is when the waste-pickers of Indonesia did launch a protest against the import of waste plastic in 1992-93 as it was against their interest.²

¹ A. Gilbert, and J. Gugler, (1982) '*Cities, Poverty and Development: Urbanization in the third World*', OUP, pp. 49.

² Furedy, C. (1994) '*Solid Wastes in the Waste Economy: Socio-cultural Aspects*', paper presented at the *Workshop on The Waste Economy*, National Institute for Scientific and Technical Forecasting, University of Toronto, and International Development Research Centre, Hanoi, Vietnam, August 22-25, 1994, p. 3.

Waste has been a resource for long time. Slowly and steadily its importance has been felt by the entrepreneurs and it has been developed in the form of waste processing industry at a comparatively larger scale. The interest of waste-pickers is not decided locally but gets conditioned on a larger scale. Therefore, waste-pickers are interacting with a larger group than that is commonly seen. Their relation with the outside world is not limited to the *Thekedar* (small dealer) rather *Thekedar* is only a representative of the entire system in front of waste-pickers.

5.1 ECONOMICS OF WASTES

Waste is universal and its uses are numerous. It is a flexible source of employment in the cities of entire Third World and waste-pickers are only a party to the economic interplay of waste. In the Third World countries, much that is considered garbage by the affluent societies is reused³ and provides a common source of employment to the urban poor and raw material to other sectors of the urban economy. Recycling in India has developed into a profitable and veritable industry.⁴ It is encouraged by a variety of economic as well as social and demographic factors such as a large and gradually increasing urban population with a decreasing resource base.

Waste recycling industry does make economic sense in as much as that it re-uses, finds new uses and alters the goods. Many businesses depend on regular supplies of waste materials from these waste-pickers. A comparative study in Dar-e-Salaam and Tanzania found that small-scale industries used to receive 50 to 65 percent of their raw materials from waste-pickers that are working on landfill

3 Douglas (1983) in A. C. Macqueen (1987) 'Work from Waste: The Garbage-Comber of Delhi, India', Submitted to the Department of Environment and Resource Planning, University of Waterloo, pp. 16.

4 A. C. Macqueen (1987) 'Work from Waste: The Garbage-Comber of Delhi, India', Submitted to the Department of Environment and Resource Planning, University of Waterloo pp. 22.

sites.⁵ In most cases, waste-picking is driven by unemployment and consequent poverty.

The finished products ranged from despicable shoes to buckets to kerosene stoves and so on. More generally, steel, paper, and glass producers in developing countries are heavily dependent on recycled material inputs. These goods are consumed by the common people in the cities and villages. However, the products that are inferior and reused in the raw form are utilized mostly by the people who are living in utter poverty and are denied access to resources that are available to the better-off (including job opportunities and capital to buy goods). The extent of waste recycling does not end here, rather it is a matter of sheer survival for many.

Vogler⁶ has developed a comprehensive list of the specific characteristics of waste that makes it an available and accessible resource to the urban masses in the developing countries.

Waste is plentiful - in most towns and cities of the world, waste is not only heaped in huge quantities on refuse dumps, but also lie in piles around streets and in small dumps on any piece of waste ground.

Waste is flexible – it is needed in various types of work. A waste-collector can either process it into something more valuable himself or can sell immediately for the price of his food and shelter.

Waste is labour-intensive – this is mainly because it comes from so many places and in so many forms. Although it can be collected and sorted by machines yet human being can do the work more efficiently and more cheaply than any machines that has been developed so far. In the developed world where wage rates and per capita incomes are high and where few people are willing to do this dirty work, machines are used. In the Third World countries this does not seem to

⁵ M. Yhdego (1991) 'Scavenging Solid Wastes in Dar e Salaam, Tanzania', *Waste Management and Research*, Vol. 9, p. 263.

⁶ J. Vogler (1981) 'Work from Waste: Recycling Waste to Create Employment', International Technology Publication Ltd. & Oxfam, pp.

be happening in the near future and many people are joining this job daily due to various reasons (including higher economic returns).⁷

Waste needs little capital – as elsewhere there is an inverse relationship between the investment of capital and technology in the process of waste retrieval and the time and efforts that are spent on waste assortment. With the little capital available to the municipalities in the Third World countries, the process of waste retrieval and processing will be based on indigenous technology and will need little capital.

Waste is free – if it is not free it is very cheap.

Waste sells for cash – cash can be used to buy food or clothing, or to purchase equipment that can be helpful in waste collection or to acquire smack or drug.

Waste is familiar – a simple person who may not have any idea about recycling and processing of waste knows how to collect waste and sell it. It does not need any particular skill that is to be acquired through formal training. Anybody can take a sack on his / her back and start collecting the waste from dumps and streets of a city.

Waste has a wide market – the backward and forward linkages of waste are very quick. The household or establishment that produces waste wants to get rid of it, while the customers of waste needs it for their business. Waste-collectors have potential sources of waste and customers everywhere since waste embodies a great variety of goods and materials like reusable paper, plastic and metal containers and so on.

In a resource-scarce society, where people are eagerly looking for the start of small industries and enterprises like recycling units, the unused resource of the production-consumption cycle are extensively recovered.⁸ Any material that can be used for recycling or can directly be reused for greater value has been referred

⁷ J. Vogler, (1981) *op. cit.* 6, pp. 18.

⁸ C. Furedy (1994) *op. cit.* 2, pp. 5.

to as resource. Various types of metal, glass, paper, cardboard, leather, rubber, plastic etc. are among the most common forms of recoverable resources. The wastes that arise from the process of extraction, production and consumption of goods form another cycle of production and consumption, which is commonly referred to as the 'waste economy'.⁹

Waste recovery and recycling, not only serve production cycle but also enable very poor people to meet some of the basic needs without any payment or capital investment. This can both be direct and indirect. In the direct form poor people can be allowed to pick up wood or cow-dung for fuel, leaves of the deciduous trees can be picked up for keeping them on top of the roof of their hut, and so on. Waste-picking can be regarded as indirect form though it is more powerful as it supports the entire economy of the family.

5.2 ECONOMIC PROFILE OF THE WASTE-PICKERS IN DELHI

It is important to be familiar with the economic profile of the waste-pickers, the lowest in the hierarchy of waste economy, to understand their position in the economics of waste-picking. Economic profile of people decides their level of livings, their position in the social milieu, their capacity to avail of various health and educational facilities and so on. Besides, this decides the fate of their siblings who are a part of the country's future generation. All these come after fulfilling the minimum level of sustenance. Notably, waste-pickers are amongst the poorest of the poor, who are not only trying to overcome their hunger but are continuously fighting with the ill-health of their children due to malnutrition.

⁹ R. White and J. Whiteny (1992) 'Cities and the Environment: An Overview' in R. E. Stren, et al. (eds.) *Sustainable Cities: Urbanization and the Environment in International Perspective*, Westwise Press, Boulder, pp. 23-24.

5.2.1 AVERAGE DAILY COLLECTION

An attempt has been made here to identify the type of waste (item-wise collection), their selling price for each item on the basis of the information given by the interviewed waste-pickers in Delhi. This is also an attempt to cross verify their average per day collection and average daily income. On an average a waste-picker collects about 20 to 25 Kilograms of recyclable waste material.

Table: 5.1

Item-wise average daily collection and selling price of waste in Delhi

| Recyclable waste item | Average daily collection | Average selling price |
|-----------------------|--------------------------|-----------------------|
| Paper | 10 | 1.5 |
| Cardboard | 2.8 | 3.4 |
| Plastic container | 2.2 | 7.2 |
| Plastic polythene | 4.5 | 1.5 |
| Glass | 4.3 | 0.8 |
| Iron | 0.4 | 3.0 |
| Tin | 0.3 | 2.25 |
| Total | 24.5 | |

Source: Field Survey, November – December 2001

Quantity and price of the average daily collection is based on the response that has been given by waste-pickers in different parts of the city. Interestingly their reporting varies on the basis of the location where they are operating and the time they put to work. The selling price of waste material does not seem to vary much across the city and is mainly based on the quality of recyclable waste. This does not mean that the price of waste material is uniform or is kept uniform by certain force. Rather waste-pickers answer in a generalized way like 'raddi is sold one rupees per kilogram, empty bottle of wine is sold 50 paisa each' and so on. It was reported by the majority of waste-pickers that price of recyclable waste varies according to change in weather. The items listed in the table have been sorted and in almost each category, there are several sub-categories like paper – raddi, fresh

paper, gatta, newspaper, and so on. Waste-pickers hardly get news paper as the households usually sell it to *Kabadiwala* for some economic returns.

5.2.2 DAILY WORKING HOURS

The quantity varies substantially among different groups like children, youths, adults, elderly and women. Usually children do not work for the whole day and their average daily collection remains about 60 percent of that of a male waste-picker. Similar situation prevails in the case of female waste-pickers also. They also generally do not work for the whole day. On an average a waste-picker works for 8 to 10 hours a day. Some of them reported that they used to work for more than 12 hours. Their disclosure does seem true as it goes along with their comparatively higher income. Waste-pickers work from the wee hours in the morning till late at night at various places. One of the waste-picker was found picking waste in a residential colony (Deer Park) at around 9.30 in the evening.

Children and female usually do not work for so long and they reported that they used to go for picking either in the first half of the day or in the afternoon. Their moderately lower income also shows this. They generally work for about 4 to 5 hours per day. However, they do help in sorting if the male member of the family is also in the same profession.

5.2.3 DISTANCE COVERED AND THE MODE OF TRANSPORT

Average distance that is covered by waste-pickers and their income is always not correlated as place of work often becomes more important in terms of income than the distance covered. Waste-pickers, who are working at market places, sometimes earn more than the street-pickers even though the former usually work at only one place. However, in certain cases it has been reported by the male members that they do not work at market places because these are not potential grounds for recyclable waste.

In any case waste-pickers usually cover an average distance of 6 to 8 k. m. in a day. Even, those working at a market place do not live there and come from a distance of almost 3 to 4 k. m. as slums are usually not located adjacent to the market. However, if two waste-pickers are working in the same type of operation, than distance has substantial effect on the income. This is more important in case of street-picking. A street-picker normally covers more than 10 k. m. per day and generally uses a bicycle. The bicycle more often belongs to *Thekedar* (the small dealer), who does not charge a rent for the bicycle. Females and elderly were always found to be on foot and did not use any other mode of transport (e.g. handcart or bicycle).

5.2.4 NATURE OF SORTING AND FREQUENCY OF SELLING

Sorting and frequency of selling are interrelated phenomena. All the waste-pickers that were surveyed answered that they used to separate the material just before selling. Waste-pickers sell their daily collection after rudimentary sorting, where they put things in three or four broad categories: namely paper, plastic, glass and metal. Usually waste-pickers collect scraps in the forenoon and do sorting in the afternoon or in the evening either at the shop of the *Thekedar* or near the *Khatta* (pit), or dumps.

Some of the waste-pickers, basically those who are working with the family in the market area, accumulate their daily collection for a week. The females and children are involved in this type and thus, are mainly operative in the market areas. They perform sorting on the day when market remains closed. In this type, as quantity of waste is comparatively less, they do not sell it daily. There are mainly two types of wastes, namely gatta and plastic. Apart from this, some waste-pickers sell their waste even without rudimentary sorting. Women and elderly are prominent among them. They put the sack at the *Thekedar's* shop and take whatever money that is offered to them. Children, in majority of cases present distinctive feature. They collect only special type of waste like in one

case, a boy collects only plastic scrap because he gets a substantial amount from that.

5.2.5 AVERAGE INCOME OF WASTE-PICKERS IN DELHI

Average income of waste-pickers is as varied as possible. Some of the waste-pickers are able to earn about 100 rupees, while some can only manage 30 to 40 rupees. A waste-picker generally earns about 62.50 rupees daily. There has been a direct relationship between the age of a waste-picker and his/her daily income. It is noticed that children and elderly are earning less than adults. Average income of children in the age-group of 5 to 9 is worked out to be about 31 rupees. It is less than the half of an adult's daily income.

Table: 5.2

Level of income with respect to the age-group of waste-pickers

| Level of income(Rs) | Average daily income (in Rs.) | Number of waste-pickers | | | | | Total* |
|---------------------|-------------------------------|-------------------------|-------|-------|-------|--------------|--------|
| Age-group | | Less than 40 | 41-55 | 56-70 | 71-85 | More than 85 | |
| 5 - 9 | 30.70 | 10 | | 0 | 0 | 0 | 10 |
| 10 - 14 | 49.50 | 5 | 3 | 2 | 0 | 2 | 12 |
| 15 - 29 | 65.90 | 0 | 6 | 16 | 5 | 8 | 35 |
| 30 - 44 | 73.60 | 2 | 3 | 6 | 3 | 4 | 18 |
| 45 - 59 | 70 | 1 | 2 | 1 | 2 | 3 | 9 |
| More than 60 | 45 | 0 | 2 | 1 | 0 | 0 | 3 |
| Total* | | 18 | 16 | 26 | 10 | 17 | 87 |

* Out of 100 waste-pickers 13 did not respond

Source: Field Survey, November – December 2001

A child in the age group of 10 to 14 earns about 50 rupees per day, which is about 50 percent more than the children in the age-group of 5 to 9 but is about 30 percent less than the youths in the age-group of 15 to 29. Maximum earning was found among the waste-pickers in the age-group of 30 to 44 and here daily income was recorded as about 74 rupees, 9 rupees more than what the youths earn

in the age-group of 15-29. These youths are earning about 15 percent less than the waste-pickers in the age-group of 30 to 44. It goes down to about 70 rupees for the next age-group i.e. waste-pickers of the age-group of 45-49. Old people are earning about 60 percent of the highest earning members amongst the waste-pickers.

It is visible that the time given in the collection process has direct impact on the daily earnings of a waste-picker. Children and elderly devote less number of hours in collection and so earn less. However, the percentage variation in daily earning among the groups does suggest that children especially in the age-group of 5 to 9 are economically exploited. The children in this age-group are earning 50 percent less than the next age-group of children.

Elderly and children had reported similar hours of work daily, but their income varies. It seems that small children are unaware of the market price and also do not understand the cheating that can occur during weighing the materials. In the majority of cases dealers pay abruptly and not according to the weight of the material.

The average selling price reported by children strengthens this argument. Besides, they are made to work by the *Thekedar* in the godowns without any payment.

5.3 INTERPLAY OF VARIOUS ACTORS ENGAGED IN WASTE-PICKING

Enhancement in the process of waste recycling saves resources, purchase of raw material with foreign exchange and reduces the cost of final disposal of residues. Cheaper goods can be produced, which helps low-income households and also creates jobs.¹⁰ After discussing the general socio-economic characteristics of waste-pickers in Delhi, it is important to have a quick look at the activities of other actors, who are engaged in this profession. Their way of

¹⁰ C. Furedy (1994) *op. cit.* 2, pp. 7.

working and operating directly or indirectly also affect the economic as well as extra-economic fate of waste-pickers.

5.3.1 Itinerant buyers

As against the waste-pickers, itinerant buyers and dealers – small and large, both are not abusive about their own profession. Their perception about the job is that to run the family something is to be done and that is why they are doing this. They were quite aware of the problems of this activity but at the same time admitted that all other professions have same or other types of problems. Their economic condition is also better than the waste-pickers. A common itinerant buyer usually earns about 100 to 120 rupees per day against 80 to 100 rupees earned by a waste-picker.

Though the rate of economic return does not differ much between these two, i.e. itinerant buyers and waste-pickers, yet itinerant buyers feel more comfortable with the job as their job is socially not rejected like that of waste-pickers. When, the probability of occurrence of health problems among waste-pickers is taken into consideration, then, the itinerant buyer will be better placed in terms of rate of economic returns. Besides, they do not come into direct contact with the contaminated biological and other wastes in the process of waste-collection. The *kabadiwala* buys clean and salvageable wastes generally against the payment of small amount of money. However, some itinerant buyer especially in low income areas do barter *kabad* (scrap) for different material like knife, plate etc. that is used in the kitchen of poor people. Females are more prominent in this type of activity, as they are more easily accepted inside of the house.

In both cases, they need a fixed amount of capital investment for running their occupation. In the production process 'capital' is entitled for 'interest'. If this fact is taken into consideration, the economic returns for itinerant buyer will be lower and there will only a marginal difference among these two i.e. waste-pickers and itinerant buyers in the economic sense.

5.3.2 Dealers

The actors at the second level are known as *Thekedars* or *Godown-walas* by waste-pickers and itinerant buyers respectively. They are located on the main roads of busy markets or behind the markets, in the residential areas, near slums and dumps, in busy commercial or business area and so on. There are three distinctive kinds of dealers viz. small, medium and large on the basis of the capital they invest in the occupation and their mode of operation.

Small dealers directly approach wholesalers and often go to them weekly to sell their collected waste material. Medium level of dealers is generally approached by the wholesalers and they arrange the transportation of recyclable material. Larger dealers are almost like wholesalers; located in the area other than Central Business District of the city, and sell their material in comparatively professional manner like paper to one, glass to another and so on. They often supply the material directly to the factories that are involved in manufacturing of new raw material or in recycling of the waste.

It is noticed that small dealers purchase about 100 to 150 Kilograms of waste material per day, the medium level dealers gets about 200 to 300 Kilograms of waste, while large dealers are able to purchase about 500 Kilograms of recyclable material daily. Their income is much higher than these two. In case of small and medium dealers, their income works out to be about 4500 to 6000 per month i.e. around 150 to 200 rupees per day. Larger dealers also reported their monthly income as about 6000 rupees per month but seeing their scale of operation it is hard to believe them.

These dealers form the main link in the chain of waste recovery and recycling process. Despite their fixed location, they are able to procure waste material from waste-pickers, itinerant buyers, establishments, offices and households. These dealers perform an indispensable role in the organization of the recycling industry. They sometimes finance itinerant buyers and waste-pickers in different ways and in the process fix their source of supply of recyclable material. One *Thekedar* in Masoodpur village of Vasant Kunj area was said to bring about

100 persons, who were labourers from West Bengal, for waste-picking. All of them are independent waste-pickers, but sell their product to that particular dealer, who provides them with some kind of living space and often lend money. In some cases, they also provide bicycles as well as a small sum of money to the itinerant buyer. Often dealers have their own and regular network of waste-pickers and itinerant buyers.

On certain occasions, dealers have also been found to be financed by wholesalers in setting up shops. Capitalization of dealership has increased manifold over the years and it is getting difficult for new people to enter into this trade.

5.4 PERCEPTION OF WASTE-PICKERS ABOUT THE *THEKEDAR* IN DELHI

Qualitative side of the planning may be insufficient in achieving a definite and clear-cut solution but will certainly help in identifying the prevailing negative and positive facets of the concerned process of research. One of the qualitative aspects pertains to the perception of the concerned people for whom the research is being carried out. This part of the exercise deals with the perception of waste-pickers about Kawadiwalas (itinerant buyer), with whom they are competing and about *Thekedars* (dealers), to whom they sell their waste materials. They are directly related to one another as far as their socio-economic relationships are concerned.

Waste-pickers were not critical about the role of dealers. Rather they argued in favour of the dealer, who otherwise seems to be an exploiter to us. Waste-pickers express that *Thekedars* usually help them in a number of ways. Their responses have been clubbed into the following categories. Dealers are perceived as:

One who provides shelter: half of the waste-pickers in Delhi were found to be living in the godown of the *Thekedar*, who usually do not charge rent from them. Waste-pickers are all praise for this action of the dealer. They argued that in

a city like Delhi, where Juggis are not available to many of the poor, providing a free living space even in godowns is of great help to them. They can not afford an accommodation with their little income, a part of which they send to their family, which is staying in the village.

One who arranges vehicle: dealers provide a bicycle to waste-pickers. Waste-pickers found themselves incapable of purchasing anything that needs a capital investment. They were aware of the fact that on foot they can not easily walk more than 10 to 12 kilometres everyday and it would be difficult to carry a head-load of more than 20 to 25 Kilograms for such a long distance. Dealers do not directly charge for the bicycle from waste-pickers.

One who protects from police: harassment by the police personnel was frequently reported by waste-pickers. In case of complaints the police could lock them up. In such a situation only the *Thekedar* comes forward to help, as reported by the surveyed waste-pickers.

One who acts as a bank: for waste-pickers, dealers act as bank, where they can keep their extra income and can take loan in case of emergency. They argued that if they fell ill or damaged their hand or feet in the process of waste collection, nobody would come forward to help other than their trusted and tested *Thekedar*. He lends the required money and waste-pickers repay it in installments.

5.5 RELATIONSHIP OF WASTE-PICKERS WITH DEALERS

On the basis of above perception about dealers, the relationship between waste-pickers and dealers seems to be cordial. The response of waste-pickers to the specific question about the behaviour of dealers was that they have no problem with dealers. A critical evaluation of the real situation does not give the similar impression.

It is hard to realize why dealers are fatherly towards the waste-pickers and compels us to rethink about the reported cordial relationship prevailing between the two. What are the reasons, which make dealers to act in this particular way? Is

it the simple reason to restore the source of supply of scrap or some thing other than that? The exploitative relationship is more than the sum of grievances and mutual antagonism. It is a relationship which can be seen to take distinct forms in different historical context, forms new relationship, which are related to corresponding forms of ownership and power.¹¹

Comparison of waste-picker's daily income with their monthly income gives some clues in this regard. The waste-pickers, who reported their daily income about 100 rupees, reported their monthly income about 1200 to 1500 rupees. The gap seems large. The waste-pickers do not usually take the whole money on a daily basis from the dealer. They take a fixed amount of about 5 to 7 rupees per diet from the dealer for their food. It works out to be about 300 to 420 rupees per month. Considering the upper side, it is about 450 rupees per month. But at the end of the month they get only 1500 rupees (on the upper side, otherwise 1200 rupees). The sum of the two comes about to 1950 rupees only. Waste-pickers are unaware about the rest of the amount, which is about 1000 rupees. The amount which gets lost in a month is almost equal to the monthly income of a common waste-picker.

5.6 EXPLOITATION OF WASTE-PICKERS IN THE 'WASTE-ECONOMY'

Waste-pickers are not only socially rejected but are also exploited by the society. The social and political system that does not recognize the role of waste-pickers is a source of exploitation. They become victims of different types of subjugated behaviour besides economic and social exploitation.

Interestingly, they were found unaware about their economic exploitation. On the contrary, they think it is of vital help. In rural India, slaves are made to work but the *Maliks* (owners) do not let them feel that they are being exploited. Considering this behaviour, the ongoing exploitation of waste-pickers by the *Thekedars* can be understood. In Delhi, waste-pickers think that *Thekedars* are

¹¹ E. P. Thompson (1963) 'The Making of the English Working Class', Victor Gollancz Ltd., London, pp. 195.

their guardians rather than the cause of their economic exploitation. Some of them are aware of the misuse of their labour by the *Thekedar*, but told us that they can not afford to stay independently.

Waste-pickers are compelled to take help from the *Thekedar* because they have no other way to avoid regular harassment from the police. If they can get a small financial help from the system they will not be compelled to depend on the *Thekedar*. Children do report physical abuse by the *Thekedar* and change of *Thekedar* by them has been frequent. Children have been found to be aware of the fact that if they stay with the *Thekedar* than their product is purchased at normal market price other wise dealers will pay a lower price.

At the later stage, some of the waste-pickers were found working on their own but they were the ones who were trying to graduate either to the position of a small dealer or to that of an itinerant buyer. Still, they have a constant relationship with some dealer in order to sell his/her products.

The manipulative nature of dealers towards the waste-pickers reminds us about the existing exploitative relationship between the landlords and their workers in village. Relationship between waste-pickers and dealers is comparatively better in a certain sense. For example, if a waste-picker sends his/her children to school he receives less abuse and has to face a lesser degree of consequences than the rural agricultural or non-agricultural workers. The fact that waste-pickers like other modern workers are formally 'free' to sell their conditions is distinct from that of earlier exploited classes. Waste-pickers in the cities are like workers in the village, who have no other alternatives than to work in the fields of the landlords to feed their family. Similarly, waste-pickers can not work independently at least in the beginning of their careers.

Besides, they do report their understanding about social rejection and harassment during the work. Police harassment has been reported as a major obstacle in their work. They do identify dirty gestures of the people, and think it as a major cause of mental stress.

Despite continuous economic exploitation and subjugated social behaviour, waste-pickers have failed to organize themselves and stand against the exploitative system. Due to certain reasons, even the increased material inequality in the society could not aggravate class antagonism. In the 'modern' democratic society, where even the marginal groups of poor citizens are relatively free and treated as politically equal, waste-pickers in the metropolitan cities of India and other developed countries are deprived of the basic principle of equality and social justice.

5.7 WASTE-PICKERS IN THEIR SURROUNDINGS

Urban areas are often diverse ethnically, culturally, and economically. The close interaction and interdependence of these diverse groups within cities and towns can enhance social cohesion. On the contrary, disparity among the urban populations can lead to social stress or alienation of certain groups. Groups in cities can become marginalized in economic terms or through cultural and social differences from dominant groups. The two tend to work together- particular cultural groups in cities may be disadvantaged in terms of access to education and employment opportunities. All of these contribute to social marginalization of a person or a group.

Waste-pickers in Delhi have been a marginalized group- economically as well as socially. They hardly have been entertained by other categories of employer if previous profession is known to them. The world does not recognize their contribution in the maintenance of urban public health at the cost of their individual health, by reducing the work of municipality, which is incapable of keeping the city free from the swell of garbage. Besides, waste-pickers were found unaware of the happenings outside their profession. They hardly take part in different events or activities that take place in their social environment.

In India, caste hierarchy had been a decisive factor in determining one's social status. Today economic conditions have taken over the historically established caste identity to a certain extent. This does not mean that caste has

become nonexistent now; rather it has become complementary and supplementary to the economy in establishing a person's position in the society. Majority of waste-pickers belong to scheduled caste (dalits); lowest in the caste hierarchy. They are also economically marginalized as their income is below the subsistence level.

Social marginalization is believed to exert a toll on an individual's health, largely through behavioural changes such as seeking relief through smoking, alcohol or drugs. The waste-pickers aged between 15 and 29 years usually come from the categories of runaway boys from villages, children from slums and pavement dwellers. They soon get involved in social vices like chewing tobacco and its processed product (Gutkha), smoking and even addiction to alcohol and drugs. Many of them, influenced by local 'dada's', take to chain snatching, pick-pocketing and drug peddling.¹² Women are also not protected from these vices.

5.8 ECONOMICS OF WASTE-PICKING

Three main elements have to be taken into consideration to understand the economics of a production system.

1. The means of production like the land, the factories, capital and so on.
2. The organisation of labour.
3. The distribution of the social product.

As like other production systems waste-picking also has the means of production but definition of the owner of the means of producer is not clear. It is important to see the kind of relationship which exists between the producers at various levels? By the traditional definition, waste-pickers do not fit into the category of labour. At the same time, they can not be called the owner of the means of production. In almost complete informal economy of waste recovery and recycling waste-pickers can best be identified as petty producers.

12 S. Natrajan (2001) 'Rehabilitating rag-pickers', NGO Watch, www.chennaibest.com/others/feature.asp

Like in a dualistic economy, waste-picking has a 'dominant' sector represented by dealers and wholesalers and a 'dependent' sector consisting of waste-pickers and itinerant buyers. Above discussion about their relationship revealed that dealers and the wholesalers define the terms of trade and play a dominant role in fixing price. In most of the cases, waste-picking and recycling activity does not have a proper labour organization. Waste-pickers hardly have any share in the decision making process of the distribution of social product.

To understand the economics, it is imperative to put waste-picking in the historical perspective in which Indian society has developed. Every new society emerges from the womb of another type. Each society differs from another in various aspects of social organisation, organization of power and organization of production.

Waste-picking is a comparatively new phenomenon and has been concentrated in the urban areas. The actors in this occupation are from various social strata. However, majority of waste-pickers in Delhi are from the lowest social strata i.e. dalits. They hardly have any real share in power structure and political set-up. Traditionally, they have been working as cleaners in the social space as well as individual space and have been denied the basic minimum dignity. They have grown as oppressed in the society but rituals have often made them feel like a part of the social structure. In an effort to provide an ideological basis for their policies of oppression, the ruling classes in ancient India (Brahmins) mislead the masses and made them believe that inequality, intellectual, moral, as well as material, were an unshakable, sacred principle decreed by heaven itself.

In this backdrop, waste-pickers are the oppressed rural people who remain subjugated even after coming to the large metropolitan cities. They are marginalized in economic sense. They get affected by the policies at national and international levels but have no share in formulation of those policies.

5.9 IMPACT OF POOR HEALTH ON THE ECONOMY OF WASTE-PICKERS

The problems of waste disposal are severe in metro cities of the developing countries. Door-to-door waste collection is expensive and municipalities are unable to afford it. Collection points can easily become small garbage dumps, especially when collection is intermittent. Most domestic solid waste is not a direct threat to health like industrial waste, which contains few hazardous chemicals. However, fecal matter is often mixed with domestic waste, which gets contaminated. Solid waste is not kept in closed containers and often is not removed regularly. In such a scenario, solid waste often creates one of the most visible environmental problems in low-income communities the health risks to the people who come in contact with this. The group that is most directly exposed to solid waste is that of waste-pickers in various parts of the city. An individual's health may be affected by problematic practices which can result in infections from humans, injuries from sharp objects like broken glass, blades, syringes etc. in garbage, and so on. They in most general case are exposed to these kinds of health hazards:

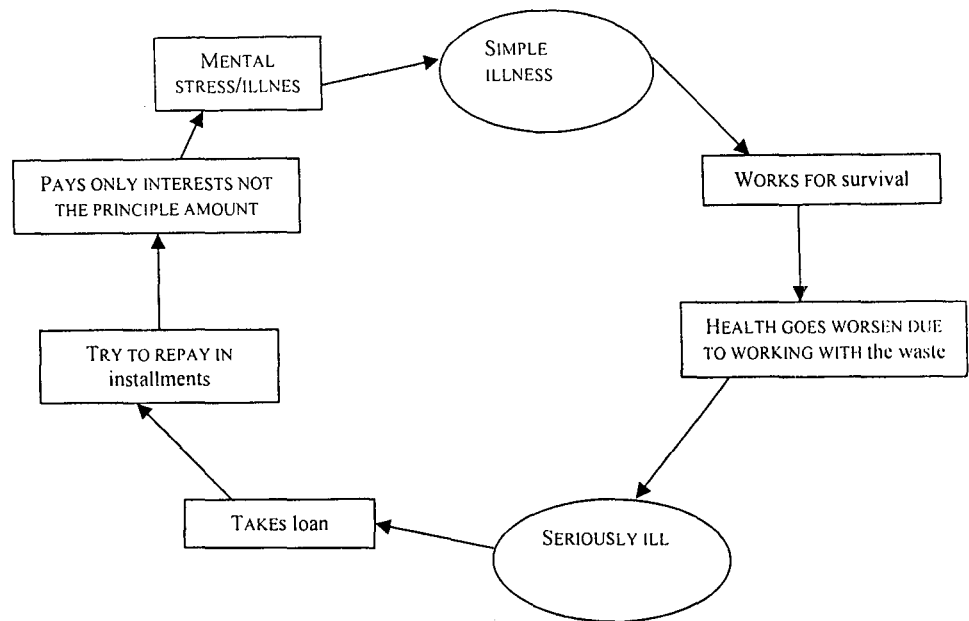
- snake, scorpion bites
- cuts from sharp wastes leading to infection
- chemical burns or wounds
- toxication, cancers from exposure to hazardous waste, gases, etc.
- chronic respiratory, ophthalmic diseases from exposure to dust, gases, etc.
- viral (dengue, yellow fever) or parasitic (malaria, filariasis) diseases transmitted by vectors breeding in waste-generated ponds

The poor health of waste-pickers often has been reported as the limiting factor for their deteriorating economic condition. Health risks are typically low in the priority list amongst these people, who lack basic needs. Waste-pickers are undoubtedly from the community that lacks basic needs of food, clothing and shelter. They have no money to take preventive measure of health for their

children or for themselves. Even curative measures put them in a continuous cycle of indebtedness.

Figure 5.1

A COMMON CYCLE OF INDEBTNESS AMONG WASTE-PICKERS



In case of short term or long term health problems, waste-pickers are compelled to take loan from the *Thekedar* for the treatment and also for daily expenditure. If the problem is severe, which in most cases is likely to be, the amount of loan becomes heavy. Waste-pickers generally fell ill with normal danger of leaving work once in a week. In case of simple injuries, they continue working with the waste, which makes these injuries severe. In case of severe injuries, they have to leave the job for a particular period of time and have to take loan. Once they borrow money from the *Thekedar*, they in all probability do not come out of this cycle of borrowing. They never have the total amount that is to

be repaid to the *Thekedar*. Consequently, waste-pickers pay the loan in installments, but never pay the final installment.

5.10 WILLINGNESS TO AVAIL HEALTH AND EDUCATION FACILITIES

Waste-pickers have shown willingness to utilize public health facilities, if easily available to them. They do not have the courage to face a hostile system for free health care services, as their tolerance gets exhausted in the process of waste recovery. They were interested in knowing the benefits of education and showed willingness to put their children to school, if they can manage two square meals a day without their help in waste collection.

Availability of health and education facilities to the waste-pickers is of immense import and in making their lives better. Only with access to health facilities, can they be kept apart from the cycle of indebtedness and with the education they can be made aware about their ongoing exploitation.

5.11 Conclusion

1. The root-cause of poverty is unemployment in the contemporary Third World. The poor people work with waste material for survival as they are denied access to resources including job opportunities that are available to the better-off.
2. Waste is a flexible source of employment in the Third World cities. Waste recovery and recycling not only serve the production cycle but also enable poor to meet some of the basic needs without any payment or capital investment.
3. The economic status of the waste-pickers is directly linked with their working hours, which vary for different groups. Dealers do not pay the appropriate amount to children due to their unawareness about the prevailing market price.

4. Itinerant buyers enjoy a better social space in the society but in economic term they are marginally better than the waste-pickers. Dealers form the main link in the chain of waste recovery and recycling processes.
5. Capitalization of dealer has increased manifold over the years due to which many people face difficulties in entering into this trade.
6. Waste-pickers perceive dealers as one who provide shelters, arrange vehicle, protect from the police and act as a bank. It is perceived that there exists a fatherly relationship between waste-pickers and dealers.
7. Waste-pickers are vulnerable to various types of exploitation. They become victims of different types of subjugated behaviour besides economic and social exploitation.
8. In India, even as we question the unequal distribution of power in society, we need to question the pattern of development and who benefits from our current development choices and how much.
9. The evolution to a higher conscious human being is on the march, the process will be slow as an enormous amount of ground and people have to be covered. People have to be educated and developed, so that they will not be blocked in coming step by step to a realization of the higher self.

Chapter: Six

NON-FORMAL INITIATIVES IN SOLID

WASTE MANAGEMENT

The rise of non-formal organizations and their initiatives is not uncommon in various aspects of life. Their participation has been significant in the process of solid waste management at different levels. Some of them have been involved in the development of the collection and disposal systems to make the city better. At the same time certain institutions have extended their helping hands in the development of the waste-pickers. The social implications of inefficient waste management process have been highlighted by these institutions.

Experience over the past few years has shown that community-led initiatives help in the decentralization of waste management and make it workable as well as sustainable at local levels. It has become imperative as municipal services have often been related to the socio-economic conditions of the resident groups.

6.1 CHARACTERISTICS OF NON-FORMAL INITIATIVES

Voluntarism has played an important role in the building of India's social history. Voluntary work has its root in the social reform movements that began to challenge the repressive system during the 19th century. Failure of the development processes in the last few years has made the planners realize the importance of involving the local communities in decision making. Without the active participation of these stake holders in the formulation of policy as well as its implementation, the plan would hardly serve its purpose.

Recent years have witnessed a growing interest among communities as well as among governments and the donor agencies in the development initiatives

of non-governmental organizations (NGOs). In popular use, the term NGO refers to those private organizations registered as public trusts or societies, which are voluntary association of people working at the grassroots to help the poor and needy through charitable or developmental work on a non-profit basis.¹ The common characteristics of a non-governmental organization can be put in the following form:

- In the developmental terms, NGOs have provided an alternative to the bureaucratic process of large-scale programmes.
- The average NGO is not bureaucratized and can respond flexibly to a required situation.
- It can and it does experiment with new ideas and approaches while taking up different initiatives.
- In several instances, NGOs have tried to reach and in many cases have successfully addressed the need of the poor who are not served by the government programmes.
- NGOs have also increased the potential for organizing the poor and thus, have contributed to the development of a just and pluralistic society.
- They encourage and ensure public participation in the community based programmes.

Rooted in the idea of the humanitarian services, the approach of the non-governmental organizations is to put people at the centre of the scheme. The basic difference in the government and non-governmental approach lies in the sense of motivation. Contrary to the government, NGOs encourage close and intimate contacts with their clients. They have consciously tried to target and give priority to the most vulnerable sections of the society.

¹ Sunder (1994) 'NGO Experience in Health' in Pachauri, S. (eds.) *Reaching India's Poor: Non-governmental Approach to Community Health*, Sage Publications, New Delhi, pp. 312.

6.2 VARIOUS NONFORMAL INITIATIVES

6.2.1 ACORD (Asian Centre for Organisation Research and Development)

ACORD initiated an action oriented pilot project in a low-income area of Harkesh Nagar in Delhi. The project involved awareness building and operation of a waste collection system. It trained the waste-pickers in segregation of waste and distributed demonstration kits to the residents so that they segregate waste at the door-step. Initially, it started composting the bio-degradable waste but could not continue the composting activity as the land used for this purpose was taken away by Delhi Development Authority (DDA). However, it continued with door-to-door collection of waste in several localities.

Currently, ACORD is engaged in the implementation of a large-scale project in Delhi named 'Upgrading Environment Quality of Delhi', which is implemented at the central zone of the Municipal Corporation of Delhi (MCD) and in circle III of the New Delhi Municipal Corporation (NDMC). The focus of the project is on 'awareness building', 'public participation' and facilitating primary collection of waste.

6.2.2 Naya Savera

Initiated in the form of a class assignment to the students at Indian Institute of Technology (IIT), Naya Savera (New Dawn) has impressed many with its work since its formation in April 2001. Before the formal creation of Naya Savera, G. V. Soumitri with a group of trained workers carried out a pilot project with 200 households in IIT. Based on the success, the entire campus with 1600 houses, hostels and canteens was handed over to the group. The objectives of the organization include providing a solution to the solid waste management and giving regular earnings to the workers.

Currently, Naya Savera works in three residential colonies besides IIT. It encourages people for the separation of waste at the source and collects separated

waste from the door-step. After collection of waste from the door-step, the workers separate bio-degradable waste for composting. Composting is done in the concerned colonies on the basis of 'close pit technology'. Recyclable waste is sold to the dealers for money. Waste-pickers are paid from this income. These waste-pickers stay away from the market mechanism and work almost like regular or semi-regular workers. In this way, it helps waste-pickers in generating regular income.

Table: 6.1

Projects of Naya Savera at a glance

| Project Areas | Number of House holds | Cleaning Brigade ¹ | Monthly Fee Rs. ² | Monthly Supervisor | Pay Boys |
|----------------------------------|-----------------------|-------------------------------|------------------------------|--------------------|----------|
| Panchshil | 625 | 1+10 | 50 | 3500 | 1650 |
| Aya Nagar | 250 | 14 | 25-30 | 1800 | 1800 |
| Airport Authority of India (AAI) | 400 | 1+5 | 18,000 lump-sum | 1800 | 1800 |
| IIT | 1600 | 1+4+25 | 70,000 lump-sum | 3500(s) | 2570 |

Note:

1. Cleaning Brigade includes Supervisor and Deputy Supervisor and cleaning boys in case where three categories exist and Supervisors and cleaning boys in other areas.
2. IIT and AAI pay Naya Savera in lump-sum (monthly) while in case of others it is the monthly contribution of each household.

Source: Interview with S. Kohili (director) during the Field-work in March 2002.

6.2.3 SRISHTI

It is a Delhi-based non-governmental organization and works as a facilitator in setting up community organization in low and middle-income localities for managing solid waste services. It was set up in 1988 as a nature club and initially its activities were centered on conservation of Delhi ridge.² In the field of solid waste management, its objectives are to initiate solid waste

² Ghosh, A. (2000) 'Solid Waste Management in Delhi: An Exploratory study a local government - communities interface', Indian Social Institute, New Delhi, pp. 65.

management projects in certain localities, build community organizations and train them to take over and run the programme on a financially viable basis. In the process it manages the project for certain period of time, and then withdraws from the project. It has also been involved in working out waste management schemes for the number of hospitals. The schemes encompass awareness generation, training hospital staff, segregation of waste and regular monitoring.

Sristhi has worked at the level of research and have operationalised the schemes at the local level. Its research initiatives include study of the prevailing system and development of various models for solid waste management. Biomethanation project in the resettlement colony of Daksin Puri was one of the successful projects taken up by Sristhi. Biomethanation technology is based on the gohar-gas (cow-dung) system. Instead of cow-dung, biodegradable kitchen waste is fed on a daily basis. The produced gas can be used as cooking fuel and slurry makes good manure.

During 1996 Sristhi took up three projects in different areas. Sristhi along with TERI (Tata Energy Research Institute) carried out a survey and determined the quantity and nature of the waste in Dakshin Puri locality and decided to start biomethanation project. The space to set up the plant was provided by the MCD. Waste-pickers from the locality were employed to collect the waste, sort it and feed it in the reactor.

At Indian Agricultural Research Institute, Sristhi started two types of collection systems – ‘door-to-door’ and from ‘waste bins’. Waste bins were put to fixed locations near hostels and offices, while at the household level it initiated door-to-door collection. Six waste-pickers were identified and trained. They were given uniforms and identification cards.

Sristhi launched its third project in Munirka enclave and trained the waste-pickers in collection and sorting of waste.

The number of waste-pickers identified by Sristhi was very small and it could not help the majority of the waste-pickers. Moreover as soon as Sristhi withdrew from the projects, they started giving poor results and finally came to a

standstill as accepted by the Srithi during the interview. It informed that it is not easy for the organization to run the projects for longer period due to financial constraints. The very objective of self-help also remains unfulfilled if it continues to run the projects.

6.2.4 VATAVARAN

Vatavaran at present runs three types of programs – (I) community management of domestic waste in residential colonies (ii) awareness building about municipal waste management and composting and (iii) exchanging recycled products with non-degradable domestic waste at the individual household level.

The community garbage management initiative of Vatavaran was started in 1994 with only 150 households of Asiad Village, a middle class residential colony. This programme has grown manifold in last few years and at present Vatavaran serves about 5 lakh people in about 15 residential colonies. The programmes, launched by Vatavaran depend mainly on field staff, viz. supervisors and cleaning boys. Consequently it neither needs nor has large office staff or space.

The whole garbage management operation is conducted in three stages. The 'clearing brigade' first collect the garbage from households in the operation area from 8 am to 12 noon everyday except on Sunday (on Sunday and National holidays working hours are reduced). Segregation of garbage into degradable, recyclable and inert matter is done at the collection point itself. At the second stage, degradable material is taken to the composting pit or to the bio gas plant. The recyclable materials are sent to small recycling industries or are sold to the *kabadiwala*. At third stage the composting pits are maintained and compost is taken out from the pits when ready and is packed in small packets for use.

In JNU Campus, Vatavaran started its operations on 1 April 1995 and has been managing waste satisfactorily. The cleaning brigade in the JNU campus comprises of 31 boys, who collect the garbage. The university has allotted land to Vatavaran for composting. TERI installed a bio gas- plant, which requires around

80 kg of garbage every 10 days. But at the time of interview the plant was out of order.

Table: 6.2

Projects of Vatavaran at a glance

| Project Areas | House holds No. | Cleaning Brigade ¹ | Monthly Fee RS. ² | Monthly Supervisor | Pay Boys |
|-------------------------------|-----------------|-------------------------------|------------------------------|-----------------------|----------|
| Asiad village | 625 | 1+10 | 50 | 2400 | 1650 |
| Vasant Kunj C-9 | 500 | 1+2+15 | 40-50 | 2500 | 1800 |
| Vasant Kunj C-8 | 400 | 1+12 | 40-50 | 2500 | 1800 |
| Vasant Kunj B-5 | 260 | 1+4 | 40-50 | 2500 | 1800 |
| Vasant Kunj B-9 | 100 | 1+3 | 40-50 | 2500 | 1800 |
| Vasant Kunj B-10 | 600 | 1+2+15 | 40-50 | 2500 | 1800 |
| Noida 14 A | 170 | 1+3 | 50 | 2200 | 1800 |
| Noida 15 A | 490 | 1+12 | 50 | 2200 | 1800 |
| Noida 12 C | 450 | 1+9 | 50 | 2200 | 1800 |
| Nizammuddin | 490 | 1+10 | 35 | 2500 | 1700 |
| JNU | 1000* | 2+4+31 | 80,000 lump-sum | 4000(s) 3000(Ds) | 2200 |
| Delhi University South campus | Not available | 1+2+24 | 64,000 lump-sum | 3500 (S) 3000 (DS) | 2000 |

*Hostels not included

Notes: -

1. Cleaning Brigade includes Supervisor and Deputy Supervisor and cleaning boys in case where three categories exist and Supervisors and cleaning boys in other areas.
2. JNU and Delhi University pays Vatavaran in lump-sum (monthly) while in case of others it is the monthly contribution of each household.

Source: - Interview with Mr. Bijendra during Field-work in March 2002.

The required salary to the 'cleaning brigade' comes from the client groups. Contributions from the residents are the major source, which comes in the form of a pre-decided amount every month. The amount varies from area to area depending upon the number of residents to be covered and the type of work to be done. In any case rate does not go beyond Rs50 per month and starts at Rs40. The households residing on upper floors have to pay more for the services. For

example, in Vasant Kunj, residents at the ground floor pay Rs40 and those living on the top floor pay Rs50 per month.

The projects in JNU and in Delhi University are operated under a different arrangement. JNU pays a lump-sum of Rs 80,000 only, while, Delhi University pays a lump-sum of Rs 64,000 only, to Vatavaran as every month 'running cost'. This cost is partially retrieved by the universities from the residents from their monthly salaries with a rate varying proportionately with the income of different sections of employees. The second source of income is the earning from the sale of recyclable items to *kabadiwala*. According to field supervisor of JNU project, Vatavaran earns about Rs10,000 to Rs15,000 per month from selling of the recyclable materials. A small amount is also earned from the selling of manure and some plants.

6.3 SURVEY RESULT OF THE WASTE-PICKERS UNDER VATAVARAN

The survey, which was conducted in JNU and Vasant Kunj B-10 in the month of October, provides the socio-economic profile of the rag-pickers. A total of 30 waste-pickers were interviewed out of which 5 were deputy supervisors and rest of the 25 was cleaning boys. 15 cleaning boys were interviewed in JNU and 10 were interviewed in Vasant Kunj. All of them were male, as Vatavaran does not employ female workers as rag-pickers.

The survey shows that 60 percent of the respondents are 30 years old or younger only 8 percent of the respondents are above the age of 45 years while 32 percent of them are between the age of 30 and 45 years. The data shows that Deputy Supervisors and supervisors are comparatively older than the cleaning boys. It was also informed during the interview that supervisors are not recruited directly; a majority of them have earlier served as cleaning boys.

The dropout rate for worker from the workforce is high after the age of 40. This can be explained but the argument that male workers tend to graduate into

other occupations with the passage of time as waste-picking is seen as an inferior activity.

All the respondents were not migrants and about 28 percent of respondent were of local origin. All 5 deputy supervisors and were residents of Delhi. Remaining 72 percent of respondents were migrants. About 83 percent of the migrants were from Uttar Pradesh and 17 percent of the migrant respondents were from other states like Bihar and Rajasthan. Most of the migrants were from western district of Uttar Pradesh like Mathura, Moradabad and so on. All of the migrants have come from the rural areas. They did not join Vatavaran directly. While, living in Delhi, they came in touch with some or other working person under Vatavaran.

Against the findings of earlier studies, 84 percent of the total respondents were found literate. Only 16 percent of the rag-pickers were illiterate. About 4 percent of total respondents were found to have an education up to matric and one respondent (supervisor) was found to be a graduate. Rest 76 percent of the interviewed waste-pickers had education at the primary level. This explains that rag-pickers under Vatavaran are not comparable to that of the rag-pickers in general.

The social profile of the respondents is diverse. However some patterns in social conditions can be recognized. A large majority of the waste pickers live with their family and contribute to household income. In general it is observed that young children accompany their parents from an early age in waste-picking. This feature is absent in case of waste-pickers under Vatavaran. Here also a distinction can be drawn between the general rag-pickers and those who are working under Vatavaran. These rag-pickers do not have to face any harassment like general rag-pickers either from the members of a household or from the police.

As far as the income of the waste-pickers is concern, rag-pickers do not have to fight for income everyday when they work under Vatavaran. They are away from the market mechanism. Market price of recyclable materials hardly

had any impact on the income of these rag-pickers. They get a fixed salary from the Vatavaran. Their payment is reduced if they remain absent, even, for one day in a month. No consideration is made even on the ground of health.

In general, waste-pickers directly interact with the buyers who attempt to enlarge his relatively small margin by keeping the price as low as possible. In times of inflation, poor weather and competition the waste-pickers have to bear the consequences of decline in price. In this regard also the waste-pickers that work under Vatavaran do not show similarity with unorganized rag-pickers.

Most of the waste-pickers considered waste picking as a temporary occupation. Except from the deputy supervisors and supervisors, all others asked whether 'Can I provide them with jobs'. They all wanted to leave the job as soon as other options are available to them. One field supervisor also answered in a similar way. They even preferred to switch over to other manual labour such as construction work or street vending if they can survive there. They were aware of the inconsistency in construction work. In street vending, they need small amount of capital which they do not have and thus cannot switch over to other informal activities. It was informed that waste-pickers who are working under Vatavaran get a uniform and some sort of bonus once in a year.

It may be pointed out that waste-pickers under Vatavaran are in a much better condition when compared to other unorganized waste-pickers. However, the monthly salary of the waste-pickers under Vatavaran is as low as Rs1800 the amount an average waste-picker earns in a 'real sense'. As discussed earlier a common waste-picker loses about 1000 rupees in a month. The salary given by the NGOs that are run on a 'no-profit' basis do not seem to match the 'potential income' of waste-pickers (they usually earn about 3000 rupees in a month). This reveals that NGOs have also not remained only 'humanitarian' in nature.

Chapter: Seven

CONCLUSIONS AND RECOMMENDATIONS

Under the structural adjustment programme, which encourages deregulation, decentralization and labour flexibility, many people have found themselves in the unprotected job-market or in the informal sector.

The classical conception of labour has changed since the introduction of 'white collar' and 'blue collar' jobs. On the one hand we have managers, supervisors etc. in the category of workers. On the other hand there are those, who are selling their labourforce in the informal sectors. The later are not recognized as workers even by the trade unions. Waste-pickers belong to this category whose jobs are vulnerable and exposed to the various kinds of exploitations.

Waste pickers play an important role in protecting the environment at the cost of their health. Notwithstanding this danger, the role of waste pickers has not been institutionally supported or recognized. The present study has analysed the conditions at the demand side (inability of municipalities to collect the entire waste) and at the supply side (inability of urban economy to provide some kind of job opportunities to the pushed out rural migrants) which have led the activities of recovery and recycling of waste to continue.

Conclusions:

1. Characteristics of urban labour market are fast changing. Capital is acquiring a global character and labour is increasingly becoming flexible and unregulated.
2. In these circumstances, the nature of informal sector has changed from what it was in 1970s. The range of informal sector is from managers of multinational firms (in the top bracket) to shoe-shine boys and garbage-combers (in the lower wrung) in contemporary urban labour market.

3. Delhi presents a gloomy picture in terms of solid waste management in comparison to other cities of India as well as world. The capital city of India is going to face more problems in the management of solid waste in the near future with increasing commercialization and industrialization and resultant population growth. About 8000 tonnes of solid waste is generated per day in Delhi and municipal bodies are able to collect only about 60 percent of the generated waste. Generation of waste has grown at a much faster rate than the growth of population.
4. The quantity of collection of solid waste has increased overtime, but the rate of increase has not been consistent. Consequently, collection efficiency has decreased especially in the zones that lie on the peripheries.
5. The zones with affluent population are served in a better way than the peripheral zones. Collection efficiency in the zone 'City' and 'Central' is about 90 percent as against the zones of 'Narela' and 'Najafgarh' where it is as low as 40 percent.
6. The benefits of 'R-trio' i.e. recovery, reuse and recycling, have not been formally recognized in the management of solid waste in the city of Delhi, though one fourth of the generated wastes is recyclable in nature.
7. In a situation, where municipal bodies are not able to manage solid waste effectively there is a rise of informal sector activities. Delhi too is dependent partly on informal sector activities for the proper clearance (collection and disposal) of solid waste from the city.
8. Waste is a flexible source of employment in the Third World cities. Waste recovery and recycling not only serve the production cycle but also enable the poor to meet some of the basic needs without any payment or capital investment. In most of the developing cities, solid waste is considered as a solid asset, which is recovered directly or indirectly through informal stages for reuse and recycling.

9. The root-cause of poverty is unemployment in the contemporary Third World. The poor people work with waste material for survival as they are denied access to resources including job opportunities that are available to the better-off.
10. Waste-picking is a marginal activity which involves low returns and high health risks. Waste-pickers are unable to meet the three necessary production processes of (i) the production of the means of production; (ii) the production of the means of subsistence; and (iii) the reproduction of labour-power on a daily and generational basis.
11. Poor people who lack resources are earning a livelihood from waste-picking because they are able to meet one or two of the above mentioned productions. They have no other alternative but to shift to begging for the survival if they leave this occupation.
12. Waste-pickers and itinerant buyers along with dealers and traders form the lower level network in the informal recovery and recycling of waste. Different types of waste-pickers work at various places. Female waste-pickers operate either in the streets of residential colonies or at market places. Dumping grounds are the prime location for the child waste-pickers.
13. The demographic characteristics of these waste-pickers reveal that majority of them are from the age group of 15 to 29 years. Social profile of the waste-pickers shows similarity with the earlier studies. Majority of them belong to the scheduled castes with very low levels of education. Incidence of drop-out has been high in case of family members of the waste-pickers. Chronic poverty has compelled their children to work from a young age.
14. Economic expectations have been the main cause of migration for the waste-pickers. Majority of the migrant waste-pickers are from the states of Uttar Pradesh and West Bengal. A large proportion of Bengali migrants belong to the Muslim community. They are new migrant, who

come to the cities in hope of an economic breakthrough and social nobility. Majority of them are new to the profession and hope to get a better job in long run.

15. Majority of the waste-pickers live in some form of spontaneous settlements like slums and squatter settlements. A large proportion of them sleep in the godowns of the *Thekedars*. They have been deprived of minimum basic needs like safe drinking water and sanitation. Their access to basic amenities and social infrastructure has been limited.
16. Waste-pickers are doing this job as nothing better is available to them in the urban areas. The economic status of the waste-pickers is directly linked with their working hours, which vary for different groups. Children do not get an appropriate amount for the collected waste due to their unawareness about the prevailing market price.
17. Itinerant buyers enjoy a better social status in the society but in economic terms they are only marginally better-off than the waste-pickers. Dealers form the main link in the chain of waste recovery and recycling processes. The capital requirement to become a dealer in solid waste recycling has increased manifold over the years due to which many people face difficulties in entering into this trade.
18. Waste-pickers perceive dealers as one who provides shelter, arranges vehicles, protect them from the police and acts as a bank. It is perceived that there exists a fatherly relationship between waste-pickers and dealers.
19. Waste-pickers are vulnerable to various types of exploitation. They become victims of different types of subjugated behaviour besides economic and social exploitation. In most of the cases, they remain ignorant about their economic exploitation.
20. The waste-pickers informed that their daily income was about 100 rupees, but at the end of the month they get only about 1200 to 1500

rupees from *Thekedars*. They usually spend nearly 450 rupees for their food and are unaware about the rest of the amount, which is about 1000 rupees.

21. Waste-pickers have to take the help from the *Thekedar* (dealer) to avoid regular harassment from the police. They are dependent on dealers for occasional financial help especially in case of ill health.
22. The manipulative nature of dealers towards waste-pickers reminds us about the existing exploitative relationship between the landlords and their workers in villages. Waste-pickers like other modern workers are formally 'free' to sell their labour but have no other alternatives but to work with the *Thekedars*.
23. Despite continuous economic exploitation and subjugated social behaviour, the waste-pickers have failed to organize themselves and stand against the exploitative system.
24. Waste-pickers like other groups in cities are marginalized in economic terms and have been culturally and socially rejected by dominant groups. Social marginalization exerts a toll on an individual's health, largely through behavioral changes such as seeking relief through smoking, consuming alcohol and taking drugs.
25. In India, even as we question the unequal distribution of power in society, we need to question the pattern of development and who benefits from our current development choices and how much.

Recommendations:

Based on the above findings of the study, certain recommendations can be suggested

1. Distribution of resources and conservancy staff should be based on the size of population and quantity of waste generation.

2. The method of 'source-separation' of solid waste should be encouraged. It will not only reduce the quantity of waste going to landfill sites but also will provide clean recyclable materials to the waste-pickers.
3. Municipal bodies should acknowledge the benefits of 'R-trio' i.e. recovery, reuse and recycling for efficient management of solid waste.
4. Waste-pickers should be organized so that they are neither economically exploited nor socially harassed by the dominant groups. Waste-picking should be formally recognized as a legal economic activity and waste-pickers should be given identity cards to avoid harassment from the police.
5. NGOs should take initiative in organizing waste-pickers so that they can get formal recognition.
6. Government or NGOs should encourage 'small savings schemes' so that waste-pickers can deposit their income on a daily basis and take a loan in case of health hazards. This would help them in coming out of the 'cycle of indebtedness'.
7. The education should be imparted to the waste-pickers and development strategies should be implemented to enhance their living standards.

Appendix-I

QUESTIONNAIRE FOR WASTE PICKERS

| | |
|-----------------------|--------------------|
| DATE OF SURVEY | SURVEYED BY |
|-----------------------|--------------------|

1.Name of the respondent:

2. Sex: (M-1; F-2)

2. (a) Marital Status:

2. (b) Caste:

3. Age:

| | | | | | | |
|-----------|--------|-------|---------|---------|---------|------|
| Age-group | 5 - 10 | 10-14 | 15 - 29 | 30 - 45 | 45 - 59 | 60 + |
| Code | 1 | 2 | 3 | 4 | 5 | 6 |

4. Level of education

| | | | | | |
|------------|---------|--------|--------------|----------|--------|
| Illiterate | Primary | Matric | Intermediate | Graduate | Others |
| 1 | 2 | 3 | 4 | 5 | 6 |

(a) Reason for dropout / non enrollment:

(Poverty-1; Forceful withdrawal -2; Not interested -3; Discrimination in school-4;

School not available-5; Others-6)

5. Family's size (if adult):

(a). Family Background:

| S.no. | R ship | M/F | Lof Edu | occupation | income | Place of Residence |
|-------|--------|-----|---------|------------|--------|--------------------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

6 No. Of dependent(s):

7. Whether local resident or migrant :

If migrant

(a) Year of migration

(b) Place of origin:

(c). Reason(s) of migration:

| | | | | |
|----------|--------|--------|---------------|--------|
| Economic | Social | Family | Runaway Child | Others |
| 1 | 2 | 3 | 4 | 5 |

8. Whether employed before this: (Yes – 1; No – 2)

If yes, where

b. Reasons for changing previous occupation

9. Reason(s) to choose this profession:

(a) how did you get information about this profession:

(b) Working since when in this profession :

10. Place of residence:

11. Journey to work:

Hours:

Cost:

12. Average number of days worked in a month

Hours of work per day :

13. Waste collection per day/per week /per month

14. Nature of collected waste per day:

| S.N. | TYPE | QUANTITY | PRICE | USES |
|------|---------------|----------|-------|------|
| 1. | Biodegradable | | | |
| 2. | Plastic | | | |
| 3. | Paper | | | |
| 4. | Glass | | | |
| 5. | Metal | | | |
| 6. | Others | | | |
| | | | | |

15. Do you collect from houses, if yes

- nature of waste
- quantity
- Price

16. Nature of sorting:

(a) place of sorting:

17. Time allocation:

For collection:

For sorting:

For selling

18. To whom do you sell your waste:

(a). Where is the sorted material sold:

19. Income per day/month:

20. Whether suffering from any illness: (yes 1; No 2)

If no, when did you last got ill:

(a). Nature of illness:

(i) mild fever

(ii) skin disease;

(iii) respiratory problem

(iv) backache

(v) others

(b) Period of illness (in days):

(c) Break in the work (in days):

(d) Expenses for recovery (in Rs.)

(e) How did he manage the basic expenses:

(f) If loan, then how do you repay:

(g) place of visiting doctor (govt. hospital -1; clinic -2; local doctor-3)

21. Problems, If any

22. Whether satisfied or not

23. If not waste picking then what alternative job opportunities are available to you:

Appendix- II
QUESTIONNAIRE FOR KAWADIWALA

DATE OF SURVEY

SURVEYED BY

1. Name of the respondent:

2. Sex: (M-1; F-2)

2. (a) Marital Status:

2. (b) Caste:

3. Age:

| | | | | | | |
|-----------|--------|-------|---------|---------|---------|------|
| Age-group | 5 - 10 | 10-14 | 15 - 29 | 30 - 45 | 45 - 59 | 60 + |
| Code | 1 | 2 | 3 | 4 | 5 | 6 |

4. Level of education

| | | | | | |
|------------|---------|--------|--------------|----------|--------|
| Illiterate | Primary | Matric | Intermediate | Graduate | Others |
| 1 | 2 | 3 | 4 | 5 | 6 |

(b) Reason for dropout / non enrollment:

(Poverty-1; Forceful withdrawal -2; Not interested -3; Discrimination in school-4;

School not available-5; Others-6)

5. Family's size (if adult):

(a). Family Background:

| S.no. | R ship | M/F | Lof edu | Occupation | Income | Place of Residence |
|-------|--------|-----|---------|------------|--------|--------------------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

6 No. Of dependent(s):

7. Whether local resident or migrant :

If migrant

(a) Year of migration

(b) Place of origin:

(c). Reason(s) of migration:

| | | | | |
|----------|--------|--------|---------------|--------|
| Economic | Social | Family | Runaway Child | Others |
| 1 | 2 | 3 | 4 | 5 |

8. Whether employed before this: (Yes – 1; No – 2)

If yes, where

b. Reasons for changing previous occupation

9. Reason(s) to choose this profession:

(a) how did you get information about this profession:

(b) Working since when in this profession :

10. Place of residence:

11. Journey to work:

Hours:

Cost:

12. Average number of days worked in a month

Hours of work per day :

13. Waste collection per day/per week /per month

14. Nature of collected waste per day:

| S.N. | TYPE | QUANTITY | PRICE | | USES |
|------|---------------|----------|--------|---------|------|
| | | | Buying | Selling | |
| 1. | Biodegradable | | | | |
| 2. | Plastic | | | | |
| 3. | Paper | | | | |
| 4. | Glass | | | | |
| 5. | Metal | | | | |
| 6. | Others | | | | |

15 To whom do you sell your waste:

(a). Where is the sorted material sold:

16. Income per day/month:

17. Problems, If any

18. Whether satisfied or not

19. If not this, then what alternative job opportunities are available to you:

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