

**WASTE MANAGEMENT AND HEALTH OF THE WASTE
WORKERS: A STUDY IN SHIMLA CITY, HIMACHAL PRADESH**

*Thesis submitted to Jawaharlal Nehru University
for award of the degree of*

DOCTOR OF PHILOSOPHY

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Date: 30 Nov 2022

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The thesis entitled “**Waste Management and Health of the Waste workers: A Study in Shimla City, Himachal Pradesh**” is submitted for the award of the Degree of Doctor of Philosophy of Jawaharlal Nehru University. This thesis has not been submitted previously for the award of any other degree of this or any other University and is my original work.

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Dedication

Dedicated to my Baba

The eternal source of strength and inspiration to our family

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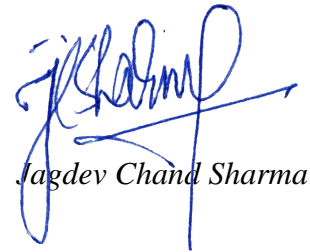
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Jagdev Chand Sharma

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List of Abbreviations

AIDS	Acquired Immuno Deficiency Syndrome
APD	Alternative Perspectives on Development
BMW	Bio Medical Waste
CBD	Central Business District
CDP	City Development Plan
CHC	Community Health Centre
CO ₂	Carbon Dioxide
CPWD	Central Public Works Department
CSE	Centre for Science and Environment
CWT	Centralized Waste Treatment
DoSET	Department of Science, Environment and Technology
DTD	Door-to-Door
EPF	Employee Provident Fund
EPR	Extended Producer's Responsibility
ESI	Employees' State Insurance Scheme
GDP	Gross Domestic Product

GHG	Green House Gas
GoHP	Government of Himachal Pradesh
GPF	General Provident Fund
HCU	Health Care Unit
HIMCARE	Mukhya Mantri Himachal Health Care Scheme (HIMCARE)
HP	Himachal Pradesh
HPSPCB	Himachal Pradesh State Pollution Control Board
HPDR	Himachal Pradesh Development Report
IEC	Information, Education and Communication
IGMC	Indira Gandhi Medical College
IIAS	Indian Institute of Advanced Study
IMF	International Monetary Fund
ISBT	Inter State Bus Terminus
JNNURM	Jawaharlal Nehru Urban Renewal Mission
LSGB	Local Self-Governing Bodies
LPG	Liberalisation, Privatisation and Globalisation
LPG	Liquified Petroleum Gas
MCD	Municipal Corporation of Delhi
MoEF	Ministry of Environment and Forests
MC	Municipal Committee
MCS	Municipal Corporation Shimla
MPD	Mainstream Perspectives on Development
MSK	Municipal Safai Karamcharis
MSW	Municipal Solid Waste
MSWM	Municipal Solid Waste Management
MT	Metric Tonnes
NCT	National Capital Territory
NDMC	New Delhi Municipal Corporation
NGO	Non-Governmental Organization
NIMBY	Not In My Backyard
OPD	Out Patient Department
OT	Operation Theatre
PDP	Post Development Perspective
PHC	Primary Health Centre
RDF	Refuse Derived Fuel
RGI	Registrar General of India
RWA	Resident Welfare Association
SADA	Special Area Development Authority
SAP	Structural Adjustment Policies
SPA	Shimla Planning Area

SC	Sub Centre
SDG	Sustainable Development Goal
SDP	State Domestic Product
SEHB	Society for Environment Heritage and Beautification
SMT	Small and Medium Town
TCP	Town and Country Planning
TERI	The Energy Research Institute
TPD	Tonnes Per Day
UA	Urban Agglomeration
UHTC	Urban Health Training Centre
ULB	Urban Local Bodies
UNCHE	United Nations Conference on the Human Environment
USA	United States of America
USSR	Union of Soviet Socialist Republic
UT	Union Territory
WHO	World Health Organization

Waste Management, Urban Spaces, Environment and Health: Situating the problems

Brief Introduction to Key concepts and Issues

Two things are certain in life – one is change, and second is death. There is a saying that “change” is the law of nature, it is bound to happen, and nothing is permanent. Similarly, anyone that is born is bound to die or perish. One more addition to these certainties is “waste”. These events will inevitably happen in our lives over time, but with better management, we can prepare ourselves for them and minimise the problems or losses. With regard to the waste, the very first question that comes to our mind is what is ‘Waste’? How is it produced? How does it impact us? And how can we manage it in order to live a healthy life? We all have a right to healthy food, water, and air. By keeping a healthy environment, this can be ensured. Each one of us has a right to clean air, water and food. This can be ensured by maintaining healthy environment. Man in order to fulfill his basic material needs or necessities have entered into some kinds of modes of production wherein he exploits natural resources - both renewable and non renewable. Now for the first question what is waste? In the process of exploiting nature in order to fulfill his or her material needs man produces certain goods and in this process some ‘waste’ is produced. Waste is any material that the owner, generator, or producer does not find desirable. Due to the fact that it has reached the end of its useful life, it is abandoned and discarded. In its journey to reach the end stage of ‘death’ a product or a commodity is consistently in the stage of transformation i.e., undergoing ‘change’. As what is considered ‘waste’ by one person becomes the ‘resource’ for another person. However, scientifically speaking no material is waste, every component of garbage has some potential at every step if it is accessed, processed, or converted in a scientific manner. Since human civilization began, people have gradually turned away from nature and on its march from Primary stage (where dependence is completely on nature to meet out his basic necessities), to Secondary stage (where major thrust is on manufacturing from the

raw material in order to produce goods) to the tertiary stage which is dominated by the service sector which today has caused a significant shift in the way of life of human society. The type and volume of garbage that a community consistently produces serves as a window into this variance.

Key Concepts:

Environment

The term “*Environment*” has originated from the French word ‘*Environia*’, which means neighborhood i.e., the surroundings or conditions in which a person, animal, or plant lives or operates. In quest for survival All living things interact with the physical and chemical essentials of their surroundings and are connected by the exchange of energy materials. Technically speaking, this system of dependency and connections between the living body and other crucial elements of the environment is referred to as a "Ecosystem". In order to meet out the basic necessities human beings have been engaging themselves in modifying their *natural environment* as a whole or in a particular geographical area, especially as affected by human activity. The reason of such alteration in the natural environment is anthropogenic which includes establishing factories and manufacturing units, and many other such activities, through which natural resources are being exploited resulting in air, water and land pollution in large magnitudes over a period of time. In recent decades it has gained prominence and has become the fulcrum of debates, discussions and research at local national and global levels.

Developmental State:

As an institution of governance, globally, the role of the state has changed from *laissez-faire* to regulator to facilitator, and India is no exception. The concept of state cannot be ignored while we are studying the issues pertaining to environment, public health and waste management in the present context. In the modern world, state is a major actor in the social system therefore the state-society relation is very important as the ‘state’ aims to govern and administer the division of social labour as well as distributes resources in an efficient manner within its citizens when it comes to the issues of development. Since

the implementation of Structural Adjustment Policies (SAP) i.e., new economic policies, impetus has grown in every sector, and waste management is no exception. Scholars of the ecological environment have traditionally focused their research on the political and economic influences on the environment. Mohandas Karamchand Gandhi, India's great moral leader said "*there is enough on Earth for everybody's need, but not enough for everybody's greed*"¹. In his interactions with the environment, man has been exceeding global resource constraints, particularly in the delicate mountain ecosystems. Rapid urbanisation, unchecked population expansion, and a culture of "conspicuous consumption" have all contributed to the production of enormous amounts of garbage, making waste management (both solid and biomedical waste) a crucial issue in India.

Human - Environment Interactions:

Man is considered as a social animal. Human Environment interactions describes how the human social system interacts with rest of the ecosystem. These are complex adaptive systems. Complex because both have many parts and inter connections between these parts, and adaptive as they have feedback systems that encourages survival in ever changing environment. Society is a complex reality which cannot be understood in totality from a single perspective. According to MacIver and Page (1949), society is the "network of social relationships," which refers to many institutions and people involved in meaningful interactions with one another. Weber has tried to understand this meaningful engagement or interaction of the different 'actors' through the concept of 'Social Action' wherein he defines Sociology as an interpretative understanding of social action through their causal explanation. In order to understand human-environment interactions it is inevitable to be aware the peculiar characteristics of human social systems. The society has evolved through various stages and the type of society strongly influences people's attitude towards nature, their behaviour and consequently their impact on larger ecosystem. These peculiar characteristics of human society are social organizations, population, values, education, technology, wealth, knowledge etc. The most determining characteristics which strongly influences people's "view of life" are

¹ <https://www.goodreads.com/quotes/427443-the-world-has-enough-for-everyone-s-need-but-not-enough>

knowledge and values and defines the way people behave and act in a particular way and the choice of possible actions is further restricted by accessible technology. To maximize their benefits from the environment, humans alter it. The ecosystem offers a number of vital services for human well-being, including the provision of resources for both renewable and non-renewable resources, including water, timber, food, energy, information, and land. The over exploitation of these resources by people affects the environment in a number of ways.

Every society has its own philosophical justifications for the natural world, relationships between humans and the environment, and our place within it. With use of such accounts members of a society expresses their normative standards and the broad knobs of how they can function as cultures that are reliant on natural resources to survive.

Environmental Determinism, Cultural Determinism, and Human-Environment Interaction are three different approaches and methods that focus on the processual links between people and the environment as they are rooted in historical, social, and ecological contexts. These approaches and methods are discussed by Brondizio and Emilio (2013) in their edited book "Human - Environment Interactions - Current and Future Directions." Environmental determinism describes how nature shapes society; cultural determinism, on the other hand, emphasizes how man-made culture shapes nature, while the human-environment interaction approach is more focused on how people and the environment interact. All three approaches try to look at the same subject matter but from different vantage point of views. The first viewpoint emphasizes how the environment affects people, whereas the second emphasizes the significance of human culture. In order to investigate Human Environment Interaction as dialectical and historical processes rather than one-dimensional phenomena, the third viewpoint attempts to bridge the gap between the two issues, namely Environment and Culture.

The Concepts of Health and Public Health:

World Health Organization defines health as “*a state of complete physical, mental and social well being and not just the absence of disease or infirmity*” (Park, 2009). This

definition for the first time acknowledged the fact that social welfare is the integral component of overall health in addition to physical and mental aspects of health. This definition takes into cognizance the working and living conditions as they are closely linked with the social environment of the individual that he interacts with or lives in. However, the focal point of this definition is the health of an individual.

On the other hand, public health is described as the "science of protecting the safety and improving the health of communities" through research, education, and the development of public policies for the prevention of illness and harm. Public health promotes and protects the health of people and the communities where they live work and interacts. The approach here is on preventive and promotive instead of the curative one. There is a place for everyone in the subject of public health, even though the definition varies depending on the viewpoint. Whether one prefers to do field research, engage directly with people, or formulate to assist improve the health of the public. Being a public health professional gives us the ability to address the health issues that affect communities as a whole and have an impact on the policies that determine how societies are governed.

Waste management embraces the actions and activities required to manage waste from its initiation i.e., the source of generation to its final disposal. This involves multiple stages i.e., collection, transportation, treatment and disposal of waste, along with monitoring and regulation of the waste management procedure in accordance with waste-related laws, appropriate technologies with sustainable economic mechanisms. On the one hand waste management needs to be looked at comprehensively viz. solid waste, biomedical waste, liquid waste, electronic waste etc. which are produced at domestic level as well as through commercial activities, on the other hand it involves work force at every level which would be handling it manually. Within waste management system it requires our attention towards the health of the workers involved with the waste management process across all hierarchies, as they play a pivotal role in protection and prevention of public health. This requires the public health scholars to look into associated factors within the waste management system.

Urbanization and waste generation

Urbanization is a form of social transformation from traditional rural societies to modern urban communities. It refers to the process by which a population sustains itself in its habitat through the process of expansion in all systems of interrelationships. Waste generation has increased both in city and rural hinterlands of the country as a result of improved lifestyles, increase in population and prevalence of conspicuous consumption. Despite the fact that garbage in urban and rural locations has quite different characteristics, the distance between the two is closing as a result of rapid urbanization and prevailing acceptance of "use and throw" culture and moreover, gap seems to be reducing due to equally rapid communication between urban and rural areas. One can find the scattered components of plastic and packaging material all across the fields or open hillocks in the rural hinterlands as well. It is a phenomenon no longer confined to urban areas any longer and the repulsive attitude of people towards waste and its management is however, same in both the regions. Universally the commonly followed practice is 'making garbage out of sight' knowingly or unknowingly.

With increasing industrialization and urbanisation, waste generation has become an inevitable phenomenon. In recent decades, globally, with improvement in standards of living and rise in population seeped in the culture of conspicuous consumption, the quantities of wastes have grown rapidly. Over the past few decades, the amount of solid waste from various processes, including domestic, commercial, and industrial processes, has significantly increased in our country due to the alarming population growth and sustained drive for economic progress and development leading to conspicuous consumption.

The littered garbage decaying in streets and choked overflowing sewage drains littered non-biodegradable waste especially plastic carry bags by and large results in unhygienic lifestyle for city dwellers which may result in spread of deadly diseases. The consistent rise in urban population across all states in India indicates the fact that the cities are enlarging. The magnitude of the problem of migration is mounting at all the hierarchical levels from Class VI towns in general up to the metropolitan cities in India. The major

reason behind the enlargement of cities is the migration of population from rural to urban areas.

According to a report by United Nations published in 2012 which has been cited in Kumar (2015) states "In 2011, 52% of the world's population lived in cities and towns for the first time, and both the number and percentage of urban dwellers will continue to climb significantly." This study highlights how historically, the process of rapid urbanization started first in developed regions and following the same path the urban population is growing at a fast speed in developing countries also. Further, he observed, the urban population is growing today between two and three times faster than the rural population, with the majority of this growth taking place in developing countries. According to the 2011 India Census, there are more than 377 million urban residents in India overall, which constitutes 31.16 % of the total population. The Urban Agglomerations (UA)/Towns are grouped on the basis of their population composition in Census. The Urban Agglomerations (UA)/Towns which is having at least 1, 00, 000 persons are categorized as Class I cities Urban Agglomeration or Town. Their number has risen to 468 in 2011 from 394 in 2001 (RGI, 2011).

Kumar (2015), while examining the trends of urbanization in India observes "*the level of urbanization in India has expanded from 10.8% in 1901 to 31.2 percent in 2011*". This represents a three-fold growth in more than a century. Explaining the reasons for increase in population in urban centre Premi (2006) mentions cities typically draw individuals from both rural and urban areas as well as from outside by offering work opportunities in both the formal and informal sectors. Cities have a crucial role in determining the structure of the Indian economy and policy on a number of issues by creating employment possibilities (Ibid).

Most urban areas in the country are plagued by acute problems related to solid waste management over the years. Urban populations have been steadily growing, but there has also been a clear reduction in the quality of services provided for the collection and disposal of Municipal Solid Waste (MSW). The unattended uncollected littered waste has

given rise to unsanitary conditions. For the effective and scientific management of waste, Ministry of Environment & Forests, Govt. of India has framed Municipal Solid Waste (Management & Handling) Rules, 2000 after the intervention of the honorable Supreme Court has set certain time frame to comply with these rules. However, due to lack of sufficient infrastructure, skilled technical manpower, etc, the fulfillment of these deadlines remains a distant dream.

Sharholly et al. (2008) in their study observe “*The amount of MSW has significantly increased with enhanced life style and social status of the populations in urban centers*”. Similar observations were made by Idris et al. (2004) in their study where they establish that the annual waste generation has increased proportionally as a result of population growth and urbanization, as a result more area is needed for the final disposal of these solid wastes, which makes the task difficult for urban local bodies.

Urban Health:

Cities have consistently been centers of attraction for migrants owing to its better facilities that it provides to its habitants compared to the rural areas leading to increasing urbanization. This result in formation of man-made ecosystem where the physical stressors of natural environment are buffered, both communicable and non communicable diseases thrive under a new system of bio-social interaction. Due to industrialization and urbanization the health scenario in urban centers gets complicated as the natural environment is replaced by the man-made environment.

Urban areas especially large ones are exposed to health threats which are uncommon in rural settings. Man made environment refers to the pollution of land, water and air as a result of industrial and transportation activities, is a prime example. The incidence of infectious diseases tends to be more prevalent in crowded urban areas than in rural environments. Urban environment, particularly poor neighbourhoods with poor sanitation, water and solid waste services, are hosts to vermin that transmit diseases. This calls for the appropriate handling and disposal practices with regard to municipal solid waste, industrial and health care wastes in order to minimise risks to public health.

The urban centers play an ambiguous role vis-à-vis the health status. On the one hand they have the potentiality of producing healthier citizens due to concentration of medical services, better water and sewage system and treatment facilities etc. on the other hand same urban centers are prone to the increasing incidences of diseases due to concentration of poor people in crowded under serviced slums and their attraction for transient people.

Issues and concerns of Waste Management:

The increasing rate of urbanization and industrialization aided by the culture of conspicuous consumption and lack of farsightedness has brought urban India on the verge of enormous waste disposal crisis. Studies show a direct relation between economic growth and amount of waste generation. Since waste management is the responsibility of municipal bodies and it is increasingly becoming a critical issue for them to deal with large quantities of generated waste on day-to-day basis. Moreover, in cities or urban centers waste generation is never consistent. Within city different areas generate different materials, as consumption patterns also vary and these generated waste streams varies in composition. With increasing pressure on landfills which are frequently getting exhausted beyond limit and urban local bodies or municipal bodies are falling short of land for new landfills owing to different reasons calls for an effective well designed waste management system which takes a holistic consideration. To undertake this function, it is necessary to identify the composition of the waste streams, the source of generation, the appropriate and sustainable ways of management.

Waste management includes the activities and actions that are required to manage waste right from its beginning i.e., generation to its final disposal. This requires taking into consideration multiple phases of handling waste which includes the collection, transportation, treatment and disposal of waste, and requires stringent monitoring and regulation of the entire process including use of appropriate technologies. Waste management is planned to reduce undesirable effects of waste on human health, environment, aesthetics and optimum utilization of resources.

Types of Waste

The waste that is produced might be solid, liquid, or gaseous, and each type necessitates a unique approach to management and disposal. All waste categories, including residential, municipal, organic, biomedical, industrial, hazardous, and others, are included in waste management. Waste occasionally poses a risk to human health. Health issues are connected with the whole process of waste management directly, through the handling of said waste, and indirectly through the consumption of contaminated or polluted air, water, land, soil and food.

Municipal Solid Waste

Solid waste refers to any undesirable solid stuff that results from human activity in a home, commercial, or industrial setting. It can be divided into three categories based on its origin (home, commercial, or industrial), contents (paper, plastic, metal, organic material, etc.), and risk it poses (infectious, toxic, flammable, non-toxic etc.).

The unscientific handling of Municipal Solid Waste (MSW) has resulted in major environmental and public health problems and may cause hazards to inhabitants. Sharholy et al. (2008) in their study reveals that 90% of MSW is improperly disposed of in open landfills and dumps, endangering both the environment and human health. To provide solid waste management services, it is responsibility of Municipal bodies. Despite being a necessary service, it does not receive the proper attention, and as a result, the services continue to be sub standard. Municipal Solid Waste Management is a part of public health and sanitation, which is enshrined in Seventh Schedule² (State List-List II) and solid waste management in Twelfth Schedule (Entry 6) of the Indian constitution under Article 243W³ and municipal bodies have been assigned the task of its execution. Solid waste management (SWM) systems are becoming more important right now because of the growing public awareness of the need for cleanliness, which necessitates

² Seventh Schedule contains three lists: List I- Union list, List II – State list, List III – Concurrent list, List II contains the subjects which comes under the state's discretion

³ Article 243 W deals with the powers, authority and responsibilities of Municipalities etc. Entry 6 in Twelfth Schedule empowers municipalities for public health, sanitation conservancy and solid waste management.

academic inquiry, the possibility of legal intervention, and the emergence of newer technologies and methods to handle and process generated waste.

Waste generation is outcome of human activities. Within towns or cities where human activities are intense huge amount of waste is generated regularly, and the way it is collected, stored, handled and disposed off can pose a risk to not only environment but public health as well. The effective waste management system supported by appropriate technologies are utmost required to put in place in order to provide healthy living conditions to the urban inhabitants. Within waste management systems, urban local bodies, such as Municipal Corporations in large cities, Municipal Councils and Nagar Panchayats, have been given the responsibility of waste management at all levels of the hierarchical structure. However, they are facing acute shortage of resources to keep pace with increasing population and urbanisation process vis a vis the rising demands as a result the waste segregation, collection, transportation, storage, treatment and disposal remains poor in urban areas. The limited revenue allocation to municipal bodies further aggravates the problem and ultimately municipal bodies resort to *secondary collection* which means they collect the waste from the municipal bins only which are installed by the municipal bodies at reasonable distance. In this kind of approach substantial amount of generated waste remains unattended in the streets or dhal lows. This uncollected or unattended waste provides a suitable environment for breeding of disease vectors like pests, rats, flies, mosquitoes and cockroaches which may result in spread of diseases.

This phenomenon is no longer confined to our towns, cities but even in rural areas these days this has become a major problem. Any type of waste material which is generated at home and discarded of as it is no longer considered necessary for any other use comes under the category of waste and we tend to throw them away. The generation of solid waste and its disposal are not new phenomena in human society. It dates back to inception of human civilization itself (Misra and Mani, 1993). Increase in population, industrialization, urbanization, a rapidly changing lifestyle, eating habits, and a culture of conspicuous consumption which has led to the "use and throw" and throwaway patterns

all contribute to increased waste output, and consequently resulted in waste generation in large quantity.

Evolution of waste management practices and Policy in India

The quest for sustained growth is not new. Waldauer et al. (1996) in their study mentions that Kautilya in his famous book '*Arthshastra*' explicitly recognizes "*that international trade (trade among kingdoms) in goods and services is a major vehicle for increasing the sovereign's wealth as well as that of his subjects*". For Kautilya this would help in setting up industries or businesses that would result in creation of 'jobs' in addition this would mitigate the needs of 'products' by the instrument of 'import' and 'export'. Kautilya in his times was perhaps referring to the goods and services when dependence was completely on nature but today it has moved altogether in a new paradigm. Moreover, today dimensions have changed and regional disparities have grown variedly. Developed versus developing economies have their own equations and former dominate the terms and conditions in their favour. This has led to '*not in my backyard*' (NIMBY) syndrome. In India the momentum got impetus by adoption of New Economic Policies i.e., Liberalisation, Privatisation and Globalisation (LPG) in 1990s where in foreign industries set up their businesses in India. With this the process of industrialization, urbanization and consequently changing life styles of people got acceleration and India has seen generation of waste in huge quantities which requires new waste management rules and strategies to protect environment and public health from adverse impacts.

Waste management is indeed a collective responsibility in which all members of society as individuals or units have an opportunity to contribute and alleviate many of the problems associated with it. An attempt is being made to look into the waste management process how it has evolved in India over last few decades and where are the scopes for intervention and what are the best practices within the present system.

Waste as Wealth

One needs to ask a very pertinent question whether is waste really a waste? Or is it a Resource? And if resource then whose resource? And how does the notion of 'values'

gets associated with it. India has been a land where people have great respect for ‘Nature’ and use everything as a resource. There have been instances which portrays respect for resources. For instance, when saint Tiruvalluvar used to have his meal, he would sit with a bowl filled with water and a needle. While taking his meal, if any food grain spilled over, he would pick it up with needle, wash it with water in the bowl and would consume it. In India’s villages, raw food waste such as vegetable and fruit peel etc. is fed to livestock; or is added into the soil around plants, trees, or added into a backyard pit with animal dung, to decompose naturally into compost known as ‘black gold’⁴. This is further used in the fields every monsoon before sowing seeds in the fields. Cooked food is rarely wasted, as a practice it is fed to livestock. However, this historic technique of replenishing nutrients to the soil, which was sustainable, profitable, and nuisance-free, was interrupted as plastic-made objects replaced paper wrapping.

With increasing urbanization, urbanism and changing life styles the problem of waste grew larger with villages emerging into towns, cities and metropolitans. The over production of waste has resulted into habit of spilling waste in streets that are used for garbage disposal round the clock. Being the responsibility of municipal bodies, it is collected and dumped nearby, frequently into the backyard of the village, town or city.

With invention and introduction of plastics in day-to-day life, which when mixed with discarded waste not only reduces aesthetic value but the fertility of land as well, yet cities continue to dump the collected waste on the outskirts as before. Consequently, the accumulated dumped waste piles turn into huge ‘waste mountains’ and become no-man’s land where monkeys, vagrant dogs, which are eating on waste-piles, turn savage and attack people and rural livestock. Singh (2019) reports in his article 18 kg of plastic trash surgically removed from stomach of an ailing cow in Mumbai. Everyone is affected by the stink of enormous, rotting mounds. When the land gets exhausted due to rampant dumping of waste, further encroachment begins at private lands often resulting into conflicts with authorities. The key to minimise the volume of discarded waste and to

⁴ Frogs, Pigs and You (Part 4) episode of the popular television program Satyamev Jayate, “Don’t Waste Your Garbage,” http://www.satyamevjayate.in/dont-waste-your_garbage.aspx.

manage it effectively lies in the recognition of waste as a 'resource' and tap it right at the source of generation.

'Surat Plague'- A Clarion call for Public Health in India

The 1994 'Surat Plague' in Gujarat rang a wakeup call in September 1994 to mark a beginning of waste management policy in general and an eye opener for scholars of public health in particular regarding public health problems that may arise out of improper disposal of waste. Rat burrows in the city of Surat were inundated by "choked storm-drains" brought on by strewn waste and "heavy rains" during high tide, which caused the rodents to emerge and spread among the populace. Basu and Yadavar (2020); reported *"as many as 832 people were suspected to have been infected by pneumonic plague in Gujarat and another 400 in Maharashtra. The official death toll across India stood at 52"* while few were reported to have died, lakhs of migrant workers fled the city. *'Businesses stopped and losses incurred amounted to around Rs 816 crore.'* (Ibid) and which resulted in enormous economic losses for the 'Diamond city of India' i.e., Surat and at international level Indian flights were not allowed to land on their airports in Great Britain, USA and other countries, tarnishing the image of the country at the international forum. It proved to be 'a wake-up call' for India as soon after, the Municipal Commissioner, S. R. Rao, selected a team of efficient administrators, experts, and sweepers that changed India's 'dirtiest city' into the 'cleanest city' in record eighteen months. He worked passionately with a motto "A city is only as clean as its dirtiest areas". In order to realize and internalize the gravity of the problem he used to conduct his meetings in these dirty areas of city instead of air-conditioned offices.

Public Interest Litigation in the Hon'ble Supreme Court and Constitutional Provisions

The constitution of India has specific provisions pertaining protection of environment and public health which entails the rights and responsibilities of 'state' and 'citizens' towards protection of environment and Life, and some of them are as follows-

Article 21 of the Constitution of India, contains provisions for “*protection of life and personal liberty*” of an individual and guarantees dignity of life;

Article 48-A of the Constitution of India draws attention towards "*the Protection and Improvement of Environment and Safeguarding of Forests and Wildlife*". As per this Article the State shall make efforts to safeguard the country's forests and wildlife as well as to maintain and develop the environment. The Environment (Protection) Act of 1986 was passed based on the aforementioned provision.

However, we often tend to talk of ‘*right*’ and every right comes with sense of ‘*duty*’. In accordance with Article 51-A(g), every citizen of India has a responsibility to "protect and improve the natural environment, including forests, lakes, rivers, and wildlife, and to have compassion for all living things."

Realizing the adverse impact of urbanisation, industrialization on environment and pollution in cities, particularly in Delhi when pollution levels had gone beyond tolerance capacity led to filing up of a writ petition (Civil) No.286/1994, Dr. B.L. Wadehra Vs Union of India & Ors, was filed with regard to management of municipal solid waste and Hon’ble court issued orders for compliance, some of which are mentioned as follows-

- 1) The door-to-door garbage collection scheme by Municipal Corporation Delhi (MCD) and New Delhi Municipal Corporation (NDMC) on experimental basis.
- 2) The Ministry of Health, the Government of the National Capital Territory (NCT) of Delhi, the MCD through its Commissioner, and the NDMC through its Administrator were directed to build and install Incinerators in all medical facilities with 50 beds or more that were under its administrative control.
- 3) The Director General of Doordarshan was directed to undertake program of educating the residents of Delhi regarding their civic obligations under the Delhi Act and the New Delhi Act.

In Writ Petition (Civil) No. 888/1996 (Almitra H. Patel vs. Union of India & Others.), a precedent-setting writ petition regarding the Management of Solid Waste in class-I cities,

the petitioner claimed that the municipal practices used for disposing of for disposal of garbage in urban areas were flawed and inadequate. The petitioner emphasized that the management of solid waste by the municipalities had a direct impact on the health of the population in the country, and the Hon'ble Supreme Court ordered on January 16, 1998 to form a committee to investigate all aspects of the management of solid waste in Class-I cities in India, with Shri Asim Barman as its chairperson. The aforementioned committee submitted its report in the month of March 1999. The committee offered a number of suggestions for management of solid waste in class I cities. The mandatory recommendations were further categorized under three heads viz. state Governments, urban local bodies and citizens. Based on the recommendations of this committee, the Municipal Solid Wastes (Management and Handling) Rules, 2000 came into force on September 25, 2000.

Municipal Solid Waste Management Rules

The Ministry of Environment and Forest, Government of India, notified the first set of Municipal Solid Waste (Management and Handling) Rules 2000, issued in accordance with the Environment Protection Act of 1986. Citizens who saw their potential and used Public Interest Litigation, as a powerful instrument in their arsenal for necessitating compliance, sanitary waste management, and ethical conduct on the part of elected and appointed city officials, made this initiative successful. This not only fixed up the responsibility of urban local bodies, state governments, pollution control boards but also fixed up the responsibility on part of the public that generates the waste in the first place. Article 243W entails the powers, authority and responsibilities to the municipal bodies in Twelfth Schedule of Indian constitution and empowers municipalities for public health, sanitation conservancy and solid waste management. The constitution of India explicitly cites municipal solid waste management as an essential service and one of the obligatory duties of the local governments. Nevertheless, there have not been many systematic attempts to develop policies that prescribe the norms and standards for collection, treatment and disposal of waste. Subsequently, the Government of India published the Municipal Solid Wastes (management and handling) Rules in the Gazette of India, in September 2000 (MoEF, 2000) these rules make the municipal authorities primarily

responsible for collection, segregation, storage, transportation, processing and disposal of MSW generated in their respective urban areas.

Solid Waste Management Rules

With promulgation of Municipal Solid Wastes (management and handling) Rules 2000, MoEF has envisioned a waste management system to protect environment and human health. No doubt the responsibilities were fixed within these rules but an effective Waste management system involves several factors such as individual behaviour as the generator of waste, community participation, type of generated waste and suitable technology. “*One size fits all*” and “*end of the pipe*” solution approach may not work across the globe as it is dependent upon regional, cultural, social and political factors. A plethora of research studies have been carried out to understand, assess the suitability and impact of waste management systems. The aim of suitable waste management includes what Brunner (2013) would say prevention of the export of waste related problems into the future i.e., ‘clean’ cycles and ‘landfills requiring little after care’. It involves ‘socially acceptable waste management practices’ (Wilson et al., 2007). It is indeed a time-consuming process to evolve a strong system which is entirely full proof, but despite being concerted efforts and programs waste management system is in a deplorable condition in India, why is it so? Uncleanliness is attributed to poverty but Teltumbde (2014) argues “cleanliness is more of a cultural matter than poverty”, he believes that caste culture in India is the root of the problem. *“as it stigmatizes work as unclean and workers as untouchables, and externalizes the duty of maintaining cleanliness to a particular caste.”* However, Snel (1999) observes “*a new movement in cities such as in Hyderabad toward starting to view waste pickers as entrepreneurs in their own right, although this is happening slowly*”.

In developing countries such as in India, where industrialization led to urbanization and urbanism which has brought its own repercussions for example waste generation as its by product, apart from the formal waste management institutions in place, a robust informal network that operates as a parallel system and makes a substantial contribution to the overall waste management procedure in the cities exists throughout the country. The amount of waste recovery by the informal sector, which is made up of waste pickers,

itinerant waste purchasers, and junk dealers, is estimated to range from 6-7% to about 15% of waste generated (Bhide, 1990). The health situation is largely related to the social environment. Shah (1997) in a study on Surat plague, in Gujarat very well substantiated, wherein during the plague people were scared of garbage. It was almost believed that the garbage in the streets was the cause of the plague. The uncollected waste (especially plastic), which was dumped indiscriminately in the streets led to drain choking and blocked rat borrows which resulted in the spread of disease.

‘The end of the pipe’ solution approach is bound to be a failure rather disaster where as Sharholly et al (2007) observes that “about 90 % of the municipal solid waste is disposed of unscientifically in open dumps and landfills” in an uncontrolled manner without proper segregation. This type of garbage disposal practices leads to significant environmental issues that have an impact on human health, not only the residents or inhabitants of the city or area and the animals which include stray cattle, dogs, cows and monkeys as it is hilly and forest area but the work force involved in waste management who is handling it manually and it also causes serious economic and other welfare losses to land, resources and public.

Due to a combination of issues, including institutional deficiencies, poor technology selection, a lack of funding, and public apathy towards municipal solid waste (MSW), waste management suffers significantly, making this service far from satisfactory. MSW in India’s urban areas is collected from individual households by various means such as door to door collection carried manually, through push-carts, tricycle trolleys and dropped by residents into the garbage bins placed by municipal bodies. When the cart is full, the waste is dumped in designated large bins, constructed at locations easily accessible for the collection trucks that then carry the wastes to disposal sites. In small and medium towns, the financial requirements for even this simple and low-cost collection method could not be adequately met, and so not all parts of towns have household collection on a regular basis. Instead, bottomless open concrete rings, placed at street corners, are used as bins for waste disposal by households. In streets without such bins, the street corners and open drains (used for waste waters and storm water collection)

are abused for dumping garbage, road sweepings, building wastes and so on. This causes frequent choking and overflows of sewage, particularly during rainy season, posing public health risks.

In order to assess MSW management practices, a study “Sustainable MSW management in developing countries; the experience of smaller towns in India” conducted by Sundaravadivel, M. et al. (2000) in four small and medium towns (SMTs) of Tamil Nadu brings out two important issues, first there was no door-to-door service in Andipatti, one of the four towns studied, while in other three towns only 48.5% of the households were provided with either door-to-door service or access to a bottomless garbage bin; the remaining households disposed of MSW on street corners. The other issue studied was pertaining physical composition of the solid waste which is compared with the composition in Metropolitan cities the major difference being Organic waste comprises 69.0% in SMTs where as it is 41.8% in metropolitan cities (Vigneswaran et al. 2002).

With increasing Economic development, urbanization and improving living standards in cities, waste is an unavoidable by-product and composition of the waste also varies across different hierarchical levels of towns, cities and metropolitans, which inevitably calls for different strategies and approaches to handle it. The human activities related to production and conspicuous consumption has resulted in increase in the quantity and complexity of generated waste. This complexity has caused major apprehension for government agencies, regulatory authorities, pollution control boards, and the general public.

The development of any town, city, or country is greatly influenced by cleanliness, which is otherwise inhibited by incorrect disposal of solid waste. ‘Healthy cities’ attract investors which boost industries and ultimately generation of employment opportunities. It is clear from the literature on MSW that there are two key issues resulting from poor solid waste management; one is the loss/underutilization of resourceful material, which otherwise is wasted without realizing its potential as a ‘resource’ and other is social cost due to health impact on public health. The most important contribution in waste

management process is made by ‘*the warriors of cleanliness*’ i.e., the work force engaged in waste management process. This work force comprises of *municipal safai karamcharis* as part of formal system and *rag pickers*, who contributes tremendously as part of informal system, who have been carving out their livelihood by toiling around streets, garbage bins, surroundings dump or disposal site, landfills and relieves the from improper or no collection of waste from streets resulting in nuisance and spread of diseases. So in other words this work force from informal system is supplementing the task of workforce of formal system. This study tries to look at the significant contribution made by safai karamcharis both from formal and informal system within the waste management system and tries to explore the health of these waste workers.

Bio-Medical Waste

In the process of treatment while seeking medical care, wastes produced from hospitals, nursing homes, research laboratories, operation theatres within health care facilities, and veterinary practices falls under the category of ‘*biomedical waste*’. These biological wastes are dangerous and may spread contagious diseases to people or animals. The biomedical waste owing to its infectious character can be the source of diseases such as Tuberculosis, hepatitis, Acquired Immuno Deficiency Syndrome (AIDS) and communicable diseases. The nomenclature used to characterize infectious waste is inconsistent, and the biomedical waste is poorly defined. Infectious waste has also been referred to as pathological, biomedical, bio-hazardous, toxic, and medically hazardous waste. Hospitals, research labs, and regulatory bodies all have different viewpoints and goals that shape how they see the world. Bhadram (2002) observed that biomedical waste has become a bigger problem ever since the Environmental Protection Act of 1986 (Govt. of India) reclassified it as hazardous waste. The disposal of hospital waste can be extremely risky, especially when mixed with municipal solid waste.

Generation of Biomedical Waste in Hospital/Health Care Units:

Hospital or the Health Care Unit (HCU) is a place, where an individual approaches the doctor to seek medical care. The doctor makes a diagnosis following a thorough examination and then applies the proper treatment. During the checkup, the patient is

either treated in the outpatient department (OPD) or is admitted to the hospital for additional testing and examinations as part of the treatment. In both the cases, whether indoor admission or OPD treatment solid waste and biomedical waste is generated in course of treatment. However, the quantum or nature of waste generated depends upon the procedure followed and site of treatment viz. Sub-Centre, Primary Health Center (PHC), Community Health Centre (CHC), Tertiary hospital or specialized hospital.

The amount of waste generated in this manner varies depending on the location and the type of treatment. For instance, compared to major operation theatre (OT), waste generation in minor OT will be lower. Orthopedic department in general generates less biomedical waste comparatively. But the quantity of infectious waste generated in maternity wards would be much higher as compared to general ward in hospitals. Further if a patient is admitted indoor for treatment, then there would also be the waste generation at individual ward level, though by and large the nature of waste generated would be domestic type usually non infectious. Similarly biomedical waste would be generated at private clinics, dispensaries where general practitioners attend their patients for medical diagnosis and treatment. With increasing need for health care provisions, depending upon the nature of treatment different health care institutions have been established both in private and public sector at varied hierarchical levels ranging from sub centre, dispensary to tertiary care hospitals in public sector and private clinics to multi specialty hospitals in private sector both providing the health care need facilities to the individuals and in the process biomedical waste is generated.

Handling of Biomedical Waste

The risks associated with handling of biomedical waste generated by health care institutions are still unacquainted to health workers especially the sanitary staff handling this waste. This requires a timely assessment and intervention accordingly. Lack of responsibility in handling of the biological waste in all forms viz. solid, liquid, and gaseous, produced by these healthcare institutions, particularly with regard to body fluid-contaminated tools and containers, frequently compromises public health. The risk of

infection and harm from waste generated during medical procedures is greater than that from any other sort of waste and requires accountability in 'Cradle-to-grave' approach in order to protect public health.

Bio-Medical waste is a particularly dangerous kind of waste that, if improperly managed, can have major negative effects on both human health and the environment. Bio-Medical Waste (BMW) (Management and Handling Rules, 1998) describes "*Bio-Medical waste as any type of waste generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining to the production of drugs in pharmaceutical companies, animal waste generated in the veterinary hospitals and also in the slaughter houses etc.*" Certain types of domestic wastes, such as sanitary pads, diapers, cotton swabs, disposable razors, etc., must be included in the definition of bio-medical waste. In many cases, owing to some specificity sometimes the patient is given treatment in his or her own house when the hospitalization is not possible and during that also biomedical waste is also generated which is often mixed with or discarded with solid waste. Such "*domestic BMW*" has not been given any consideration so far.

Hazardous and Biomedical Waste Management Policy in India

Realizing the potential threats associated with Biomedical Waste in India, The Ministry of Environment & Forests in 1998 issued a notification on the Biomedical Wastes (Management and Handling Rules) regarding the management of biomedical waste. Before enforcement of these rules in 1998, the municipal or government authority was entirely responsible for handling all type of waste in an appropriate and efficient manner, but now as per this notification the responsibility of managing biomedical waste has been fixed up with health care institutions. In this notification the term biomedical waste was defined and the legal framework was established for all categories of biomedical waste generated within health care units. The rules fixed up the responsibility of the generator i.e., 'Occupier' of Health Care Unit (HCU) accountable for segregation, packing, storage, transportation and disposal of the waste so that the public health can be protected. Various kinds of categories were classified and their corresponding treatment and disposal options were specified. For the purpose of safe handling of Biomedical waste by

the health workers and sanitary staffs the containers which are used for storing it are mandatorily to be labeled with appropriate biohazard or cytotoxic symbol. The state pollution Control Board have been identified as nodal agency to grant authorization for a period of one year to all health care units which are identified or defined as ‘*occupiers*’ and treat more than 1000 patients for medical purposes each month. The obligations of occupiers with regard to the handling and disposal of biomedical waste are expressly stated in the rules. Different types of disposal mechanisms prescribed by Ministry of Environment and Forestry are namely disinfection, autoclaving, mutilation, microwaving, deep burial, incineration and disposal in municipal landfill. Biomedical Wastes (Management and Handling Rules) 1998 contains six schedules which have been summed up as follows:

Schedule 1	classification of Biomedical Waste in 10 categories (shown in Table 1.1)
Schedule 2	contains a color-coding system and descriptions of the different Biomedical Waste collection and storage containers. (BMW) (Shown in Table 1.2)
Schedule 3, 4	recommends marking of containers or bins with appropriate Biohazard and Cytotoxin symbols
Schedule 5	treatment and disposal options for each category of waste
Schedule 6	mandates all health care units, veterinary institutes, and animal & slaughterhouses to install appropriate waste management amenities in place.

Table 1.1 shows the categories of Biomedical waste and Table 1.2 shows different categories of biological waste, their corresponding treatment and disposal options, and the type of containers and colour coding for each category.

Table 1.1 Categories of Bio-Medical Waste

SCHEDULE I

(See Rule 5)⁵

Categories of Bio Medical Waste

Waste Category No.	Waste Category (Type)	Treatment and Disposal [Option +]
Category No.1	Human Anatomical Waste (human tissues, organs, body parts)	Incineration @/deep burial*
Category No. 2	Animal Waste (animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal houses)	Incineration @/deep burial*
Category No. 3	Microbiology and Biotechnology Wastes (Wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures)	Local autoclaving/ microwaving/incineration@
Category No. 4	Waste sharps (Needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps)	Disinfection (chemical treatment @ @/autoclaving/microwaving and mutilation/shredding##
Category No. 5	Discarded Medicines and Cytotoxic drugs (Wastes comprising of outdated, contaminated and discarded medicines)	incineration@/destruction and drugs disposal in secured landfills
Category No. 6	(Soiled) Waste (Items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines beddings, other material contaminated with blood)	incineration@ autoclaving/microwaving
Category No. 7	Solid Waste (Wastes generated from disposable items other than the waste [sharps] such as tubings, catheters, intravenous sets etc.)	Disinfection by chemical treatment @ @ autoclaving/microwaving and mutilation/shredding##
Category No. 8	Liquid Waste (Waste generated from laboratory and washing, cleaning, housekeeping and disinfecting activities)	Disinfection by chemical treatment and discharge into drains.
Category No. 9	Incineration Ash (ash from incineration of any bio-medical waste)	Disposal into municipal landfill
Category No.10	Chemical Waste (Chemicals used in production of biomedical, chemicals used in disinfection, as insecticides etc.)	Chemical treatment @ @ and discharge into drains for liquids and secured landfill for solids
@@	Chemicals treatment using at least 1% hypochlorite solution or any other equivalent chemical reagent. It must be ensured that chemical treatment ensures disinfection.	
##	Mutilation/shredding must be such so as to prevent unauthorized reuse.	
@	There will be no chemical pretreatment before incineration. Chlorinated plastics shall not be incinerated.	
*	Deep burial shall be an option available only in towns with population less than five lakhs and in rural areas.	
[+]	Option given above are based on available technologies. Occupier/operator wishing to use other State-of-the-art technologies shall approach the Central Pollution Control Board to get the standards laid down to enable the prescribed authority to consider grant of authorization]	

⁵ classifies 10 different categories of Biomedical Waste viz. Category 1 – category 10.

Table 1.2 Category wise coloured containers of Bio-Medical Waste

SCHEDULE II (see Rule 6)⁶

Colour Coding	Type of Container -I Waste Category	Treatment options as per Schedule I
Yellow	Plastic bag Cat. 1, Cat. 2, and Cat. 3, Cat. 6.	Incineration/deep burial
Red	Disinfected container/plastic bag Cat. 3, Cat. 6, Cat.7.	Autoclaving/Microwaving/Chemical Treatment
Blue/White translucent	Plastic bag/puncture proof Cat. 4, Cat. 7. Container	Autoclaving/Microwaving/Chemical Treatment and destruction/shredding
Black	Plastic bag Cat. 5 and Cat. 9 and Cat. 10. (solid)	Disposal in secured landfill

Source: Bio-Medical Waste (Management and Handling) Rules, 1998

Literature review

For existence of human beings ‘economic activities’ are necessary. In order to generate these economic activities ‘industrialization’ plays a pivotal role because industries will generate products and services in an implicit way. These industries are set up in a place where suitable congenial environment and facilities are available leading to the process of ‘urbanization’. In the whole process of industrialization and economic growth a huge amount of waste is generated, some of it gets decomposed in a natural process but most of it requires a careful and scientific handling but mostly it gets dumped in cities. If we go by the contemporary lifestyle of people which is dominated by secondary and tertiary sectors, we would realize that people are busy with fulfilling their personal and professional desires day in and day out which at times adversely impacts their health and this perhaps led to the concept of ‘holistic health’ by World Health Organisation (WHO) which talks about caring for the whole person providing for your physical, mental, spiritual, and social needs. Consequent upon which more and more hospitals have come up which are providing diversified health care services. This has resulted into generation of more and more biomedical waste which requires to be taken care of. Scholars (Thakur and Ramesh, 2015; Thakur, and Anbanandam, 2016; 2017;) who have carried out studies in this direction have observed that if not managed properly it can be ‘detrimental for environment and human health’.

⁶ BMW Rules 1998 prescribes colour coding and type of container for disposal of biomedical wastes

Radha (2009), and Glenn and Garwal (1999) reiterates the findings of world health organization report by citing that *'85 percent of hospital waste are actually non hazardous, whereas 10 percent are infectious and 5 percent are non infectious but they are included in hazardous waste. 15 to 35 percent of hospital waste is regulated as infectious waste'*. If the infectious waste is not handled carefully and gets mixed into non infected waste either by ignorance or carelessness may contaminate the other waste as well and may result in disaster. Acharya and Singh (2000) in their study recommend 'segregation' of general waste and 'biomedical waste' at source of generation itself. Sharps should be put in "puncture-proof containers," and infectious waste bags should be labelled with the biohazard symbol. The study goes on to suggest that, in order to prevent reuse, syringes and needles should be destroyed using the available needle cutters and needle destroyers at the point of generation. Srivastava (2000) in his study observes that generated biomedical waste should be stored in a storage facility having 'a hard surface that is impermeable and has efficient drainage for any spills or leaks' which is inaccessible to common masses but must provide a garbage collection vehicle an easy access in order to transport it to biomedical waste treatment facility i.e., incinerator. Thakur and Anbanandam (2016) in their study have identified hindrances or barriers in healthcare waste management Adhikari and Supakantkunit (2014) have undertaken a cost benefit analysis of health care waste and recommends its financial implications in their study. Oli, et al. (2016) in their study observed that there is a remarkable difference in generation of health care waste in public and private hospitals. It was also observed in their study that the employees those working in public hospitals are better knowledgeable about managing biomedical waste than those employed by private hospitals.

Industry resemblance of Municipal Solid Waste (MSW) with Bio-Medical Waste (BMW)

Owing to its nature, waste is an extremely sensitive topic for the public in general, and health care waste is even more so. It finds a resemblance with municipal solid waste management in many ways. For instance, in India workforce engaged in MSWM and BMW waste management comes from the same community having the lower social and economic status in the society. These kinds of services are avoided to be taken up by

others caste communities. Apart from the formal system of waste management there is a parallel informal system of waste management for example rag pickers who contribute significantly in process of waste management both in MSWM as well as in BMW management and they also belong to the same socio-economic stratum of the society. Many issues can make it difficult for the public to comprehend this waste and the dangers it brings, for instance in March 2009 there was hepatitis-B outbreak in Gujarat's Sabarkantha district where *'total 593 confirmed cases had been registered with 94 deaths of unfortunate victims. Epidemiological Investigations carried out with the help of various departments and Institutions and pointed the use and re-use of unsterilized syringes and needles as the root cause for this unfortunate event'* (Gandhi, 2020). Material remnants from clinical interactions are referred to as biomedical waste. This includes, but is not restricted to, items like old syringes, plastic tubing, blood bags, medications, and containers used to store medications, along with human tissue and bodily fluids.

Anyone who has ever lived in an Indian family will notice⁷ the structural similarities between the biomedical waste recovery sector and general household waste recovery industry. One study on garbage recovery in Delhi, sweepers, waste collectors from caste communities are the primary source of itinerant waste collectors (rag pickers) (workers in human and animal faeces or who worked with corpses or carcasses)⁸. The majority of the biomedical waste recovery market is a smaller division of the broader waste plastics market. The plastics industry is more complicated than paper or glass. This is partially due to the highly specialized nature of the plastics waste recovery sector. The pyramid-shaped structure of Biomedical Waste⁹ is analogous to that of Municipal Solid Waste as described above. In medical waste economies, rag pickers have traditionally been the most obvious labourers, their job include searching through garbage dumped outside of clinics, hospitals, and laboratories to gather specific discarded materials. The Biomedical

⁷ For an analysis of the general waste recovery industry in Delhi, see Kaveri Gill, "Deprived Castes and Privileged Politics: An Urban Informal Market in Contemporary India." *Economic and Political Weekly* (January 14, 2006): 133-141

⁸ *Ibid*

⁹ The Rules define biomedical waste as "any waste which is generated during diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals..." (pp. 1-2)

Waste (Management and Handling) (Second Amendment) Rules of 2000, of the Ministry of Environment and Forest Notification, Government of India, outline the official guidelines for the disposal of biomedical waste in the country. Since the initial set of regulations was issued in 1998, hospitals have been required to separate and dispose of their biomedical waste separately from their general waste.

As a social scientist, it is important to include the waste economies of garbage when studying waste management in India, especially when connecting this component to public health. It has been sought to draw attention to the delicate, contingent, and shifting interactions between those who manage health and those who are governed, between buyers and sellers and between rejected and those who have been grasped.

Understanding ‘Garbage’ through concept of ‘Sociological Imagination’

C. Wright Mills (2000) in his book *‘Sociological Imagination’* describes Sociological imagination as quality of mind through which the ‘personal realities’ of oneself are tried to be understood in connection with ‘the larger social realities’. Sociological imagination cultivates the critical thinking of researcher.

In common parlance garbage means ‘rubbish or waste’, especially domestic refuse, which we normally discard away into garbage bins considering waste, which does not have any worth without bothering about it.

Incorporating Lived Experiences:

With students of undergraduate class in Degree College, where I taught in routine classroom interaction with help of the concept of ‘Sociological Imagination’ the concept of ‘garbage’ was attempted to acquaint my students with this very concept and how useful it is in this discipline. The students of sociology are introduced to the basic concepts like society, community, structure, agency, family, household, marriage, kinship, norms, values, attitudes, equality, environment, inequity in social structure etc. in their introductory course. But students may not be able to grasp or internalize such issues

through textbook with full understanding, hence this exercise was attempted to make the classroom interaction more meaningful.

This assignment involved students to collect garbage which they came across and was generated within household in last 24 hours. The next step undertaken was to weight and desegregate the collected waste, which students did themselves and the purpose was to make them feel the 'gravity or size' of the problem at local and national level beginning with home. The final step involved discussions around the 'experience with garbage' and with flexible choice to submit it in writing if not comfortable in participating in discussion, the purpose of this flexibility was to ensure this participation to share their experience and observations. The third step involved highlighting the evolution of waste management (handling and management) Rules, 2000. This led to unexpected surprising results and responses from the students regarding this exercise with which they learnt how as individuals we contribute in shaping the society and how society in turn shapes us in day-to-day life. The students agreed that they looked at this concept of 'garbage or waste' for the first time from this perspective which was otherwise a taken for granted phenomena for them.

Sociological understanding of Waste, Waste Management and Public Health

Society is a complex reality which cannot be understood in totality from a single perspective. Society as MacIver and Page (1949) would define is the "web of social relationships" which means different actors and institutions engaged in a meaningful way with each other. Max Weber has tried to understand this meaningful engagement or interaction of the different 'actors' through the concept of 'Social Action' wherein he defines Sociology as an interpretative understanding of social action through their causal explanation.

The Functionalism Perspective

Different thinkers have tried to understand the phenomena of development through different disciplinary boundaries from time to time. Emile Durkheim would analyse it as an evolution from simple form to the complex form of evolution. The Simple society

characterized by ‘mechanical solidarity’ where population was relatively scarce and more or less homogeneous with almost identical necessities and complex society characterized by ‘organic solidarity’ with heterogeneous population and with varied necessities. Durkheim borrowed the word ‘Organic’ from Herbert Spencer’s ‘Organic Analogy’ where he has tried to compare ‘Society’ with an ‘Organism’ and postulates that like an organism survives as a result of proper and coordinated functioning of its different parts which are functionally related to each other. In a similar way society is a result of interaction between different parts and institutions which are functionally interrelated to each other. Therefore, it is very important to understand the interconnections or interconnectedness between different aspects of social life.

The functionalist perspective looks at the phenomena of waste management as a consensus, an integration, and stability between different stakeholders in the system and identifies its structural part and the functions of these parts. Functionalism tries to portray a “big picture” of the whole social life, particularly as it finds expressions in patterned, recurrent behaviour and institutions. The perspective can be used to analyse interaction patterns between various aspects of the actors and tries to examine the interconnectedness within waste management system.

The Conflict Perspective

According to conflict theorists, "scarcity" of the resources needed by individuals is the source of conflict in human civilizations. Power, prestige, and resources are constantly in short supply, which means that gains for one person or group are sometimes accompanied by losses for others. Who will win? and who will lose? is determined by who has the most power, or the capacity to influence others' behaviour. Conflict theorists are interested in the processes through which some people or organizations come to power and rule over others. The problem with waste management systems is not how much is available, but rather which people and organizations will get a disproportionate amount of it.

The society has developed over time from the primitive communism stage to the agrarian society and further on to the modern complex industrial stage. Humans have engaged in various degrees of production and consumption as society has advanced from one stage to the next. As a result of this production-consumption cycle, a significant amount of garbage has begun to accumulate and requires equal care. The process of waste management involves the waste management workers who are at the last echelon within the waste management system, but their contribution is not lesser in any sense than anyone else within the waste management system.

Modernism and Postmodernism

What post-modernity is? Can be answered or understood once we understand what modernity or modern society stands for. 'Modern society' refers to the "Enlightenment" era of European society roughly from middle of seventeenth century onwards till 1950 where as postmodern society refers to European and other 'advanced' post-industrial societies from around 1950 onwards.

Modernism as a movement came around 1910. What led to modernism? The conditions around 1910 gave rise to theories of modernism. First of all, let us understand the difference between the term "Modern" and "Modernism" though they seem to be a like. The term modern can be defined by way of historic sense. Modern means when you do not adhere to the previous existing traditional values. In that case every age is a modern age. For instance, our parents call us modern generation when we do not follow the values or principles of our parents' generation. But if we ask our parents, they would say that their parents (our grandparents) would say the same thing to them i.e. you guys are modern, because each generation drifts from previous generation, and this drift is modern. Modernism, as stated earlier, as a term or a literary movement began around 1910.

Postmodernism is another literary movement which began after Second World War i.e. 1945. Post-Modernists argue that postmodern society is different from modern society as it requires 'new theoretical frameworks and methods of study'. Postmodernists emphasise that 'the pillars of faith' or the institutions which were considered stable in modern

society and used to bind us together, have been weakened by the rise of globalisation and new media technologies and therefore it requires new methods and theoretical frameworks of study.

Key features of modern societies:

- 1) Industry based economic production which led to capitalism: Marx argues that this kind of industrial society was divided into two classes' viz. industrialists and the workers (who sold their labour).
- 2) Urbanisation and growth of cities: since the production moved to the industries which led to the migration of people from rural areas to the cities in search of employment.
- 3) A strong bureaucratic state: central and local administration: From administrative point of view in order to have a strong control over the masses a central, state and local administrative bureaucratic set up was evolved by the government known as 'welfare state'.
- 4) Emphasis on 'Scientific and Rational Thinking' rather than superstition: in modern society there was a heightened emphasis on causal explanation of a phenomena based on scientific and logical thinking rather than merely considering it as an 'act of god'. Technological progress based on science was viewed as a necessary condition for making a better society.

The classical sociologists like Emile Durkheim and Karl Marx created theories such as functionalism and Conflict theory in order to explain the working of society and tried to address the basic questions 'what holds societies together'? and 'how does societies change'?

Postmodernism

The late 20th Century literary movement, known as Postmodernism is characterized by a widespread skepticism, subjectivism or relativism, and an intense sensitivity to the role of ideology in establishing and maintaining political and economic power. The postmodernist movement contends that the institutions and lifestyles that characterized

modernity have largely been replaced and that today's society is fundamentally different from that of modern society.

What led to Postmodernism?

When the pillars of strength viz. faith in God, faith in king, faith on human mind, faith in democracy, our faith in science, everything was shaken and that led to the postmodernism where the major principle was 'fragmented universe'. There was nothing on which we could rely up on; there is nothing where we could get out of the problems. This was modernism. This socioeconomic condition is going to help us why writers like T.S Eliot in 'The Waste Land', Virginia Woolf in 'To the Light House' were writing what they were writing. They were right when you do not have anything to rely on how you are going to live the rest of your life.

Despite the fact, that the foundations of religion were shaken throughout the 1920s and 1930s, modern man continued to think that solutions are possible, and all of these writers were writing at the time when they used the idea of solutions as a central theme in their works of literature. But then situations kept on becoming worse if we look at post First World War period, we find that there was great depression, then came different cold war and finally came Second World War and during all this period European countries were gradually losing their colonies as a result their power was reduced.

Apart from this these European nations became countries of multi ethnicity. People from different colonised world like Africa, India started living there and this contradiction of multi ethnicity came into being. So, if we look at this postmodern world, we will find that writers stopped looking for the solutions, there was 'problematization' of the problems. 'Being aware' is considered to be a form of rebellion where as in modernism there is still search of solution but in postmodernism world people started to believe that there is no solution, there is a focus on 'problematization of the problem'.

Key Features of Postmodern Society:

Post Second World War conditions have altered the society and social interaction at local, regional, national and international level to a large extent. What makes contemporary society different from modern society can be examined with help of the following characteristics:

- 1) Cultural Diversity and hybridity: After Second World War when the people from different colonised world like Africa, India etc. started living in Europe as a result European nations became countries of multi ethnicity and thus contradiction of multi ethnicity i.e. cultural diversity and hybridity came into being. If we compare society 50 years in retrospect to present time, we are bewildered to see the diversity of social and cultural forms for instance shopping mall culture renders a huge range of products one can buy and same stands true of services.
- 2) Globalisation: After the collapse of Soviet Union in late 1980s which led to monopoly of 'capitalist ideology' accelerated the process of adoption of new economic policies this leading to accentuation of globalisation, with increased connectedness between societies across the globe. There was increased flow of ideas, information, money and people beyond national borders.
- 3) Media: The importance of mass media is another determining feature of postmodern world. The rise in digital media has transformed the contemporary society beyond expectation. The invention of internet has led to unprecedented usage of media by the people. This has led to what great postmodernist thinkers like Jean Baudrillard call "*Hyper Reality*"¹⁰. What is *Hyper Reality*? Let us look at it with a simple example. Before modernism people used to manufacture 'Objects' which were known as 'hardware'. Later computers came, technologies came now in computers, technologies, mobiles what do we have is 'software'. We have apps, software, they are also manufactured but they are not objects. For example, if we look at minion, it has become a very popular character. But do we have a minion in reality. We have copies of minion in reality. When we have copy of something which in reality does not exist is what Jean Baudrillard calls as

¹⁰ https://www.mlsu.ac.in/econtents/2289_hyper%20reality%20boudrilard.pdf

hyper real. Hardware is reality, we can see it as it is tangible but software is intangible. It is manufactured but it is not in physical forms so that is hyper real. Jean Baudrillard in his book 'The Gulf war did not take place' said that first gulf war did not take place, it did not exist, it was hyper real that was the basic premise of Jean Baudrillard. He said all what we see on media, television, radio is actually hyper reality. They are trying to tell us what is real? But we do not know whether it is real or not. We brought Disney movies but does Disney exist in reality? No, it does not. So it is hyper real, this is what Jean Baudrillard calls hyper real.

- 4) **Fragmented World:** Post modern society is quite fluid and dynamic due to fast pace of change as compared to the modern society; as a result, it lacks 'stable social structure' and coherence. Postmodernism as movement came into being when people unanimously believed in the fact that they are left with no 'pillars of faith'. We as human beings always want to rely on something to get strength from something and there were lot of pillars of faith for each of us during the period of Victorian and romantic period and gradually human beings saw that all these pillars of faith were shaken and no longer they could rely on them because of which they found that entire world is 'fragmented' and they have no scope for betterment. For instance, these days there is an emergence of culture of 'portfolio worker' which has replaced the concept of welfare state's "job for life". In contemporary days new economic policies i.e. Liberalisation, privatisation and globalisation have accentuated the notion of 'fragmented world'. The companies employ workers through recruitment agencies which can fire them at short notice. Today much of the work is temporary and part time.
- 5) **The Consumer society:** Baudrillard (1998) terms contemporary society as a consumer society where "*consumption is defined not any longer as a functional practice of objects – possession, etc., or as a mere individual or group prestige function, but as a system of communication and exchange, as a code of signs continually being sent, received, and reinvented – as language*". For Baudrillard consuming things and leisure activities are more important today than work. Post modernists argue that due to 'individualism' people are free to choose their life style and life course, leading to a culture of 'pick and mix' society.

Actor-Network Paradigm in waste management

Within Sociology of Waste, through a "network analysis" paradigm, one may comprehend the positions and functions of the numerous players and stakeholders involved in waste management. Urban local governments in India are required to manage municipal garbage within the difficult sustainability and competitiveness paradigms. In order to avoid negative health effects of generated waste with in various waste streams on public health and the environment, this research work tries to argue and emphasize the need to take a grounded approach to building insights into these networks of waste and networked political, economic, and social processes of waste management for sustainable development.

Within sociological parlance while analyzing the issues of value of money associated with waste, by making the distinction between "global networks" and "global fluids," we can theoretically investigate them as has been explained by Urry (2005). A "network" is described as a collection of nodes that are connected and related to one another; it is an open, dynamic structure. Consequently, "global commodity chains" can be used to describe the global economy. (Gereffi, 1994). The waste issue, which is in fact related to commodities chains, is likely best understood as a "global fluid." those are, according to Urry (2005), *'flows or waves of people, information, objects, images, risk and networks across regions in heterogeneous, uneven, unpredictable and often unplanned shapes'*. Money is one such flow, and waste is another: the former is visible, beneficial, and widely researched; the latter is typically invisible, viewed as being unproductive, and most definitely not well researched. Both have the capacity to bring tremendous change in society and environment.

Through this research work within sociological understanding an attempt is being made to understand or decipher the sociology of what O'Brien call the 'rubbish society' or 'throwaway society' with its concurrent 'rubbish values' and would articulate that in using waste as an entry point, and its impact on health we can begin to understand the sociological complexities of the above-mentioned relationship between social change,

environment and public health. It tries to explore on the situation of regulations regarding waste management in India as one possible site from which to begin to build insights into networks of wasting and the networked political and social processes of waste management and governance specifically in Shimla.

Network paradigm provides a way of understanding waste through the sociological lens of what Latour (1998) calls 'global circulations' or Appadurai calls 'global flows' through ethnoscaples, technoscaples, financescaples, mediascaples and ideoscaples (Appadurai as cited in Hannigan, J. 2002). A general network approach or logic is one potential framework through which sociology of waste can be developed at a general and a specific level, to understand the governance of waste management in India and specifically in Shimla. The concept of networks attempts a shift in sociological interest beyond the agency/structure and macro/micro binaries to a poststructuralist understanding. In this context the circulating entity of the 'social' is seen as a process of interactive effects comprising of both material and human forms. Therefore, an analysis of the waste management system through a network approach allows the space for what (Law, 1992) calls 'relational materialism'. Within this framework rubbish itself such as stinking landfills and the waste bin in our kitchen is networked with interactive effects in chain of point of generation to the point of disposal in 'throwaway society'. In other words, society is a 'heterogeneous network' (Law, 1992) composed of both people and material things. Machines and people within the waste management system all contribute to the process of patterning the social or creating the 'social order'. A network paradigm methodology establishes the network to be the key unit of analysis wherein the actors are identified and their relations and the structural effects of these relations are analyzed. For instance, within waste management system there are households, safaikaramcharis both from formal and informal system, urban local bodies and other agencies involved in the entire process who are networked and interacting with each other for the waste management.

Law (1992) explains how *'Actor-Network theory suggests that we should be 'exploring social effects, whatever their material form, if we want to answer the 'how' questions about structure, power and agency'. The use of actor-network theory as an analytical*

tool makes it possible to frame waste itself as a material outcome of social relations'. For instance, the contents of the garbage bin in our kitchen or garbage from the point of generation become active and mobile after a certain point in time, in its very materiality whether it has been named bio-degradable, non-biodegradable, biomedical, toxic, nuclear, domestic or agricultural, it creates environmental change. It remains a fluid effect whether dumped in the land, burned in an incinerator, or buried at sea.

An Actor-Network approach to waste is helpful in a number of ways as on one hand notion of 'global networks' and 'global flows' is flexible enough to allow the contextualization of waste at both global and local, on the other hand Actor-Network analysis provides a methodology for approaching the analysis of waste management strategy through interactions of the key players and material conditions.

Given this understanding of development processes and evolution of urban spaces vis a vis urbanization process and transformation of urban spaces which have not only impacted environment and the health of the cities but the residents within the urban centres. With help of literature review in this study an attempt has been made to understand the ongoing societal transformations. Human beings in pursuit of comfortable and luxurious ways of life have been exploiting nature and exerting pressure on the environment and have caused imbalance to physical and social spaces by the producing, consuming and wasting of natural resources, resulting in generation of huge amount of waste. To understand the gravity of this problem, it is imperative to have knowledge of formal waste collection system and informal waste recovery process to understand the mechanism of the waste management system. This study attempts to look beyond and seeks to understand the health of the waste management workers within Waste Management system in city of Shimla, which is the state capital of Himachal Pradesh.

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Himachal Pradesh: Mapping Geographic and Socio-demographic Characteristics

Geography

Himachal means Him + Anchal which means ‘the abode of Snow’. The term deeply fascinates, so is its mountainous beauty. Himachal Pradesh is a hilly state situated in Himalayan region of great Himalayas. The hills of this region receive snowfall every year and which is a centre of attraction for the tourists not only from India but across the globe. This gives exposure to the native population of the region and vitally influences the culture, language, polity, and society by way of resource use. Predominantly an agrarian society now is under the sway of transformation and the impacts are very much visible around us.

Himachal Pradesh is surrounded by Jammu & Kashmir, Ladakh, Punjab, Haryana, Uttarakhand, Uttar Pradesh and China. Geographically it extends between 30° 22’ 40" N to 33° 12’ 40" N latitude and 75° 45’ 55" to 79° 04’ 20" E longitude. The total physical area of Himachal Pradesh is 55,673 Sq. Km. and ranks 17th among the States and Union territories in India. It is a small hill state, with altitude varying from 300 m in Kangra and Una to nearly 7000 m in Central Himalayan range of Lahaul and Spiti.

Demography

Himachal Pradesh is a hill state with 12 districts which came into existence with mergers of 31 princely states, with variety of cultural combinations and multilingualism. According to the latest Census the total population of Himachal Pradesh is 6,864,602¹ and ranks 20th among the States & UTs. It comprises 1.7% of the total physical area of the country and 0.57% of the total population, with a density of 123 persons/km², it ranks 27th among the states and UTs which is much below the all-India average of 382 persons per sq. km. The

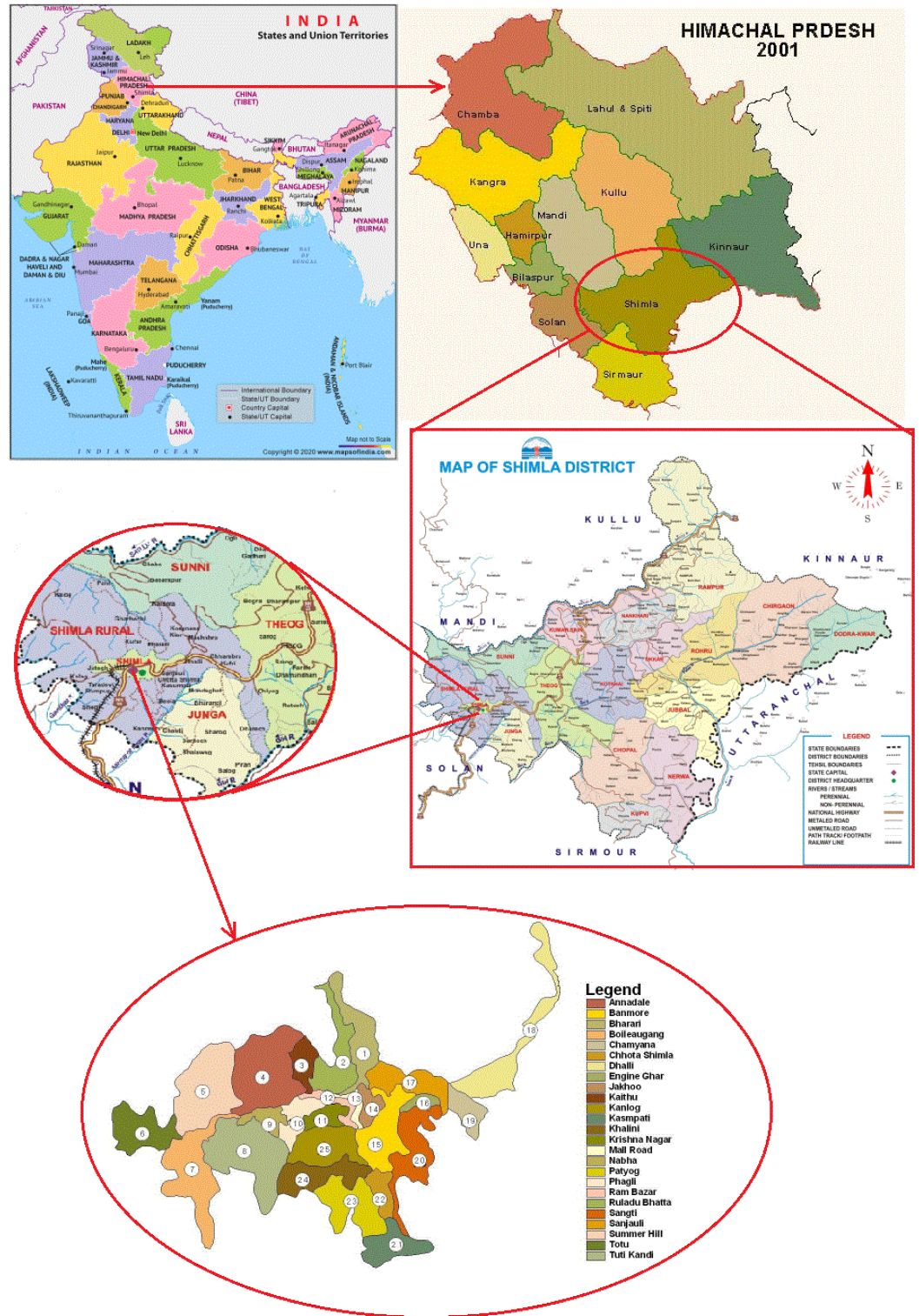
¹ Census of India 2011

urban population constitutes 10.03% of total population of the state, the lowest among all states and UTs. With literacy of 82.8 % it ranks 11th in India.

History

The stories and folklores have varied versions about the history of Himachal Pradesh. It finds prehistoric existence along with Kulut riyasat (Modern Kullu), Trigarta of Mahabharata period (modern Kangra), the period of influence of Guptas, Mauryas and other small princely states known as '*thakurais*' of these kingdoms. The state of Himachal Pradesh further witnessed the colonial era with the establishment of various hill stations in the era of British Empire. Shimla became the summer capital of British India, after the division of Bengal. It still houses the old buildings showcasing the English Grandeur. After Indian independence in 1947, the demand for merger of the Hill states resulted in formation of the Chief Commissioner's province leading to the formation of Himachal Pradesh as Part 'C' state (Union Territory) of Indian Union on 15th April 1948 comprising of four districts viz. Mahasu, Chamba, Mandi, and Sirmaur by integrating 31 big and small hill states. In 1956 with merger of Bilaspur riyasat with Himachal Pradesh number of districts rose to 5. In 1960 the border Chini tehsil of Mahasu district was carved out as a separate administrative unit raising the number of districts to six and on 1st November, 1966 with 'Re-organization of Himalayan hill states', with areas of Kullu, Kangra, Shimla and some hilly areas of Hoshiarpur district and Dalhousie of Gurdaspur district of Punjab were merged into Himachal Pradesh creating four new districts viz. Kullu, Lahaul-Spiti, Kangra and Shimla in Himachal Pradesh and merging Dalhousie into Chamba district. With this enlargement with an area of 55,673 sq. km and a population of 28.12 lakh according to 1961 census the number of districts in Himachal Pradesh rose to 10. Himachal Pradesh was conferred statehood on 25th of January, 1971. On 1st September 1972, Hamirpur and Una districts were carved out by trifurcation of district Kangra. Shimla and Solan districts were formed after the reorganization of Mahasu and Solan leading to formation of total 12 districts in Himachal Pradesh. Himachal Pradesh is famous not only for natural scenic beauty which attracts tourists throughout year but also for its handicrafts. The paintings, shawls, carpets, and woodwork are worth mentioning. Pashmina shawl, Himachali caps are also the products which is in high demand not only in Himachal Pradesh but all over the

Figure 2.1 shows the location of Himachal Pradesh, district Shimla, Shimla city with wards where the study was undertaken



Source: Prepared by researcher from physical map of Himachal Pradesh and ward map provided by Municipal Corporation Shimla

country. The local music and different dance forms popularly known as *nati* reflects the cultural identity of the state. By way of these dance forms and music, people of Himachal Pradesh praise their deities during local festivals and other special occasions.

Evolution and Development of the Shimla City

Shimla town during colonial period

The town of Shimla, existed as a small hamlet, probably called *Shayamala* at a point of time, before the Britishers discovered this piece of land that was very similar to their homeland in terms of ecology and climate. It is said that some of the original indigenous settlement existed near a spring located somewhere in the present-day Ram Bazaar-Ripon Place area. It should be clear though that there is no physical evidence to prove that this is a correct assumption. The Jakhu Temple dedicated to Lord Hanuman is also said to have been present much before the inception of the town and has been recollected as the abode of a fakir where water and food were made available to the visitors.

From a nondescript village whose name is variously reported Shimlu, Shemalaya, Shumla and Shemla, the town went on to become the ‘summer capital’ of British India. As mentioned by Buck (2005) *‘Simla derives its name from ‘Shyeamalay,’ the house built of blue slate erected by a fakir on Jakko, the first nucleus of the settlement. But this derivation be it noted, is regarded by many people as fanciful and farfetched, and probably ‘Shimlah,’ or ‘Shumlah’ as pronounced by the hill people, is the actual word from which the station takes its present name’*

About the nomenclature of this city another anecdote ascribes the origin of the place name to shamla – blue or dark lady – another name for the Hindu goddess Kali who is held in high veneration in these hills. In English, the spelling ‘Simla’ was used for the most of the town’s life while the start of the name had a gentler ‘Sh’ in the vernacular languages and was spelt ‘Shimla’. In 1980s Shimla became the official spelling for the town.

Shimla finds its first mention in the journal of Alexander Gerard as Simla in the year 1817. As per the historians wood and thatch shacks were a common shelter for the visitors before

1822 which is when it is said that the first durable construction of a permanent residence was done by Captain Kennedy. The Kennedy Estate (Plate-1) consisted of the main residence, a cottage and some outhouses. The main building does not exist anymore and its exact location was where the Vidhan Sabha library and the parking exist at present. The Kennedy Cottage is presently CPWD Executive Engineer's Office.

Plate 1 – Kennedy house about 1824



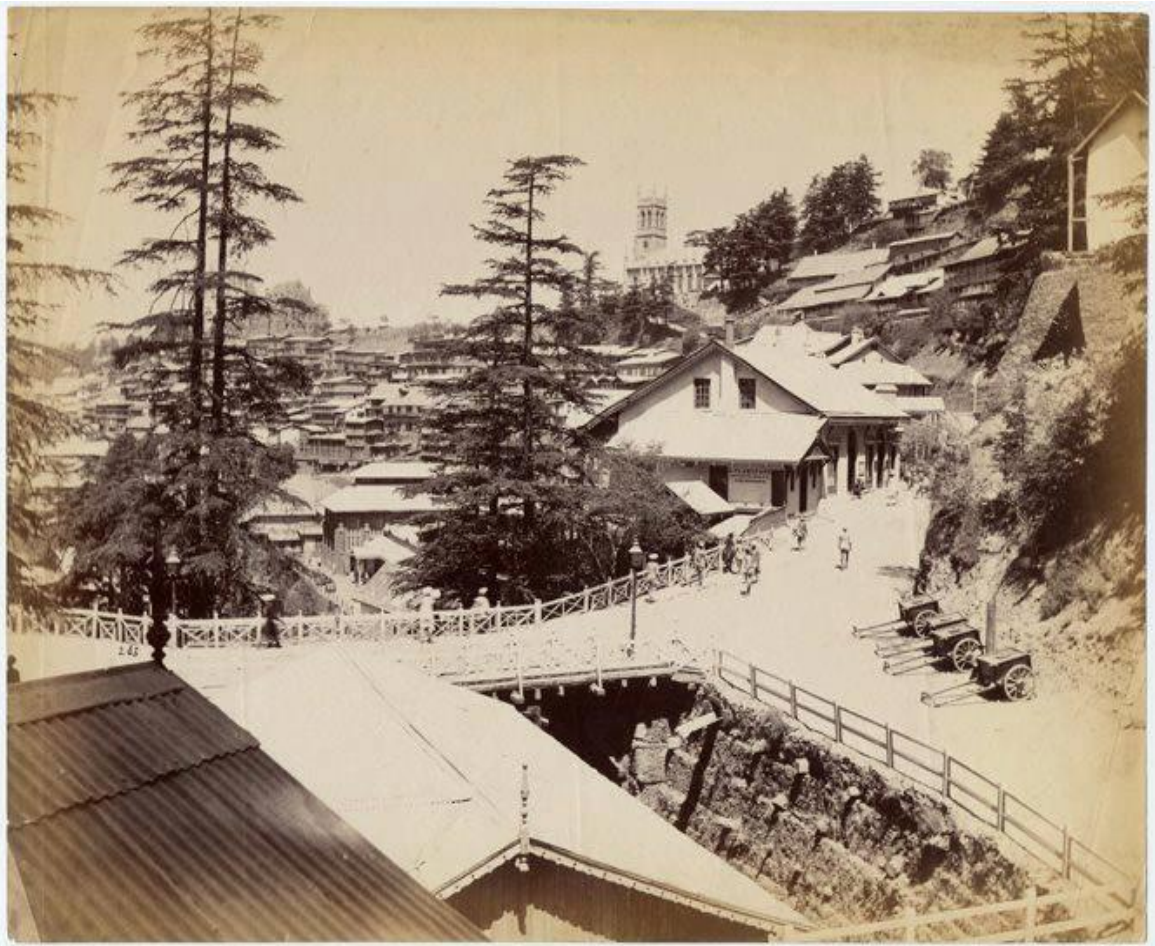
Source: <https://images.app.goo.gl/hoRcFqkTy4WLMdh7>

The hill station of Shimla was established as a sanatorium and for quite some time the Britishers visited the town with hope to recover in a comparatively friendly climatic condition. The town grew and by the year 1831, it is said that, there were sixty permanent houses in Simla. By this time the bureaucracy had started visiting the town. Lord Amherst was the first Governor General to visit Simla in 1827 followed by his successor William Bentinck in 1828. Lord Combermere, the Commander in Chief, also visited Simla in 1828 and the first proper road of the town was superintended by him round the Mount Jakhu.

This road is the main pedestrian spine of the town, a part of which is the famous Mall Road. The bridge across a deep ravine that made the connection of the main area of the town to Chhota Shimla was also due to his efforts.

The bridge was called the Combermere Bridge (Plate-2) and there was a residence placed right beside the bridge called the Combermere House. The building has now been replaced by a multi-storeyed concrete structure that is popular now for being the hub of two major fast-food chains namely Pizza hut and KFC. The legacy of the name is carried forward by Hotel Combermere that is also a modern construction and is built right next to the original building site, probably a sold-out part of the original property of Combermere House.

Plate – 2 Combermere Bridge



Source: <https://images.app.goo.gl/qdDhrbAPNGHZRH067>

1829 saw the construction of the first residence of a Governor General in Simla, namely the Bentinck Castle. This site was a ground for many buildings. The Bentinck castle was followed by The New Club which was then replaced by the Peliti's Grand Hotel. The original building of this hotel was engulfed by fire. This site is now occupied by a CPWD owned guest house which still carries the name Grand Hotel. From 1842 to 1848 Auckland House (Plate-3) which is situated on the Elysium Hill, served as the residence for the Viceroy and was also called the Government House for some time.

Plate-3A Auckland house



Source: received from Ramesh Sharma in pen drive

At present this building house one of the oldest girls' schools of the town which till date goes by the name of Auckland House School.

Plate-3B Annadale



Source: https://en.wikipedia.org/wiki/Annadale,_Shimla#/media/File:Old_photo_of_Annadale,_Shimla.jpg

Establishment of Municipal Government in Shimla

By the decade of 1840s, the town had taken the shape of a proper settlement with public buildings as well as residences. The town was becoming vibrant and many public activities were taking place like theatrical performances, art exhibitions, etc. Annadale, the biggest piece of plain land in Shimla, was used for holding exhibitions, balls, games and fairs. (Plate-3B)

The town had a library, a reading room and a billiard room. It had a main market, an upper market and a lower market in the heart of the city. The upper market was consumed by a devastating fire in 1875 and since then the place is an open plaza called the Ridge (Plate-4).

Plate 4 – Ridge



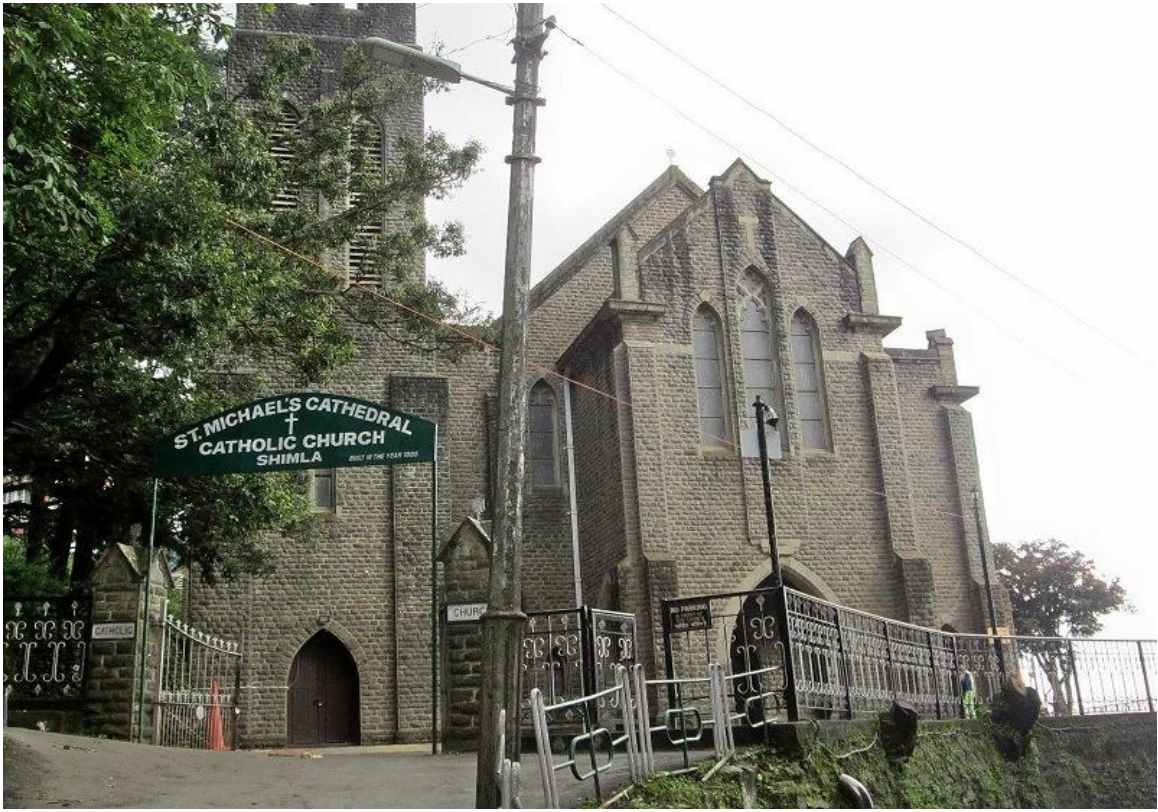
Source: received from Ramesh Sharma in pen drive

In the year 1851, municipal government was introduced in the town. An example of a planned market space that was formally set up is the grain market just below the Lower Bazaar. In 1848, William Edwards, the then deputy Commissioner of Simla and Superintendent of Hill States from 1847-1852, planned a grain market that was called Edward's Gunj and is still known as the Gunj.

Religious Institutions in Shimla

Religious institutions were setup. The first Freemasons meeting was held in Shimla in 1838, the Christ Church was planned and the cornerstone was laid in 1844 and not neglecting the activities by the Indians, Kali Bari Temple was built in 1845. The St. Michael's Cathedral was built in 1885 (Plate-5).

Plate-5 St. Michael's Cathedral



Source: Clicked by the researcher during field visit

Apart from these landmarks many other small religious institutions can be observed in various parts of the town. Middle Bazaar has an equal mix of religious centres for various communities, it is noticeable that along a below Lower Bazaar, mostly Hindu and Muslim religious landmarks exist. The Kashmiri Mosque and the Arya Samaj Mandir are two buildings that lie along the main Lower Bazaar Street and are prominent landmarks.

Urban Development of the town during the colonial period

As the footfall in Simla increased, cantonments like Jatogh, Dagshai and Solan were built on the way to Simla from plains in 1843, 1847 and 1861 respectively. The Governor Generals and Viceroy were now visiting Shimla regularly. After 1862 Peterhof was the permanent residence of the Viceroy till the construction of Viceregal Lodge was completed in the year 1888 (Plate-6).

Plate-6 Viceregal Lodge



Source: received from Ramesh Sharma in pen drive

The Viceregal Lodge served as the Rashtrapati Niwas after independence till 20th October 1965 when the building was officially given to the Indian Institute of Advanced Study (IIAS) after Dr Radhakrishnan took the decision to hand it over in order to be used by the academics of the country in 1964. The building is a protected monument now and was brought under the jurisdiction of the Archaeological Survey of India.

During Sir John Lawrence's tenure as Viceroy, in 1864, Shimla was made the Summer Capital, that is, the summer headquarters of the Imperial Government. And accordingly, the Viceroy and his Council shifted their office from Calcutta to Shimla for seven months (April to October) and in the same year decision to permanently locate an Army headquarter in Shimla was also taken.

The yearly shift of the government gave further impetus to the town to grow and by the year 1870 the number of recorded houses was more than 290, within 10 years the number of houses shot up to 1141. By the year 1900 Shimla had all the amenities in place. Three

major schools were set up, namely Bishop Cotton School, Auckland House and Convent of Jesus and Marry in the mid-1800s and the Loreto Convent Tara Hall was built in 1885. An orphanage and school called the Mayo Orphanage was instituted in 1871 and this site is now occupied by the Government Degree College, Sanjauli. Ripon hospital; was opened in 1882. Efforts to organize civic amenities were made and water reservoirs were planned at various places inside the town. Meanwhile in 1871, the Government of Punjab also decided to use Shimla as its summer capital. As the annual shift of Punjab Government was also a phenomenon, the Punjab Government Secretariate was completed in 1899 and the building id till date known by the name Elerslie. This now houses the Secretariat of the state of Himachal Pradesh. The access to the town was also improved. The Hindustan Tibet Road was finished in 1856 and the Kalka-Shimla Railway commenced its services in 1903 (Plate-7).

Plate 7 – Kalka-Shimla railway Line in 1903



Source: received from Ramesh Sharma in pen drive

The old Town Hall was built in 1887 which had huge hall for meetings and balls, a library, a police station, an armoury, a place for the Freemasons and the famous Gaiety theatre (Plate-8)

Plate-8 Gaiety Theatre



Source: received from Ramesh Sharma in pen drive

Throughout this time the Indian population was also increasing because of the work prospects that the growing town had to offer. From labour for construction, rickshaw pullers, load bearers, servants in residences, to shop owners, merchants and clerks in offices; the local population with time became the wheels on which this European vehicle was moving. The summer census of 1921 lists the total population of Shimla as 43333 out of which only 4803 were Europeans and 38530 were Indians.

The major landmarks that mark the character of the town were mostly built or created by the year 1930. The town had major services by then; in 1912 hydro-electric power commenced, the telegraph office was set up in 1922 and the water supply scheme was completed by 1924. For a brief period of two years, Shimla also served as the headquarters

of the Burmese Government from 1942-44 during the Second World War. The town was almost a dead town during the 1940s.

Shimla after 1947

After Indian independence in 1947, the demand for merger of the Hill states resulting into formation of Chief Commissioner province leading to the formation of Himachal Pradesh as Part 'C' state (Union Territory) of Indian Union on 15th April 1948 comprising of four districts viz. Mahasu, Chamba, Mandi, and Sirmaur by integrating 31 big and small hill states. In 1956 the Punjab Government shifted to the newly made capital of Chandigarh. Shimla district was merged in Himachal Pradesh in 1966 and Himachal was granted statehood in 1971. Shimla town regained its glory in a new form when it was expected to rise to the new challenge of being the state capital of the young state.

Since then, Shimla has witnessed many developmental challenges. Initially, it was probably a wise choice to make Shimla the state capital as the entire basic infrastructure required for an administrative capital was already in place. But as the population pressure grew in administrative capital, it further increased the need of new construction and thus the pressure on the existing infrastructure has also reached breaking point. The services in place were sufficient for a resident population of a maximum of 45000-60000 people. The resident population of the city that is governed by the Municipal Corporation is 169,578 as per 2011 census. The Shimla Metropolitan Region, which includes Jutogh, has the population of 171,640. The present population is therefore approximately three times the population for which the services were designed and implemented and this is excluding the new continuous tourist influx.

Shimla is a major tourist destination because of its scenic beauty, its comfortable climate and its rich history. The tourist influx has increased manifold in the past decade itself. A lot of construction is taking place because of the need of more and more infrastructure for the tourist industry. The local population obviously sees a lot of economic potential in this and therefore numerous hotels and guest houses are being built. Many travel agencies have come up, tour guides is a major profession here and the biggest change is seen in the main

shopping area. The shops that were once based on small scale industries and local independent businesses are now being converted to branches of big global brands and food chains. The biggest noticeable problem in terms of infrastructure is being witnessed in terms of the increasing traffic on the main vehicular road, the frequent traffic jams, the increasing need of parking facilities, the decreasing forest cover and the growing problem of water shortage in the town.

Urbanization process is an index of transformation of traditional rural economy into modern industrial one. This leads to a progressive concentration of population in urban centres. Natural growths of population, migration, reclassification of habitation are the determining features which lead to transformation of 'natural environment' into 'built environment'. This built environment has become the major area of concern as it has given rise to environmental pollution but a threat to public health as well.

Geographical Setting

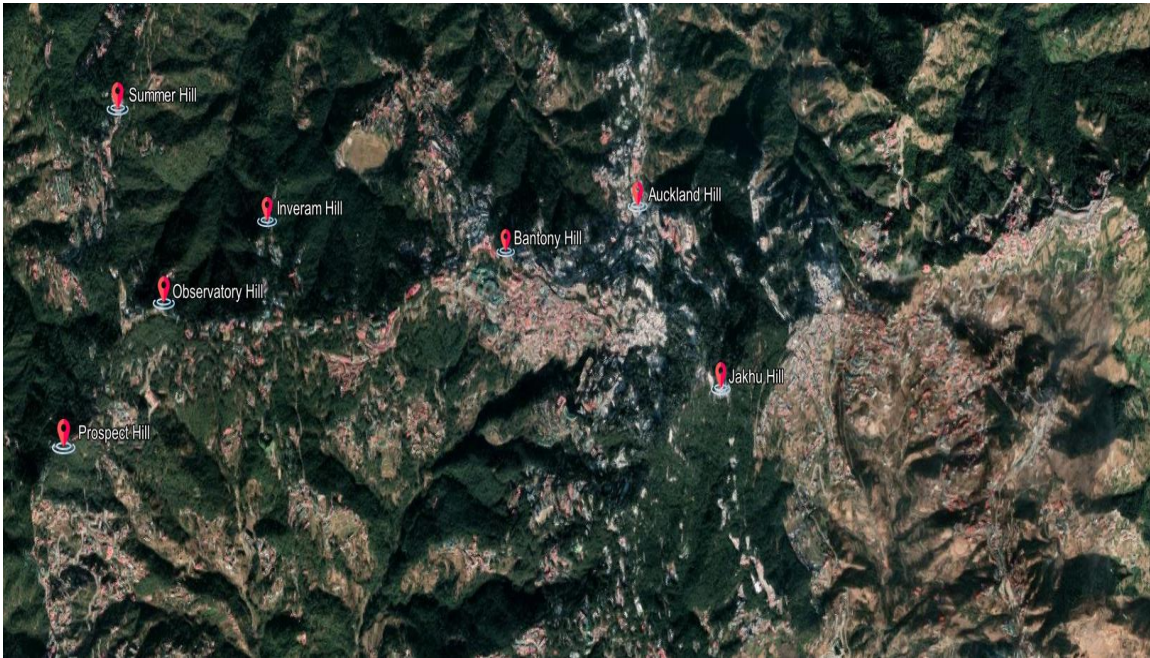
Shimla district is a part of north-western Himalayan Agro climatic region of Himachal Pradesh. It is located in the south of the Himachal Pradesh at an altitude of 2130 m. The highest point of Shimla is the top of the *Jakhoo hill*, which is 8050 feet or 2454 meters. On North East side boundary of district Shimla is surrounded by Kullu and Kinnaur district, on Southeast and West by Sirmour district and Dehradun district of Uttrakhand and North West by Solan and Mandi districts. The town of Shimla is built over several hills and connecting ridges as shown in Figure 2.2. These important hills are namely Prospect Hill (7140 ft), Summer Hill (6900 ft), Observatory Hill (7050 ft), Inverarm (also called Mount Pleasant), Bantony hill, Jakhoo Hill (8050 ft), and The Elysium Hill (7400 ft). Shimla is also known as the Queen of the hills for the fact that it is surrounded by Seven Hills. These seven hills are also referred to as 'seven sisters' owing to their location closed to each other. Historians and different writers have written a lot about these hills as they form an important part of the Shimla and at present also the expansion of Shimla city is taking place on and around these hills.

The final years of Eighteenth century and opening decade of nineteenth were a period of considerable turbulence in the hills of the Western Himalaya. The armies of Nepal had spilled over their borders and wrested control of large tracts of North India-including most of present-day Himachal Pradesh. Deprived of their territories, many of the local hill chiefs approached the powerful East India Company for help. For a long time this assistance was not forthcoming but the turning point came when 'Gurkhas' began making damaging forays into the indigo plantations of today's Uttar Pradesh. The crop was vital for the 'Company Bahadur' as indigo was used to dye the uniforms of Royal Navy. Immediately British army raised war against the Gurkhas who were defeated in 1815 and the Treaty of Saghauli was signed the following year.

After defeating Gurkhas, the British rulers though restored most of the hill kingdoms to their original rulers and decided to retain certain key positions as military outposts and as sanitarium.

They acquired these hills and constructed the city of Shimla. They routinely transferred their capital every summer to Shimla. Also, they constructed various office buildings and various residences for the senior and junior officials in Shimla. These hills were named as per their importance such as observatory hill, prospect hills or after the names of the British officers whose residences or offices were established on these hills and the legacy still continues.

Figure: 2.2 Names of Seven Hills of Shimla on which Shimla City is situated



Source: prepared by Researcher with use of Google Earth

Regional Linkages of Shimla

Shimla was initially accessed by two-wheel carts drawn by ponies under the auspices of the “Mountain Car Company” during the British rule which eventually paved way to Grand Hindustan-Tibet Road owing to its trade route to Tibet and this crossed through Shimla. The main road of Shimla which is still known as ‘Cart Road’ crosses through middle of the city. Shimla is connected by road, rail and air. Shimla is connected by road with Delhi (300 km), Chandigarh (117 km) and Kalka (90 km). Shimla is connected by narrow gauge railway line from Kalka (90 km), the Kalka-Shimla railway line was completed in 1903. Shimla Airport at Jubbarhatti, 23 km from city is connected to Chandigarh, Kullu and Delhi.

Census classification of Shimla City

According to 2011 census, Shimla is the only Class I town/city in entire State of Himachal Pradesh with majority of towns falling under Class V and Class VI category. This in itself explains the dominance of this town in the State in terms of facilities, amenities and opportunities, resulting in population and related infrastructural pressure on the city.

Shimla is a multi-functional city with dominance in tourism, administration and institutional activities. Apart from being the administrative centre and capital of Himachal Pradesh, Shimla is also the nerve centre for all social, cultural, educational and tourism activities. The multi-functional activities are putting heavy stress on development activities leading to unregulated development and congestion in the core area as discussed and shown in chapter 3.

Demography

City life and urbanization are indeed the defining characteristics of modern industrial human society. Though the development of a particular city, town or a region depends upon natural, physical and socio-economic factors but the demographic characteristics of the population heavily determines the developmental pace, process and direction. The population among these factors assumes significance in determining the future pattern of progress and development. Shimla, the only Class I city in the Himachal Pradesh, has a population of 1, 69,578 persons (2011 census), which accounts for 21% population of the total population of Shimla district.

Apart from the permanent population, floating population and tourists constitute a sizable proportion in Shimla city. According to the estimates of Town and Country Planning department, Shimla had about 76000 persons as floating population by 2011 and which is expected to reach 100000 by 2021(Source CDP). Similarly, tourists (having average stay in Shimla for 1.35 days) constitute a larger share in city's demography. Total tourist influx (domestic and foreigner) was about 22 lakhs in 2009 (Source: City Sanitation Plan for Shimla) with immense seasonal variations. The months of May and June are peak for domestic tourists, while September and October are peak months for foreign tourists.

Shimla being an administrative center of the state, the majority of economic activities are located within the city. Unlike rest of cities in Himachal Pradesh, which is predominantly an agrarian economy, Shimla is a service sector-oriented city. About 89% of the workforce is absorbed in the tertiary sector (mainly tourism, transportation, academic institutions, government services etc.), 10% in the secondary sector (small scale manufacturing and

construction) and only 1% of the workforce is in the primary activities (City Sanitation plan for Shimla, 2011).

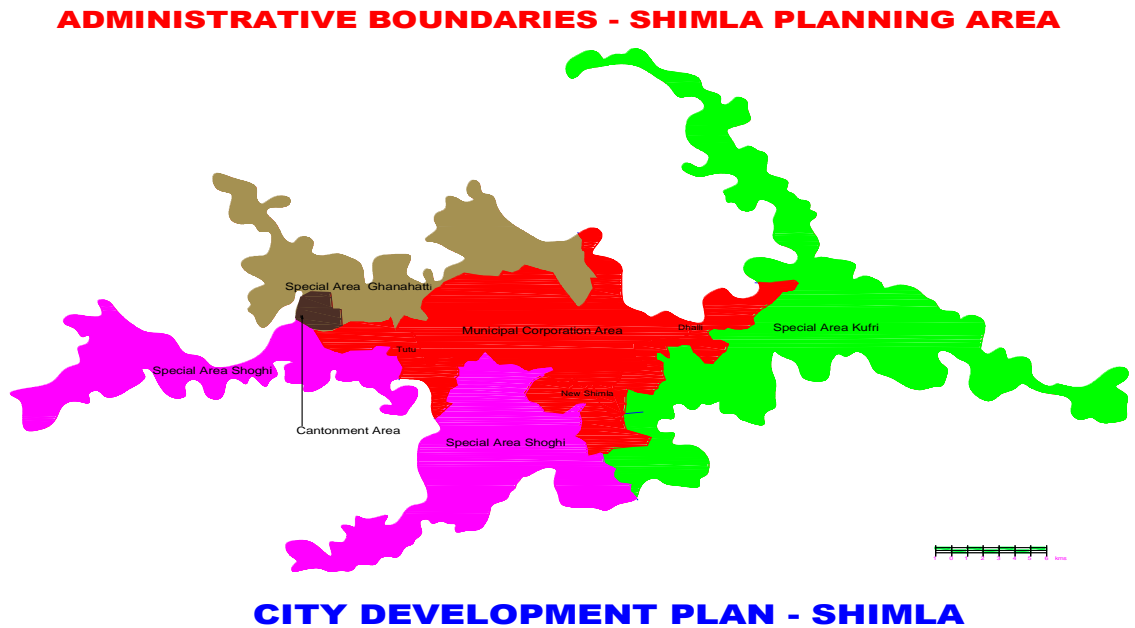
Spatial-Temporal Growth of the Town

Significant area growth was registered by the town when it became the district headquarter of district Shimla and the state capital in 1971, in all the directions especially along the national highway in Ribbon-Pattern. The town recorded a tremendous increase in its population and the built-up area due to expansion of town. Shimla is the most urbanized district in Himachal Pradesh and Shimla city alone contains 21 percent of the population of the Shimla district. The peripheral area, encircling the town was taken away by the urban expansion and the open spaces began to be filled up by the residential buildings along both the sides of the road. As per 2011 census, Shimla city is spread over an area of 35.34 km² and having population of 169,578. Shimla urban agglomeration had a population of 171,817 as per provisional data of 2011 census. The city area has increased with passage of time. It has stretched from Hiranagar to Dhalli from one side & from Tara Devi to Malyana in the other. As per the 2001 India Census, the city had a population of 142,161 spread over an area of 19.55 km².

Fig. 1.3 shows Shimla Planning Area (SPA)², and the administrative limits included in them, depicting in its core the urban area of Shimla town, and neighbouring Special Area Development Authority (SADA). Department of Town & Country Planning, Government of Himachal Pradesh has delineated this region, which comprises the urban area of Shimla and 3 Special Area Development Authorities (SADA), as a definitive planning area. However, in 2017 the Shimla Municipal Corporation now has 34 wards. Earlier, it had 25 wards regarding which a notification was issued by the State Election Commission.

² SPA represents an area of potential urbanization, comprising the core urban area of Shimla and its peri-urban fringe and the rural hinterland that is expected to urbanize in due course.

Figure 2.3 Administrative boundaries of Shimla Planning Area



Source: City Development Plan, Shimla

Research Design:

Area of Study

It is in this context that this study primarily aims to understand waste generation and management issues from the perspective of a developing country, with focus on Shimla city in Himachal Pradesh. This involves a look at traditional and recent ways of waste management, patterns of urbanisation and waste generation, problems pertaining to them, organisation of waste management and public awareness, participation and responsibility. Shimla has been primarily a tourist destination since its discovery in 1819. It was summer capital during British Raj and administrative capital of HP after it came to HP from Punjab during reorganization of territory. Population of Shimla Planning Area was 1, 74,789 and floating population was 56000 in 2001 which accounts for 24% population of the Shimla district. It is assumed that population of Shimla Planning Area is anticipated to increase at the rate of 35 % during the decades of 2011 and 2021, which is likely to be 2,35,970 and 3,18,560 respectively (City Development Plan, Shimla). 87% of population is below 45 years of age which has very high potential for economic growth. Around 38% of total populations are workers and 98% of these workers are other workers involved in

horticulture, trade & commerce, transport, storage and communication, and other service industries. Shimla, being traditional educational center since British days, has an average literacy rate of 84%, much higher than national average of 59.5%.

Solid waste management includes the series of activities, such as —

- i. prevention, which attempts reducing the content of waste or by reusing it,
- ii. recycling the generated waste into secondary raw material or as a source of energy through proper segregation; and
- iii. finally, disposal through land filling at designated landfills

However, the reality is quite different from these environmentally sound options.

Research question-

The study thus seeks to address the following question:

What is the nature and extent of waste generated in Shimla city and What are the health hazards for the personnel involved in the waste management and disposal? How are they protected? What is the state mechanism in place? How do the stakeholders address this?

Objectives of the Study: The specific objectives therefore are to -

- Understand the process of waste management and disposal in the Study area
- To examine the socio-economic issues of workers involved in the process of waste management and disposal.
- Examine the health of the personnel engaged in the process of waste management and disposal
- Examine the health security and hazard safety of the personnel involved in the process of waste management and disposal and the prospects for betterment.

Methodology:

This is an analytical study. It is imperative to have knowledge of formal waste collection system and informal waste recovery process to understand the mechanism of the waste management system. Shimla, the capital of Himachal Pradesh is formally served by Shimla Municipal Corporation and also depends upon a large number of individual waste pickers

who reduce the burden of urban local body and in the process relieve the city from the uncollected waste.

Since Municipal Corporation barely releases any systematic data on the status of solid waste generation and collection, hence 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 informal sector and to have an understanding of solid waste management system as a whole. The study methodology combines field investigations in the role of stakeholders playing in solid waste management in Shimla, differently in their capacities. Personal observation, focused group discussion and in-depth interview have been the principal source of information for this type of study. Interviews, which are a flexible and adaptable way of carving things out, were taken by the researcher in the study. To gather up information pertaining to garbage generation, disposal and different services provided by Municipal Corporation some Safaikaramcharis in different categories were interviewed. This proved helpful in collection of information about waste management and disposal in the study area. Some information about the waste management and disposal of the town were collected by direct observations. The observations were also recorded in form of photographs and field notes taken in the field. It proved in asserting the authenticity of the responses given by various respondents. Before the conduct of interview/discussion the consent to respond was taken from the participants/respondents and their convenience was given priority.

Data and information used in present research work also included those already collected, recorded and reported in already existing sources. These secondary sources included data collected by various governmental agencies and also the one posted on internet. Finally the data has been presented in the form of contingency tables, relevant bar diagrams, pie charts, line graph etc.

The general particulars of the respondent, housing amenities, illness history, occupational risks, information regarding services provided by Municipal Corporation and problem

related to waste management have been included in the questionnaire. Some information based on personal observation has also been taken into account while analyzing the data.

Apart from this, the study has also taken collection and synthesis of existing literature on urban areas, including published and unpublished government reports, censuses and articles published in local newspapers and magazines. The principal methods of field enquiry has been the discussions with pertinent municipal officials and health care personnel, individual and group interviews with residents, waste management workers, incinerator workers and disposal plant workers.

Method of Data Collection-

Collecting data on waste generation and collection is indeed a difficult task. However, reports, articles and data available through different sources, have been used for analysis. The study has also used information available in the City Development Plan as well. Field investigation is the other method of data collection which has been employed by the researcher in carrying out an empirical study. This was necessary due to unavailability of data with respect to the contribution of informal sector and to have an understanding of waste management system as a whole. Thus, the study methodology combines primary sources, secondary sources and field investigation to draw data on the role of participants in waste management in Shimla, in their different capacities. The field work was carried out during 2009-2010. The field was revisited in 2011 for follow up sessions to update information. The field work was carried mostly during summers and monsoon as it was difficult to carry this during winters. Field was revisited time and again as and when required to get the recent update especially due to several ongoing projects such as Jawaharlal Nehru Urban Renewal Mission related to waste management system which was in the stage of transformation.

On many occasions it was very difficult to convince the respondents for the interview which has restricted the field work due to their reluctance to interact with the researcher. Therefore, a field investigator was to be hired from the same community to get access to the respondents. The researcher was always suspected to be an outsider intruding into their

domain. The field data was corroborated with recent literature available in research articles and reports.

Instruments of data collection-

Personal observation, focused group discussion and in-depth interview have been the major source of information for this study. To gather information pertaining to garbage generation, disposal and different services provided by municipality using these techniques, some Safaikaramcharis (Permanent, contractual and daily wagers), Society for Environment Conservation Heritage and Beautification (SEHB) workers, incinerator workers, officials and waste pickers have been interviewed. The following are the tools and Techniques which have been used in the study-

1. Semi structured interview schedules.
2. Field notes.
3. Observations.

Sampling and sample-

Purposive convenient sampling has been used in this study. The study methodology has been divided into two parts: 1) related to the Municipal Solid Waste Management, and 2) Biomedical waste management at the hospital/health facilities. The data was generated through canvassing a semi structured interview schedule. The information regarding services provided by local Municipal Corporation and problem related to garbage disposal has been included in it. Some information based on observation has also been taken into account while analyzing the data. The sample of this study in each category comprises of 54 municipal safaikaramcharis (Permanent), 17 municipal safaikaramcharis (Contractual), 21 Door to Collection workers engaged by Municipal Corporation Shimla (MCS), 11 Contractual Bio-Medical Waste (BMW) workers hospital/centre (public), three Incinerator BMW workers, 25 waste pickers and 10 officials in total from all categories mentioned above. The total sample comprises of 131 persons engaged in waste management process of different categories and nine officials in different categories were interviewed and the selected sample in each category is shown in the Table 1.3 This study has interviewed some officials from the municipal corporation and other concerned departments as well.

These respondents/individuals were selected based on prior contacts and appointments during the preparatory phase of the field work.

Table- 2.1 Sample size of selected waste management workers and officials in respective Categories

Category of waste workers	Respondents for in depth interviews	
	Engaged Personnel	Officials
Permanent Municipal Safaikaramcharis (MCS)	54	03
Contractual Municipal Safaikaramcharis	17	01
Door to Door Collection MCS	21	02
Waste Pickers	25	-
Incinerator BMW Workers	03	-
Contractual BMW Workers	11	04
Total	131	10

Preparatory work plan-

1. Review of Literature and analysis of published data
2. List the personnel engaged (permanent/temporary/contractual) in management and disposal work in the
 - a) hospitals/centres and
 - b) the municipal bodies
 - c) incinerator
 - d) waste treatment plant and landfill site
3. Personnel engaged in management and disposal process were interviewed at the place of work or home depending upon the convenience of the personnel. The researcher met the personnel to take consent and appointment for the interview. Only those willing to participate were included.

Limitations of the Study

The researcher's involvement in the affairs of society often raises certain methodological and moral limitations. The undertaken study, as well, has its limitations, which has to be taken into consideration for proper apprehension of the existing scenario.

This study has tried to minimize biases by selecting the sample from various parts of the town. Still certain institutions such as factories like paper recycling unit etc. are not taken into the study as they are situated towards the outskirts of the city. Sometimes it was very difficult to convince the respondents for the interview despite their prior approval, especially the ones who are engaged on temporary or contractual basis. The social, institutional, individual and political insecurities have often constrained the field work due to their reluctance to interact with the researcher. The researcher's background is in social science therefore the technical jargons in medical terminology while carrying out field work in healthcare institutions in order to understand the biomedical waste management process had its own challenges to overcome.

Moreover, the waste management must include other types of wastes such as electronic waste which is going to be a huge problem in near future due to modernization of institutions and would require the specific measures and policy to deal with it.

Chapter Scheme: The present study has been organized in five chapters.

Chapter-I: This chapter begins with introduction to key concepts and issues which outlines the conceptual theme of the study i.e., Waste Management, urban spaces, Environment and Health: Situating the problems. The chapter introduces us to the research problem undertaken through sufficient literature review, establishes a disciplinary theoretical background and rationalizes the need to conduct the research. It discusses the industrialization, urbanization and commercialization processes which has led to the generation of waste and hence builds a rationale for research on this area by way of adopting an integrated waste management approach. It also highlights the waste management policies in India for both municipal solid waste and Bio-medical waste. This chapter further attempts to provide the sociological understanding of waste, waste management and public

health with help of concepts developed by classical sociologists, modern and post-modern thinkers. It also discusses the Actor-Network paradigm within waste management system by studying both formal waste collection system and informal waste recovery processes.

Chapter II: Himachal Pradesh: Mapping Geographic and Socio-demographic Characteristics describes the profile of Himachal Pradesh as a state. This chapter proceeds towards describing the evolution and development of Shimla City, both during colonial period and post-independence India. It discusses how Simla³ was chosen as a recuperative centre by British away from scorching heat of plains which in due course of time led to the urban growth and development of the city. On 25th January, 1971, Himachal Pradesh got statehood and Shimla became the capital city of the state of Himachal Pradesh. Being the administrative and political capital, the process of urban growth and development got expedited manifold which resulted in manifold increase of population both permanent and floating which led to spatial and temporal growth of Shimla city. The later section of this chapter establishes the rationale for undertaking this city and explains the research process along with the organized research design. This section highlights the area of study, research question, methodology and the objectives of the study. It also mentions the limitations of the study.

Chapter III: Development, Environment, Urbanization and Urbanism: waste management and its impact on health. In order to understand and analyze the process of development, this chapter briefly introduces the concept of the development and discusses about the major theories related to development. It reviews the literature dealing with Development, Environment, urbanisation process, urbanism vis-à-vis waste generation & management in Himachal Pradesh in general and Shimla city in particular and tries to understand the phenomena. The review of literature is organized as beginning with role of state vis a vis development, development theories, general urbanisation trend and then looking at the urbanisation trends in Himachal Pradesh and Shimla. The chapter also discusses Polity, Society, Environment and State in Himachal Pradesh. This chapter attempts to study different stakeholders in the Refuge Collection, Transportation and

³ Simla the official name until 1972

Disposal Services and discusses the rationale of the study i.e., the process of waste management vis-à-vis health of the waste workers and health of public in general. It tries to understand the waste management policies and strategies in general- India, Himachal Pradesh and in Shimla City.

Chapter IV: Contextualizing Waste Management in relation to waste workers Health and Public Health is based on the field discussion and discusses waste management process by contextualizing Waste Management in relation to waste management workers. This chapter addresses second and third objective of the study. This chapter deals with profiling the workers management workers within waste management by taking into consideration the demographic and Socio-economic profile of workers, their material conditions, and social background. This chapter discusses the Process of Waste Management, division of labour in Waste Management, Waste collection and sorting, Theoretical approaches to waste management (Hard approach & Soft approach), Health and Environment issues (Micro level) with help of some case studies.

Chapter V Health security and hazard safety of the personnel involved in the process of waste management discusses the work-related aspects – workers in relation to their work, their remuneration, perceptions, problems, mobility etc. and look at the health hazards and occupational security measures, the government initiatives (health security and hazard safety), Health hazards in waste management industry, problems caused and posed by these hazards, coping mechanism and protective measures. This chapter attempts to contextualize the Waste Management System and health of the Waste Management Workers with Sustainable Development Goals.

Chapter VI is Summary and Conclusions, which summarizes the discussion and results. On the basis of the findings, conclusions are drawn. An attempt is also made to discuss the relevant policies and their implications in the light of the present study.

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Development, Environment, Urbanization and Urbanism: Waste Management and its impact on Health

This chapter begins with an attempt to understand the concept of development and related theories. It strives to discuss the colonial and post-colonial developmental strategies leading to urbanization. It also explains industrialization with reference to urbanisation and waste generation, its impact on environment and through the framework of public health. It tries to examine the role of state as harbinger of development as an instrument of ‘modernity’ which has led to the transformation of society from traditional to modern to postmodern stages with the idea of ‘development’.

The concept of Development

The concept of development encapsulates multiple meanings; the term is complex, ambiguous, contested, and elusive. In the simplest terms, development can be described as the process of bringing about social change that enables individuals to realize their full potential. Development as a concept is an ever-changing ongoing process which over a period of time has encapsulated economic, political, historical, cultural and social dimensions within its ambit. The nature of development varies from and differs considerably from time to time. For instance, pre-independence notion of development was different from 1950s, which again is different from 21st century concept of development. For some development means economic progress of the nation; few observes as in terms of increase in capacity of ‘political system’; whereas others look at it from social transformation perspective. Development indeed is a very complex phenomenon since it involves economic, political, cultural, administrative and social dimensions etc. and calls for an integrative and comprehensive approach for holistic understanding of this concept. This gets amply reflected in World Development Report (1991) while highlighting multiple indices of development and states “*The challenge of development, in the broadest sense, is to improve the quality of life. Essentially in the world’s poor countries, a better quality of life generally calls for higher incomes but it involves much more. It encompasses as ends*

in themselves, better education, higher standards of health and nutrition, less poverty, cleaner environment, more quality of opportunity, greater individual freedom and richer cultural life”

Ideological considerations of Development

The concept of development is guided by certain ideological assumptions. In modern societies with the project of ‘Enlightenment’ the concept of ‘development’ got momentum during colonial period with their ‘mission of civilizing others’ in the colonized world. Since it was the period of industrial revolution in Europe and the British Empire had to maintain the momentum of industrial development in their country in order to sustain the employment and economic growth of England which required the export of raw material from their colonies and production of goods in European countries and the finished products were again to be exported to the colonized world for ready market. This was the phase when primacy of industry was imposed by colonisers over the agriculture in their colonies.

The career of the concept of development has ‘undergone numerous twists and turns’ as argued by Oommen (2004). He has classified three major perspectives on trajectory of development namely Mainstream Perspectives on Development (MPD)¹, Alternative Perspectives on Development (APD)² and Post Development Perspective (PDP)³. Of the three, mainstream perspective on development has a long history, and traces back to history when the term ‘development’ was not even invoked.

An alternative approach towards development emerged out as a response or critique to mainstream perspective on development after the Second World War when decolonisation happened and developing nations came up with their regional specific problems with new

¹ Mainstream Perspective on Development reference to the colonial period in India which led to industrialization projects

² Alternative Perspective on Development, as its name indicates evolved as a critique to Mainstream Perspective on Development due to its heavy reliance on economic growth model. APD promotes participatory, people centered and holistic approach towards development.

³ Post Development Perspective critiques both MPD and APD due to their un-sustainability approach and the non-recognition of Local values within the constructed western global model.

consciousness. This new consciousness had arisen out of political consideration of socialist experience as against the capitalism. This anti colonial movement resulted in rejection of 'western model of development' but accepted its goals such as 'modernisation' and 'nationalistic developmentalism' as an ideology for national development with dominant discourse on 'tradition'. After the end of 'cold war' which led to the dominance of capitalism resulting in adoption of structural adjustment policies viz. Liberalization, privatisation and globalisation by the modern state; 'modernization has become the endogamous project of development' blatantly imposed by 'national elite'. This kind of industrialization and modernisation has been criticized by scholars (Nadkarni, 2000; Shiva, 1991) for its adverse impact on 'environment' and 'common property resources'. The intellectual community analysed 'the idea of development' through intellectual discourses and highlighted the concerns over growing divide between the elites and masses over the issue of development. This model of development has produced what Beck (1992) calls 'Risk Society' as the entire world has led to ecological devastations due to polluting industries and waste materials. The intellectual discourses on development have resulted in the emergence of new concepts such as sustainable development, equitable development etc.

Theories of Development

The process of development in India began with the 'mission of civilizing others' by the colonizers which saw a different approach in post second world war scenario. On the journey of transformation from traditional to the modern societies the guiding principles were 'modernisation' and 'nationalist developmentalism'⁴ and the post adoption of new economic policies further saw a different perspective in analysis of 'development' process. This has been analysed as three different types of 'development' theories in Sociology namely Modernisation Theory, Dependency theory and theory of underdevelopment and Neo-liberal theory.

⁴Developmentalism is an economic theory which states that the best way for less developed economies to develop is through fostering a strong and varied internal market and imposing high tariffs on imported goods.

Modernisation theory

‘Modernisation theory’ is the outcome of challenges or the problems countered by theorists after decolonization process and emergence of newly developing nations. As mentioned earlier, a new consciousness had emerged out of the needs of developing nations which were different from that of developed nations, on the way of transition from traditional societies to the modern societies. The following components led to the development of ‘modernization theory’ by theorists: Keynesian economics showed the way of ‘optimum economic configurations’ to the economies that were stuck into ‘depression equilibrium’ where the thrust was on ‘economic growth’; the strains of ‘nationalist developmentalism’ by developing nations; political considerations of USA (proponent of capitalism) as against threat of socialist experience of Union of Soviet Socialist Republic (USSR); and in response to this the ‘Marshall Plan’ which was an American effort passed in 1948 as economic recovery plans for Western European economies following the end of World War II was enacted in reaction to this. Rebuilding war-torn areas, lowering trade barriers, modernizing industry, enhancing European prosperity, and halting the rise of communism were among the objectives of the United States.

During the experiment of ‘Nationalist Developmentalism’, the term “Third World” was used to denote a distinct path between capitalism and communism in colonial nations (Geertz, 1971) where the third world leaders tried to develop their own model of development by challenging the supremacy of the first world countries. However, these new nations were old civilizations with ‘new states’ in their political structure only that had biggest challenge of countering ‘tradition’ as biggest hindrance on the path of modernity. ‘Modernization theory’ developed by scholars was an attempt to explain the social reality of the third world where these ‘new states’ were facing the challenges of tradition as against modernity. The ‘modern society’ which paved a way for social mobility, individual freedom and equal opportunity was seen as an aspiration based upon the principles of universalism, individualism and achievement as against traditional societies ridden with personalised social relations, hierarchy and ascribed status. The process of modernising the traditional society was attempted by modernization theory as a process and argued that there are certain preconditions for development such as rational scientific ideas,

industrialisation, expansion of trade and 'elite' who would invest in trade were considered prerequisites and the state was to take the lead role in fulfilling these prerequisites. To quote in words of Kiely (1995) '*industrialisation would promote western ideas of individualism, equality of opportunity and shared values, which in turn would reduce social unrest and class conflict*'.

Dependency Theory and the Theory of Underdevelopment

As the name highlights dependency theory explains the relationship of 'dominance' and 'dependency' between the 'core' and 'periphery', where underdeveloped nations are dependent on developed nations for its development. There are three salient features or important characteristics of Dependency theory and the Theory of underdevelopment:

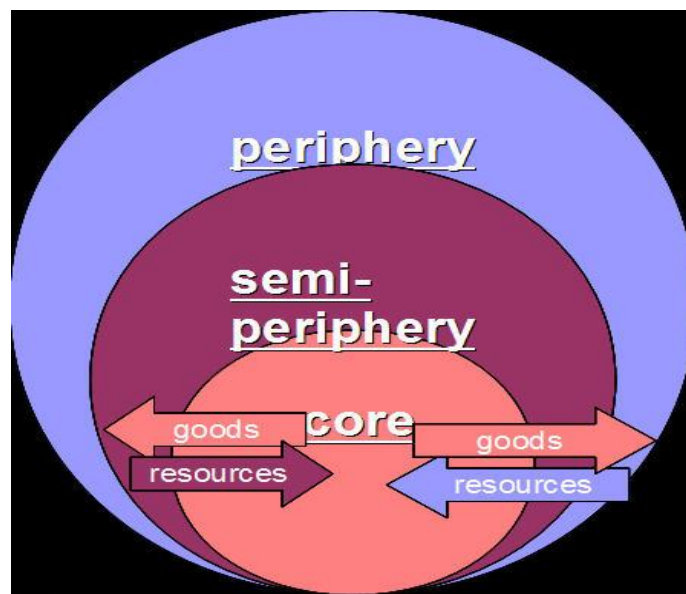
- 1) The international system is seen as the sum of *dominant* and *dependent* nations.
- 2) *External Forces* i.e., core nations play an influential role in terms of economic activity of dependent states.
- 3) The relationships of inequality get reflected in reinforcement of patterns of inequality by way of transfer of wealth from 'Periphery' to the 'Core' and exploitation of resources of peripheral nations by the core nations.

Dependency Theory highlights the accepted limitations "placed by the global political and economic order" as a way to understand economic underdevelopment. According to *Dependency Theory*, underdevelopment is mainly '*caused by the peripheral position of underdeveloped countries in the world economy*'. Underdeveloped nations' resources are "cheap labour" and "raw materials," which are sold to developed economies with the technology to turn them into '*finished goods*'. As a result, underdeveloped nations end up paying exorbitant costs for the finished goods, transferring income that they could have used to increase their own productive capabilities. This "inequality" further contributes to a vicious cycle that keeps a wealthy core and an impoverished periphery at the centre of the global economy. The dependency theory school of thought argues that no doubt the development phenomena is happening in underdeveloped nations but for this they are

completely dependent on developed nations which are based on the principle of ‘conflict and exploitation’ of periphery by the core nations.

In his renowned book "The Modern World System," Wallerstein (1980), noted that the development of the global capitalist economy was a result of increased commerce, improved production efficiency, and the structure of unequal nation states. Similar analysis has been made by A.G. Frank (Frank, 1996) where he states that the capitalist world is founded on a system of metropolis-satellite linkages, divided by nations and regions within nations. The Wallerstein’s World Systems Theory model demonstrates the dualist thesis of ‘conflict and exploitation’.

Figure 3.1 WORLD SYSTEMS THEORY



Source: <http://www.faculty.rsu.edu/users/f/felwell/www/Theorists/Essays/Wallerstein1.htm>

Neo Liberal Theory

The Neoliberal theory of development came up as a response to ‘the debt crisis’ of 1980 where the instruments of International Monetary Fund (IMF) and World Bank played a pivotal role in financing the conditional loans to prevent the complete collapse of indebted economies which eventually paved way for adoption or enforcement of Structural

Adjustment Policies after collapse of USSR which led to liberalization of trade and financial regulations and paved a way for privatization of many public sector undertakings. To put it in words of Conway, (2014)-

*‘Financial institutions reinforce the principles of the free trade by reducing the public spending, removing subsidies on basic foods and commodities, and devaluing the local currencies.’*⁵

Neoliberalism advocates centrality of free market and advocates the establishment of free trade between nations in order to maximize proficiency and profit of the countries. It proposes for complete removal of obstacles to free trade, the liberalization of foreign investment regulations and elimination of market inhibitory social institutions and practices. It promotes privatization of social goods and resources, gradually endeavouring the ownership of public and community goods to that of individuals.

The centrality of market model has rendered unsatisfactory results at the policy level as even in first world poverty seems to be increasing and the economic disparities seems to have widened across globe across different groups. The response to these problems can be addressed by paying closer attention to specific societies and local dynamics of interrelated systems of structural inequalities in order to understand the peculiarities of these societies. The theoretical contexts of dependency theory and neo liberal theory with regard to the development process makes it inevitable to draw parallels at the national and local level as well. At the state level the states have adopted ‘economic growth’ model primarily based on industrialization, which has led to the transition of state from primary sector dominance to tertiary sector dominance. With opening up the market and cities being the centre of attraction have not only resulted in migration of people from rural hinterland to the cities but also has resulted in culture of conspicuous consumption and consequently resulted in generation of waste in large quantity.

⁵<https://freshessay.net/essays/comparative-essays/modernization-dependency-and-neoliberal-theories>

The Sociology of State

In previous section, an attempt has been made to discuss the theories of development which try to explain the developmental models that have been adopted so far in the history of human development. An attempt has been made to explain the strengths and weaknesses of these models in journey of its evolution. The study of state is central and is very important in order to understand the developmental models from different perspectives. Since different states have adopted different developmental models, owing to their specific socio-historical conditions, in pursuit of their national development. 'State' becomes an important subject of analysis as it produces and destroys institutions of different kinds in society by which society governs and exercises its controls over its members and institutions.

The state formation and reformation always depend on the major, political, economic and social transformation in different societies and if we observe the trajectories of the formation of the state, one would realise that this is indeed a subject matter of sociology. Badie and Birnbaum (1983) present a strong case for the idea that "the origin of the state is a '*Social Fact*', arising out of the distinctive socio-historical environment of Western Europe." They argued that the state is "*a unique social invention devised to solve the specific crises of the western European societies at a particular point in their development*". The authors provide the groundwork for a strikingly unique explanation of the '*invention*' and subsequent spread of the '*state*' by drawing on historical sources and applying sociological insights to a field long neglected by lawyers and political scientists. They started off by going over the main hypotheses put forth by early sociologists like Durkheim, Weber, and Marx regarding the evolution of the institution. The writers put forth and support their claim that the state was a "creation" rather than an inevitable outcome of any other process. They began with a review of the principal evolutionary theories concerning the origin of the institution proposed by classical sociologists such as Durkheim, Weber and Marx. Rejecting these views, the authors set forward and defend their thesis that the state was an "*invention*" rather than a necessary consequence of any other process. Once invented, the state was disseminated outside its Western European birthplace either through imposition or imitation.

‘State’ as analysed by Classical Sociologists

Emile Durkheim, who propounded functionalism perspective, analyses social development with that of increasing ‘division of labour’ in society. For him as society evolved from simple form of evolution to the complex form, it resulted in increasing division of labour which gave rise to new structures and institutions and as a result new forms of ‘power’. Durkheim argued that with increasing ‘division of labour’ based on differentiation and specialisation, state took on more and more functions and becomes increasingly involved in all the social functions, thereby unifying and centralizing them (Badie and Birnbaum (1983). Durkheim believed that increasing division of labour necessitated the ‘birth’ of state and since then state has been managing the same.

Karl Marx, who introduced the concept of ‘dialects’ in social sciences has divided the development of society into five stages beginning with the stage of primitive communism, slave society, feudal society, industrial society and Communism. For him ‘State’ is the product of society and to quote him “the state is, by no means, a power forced on society from without... rather it is a product of society at a certain stage of development”. What is the source this? He finds answer in theory of ‘economic determinism’ where he explains how in order to meet out his material necessities man enter into the ‘Modes of Production’ where through ‘means of production’ and ‘relations of production’. This resulted in emergence of two competing ‘classes’ i.e., the class of ‘haves’ and ‘have not’. The former owns the means and forces of production and later possess nothing but the labour skill which is also determined and controlled by the former. In the old communist society, there was no state because there was no existence of private property. The concept of ownership of private property began with second stage and the system of private property worked as a potential cause of the rise of state. According to Marx, state is a product of force, subjugation of weak by the strong. Private property owners were concerned about protecting it and felt that a superpower that could offer protection in the end was necessary. This is how the private property system aided in the establishment of the state. Marx believed that the state was established largely to protect economic interests, while other interests were also protected, and as a result, the state evolved into a tool for the

advancement of the interests of a specific class or group within society, the class of "haves." One of the Marxist scholars, Immanuel Wallerstein (1980) observed that economic revolution was the leading factor in the rise of modern state, he substantiates it by showing that the development of ocean trade gave rise to a worldwide capitalist market and thus to an international economic system.

Within sociological tradition Durkheimian and Marxist theories, despite being rich and systemic, the concept of 'state' could not take a centre place where as Max Weber who is also known as father of modern political sociology could prominently establish this with the help of concepts of authority, power, domination and subordination. With the concept of authority, he discusses about the evolution and establishing of rational legal authority as means of administration in modern capitalist society. Weber conceptualizes the concepts of power, authority and bureaucracy as characteristic features of modern state which comes into being when it puts an end to all patrimonial aspects ⁶.

The evolutionary process highlighted by Max Weber concludes the emergence of modern state and bureaucracy as its primary instrument. He explains bureaucracy as an ideal type, an example of rational legal authority, an organization comprising of actors in which each position corresponds to certain roles and these actors are selected for the corresponding positions based on their merit and competence. Within bureaucracy the persons or actors and their jobs are matched impartially, the relations are hierarchical and impartial. This form of 'domination' is characterised as rational and legitimate and hence an example of rational legal authority. (Badie and Birnbaum, 1983); Kaviraj, 1997) observed that although state as a peculiar type of organization of social power had originated in western modernity but the structure and sequence of this modernity significantly differ in different parts of Europe itself. Further these scholars argued that one of the major objectives of the state formation in India and majority of the post-colonial states was the way they planned their economic development just after their independence from foreign rule.

⁶In his analysis of previous forms of state which are based on traditional and charismatic authority where transfer of power is hereditary in former case or based on routinization of charisma in later case.

Polity, Society, Environment and State: A case of Himachal Pradesh

In order to have an understanding of development processes in Himachal Pradesh, it would be pertinent to have a retrospective glance of basic characteristics of society-Environment interaction in Himachal Pradesh which is a part of Western Himalayan region. With regard to study of 'environmental change' which picks upon elements of continuity as in case of Himachal Pradesh the words of McEvoy (1987) holds true wherein he explains three elements of 'ecology, production and cognition' which evolved in tandem with the other two in its own particular logic and I quote

"Any explanation of environmental change should account for the mutually constitutive nature of ecology, production, and cognition, the latter at the level of individuals, which we call ideology, or at the societal level, which in the modern world we call law. First, people adapt to the world around them, one that consists of a non-human environment-evolving in part on its own and in response to what people do to it - and of other people as well. Second, what distinguishes humanity as a species is its capacity to produce, to alter its environment more or less deliberately to ensure its survival and propagation. Finally, people organize their behavior according to particular world views, whether expressed or implicit. As people act on the basis of their understanding of how the world works, what they do inevitably changes their social and natural environment, to which they then must adapt anew. All three elements-ecology, production, and cognition-evolve in tandem, each according to its own particular logic and in response to changes in the other two. To externalize any of the three elements, to place it in the set of given "environmental" conditions within which one explains an ecological change, is to miss the crucial fact that human life and thought are embedded in each other and together in the non-human world. Insofar as the tragic myth of the commons does this, it may serve less as a heuristic device for understanding environmental problems than as a recipe for exacerbating them".

Karl Polanyi (1946) explained the rise of centralized state in terms of 'commercial revolution'. Although he tries to maintain a balance between both 'external' and 'internal' factors but he seems to lay a greater emphasis on external factors. He observed that setting up of 'sovereign power' was the need of the hour in 'external politics' and accordingly

mercantilist statecraft involved the assembling of resources of the national territory to the purpose of power in foreign affair; and similarly in 'internal politics' unification of territories or countries was accentuated by feudalism as the necessary by product of such endeavours. The world systems approach of Immanuel Wallerstein and A. G. Frank contend that that historically it was world economy and the 'world system' that preceded the nation state both in 'time and importance'. Somewhere amongst the interplay of wide ranges of forces is located the emergence of government and the state and it is in close association with the state that a complex web of social relationship (socio-economic and cultural) was woven by man in different parts of the world.

As regards the historical developments of Himachal Pradesh in Himalayan region geography plays an important role and one can explain the links between environmental factors and political organization. Geography plays a determining role in delineating the boundaries between these states. Political frontiers were carved out by combination of what rulers perceive as 'natural frontiers' and the actual existence of which W. Gorton East calls as areas of 'negative land'⁷. The territories of Simla Hill⁸ states were somewhat in the nature of semi-segregated, bowl-like geographical formations. The resources in terms of water, cultivable land and pastures were scarcely sufficient to meet the essential requirements of their small population. This strangely limiting environmental situation explains their long-standing persistence as small *thakurais* and failure of any amongst them to establish its political predominance. This explains a close relationship between political boundaries of a state and ecological environment of the terrain that it occupied. In terms of the interaction between ecology and political economy Simla Hill states exhibits a peculiar category until British interventions broke their isolation and dismantle their independence. Environmental circumstances and conditions prevented many historical developments from influencing the political history of these regions.

⁷Negative land was area where 'communication was difficult and settlement largely lacking'.

⁸Simla Hill State Gazeteer, 1910. The Simla Hill states numbered 28 *thakurais* and occupied total of 4800 square miles

Economy of the Hill states

The scarcity of cultivable land, extreme winter conditions and shorter agricultural season limited the sort of crops that could be grown. Owing to hill topography animal rearing was the main occupation and subsistence economy of the hilly people. The source of revenue for the rulers was raised through the system of taxation. Grazing fee was levied by the rajas on actual number of animals browsing in pastures. In Simla hill states another method devised by the rulers for obtaining a share of grass (fodder) available in their territories. Such grass was usually allowed to grow in these grasslands locally known as *ghasni*⁹ set aside specifically for this purpose. It was usually cut, made into hay, and stored by the peasants for use as winter fodder. The state levy, in this case was not related to the total number of animals owned by peasant but to the land that he cultivated. The peasant household was required to provide a fixed quantity of grass to the state for every unit of land that he cultivated¹⁰. The regions where access to pastures was granted or permitted the peasants kept relatively large number of livestock. In addition to the usual grazing tax, they would pay in kind for example, in the form of a goat or sheep. Watermills (*gharats*)¹¹, of a rudimentary kind, due to the convenience with which they could be built and operated, were the most common means of grinding grains into flour throughout the region. While the rate of taxation varied in different states and the means of calculating it differed¹². 'A share in all activities' was demanded by the state. Village artisan such as iron-smelter would give iron ore, 'the chamars leather and dumnas baskets and ropes'¹³. Another new source of revenue which rapidly out passed the all others after mid nineteenth century was the income from forests through the sale of timber. Pre-colonial India knew the value of this commodity and there were certain markets for this, but during British rule in India there was quantum leap in extraction of Timber from this region. With improved felling methods and voracious sub-continental markets the peasantry and local rajas were

⁹Steep, uncultivable and treeless slope used as a hay field or hay preserve

¹⁰Simla Hill State Gazetteer, 1910 (Dhami) P. 4. 'a certain amount of *ghasni* (grass land) goes with each lih and every zamindar gives ten *kacha* mounds of grass a year to the state'; (Kunihar) P. 10: 'eighty bundles of grass per *kain* of cultivated land'

¹¹ watermill for grinding grain

¹² Simla Hill State Gazetteer, 1910 (Bushahar) p. 74; Baghal, p. 17

¹³Mandi State Gazetteer, 1920, p. 67

completely devoid of the benefits which were accrued by the Britishers and the contractors who were involved in the extraction of the timber (Singh, 1991).

Cultivation and Construction of houses in the Hills

Villages and houses are the most apparent and visible signs of man's impact on environment and vice versa. In a hilly habitation village is the unit around which peasant's existence evolved and the village house forms the point around which numerous activities are connected with daily life ranging from cultivation of land to rearing of animals. The scattered hamlets and cottages of farmers are a common feature in hills. The terraced fields of hill peasantry seemingly merged with landscapes are the prominent proof of man's handiwork on nature and environment. Owing to the harsh climatic condition's cultivation was mostly confined to one or two crops in hilly region and animal rearing was the common feature.

Environmental conditions determined the construction of houses in the hill villages which varied from region to the region. There are tremendous variations in structure of the villages and so are reflected in the construction of houses by the peasants. For instance, Chamba gazetteer describes the construction of houses in Churah *wizarat*¹⁴ as one or two storeys, with a flat roof in the northern region where as with slanting roof in the southern portion. In Bharmour houses are built in bungalow like structure made of wood and stone, which are two-three storeys with slanting roof. In Pangi and Lahaul houses are two storeyed with flat roofs. In summers family occupies the upper storey and the animals are sent to pastures, where as in winter the cattle are tied to one corner of the living room on the bottom floor and the family members occupy the other end.

In the lower hills the walls of peasant huts were made of mud and the roof made of thatch. These houses could either be one or two storey depending upon the economic status of the family. The lower portion was utilized as living room by the family and upper storey as storing room for grains and other essential commodities.

¹⁴The largest pre British administrative sub-division of some of the biggest princely states of Himachal Pradesh

The construction of a house was indeed an expensive affair, despite the ready availability of the construction material locally used for construction of house. Most of the labour was provided by peasant, his immediate family and his immediate neighbour with the system of *buara*¹⁵. The Sirmur Gazetter¹⁶ (1904) observed that in trans-Giri area ‘*a house costs from Rs 200 to Rs 1500 and as only one mason is employed it takes from one to ten years in building. During its construction the mason is fed by the owner, and when the house is finished a panchayat decides the amount to be paid as the mason’s remuneration*’.

Transition of a predominantly rural society

The social formation of the hills, until the early nineteenth century rested on an agro-pastoral subsistence economy, barter trade, with pockets of commercialised agriculture. The attendant towns were usually capitals of state that straddled autonomous geographical tracts, as well as nodes of trade, reflecting both the political milieu and the channels of trade that coursed ‘horizontally’ across the region and ‘vertically’ within individual states. Although rural and urban settlements were located in the valleys, a cycle of ecological adaptation interlocked the multifarious uses of land and tied agriculture, forest use and Pasture into a stable balance of interdependent activities.

Colonial period paved a strong impact on predominantly hilly society in nineteenth century. As has been discussed in Chapter I, on the one hand their choice of Shimla as one of the strategic locations from exercising control and administration over the Himalayan region; on the other hand, it served the purpose of recuperative centre for them to escape from scorching heat of plains as the environmental conditions and climate resembled to that of Europe. They developed it accordingly and it paved a way for transition of this region markedly different from traditionally rural one.

The hill station must be seen as an adjunct to the many urban centres created by colonial relationship. Colonial cities centralised this function, which was characterised by a change in the productivity of the colonial society so that its wealth could be exported to the

¹⁵A locally evolved system of sharing the tasks in need, when additional hands are needed

¹⁶Sirmur State Gazetteer 194, p 59, regarding employment of a mason.

metropolitan state. Their cultural function was to serve as a home for the institutions of this unequal relationship, including the bureaucracies, police, and military that the colony's "core" used to rule it, as well as the financial institutions, including banks, merchants, and moneylenders, that allowed wealth to be taken from these colonies. The conquest and colonisation were accomplished through a network of centres, if the ports were the bridgeheads of the British Empire, the hill stations were bunkers for climatic protection, built to ensure the health of the empire and its builders. The hill stations formed an integral part of the administrative structure that was created to govern the country.

All the resources available in the hills, the most valuable was the forest of hard woods, especially the *deodar* stands available at heights of 7000 ft. the hardwoods that were necessary for the building of new cantonments as well as urgently required for railway construction. The early years of British Rule were characterized by a forcible takeover of forests till then held by village communities. The state no longer recognized the right of local communities to control and manage the forest, and initiated a phase of transformation of the social system of resource use. The two most significant changes were disintegration of community management of common commercial property resources and next the advent of large-scale commercial felling.

The urgent need to link these centres with roads and railways led to a spurt of road building and to the mapping and use of technology to make these. Such roads, however, while they linked the hill stations and the forests, tended to zigzag above and away from the local centres of population.

Political changes were made in the administrative structure as well. The tying together of states politically into the Simla Hill States and the creation of Punjab Hill States and the Kangra districts had many implications. The hill stations hijacked the regions into the colonial framework as had been devised and was being formed a very limited generative role to play, as holiday resorts and subsequently as centres of administration, such towns came to dominate the countryside.

The concept of the town changes according to the historical setting and each civilization has its own conception of the town, depending on the juncture of the development. Conceptually the town in the hills has been utilized as a vantage point to view the urban structure as it obtained at various points of time.

Urban Growth in Shimla

Shimla, a hill station and the summer capital of British India, served the purpose of recuperative centre for Europeans in India from the scorching plains especially during summers. The highland communities of hill stations like Shimla accommodated a specific set of environmental preferences and provided examples of the various colonial residential types that were available. The idea that residents of hill stations were healthier than those who lived in lowlands settlements is supported by ethnomedical considerations. Although Shimla was never planned as was Lutyen's New Delhi, but image of it as an English town, in colonial setting, paved the way to its urban form.

In the early Nineteenth century, when Shimla was a sanatorium and holiday resort, the search for flat pieces of land, preferably near springs, determined the location of houses, while a retaining wall could account for a few extensions. Sometimes a tent pitched at a space for a few seasons became the site for a house. After 1864, when John Lawrence, as Viceroy, found Shimla the most centrally located hill station in India, the holiday resort and sanatorium grew to meet the annual needs of government departments for office and residential accommodation. The town grew during the years that followed and the number of houses increased from 290 in 1866 to 1400 in 1891. Translated into the property ownership structure of Shimla it meant that upwards of four hundred estates were owned by British officials, retired or serving. The pattern gave Shimla quite tangibly its English and official atmosphere (Kanwar, 1999).

Since its spotting and the deliberate attempt by Britishers to develop it as a military station owing to its strategic location and as a recuperative centre, due to its climatic suitability, Shimla started transforming into a cosmopolitan fervor and an early advent towards the urbanization of this city. Going by the record room files of Shimla Municipal Corporation,

the lowest slopes are referred as 'below Cart Road'. In formative years of the Imperial capital, cart road appears as a demarcating line dividing the town into two habitats, 'above Cart Road', the posh area inhabited by the English people and the 'below cart road, which appears as a placeholder. The Ridge, Mall Road, Gunj Bazaar, Lawrence Gunj, Edwards Gunj, and so forth were the names of the locations above Cart Road. Slaughter House (an abattoir), Skin Godown (an animal slaughterhouse), a "Hindoo" graveyard, a Serai, and "Ladakhi Mohalla," a neighbourhood constructed around the Imambara by Shia migrants from Ladakh in North India, are all names and landmarks of the Below Cart Road region. To serve the Sikh homes relocating "below Cart Road," a "Singh Sabha" was also constructed on Cart Road. The region below cart road served as a sanctuary for the migrant worker population that came to this city to work as coolies, butchers, tailors, blacksmiths, sweepers, and shoemakers, among other jobs.

With the growth of the town an infrastructure of sanitation and water supply suitable to Shimla's rugged and wooded topography emerged. Its dependence on springs gave way to piped water drawn from a tributary of the Sutlej. The more intimidating task was that of sewage and garbage collection and disposal. Attempts to introduce modern system of sanitation were expensive; consequently, an army of sweepers, both private and municipal, were required to keep Shimla the legend of cleanliness that it became at one point in time. According to the project Coordinator Solid waste management Shimla Municipal Corporation which he reported during his interview 'Shimla Municipal Corporation used to be richest municipal body in India as it used to lend money to Bombay Municipal Corporation during British regime'. The European population of Shimla accounted for about four thousand in the late Nineteenth century. It however required an India population of about 30000 to serve the colony (Kanwar, 1999). Most of the serving population got refuge in the five bazaars of Shimla namely Boileuganj, Kaithu, Lakkar Bazaar, Chhotta Shimla and the largest Lower bazaar which were located in different parts of Shimla. Lower bazaar spread haphazardly in a hotch-potch of construction and raised tier upon tier from the cart road up to the Ridge. The cascading tiers were divided into an Upper (The Ridge), the Main and a Lower Bazar. Buck (2005, reprint, originally published in 1925) mentions that '*in 1877, the municipality was seized with the problem of Lower Bazar and realistically*

reviewed. If you want to improve Simla, knock down the bazaar...then when you have removed the present native population, where do you find a more suitable location for the native inhabitants who are essential to the existence of Simla'.

As a result, the area of the Ridge was cleared of shops to create a city centre. A Ridge had been built in the years between 1844-57. In the 1880s a town hall, the monument to Victorian civic energy was built. At Shimla, it reflected the social milieu of its British population and included the Gaiety theatre, library, a large hall for suppers, balls and exhibitions, a police station and an armoury. The bazaar was replaced by European shops – milliners, dress makers, hair dressers, restaurants, etc. Buck wrote in his book, that some of its structures which would be ‘a credit to any English town’.

For municipal purposes the town was divided into two wards; Station ward and Bazar ward. The former residential- the recreation of the British town; the latter commercial- crowded, slummy and housing about half the Indian population of Shimla considered necessary for the maintenance of the former. On the one hand Station ward was beautifully designed and decorated with palatial structures; on the other hand, municipal resolution restricted the extension of the bazaar along the mall over its entire length. However, to accommodate the influx of population, landlords ran up to existing structure into four, five and six storeys.

Space Creation

Space can be defined as the answer to the 'where?' of existence. For anything to happen space provides the base. It can be a void, an expanse or an enclosure. The initial creator of space is always nature. A natural environ provides us the canvas and scope for furthering the process of spatial conception. Any space will always have space for more. This 'more' comprises of physical entities, emotional responses and a variety of meanings that are perception centric to a particular atmosphere.

The individual experience of a space is guided by various factors like the sense of scale and balance, duration of experience, play of light and colour, purpose of the space, socio-

cultural location, temporal context and ultimately the individual's multilayered emotional participation with the space.

Many times, the terms 'space' and 'place' are used as synonyms. But to distinguish, somewhat naively, it can be said that the place is created when knowingly or unknowingly a human intervention contributes to the character of a space. Either the vocabulary is enhanced or a new meaning is introduced. This can be observed at various levels in our daily environment. The interventions range from being as small as adding a simple icon or changing a colour to being as expansive as constructing a megastructure. In any case, the reading of the initial space changes. The term 'space' can be used as synonymous to 'place' but 'place' cannot be used synonymous to 'space'.

In other words, a place is also a space but a space may or may not be a place. For instance, while walking on one of the beautiful roads of Shimla surrounded by a dense forest on both sides, one notices a small image of a religious figure placed on one of the rocks along the road and a random number written beside it. The space now grasps your attention, makes you wonder and takes you to a completely different chain of thoughts as compared to when you were just a passerby strolling amid a beautiful landscape. Place creation can be as subtle as this.

The calling of an architect and professionals from various related fields, is the creation of a place a space within a space. The process of place creation must be sensitively approached with regards to the space in which the creation is intended. The response of the initiator or creator to an existing space leads to the implementation of an informed decision, further leading to the creation of a new space. This is then followed by the response of the visitor to the space. This response may or may not be similar to the creator's intention because of various factors such as an individual's spatial exposure, socio-cultural background and the temporal location of the experience.

Space creation in Shimla was guided mostly by the natural setting followed by the intended use of the area. Shimla, for one, is replete with scenic views and a picturesque landscape.

The main point of attraction for the Britishers to create a settlement in this area was the conducive environment in terms of natural beauty and the comfortable climate. According to popular hearsay, the town is said to have emerged on a group of seven main hills, presently identified as Prospect Hill, Observatory Hill, Summer Hill, Mount Pleasant or Inverarm Hill, Bantony Hill, Ellysium Hill and Jakhu Hill (Figure 2.2, Chapter II). As the town grew, it extended to the surrounding hills and the areas like Totu, Dhar, Kusumpti, Sanjauli, Dhali and others took shape. The most recent prominent area to have been developed is that of New Shimla and some of its adjoining neighbourhoods. All these areas had a dense forest cover with some open spaces, valleys with natural springs and flat lands. Each spur provides a beautiful view of the hills lying right across the valley. These views were tapped by the Britishers for building their estates.

The estates were located so as to enjoy large private spaces around the property. The construction on a hilly terrain is done along the contours and thus very steep spurs were not developed initially. The comparatively subtle slopes on various spurs were developed keeping in mind proper sunlight availability, a natural water source and the views from the sites. Even the pathways and roads follow the contours as it is a prerequisite for easy construction and therefore in mountainous regions the roads are not the shortest distance between two locations. They are zig zags that are designed to turn at the nearest most subtle slope.

Ward Divisions: A history of chronological evolution of Space

The town of Shimla, from being a place where the Britishers came as visitors and had to get the land for construction on lease 'free from rent from the rulers of Keonthal or Patiala, became the most important hill station in the history of the British Empire in India. In 1851 a Municipal Committee was set up which had appointed Commissioners. Over time many administrative reforms took place and ultimately the Committee was converted to Municipal Corporation in 1969.

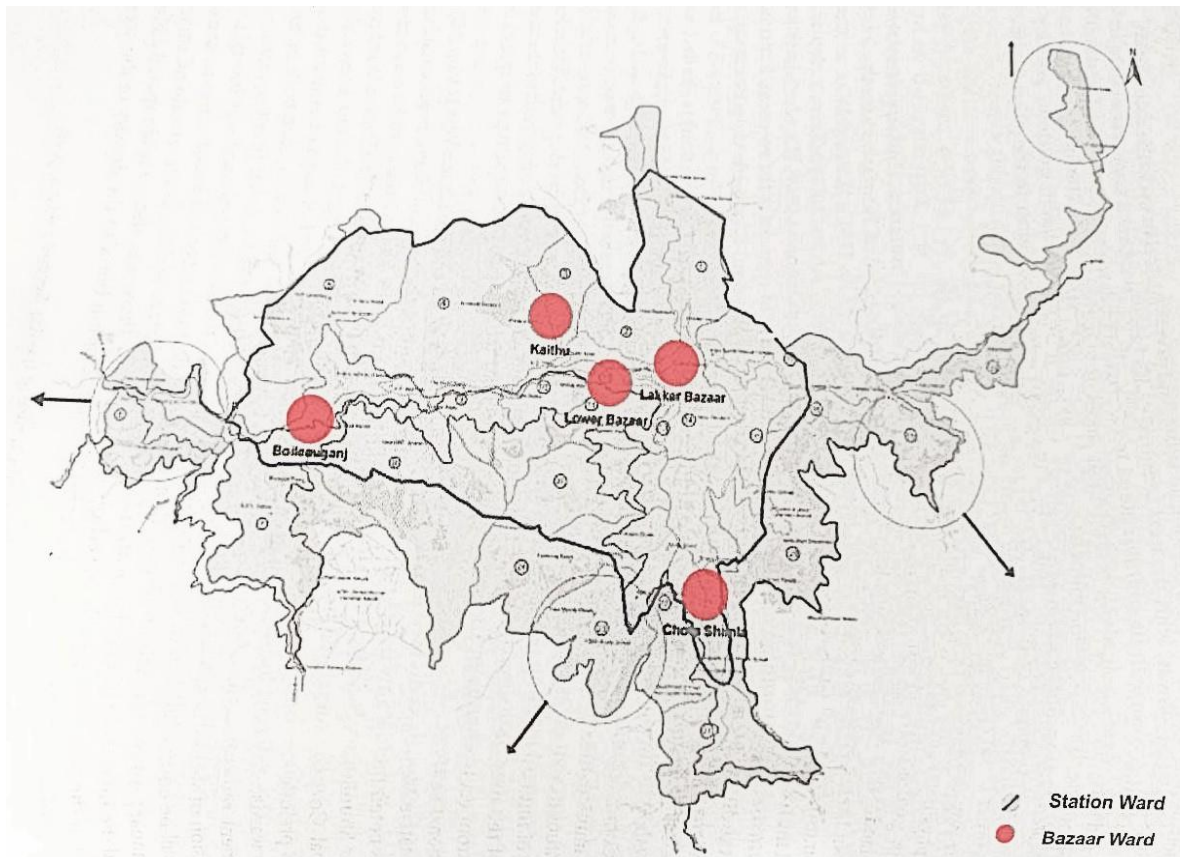
One of the main functional tools of the Municipal Committee (now Corporation) is the division of the town into multiple wards in order to ensure proper governance. The division

of wards is primarily an administrative exercise that on the one hand, enables the knowledge and a fair dealing of residents' issues that are conceived at various social levels through the equal number of elected representations from each ward, and on the other hand, a methodical documentation, understanding and tackling of the various aspects of city maintenance and development. Therefore, the administrative divisions done over time not only indicate a pattern of development of the town, but also, show the change in the socio-cultural setup, which further affects the type of spaces that emerge in these areas.

In 1884, the town was divided into two wards: the Station Ward and the Bazaar Ward (Figure 3.2). As described by Pamela Kanwar, "The divisions not only signified the residential and commercial areas respectively, but also, broadly, the European and Indian enclaves. The division can be conveniently used to describe the social gulf between those who lived in the two areas.... The Bazaar Ward meant all the five bazaars-Boileauganj, Kainthu, Lakkar bazaar, Chhota Shimla, and the largest, Bara or Lower Shimla Bazaar-in the different localities of Simla...Station Ward consisted of most of municipal Simla and, dotted with upwards of 400 privately owned cottages, villas, and castles, each built on an acre or more of land, had a distinctively English character."¹⁷

¹⁷ Pamela Kanwar, *Imperial Simla: The Political Culture of the Raj*, Second Edition, 1999, p. 48.

Figure 3.2 Old Ward divisions of Shimla Town



Source prepared with help of ward maps provided by Municipal Corporation Shimla

It should be noted that the main market for the British, the Mall Road, was a part of the Bazaar Ward till 1900 only and was brought under Station Ward thereafter, which shows that the ward divisions were not based on land use as the two divisions did not signify the prominently residential areas and the commercial and mixed-use areas. The divisions were clearly based on social factors. There was also a visible spatial difference between these two wards not only in terms of their location but also the density of the areas, the building techniques and the quality, quantity and the typology of spaces created inside and outside the buildings.

The spatial construction of a neighbourhood is also a representation of its inhabitants' social, religious and cultural orientations that are indicated by the treatment of a space and also through certain symbolic signatures. Where, on one hand, the Station Ward had huge estates spread all over the city located mostly at large distances from each other, the Bazaar

ward, on the other hand, was a dense area with shops and houses lying in close proximity to each other sometimes sharing one (in case of a corner building) or two (in case of adjacent buildings) common walls between them. One fifth of the population of Shimla is said to have been a resident of the Lower Bazaar area in those times. A physically closely knit dense neighbourhood is an indicator of a service class, and the large estate with gardens and spaces to spare is an indicator of the lavish elite. The distribution of the religious landmarks throughout the town can also be seen as a hint to understand the social division of the town then. The Bazaar Ward was prominently the area of the Indians as some of the major temples, mosques and gurudwaras lie in these areas. Except for the two temples that are said to have preceded the town, namely the Jakhu Temple and the Kalibari Temple, the Station Ward had all the churches in the area defined under it. Sometimes, the cultural difference can also be judged not only through the division of space inside the buildings but also through the carved motifs observed on the elevations or inside the buildings.

Till 1930, the Municipality was under direct surveillance of the Central Government and the District Commissioner was the municipal president. Pamela Kanwar records that, "*In the nineteenth century, municipal representation had been based on the Whig concept of 'interest, connoting that the quantum of tax paid by houseowners or tenants entitled them to a proportionate right in the running of municipal affairs. Property qualifications formed the basis on which the representative nature of the municipality rested.... The pressure to democratize resulted in one member being elected from each of the two wards, Station and Bazaar and in 1930, the Bazaar Ward was given an additional seat.*"¹⁸ Till India's independence these two ward divisions prevailed, after which a representative Municipal Committee was put in place and Shimla was divided into fifteen wards in 1953. As noted, before, the Committee was converted to a Municipal Corporation in 1969, which was after Shimla became the capital of the newly formed state of Himachal Pradesh. As per the Municipal Corporation website, "*In 1968 arrangements for holding first elections were made and as a prelude the government ordered the delimitation of wards of the Municipal Committee into ten wards.... With promulgation of Himachal Pradesh Municipal Corporation Act. 1994, the government revised delimitation of wards into 21 and*

¹⁸ Ibid p. 254

conducted election."¹⁹ This Act states that, the division of wards must be done in such a manner that as far as possible the population in each dated January 1997, a record available with the Corporation, states the altering of the Municipal ward shall be equally distributed and one member shall be elected from each ward. A notification area and the inclusion of parts of some surrounding villages There is a list of 29 villages that were included in the form of three new wards, namely, Kasumpti, Dhalli and Totu. In the year 2002, a Special Area Development Authority (SADA) was set up for these three areas and they no longer remained under the jurisdiction of the Corporation, but as per a notification dated 2006, Totu, New Shimla (Kasumpti) and Dhalli (which included Mashobra) were again included in the limits of the Shimla Municipal Corporation. Presently, when the field work was conducted, the town has 25 ward divisions, namely, Bharari, Ruldu Bhatta, Kaithu, Annandale, Summer Hill, Totu, Boileauganj, Tuti Kandi, Nabha, Phagli, Krishna Nagar, Ram Bazar Gunj, Lower Bazaar, Jakhu, Benmore, Engine Ghar, Sanjauli Chowk, Dhalli, Chamyana, Malyana, Kasumpti, Chhota Shimla, Pateog, Khalini and Kanlog.²⁰ (though the local newspapers put forth the information that the government intends to begin the process of further delimitation of wards and if the news is to be believed, very soon, Shimla might have 34 wards instead of the present 25 wards.

There is an obvious change in the method of division of space. The social division has been replaced by a division based on population data followed by ensuring inclusion of a particular neighbourhood completely as per its location on site. But the social processes cannot be ignored and thus it is a given that even in these ward divisions a certain kind of social hierarchy can be observed. Henri Lefebvre in *The Production of Space*, quite effectively summarizes, "Space is permeated with social relations; it is not only supported by social relations but it is also producing and produced by social relations." The spaces of these wards, therefore, exhibit variations in the kind of place making processes when compared to each other.

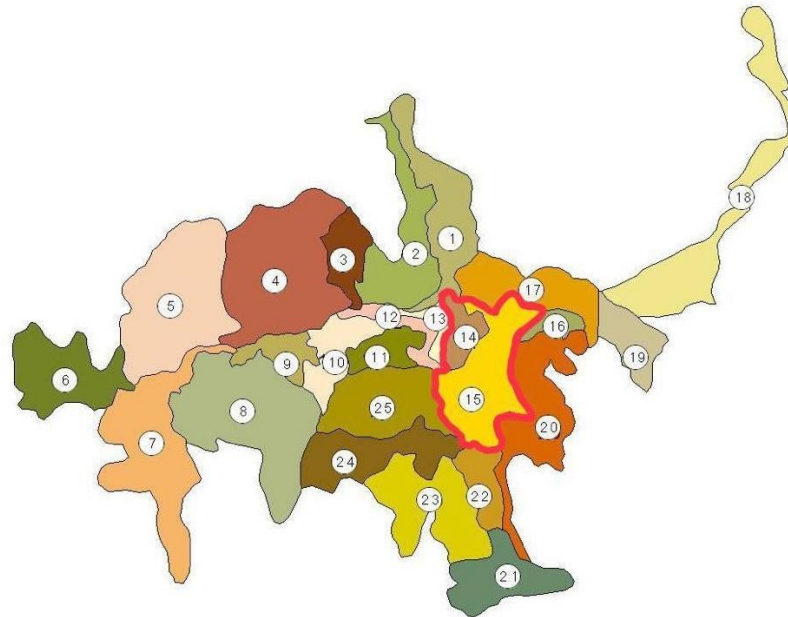
The present division of wards is made up of old and new neighbourhoods. The associations of the internal boundaries of the neighbourhoods within a ward and the interaction of each

¹⁹ www.shimlamc.org accessed on 15th July 2015

²⁰ Municipal Corporation Shimla

ward with the adjacent wards, both at a social and spatial level, creates ties that ultimately bind the town together. Here I would like to illustrate some of such nuances through examples of some wards or clusters of wards in Shimla. The first example I take is that of the neighbouring wards of Jakhu and Benmore (Ward No. 14 and 15 on **Fig. 3.3**).

Figure 3.3 - Ward No. 14 and 15



Source: Marked by researcher on map provided by Municipal Corporation Shimla

These two wards, along with a part of Sanjauli Ward, lie on the Jakhu Hill. The Benmore Ward, with a residing population of 3988 people, is bounded by Mall road from Nallah near Pumping Station Sanjauli Chowk in the North, the ravine between Outer Bourne and Emm Villa to Cart Road in the south, from Sanjauli Chowk upto the same ravine via St. Bede's College in the East and from the junction of Cart road with Chhota Shimla Mall Road to Marina Hotel moving along the naala upwards to the junction with Five Benches Road further moving along MC Kutch Road to Sanjauli Chowk in the West. The Jakhu Ward, with a residing population of 3505, is bounded by the Snowdon Pump House Naala to Cart Road on the North, from Christ Church on Ridge to Shivalik Hotel near U.S. Club

Gate on the South, up to Richmond Area on the East and the Upper Lakkar Bazaar area on the West.

The entire residential area in these two wards was a part of the old Station Ward. Many of the oldest Colonial residential properties lie in these areas, some of them still retaining acres of land. Most of these estates that lie in the Jakhu Ward are privately owned, except the Richmond Estate which is now a residential area for State Government employees the old Corstorphan's Hotel which serves as residences for IGMC employees and the old Craggs Estate which is now completely modified to accommodate the Central School premises. The Benmore Ward sees a comparatively equal distribution of private and government ownership. The land-use of the old estates is mostly residential, which includes State and Central government owned properties and private properties, except administrative buildings like the mini-Secretariat, commercial conversions like Wood Ville which is now a heritage hotel, Radhaswami Satsang building which replaced an old called Forest Hill and the educational precinct like St. Bede's College premises. The government to has retained the open spaces and green cover around the properties under its jurisdiction. The residences have undergone repair on a regular basis whenever the property is occupied by a new government employee. Some internal or external interventions, which are not always sympathetic to the building's structure or character, have been done in order to make them suitable for the present-day requirements. But, as of now, the original vocabulary is more or less retained. The junction of these two wards is at a purely residential area and therefore, these wards meet quite harmoniously at the Richmond Estate. The difference between these wards is in terms of the development over the years. As one walks from the Benmore ward towards the Jakhu ward there is a noticeable change in the spatial character because of a stark presence of dense recent construction in Jakhu.

Comparative areas and population of both wards show the pattern of growth. The phenomenon of extensive construction and the visible diminishing forest cover in the Jakhu Ward can be attributed to the private ownership of land. As stated before, the original estates had acres of land and the owners, over time, did not feel the need of such big grounds. As a result they either sold the land in parts and kept just enough for themselves

or razed the old buildings to the ground and developed the properties as economically viable investments. These pieces of land, that were once under thick forest cover are now covered with a concentrated multi storeyed constructions. Explaining the division of land, in a very basic matter-of-fact language, the Development Plan for Shimla Planning Area states, "The individuals generally purchased raw land with zig-zag 'Khasra' Numbers here and there from the landlords, without requisite basic services infrastructure. The Section 16-C provides for approval of sub-divisions of land by the Director TCP and yet development of roads and other requisite amenities including parks, open spaces, sewerage, drainage, water supply, electricity, etc. were grossly violated. Though the Registrars were restrained to register the sale deeds without proper sub-divisions of land and development yet they continued to register the same according to the whims of landlords, leading to the menace of unplanned development in the entire Planning Area."²¹

Apart from the decreasing green cover, that environmentalists describe as the destruction of the lungs of the city, another major implication is the blocking and littering of the natural water ravines. Zooming into this area the map of 1925 shows buildings located along the natural water sources (**Fig.3.4**). Comparing it to the present mapping of the area shows clearly the increase in the number of structures in the highlighted area (**Fig. 3.5**).

Furthermore, when one observes the construction. there are points where, construction has been done over the water ravines. It is noticeable that either the buildings lie over them almost like bridges or the neighbourhood is built along the ravine with its connecting staircase or path over the ravine in which case the once natural stream has been turned into the form of a drain. Even though the ravines have been considered and the construction hasn't blocked the stream of water directly, the accumulative litter under and near these areas end up blocking the minor streams or become a major eye sore along the major ones. In the chapter that deals with various aspects of urban conservation, one of the main ideas is that the natural systems are a major part of the inclusive approach towards the conservation of a built environment. Retention in their original form as far as possible and

²¹ Draft Development Plan for Shimla Planning Area, 2012, Town and Country Planning Department

in the cases where intervention is a major factor, a regular maintenance and upkeep is absolutely necessary.

Nevertheless, many old colonial properties that lie in these wards must be visited to experience the old Simla charm. Some properties exist in almost the same environmental surroundings as when they were established and enjoy the same uninterrupted views, regardless of the ownership. There are some that do not enjoy this privilege of surrounding open spaces, but can be observed to have retained their building vocabulary, if nothing else. Some, unlucky ones, have either been demolished and replaced or the original properties have undergone unsympathetic interventions as a result of which they are not identifiable, or the properties are lying in shambles and the owners seem to be waiting for the buildings to crumble. Many examples also exist of buildings that were made very near to the time of independence and belonged to rich Indians. There can be observed difference between them and the Colonial properties in terms of the type of site, the division of spaces, the use of material, the craftsmanship and the motifs and the names of the properties: The Indian houses though equally large in the size of the building, did contain the enormous grounds and open spaces around the main building.

Figure 3.4 – Situation as per 1925 Map



Source: Directorate of Urban Development


Area under Focus

Natural Water Ravines

Figure 3.5 – Situation as per recent Google Maps, 2022



Source: Prepared by researcher with Google Earth

 Construction over or dangerously close to the natural water ravines

Different approaches to understand the concept of 'Urban area'

The term 'urban area' or a town or a city has been tried to understand and explained by scholars from their respective boundaries such as demographically, sociologically and through Ecological approach by taking into account features of cities, towns and urban agglomerations. From demographic acumen it refers to the size and density of population and nature of work in which majority of the adult males population is engaged with; whereas sociologists focus on the issue of heterogeneity, impersonality, interdependence and the quality of life. Sociologists, Max Weber and George Simmel have emphasized on dense living conditions, pace of change and impersonal nature of urban settings (Weber 1961, Simmel 1978). According to Louis Wirth heterogeneity is a determining characteristic and defines city as 'a relatively large, dense and permanent settlement of socially heterogeneous individuals' (Wirth, 1938), while Tonnies (1887) distinguishes between rural and urban societies based on their social relationships and values. The rural community which he calls *gemeinschaft* is one characterised by strong social bond among the members and are informal in nature where emphasis is on tradition and consensus while on the other hand the urban society which he calls *gesellschaft* are characterised by secondary relationships where predominantly the interaction of people seemed to be impersonal, formal, contractual and dependent on the specialised function or service they perform.

Park (1925) applied Ecological approach in social sciences to understand the phenomena of urbanization in cities. It was an early stimulus to the urban ecology. Park emphasised that the patterns and relationships evident in a city could be determined by land use and people in cities. The cardinal principle emphasized was competition; through which human race competes for limited space and for access to the most advantageous location for once residence and business activities.

Social area analysis which got recognition in 1955 was examined by the Shevky-bell model. For them the Central Business District exercises control over the functional use of land in the other parts of the city just as in different plant communities one dominant specie exerts an overriding influence which controls the environmental surroundings and in turn

encourage or discourage the other species, this has been observed in a study on Delhi too (Sheel, 1994). The traditional ecological studies have been characterized into three basic types such as Morphological Approach, Social Area Approach and Factorial Ecological Approach.

Morphological approach deals with the concept and a principle derived from plant and animal ecology to the analysis of human community and are largely based on the concept of competition, supremacy and succession. The pioneering works include that of Park, Burgess and Mckenzie (1925) which lay emphasis on concentric zone model. The social areas have been identified through the classical model (Burgess 1925, Hoyt 1939) which metamorphosed into more recent multivariate studies over a period of time. The Morphological approach encompasses three basic 'classical' models of spatial patterning viz.: concentric zone model, sector model and multiple nuclei model.

Burgess (1925) developed Concentric Zone Model after researching the land use and social characteristics of Chicago city in early 1920s. He divided the city into five concentric land use zones which showed both, the successive zones of urban expansion and characterized the pattern at a specific moment.

The first and innermost zone described as 'Central Business District', characterized by all types of economic activities, office, bank, recreation, wholesale and retail business etc. The second zone termed as 'zone in transition' was characterized by poor residences and inner factory belt. The third zone was labeled the 'zone of interdependent working men's homes'. It contained the working-class people who could move out of the second zone. The fourth zone was entitled the zone of better residence and comprised of single-family dwelling units with spacious yard and owned by middle class native population. The fifth outermost zone was the 'commuter's zone' lying on the periphery, outside the legal boundary of the city. It consisted of a ring of small towns and villages. They primarily were dormitory suburbs, with very little industry or employment of their own.

Sector Model formulated by Hoyt (1939) suggested that social areas within the cities could be summarized in terms of sectors rather than zones. Hoyt examined 142 cities of United States and concluded that socio-economic status varied primarily in a sectoral fashion. He postulated that the Central Business District (CBD) remains in a circular form and the residential area of similar socio-economic status tends to extend in sectoral fashion towards the fringe. He made certain observations pertaining these sectors like the highly valued residential areas were located in sectors on one side of the city, the intermediate rental areas were often found on either side of the highest rent areas, the low rent sectors were frequently found on the opposite side of the city to the high rent sectors.

Social Area Approach primarily analyses the basic characteristics of certain natural areas which are identified and outlined as social, economic and demographic elements (Wirth 1938, Zorbaugh 1929). The basic concern to develop this alternative was to separate people and their business activities into somewhat uniform entities termed as 'natural areas'. Zorbaugh defined it as a 'geographical area characteristics of the people who live in it'. It was higher order concept than morphological area, for its definition included physical and cultural features. This model is criticized for its inclination towards the central sections of the city where unambiguous lifestyle and ethnic territories were contained within large areas of industrial and transportation land uses.

The Social area approach provides a broader framework for the analysis of ecological structure within the cities by examining the underlying dimensions of urban society. This approach was first given by E. Shevky and M. Williams (1949) in a study of Los Angeles and detailed by Shevky and Bell (1955) in a study of San Francisco. The analysis is premised on three basic constructs concerning the changing nature of modern society, change in the range and intensity of relations, differentiation of function and increasing complexity of organization. The three constructs can be listed as:

- i) Economic status or social rank
- ii) Family status or urbanisation
- iii) Ethnic status or segregation

Through perusal of works of different scholars, it is evident that Urbanization is a form of social transformation from traditional rural societies to modern urban communities. The scholars have defined the concept of urbanization from the perspective of their respective disciplines. For instance, demographers (Mitra, 1967; Bose, 1974; Premi, 2006) define urbanization as a population agglomeration, a city or a town is a concentration of population of different hues. Sociologists are also concerned with how the traditional social institutions and social structures undergo changes in the new social milieu of a town or a city. For instance, Rao (1991) has defined urbanisation as a worldwide process and an important factor for social change (Rao, 1991). Some of the changes occurred in Indian towns and cities have been visualized as those from the caste-system to the class structure, from joint families to nuclear families and from sacred to profane or religious belief system to secular outlook and behaviour. Davis (1965) and Pocock (1970) have examined the process of urbanisation as a transition from rural to urban life patterns and from the agricultural economy to the industrial economy (Pocock, 1970, Davis, 1965). In other words, urbanisation refers to the influence of city lifestyles on rural customs in addition to the unique migration of people permanently or temporarily from village to town or city. (Vishwakarma, 1981).

Urbanization Process as an engine of change

Urbanisation is, thus a process of expansions in the entire systems of interrelationships by which a population maintains itself in its habitat. There is both increase in the number of people at a point of population (in town or city) and also increase in the number of points (of town or cities) at which population is concerned (Boragatta, 1984: 2198). In contrast, they define the rate of urbanisation as the percentage change in the proportion of the urban population to the total population over a given decade or period. Demographer Ashish Bose defines the rate of urban growth as the percentage increase or decrease in the urban population over a given decade or particular period of time (Rao, 1974).

The above reviewed literature on urbanization brought forward several dimensions of analysis which includes a time dimension, a spatial dimension, and a socio-cultural dimension that covers a wide spectrum of diverse interactions. In an urban setting, one can

find the rural-urban continuum in which urban habitats comprise not only the territory of town or city but retains the territorial and spatial linkages with the rural hinterland and the settlements. Cities are the results of man and environment interacting in a process of adaptation and change, stimuli and response which has resulted in creation of a highly complex matrix of human and environmental attributes and are in the process of continuous change.

Urbanism as a way of life

Urbanism is a way of life actually represents how society is organised in terms of a complex division of labour, advanced technology, high mobility, dependency among its members in carrying out economic duties, and impersonality in interpersonal interactions. According to Louis Worth Urbanism as way of life, may be empirically analyzed from the following interrelated perspectives:

- By taking into cognizance its physical characteristics with a population base, technology and ecological order;
- Social organization system which is characterized by impersonal relations, prevalence of secondary contacts over the primary and weakening of kinship ties etc.;
- Prevalence of ideas, practices, beliefs and attitudes reflecting constellation of personalities with increased tendencies of personal disorganization, suicide, crime, delinquency and corruption.

Urbanization in Himachal Pradesh: Stemming a perilous impact

Urbanization is defined as the upsurge over time in the population of cities in relation to the rural population of the region, while in terms of a place; urbanization refers to increased geographical scale, density of population, and other activities in the area over time. However, a clear contrast between rural and urban societies is not plausible. There are gradations of urban and rural regions. Eminent sociologist Robert Redfield²² has made an important contribution to develop the concept of folk, rural, and urban continuum. The

²² <http://scih.org/robert-redfield-folk-urban-continuum/> accessed on 23rd November 2022

spread of modern industrial traits has decreased considerably the difference between the village life and city life. Therefore, a clear line of contrast between the two is not visible. Urbanization as a dynamic process takes place due to a variety of factors; such as due to natural expansion of the existing population, although urban reproduction tends to be lower than rural, or due to the transformation of peripheral population from rural to urban, incoming migration, or a combination of these.

Urbanization and its ramifications

The studies in the field of urban sociology have observed that people's psychology and lifestyle's changes in an urban environment. The way of life and the organization of society in urban areas gets transformed into a complex division of labour, extensive use of high level of technology, high levels of mobility, interdependence among members in carrying out economic functions and impersonality in social relations. This results in alteration of the ecology and economy of the region. Urbanization brings both perilous as well positive impacts which are quite discernible in India. On one hand it has opened up new avenues and vistas of development, on the other hand it has opened floodgates for the thriving and perpetuation of a host of social problems. The increasing urbanization in India has led to problems like pollution, over-crowding, slums, unemployment, poverty, crime and juvenile delinquency. Especially the unplanned and haphazard growth of urban areas has led to several complicated problems in several cities of India. Due to large-scale encroachments by commercial establishments and unauthorized construction, urbanization has become a source of great nuisance. The city which was known for pure air and was historically used as a recuperating centre is gradually getting transformed into the 'concrete jungle' with multi storey buildings despite the fact that all 12 districts of Himachal Pradesh fall under the category on seismic zone 4 and 5 which are highly vulnerable to earthquakes.

On the social and cultural front, the dynamic process of urbanization has led to intermingling of rural and urban population and as a consequence helps in the spread of new cultural traits, thus further enriching the cultural matrix of a society. This trend is quite evident in a multicultural country like India. However, at the same time urban pressures have resulted in deterioration of traditional family values and social control over children.

Since schools are not available always which further breeds the vicious cycle of disparity. There is a dearth of playtime for kids, entertainment, and cultural enrichment. Economically urbanization in terms of the process of industrialization has played and is playing an immensely important role in the development of our country and there is no denying the fact that urbanization has boosted productivity and economic diversification, but at the same time has also given rise to deprivation, poverty and marginalization. This process has gained further momentum in this era of liberalization and globalization.

The urbanization process has greatly altered the lifestyle of urban dwellers, which in many cases giving rise to a host of health problems particularly for poor and low-income groups. Many urban dwellers in developing countries, particularly teenagers and young adults, are seeing an increase in psycho-social health issues. In addition to poor housing and sanitation, excess of chemical pollutants in urban areas, toxic hazardous wastes, shortage of fresh water etc. lead to variety of health related complications. Mehta (1992); Anand (2021) while studying the impact of urbanization, Environment state- '*Slum dwellings have no ventilation or natural light and are the most vulnerable. Slum dwellers suffer from dust, smoke, and noise pollution. Piles of garbage, potholes, stray animals, flies and mosquitoes are common in these areas. Children in these areas are more vulnerable to diseases and deficiencies than their rural and other urban counterparts*'.

Urbanization Pattern in Himachal Pradesh

The journey to hills usually means cruising along one of the winding roads snaking across the mountain crests to the vistas of rugged terrain cascading below. Scenic beauty may fascinate the visitors who may normally find remains of forest trees on the route or one may observe the well-tended orchards. Some of the routes race past cantonments and small towns that have grown in the recent past decades or century. Just as the port cities emerged as prime cities similarly the hill stations emerge as the key towns in Himachal Pradesh. A description of geography or environment with special emphasis on human factors is a necessary concomitant especially for the Himalayas, since a combination of geographical and physical features alter the features of climate, cropping patterns and the location of forests all affecting the human habitat. The urban refers to towns and cities that are regarded

as agglomerates whose residents are not directly associated with the generation of agricultural wealth and broadly, where non-agricultural functions are performed. The transformation in the hill state and particularly Shimla city has been taken as the vantage point of the study how it has transformed over a period of time and the cascading effects it has thereof. The concept of a town changes according to the historical setting and each civilization has its own conception of a town, depending on the juncture of development. The formation of H.P. as a part 'C' state on April 15, 1948 with the merger of 30 erstwhile princely states gave impetus to urbanization in the State. Himachal Pradesh has observed a sudden growth of its urban population from 0.86 lakh in 1941 to 1.54 lakh in 1951. The rate of urbanization grew from 3.80% to 6.45% in respective census decades.

Since 1971 when Himachal Pradesh got its statehood, the urbanization of a predominantly rural society has gained momentum and the urban population of Himachal Pradesh has more than doubled between 1971 and 2011 (Table 3.1). According to the 2011 census; population density (persons per square kilometers) has doubled from 62 in 1971 census to 123 in 2011. The projected higher growth of economy, industry, trade, commerce and tourism in H.P. may lead to faster urbanization. Table indicates the trends of urbanization in H.P.

Table: 3.1 Trends of Urbanization in H.P.

Census Year	Total population (in Lakh)	Urban Population (in Lakh)	Rural Population (in Lakh)	% of urban population	CAGR (%)		No. of towns/urban Agglomerations
					Rural	Urban	
1971	34.60	2.42	32.18	6.99	-1.98	3.12	36
1981	42.81	3.26	39.55	7.61	4.15	3.02	47
1991	51.71	4.49	47.22	8.69	1.79	3.25	58
2001	60.77	5.95	54.82	9.79	1.50	2.86	57
2011	68.65	6.88	61.76	10.03	1.50	2.86	59

Source: Registrar General of India 1981, 1991, 2001 and 2011

Table: 3.2 District-wise Rural and Urban Population (in %)

District	Total			Rural			Urban		
	1991	2001	2011	1991	2001	2011	1991	2001	2011
Bilaspur	5.71	5.61	5.56	5.90	5.82	5.78	3.73	3.69	3.65
Chamba	7.61	7.58	7.56	7.70	7.78	7.82	6.65	5.80	5.25
Hamirpur	7.14	6.79	6.62	7.34	6.98	6.86	5.05	5.07	4.56
Kangra	22.70	22.03	22.00	23.61	23.10	23.05	13.21	12.14	12.53
Kinnaur	1.38	1.29	1.23	1.51	1.43	1.36	-	-	-
Kullu	5.85	6.28	6.38	5.96	6.41	6.42	4.68	5.05	6.01
L. & Spiti	0.61	0.55	0.46	0.66	0.60	0.51	-	-	-
Mandi	15.01	14.83	14.57	15.26	15.33	15.18	12.41	10.24	9.10
Shimla	11.94	11.89	11.86	10.40	10.13	9.92	28.08	28.08	29.24
Sirmaur	7.34	7.54	7.72	7.24	7.49	7.65	8.48	8.00	8.30
Solan	7.39	8.24	8.45	7.09	7.47	7.74	10.53	15.31	14.84
Una	7.32	7.37	7.59	7.33	7.46	7.71	7.18	6.62	6.52
H.P.	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Statistical Abstract of Himachal Pradesh 2017-18

While analyzing the last three census from 1991 onwards, the district-wise trend of urbanization discreetly indicates that Shimla, Solan and Sirmaur districts have 29.24%, 14.84% and 8.30% urban population respectively and are the top average. The urban population of Himachal Pradesh is not growing in an equitable manner. The inequalities have increased considerably in the last 5 decades. The 2 most urbanized districts of the state i.e., Shimla and Solan, have 19 towns of different sizes i.e., 11 in Shimla and 8 in Solan and these indicate a linear/ corridor pattern of urbanization. There is a ribbon-type of growth of towns in other districts also i.e. Bilaspur, Chamba, Hamirpur, Kangra, Kullu, Mandi, and Una except Kinnaur and Lahaul & Spiti, which have no urban population.

Table: 3.3 Towns classified by Population Size, 2011 Census

District	Total no. of towns	Number of towns with population					
		100000 & above (Class I)	50000 to 99999 (Class II)	20000 to 49999 (Class III)	10000 to 19999 (Class IV)	5000 to 9999 (Class V)	Less than 5000 (Class VI)
Bilaspur	4	-	-	-	1	1	2
Chamba	5	-	-	-	1	1	3
Hamirpur	4	-	-	-	1	1	2
Kangra	9	-	-	1	1	4	3
Kinnaur	-	-	-	-	-	-	-
Kullu	5	-	-	-	1	2	2
L.& Spiti	-	-	-	-	-	-	-
Mandi	5	-	-	2	-	1	2
Shimla	11	1	-	-	-	2	8
Sirmaur	3	-	-	2	-	-	1
Solan	8	-	-	2	1	1	4
Una	5	-	-	-	1	2	2
H.P.	59	1	-	7	7	15	29

Source: Statistical Abstract of Himachal Pradesh 2017-18

As per 2011 census classification of towns Shimla district has highest number of towns with Shimla town as the only class I town of Himachal Pradesh. The town classification clearly indicates that there are 29 class VI towns, 15 class V towns, 7 class III towns, 7 Class IV towns and 1 class I towns and no town in Class II town category, in Himachal Pradesh. Shimla district is most urbanized one with 29.24% urban population of Himachal Pradesh.

The number of towns has augmented from 36 in 1971 to 59 in 2011 and further 61 in 2018. The urban population of H.P. is consistently converging in the larger towns. It is also noteworthy that smaller towns with sparse urban populations have begun to show decadal growth rates that are on par with or higher than those of the larger towns. Manali, a class V town in the Kullu district, had the highest decadal growth rate (157.50%) between 1991 and 2001, partly as a result of the expansion of tourism there. With the growth of urban population, now the number of Municipal Corporation has been raised to 5, municipal councils 29, nagar panchayats 27 and number of cantonments 07. For the urban regions to expand sustainably, the spatial pattern of urbanization that results from the expansion of trade, tourist, and industrial activity needs to be examined and managed. In Himachal Pradesh, there is a significant difference in the size, population base, and rate of population increase between towns of the same class and between towns of different classes.

Table: 3.4 Percentage contribution of Sectoral State Domestic Product at Current Prices

S.No	Sectors	1970-71	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1	Primary	58.56	25.74	25.28	23.15	23.22	20.05	19.02	19.15	18.01	18.23	19.28	17.09
2	Secondary	16.73	38.11	38.24	39.95	39.77	43.02	42.91	42.19	44.28	40.85	37.87	37.56
3	Tertiary	24.71	36.15	36.48	36.90	37.01	36.93	38.07	38.66	39.71	40.92	42.85	45.35

Source: Statistical Abstract of Himachal Pradesh 2017-18

While analysing the state domestic product share of different sectors, (Table 3.4) one can distinctly observe that there is a consistent increase in secondary and tertiary sectors and share of primary sector has declined tremendously from 58.56 in 1971 to 17.09 in 2014. There are resource imbalances and gaps in the provision of urban infrastructure and municipal services as a result of the uneven growth and spatial pattern of urbanisation in H.P. The quality and quantity of urban infrastructure remains poor in Himachal Pradesh despite the growing contribution of the urban sector, particularly the urban service sector, to the State Domestic Product (SDP). As a result of the primary sector's declining share in the SDP and the secondary and tertiary sectors' increasing share in terms of employment creation and overall output, the share of urban areas in the SDP has increased. One of the primary issues in Himachal Pradesh as a result of expanding urbanisation is the escalating environmental issues and pollution brought on by the direct disposal of untreated sewage in the majority of rivers, for instance as has been observed by Gupta J.P. and Manoj K. Teotia (2003) '*One of the major concerns in Manali is growing environmental pollution due to disposal of untreated sewage in the river Beas and unscientific disposal of non-biodegradable waste*'. Even solid waste such as garbage, polythene bags and other domestic waste, is also dumped on the slopes near the towns which ultimately gets down to the rivers or streams flowing beneath.

Critical Appraisal of Jawaharlal Nehru National Urban Renewal Mission (JNNURM)

JNNURM was launched on December 3, 2005. JNNURM, the central government's flagship programme, recognised that urbanisation was a "relentless process" that had sparked a severe urban problem. The cost of infrastructure development could not keep up

with urban growth, and the most vulnerable citizens—those living in sprawling slum communities and the homeless—were paying for this. To address this, the centre set aside Rs. 50,000 crore under JNNURM, covering a seven-year period starting with the fiscal year 2005–2006. The private sector was expected to contribute another Rs. 50,000 crore. The mission seeks to transform 63 Indian cities into sustainable urban models throughout this time. In return, cities would have to implement mandatory and optional reforms, the mission guidelines said, *‘to ensure improvement in urban governance so that urban local bodies (ULBs) and parastatal agencies became financially sound with enhanced credit rating and ability to access market capital for undertaking new programmes and expansion of services. In this improved environment, public-private participation models for provisioning of various services would also become feasible’*. Narendra Pani of *The Economic Times* has summed up JNNURM in an article, ‘Dressing up the Urban Crisis’ said *‘it could result in a huge expenditure on underutilized infrastructure, even as access to basic services gets more difficult and urban taxes increase inequality’*.

Urban renewal, water supply and sanitation, sewage and solid waste management, urban transport, development of heritage areas, preservation of water bodies, and other components are all admissible components under the sub-mission on urban infrastructure and governance. JNNURM is criticized on the grounds that it aims to give private corporations more power than elected authorities in the name of public-private involvement. JNNURM is a governance issue, not just a financial or technological one, hence the "process" becomes crucial rather than the "product". At the local level, municipalities and elected metropolitan planning committees should be in charge of making decisions rather than mayors or bureaucrats. The decision-making fall outs can be seen apparently in public-private partnership model in Shimla as well, particularly with regard to waste management process in Shimla. The Solid Waste Management plants which kept changing hands from one contractor to the other only to deteriorate the SWM scenario over decades but situation worsened year by year.

However, SWM is an admissible component of JNNURM, but it takes in its purview the three Category cities, i.e., category ‘A’ (7 Megalopolis), Category ‘B’ (28 million plus

cities), and category ‘C’ (28 cities having population more than 1 lakh)²³. The towns between class two to six which are in thousands are not included in such mission. Therefore, the policies need to look at these towns as well which are growing at faster rate in India.

Tourism in Himachal Pradesh and Shimla

According to a Himachal Pradesh State Report, a tourism survey on Himachal Pradesh conducted for one year i.e., April 2011 – March 2012 by a market research company ACNielsen ORG-MARG on tourist inflow of both domestic and international tourists in the state has observed that there has been a consistent increase in tourist every year and the Shimla and the Kullu district remains the top choice of the tourists as shown in Table and figure below. Interestingly Shimla is the top choice for domestic tourists consistently throughout the year, with most of the tourists visiting Shimla in summer season i.e. April to June with consecutive increase in number in month of June, leading to situation of traffic jams and shortage of other infrastructural facilities as is apparent from the table that the number of domestic tourists visiting Shimla in the month of June is 488492 and the population of Shimla City as per census 2011 is 169578, additionally receiving 12261 international tourists (Table 3.5 & Table 3.6) in the same month resulting in almost three times rise in city population. In contrast in winters the number of domestic tourists in Shimla shows lesser trends in comparison to Kullu district where there is a corresponding increase in the winter months i.e., December to March months; 343335 tourists in Kullu in the month of March whereas the corresponding figure for the same month in Shimla is 227412 (albeit still larger than the total resident population of the city). The possible reasons could be Kullu receiving heavier snowfall in season compared to Shimla nowadays and the skiing facilities available in Solang Nala in Kullu district. Although Shimla still remains the top choice for international tourists in the month of March as well receiving 9219 international tourists as per the report.

²³ [https://mohua.gov.in/upload/uploadfiles/files/1Mission%20Overview%20English\(1\).pdf](https://mohua.gov.in/upload/uploadfiles/files/1Mission%20Overview%20English(1).pdf) accessed on 22-11-2022

Figure 3.6 Month Wise and District Wise Domestic Visitor Arrival in Himachal Pradesh:

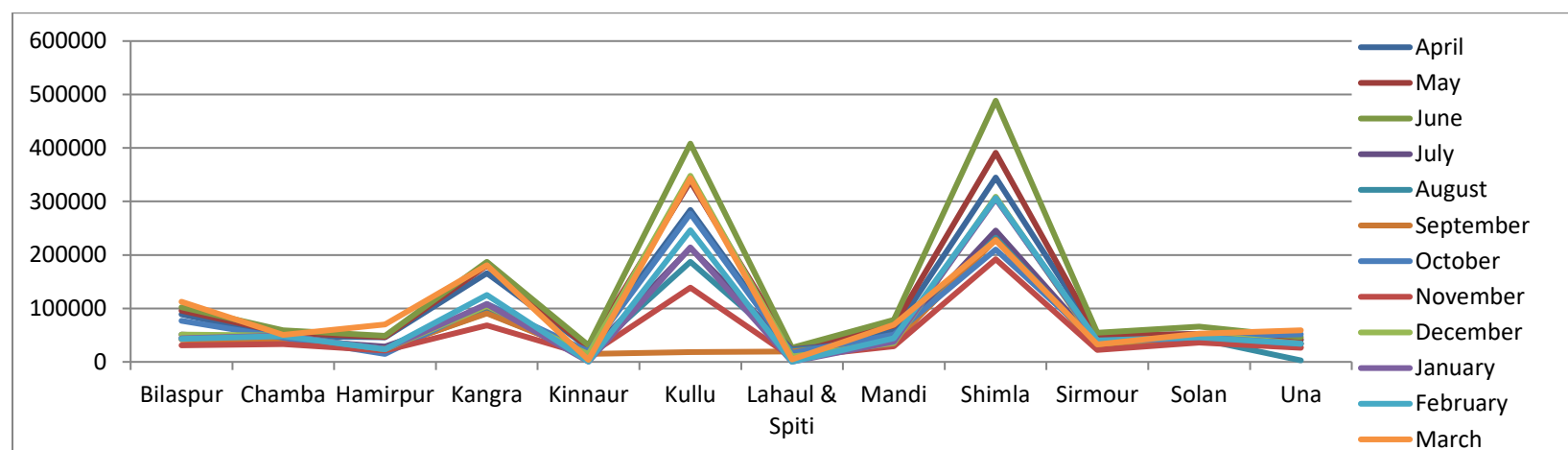


Table: 3.5 Month Wise and District Wise Domestic Visitor Arrival in Himachal Pradesh:

	Bilaspur	Chamba	Hamirpur	Kangra	Kinnaur	Kullu	Lahaul&Spiti	Mandi	Shimla	Sirmour	Solan	Una	Total
April	88683	48156	45767	165688	26133	284041	20050	58164	344795	48494	52441	40447	1222859
May	96112	54549	46229	179999	26632	337502	24285	67673	391149	49313	52315	42254	1368013
June	101903	59179	48983	186879	30807	408235	26417	78577	488492	54254	66097	46276	1596098
July	51170	42587	28813	95444	15877	213126	23392	41189	245688	32957	45942	34375	870560
August	44380	38513	23873	91634	15114	186924	21923	38019	232340	28797	43112	2765	792280
September	42061	37862	24523	90873	14942	18580	19618	37401	228800	28897	39111	27506	777399
October	76872	45510	14845	108316	19267	277251	16751	51205	209882	37303	45513	51838	954553
November	31072	33464	21004	68024	12801	138842	8651	29069	191969	22604	35906	26501	619906
December	51010	49489	23603	104368	14150	348083	9949	34750	308778	33037	50305	34296	1061817
January	44117	49305	24123	108159	346	214226	321	37991	304864	37057	46663	34012	901184
February	43267	48364	23597	125194	279	246263	229	43916	306650	39922	45852	34015	957549
March	112630	50621	70275	180911	3716	343335	4453	69633	227412	32625	52936	59140	1207689
Total	783277	557599	395635	1505489	180064	318361	176041	587587	3480819	445260	576193	458311	12329907

Source: Report on Tourism Survey on Himachal Pradesh April 2011-March 2012, Fig 3.6 has been prepared by researcher based on this data.

Figure 3.7 Month Wise and State Wise Foreign Visitor Arrival in Himachal Pradesh:

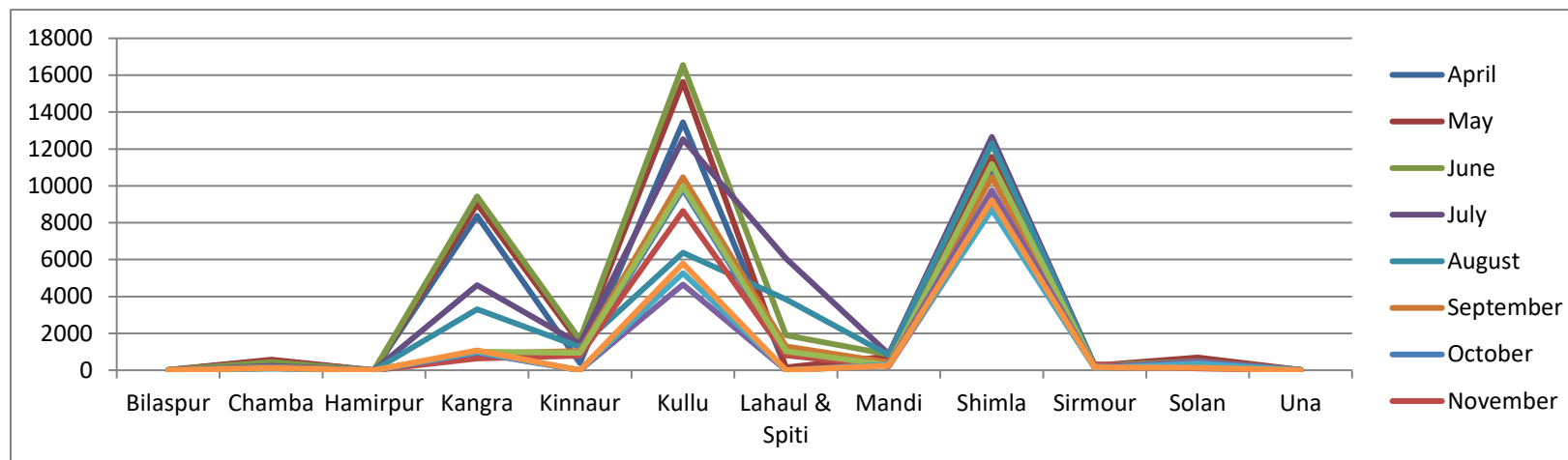


Table 3.6 Month Wise and State Wise Foreign Visitor Arrival in Himachal Pradesh:

	Bilaspur	Chamba	Hamirpur	Kangra	Kinnaur	Kullu	Lahaul-Spiti	Mandi	Shimla	Sirmaur	Solan	Una	Total
April	11	528	0	8364	390	13450	117	641	10838	241	580	12	35173
May	12	575	0	9009	1443	15638	148	761	11572	246	687	15	40104
June	13	435	5	9430	1664	16552	1891	851	12261	260	486	17	43865
July	8	242	3	4621	1430	12538	6054	879	12655	258	246	13	38946
August	6	184	2	3305	1260	6369	3843	817	12299	220	193	6	28504
September	4	127	2	905	1037	10461	1292	419	10476	197	235	2	25158
October	6	113	3	893	797	9805	892	242	9445	162	206	3	22567
November	1	120	2	645	788	8642	805	226	8773	318	105	2	20426
December	2	168	2	1012	935	9974	1021	265	11186	192	254	2	25013
January	2	160	0	947	0	4653	0	292	9758	150	465	4	17229
February	0	84	0	985	0	5264	0	302	8719	112	356	6	15827
March	6	112	6	1072	0	5790	0	260	9219	157	128	4	16750
Total	71	2848	21	41188	9744	120136	16063	5955	127201	2513	3741	86	329562

Source: Report on Tourism Survey on Himachal Pradesh April 2011-March 2012, Fig 3.7 has been prepared by researcher based on this data.

Development, Pollution and Waste Generation in Himachal Pradesh

With increasing economic growth and industrialization, the generation and disposal of garbage which hardly got attention until recently, has now become a serious problem not only in metropolitan areas but in other cities, towns, and rural areas as well. Discarded wastes are most noticeable form of pollution which presents a serious problem because either it is burnt or it is disposed off haphazardly which result in damage to the environment in one or the other form. Open dumping is ugly; its burning pollutes air and its random dumping in water affects the aquatic life and makes water unusable.

The studies conducted in this field show that quantum of solid waste generation and per capita solid waste has been on the increase. It is generally believed that there is a positive correlation between solid waste generation and the wealth of a nation. There by meaning that the wealthy nations generate more solid waste than the poor nations. With the increase on the wealth level of a nation, not only the quantum of solid waste generation increases but also the composition of the waste changes qualitatively. For example, with increasing standard of living the nature of solid waste of a society change from bio-degradable organic material to plastic and other synthetic (non-biodegradable) materials. The quantity and quality of refuse generated by a population depends on various factors such as size of population, geographical location, climatic conditions and nature and status of community. Development is a continuous process which changes the contents of space often drastically. As stated earlier an undesirable by-product of development has been environmental pollution and degradation, leading to serious ecological imbalances threatening the very existence of survival of mankind. The reported generation of Municipal Solid Waste (MSW) in the State of Himachal Pradesh was estimated to be 304.3 TPD in 2011 (CPCB, 2012) which is further expected to rise by almost 133% by 2041 (DoSET, GoHP 2015). The per capita waste generation rate in Himachal Pradesh is around 0.413 kg/day. The daily waste generation in Shimla city is approximately 93.0 MT. this depicts that the waste generation per capita per day is 350gm/capita/day in the city. The report further estimated that 60% of the waste generated ends up in landfills. Dumping of waste in unscientific manner creates anaerobic condition at the disposal site which leads to uncontrolled emission of methane which is a greenhouse gas (GHG) like methane. The total GHG

emission from waste sector in Himachal Pradesh is estimated at 6.129 tonnes of equivalent CO₂ (Department of Science and Technology, GoHP, 2012).

Several studies have been conducted focusing on water and air pollution, but there are certain other aspects of pollution which have received lesser attention. The problem of Garbage disposal is one of them and particularly there are very few studies looking at this issue from public health in general and health of the waste management workers in particular. This huge amount of generated waste which goes to the landfill untreated on the one side creates problems for environment and on the other hand can provide not only the employment opportunities but can provide alternative fuel through 'waste to energy' initiatives saving land which otherwise would be required in form of land fill.

Stakeholders in the Refuse Collection, Transportation and Disposal Services

The contributors in the urban solid waste management process are the waste generators and waste processors. Waste generators refer to all the agents generating and consuming services provided by the waste processors and waste processors refer to the agents directly active in waste processing i.e., service producers. The former comprises of waste pickers, itinerant waste buyers, middlemen like junk dealers and wholesalers, the urban local body and recycling unit. The first three form informal network and the others are formal agents. The waste producers comprise mainly of the agents viz. households, commercial establishments (markets and hotels), institutions (offices, educational institutions and hospitals) and industries.

The Waste Management system involves more or less eight functional steps such as - Generation of Waste, storage, collection, transfer, transport, processing, recovery and disposal. The entire process of waste management aims at providing hygienic, efficient and economic collection, transportation, treatment and disposal of solid waste without polluting and affecting the atmosphere, soil, water system and health of the public²⁴.

²⁴Here the term 'health of the public' has been used in a broader context which also covers (and emphasizes on) the health of the workers handling the waste.

Rationale-

The influence of wastes generated through different activities on public health and environment has been felt strongly over the last two decades. Traditionally, Municipal Solid Waste has been understood as solid waste generated in a community and should be disposed off as useless material. Waste managers have always asked the question: How does one get rid of the waste? People have traditionally been using crude ways to dispose of waste, such as burning, burying, land filling, of now they are beginning to use some sophisticated techniques such as incineration and secured landfills. But as societies have developed, so has the production and consumption of a wide variety of materials. That has resulted in increased generation of waste, leading to ever-larger waste management plants, which have become serious threats to health and environment and have triggered contentious socio-political issues. While this is still the dominant paradigm, fortunately, many countries are bringing about radical changes in the approach to waste management and disposal. Now, one man's waste can be another man's resource. This signals a shift from the disposal centric waste management paradigm to a recovery-centric one.

As noted earlier in an urban set up an enormous amount of garbage is produced. Given the modern conspicuous consumerist culture invading every home in Himachal Pradesh (Shimla), the people tend to use everything in excess and also produce waste in abundance. At the same time the infrastructure in place, including waste disposal systems, is of pre-independence vintage in concept, technology and administration. There is no land available to fill in at reasonable distances from the sites of waste accumulation, nor is the waste produced susceptible to traditional methods of disposal and management. Shimla is the only Class I city in Himachal Pradesh and therefore an attempt has been made to study Shimla city by taking into consideration the problem of garbage generation and its disposal with a focus on the waste management workers in the waste management process. Going by the literature Shimla has a large proportion of population living with high standard of living. It has large number of shops, hotels, restaurants, private and government offices. The city has an enormous floating population including migrants. This generates a large

amount of garbage. In the present study different aspects of garbage problem of Shimla city has been studied.

With urbanization this hilly Himalayan state which is predominantly an agriculture and horticulture dominated society, the gradual transformation has been set into motion and the urban population of Himachal Pradesh has increased to more than double between 1971 and 2001 (HPDR, 2005, 340). Observing the district wise trend of urbanization indicates that Shimla, Solan and Sirmaur districts have 23.12%, 18.26% and 10.38% urban population respectively and are the top three urbanized districts with higher level of urbanization as compared to the state average (Ibid, 340). In urban areas, in Himachal Pradesh there are reported deficiencies in water supply, solid waste management and sewerage services on part of urban local bodies. The urban infrastructure and municipal services do not seem to be satisfactory at pace with urbanization and rising urban populations. A large number of population and areas remain uncovered by municipal services on one or the other pretext. Owing to the difficult mountainous terrain the cost of providing urban infrastructure services is very high in towns or cities of Himachal Pradesh. There are complaints about inadequate water supply and other provisioning by municipal bodies in hill stations like Shimla. On the one hand it is facing inadequate supply of low cost raw material and labour on the other hand pricing and cost recovery of urban infrastructure is negligible. There seems to be a widened gap and inappropriateness between the technology used for providing and maintaining the urban infrastructure services and growing needs of increasing population at a faster rate (Ibid, 342).

The average solid waste generation in Shimla Planning Area is estimated to be 87 MT per day @ average of 0.43 kg per day. The Solid Waste collection is about 35-40 MT/day amounting to collection efficiency of about 40 to 46% (City Development Plan, 2007). The Roadmap for Health development in HP, Vision 2008, proposes to address the environmental health issues such as liquid waste disposal; solid waste management; excreta disposal and hospital Bio-medical waste management. The primary goal of 'health for all' is aimed to be achieved by improving primary health care services; increasing the utilization and access of services; and the number of specialists; by continuous training of

health personnel; encouraging use of indigenous system of medicine; and by increasing involvement of community and NGO participation. All this is to be done by showing respect for the dignity of the persons; giving prompt attention to health needs; providing basic amenities and respect confidentiality. While on the one hand, environment seems to be of supreme concern, there are also reflections of the consideration for the people involved in the disposal process too. This therefore makes it desirable to examine the process of waste management and disposal as well as the health of the persons engaged in the activities related to this process and its outcome and its responses.

Development and Environmental Concerns Globally and at National Level

In 1972, the United Nations Conference on the Human Environment (UNCHE) also known as the Stockholm Conference was convened to address issues concerning the environment and sustainable development. The purpose of organizing this international conference was to draw a public attention towards the fact that anthropogenic activities in the name of development has been causing environmental pollution at global level and the cardinal outcome of this conference on human environment was that it brought the word “Environment” into common use as early as in 1972.

Twenty years later, the year 1992 marks another remarkable milestone endeavoured by United Nations at international level which is known as the Rio Declaration on Environment and Development, popularly known as the Earth Summit. In order to attain the goal of ‘equitable development’ and to promote it at global level total twenty-seven principles were envisaged. The fourth principle states that “*in order to achieve sustainable development, environmental protection shall constitute an integral part of the development process chain and cannot be considered in isolation from it*”. This summit recognized and highlighted the significance of global peace, growth and environmental protection as interdependent and indivisible phenomenon. The debate between environment and development is considered the real culprit behind all kinds of problems. The environment protection is the collective responsibility and optimum balance must be maintained

between environment and development; and environment should not be ignored at the cost of development.

Stockholm Conference marks the beginning of drawing global attention towards the fact that human activity in pursuit of growth and development leaves an adverse impact on environment. It attempts at formulating a basic common outlook on addressing the challenges of conserving and enhancing the human environment. The Rio Conference in 1992 systematized and reiterated the existing normative expectations regarding the environment and provided a legal and political sanctity of sustainable development.

A global scenario of population and waste generation in 2018, '*provides a comparison of several countries' share of the global population and their share of global municipal solid waste generation*' (Wang, 2019). At this point, the United States produced 11.65% of the world's municipal solid garbage despite having only 4.4% of the world's population. China contributes to 18.75 % global population and generates 15.55 % Municipal Solid Waste, whereas India contributes to 18.05% of global population and generates 11.95% of global Municipal Solid Waste.

Urbanization and waste generation in India

According to census of India 2011, the numbers of towns and cities have increased from 5161 in 2001 to 7935 in 2011. The urban population of India, as per Census 2011 is more than 377 million which constitutes 31.16% of the total population. The UAs/Towns having at least 1,00,000 persons as population are categorized as Class I UA/Town and in India number of such towns/cities have increased to 468 as per 2011 census from their corresponding figure of 394 in 2001; 70% of the total urban population, live in these Class I UAs/Towns. Out of 468 UAs/Towns belonging to Class I category, 53 UAs/Towns each has a population of one million or above each, known as Million plus UAs/Cities, these are the major urban centres in the country. 160.7 million Persons (or 42.6% of the urban population) live in these Million plus UAs/Cities. 18 new UAs/Towns have been added to this list since the last Census.

Among the Million plus UAs/Cities, there are three very large UAs with more than 10 million persons in the country, known as Mega Cities. These are Greater Mumbai UA (18.4 million), Delhi UA (16.3 million) and Kolkata UA (14.1 million). The largest UA in the country is Greater Mumbai UA followed by Delhi UA. Kolkata UA which held the second rank in Census 2001 has been replaced by Delhi UA.

Waste generation and impact on Environment

The urbanization and economic growth processes go hand in hand which impacts the environment adversely leading to several environmental problems. In developing nations like India, impact of urbanization is apparent, but the growing urban centres have not been able to keep pace with increasing population because of inadequate urban infrastructure namely the provision of basic urban services such as sanitation facilities, supply of water, collection, transportation and disposal of waste. The urban local bodies have not been able to manage or handle the increasing quantity of waste due to urbanism and urbanisation. The uncollected waste remains littered on roads or gets passage to nearby open areas or dhallows leading to soil and environmental pollution. Environmental issues pertain to resource depletion such as soil, water, forest, minerals etc. the increasing urban population and economic growth, thereof, to meet their requirement has contributed to many serious environmental mishaps in India leading to heavy pressure on land degradation, forests, habitat destruction and loss of biodiversity.

As reviewed by Sharholly, et al. (2008), in their article ‘Municipal solid waste management in Indian cities – A review,’ cites ‘*rapid industrialization and population explosion in India has led to the migration of people from villages to cities, which generate thousands of tons of MSW daily*’. As the country strives to become an industrialized nation by the year 2020, the volume of MSW is anticipated to rise dramatically in the near future. (Sharma and Shah, 2005; CPCB, 2004; Shekdar et al., 1992). The urban local bodies have not been able to collect the generated waste on day to day basis which has led to littering of municipal solid waste at every nook and corner. The waste management is going through a perilous phase due to lack of awareness on part of generator, collection and transportation on part of municipalities and due to the unavailability of suitable facilities to treat and dispose of

the larger amount of MSW generated daily in urban areas. The 'end of the pipe' solution which is being practiced largely has led to unscientific disposal causing adverse impact on environment and human health (Rathi, 2006; Sharholy et al., 2005; Ray et al., 2005; Jha et al., 2003; Kansal, 2002; Kansal et al., 1998; Singh and Singh, 1998; Gupta et al., 1998). Municipal waste includes leftover food waste, rotten vegetables and fruits from the domestic uses, restaurants, rubbish, commercial waste, institutional waste, industrial waste, street sweeping waste, construction & demolition waste, and sanitation waste. This waste contains recyclables (paper, plastic, glass, metals, etc.), toxic substances (paints, pesticides, used batteries, medicines), compostable organic matter (fruit and vegetable peels, food waste) and soiled waste (blood-stained cotton, sanitary napkins, disposable syringes) (Jha et al., 2003; Reddy and Galab, 1998; Khan, 1994). The toxic substances and soiled waste which when mixed with compostable organic waste and recyclables further aggravates the problem of not only environmental problems but also the health of the waste workers who are involved in the waste management process.

The changing life styles characterized by urbanism and culture of conspicuous consumption aided by the degree of commercial activities and seasons has led to generation of large amount of municipal solid waste in urban areas. In comparison to 1947 the Indian cities now generate eight times more MSW today is a startling figure which is the reflection of increasing urbanization and changing life styles. Had a systematic data been maintained on quantity variation and generation of MSW it could have been useful for planning for collection and disposal systems. The quantum of MSW can be reduced by segregation of toxic substances and soiled waste from recyclables and compostable organic matter which increases the market value of recyclables and can reduce the amount of waste reaching for disposal treatment.

Nandan, et al. (2017) has observed an incessant increase in urban population owing to industrial development plays a pivotal role in modern society. Developing countries like India are in industrialization phase which has also contributed to rampant urbanisation. Consequently, large numbers of people are migrating from rural to urban areas in search of better opportunities. India is one of the fastest growing economies in the world in terms

of GDP which is further estimated to be increased. Secondary and tertiary services are the major contributors in higher level of GDP. Consequent upon which the improved living standards, over population, rapid industrialization and urbanisation, when not planned apparently aided by improved living standards results in increased rate of per capita waste generation.

Central Pollution Control Board (2012) has estimated that due to various household, institutional and commercial activities at present 127486 tonnes of waste is generated every day in India. As mentioned earlier, if not checked and managed properly leaves comparatively significant impact on environment. A substantial amount of these wastes is extremely dangerous to the living organisms including human beings (Misra et al., 2004). This unsegregated mixed waste degrades the groundwater quality by leachate percolation and emission of greenhouse gases from these wastes causes air pollution.

Quantum of Waste generation in Himachal Pradesh and Shimla

According to a report by Central Pollution Control Board (2012), in 2011, 304.3 TPD of municipal solid waste (MSW) was produced in Himachal Pradesh. It is also estimated that 60% of the generated waste ends up in landfills in an unscientific manner which on one hand will exhaust the bearing capacity of landfill site, on the other hand unsegregated dumped waste creates anaerobic conditions at the disposal site which leads to uncontrolled emission of greenhouse gases like methane which when gets exposed to oxygen causes fire at landfill site causing air pollution. Carbon Dioxide (CO₂) is another greenhouse gas emission from unscientifically dumped waste. It is estimated to be 6.129 tonnes of equivalent CO₂ (Department of Science and Technology, GoHP, 2012).

According to a report of GoHP (2015), prepared with assistance of The Energy Resource Institute (TERI), New Delhi estimated that with increase in population of Himachal Pradesh, MSW generation is also likely to be increased. Pappu et al., (2007) estimated the quantity of waste generation by multiplying the rate of waste generation for the year 2011 with the urban population in 2011 and derived the per capita waste generation in H.P. and

estimated for the urban population projections in the year 2011, 2021, 2031 and 2041 for the State, total amount of MSW generated is shown in Table 2.7

Table: 3.7 Estimated waste generation in Himachal Pradesh

HIMACHAL PRADESH			
Year	Per capita waste generated (kg/day)	Urban Population (x1000)	Waste generated (T/day)
2011	0.413	736.3369	304.3
2021	0.472	883.3212	416.6
2031	0.538	1023.429	550.9
2041	0.614	1155.249	709.6

Source: Urban Waste Management in Himachal Pradesh, 2015

The estimation shows that daily waste generation is expected to rise by 133 percent by 2041 in the state of Himachal Pradesh. Even today the municipal corporation is struggling with waste management and in the coming years the quantum of waste generated is expected to increase, which if not given due consideration, will assume a crisis situation for the municipal corporation in Shimla. For want of centralized command and coordination, lack of participation from community and ‘end of the pipe’ solution approach has resulted in this deplorable situation. Working in isolation has resulted in little or no treatment of the collected MSW and unscientific disposal of waste at dumpsites which are usually the low-lying areas endangering the fragile ecology of sub-Himalayan Himalayas. A national level initiative, Jawaharlal Nehru National Urban Renewal Mission (JNNURM) has in some sense fructified investments for urban development by bringing together the State Governments and enable ULBs to catalyze investment flows in the urban infrastructure sector. Shimla is the only city in Himachal Pradesh planned under JNNURM for urban development. Solid Waste management is part of urban development.

Understanding the Process of Waste Management and Disposal in the Study area

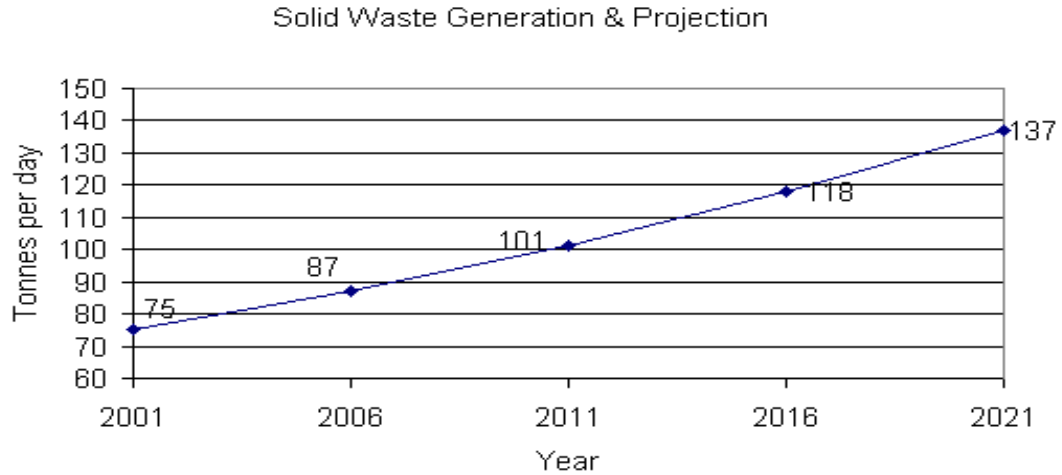
According to 2011 census, principally Himachal Pradesh is a rural society and only 10.03 % of its total population resides in urban area, but the gradual urbanization of a predominantly rural society has been in transformation as the urban population of Himachal Pradesh has increased to more than double between 1971 and 2001 (HPDR, 2005 pg.340).

While observing the district wise trend of urbanization one finds that Shimla, Solan and Sirmaur districts have 23.12%, 18.26% and 10.38% urban population respectively and are the most urbanized districts with higher level of urbanization as compared to the state average (Ibid, 340). As per census 2011, Shimla district alone possesses 29.24 % of total urban population of Himachal Pradesh. Being the state capital Shimla attracts a large number of migrants from various parts of the state in search of employment and a better quality of life. There is a consistent rate of urbanization in Shimla and moreover being a most favoured tourist destination, it attracts tourists in large number throughout the year during all seasons, subsequently resulting in generation of solid waste in large quantity which has become a daunting task for the urban local body to manage it efficiently.

Within Shimla Planning area, the responsibility for collection, transportation, treatment and disposal of solid waste lies on Municipal Corporation Shimla. The average solid waste generation in Shimla Planning Area is estimated to be 87 MT per day at the average rate of 0.43 kg per capita per day. The Solid Waste collection is about 35-40 MT/day amounting to collection efficiency of about 40 to 46% (City Development Plan, 2007). The Solid Waste generation and projections estimations are shown in table below:

Table: 3.8 Solid waste generation and projection

S.N	Year	Population	Solid Waste Generation (MT per day)
1	2001	174789	75
2	2006	203091	87
3	2011	235970	101
4	2016	274185	118
5	2021	318560	137



Source: City Development Plan Shimla, 2007

Figure 3.8 - Solid waste generation and projection

In order to dispose of Municipal solid waste of Shimla city, Municipal Corporation Shimla had installed a Solid Waste Disposal Plant way back in the year 1999, on Shimla-bye pass road, at DARNI-KA-BAGICHA, at that point in time on the outskirts of Shimla (which now seems to be in middle of the city due to outward expansion of the city). Since the existing landfill site got exhausted beyond its capacity, new landfill site and waste management plant has been installed at Bharyal on Totu-Tara Devi Bye pass which again is running into troubles due to mismanagement.

Municipal Solid Waste Disposal Plant at DARNI-KA-BAGICHA:



FIG. 3.9 A & 3.9 B - MUNICIPAL SOLID WASTE DISPOSAL PLANT AT DARNI-KA-BAGICHA
 Source: Photograph clicked by Researcher at the site during the field work

The MSW is collected from 142 dumper containers and 209 concrete dustbins put up by the Municipal Corporation at different places in the city. Depending upon the area frequency of clearing of bin varies from daily to alternate day to twice in week by the Municipal Safai karamcharis who are also assigned the task of street sweeping. Since the waste collection was extremely low as has been observed by Banta (2008) ‘due to terrain and hill slopes most of the areas with the MC limits are inaccessible by vehicles as a result only 30% of the area has been covered through vehicles and out of 500 bins only 50 (10%) are emptied daily, 31.5% (157) of the bins are placed at a distance of 50 meters from the road’. At various points of time MC Shimla has launched several schemes to handle the increasing waste management problems in the city, but at despair every time. Looking at the deplorable and the grim scenario of waste management the Hon’ble High Court of Himachal Pradesh issued the mandatory directions in October 2003 to Municipal Corporation of Shimla to improve the situation. Abiding by the directions issued by Hon’ble High Court, the Municipal Corporation Shimla passed the Door-to-Door Garbage Collection Bylaws, 2006 in exercise of the powers conferred by section 395 of the Himachal Pradesh Municipal Corporation Act, 1994 (Act No. 12 of 1994) which were approved by the state government required under section 397(1) of the aforesaid Act in order to prohibit littering and promotes participation of community. This led to formation of “*Shimla Environment, Heritage Conservation & Beautification Society (SEHB), Municipal Corporation, Shimla, Himachal Pradesh*” which was registered under HP Societies Registration Act, 2006 on 12th February 2009. Further, Ward Committee under the above-mentioned Society was formed on 28th February 2009 after the approval from the House of Municipal Corporation Shimla.

Collection

Conventionally residents are expected to put the garbage in the garbage bins put up by the Municipal Corporation Shimla, where from it is being cleaned up by the Municipal Safaikaramcharis, but the mess was getting worse day by day. Therefore, in order to improve the Solid Waste collection system, Door-to-door collection (DTD) scheme was introduced by Municipal Corporation Shimla, under HP Municipal Corporation Act 1994 in selected areas through Private Sector Participation by invoking “The Polluter Pays

Principle”. Shimla Municipal Corporation has notified the nominal monthly charges for DTD solid waste collection for contracted areas. The contracted labour hired through SEHB is assigned the task of DTD garbage collection from their respected allotted areas. The consistent efforts are being made to provide maximum coverage to DTD garbage collection, aiming at 100 % coverage.

As per Municipal Corporation Shimla information 488 Municipal Safaikaramcharis engaged in cleaning, collecting and disposal of waste. 220 dumper, containers, 288 manual dustbins are put up at different places for storage of garbage. The collection is also carried out manually by using Suphli and baskets and the transportation of street sweepings to nearest community bin is carried out with use of plastic/nylon bags.

As more than 50% areas are not accessible by vehicles, therefore it is imperative to enforce the Door-to-Door collection scheme on nominal charges from the households and establishments. Shimla being a hilly terrain poses certain topographic constraints in Door-to-Door garbage collection scheme. Therefore, despite DTD garbage collection through SEHB workers, collection of municipal solid waste remains a challenge and resultantly collection efficiency also remain poor. What troubles the DTD garbage collectors more is the mixed garbage which sometimes becomes a dirty affair when it drips out of their carry bags over their bodies as they have to lift these bags over their backs. Uncollected waste gets disposed off arbitrarily on the valley slopes. Unwillingness of citizen and commercial establishments was observed to participate in DTD collection services which remain a great hurdle towards its aspired coverage. A timing of garbage collection also remains an issue. Since DTD collection services are provided in morning hours which are not consistent with timings as people are in hurry to move to work places. Secondly Shimla is a tourist destination, receives a huge number of tourists round the year but the check timings of hotels are at noon time and DTD collection services are provided in morning hours which are again not consistent with checkout timings of hotels and office working hours.

Transportation

SEHB workers collect the solid waste from the respective houses and establishments and bring it to the designated collection points where from the collected municipal solid waste is being carried out mainly through dumper placers and tipper trucks. As told by MSW, project coordinator, about 14 vehicles respectively one truck, four tipper and 10 dumper placers are utilized for transportation of waste. Since more than 50% of areas are not accessible few small modified vehicles are under consideration to be purchased for SEHB workers where large vehicles cannot be driven. The transport vehicle needs to travel approximately 15 km distance to the disposal location. Four of the 14 vehicles that Municipal Corporation, Shimla, has available for transportation; are older than ten years, and six are older than eight. Transportation of waste is done in single shift with dumper placer making 6-8 trips and tipper only making 1 trip in a shift. Only 25% of the dumper containers are lifted in a day. Looking at the demographic profile of the city and increasing urban sprawl and expansion of city due to urbanization the existing transportation infrastructure and resources seems inadequate which result in lower collection efficiency. The transportation vehicles are old reducing their usefulness.



Figure 3.10 A: Uncovered vehicle for transportation of waste to treatment plant

Fig. 3.10 B: Covered vehicle for transportation of collected waste by SEHB workers

Processing and Treatment

The solid waste processing and treatment plant of 100 MT/day capacity is commissioned by Municipal Corporation, Shimla at the cost of Rs 3.72 Cr in 2001 which started in 1999 at Darni-ka-Bagicha on Shimla – Bye pass road near Lalpani. The treatment is based on Excel aerobic composting technology. The plant receives about 912 MT wastes per month during normal season, which increases during peak season especially during summers due to tourists and floating population. The compost produced out of solid waste in this plant is about 15-20 MT per month, but quality of compost remains a worry some issue due to unsegregated waste and machine cannot process it properly as was observed during the field work. The left out unprocessed waste gets disposed off unscientifically in adjacent hill slants near the processing and treatment plant. The separate collection of construction wastes and debris that is disposed of at the landfill serves as cover material for the solid waste that is dumped there.

The MSW Plant at DARNI-KA-BAGICHA caught fire in 2009, and the M.C. Shimla was unable to do anything to control. The fire continued for more than 72hrs and created a disturbing situation all around the city, owing to the plant location at base of the city and city located uphill on the mountain and the smoke had covered the entire city uphill. Not only the immediate region but also the entire town was surrounded by the repulsive smell and smoke coming from the dump site, posing serious health hazards and respiratory problems for the locals. Several media, newspapers including Indian Express (Fig. 3.11) and Dainik Bhasker, reported the incidence. On the basis of newspaper reports, the Honourable High Court of Himachal Pradesh took suo-motu cognizance, registered CW PIL No. 56 of 2009, and served notices on M.C. Shimla, the State Government, and other parties. The hon'ble High court observed *'We are conscious of the fact that the present place of dumping of garbage is not suitable. It is on the by-pass road and it has already played havoc with the environment and ecology of the area'*. In light of this, the Hon'ble High Court ordered the Forest Department through the Additional Chief Secretary (Forest), Divisional Commissioner, and District Magistrate of Shimla to provide a space for landfill site where the new Bio-conversion plant must be put up within a period of four weeks. Since these incidences had happened, the impact was felt during my field work with number of restrictions imposed as I was not allowed access and entry into the waste treatment plant for several months

Figure: 3.11 Fire at Darni-Ka-Bagicha MSW treatment and Disposal Plant, Shimla



Source: Indian Express, 21st December 2009

Recent Development after the field work was completed

It was observed that the municipal solid waste treatment and disposal plant which was used to dump the waste since 1994 (as was reported by Project coordinator, MC Shimla) at that point in time was on the outskirts of Shimla city, which by now appears to be in middle of city due to urban sprawl and city expansion due to urbanization and changing land use pattern. With increasing population and waste generation quantity the waste dumping site has run out of space and moreover due to fire incidence and inefficiency in disposing waste scientifically resulting in emanating obnoxious smell which was affecting the city adversely. Due to its very location on Shimla - Bye-pass Road near Lalpani (and recently Inter State Bus Terminus (ISBT) was shifted /constructed on this road only) the obnoxious smell emanating from garbage dumping site and waste treatment plant make it very difficult for the passengers and passerby to travel from this side of the road. Moreover, with the direction of the Hon'ble High Court of Himachal Pradesh dated 11th October, 2011 the MSW treatment and disposal plant was shifted to newly constructed one at Bharyal on Totu -Taradevi bypass in 2013.

The problems started arising at new plant as well in 2014; the local residents from surrounding villages area headed by the Totu Vikas Sameeti, approached the then Chief Minister of Himachal Pradesh with their complaints and alleged 'that garbage that arrived

at the treatment plant was not being processed properly. The garbage was either set on fire or left to degrade and stink’.

Figure: 3.12 New Municipal Solid Waste Treatment Plant at Bharyal on Totu-Tara Devi Bypass



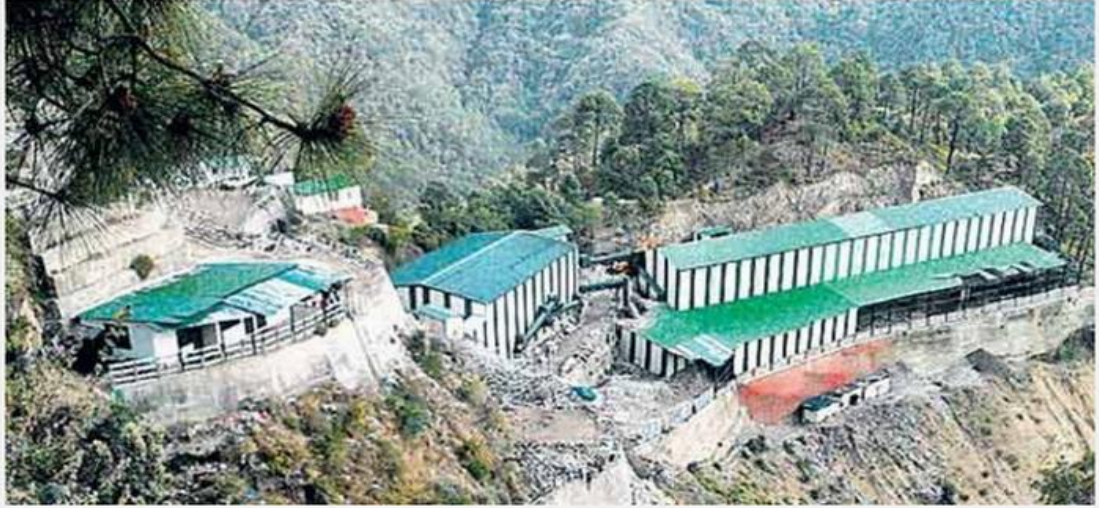
Source: <https://www.planetcustodian.com/queen-of-hills-shimla-grapples-with-garbage-owing-to-mcs-complete-failure-in-managing-waste/8023/>

The workers at solid waste treatment plant Bharyal have their own version. To convert Waste into fertilizers, there are bare minimum requirement such as segregated dry waste and owing to the reason that waste which we receive at this site is in mixed form, mostly plastic and other packaging materials mixed with it does not allow machine to function properly. The fertilizers produced out of it does not get good market. Unless it is properly segregated at source, the problem cannot be addressed.

Figure: 3.13 Fire at new Municipal Solid Waste Treatment Plant

निगम के कूड़ा संयंत्र को आग लगाकर फरार हुआ ठेकेदार, मामला हुआ दर्ज

bhaskar news | Jul 10, 2015, 00:02 AM IST



Source: <https://www.planetcustodian.com/queen-of-hills-shimla-grapples-with-garbage-owing-to-mcs-complete-failure-in-managing-waste/8023/>

By the year 2015, the heaps/mounds of untreated garbage got piled up at plant site. It was reported by the newspapers that when questions were raised regarding working of the treatment plant, Municipal Corporation Shimla reported that ‘the contractor set the garbage and the plant on fire and fled away by deserting the plant’, though an FIR was lodged alleging that contractor has taken some expensive machines with him too. The fire could not be extinguished and the garbage kept burning for days due to which smoke engulfed nearby areas and intolerable stink distressed the local residents.

There had arisen a troublesome situation as Shimla Municipal Corporation was without any waste treatment and disposal plant, nowhere to dump the city garbage, eventually in October 2015 with orders from National Green Tribunal; MC Shimla got a brief relief as it was ordered to send the city garbage to Dadu Majra waste plant in Chandigarh, nearly 120 kilometers from Shimla, bearing a huge transportation cost, which was later challenged by MC Commissioner, Chandigarh under Not in my backyard (NIMBY) syndrome, saying ‘*We do not want Shimla’s waste*’.

Recently the protests by the resident associations of Shimla over their dissatisfaction and resentment about the waste management are reported by newspaper, where in it was alleged the contractors who are contracted the contract for DTD collection in different municipal wards under SEHB do not pay the monthly dues to their labour hence they part their ways with contractor and the garbage collection gets adversely affected.

Biomedical Waste Management in Shimla - A case study

The Municipal Corporation of Shimla has established a common biomedical waste treatment facility, which includes two incinerators for the treatment and disposal of biomedical wastes (NORAD assisted), close to the Indira Gandhi Medical College and Hospital, which is the largest medical college and tertiary hospital in Himachal Pradesh, in order to comply with the Biomedical Waste (Management and Handling) Rules.

Biomedical Waste Disposal Plant for incineration of infectious hospital waste in August 2002. Incineration is common method used to be quite safe for neutralization of infected wastes from hospitals provided it is carried out under appropriate thermal conditions in order to avoid contamination of the environment by toxics. There are two incinerators of 100 kg/hr and 70 kg/hr capacity installed in Biomedical Waste Disposal Plant managed by Municipal Corporation Shimla. Initially for three years the responsibility of incinerating the biomedical waste was given to M/s Haat Incinerators India Private Limited but later Municipal Corporation Shimla started managing this biomedical waste disposal plant itself.

Figure: 3.14 and 3.15 Centralized BMW Treatment Facility with Incinerators at Shimla



Source: Photograph taken by the researcher

When the field work was carried out, it was observed that the centralized treatment facility for incineration having two incinerators was established in 2002, and is located near a tertiary care hospital in Shimla, and gets biomedical waste from Shimla, Solan, Bilaspur and Mandi districts respectively. The transportation of biomedical waste is done through Non-Governmental Organizations (NGO). Municipal Corporation Shimla collects biomedical waste from all government health care institutions of Shimla city. Green Carpet, an NGO collects and transport biomedical waste from all private health care institutions within Shimla city, 'Parivartan' another NGO collects and transport biomedical waste from Mandi and Bilaspur districts, and 'Vatatavaran Shudhi Sansthan' NGO collects and transports biomedical waste from Solan and Sirmaur districts of Himachal Pradesh to this centralized treatment facility, a biomedical waste disposal plant managed by Municipal Corporation Shimla. The load was so heavy that this centralized treatment facility for incineration was run day in and day out. When the field work was under taken one of the smoke pipes of the incinerator was rusted due to overheating and the smoke was billowing out of the furnace inside the incineration room itself where the furnace was installed, making incineration difficult for the incinerator workers. As reported by the plant operator *'humein raat ko hi kachra jalana hota hai, varna aaspaas ke log complaint kartein hain'*. The statement meant the biomedical waste needs to be burnt at night as the nearby residents complaint of smell and smoke coming out of the plant at day time.

Figure: 3.16 Biomedical waste being unloaded by attendant from transport vehicle
Figure: 3.17 Biomedical waste being shifted to the centralized treatment facility



Source: Photograph taken by the researcher

Data collection took place over the course of the months during September and October 2010 in order to comprehend the biomedical waste management procedure in Shimla city in a Tertiary care hospital which is a medical College as well in Shimla and an Urban Health Training Centre (UHTC) Boileuganj (which is a sub-centre) in Shimla in Himachal Pradesh, to understand the current biomedical waste management practices. The study tries to explore the perceptions of healthcare professionals and waste handlers about the biomedical waste management rules from 'etic' or outsider perspective. This study is a qualitative case study carried out by using purposive sampling to explore the factors influencing the biomedical waste management practices and perspectives of waste handling staff in healthcare Institutions.

Instruments of Data collection

Prior appointments with the selected key informants i.e., Hospital Administrator, Medical Superintendents, Nodal officer of biomedical waste management of the institution and in charge of common waste collection unit were obtained for discussion to understand the process of biomedical waste management in this tertiary care hospital. The interviews were conducted in their office by seeking prior appointments. Apart from them 11 contractual biomedical waste workers in hospital and three biomedical waste workers/handlers at

incinerators were also interviewed in this study. The respondents' information was gathered through the use of a semi-structured questionnaire. Both closed and open-ended questions about the biological waste management practices, level of awareness, and improvements needed in waste treatment were included in the questionnaire. The study tried to cover the respondents at all levels of biomedical waste management whether they were involved directly or indirectly in the process. The interviews were intended at collecting the point of view and understanding of the key persons involved in the supervisory process, handling and management of bio-medical waste using semi-structured interview guide and observation at the site. Open ended questions were asked on the procedure and practices regarding bio-medical waste management being followed in the institution. Interviews lasted from about half an hour to two hours depending upon the convenience and interest of my respondents. Some data was also collected using participant observation technique. The site of central waste collection centre and processing unit, Autoclaving and Shredding unit, and centralized treatment facility for incineration was also visited and data was collected on the process and procedures followed by the identified stakeholders.

Biomedical Waste Management- A case study of Tertiary care hospital

It came up during discussions that 40kg to 65 kg of biomedical waste is generated on an average daily. All kinds of wastes generated during the routine treatment and teaching practices (being a tertiary care hospital and medical college) of the institution were categorized as per the schedule described according the Biomedical Waste Handling and Management Rules 2000.

General waste, pathological, infectious, radioactive, pharmaceutical, chemical sharps, etc. were among the waste categories that were detected. The general wastes were found in all departments in different forms and were segregated in black bins. Sharp wastes were kept in sharp boxes designated for the purpose.

Figure: 3.18 & Fig. 3.19 - Autoclaving and Shredding unit at Tertiary care Hospital



Source: Photograph taken by researcher

General wastes

Paper, plastic, bottles, and other organic waste from the hospital were collected in a black bucket and afterwards packaged in black polythene bags. Organic waste from the hospital is primarily leftover food and kitchen by-products. These black polythene bags are transported to the central waste collection unit, finally to be collected and transported by the municipal corporation of Shimla vehicle on daily basis.

Plastic material

Syringes, urine bags, I/V sets, and other recyclable plastic items and recyclable plastic materials were collected in non-chlorinated plastic bags and bins of red colour. After collection from all wards the plastic material is sent to the central processing unit for autoclaving and shredding (Figure 3.18 & Fig. 3.19), after shredding plastic material is transported to the incinerator for final disposal.

Solid and Chemical Waste

Yellow colour non-chlorinated plastic bags or containers were used for these kinds of waste which included human anatomical waste, chemical waste, expired medicines, liquid waste, microbiological, biotechnology waste, and cytotoxic drugs. After collection from all points of generation these bags were transported to the central collection and storage unit, where from these bags were further to be transported to the incinerator through MCS vehicle.

Sharps and glassware

Sharps, such as metals, blades, fix needle syringes, scalpels, needles, etc., utilized for treatments are gathered in white translucent containers. These containers are transported to a central collection unit for additional care before being delivered to an incinerator for final disposition. Other sharps, such as glassware, broken or used glasses, and metallic implants, are gathered in cardboard boxes and bags with blue colour markings. These are then further transported to the central collection unit.

Transportation of waste containers

Although the hospital has provided wheeled trolleys and carts for moving waste within the facility, but there are only a few trolleys available, and the majority of the containers are moved manually to the central collection unit of the institution. It was observed while the bags containing biomedical waste were transported manually by the contractual biomedical waste workers within the institution in their hands in open and the blood stains oozing out were visible on the stairs.

As was found during discussions with the workers at the centralized treatment facility for incineration that this plant received biomedical waste not only from Shimla district but also from the adjoining districts namely Solan, Sirmaur, Bilaspur and Mandi etc. as well. All types of biomedical waste cannot be treated and disposed of at the current facility in accordance with the Biomedical (Handling and Management) Rules and despite two incinerators at this plant very difficult for it to treat and dispose of the biomedical waste from different districts in large quantity. According to the workers deployed at incinerators the working hours are also not fixed, as the residents from the adjoining areas complaints of the smell and smoke emission from the incinerator chimneys therefore the biomedical waste has to be incinerated at night as well. During the field work it was observed that one incinerator pipe was completely rusted and the smoke used to billow out of it inside the incinerator room itself and the workers were facing massive problems due to it. All three of them used to consume liquor to bear the smell during the operation of the plant.

Qualitative Analysis

BMW management requires diligence and the utmost care from a number of people, beginning with the nurse or doctor who uses the supplies and equipment, which when discarded become waste, the cleaning staff who transports the waste to off-site transport companies, and finally the technology operator who is in charge of making sure residues are disposed of properly. Any lapse at any stage during the process or allowing scavengers access to the waste might break the chain resulting in dangerous consequences.

The cornerstone to the BMW management process is segregation at source since at this point, wastes are divided into various streams; incorrect classification at this time might have negative effects later. This involves large number of personnel, mostly concerned with patient care, often working in condition of exigency and under pressure. Poor segregation not only results in risk to the public and the staff but also increases the handling and disposal cost of BMW also. By default, if any hazardous waste may get mixed with non-hazardous waste which constitutes the bulk of BMW, the entire waste requires to be given special treatment, thereby resulting in cost escalation for treatment of infected waste. Field research and observations showed that the majority of patient care units failed to follow regulations adequately and failed to separate waste at the point of generation. Positive results were observed in the management of sharps during the present study, with a high percentage of patient care areas destroying the needles (sharps) one by one.

On site transport

It was seen during fieldwork that cleaning employees, or garbage workers, used to tie a knot in the waste bag before carrying the waste bag or container to the location of storage in their hands. This practice could expose the visitors and patients to possible contamination. Additionally, it was found that none of the healthcare facilities had a dedicated waste route for the transportation of infectious waste, and most patient care areas did not have a different time for the disposal of infectious waste.

Storage

The hospital's storage areas directly affect the environment and provide potential health dangers, thus they must be well cleaned and guarded to allow only authorized employees access. In the present study during fieldwork, it was also observed that this hospital had a central waste storage facility, and the storage area was appropriately secured in the hospital by lock and key. Although a designated person was present for the storage area, the log book for the receipt and registration of the BMW at the hospital was not properly maintained. There was a functional scale to weigh the BMW. The collected BMW was dumped and stored together inside this storage facility.

Off Site Transport

The BMW from the public hospital was transported by the municipal corporation through its own vehicle and the BMW from the private hospitals in the city depended on Green Carpet (NGO) for transport of the BMW to the CWT facility for incineration. The government agency was using the open vehicle for collecting and transporting BMW whereas the private agency was using the closed vehicle with biohazard symbol displayed on it. Both the agencies used to collect the waste in a fixed time. None of the vehicles featured specialized spaces for carrying various types of wastes. The vehicles were not disinfected, putting the lives of off-site transport workers at risk. The transport workers were not provided the proper protective kit also (Figure 3.16) unloading the BMW by helper of vehicle which belong to 'Parivartan' NGO which is responsible for collecting and transporting BMW to CWT facility and (Figure 3.17) a contractual BMW worker who shifted downstairs (manually) the unloaded BMW to the incinerator for incineration.

Treatment and Final Disposal

Autoclave and shredder facility was available in the tertiary care hospital which was visited for this study. Only the plastic trash was being processed by machines, which included autoclaving and shredding it (Figures 3.18 and 3.19), before it was sold to a contractor for recycling. Scavenging from these places was not reported. As was found during discussions with the workers at the centralized treatment facility for incineration that this plant received biomedical waste not only from Shimla district but also from the adjoining districts namely Solan, Sirmaur, Bilaspur and Mandi etc. as well. All types of biomedical waste cannot be

treated and disposed of at the current facility in accordance with the Biomedical (Handling and Management) Rules and despite two incinerators at this plant very difficult for it to treat and dispose of the biomedical waste from different districts in large quantity. The yellow bags containing soiled waste were also transported to this plant for incineration. Mixed waste was being treated and incinerated daily and hence putting at risk the lives of waste workers at incinerator but also the people living in vicinity.

Occupational Safety and training

It was startling to find during the field work about the occupational safety status of waste handlers in hospitals that none of the waste workers/cleaning workers, off site transport waste workers and technology workers at waste incinerator facility were equipped with full personal protective gear. This could be ascertained by observing the injuries in their hands, fingers, legs and feet from the sharps or exposure to infectious material among the cleaning workers. The possible reason behind this could be the contractual nature of job of waste workers/handlers and their frequent replacements.

The staff involved in handling and monitoring biomedical waste i.e., waste workers, incinerator workers and off site transport workers did not receive any training. This could be responsible factor for the unscientific management of BMW.

The training is the most important part of performing the task with prudence with regard to any occupation, same is the case with waste workers and the personnel involved with BMW at all levels. All the staff, including those in waste disposal, should have regular medical checkups, trainings and information generated by these checkups should be used to evaluate procedures and precautions.

Monitoring: Internal and External

The responsibility of internal monitoring with regard to biomedical waste lies with the management committee which owes the responsibility of monitoring by gathering and using information relating to BMW within health care institutions. Information on the type and quantities of different types of BMW and the existing practices of segregation and treatment at source are quintessential if sound waste management decisions are to be

undertaken vis a vis safe disposal of BMW. The incidences of injuries, infections and accidents should be studied; in order to investigate the habits and interests of the waste workers and scavengers. The proper guidelines must be displayed in patient care units with regard to discarding the BMW in the designated marked bins to avoid any untoward incidence.

The external monitoring is important aspect within BMW management system and the responsibility primarily bestows with Himachal Pradesh State Pollution Control Board (HPSPCB). Municipal Corporation Shimla (MCS) is responsible for transportation and disposal of BMW at CWT facility at the regional incinerator plant. Though the BMW was carried in open truck but the MCS had not received any complaint from the local authorities i.e., HPSPCB regarding transport and treatment/disposal of BMW. The enforcing agencies need to play an active role in the effective monitoring of BMW along with MCS to strictly observe and enforce Biomedical waste (Management and Handling) Rules.

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Contextualizing Waste Management in relation to waste workers' Health and Public Health

The Oxford English dictionary defines the term 'Waste' as to use or expend carelessly, extravagantly, or to no purpose and the term 'Management' as the process of dealing with or controlling things or people. The Municipal Corporation, Shimla was established in 1851, but the rapid growth in the city's population¹, was experienced only after 1971 when Shimla became the state capital of Himachal Pradesh and thus an increased production of waste both biomedical and municipal solid waste has grown manifold which implied that the dumpers which dotted Shimla were soon overflowing. The system of waste management in Shimla has evolved through various stages. It was not so much related to the process of garbage collection as it was related to the process of garbage deposition. It was requisite from the residents and tourists to make efforts to carry garbage to the nearby 'dumpers' on a daily basis to get rid of the waste produced by their 'units'. Given the scenario that nearly 70% of the households and shops in Shimla are not connected by road to the dumpers, resulted in overthrowing of deposition of generated waste into the nearby drains, and the hillsides spoiling the natural beauty of hill station Shimla which was popularly known as the 'queen of the hills' for the charm that it offers. These loads of plastic, vegetable peels, paper, glass bottles, ceramics, etc., were further scattered by stray animals, especially monkeys, dogs and derelict cattle. It was not as if the Municipal Corporation in Shimla, who has the responsibility of waste management, was unaware of this sorry state of affairs but they were also debilitated by putting limits on the public expenses (as revealed in interview with officials). The increasing volumes of garbage generation which eventually led to the mismanagement of generated waste within the city limits required the city administration to reinvigorate the waste management system.

The word Public Health refers to the health of the population as a whole, especially as monitored, regulated, and promoted by the state. Waste management affects public health

¹Census of India, 1971, 1981, 1991, 2001, 2011

and the environment both. Improper disposal of wastes, which include municipal solid waste (from household and commercial units), human excreta, sewage and biomedical waste is one of the major risk factors that affect the health of individuals including the waste management workers who are directly exposed to the risks involved in waste management. Waste management involves the contribution, coordination and cooperation right from the individual, household, community, and units generating the waste to the urban local bodies and governments who have been endowed with the task of forming and implementing legislations with regard to waste management.

The influence of generated waste on public health and environment has been felt strongly over the last two decades. Traditionally, MSW has been understood as solid waste generated in a community and should be disposed off as useless material. Waste managers have always asked the question: 'How does one get rid of the waste?' People have traditionally been using crude ways to dispose of waste, such as burning, burying, land filling and now they are beginning to use some sophisticated techniques such as incineration and secured landfills. But as societies have developed, so has the production and consumption of a wide variety of materials. That has resulted in increased generation of waste, leading to ever larger waste management plants, which have become serious threats to health and environment and have triggered contentious socio-political issues. While this is still the dominant paradigm, fortunately many countries are bringing about radical changes in the approach to waste management and disposal. Now one man's waste can be another man's resource. This signals a shift from the disposal centric waste management paradigm to a recovery-centric one.

Waste management reduces the effect of waste on the environment, health, and so on. It can also help reuse or recycle resources; there are several things that need to be taken into consideration when discussing waste management, such as disposal methods, recycling methods, avoidance and reduction methods, and transportation of waste². The most significant and crucial role that is being played in the entire process of waste management

² <https://www.indiatoday.in/information/story/waste-disposal-and-management-all-you-need-to-know-1718288-2020-09-04>

is by the waste management workers who are actively involved at all levels of waste management process.

All the stages of waste management namely generation, collection, processing, transport and disposal of waste in the process of 'waste management' are important for both the health of the public in large and aesthetic and environmental reasons. Waste management workers play a pivotal role in the entire process right from the collection till the disposal. Waste is anything discarded by an individual, household or organization. As a result, waste is a complex mixture of different substances, and some of which are intrinsically hazardous to health. The potential health effects of both waste itself and the consequences of managing it have been the subject of a vast body of research. This chapter gives an overview of waste, waste management processes, and the research into health hazards associated with these, discusses the limitations of studies to date and outlines some future developments and challenges.

The waste generation is not a new phenomenon but the nature and quantum of waste has increased over period of time with increasing consumerism. Waste management is often looked upon as an inferior activity. In context of Shimla city, which was discovered by Britishers in 1819³ and was predominantly an agrarian society has evolved from a small hill settlement to one of the popular tourist destinations in India. Waste generation was a negligible phenomenon until Britishers developed this city as a summer destination for themselves. Owing to its hilly topography it has been a centre of attraction for visitors but has its own challenges as well particularly in terms of waste management. With consistent rise in its population, floating population and increasing number of tourists on one hand and changing life style of resident population has resulted in the increasing generation of waste. However, waste management is seen as an activity with low profile; both formal and informal sectors are engaged in activities related to waste management process. Governments also look upon informal waste recovery activities with disdain. Within the waste management process, it is usually the poorest people, usually the ones

³ <https://www.climate-kic.org/wp-content/uploads/2019/03/Specific-City-Challenges-for-Shimla.pdf>
accessed on 25-11-2022

who are at the margins of society, who roam the streets and waste dumps to find items that can be salvaged and sold, to earn their daily bread. Scavengers are the ones who are cleaning up the mess and are instrumental in recycling of the recyclables but they are often seen as social outcasts, their business as informal, and their work as nuisance to modern urban life. In contemporary time municipal authorities and urban elites everywhere are facing tremendous problems in dealing with the mounting volumes of solid waste. Conventional approaches within waste management process are highly techno centric and have included the purchase of high-tech equipment's such as compaction vehicles, incinerators etc., usually with little regard for its potential impacts. In this particular process, potentially valuable components of the waste are destroyed, resulting in the loss of means of survival for number of people who work in the informal waste trade. Albeit a great deal has been written about the need for appropriate technology, decision makers in developing and less developed countries, seem to have under-estimated the complexity and thus the vulnerability of such high-tech waste technology, as well as its high maintenance costs and the need for skilled operators. The complete reliance upon techno centric approach in waste management in developing countries does not seem to yield the expected results and success owing to its waste composition and hence calls for a localized solution to this very problem.

With increasing urbanization there is a subsequent increase in waste generation and resultantly new mechanisms are being evolved to address the problem. In this direction the atmosphere is changing, and attention is now focusing on finding ways of dealing with the problem of waste in low-income cities that do not depend only on high-tech equipment. The appropriate solutions are to be brought in taking into account the needs of the people who are already involved in the (informal) recycling business, and the financial capabilities of municipalities and national government. Waste technology which is feasible in high-income countries is usually inappropriate for the socio-economic and climatic conditions in the less industrialized countries. The industrialized countries have adopted the road of capital-intensive development, whereas in low-income countries which have the large labour surpluses should adopt the choice of labour-intensive options wherever possible as per the local circumstances.

Caste and the waste workers within waste management System

In India within caste-system, castes have been linked with occupations. Acharya, (2017) while studying marginalization and health vis a vis sanitation workers and State response observed *“all Safaikaramcharis (sanitation workers) are from the Dalit communities. The plight of these people has not drawn much attention from the required sectors. Perhaps because of the caste-ridden mind set, India has not been able to do away with a practice that is admittedly ‘a blot on humanity’. In India, sewerage and allied work is associated with caste. This work passes on to the progeny and is considered as guaranteed employment and source of regular income. It strengthens caste identity and consolidates entrenchment of youth in the ‘polluted work’.”* A variety of mythical and religious imaginations of the caste-system provides for a structure through which a segmental division of labour, social responsibilities, a social system of rights and duties have been assigned. Even today this prescribed relationship between the caste and the linked occupations exists as ‘symbolic’ relationship. The people associated with certain castes are expected to perform their duties associated with their castes, though the forms may have changed. In India various sub-caste of Dalits, have been associated with the same: manual scavenging, entering man-holes to rid sewer pipelines of obstructions, garbage picking⁴. This classification is not only horizontal but hierarchical as well and is maintained very systematically by a network of kinship and economic dominance.

The modern capitalist system which involves both the elements of capitalist production and liberal democratic polities tries to convince us that economics of our everyday lives has a secular character. Here we are told that in modern times freed from traditional bondage of caste system, merit of the ‘labour’ and ‘market’ would be appropriately rewarded. As Patnaik (2016) argues that Capitalism is generally supposed to destroy the old pre-capitalist “community” but this reserve army of labour had to resume and invigorate the ties of the “old” community in order to sustain themselves in the new economic environment in urban cities.

⁴ Gatade, S. “Silencing Caste, Sanitising Oppression” Economic and Political Weekly, 50, No. 44 (2015); 29.

The argument made here is that the modern democratic state which created a formal system of employment where rights of the workers could be protected. In my argument the logic of the formal sector is that the state can guarantee workers their rights, and hence equality, only if the state, identifies them as such, and hence protect them from overexploitation, i.e., the State grants rights not in return for services, labour and taxes, but in return for visibility i.e., formal recognition. And it is only within this that the State can be negotiated with: with regard to workers' rights, or for that matter, any rights. In absence of this visibility, therefore, the informal sector revitalizes the "old" communities and calls upon the traditional, social relations of kinship, caste, religion, regionalism to organize a network of trust and circulation in order to maintain a continuous flow of the economy.

Waste Management System in the Study Area

In order to understand the waste management process and the actors within the system who plays a pivotal role in the entire process this analytical study was carried on. For a holistic understanding it becomes imperative to have the knowledge of formal waste collection system and informal waste recovery process to understand the mechanism of the waste management system. Shimla city is also known as the queen of hills and served as a recuperating centre from the scorching heat of plains for the Britishers during British rule in India. This city was established and developed by them owing to its strategic location. The manual scavengers were brought by the Britishers along with them from Jalandhar, Hoshiarpur and Navanshahar areas of Punjab when they established this hill town. The capital city of Himachal Pradesh is formally served by the Municipal Corporation and also depends upon a large number of individual waste pickers who reduce the burden of urban local body and in the process relieve the city from the uncollected waste.

Collecting data on solid waste generation and collection is not an easy job as Municipal Corporation hardly releases any systematic data on the status of solid waste. Moreover, the work force engaged in waste management process which plays a pivotal role in waste management process forms the core of this study. 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 both formal and informal sectors and to have an understanding of waste management system as a whole. The study methodology combines field investigations in the role of stakeholders playing a significant role in waste management in Shimla, differently in their capacities. Personal observation, focused group discussion and in-depth interview have 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. To gather up information pertaining to garbage generation, disposal and different services provided by Municipal Corporation some Safaikaramcharis in different categories namely permanent, contractual and Rag pickers were interviewed. This proved helpful in collection of information about waste management and disposal in the study area. Some information about the waste management and disposal of the town were collected by direct observations. The observations were also recorded in form of photographs and field notes taken in the field. The data has been presented in the form of contingency tables, relevant bar diagrams, pie charts, line graph etc.

The general particulars of the respondent, as per the objectives of the study viz. socio-economic issues of workers and the health of the personnel engaged in the process of waste management and disposal were tried to understand through in depth interviews and questionnaires and various aspects like housing amenities, ownership status, types of facilities at residence viz. drinking water, toilet facilities etc., illness history, occupational risks, information regarding facilities provided by Municipal Corporation and problem related to waste management were collected. Some information based on personal observation has also been taken into account while analyzing the data.

Apart from this the study has also taken collection and synthesis of existing literature on urban areas, including published and unpublished government reports, censuses and articles published in local newspapers and magazines. The principal methods of field enquiry have been the discussions with pertinent municipal officials and health care

personnel, individual and group interviews with residents, waste management workers, incinerator workers and disposal plant workers.

Within the formal system of waste management municipal authorities and the governments have also started looking up for the short cut solutions. The approach is more of an 'end of the pipe solution'. The work force is often hired through the contractors to do away with the responsibility or the recruitment process is based on contractual system wherein a meager fixed monthly amount is being given to the employee without any job security, financial and health security benefits.

Government Initiatives

Government often regards informal waste recovery activities with disdain. It is usually the poorest people, often those at the margins of society, who roam the streets and waste dumps to find items that can be salvaged and sold, to earn their daily bread. Often labelled as scavengers, are often seen as social outcasts, their business as informal, and their work as nuisance to modern urban life. Nevertheless, municipal authorities and urban elites everywhere are facing mounting problems in dealing with the growing volumes of solid waste. Conventional approaches have included the purchase of high-tech equipment such as compaction vehicles, incinerators and computerized routing programmes, usually with little regard for its potential impacts. In particular, potentially valuable components of the waste are destroyed, resulting in the loss of means of survival for the waste numbers of people who work in the informal waste trade. Although a great deal has been written about the need for appropriate technology, decision makers in less developed countries, as well as the donor agencies seem to have under-estimated the complexity and thus the vulnerability of such high-tech waste technology, as well as its high maintenance costs and the need for skilled operators.

But the atmosphere is changing, and attention is now focusing on finding ways of dealing with the problem of waste in low-income cities that do not depend only on high-tech equipment. The appropriate solutions are now regarded as those that take into account the needs of the people who are already involved in the (informal) recycling business, and the financial capabilities of municipalities and national government. Waste technology that is

feasible in high-income countries is usually inappropriate for the socio-economic conditions in the less industrialized countries. Whereas industrialized countries have often taken the road of capital-intensive development, in low-income countries the large labour surpluses and low salaries should favour the choice of labour-intensive options. Wider issues such as the availability of space, climatic factors, and the existence and enforcement of environmental legislation also influence the choice of the most appropriate approach adapted to local circumstances.

Solid waste is often disposed of without the expectation of compensation for its inherent value. However, it is increasingly being recognized that some of the value of refuse could and should be recovered. In economically less developed countries, poverty is the major reason why thousands of people are involved in the (informal collection), sorting and processing of solid waste. Rapid urbanization and related problems such as the steadily decreasing employment opportunities contribute to the extended scale of resource recovery. Many materials are categorized under the broad heading of solid waste. Urban solid waste can be considered to incorporate domestic or household refuse, institutional waste (from schools, hospitals, universities and offices) and commercial waste (from restaurants, hotels, markets and industry).

Municipal refuse can be divided into two parts: organic or biodegradable waste and non-organic or non-biodegradable waste. Organic waste includes kitchen waste, food leftovers, rotten fruit and vegetables and peelings, straw and hay, leaves and garden trimming, crop residues, rags, paper, animal excreta, bones and leather. Typical industrial organic waste includes coffee husks, coconut waste and sawdust. The non-organic components of solid waste include earth, including ash, stone and bricks, coal and cinders, glass, plastics, rubber, and ferrous and non-ferrous metals.

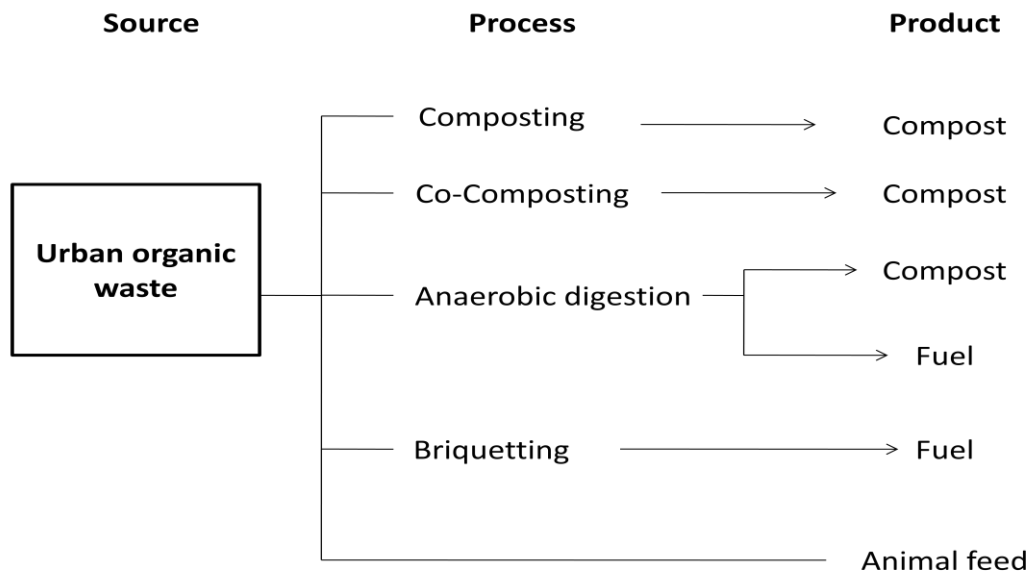
An increase in wealth not only creates an increase in the volume of waste, but also in the value of the waste. The higher income-groups produce higher amounts of easily retrievable and valuable items such as paper, metals and plastics. Since organic material forms a large proportion of urban refuse, ways can be sought as to use this resource more effectively. Organic material can be reused in three ways:

- 1) to feed animals (fodder)
- 2) to improve the soil (compost)

3) to produce energy (biogas or briquettes)

The first two options are already very common in less developed countries. Raising animals is the easiest possibility; in most cases organic waste can be fed directly to domestic animals without pretreatment, but cooking or the addition of nutrients may sometimes be necessary. The various processes and the end products that organic waste yields are evident in Figure: 4.1

Figure:4.1 Processes and products from organic waste



Source: prepared by the researcher

Compost is the end product of basically two processes: composting and anaerobic digestion. Both refer to the biological degradation of organic material, but via different processes. Composting, which is probably the oldest method of waste treatment, occurs in the presence of oxygen, whereas anaerobic digestion occurs in the absence of oxygen. The last treatment method produces as well compost as combustible gas, which is known as ‘biogas’. Co-composting refers to the combined degradation of organic household waste and animal and human excreta. In principle the process is the same as composting, in that it occurs in presence of oxygen.

Gender-Based Division of Labour in SWM

The study of gender is becoming important not only to measure the degree of participation in connection with all aspects of waste management but also to better recognize how gender roles influence waste management. This insight brings more lucidity to the question of in what way gender is to be considered when thinking about work to influence or change the sector.

Waste recovery may provide an important source of income for many households, especially in times of economic hardship (Furedy, 1989). The management of household waste is usually the responsibility of women. The disposal of household waste is just one of the many routine duties of the housewives, and so it is to women that appeals to reduce waste or take over part of these duties, such as by bringing household waste to communal bins.

Within informal solid waste recovery system, the tasks that fall to men and women vary according to the socio-cultural and economic circumstances. The men are usually involved in the selling of valuable items and the recycling of waste materials, whereas the women tend to be involved in collecting waste from the streets and dumps, and in sorting the material.

The gender division of labour within a waste system in many societies reflects a picture in which the women and children are responsible for running the household and for domestic food production, while the men earn incomes outside the home. Cultural or religious considerations often prevent women's participation in income-generating activities outside the home, whereas men have easier access to the starting capital required to purchase machinery and means of transportation. As soon as mechanization is introduced into a production process, men are usually responsible for handling the machines. Thus, the introduction of new technologies may have negative impacts on the position of women by removing employment opportunities. Sometimes changes within a solid waste management system may have negative impacts on the position of women. For example, as soon as informal activities become formalized, men become interested because of the status they derive from the work and the equipment. If no preventive measures are taken, women may lose access to certain jobs and areas. When jobs are

formalized and carts and uniforms are supplied, men often take over the jobs previously done by women and children.

The report on 'The Role of Gender in Waste Management' Krishnan and Backer (2019) studied the issue of gender and how gender analysis serve as a means to improve outcomes, rather than viewing gender as a challenge for policymakers and programme managers. The outcomes contemplated include:

1. Improved working conditions and opportunities for women engaged in waste collection.
2. A more robust and effective value chain for recyclable materials allowing for a growth in the recycling industry.
3. A recognition of the contribution of the informal sector and particularly women in limiting the challenges created by growing waste in developing Asia.

The Report observes that women and men have different behaviours when it comes to generating waste, and their roles and tasks in households and communities vary when it comes to waste management and related activities. They also have different capabilities and access to opportunities when seeking employment in small waste enterprises.

Process of Solid Waste Management

Generation, Segregation, Collection and Sorting

In many countries waste is collected from the disposal/collection points either by municipality, (formal) or informal scavengers. Informal solid waste management systems are usually complex, consisting of several strongly interrelated activities. Micro-enterprises, dealers or middlemen, pickers at the dump site, as well as municipal workers and itinerant scavengers, all play indispensable roles in collection, treatment and disposal of waste. More and more approaches to the development of sustainable solid waste management systems are attempting to include the informal sector and to focus on the community level. This chapter deals with some sociological and organizational aspects of collection and treatment.

Separation of waste at source

Most human activities create waste. Solid waste, which is non-liquid, non-gaseous disposed of matter. Urban areas produce large volumes of solid waste. Quantity of solid waste generation depends on the size of population and the level of urban household incomes. The higher the income, the larger the amount of solid waste produced as growing income facilitate higher consumption of goods and services. Solid waste generated from urban activities include those from households, street sweeping, commercial, industrial and institutional categories.

Solid waste may be categorized according to its source as —

- ✓ domestic solid waste,
- ✓ commercial and industrial solid waste, which is bulky but not hazardous,
- ✓ hazardous waste from industries and hospitals, and also to some extent from households that require special handling

The growing amounts of non-organic material in waste have led many farmers to reject urban wastes for use as soil improver. In many parts of Asia, for example, the presence of thin plastic bags in waste has reduced the quality of compost. The use of these bags for packaging has exploded over the last few years. Although a large proportion of plastic is recycled, waste pickers prefer hard plastic in large pieces, since they receive only low prices for dirty, low-grade plastic. In mechanical composting systems the plastic bags frequently cause operating problems and reduce the quality of the compost. Other non-degradable materials in compost may also cause problems: e.g., broken glass can injure farmers, and hazardous wastes may introduce toxins to the soil.

The separation of waste at source enables to set aside recyclable waste materials at their point of generation for segregated collection and transport to the secondary materials dealer, or to specialized waste processing sites for recycling or final manufacturing markets. The benefit of waste separation at source would be the retrieval of valuable items such as bottles and plastics from the valueless fraction before they enter the mixed waste stream. The separation of waste into organic and non-organic fractions retains the value of so-called waste as a resource to some other industry.

The collectors and reprocessors benefit from the separation of waste at source in a number of ways:

- 1) the incidence of injuries and waste related diseases is reduced;
- 2) the recyclable materials are cleaner and fetch higher prices;
- 3) it takes very little time to sort the various materials; and
- 4) The quality of end products such as compost, meat and vegetables are improved.

At the municipal level, the waste management system also benefits:

- 1) less waste has to be collected, which means lower transportation costs and less material that needs to be disposed of; and
- 2) When the wet (organic) part is kept separate, the heat value of the remaining fraction increases, which makes incineration a more interesting option for further treatment.

Given its high organic content and moisture, waste disposal and processing are important in waste management practices in India. It is argued that the best method for disposing garbage is by composting or in sanitary landfills (Appaswami, 1994). However, the most common practice in the country is dumping at sites located around the city that are generally uncontrolled dumps. Dumping is also carried out illegally on private farm lands in the city vicinity. One reason for this is the lack of landfill space in the cities.

Planning for urban solid waste management within the framework of sustainable development raises several intra-and-inter-generational issues such as public health, livelihood of actors in the informal recycling sector, present and future cost to society, conservation of resources both renewable and non-renewable, and environmental impacts of waste disposal.

Sustainable development is emerging as a dominant paradigm that is likely to play an important role in the design of urban policy. Provision of basic services, especially to urban poor, and ensuring their right to livelihood and access to resources, is central to the concept of urban sustainability in developing countries.

Urban Solid Waste Management (USWM) comprises both formal and informal systems. The formal system consists of two actors:

- a. the municipal body that is responsible for waste collection, transportation and disposal, and
- b. Private organizations interested in converting waste to marketable products such as compost or refuse-derived-fuel (RDF) pellets.

The informal system consists of many actors such as waste-pickers (rag pickers), itinerant buyers, small scrap dealers, and whole sellers, who together recycle about 20% of the waste. Householders also contribute to informal recycling by indulging in source separation, albeit, in a limited way. The challenge therefore, for urban planners (Department of Urban Development) is to identify approaches that are viable, i.e., satisfy short term objectives without compromising long-term objectives.

The Urban Local Bodies need to adopt following approaches to improve the condition of waste management system and thereby turning them into opportunities for sustainability instead of lurching disasters. They can be broadly categorized into “hard” and “soft” approaches as discussed in the following paragraphs.

Hard Approach

In this approach, USWM is considered a responsibility of municipal body. USWM is treated as a large material handling problem. This technical perspective places an emphasis on the design of an efficient system that reduces multiple handling of waste, allows smooth flow of waste from various collection points to the disposal sites, and facilities disposal of waste in an environmentally safe manner. Such a system, it is believed could be sustained through appropriate mechanisms such as cost-recovery or contracting to private bodies (subject to annual audits as per the SoPs) (subject to annual audits as per the SoPs). Municipal authorities observe that economies should not be criterion in safeguarding public health and environmental quality.

The techno-managerial approach treats waste-picking (scavenging) as an illegal activity. Waste pickers are seen as impediments in improving the efficiency and quality of SWM. Apart from this, reservations against waste-pickers are due to:

1. The unhygienic nature of the activity.
2. Its potential to attract street children and

3. The uncertain nature of the activity arising out of market demand for recyclables and poor socio-economic conditions prevalent in urban centers.

Therefore, the protagonists of the techno-managerial approach argue that waste-picking should not be encouraged by a government body. The world-view that large scale improvement in performance of USWM through techno-managerial mechanism is feasible, and also desirable, thus signifies the “hard” nature of this approach.

Soft Approach

Kaseva et al. (2002) observes that USWM should not be viewed from the narrow perspective of collection and disposal, but should instead be seen as a part of issues arising out of rapid urbanization. Expressing a similar view point, Furedy states that USWM is basically a socio-cultural problem, which would limit the effectiveness of a techno-managerial approach. Furedy also observes that solid waste planning in developing countries does not focus on the concept of “resource recognition” i.e., treating waste as an unused resource. She therefore calls for a non-conventional (“soft”) approach involving community-based initiatives and informal mechanisms to USWM. Another concern about the hard approach is that the planning process is top-down in nature, may not work in favour of the urban poor.

A few studies in USWM, conducted in Indian context observes that most of the interventions adopted for improving USWM aim at revamping the formal system, and ignore the role of informal waste-pickers in the field. They point out that failure to recognize the social and economic aspects of informal waste-pickers could upset the plans of municipalities. In a recent paper, Venkateswaram apices that SWM strategies in Indian cities have not been able to incorporate, to any significant extent, considerations of resource conservation, pollution reduction, health and employment generation. She also points out that the constraints and inefficiencies expended in SWM are due to the predominantly technology-oriented nature of SWM systems, which tend to ignore social, ecological and economic characteristics.

SWM and related Environmental Factors- Linking Health

The problem of environmental pollution will plague Indian cities and towns even more seriously than it has been recognized so far. Fast increasing population and rapid industrialization create in urban centers slums in congested areas with deleterious structures un-served by sufficient water, drainage, sewerage, and minimum basic facilities and public amenities. Here are the areas where the poor, who can not afford the city's good life live in filth under unhygienic conditions. These landless poor, whether in urban or suburban or rural area, squat on the public land in hutments to live a sub-human life. Human beings appear to be the worst sufferers due to air pollution. It causes lung cancer, irritates the skin, eyes and the upper respiratory tracks. Carbon monoxide, one of the chief components of car exhausts, appears to affect the nervous system. It has been found that the occurrence of chronic bronchitis is about three times as high in heavily polluted areas in comparison to cleaner areas.

Health and Environment Initiative

“Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature”. The first principle in the 1992 Rio Declaration on environment and development of the United Nations Conference on Environment and Development (UNCED) signifies a major shift in developmental thinking from the past economic model to a more human centered paradigm. The declaration fully supports the social goal of “Health for All” and directly links health, environment and development. UNCED also adopted Agenda 21, a universal plan to action to achieve sustainable development in the 21st century.

Economic development contributes to improved health, but ill-considered development also adds to health risks. Threats to health and development from deteriorating environmental conditions affect everyone. Polluted air and water, contaminated food, flooded settlements because of poor drainage; indiscriminate garbage disposal; poverty and inadequate water supply, sanitation and shelter; working lives shortened by crippling diseases; women and children made chronically ill by crowded and squalid living conditions; and industrial poisoning and accidents are reminders of the neglected

investment in environmental improvement in the rush towards quick economic development.

The health sector has to take the initiative and join forces with other sectors to bring to fore the multisectoral health and environmental concerns in planning for sustainable development. Awareness of environmental causes of all health and advocacy for health can contribute significantly to maximize the benefits of development.

Privatization in Solid Waste Management

the problem related to the planning and management of solid waste have been located in the framework of privatization that started in late 1980s. Subsequently the state-owned enterprises were transferred to private owners mostly 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 (Lee, 1997).

SWM did not remain aloof and a number of studies suggested privatization of SWM services in third world countries including India. For instance, in the aftermath of the 1994 plague outbreak in Surat, a former municipal commissioner of Bombay, when considering portions for dealing with mounting rubbish in India's cities, suggested that with local authorities 'should...think of privatizing garbage collection and disposal' (India Today, 1994) with continuing poor financial wealth of municipal bodies in Indian cities...the need for privatization of MSW is urgent (Rao, 1994). Privatization of municipal bodies in Indian cities a must (Varma, A. (2016) advocates for Privatization of SWM in Delhi and other Indian cities on pretext of non-functionality of permanent employees of municipal bodies as she states "Privatize, say the citizens of India and let us pay for good service—it is better than paying for no service".

A critical review of privatization has been provided by (Lee, 1997). He argues that still there are people who cannot afford to pay for basic services in the Asian cities. He took examples from certain Asian cities like Bangkok, Seol, Rajkot etc. where basic services have been privatized. He questions the very 'proclamation of efficiency'.

Community participation

Waste disposal is not the sole responsibility of the municipality. Those generating the waste also have tremendous contribution to make. For the smooth functioning of a waste collection and disposal system, it is first essential that the understanding and cooperation of citizens are obtained. They should be encouraged not only to segregate in separate bins at source of generation but also to dispose of their waste in the proper way by handing over segregated waste to garbage collectors at home. The success of any effort in this direction needs the cooperation of the people. And much energy has to be invested in raising public awareness of the importance and benefits of participation. It is often difficult to motivate urban populations to work voluntarily. Changes in behaviour that involve extra effort can only be achieved with long-term and strategic information campaigns or with the introduction of incentives such as reduced prices for collection services.

The formation of Resident Welfare Associations (RWA) has significant role to play in formal structure. The first could be discussing and resolving the issues at local level or the same can be channelized to the administrative channel. Similarly, the administrative channel can also get access to the community through RWA especially with regard to the IEC activities.

For the residents of low-income areas, waste removal is rarely a priority. Their lives are dictated by survival economics and so are their reasons for taking any action. Therefore, the information presented and the approach taken should emphasize the economic benefits. The increasing economic value of waste materials could provide an incentive for individual families to separate and save or sell certain items from their garbage. Although urban communities are already reusing valuable waste items, this practice could be extended to separation in more and other waste fractions. One of the most important requirements for successful community improvements is the parallel provision of other (municipal) services as well as infrastructure. For example, the provision of regular and reliable waste collection services is indispensable for public cooperation in waste collection schemes. Also, if the waste is brought by members of the household to transfer points, the removal of waste to the dump site needs to be guaranteed.

Introduction of the Waste Management Workers

The experiences during the field work were highly enriching to break down certain fallacies. The researcher tried to adopt a bottom-up approach and began with purposive and snow ball sampling with municipal workers but tough resistance was faced from the members from the respondent community across all categories as researcher was considered as an outsider and was looked at with suspicion. Though the reasons were implicit as just one month ago when the field work was started, the then existing waste treatment/disposal plant and landfill site caught fire and was burning for almost a week creating nuisance in the entire city which is situated upwards and the smoke was heading in the same direction creating air pollution all around which led to intervention of honourable high court of Himachal Pradesh and the strict directions were issued to the waste management workers not to respond to any newspaper reporters. In order to understand the entire process of waste management municipal authorities were approached to understand the system of waste management. The Corporation Health Officer, Executive Engineer, project Coordinator, Junior Engineers, Draftsman, Supervisors etc. were approached to get authentic information and to understand the entire system of waste management in Shimla City. As per the details furnished by the office the following human resource was working with Municipal Corporation Shimla with regard to solid and biomedical waste management.

Historically scavenging, cleaning up occupation is associated with a particular caste and the task is performed by them only. During this field work also, it was observed and found that largely (except for two, working with SEHB) respondents across different categories of waste management workers were from the lower caste section of the society. The researcher was always looked at as an outsider and therefore the data was to be collected by hiring an assistant from the same community. To begin with it will be reasonable to introduce various categories of waste management workers and nature of their job both in municipal solid waste management and biomedical waste management categories for a holistic understanding of their deprivation level and their status in terms of Accessibility, Availability and Affordability aspects of basic amenities for bare struggle pertaining their livelihood issues and the vast contribution that they perform within the waste management system.

Table: 4.1 displays the availability of human resource involved in waste management system through Municipal Corporation, Shimla. During the field study the sampling design was devised based upon this categorization of the workers within the formal system of waste management in municipal solid waste management category taken care of by the municipal corporation, Shimla. In addition to these biomedical waste management workers in formal waste management and rag pickers from the informal waste management system category were narrowed down as per their availability and the consent given by them as and when they could be approached. Biomedical waste management is also taken care of by the Municipal Corporation, Shimla therefore the workers at centralized waste treatment facility is also deployed by the corporation.

Table: 4.1 Human Resource involved in waste management system:

Sr No	Human Resource	Sanctioned Post	In position	Vacant Posts
1	Corporation Health Officer	01	01	00
2	Project Coordinator	01	01	00
3	Sanitary Inspectors	09	06	03
4	Safai Jamadars	30	21	09
5	Safai Karamchari	471	434*	37
6	Ward Supervisor (DTD)	--	26	
7	DTD Garbage Collectors	--	376	

* Includes 379 on regular (Permanent) basis, 17 on contract basis and 35 on daily wage basis

DTD – Door to Door

Source: Details as supplied by Municipal Corporation Shimla

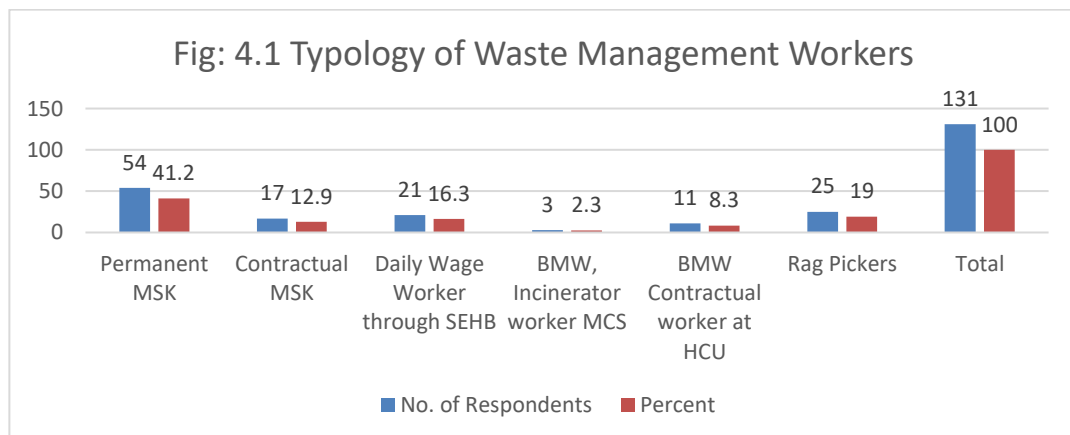
Table 4.2 and Figure 4.1 shows the typology of waste management workers in each corresponding category showing the exact number and percentage to the total number of respondents included in this study. Under municipal solid waste management category 54 Municipal Safai karamcharis were the permanent employees of the municipal corporation, 17 respondents were from the contract system in this category, 21 respondents were interviewed from daily wage category who were engaged with the task of collecting garbage under door to door collection scheme and were hired through Shimla Environment, Heritage Conservation and Beautification (SEHB) society constituted in 2009 by municipal corporation Shimla after the directions from honourable

High Court of Himachal Pradesh for effective garbage collection scheme when a legal suit was filed in the court. within biomedical waste management category total number of respondents are 14 out of which 11 respondents working on contract basis were interviewed from the health care institution a tertiary level hospital in Shimla, three respondents (one on contractual system and two permanent employees of MCS) in this category were interviewed from Common waste treatment facility i.e., the incinerator installed near tertiary medical care institution cum Medical College, Shimla. 25 rag pickers were also interviewed in addition to above to get a handy and grounded knowledge of informal sector contributing in tedious task of waste management and cleaning the city. A total sample of 131 respondents was interviewed for this study.

Table: 4.2 Typology of Waste management workers within waste management system:

Sr. No.	Category of Worker	No. of Respondents	Percent
1	Permanent MSK	54	41.2
2	Contractual MSK	17	12.9
3	Door to Door Collection MCS (Daily Wage Worker through SEHB)	21	16.3
4	BMW, Incinerator worker MCS	3	2.3
5	BMW Contractual worker at HCU	11	8.3
6	Rag Pickers	25	19.0
	Total	131	100.0

Note: MSK- Municipal Safai karamcharis, MCS- Municipal Corporation Shimla, BMW- Bio-Medical Waste Workers. HCU-Health Care Unit, SEHB - Shimla Environment, Heritage Conservation and Beautification



Waste workers within Waste Management System seems to be vulnerable populations owing to the very nature of the work. Though under social inclusion programmes they

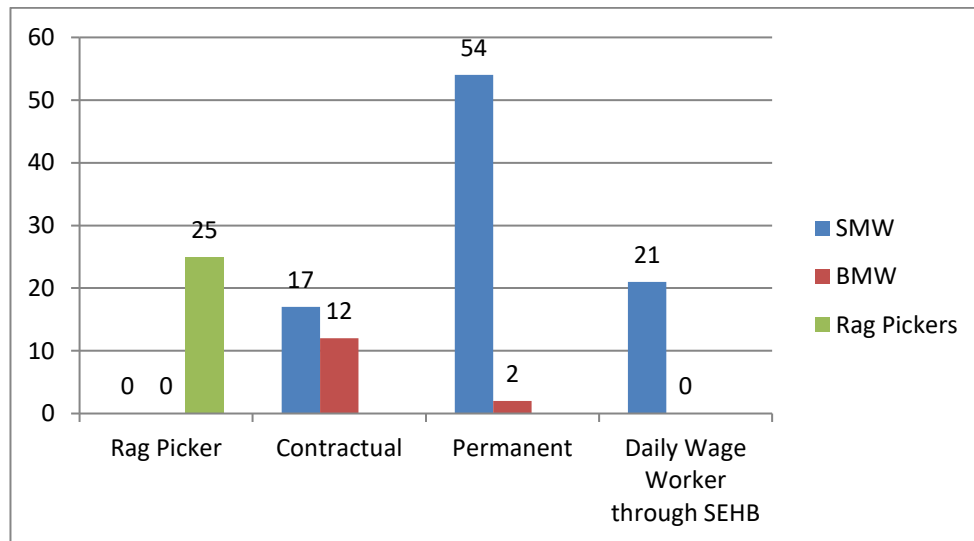
have been the focus of the governments, supporter, affected communities and groups. There are varied typologies used to define the waste management workers who are dealing with the same nature of job. *'The sanitation workers are categorized as sewerage workers and sweepers. While sewerage workers are all men, sweepers are men and women both. They are employed as permanent, temporary, daily wage, and contract workers as sweepers, drain and manhole cleaners, night soil carriers and rag pickers'* (Acharya, 2017). Since the choice for getting included in this study rested with the respondents, so there was no compulsion at any stage. The most apprehensive of the respondents were those working on contractual system as they apprehended pressure from their immediate supervisor and higher ups hence there is least number of respondents included in this study from the said categories. In fact, the rag pickers also got threatened of facing the consequences in form of not allowing them to collect and segregate waste from the dumping site near Darni ka bagicha if they report any untoward reporting about the disposal site; hence they were also very apprehensive while they were interviewed during the field study. Therefore, the number of respondents from contractual workers category and rag pickers category is relatively less.

25 respondents included in this study belong to daily wage category that were recruited and engaged with the task of collecting garbage under door-to-door collection scheme and were hired through Shimla Environment, Heritage Conservation and Beautification (SEHB) society constituted in 2009 by municipal corporation Shimla. Interestingly this segment of workers belongs to the category whose relatives were already working with Municipal Corporation Shimla as conservancy staff or supervisors. They were the handy source of information regarding this recruitment. It was found that they were most casual in terms of job profile and were absent from their duties for maximum period of time whenever they got a better chance of 'Dihari' as they would be getting fixed amount of remuneration from SEHB in a month therefore their absence from this particular job adversely affected the waste collection system on daily basis.

Table: 4.3 Nature of job of waste management workers:

Nature of job	Category of Waste management worker			Total	Valid Percent
	SWM Workers	BMW workers	Rag Pickers		
Rag Picker	0	0	25	25	19.08
Contractual	17	12	0	29	22.13
Permanent	54	2	0	56	42.74
Daily Wage Worker through SEHB	21	0	0	21	16.05
Total	92	14	25	131	100

Figure: 4.2 Nature of job of waste management workers



In order to get the comprehensive understanding and to examine the socio-economic issues, health of workers, and to examine the health security and hazard safety of the personnel involved in the process of waste management and disposal in Shimla city, all categories of waste management workers were selected in the sample studied. Depending upon the consent of the respondents they were included. Table 4.3 and Fig. 4.2 displays the category of waste management workers viz. solid waste management workers, biomedical waste management workers, door to door collection workers engaged on daily wages and rag pickers contributing respectively within the waste management system.

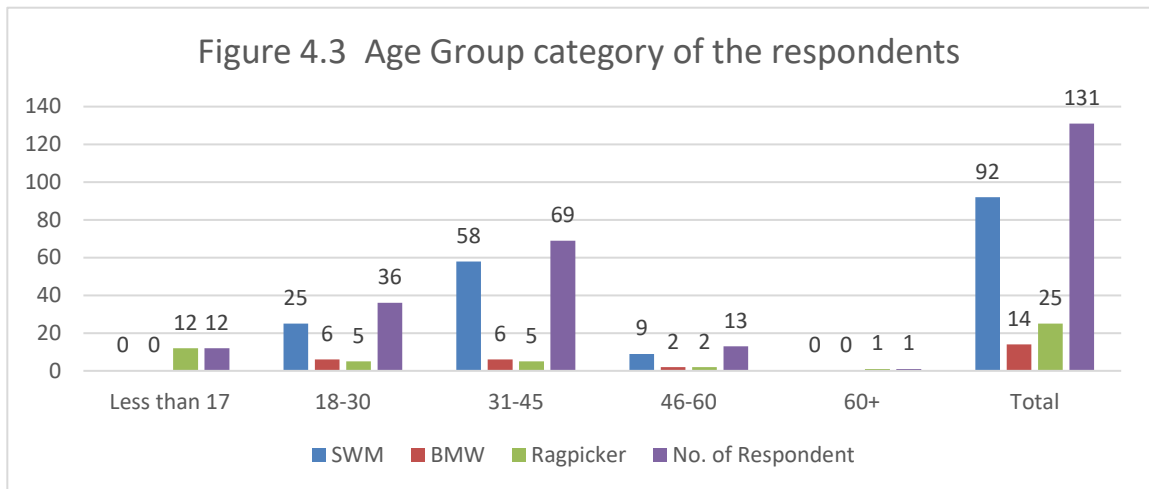
This table contains the respective number of respondents in each category and percentage wise composition in comparison to the total number of respondents. 42.74 percent of waste workers are in permanent category both in SWM and BMW category, 22.13 percent of waste workers are in Contractual category both in SWM and BMW category, 19.08 percent of respondents belong to rag pickers category and 16.05 percent of respondents belong to the daily wage workers category who have been hired through Society for Environmental Heritage and Beautification (SEHB).

Socio-Demographic Profile of waste management workers

Waste management is one of the most dangerous industries to work for as its workers are incessantly exposed to a variety of health and safety risks ranging from psychological, dermal to musculoskeletal. Unfortunately, the occupational risks that these waste workers are exposed to goes unnoticed by the managers and decision makers within the industry as well as the private, public and governmental agencies. There is dearth of safety measures out in place for multitude of reasons sometimes due to the lack of recommendations based on scientific studies or sometimes out of callous attitude towards the processes and procedures followed. This study tries to examine the socio-economic issues and health of the waste workers engaged in the process of waste management and disposal. It further tries to assess the occupational health and safety risks for the waste workers across all categories viz. permanent, contractual, daily wagers and rag pickers handling municipal solid waste and biomedical waste within the waste management system in Shimla city of Himachal Pradesh.

Table: 4.4 Age Group category of the respondents

Age group category	Category of waste management worker			No. of Respondents	Percent
	SWM	BMW	Ragpicker		
Less than 17	0	0	12	12	9.16
18-30	25	6	5	36	27.48
31-45	58	6	5	69	52.67
46-60	9	2	2	13	9.92
60+	0	0	1	1	0.8
Total	92	14	25	131	100



Age is also an important variable as it determines the physical abilities, mental abilities, health, education and job experience of an individual's productivity potential. Combination of these factors determines the performance as well. Individuals' diminishing physical capabilities may impede their ability to repair broken items; weakening eyesight and loss of fine motor skills are problematic in this regard. While considering the age variable of all the respondents startling findings were observed (Table 4.4, Fig. 4.3). Within formal waste management system since labour force is recruited by the government agency obviously all the respondents were between 18-58 years age category but the rag pickers whom the researcher could interview of the 25 respondent's 48 percent of them were less than 18 years of age and one respondent was above 63 years of age. During interviews and Focused Group Discussion (FGD) with respondents especially rag pickers the researcher observed that age and ageing may have both positive and negative effects on individuals' waste management behaviour. For instance, the tendency of leaving the home, tendency to take risk was observed more among young while with increasing age they are becoming less self-centered, caring more and becoming more aware with regard to waste management. Among older respondents diminishing physical ability and complacency was observed (Table 4.4).

Amongst all the waste management workers 12 respondents are less than 17 years of age and all of them belong to Rag picker category and only one respondent is 63 years old

(Table 4.4, Fig. 4.3) that too in rag picker category indicates the dire need of eking out their livelihood through rag picking in order to make their both ends meet at such an early age and even later years of life in old age. This oldest respondent did not even have a house to stay in and he used to stay inside an iron tank which was discarded and removed from a government accommodation after rusting of iron tank. In other categories namely biomedical waste management workers and solid waste management category since the work force was recruited or hired through municipal corporation Shimla hence all the workers were between 18-58 years of age. The former is an age of attaining adulthood and later the retirement age of an employee.

Gender inequalities and constraints in the Waste Management

The gender plays a significant role in division of labour within a waste management system as well. Many societies reflect a picture in which the women and children are responsible for running the household and for domestic food production, while the men earn incomes outside the home. Cultural or religious considerations often prevent women's participation in income-generating activities outside the home, whereas men have easier access to the starting capital required to purchase machinery and means of transportation. As soon as mechanization is introduced into a production process, men are usually responsible for handling the machines. Thus, the introduction of new technologies may have negative impacts on the position of women by removing employment opportunities.

Studies in past few decades, while explaining the reasons why individuals enter informal employment as against formal employment, has explained four main reasons of entry into informal employment namely exclusion of the urban poor from formal employment due to structural barriers; exploitation on the part of formal firms that create informal employment arrangements in order to avoid costs; voluntary choice or exit from formal employment by enterprise operators who seek to avoid state regulations; and strategic choice (Chen, 2012). However, the reasons for the workers in or entrepreneurs in the informal employment were explained in these studies but the focus on gender disparities is least addressed.

The recent research studies examine the gender-related constraints on women's labour force participation (Abramo and Valenzuela, 2005; Bushell, 2008; and Mahmud et al, 2012) and identifies several policy-relevant individual and enterprise level constraints including access to skills training, formal education, credit and markets. There are certain systemic challenges with regard to women's economic empowerment and to more comprehensive transformation towards just and inclusive towns or cities. Even in the literature i.e., research studies dealing with the economic empowerment there seems to be a bias towards enterprise operators. Within formal and informal system of waste management, the task is contracted out and many informal workers are sub-contracted, unpaid family contributors, work in more ambiguous employment arrangements that mark relations of power and subordination.

The waste management sector involves both formal and informal systems and one segment of the informal employment hierarchy where constraints on individual entrepreneurship such as access to credit are less relevant, and where the social dynamics of power more clearly intersect with gender dynamics. Exploring the constraints and inequalities amongst waste pickers through a gender perspective highlights the varying forms and degrees of social exclusion to which waste pickers experience exploitation and marginalization. Some of these constraints may also be underlined by the naturalization of hierarchical gender roles that also cut across status-based identities such as caste and class which also determine their bargaining capacity within the system.

Research studies focusing on gender inequalities in the waste management system and particularly among the waste pickers (Furedy, 1990; Dias and Fernandez, 2013) reveal three forms of oppression that women waste pickers face affecting their earnings, opportunities for political participation and physical dignity. With regard to their working conditions, on one hand women waste pickers may not be allowed access to recyclables with the highest values, even when they collect it, they often receive less amount for the same recyclables against the one collected by men, and face greater health risks as a result of handling waste or of working in unhealthy environments. On the other hand, women also do not find chances for occupying positions of authority within their work

groups or when they do occupy those positions they may not be as respected as their male counterparts. During the field work, when the safaikaramcharis were protesting for their demands, it was observed that none of the women safai karamchari was on the executive panel of union, resembling lower space for their political participation although their number in study sample counts for approximately 37 percent. Amongst the rag pickers women's participation seems to be higher at the community and local level in their surrounding with stronger gender gaps appearing as the distance from the community or region increases. Mostly they operate at the dumping sites downhill slopes.

Fig. 4.4 Women rag pickers at hill slopes



In broader sense, gender dynamics in the waste management system and especially the rag-picking sector refers to the manner in which the sexual division of labour manifests itself; social exclusion and gender-based violence appears in relations with waste pickers, intermediaries or authorities. Further occupational and safety hazards impact men and women differently owing to biological needs; and gender labels which are hindrances towards the political and economic empowerment of women workers.

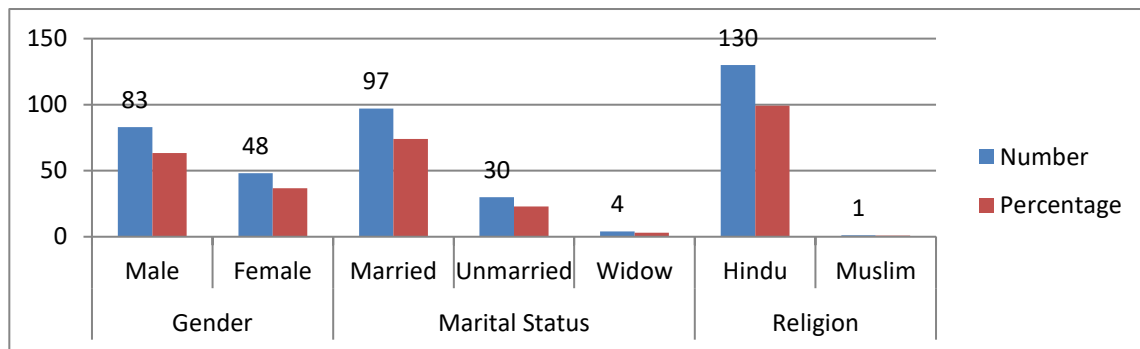
Table 4.5 and Fig 4.5 shows three variables together namely gender, marital status and religion of the respondents. Out of the total 131 respondent majority of them are male the only reason for being majority of them from male category is researcher's own limitation of not being able to tap female respondents in a patriarchal set up. 74 per cent of the respondents are married and four respondents are widow. With further exploration deeper

into these four respondents, the researcher learnt that their better half was also in the same profession and lost their life due to habit of liquor consumption.

Table: 4.5 Gender compositions, Marital Status and Religion of the respondents

Gender		Marital Status			Religion	
Male	Female	Married	Unmarried	Widow	Hindu	Muslim
83	48	97	30	4	130	01
63.4 %	36.6%	74%	22.9%	3.1%	99.2%	0.76%

Fig. 4.5 Gender compositions, Marital Status and Religion of the respondents



Adjusting support systems

Family as the basic unit of society provides a mechanism of managing a support system to its members which means on the one hand, to conform to an ideal type of family support with two traditional main roles i.e., the worker and the care taker. Only an optimum delegation of tasks allows getting ahead, but individuals have to also become accustomed to the ever-changing economic environment of work and the internal limitations of the families. This study has explored the changing family forms within different categories of respondents who are trying to maintain a balance between family structures and balancing the roles of care taker and worker.

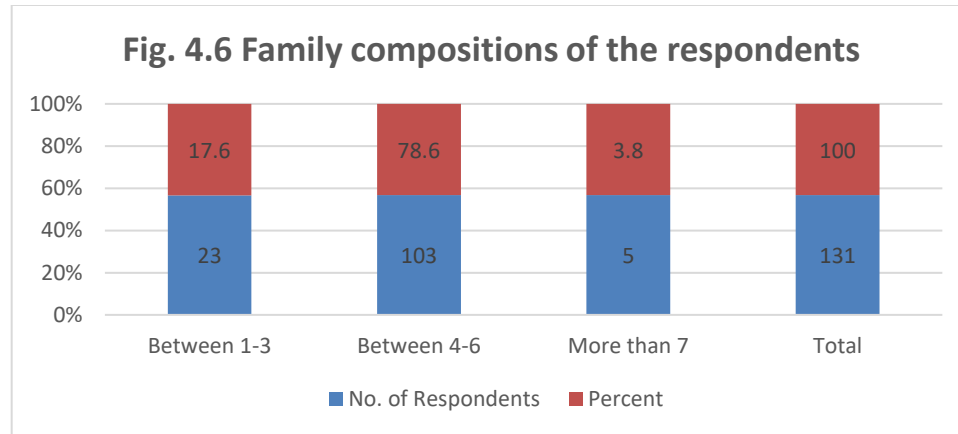
The majority of the respondents' family size i.e., 78.6 percent responded 4-6 members per household but few had reported the family size beyond 7 members as well which

comprises nearly 4 percent of the sample size. One of the questions in questionnaire was where did you get the information about the present job? brings out the fact that the source of information was informal i.e., through the family members or the members of the community who are already working with municipal corporation as safai karamchari. Since the regular recruitment are discouraged and the new mode of recruitment is either on contract or on daily wages for example in door-to-door garbage collection category the members of the already working family preferred the job to support/sustain the family income. This was observed in case of majority of the respondents.

According to 2011 Census, the total number of child labourers in India, between the ages of 5–14, is estimated to be 10.1 million. One of the worst still widespread forms of child labour is rag picking which violates basic human rights i.e., right to education and right to health. Rag picking has very adverse impact on the child rag pickers. They face emotional, psycho-social, and physical trauma. They are more susceptible to be physically abused by older rag-pickers and drug addicts. This causes a long-lasting impact on their psyche and damages them completely. Psycho-socially, these children are not accepted by society. They are treated as untouchables who must not be touched, else one gets contaminated. As a result, they develop a friend circle with other children engaged in rag-picking. Children starve for love and care that they haven't received from their support systems. Physically, the children are malnourished and consequently face health issues due to their erratic and unhealthy eating habits and lifestyle. To overcome these stigmas many respondents in this category admitted to being addicted to substance use in one or the other form. Rag picking also makes children highly susceptible to injury and infections. Sizeable group of samples in the study area i.e., 17.6 percent of the sample group i.e., 23 respondents reported family size less than 3 members, many of them were single, especially in rag picker category the respondents were away from their place of origin sizable number comes from this category whose family size was below 3 members and have been discussed in subsequent tables.

Table: 4.6 Family compositions of the respondents

Family Members	No. of Respondents	Percent
1-3	23	17.6
4-6	103	78.6
More than 7	5	3.8
Total	131	100.0



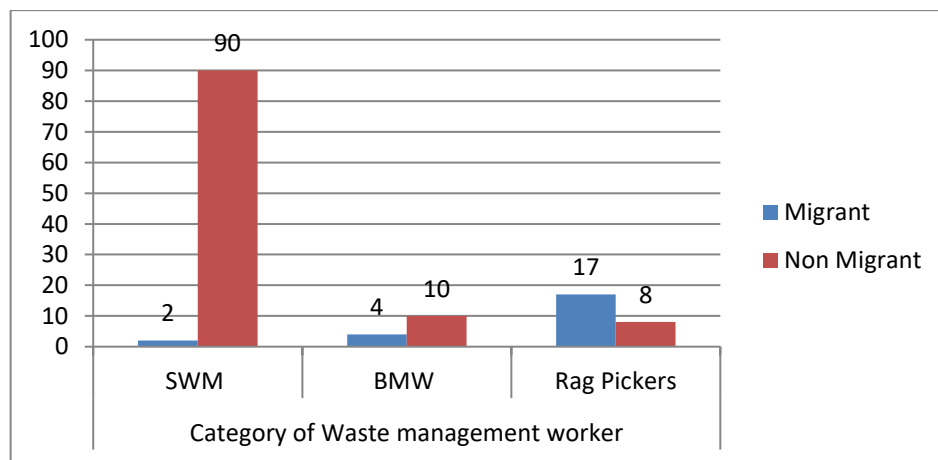
Migration is caused by both ‘push’ and ‘pulls’ factors and cities provide economic opportunities that have always attracted migrants. Demographic shifts and youths in emerging economies seeking employment have caused imbalances in labour markets and things are more problematic with unskilled labour in informal sector. Within India there is a large-scale migration from rural to urban centers or town in search of employment and life with dignity. Cities on the one hand reap the largest benefits of mobile talent but on the other hand also face the important challenges of integrating migrants and offering them services. Cities can either capitalize on migrants’ skills and enhance their competitiveness, or increase the overall cost on their welfare system from unemployment. A change in mindset is needed and the policies need to be designed accordingly to take advantage of the full potential of migration. With shrinking public sector and majority of the workers operationalised through involvement of private sector, by incentivizing private-sector engagement and developing a working partnership, cities can ensure positive outcomes for migrants. While different types and causes of migration to cities exist, this study explores their impact within waste management services in Shimla city,

and elaborates on the broader role of migrants, civil society and municipal authorities in addressing the challenges cities face to enable the long-term integration of migrants in society. This study also emphasizes the importance of effective waste management system not only for the urban inhabitants but for the health of the waste workers of whom the migrants comprise a larger junk in order to maximize the positive effects of migration. This study also draws on a call for action for city managers to be responsive and action-oriented in their approach towards addressing migration-related challenges in the long term.

Table: 4.7 Migration status of Waste management workers

Migration status	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Migrant	2	4	17	23
Non-Migrant	90	10	8	108
Total	92	14	25	131

Fig: 4.7 Migration status of Waste management workers



“Migration is an expression of the human aspiration for dignity, safety and a better future. It is part of the social fabric, part of our very make-up as a human family”.

-Ban Ki-moon, Secretary-General (2007-2016), United Nations, at the 2013 High-level Dialogue on International Migration and Development

Table 4.7 portrays the migration status of the respondents. Out of total sample of 131 respondents selected for the study 108 respondents responded their status as non-migrant and 23 respondents were migrants out of which sizable number comes from category of rag pickers i.e., 17 respondents out of total 25 in this particular category. However, it was found during the field work that conservancy staff was brought along with them from the plains of Punjab especially from Navanshahar and Hoshiarpur regions of Punjab by the Britishers when they established and developed Shimla city as summer capital of British India in nineteenth century. Since that was the first generation of migrants and at present, they are settled in Himachal Pradesh for generations so their status is that of non-migrants in this study. The migration status question is taken into consideration as first-generation migration status at the time of conduct of this study. Therefore only 6 migrants were found in SWM and BMW workers category in which five are females who got married in Himachal Pradesh and one respondent has joined here on contractual basis in BMW workers category through their relatives. It was also observed that the conjugal bonds are preferred in their own community in Punjab. The highest number of migrants is in rag picker category whose number is 17 out of 25 respondents which constitutes 68 percent of total respondents in rag picker category. The rag pickers mostly teenagers belonged to the migrant category owing to varied reasons and places, as explained in Table 4.9.

Table: 4.8 Place of Migration of Waste management workers

Place of origin	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Non migrant	90	10	8	108
Ambala	0	3	0	3
Chandigarh	1	1	0	2
Jalandhar	0	0	1	1
Kapurthala	0	0	1	1
Punjab	1	0	1	2
Kalka	0	0	1	1
Rajasthan	0	0	2	2
Uttar Pradesh	0	0	4	4
Salogara	0	0	5	5
Sirmour	0	0	2	2
Total	92	14	25	131

Table: 4.8 specify the places of migration of waste management workers. The highest number of migrants is under rag picker category out of 25 respondents 17 respondents reported their status as migrants of which 7 migrants are from other districts of Himachal Pradesh namely Solan and Sirmour which are adjoining districts of Shimla and 10 rag pickers are from outside Himachal Pradesh, namely Punjab, Chandigarh, Rajasthan and Uttar Pradesh. The highest number of respondents from rag picker category highlights the job insecurity and the mobile nature of their occupation as reason for migration in search of earning their livelihood. They are most vulnerable group as shown in Table 3.2 about the age group of respondents' highest number of respondents i.e., 12 respondents are from rag pickers who are below 17 years of age and three of them were run away kids from their homes and found this occupation as means of livelihood. All the respondents in the study who were interviewed belonged to different states of northern region of India. It was found that both inter-state and intra-state migration was happening particularly in rag picker category. A significant portion of waste is collected and recycled at no direct financial cost to cities by the informal sector. Furthermore, through its activities the informal sector contributes to the extension of landfill lifespan, provides material for the global recycling industry and increases the quality of life in the areas the waste pickers work in. Raising awareness about waste reduction is an important contribution city can make towards the migrant as well as the resident population.

Table: 4.9 Reasons for Migration of Waste management workers

Reasons for migration	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Marriage (woman)	2	3	0	5
Job	0	1	0	1
Employment opportunity	0	0	2	2
Run away from home	0	0	3	3
Social pressure and poverty	0	0	1	1
Work	0	0	11	11
Total	2	4	17	23

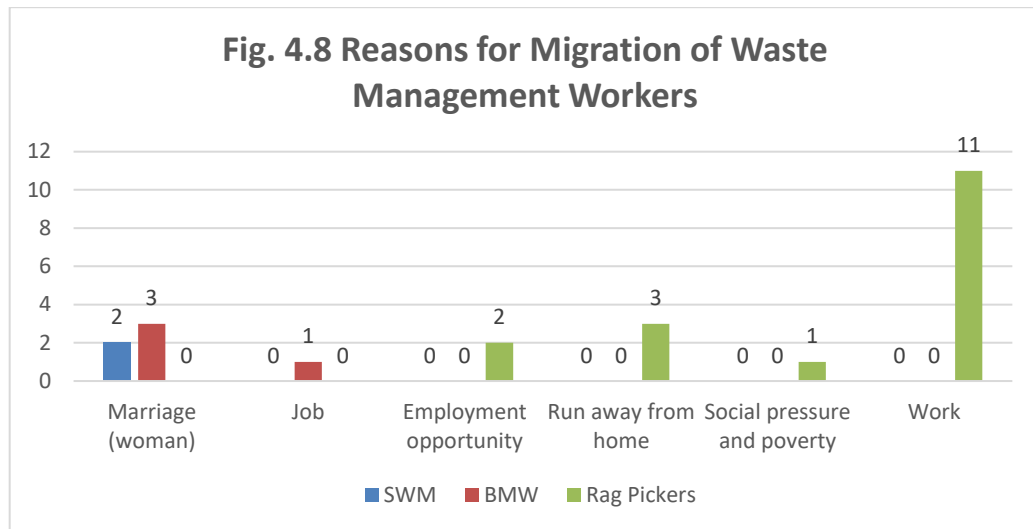


Table: 4.9 highlight the reason of migration for the respondents. Out of total sample of 131 respondents selected in this study 23 respondents reported different reasons in their respective category for the migration. For instance, in municipal SWM and BMW management category total six respondents are migrant of which five are female two in SWM and three in BMW category respectively who got married in Shimla in Himachal Pradesh and one respondent was male who got employed in BMW category on contract basis through one of his relatives in IGMC. Remaining 17 respondents with migrant status are from rag picker category that cited employment opportunity, social pressure & poverty, run away kids, and work as stated reasons for their migration. Surprisingly in this category 12 respondent were below age of 17 years and toiling the garbage dumps to make their both ends meet shows their vulnerability. The main reason for child labor in India is poverty. Although Article 24 of Indian constitution proclaims that ‘no child below the age of 14 years shall be employed to work in any factory or mine or engaged in any other hazardous employment’. Article 39(C) further lays down ‘the health, strength of the workers, men, women and the tender age of the children are not abused and that the citizens are not forced by economic necessity to enter a vocation unsuited to their age or strength’. Although Right to Education guarantees free and compulsory education till the age of 14 years but the poverty and the dire need to sustain their lives forces this vulnerable section to take up such vocation at the tender age need to be guarded and

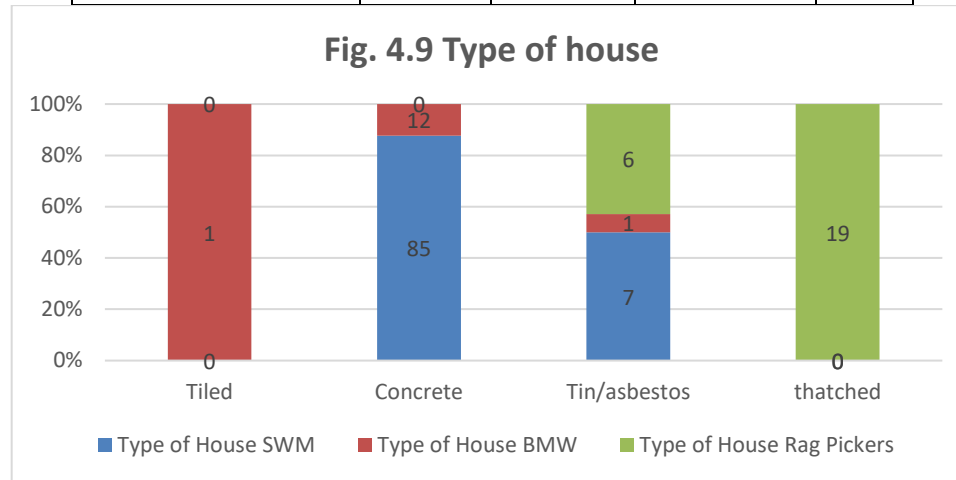
protected. However, the situation becomes more complex for the government authorities to trace them due to their migratory nature from one city to another. Perhaps the situation can be handled, managed and improved by making shelter homes for these rag pickers, through formation of cooperatives for the rag pickers or the civil society can play a formative role in addressing this issue.

Housing amenities of the waste workers

The purpose of this study is twofold: first, it investigates and compares where homeless women and homeless men come from; and second, it identifies demographic, socioeconomic, and housing factors associated with the distribution of the residential origins of each homeless category. The findings are vital for planners to address two basic planning questions: which neighborhoods should homeless prevention interventions target and what interventions should be targeted to those neighborhoods? The gendered analysis should assist in formulating more effective and targeted planning strategies for preventing homelessness. The purpose of this study is twofold: first, it investigates and compares where homeless women and homeless men come from; and second, it identifies demographic, socioeconomic, and housing factors associated with the distribution of the residential origins of each homeless category. The findings are vital for planners to address two basic planning questions: which neighborhoods should homeless prevention interventions target and what interventions should be targeted to those neighborhoods? The gendered analysis should assist in formulating more effective and targeted planning strategies for preventing homelessness. House which is a resting place where one resides feels safe & secure, and tries to find comfort is one of the basic necessities. On the level of exploration into the housing amenities of the respondents specific questions were framed in questionnaire addressing the type of house, ownership status, availability of basic services like drinking water, toilet facilities and fuel used for cooking and other amenities etc.

Table: 4.10 Type of house

Type of House	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Tiled	0	1	0	1
Concrete	85	12	0	97
Tin/asbestos	7	1	6	14
thatched	0	0	19	19
Total	92	14	25	131



Shimla being a hill station receives snow in the months of December and January every year resulting in severe cold conditions during winters, hence housing amenities are inevitable. Table 4.10 shows the housing amenities of the respondents. The specific questions were asked. In both SWM and BMW management categories respondents have been selected from all four categories namely permanent, contractual, daily wage workers and rag pickers. Out of the total sample 42.74 percent belong to permanent employee category, 22.13 percent belong to contractual category, 16.3 in the daily wage category and 19.08 in the rag pickers categories respectively. The waste workers working within waste management systems across all categories belong to the same community. Since there is no recruitment on regular (permanent category) basis in municipal body since 2003, and the information dissemination system is highly informal as mentioned in Table 4.20 where nearly 63 percent of the respondents in response to the question about where did you get the information about the present job? responded, hence the following generations within family have joined either on contract basis or as daily wagger recruited through SEHB. Therefore, with regard to housing the maximum respondents 97 out of

total sample selected which constitute 74 percent amongst all respondents are having concrete structures i.e., pucca houses. Since majority of the respondents belong to permanent category of employees who were entitled to get home loans from the banks against their salary slips and were entitled for General Provident Fund (GPF), a benefit to which a government employee is entitled to therefore they could afford to build a pucca house. Secondly contractual category and Door to Door category (daily wage) workers who have responded pucca house revealed that *'agar hamare ghar se pakki nokri mein nahin hote to Shimla mein ghar kahan bana pate, Rs 3500/- mahine ki tankha mein kahan ghar ban pata hai'*

Nearly 25 percent of the sample respondents reported temporary shed/shelters as their houses and all of them belong to rag pickers (25) and contract or Daily wage category workers (8) who seem to be most vulnerable with regard to housing amenities to bear the extreme climate conditions of Shimla especially during winters.

One respondent in this category who was oldest of all 63-year-old was residing in discarded rusted iron water tank near SDA Complex region of Kasumpti where maximum government institutions are having their offices.

Figure 4.10: shows discarded water iron tank used as house by a 63-year-old rag picker



Source: photograph taken by the researcher during the field work

Case Study of an aged Rag Picker

*'Public health includes services and resources that go beyond health-care and affect health indirectly such as safe drinking water; sanitation and drainage; hygiene; housing and basic infrastructure (Acharya, 2013)'. Lack of access to these resources or discrimination in any form certainly impedes access to health care. Manu Ram (name changed), a 63 years old man now, who is completely illiterate and is a migrant in this city, from adjoining district and has worked since age 17, but has never found a job with secure employee benefits. He has lived an insignificant existence with no residence and certainly not enough for savings. He was forced to migrate from his village in search of a dignified employment, worked as a coolie till his body supported physically but found himself helpless with increasing age. Manu Ram was having cataract in both his eyes, an accompaniment of older age and is treatable but requires expenses which he hardly can afford with his marginal income. Though recently Government of Himachal Pradesh has launched a scheme with HIMCARE⁵ through which he can seek medical support but he is unable to negotiate the public welfare system and has no one to guide him through forms, appointments, and examinations etc. When the field work was conducted, he did not have any residence to reside and had sought shelter in a rusted iron tank which was discarded from an adjacent building. He had covered it with collected plastics and was staying inside it throughout year across all seasons including snowy chilling winters of Shimla. His health problem remains troublesome and to bear the pain he regularly consumes alcohol which he could barely afford. In response to a question why he spends on alcohol instead better to save for proper housing and healthy food, he replied "*babu ji bhookh to sahan bhi ho jati hai par dard nahin*" referring to his joint pains. On deeper interaction after few weeks and in question to his family members he revealed '*ghar mein teen bigha jameen hai, do gharwali (wife) hai, aur char bacche hain. Jab tak sharir mein jaan thi kama kar diya, ab koi puchhne wala nahin, aur jamin mein kuch hota nahin. Yahan poori jindagi nikal gayi, pahle coolie ka kam karta tha. Kabhi kabhi janne vale madad kar dete hain nahin to kooda bechkar jo mila usi se gujara karta hun*'. In other words, he replied that "he consumes alcohol to get rid of pain referring to his joint pain due to old age.*

⁵ A scheme of health care under Himachal Pradesh Swasthya Bima Yojana, by Department of Health and Family Welfare, Government of Himachal Pradesh. Under this scheme a patient can seek healthcare from any government or empaneled hospitals free of cost.

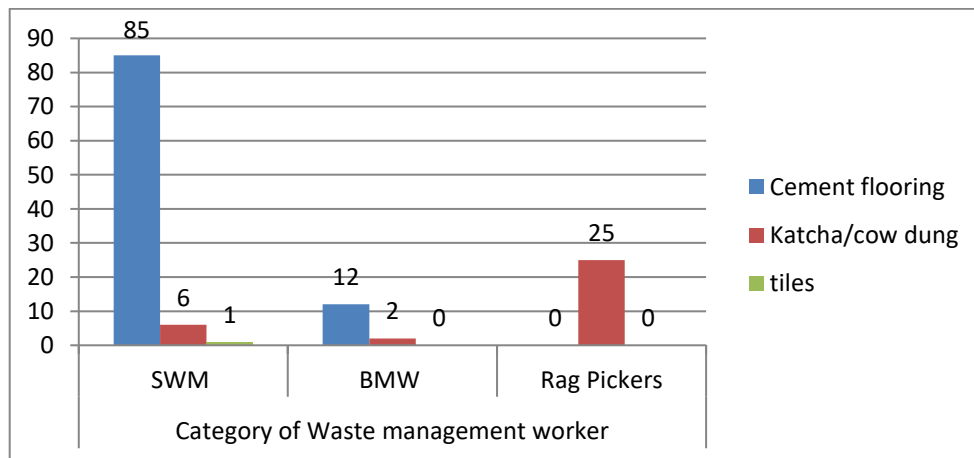
Further he told that when he was young and having strength in his body he used to work as a coolie⁶ (owing to Shimla being a hill capital and accommodates coolie to lift the load to take to respective destinations), now nobody takes care of him. Though in native district, he has a small non irrigable piece of land but of no use as they are unable to get any crop, therefore he works as waste picker in Shimla, and sometimes people who know him extend their help.

In his case, employment was not secure, and the man lacked a network of family or friends. The fact that health problems precipitated homelessness underscores the relationships among employment, health status, social supports, and access to affordable housing. Himachal Pradesh state has a law in place that if the children do not take care of their ageing parents, then the children will lose right of inheritance to the property. His illiteracy was hurdle to avail health facilities which he can access to.

Table: 4.11 Flooring of House

Floor of House	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Cement flooring	85	12	0	97
Katcha/cow dung	6	2	25	33
tiles	1	0	0	1
Total	92	14	25	131

Figure: 4.11 Flooring of House



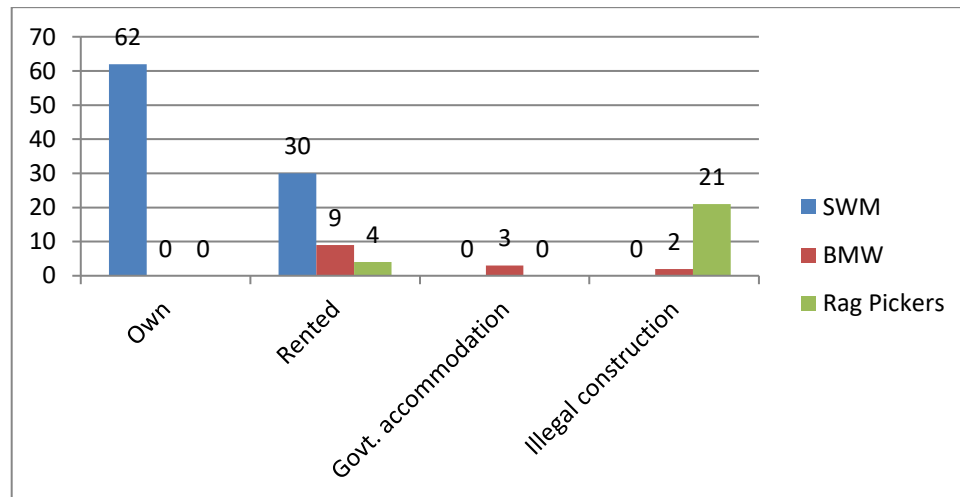
⁶ an unskilled labourer or porter who takes load and drops it to respective destination in lieu of meagre amount of money.

As regards the floor material of houses 85 respondents in SWM category and 12 respondents in BMW category reported cemented flooring. Six respondents in SWM, two in BMW and 25 respondents in rag picker category respectively reported about kachcha floor which is usually maintained with cow dung wiping on a regular basis. 33 respondents with kachcha flooring reported during the field study.

Table:4.12 Ownership of House

Ownership of house	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Own	62	0	0	62
Rented	30	9	4	43
Govt. accommodation	0	3	0	3
Illegal construction	0	2	21	23
Total	92	14	25	131

Figure: 4.12 Ownership of House



Owning a house is definitely a symbol of prestige and prosperity. Amongst respondents in municipal waste management category 62 respondents owned their own houses ranging from one room to two room sets which were constructed of kachcha and pucca structure. 43 respondents were staying in rented accommodation of which 30 belonged to SWM, nine BMW and four ragpickers category respectively. 23 respondents were staying in illegal constructions which were basically the encroachments over the government lands and were unauthorized shelters. 21 respondents among such belongs to the rag pickers category this again proves their acute vulnerability who do not even have their access to basic necessity like housing facility in a region which is predominantly cold during maximum time throughout the year (Table 4.12).

Table: 4.13 Source of Drinking water

Source of Drinking Water	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Govt. Water supply	83	12	1	96
Others	9	2	24	35
Total	92	14	25	131

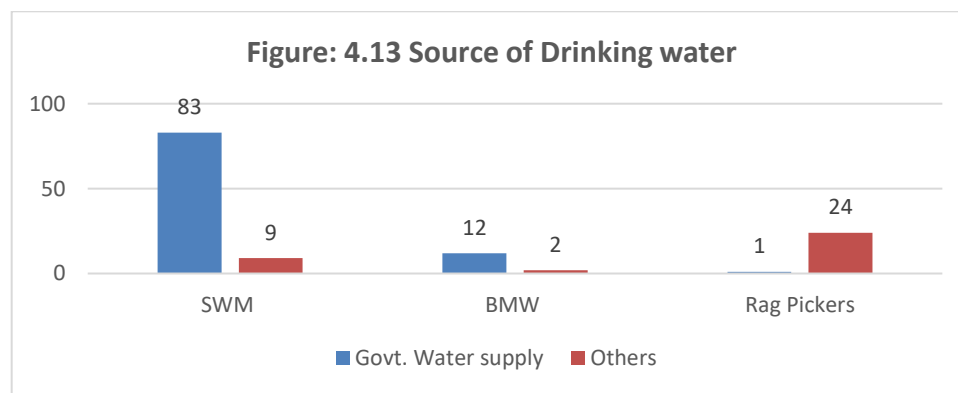
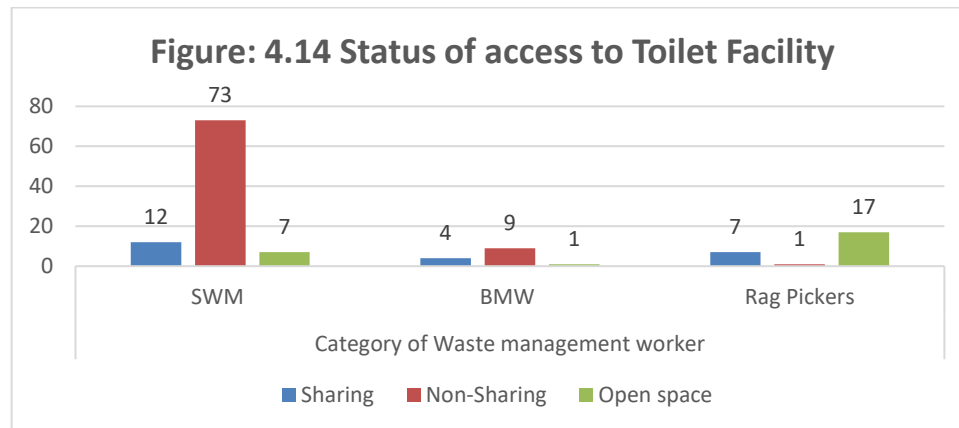


Table 4.13 shows the availability and access to drinking water facility. Of the total sample of 131 in the study 73 percent of the respondents had access to government water supply connections at their residences (own/rented) which was supplied through municipal corporation water supply, for which they pay monthly bills, whereas 27 percent respondents did not have access to piped water supply hence they use to bring

water from some other sources viz. common water supply source or natural water source e.g. ‘bawri’ or nalah which is a natural source of water supply. Majority of them are from rag picker category or the ones who are staying rented accommodation and are working on daily wage or contractual category.

Table: 4.14 Status of access to Toilet Facility

Status of Toilet facility	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Sharing	12	4	7	23
Non-Sharing	73	9	1	83
Open space	7	1	17	25
Total	92	14	25	131

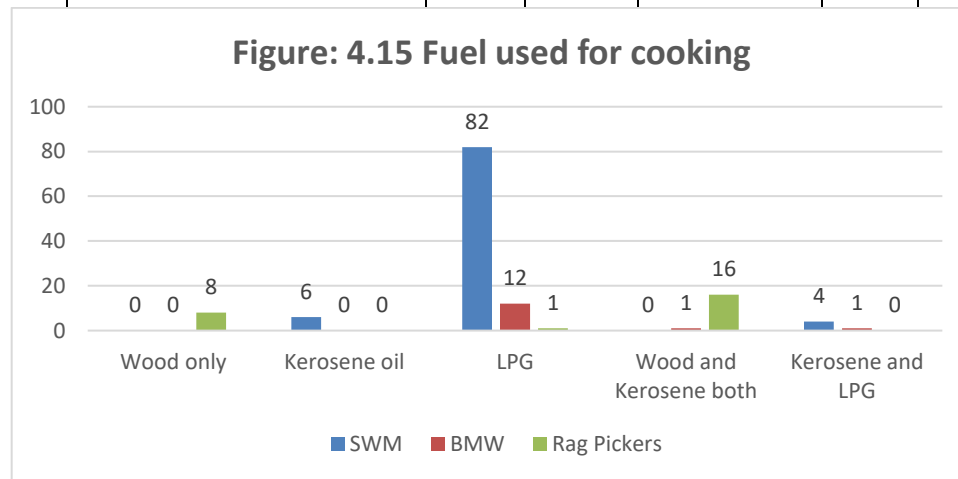


With regards to the sanitation which is prerequisite for healthy life. On the question of access to toilet facility surprising observations were found. Out of total sample of 131 respondents 63.35 percent respondents were having their own toilet facility at their residence where as 17.55 percent respondents were using toilet facility on sharing basis which means when they are living in rented accommodation the toilet facility they are using on sharing basis or are using the mobile toilet facilities installed by municipal authorities at common places like the one near ISBT which happens to be near waste processing unit and landfill site at Darni ka Bagicha, whereas 19.08 percent respondents are going for open defecation without having

any access to toilet facility out of this majority respondents belong to the rag picker category. The waste workers who are having the toilet facility on sharing basis or no access altogether have concerns regarding hygiene and safety especially for women waste workers. These workers who toil the entire city and make their efforts to improve the health and quality of life of people around the city, are themselves deprived of these facilities. The size of this workforce is unknown, especially in informal sector and these workers are among the most invisible and neglected in society.

Table: 4.15 Fuel used for cooking

Fuel for Cooking	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Wood only	0	0	8	8
Kerosene oil	6	0	0	6
LPG	82	12	1	95
Wood and Kerosene both	0	1	16	17
Kerosene and LPG	4	1	0	5
Total	92	14	25	131

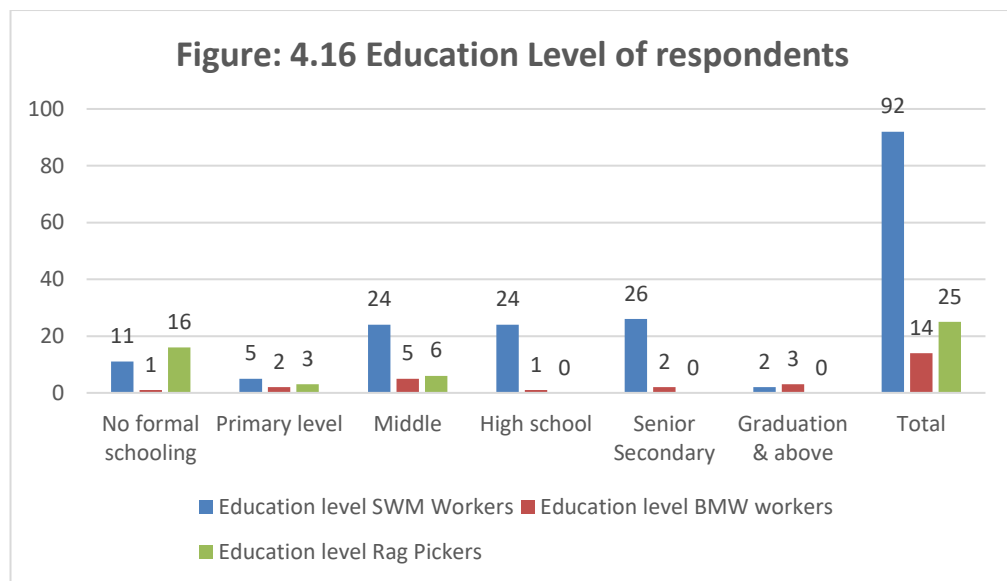


Cooked food is another requirement for survival. Conventionally we cooked food with natural fuel wood in rural area but urban areas and more so over cities are characterized by disjunction from the nature. With improved lifestyle we have used innovations within

cooking area as well for instance induction heaters, oven or LPG connection for cooking purpose. On the question of fuel used for cooking the respondents had a mixed response, for instance 72.51 percent respondents were using LPG connection for cooking purpose exclusively. 27.48 percent of the total respondents were using fire wood or kerosene oil as fuel for cooking their meals. Surprisingly only 1 rag picker was having (Liquified Petroleum Gas) LPG cylinder with him for cooking and that too was without pass book which requires a residence proof to be issued for (Table 4.15 and Fig. 4.15).

Table: 4.16 Education Level of respondents

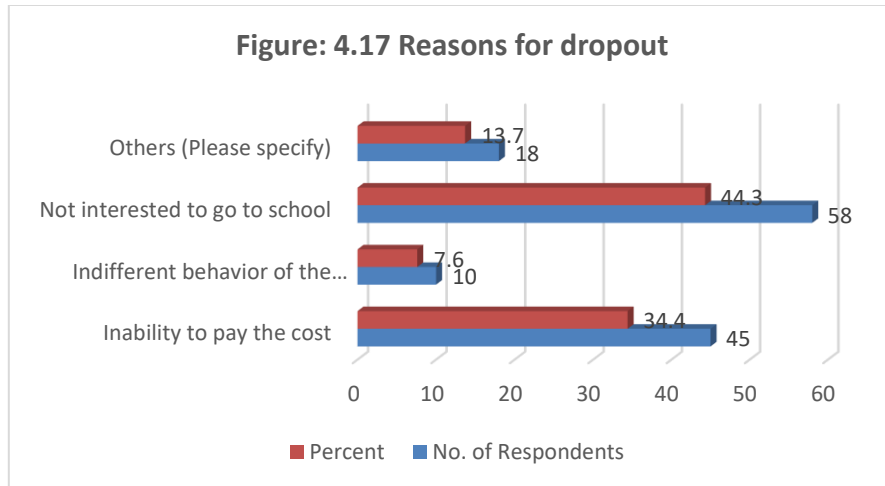
Education level	Category of worker			No. of respondents	Percent
	SWM Workers	BMW workers	Rag Pickers		
No formal schooling	11	1	16	28	21.37
Primary level	5	2	3	10	7.63
Middle	24	5	6	35	26.71
High school	24	1	0	25	19.08
Senior Secondary	26	2	0	28	21.37
Graduation & above	2	3	0	5	3.81
Total	92	14	25	131	100.0



Himachal Pradesh with an overall literacy rate of 82.80% is counted among the highly literate states in India. The literacy rate among males is 89.53%, whereas 75.93% of the female population is literate in the state. As regards the category wise educational attainment of the respondents, as shown in Table 4.16 and Figure 4.16, nearly 71 percent respondents have attained middle and above levels of education but eventually dropped out of formal schooling citing varied reasons as mentioned below. 21.37 percent of respondents were illiterate and majority of them who are least educated section is rag pickers. Of the total 25 respondents in this category 16 (which comprise 64 per cent within this category) respondents are not having any formal schooling that shows their vulnerability level and poor access to resources and basic amenities in life. Owing to their migration from one region to the other, in search of earnings, attaining education is least priority for them. Nearly 8 percent respondents dropped out of the school before completion of their primary level of schooling and the stated reasons for drop out as classified in four categories for all respondents at varied levels of educational qualifications in Table 4.17 below are inability to pay fee and Indifferent behavior of the classmates/teacher as a result they did not develop any interest to go to school (Table 4.17 and Fig. 4.17).

Table: 4.17 Reasons for dropout

Reasons for drop out	No. of Respondents	Percent
Inability to pay the cost	45	34.4
Indifferent behavior of the classmates/teacher	10	7.6
Not interested to go to school	58	44.3
Others (Please specify)	18	13.7
Total	131	100



Economic profile of the waste management workers

In response to the question whether employed before the present job? 41 respondents were engaged in one or the other source of livelihood namely female were mostly performing the task of domestic help, daily wager or running a tea shop etc. whereas the male respondents stated their previous employment options as salesman, working in a dhaba, as a seasonal labourer or coolie etc. Majority of the respondents i.e., 90 respondents responded this as a first timer job opportunity.

Table: 4.18 Employment status before this job

Whether employed before this job	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Yes	30	6	5	41
No	62	8	20	90
Total	92	14	25	131

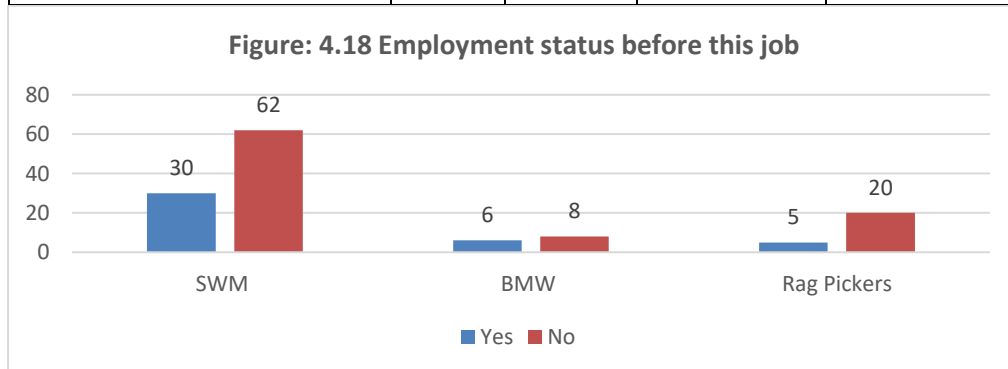
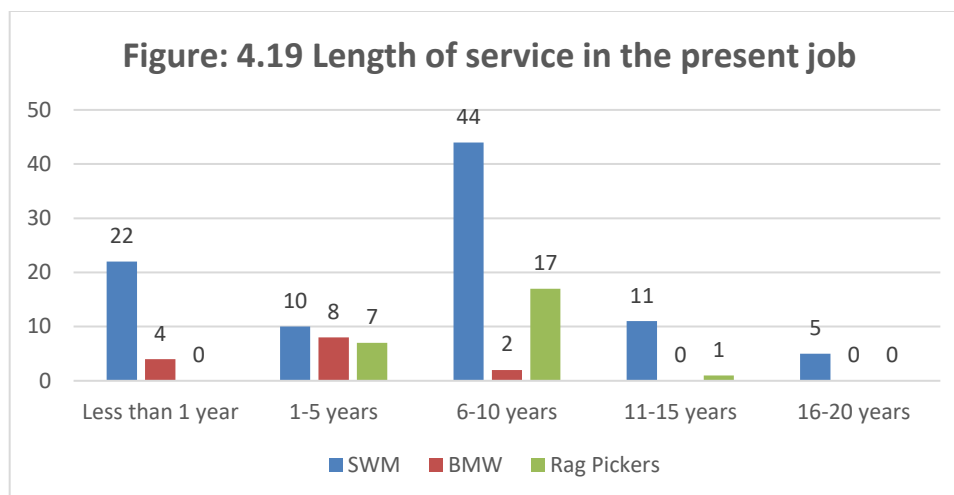


Table 4.19 shows the length of service in years in present job which is less than 10 years in majority of respondents. For instance, in municipal solid waste management category 22 respondents are having less than 1 year length of service, among them 21 are daily wagers hired for purpose of door-to-door garbage collection through Shimla Environment, Heritage Conservation and Beautification (SEHB) society constituted in 2009 by Municipal Corporation, Shimla. Four respondents are in biomedical waste management category with less than 1 year length of service and are working on contractual system hired through a contractor. Similarly, between 1 to 5 years of length of service 10 respondents in SWM and eight respondents in BMW category are working on contractual system along with seven respondents in rag picker category with this time span. Majority of respondents are in 6-10 years length of service namely 44 respondents in SWM, two respondents in BMW category and 17 respondents in rag picker category respectively form the largest group of respondents in this category of length of service. 38 respondents in SWM category and two respondents in BMW category respectively are permanent employee of Municipal Corporation, Shimla in this length of service category. All 11 respondents between 11-15 years of length of service are permanent employee of MC Shimla. One respondent in rag picker category is engaged with SWM for this much period of time the one who is oldest of all respondents in the studied sample. Remaining five respondents in 16-20 years of length of service are in SWM category and all of them are permanent employees of MC Shimla.

Table: 4.19 Length of service in the present job

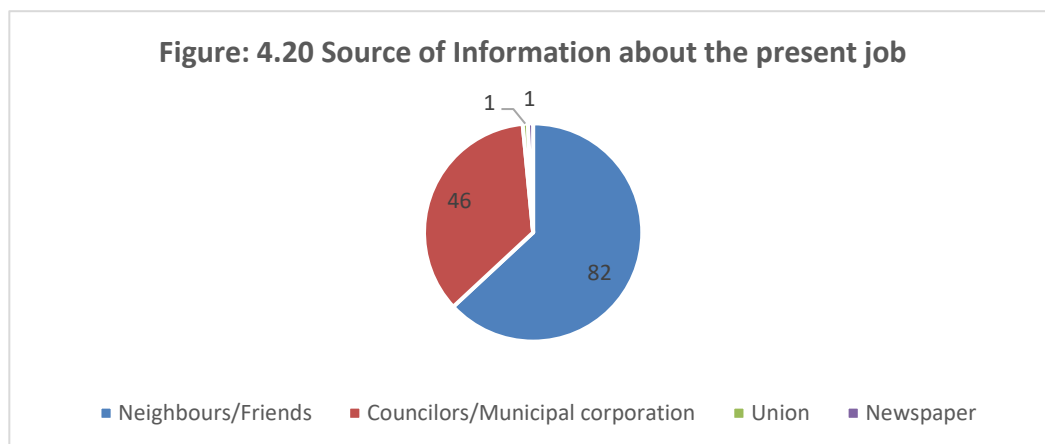
Length of service In years	Category of Waste management worker			Total
	SWM	BMW	Rag Pickers	
Less than 1 year	22	4	0	26
1-5 years	10	8	7	20
6-10 years	44	2	17	53
11-15 years	11	0	1	12
16-20 years	05	0	0	0
Total	92	14	25	131



The startling observation in this study is about the length of service in SWM category which can be seen up to 20 years of duration but the contractual employee length of duration is less than 10 years. Gradually the permanent recruitments are discouraged and the contractual and outsourced appointments are encouraged. The most exploited lot is that of the employees working on contract system. They have to work on a fixed contractual amount with no other benefit like provident fund, leave of any kind. Further they do not get any medical aid or benefits in case of any untoward incidence. There is no evolved system of renewal of contract, it completely depends upon the whims of contractor whether to continue with the services of said employee or not. This leads to exploitation of the contractual workers and they consistently work under the pressure from contractor and the job insecurity is always there.

Table: 4.20 Source of information about the present job

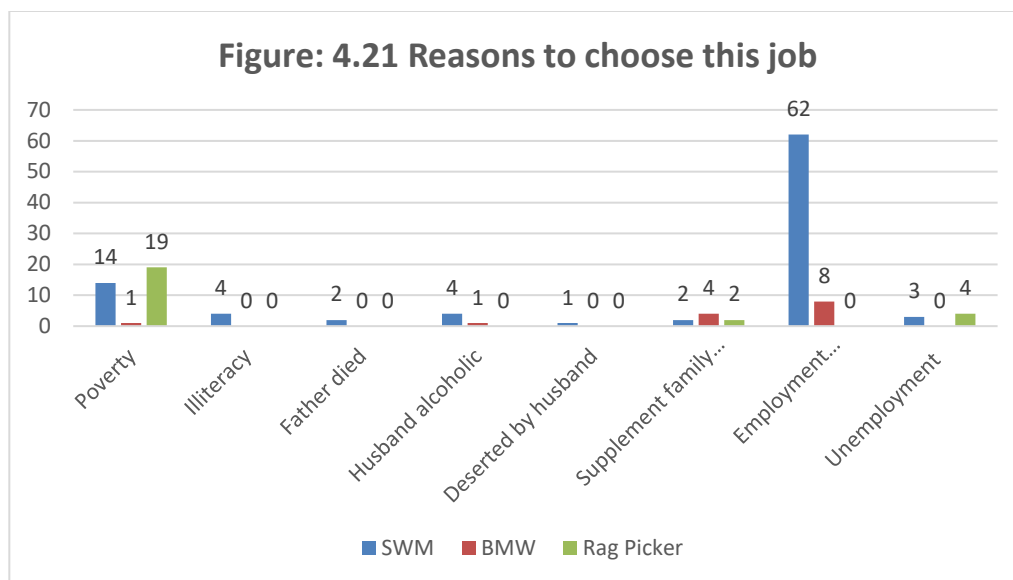
Source of information	No. of Respondents	Percent
Neighbours/Friends	82	62.6
Councilors/Municipal corporation	46	35.8
Union	1	.8
Newspaper	1	.8
Total	131	100.0



The source of information for nearly 63 per cent of respondents regarding the present job was friends and neighbours and 36 percent of the respondents got information about this job through the councilors or Municipal Corporation. Only two respondents reported their workers union and newspaper as source of information (Table 4.20 and Fig. 4.20). This shows the close nit process of information dissemination about the conservancy job performed by the members of particular section of society.

Table: 4.21 Reasons to choose this job:

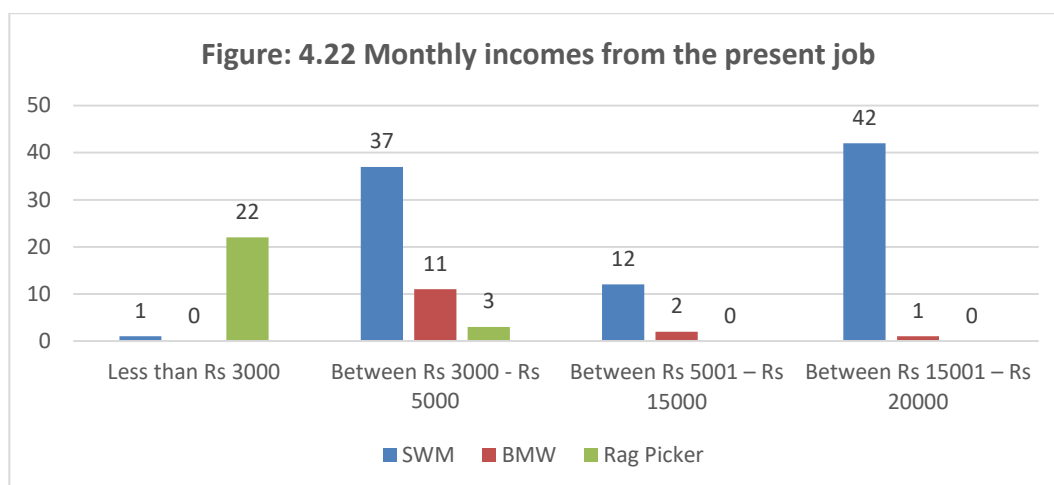
Reasons to choose this job:	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
Poverty	14	1	19	34
Illiteracy	4	0	0	4
Father died	2	0	0	2
Husband alcoholic	4	1	0	5
Deserted by husband	1	0	0	1
Supplement family income	2	4	2	8
Employment opportunity	62	8	0	70
Unemployment	3	0	4	7
Total	92	14	25	131



During the interviews with respondents the reason to choose this occupation was also explored. Table 4.21 depicts that 47 percent of the sampled respondents cited Poverty, illiteracy, unemployment and the compulsion to earn a livelihood for survival and support family income as the explicit reasons to choose this occupation, across all categories. The vulnerability was more amongst the rag pickers, daily wagers and contractual category waste workers. 53 percent of the respondent in sample groups responded the employment opportunity as the reason to choose this occupation and the majority of respondents were door-to-door garbage collectors (through SEHB) and contractual workers with a hope to be regularized soon.

Table: 4.22 Monthly incomes from the present job:

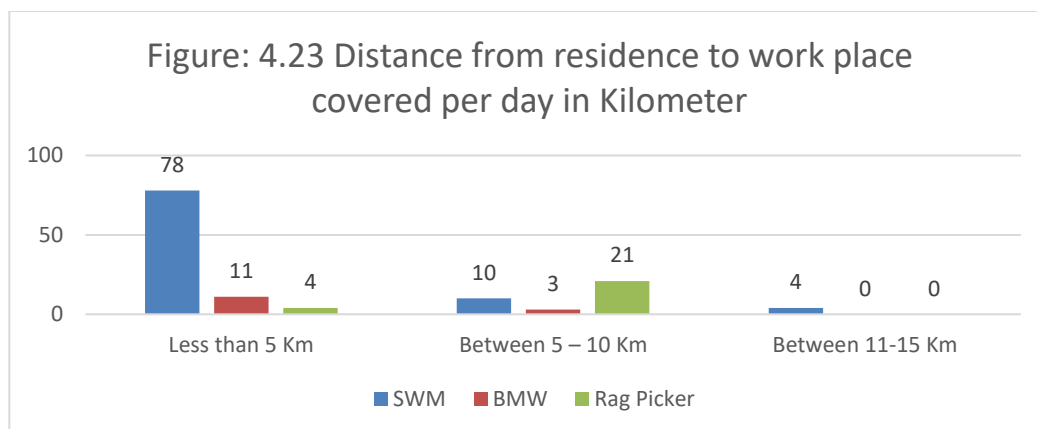
Monthly income	Category of Waste management worker			Total	Per cent
	SWM	BMW	Rag Picker		
Less than Rs 3000	1	0	22	23	17.56
Between Rs 3000 - Rs 5000	37	11	3	51	38.93
Between Rs 5001 – Rs 15000	12	2	0	14	10.69
Between Rs 15001 – Rs 20000	42	1	0	43	32.82
Total	92	14	25	131	100



Nearly 57 percent of the respondents were earning monthly income less than Rs 5000 per month and all of them were from rag picker, Door to Door garbage collector and contractual waste management workers categories (Table 4.22, Fig. 4.22). To rear a family with this amount is indeed difficult that substantiates the reason why second member of the family has joined this occupation to support family income as was reported by respondents in their responses (Table 4.22) and some of them got this as an employment opportunity to support the family income.

Table: 4.23 Approximate Distance from residence to work place covered per day in Kilometer

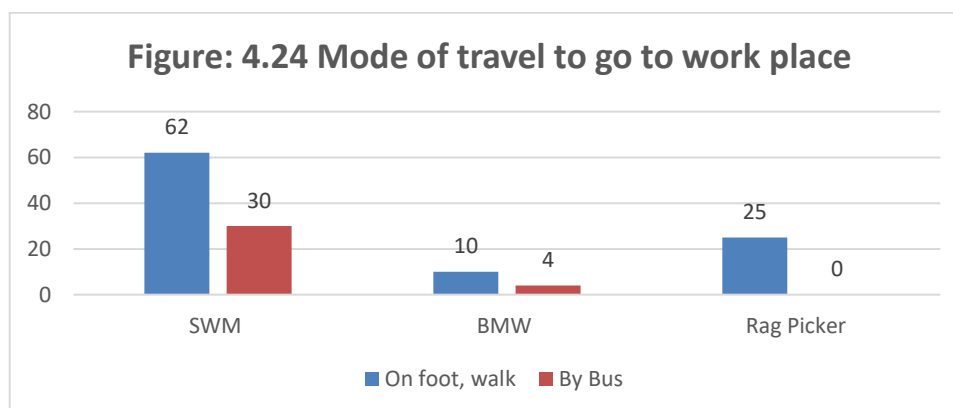
Distance	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
Less than 5 Km	78	11	4	93
Between 5 – 10 Km	10	3	21	34
Between 11-15 Km	04	0	0	4
Total	92	14	25	131



With regard to the distance commutation for work place the condition was very satisfactory. 71 per cent of the respondents in waste workers category were travelling a distance less than 5 Km per day, few between 5-10 Km and only 4 respondents were travelling beyond 10 km distance and they also were from supervisory category (Table 4.24 and Fig. 4.24).

Table: 4.24 Mode of travel to go to work place

Mode of travel to work place	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
On foot, walk	62	10	25	97
By Bus	30	4	0	34
Total	92	14	25	131



Shimla city being a hill station, comprising of seven hills, requires climbing on one hill to descending on other side to reach work place on foot, the ones who had to commute to the other side of the city for work place, preferred to travel by public transport, which is readily available during the day time.

Health related aspects of Waste Management Workers

Health as defined by the World Health Organization is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Looking from this perspective the health issues of safai karamcharis and the waste management workers are very critical. In municipal waste management one needs to ask: What are the risks in various alternatives for resource recovery? Who or what is threatened? What is saved or protected? Decisions about environmental risks are made in the face of uncertainties beyond common experience, particularly for new technologies. While many concerns have been raised about the potential harm from MSW management to the environment, general public, and wildlife, the risks and consequent costs of occupational hazard in waste management activities have received relatively little attention in the rush to adopt or adapt new technologies. The attitudes of many concerned with various hazards of MSW management appear to be rather blasé regarding worker health and safety.

This lack of attention appears to stem from the presumption that, however MSW is handled, workers will either be protected by or that liability will be reduced by appropriate management by the responsible contractor/agency. Further the skill/education level for MSW workers as to other manufacturing and production areas, the general absence of workers' and professional operators' organizations, the tardiness of state in creating certification and training standards for operators, and the public's inclination to ignore the full costs of waste management also contribute to this issue. In the name of contractualization of waste management services citing the reason of lack of financing and infrastructural resources, municipal bodies want to do away with its responsibilities, but that puts the double burden on contractual workers one lesser payment for the work

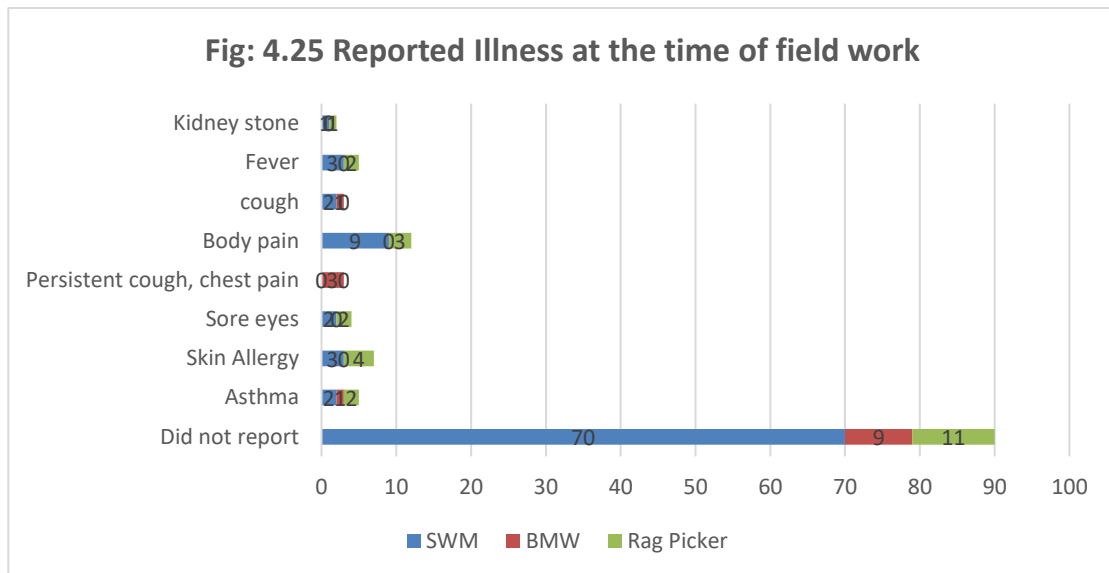
done and secondly not the proper supply of equipment to do the job which one would be having entitlement to as a government employee. Worst of all is the condition of rag pickers who to eke out their living would be toiling in mixed dumped garbage which may be having broken glass, blades, batteries, etc. risking their lives and above all listening all ill names from the general public and the contractors who have got the right over the waste.

The present times oriented towards progress driven by modernization has had its share of disadvantages, as well and one of the main areas of concern is the pollution it is causing to the earth – be it land, air, and water. With consistent upsurge in the global population and the mounting demand for food and other essentials, there has been a rise in the amount of waste being generated daily by every household. This waste is ultimately discarded into garbage bins or collected by waste management workers from households from where it is collected by the area municipalities to be further thrown into the dumps or landfills. Although, owing to indifferent attitude of communities, resource crunch or inefficient infrastructure, or mis management not all of this waste gets collected and transported to the final dumpsites. This mis management at different stages, and if disposal is improperly done, it can cause serious impacts on health and problems to the surrounding environment.

The vulnerable groups at risk from the unscientific disposal of generated waste include – the population in areas where there is no proper waste disposal method, especially the uncollected waste increases risk of infection and injury to the children and waste workers. On the other hand, high-risk group include residents living close to a waste dumps/landfill sites, where the water supply has become contaminated either due to waste dumping or leakage from landfill sites.

Table 4.25 Reported Illness at the time of field work

Are you suffering from any illness at present	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
Did not report	70	9	11	90
Asthma	2	1	2	5
Skin Allergy	3	0	4	7
Sore eyes	2	0	2	4
Persistent cough, chest pain	0	3	0	3
Body pain	9	0	3	12
cough	2	1	0	3
Fever	3	0	2	5
Kidney stone	1	0	1	2
Total	92	14	25	131



To have an assessment of the health problems of the waste management workers and safai karamcharis, specific questions were asked to from the respondents whether they are having any health problem at present. Only 31 percent of respondents across all categories reported the health ailments such as asthma, skin allergy, sore eyes, persistent cough-chest pain, body pain etc. which are associated with occupation they are in.

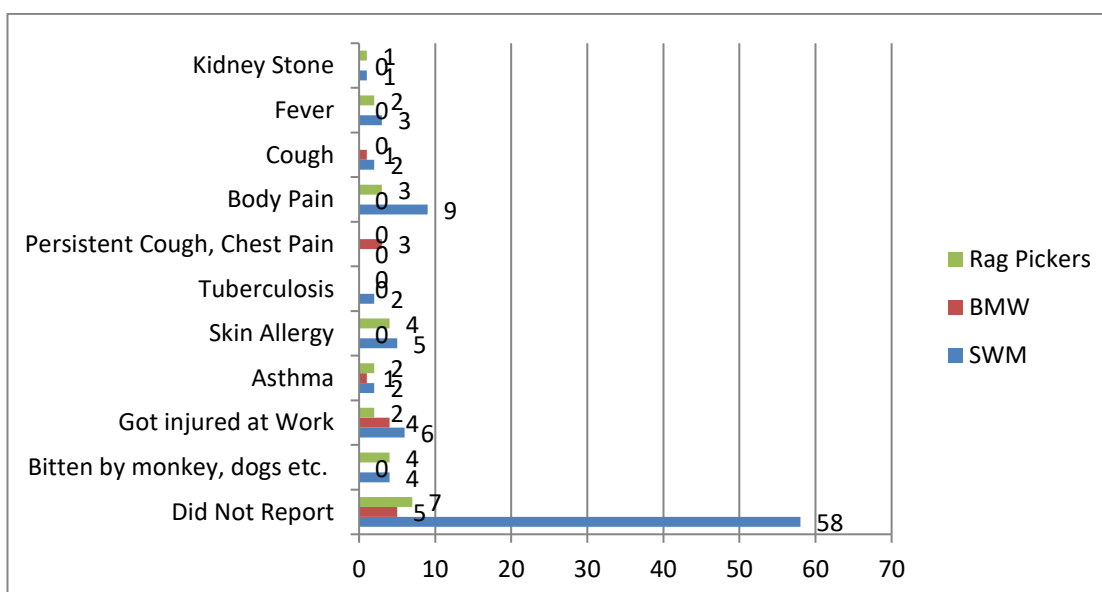
Illness sometimes seems to be a subjective understanding also. For instance, some of respondents which did not report any illness at the time of interview were actually having few symptoms but they did not consider it illness at all.

Three respondents from biomedical waste category were deployed at incinerator and all three of them reported the persistent cough and chest pain (Table 4.25) at the time of interview and this could be associated with the nature of job and work condition at incinerator. At the time of interview also when the incinerator was in running condition, the suffocating smoke could be felt and seen inside the incinerator due to rusted chimney pipe at one of the incinerator and long exposure to such work condition certainly has the adverse impact on the incinerator workers.

Table 4.26 Any other health Problem(s) in Last six months

Are you suffering from any illness at present	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
Did not report	58	5	7	70
Bitten by monkey, dogs etc.	4	0	4	8
Got injured at work	6	4	2	12
Asthma	2	1	2	5
Skin Allergy	5	0	4	9
Tuberculosis	2	0	0	2
Persistent cough, chest pain	0	3	0	3
Body pain	9	0	3	12
cough	2	1	0	3
Fever	3	0	2	5
Kidney stone	1	0	1	2
Total	92	14	25	131

Figure: 4.26 Any other health Problem(s) in Last six months



Waste management workers health is affected by a variety of factors like living conditions, eating habits, personal hygiene, etc. health problem such as physical injuries like cuts and pricks are common among them which is mostly due to poor segregation at source and the non-usage of protective gears such as hand gloves. Body pain due to manual work and carrying garbage bags over the back is a problem faced by some collectors. Table 4.26, Fig. 4.26 depicts the observation reported illness in past six months other than reported at the time of interview, a specific question was asked from the respondents regarding whether any other health problem or injury at the work place? And the number of reported illnesses increased to 78 percent i.e., 61 respondents in all reported one or the other kind of injury or health problem. Occupational injuries from the glass, blades etc. monkey and dog bites (attacks) cases were also reported other than health ailments such as asthma, skin allergy, sore eyes, persistent cough-chest pain, body pain etc. which are associated with occupation they are in.

Table 4.27 Health care institution visited for treatment:

Health care institution visited for treatment	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
Govt. Hospital	32	11	4	47
Private clinic/hospital	43	3	10	56
Indigenous healers	11	0	4	15
Any other	6	0	7	13
Total	92	14	25	131

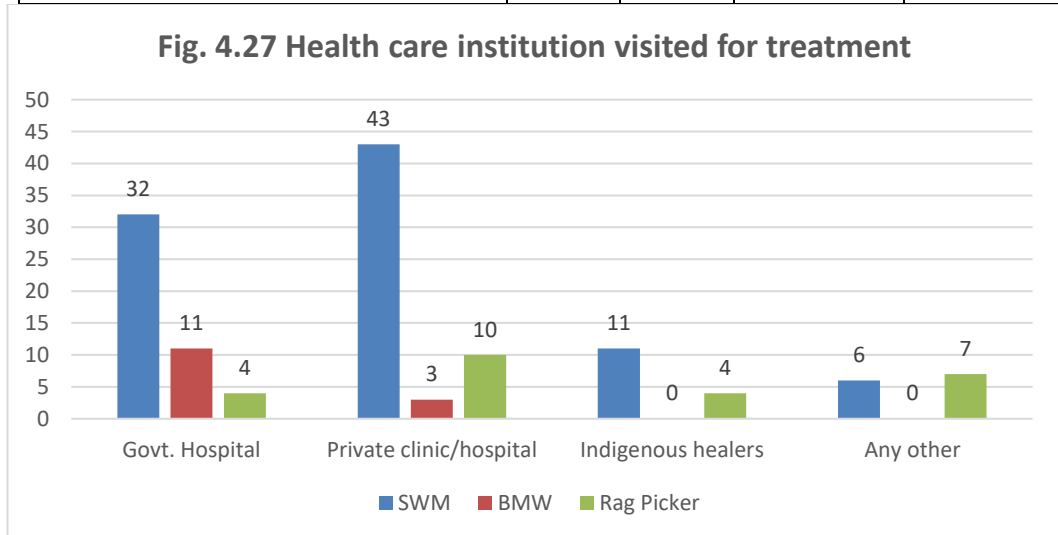
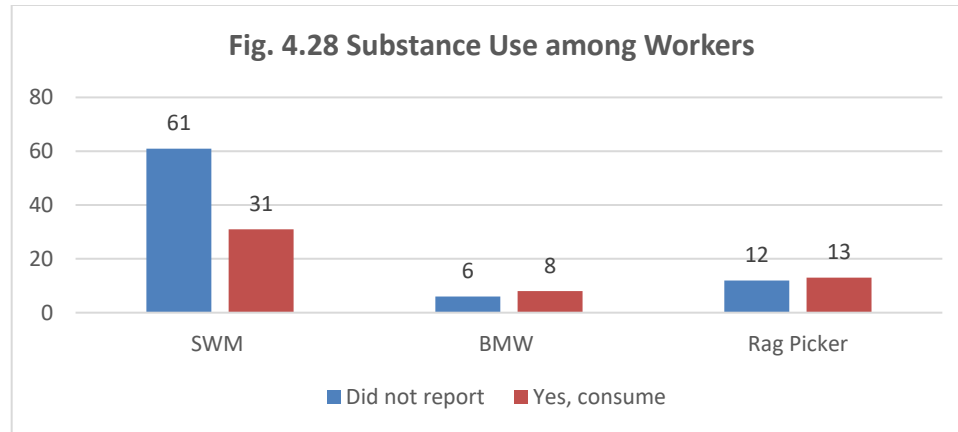


Table 4.27, Fig. 4.27 depicts the responses pertaining health seeking behaviour of safai karamcharis and waste management workers. In case of health ailment or illness which health care institution do you visit for seeking treatment or medical care? The paying capacity and nature of job discreetly determines the health seeking behaviour of waste workers. 11 out of 14 BMW workers reported to visit public hospital for treatment and all of these were contractual workers the reason to visit the public hospital was since they work in the same institution and doctors know them it provided them easy access for health care and sometimes doctors provided them medicines also. (Perhaps referring to the samples distributed by medical representatives); and 32 SWM workers who were working on daily wages or contract, earning less than Rs 5000 per month were amongst the one visiting public hospital. On the contrary the permanent employees of Municipal Corporation 43 from SWM category and two from Biomedical waste category preferred to visit empaneled private hospitals as they were entitled for medical reimbursement and the better facilities at private hospitals in addition to saving time compared to long queues in public hospital were stated reasons from these respondents. However, 10 respondents from rag picker category also preferred to private clinics / pharmacists in case of medical support. Shimla being the state capital has better health facilities both in public and private sector and the respondents exercised their discretion to choose the best available but this certainly highlights the issues of accessibility, availability and affordability to the core of discussion. Extending the Employee State Insurance Scheme (ESIS) to the unorganized workers including urban poor migrants should be considered so as to bring them under mandatory social protection.

Table 4.28 Substance Use amongst Waste Management Workers:

Use of substance like tobacco, beedi, cigarette, Alcohol, Pan masala etc.	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
Did not report	61	6	12	79
Yes, consume	31	8	13	52
Total	92	14	25	131



Though a lot has been discovered still work is being done to determine the direct causes of substance abuse and mental health issues. It is acknowledged that a number of factors play into the development of these disorders, and many of these factors are similar across both mental health and substance abuse issues. Biological factors, psychological factors and environmental factors are responsible for substance abuse.

There are certain life circumstances, particularly among younger users, that are risk factors for, rather than the direct cause of drug abuse. Parental abuse and neglect are commonly seen as part of the cause of drug abuse. A family history of substance abuse can make a person more vulnerable to addiction in response to stress. Grueling working conditions are not limited white-collar jobs alone. The social stigma associated with the menial job, the working conditions and environment in which they have to work are also the causal factors for substance use.

When asked from each respondent interviewed for this study about the consumption of liquor or substance use only few respondents accepted that they occasionally consume alcohol and other substances. However, during the conduct of interviews at waste treatment facility two respondents had consumed alcohol when I asked the reason for this at the work place, they innocently replied *“bhai itni gandh (stenching smell) mein kachre ko hath lagana mushkil hai, majboori hai, peene ke baad iska pata nahin chalta aur yahan kaam karna aasaan ho jata hai”*.

Table 4.29 Expenses incurred on Health treatment in last three months:

Expenses incurred on Health treatment in last 3 months	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
Did not reported	08	9	8	25
Upto Rs 500	28	0	7	35
Between Rs 501- Rs1000	42	3	9	54
Between Rs 1001- Rs 2000	6	1	1	8
Between Rs 2001 – Rs 3000	4	0	0	4
Between Rs 3001 – Rs 5000	3	1	0	4
Above Rs 5000	1	0	0	1
Total	92	14	25	131

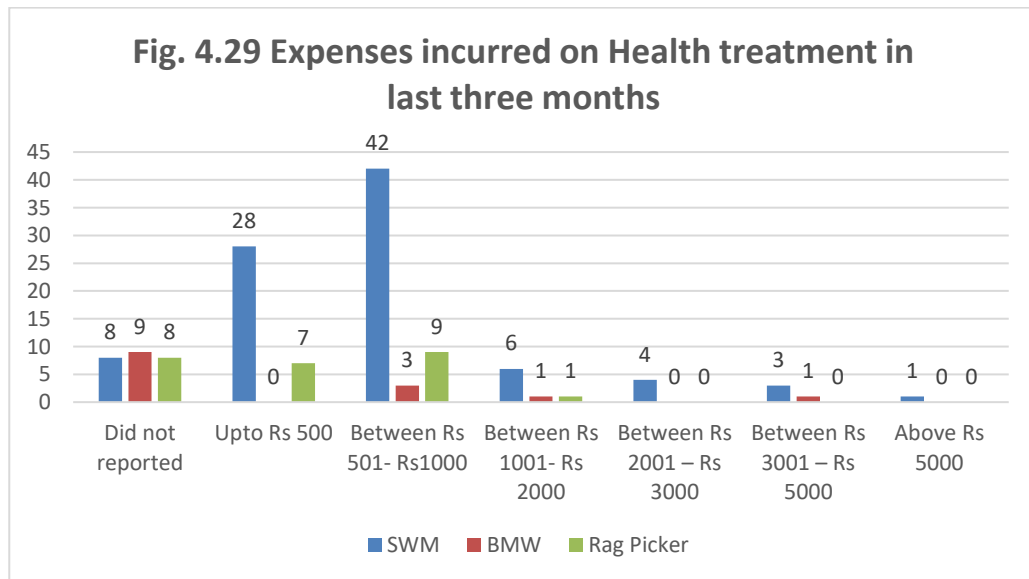
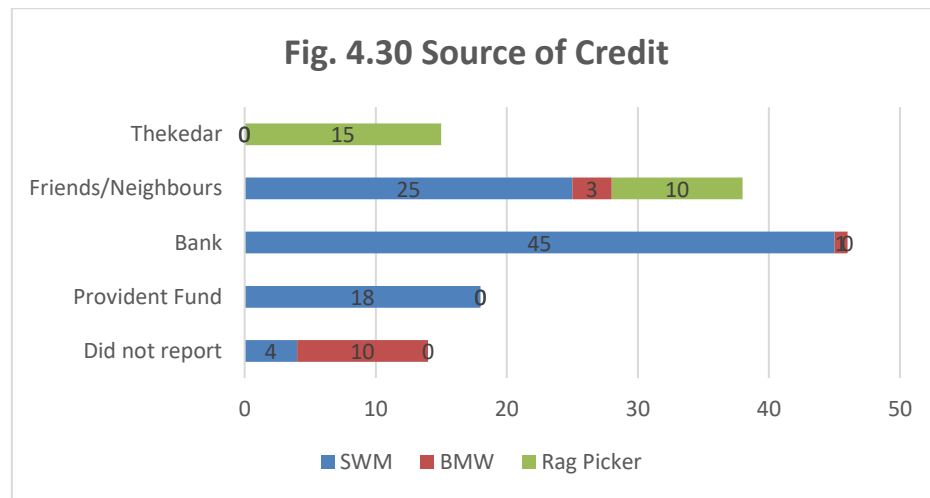


Table 4.29 shows the expenses incurred by waste management workers on health care illness experiences and episodic illness in the past 3 months. 89 respondents which constitute 81 percent of the studied sample reported to incur up to Rs 1000 on health expenses in last 3 months. It was all out of pocket expenses. Possession of Employee State Insurance Scheme in case of permanent safai karamcharis was protective against

out-of-pocket expenses. Improving access to government healthcare services or extending such social security measure to unorganized sector workers is equally important.

Table 4.30 Source of Credit:

Source of Credit	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
Did not report	04	10	0	14
Provident Fund	18	0	0	18
Bank	45	1	0	46
Friends/Neighbours	25	3	10	38
Thekedar	0	0	15	15
Total	92	14	25	131



Finances are very important aspect of life today, as everything revolves around money. Be it fulfilling basic necessities of life such as food, education and seeking health care or be it other better life opportunities such as housing or other luxuries of life. The prime requisite again is what Amartya Sen calls as “Entitlement”. In response to a question regarding source of credit, the respondents had varied responses as per their paying capacity and ‘Entitlement’ and the socio-economic status in society. The permanent category safai karamcharis who were entitled for Provident Fund (PF), as deducted from their salary on monthly basis, 18 of them had availed PF when they needed it (Table 4.30

and Fig. 4.30). Similarly, 46 MSW safai karamcharis in permanent category had availed loan facility from banks against their salary as 'security' and this loan was readily provided to them by the banks. On the other hand, contractual workers, daily wagers, door to door garbage collectors and rag pickers who did not have stable and regular source of income were devoid of 'credit facility'. The bank denied them loan for want of sustainable security 'entitlement' as reported by respondents and the source of credit for them was friends/neighbor. In case of rag pickers, it was thekedar or the itinerant buyer with whom they use to sell their collected garbage. The unorganized sector workers had their own informal mechanism to generate credit in time of need to a limited capacity.

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Health Security and Hazard Safety in the process of waste management: Perceptions of the workers

This study has analysed the occupational risks associated with waste management practices within waste management streams. The study raises several issues that need to be addressed, including the potential harm that waste could do to the environment and the general population, as well as the dangers and associated costs of workplace hazards in waste management. Protection of environment and human health are indeed the major challenges that we are facing on the path of development. The main goal of waste disposal regulation is to lessen the quantity of garbage by segregating it at the point of generation, preventing it from being mixed with other harmful elements during the process, and minimizing harm to the general public. This study explores beyond this stage taking into consideration the effect of waste management practices on the health of waste workers who are directly involved in this process at every stage. Risks occur at every stage in the process, from the point of generation onto the final stage of disposal into the landfill site in which both formal and informal sectors are contributing significantly. Therefore, a triangulation method by adopting quantitative and qualitative research paradigms is used in this study. On the one hand quantitative design involves physical categorization of waste through material constituent segregation and separation and on the other hand questionnaires were administered to look into the dangers allied with waste management. The qualitative aspect of this study includes field observations, interviews, open-ended questionnaires, and Focus Group Discussions. The key findings of the study revealed that manual handling jobs predominate in waste management system, which accounts for the increased incidences of musculoskeletal illnesses and other associated infections discussed in the previous chapter.

Occupation related Environmental Condition of the Waste Management Workers:

The working environment is the primary aspect for any occupation, but by very nature of this occupation the place of work within waste management process is in un-cleaned condition. After collection of waste, the workers have to work for long hours for separating, packing, decomposing, loading the wastes in the transportation vehicles and eventually to the dumping yard.

Sustainable Development Goals (SDGs) and Waste Management:

The seventeen Sustainable Development Goals (SDGs) are a social contract and the collective vision of mankind designed by United Nations to lead a sustainable life style to preserve this planet and calls for a collective effort. As the then UN Secretary-General Ban Ki-moon said “They are a to-do list for people and planet, and a blueprint for success,” he further emphasized and called upon the countries to start working toward achieving the 17 SDGs over the following 15 years i.e., by 2030 with help of these 17 goals and 169 targets to eradicate poverty, mitigate inequality and tackle climate change. The agenda 2030 tackles the social, economic, and environmental facets of sustainable development as well as important issues pertaining to justice, peace, and strong institutions. It also acknowledges the critical inevitableness of mobilization of means of implementation, including financial resources, technology development & transfer and capacity-building, along with the role of collaboration and partnerships.

Figure: 5.1 17 Sustainable Development Goals



Source: <https://www.un.org/sustainabledevelopment/blog/2015/12/sustainable-development-goals-kick-off-with-start-of-new-year/#>

Sustainable Development Goals are integral part of our daily life. They touch upon daily lives of normal people. Similarly, it also pertains to the waste management system and the waste workers working within this system. For instance, why are they working within waste management system? owing to the reason that they are poor. The very first goal in SDG aims at eradicating poverty from the society and the states must ensure the collective efforts in this direction i.e., (SDG-1) No Poverty. Within educational institutions such as school, the class tests are conducted almost on everyday basis forcing young students to memorize rather than understand – Is this really good education? It pertains to SDG 4 i.e., Quality Education. Within waste management system with regard to waste management workers also, migration is a pertinent issue. These workers are confronting the issues of poverty (SDG -1), Decent Work and Economic Growth (SDG-8), peace, justice and strong institutions (SDG-16), Good Health and Wellbeing (SDG-3), Sustainable cities and Communities (SDG-11), Industry, innovation and infrastructure (SDG-9), Migration issues which are driving force behind migration pertains to No Poverty (SDG-1), Decent Work and Economic growth (SDG-8), Peace, Justice and strong institutions (SDG-16), Good Health and wellbeing (SDG-3), Industry, innovation and infrastructure (SDG-9) has a tremendous potential recycling, innovative methods of handling and reducing waste and overall to design and develop the

appropriate infrastructure. In urban industrial zones, this encourages the development of smart industries and industrial clusters that foster resource efficiency, industrial competitiveness, and innovation while connecting local companies to global markets and supply chains. Sustainable Cities and Communities (SDG-11) aims to make cities and human settlements inclusive, safe, resilient and sustainable invoking the participation from the communities itself.

To put it in simple words, three steps that can help us to internalize and realize SDGs are:

Listen, Act and Listen again. We need to,

Listen to oneself and others as well (Stakeholders).

Act – Come up with the plan that you fit you are and the world around you (Strategy).

Listen again – Check up with the plan you are working and make changes, if you need to (Impact).

In professional parlance we often use the jargons such as Stakeholders, Strategies and Impact, Formulating and Implementing a Strategy. These are all synonyms of the Listen, Act and Listen again.

The companies who have been doing consultancies and charge hugely for this, have been following the same principles. They LISTEN by collecting data, they ACT by formulating and implementing strategy and they Improve (LISTEN AGAIN) upon it and design new strategies as per the requirement for further improvisation.

To achieve the SDGs, and make our cities more sustainable, within waste management system, we also need a new strategy. We need to do things differently. We need to innovate. We need to understand the interconnectedness and overarching impact of all this on the health of the waste management workers.

State response to Solid Waste Management:

Each year, India produces 62 million tonnes of mixed waste (Swaminathan, 2018) which can be broadly classified into three major categories: non-biodegradable, biodegradable, and biomedical (sanitary and hazardous waste). This section of the chapter tries to understand and build up an institutional framework which is based on secondary data and primary field experiences to address the grave environmental and public health concerns and propose some feasible recommendations to improve the waste management system in general which has a direct impact upon the health conditions of the waste management workers.

Figure: 5.2 Waste Generation in India

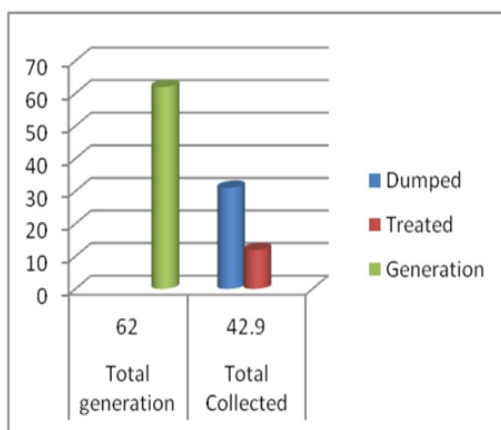
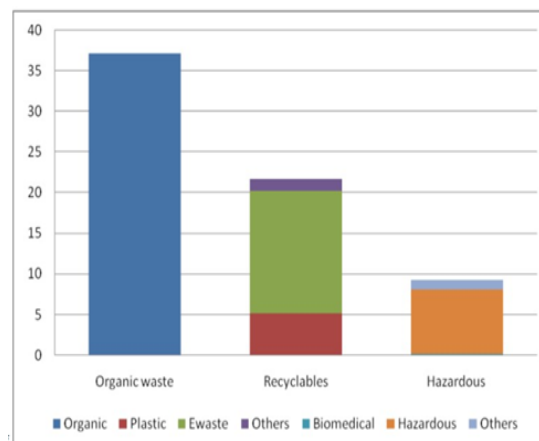


Figure: 5.3 Waste Composition in India



Collection vs Dumped Statistics in million MT per annum Waste Composition of India, in Million Metric Tonnes per annum
 Source: Swaminathan, M. (2018); How Can India's Waste Problem See a Systemic Change, EPW

Every year, India produces 62 million tonnes of mixed waste and approximately 50 per cent of the generated waste is organic in nature which if collected and treated separately can be turned into black gold i.e., good quality bio compost and if gets mixed with recyclable waste decrease the quality of that recyclable waste also. Shimla city which generates approximately 86 MT of waste daily gets it all in mixed form which makes the task of processing difficult of bio compost treatment plant and Waste to Energy plant resulting in poor quality of bio compost. The WTE facility in Shimla at Bharyal was also forced to close down due to the presence of more organic waste in mixed garbage including plastic, which makes it impossible to process/convert into Refuse Derived Fuel (RDF) pellets because of their high oxygen content, attributable mainly to

unsegregated waste being received in the plant. There are 54 Urban Local Bodies in the State of Himachal Pradesh which includes 4 Municipal Corporations, 30 Municipal Councils, and 22 Nagar Panchayats. In addition to this there are 7 cantonment boards also. Total 342.35 MT¹ solid waste is generated within urban centres of Himachal Pradesh and Shimla city alone generates 87 MT of waste every day.

Policy-level Interventions

Since 1986, when the first National Environment Protection Act, was passed, seventeen rules have been passed or revised. Each of these revisions with the management and handling of a specific type of waste, such as Solid Waste (Management and Handling) Rules 2000, Plastic Waste Rules 2011, E-waste Rules, 2011 etc. The lack of one comprehensive policy with an integrated outline of governing bodies has perhaps been the biggest bottleneck for effective implementation. Solid Waste Management Rules, 2016 provides for certain key features:

- 1) mandates all waste generators to segregate waste at the source of generation itself.
- 2) mandates bulk generators (any institution with an area greater than 5,000 sq. m.) to manage their own waste.
- 3) An extended producer responsibility on brand owners to set up a take back scheme for managing waste produced during packaging.
- 4) Promotion of WTE (waste-to-energy) plants and a directive to the Department of Fertilizers to market compost along with chemical fertilizers.
- 5) The rules also mandate local bodies to levy waste collection fees on waste generators.

Insights from the Field:

The present study has provided the scope to understand health issues and health seeking behaviour of waste management workers for mostly common ailments. It also attempted to understand the confounding factors that are in play while

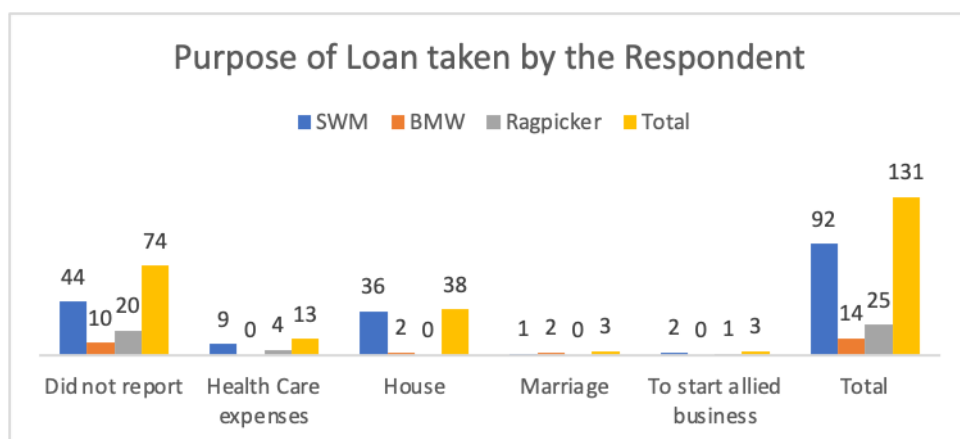
¹ Estimated by the Directorate of Urban Development, Government of Himachal Pradesh (February 2017).

seeking health care. However, there are several factors that affect whether or not an individual will seek good health such as: level of education, place of work, socio-economic status, age bracket, location, gender. However, socio-economic factors significantly affect the willingness of approaching health care institutions for seeking care. The specific question was asked whether they have sought any loan or credit and the reason hereof was used to understand this association.

Table 5.1 Purpose of Loan taken by the Waste Management Workers:

Purpose of Loan	Category of Waste management worker (WMW)			Total
	SWM	BMW	Rag Picker	
Did not report	44	10	20	74
Health Care expenses	9	0	4	13
House	36	2	0	38
Marriage	1	2	0	3
To start allied business	2	0	1	3
Total	92	14	25	131

Figure: 5.4 Purpose of Loan taken by the Waste Management Workers



This particular question was asked from each Waste Management Worker² Table 5.1 shows that 57 safai karamcharis and waste workers had availed loan facility from the sampled respondents. 13 respondents had borrowed it in order to bear health care expenses, 38 respondents had availed it from the banks for house construction or renovation, and three respondents reported that the purpose of taking loan was marriage within the family. Three respondents had availed this loan/credit facility to start some independent allied business. It is interesting to note that home loan was availed by permanent municipal safaikaramcharis against their monthly salary while one worker engaged in ragpicking also availed this facility. This worker is likely to have been in the business for a while and hoped to establish an independent set up.

Table: 5.2 Summary of questions specific to BMW management workers

Working conditions of the BMW management workers	Observations
Training for work related aspects	None, had received any training.
Wearing gloves at work	Yes, use of gloves was reported.
Wearing protective gears other than gloves	No protective gears were used.
Injuries while handling BWM	Yes, injuries were reported while handling BMW.
Vaccinated for injuries*	Tetanus only at HCU, when injured.
Frequency of emptying the bins	Once in a shift by the worker
Carrying BMW from ward/laboratory	Waste is manually carried to the points of collection.
Ever come in contact with infectious waste	Yes, only one worker reported to have come in contact with infectious waste while three did not. Notably ten did not had any knowledge about it.

² Waste Management Worker refer to the worker working with waste management system i.e., Formal and informal and includes Safai Karamcharis (Permanent employee of Municipal Corporation Shimla), Contract Workers (both SWM and BMW), Daily wagers engaged through SEHB society and Rag Pickers.

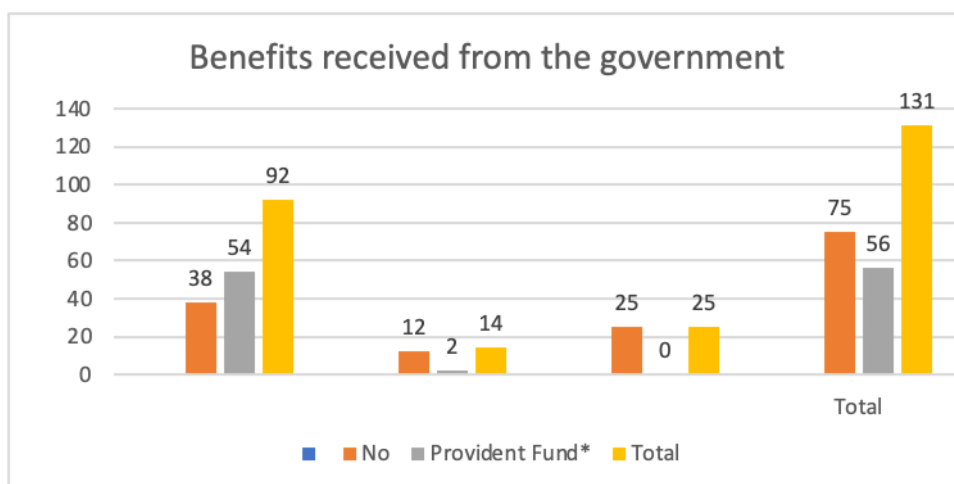
Some questions were specifically designed for biomedical waste management category workers owing to the specific nature of job. No training was provided to the BMW management category workers, who were recruited on contract through contractor. Given a proper training before assigning these workers would facilitate them handling biomedical waste with more care and precaution. No protective gears, other than gloves were used by these workers. All the respondents responded having received injury at one or the other instance at work place but in response to allied question whether have you ever come in contact with infectious waste only 1 respondent was aware of that others could not respond whether it was infected waste or not. This is an ample instance of their nature of awareness with kinds of waste they are handling on daily basis. All the respondents responded having vaccinated for tetanus at health care institutions. The BMW bins were emptied once in a shift.

Table: 5.3 Work related benefits from the government

Benefits received from the government	Category of Waste management worker			Total
	SWM	BMW	Rag Picker	
No	38	12	25	75
Provident Fund*	54	2	0	56
Total	92	14	25	131

Note: *entitled for Permanent government employees only

Figure: 5.5 Work related benefits from the government

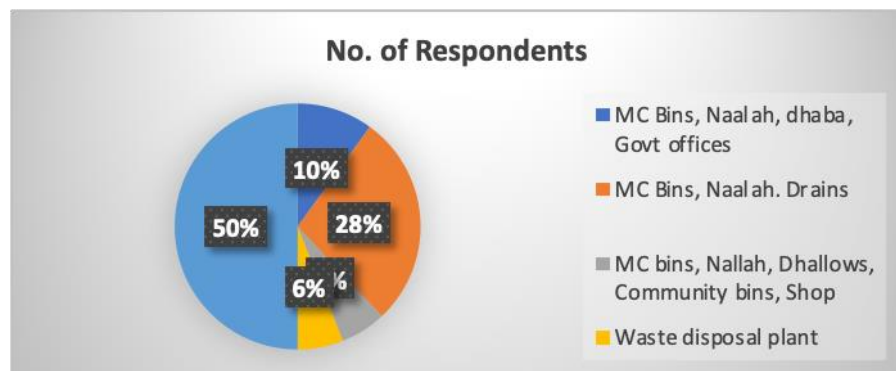


Within waste management system both SWM and BMW management categories of workers were undertaken for research study from all categories of waste workers namely safai karamcharis (permanent employee) of state government, door-to-door garbage collection, daily wagers, contractual workers within formal system of waste collection and Ragpickers from informal category of waste workers. Only 56 safai karamcharis (i.e., 54 from SWM and two from MSW) Table 5.3 who were regular (permanent) employee of state government were having all benefits of state government employee such as provident fund, medical reimbursement facility, leave benefits etc. along with other benefits available to the government employee. The other categories of waste workers were getting only the fixed monthly salary, weekly off on Sundays, but no other benefits. The impact was quite visible from their responses and they always compared themselves with permanent employee of waste workers for doing almost the same job yet so much of difference in terms of facilities.

Table 5.4 Place of waste collection (Rag Pickers)

Place of waste collection	Frequency	Percent
MC Bins, Naalah, dhaba, Govt offices	5	20
MC Bins, Naalah. Drains	14	56
MC bins, Nallah, Dhallowas, Community bins, Shop	3	12
Waste disposal plant	3	12
Total	25	100.0

Figure: 5.6 Place of waste collection for Rag pickers



Some studies, Ferronato et al. (2019); Buch et. al. (2021); Schenck et al. (2019) have highlighted that in developing countries waste pickers support the local economy, environmental sustainability, public health, and safety. Despite their enormous contributions, on the one hand they frequently experience appalling working and living circumstances, low social status, minimal assistance from local governments, and rejection by the communities; on the other hand, they face challenges due to competition for lucrative waste from powerful corporate entities.

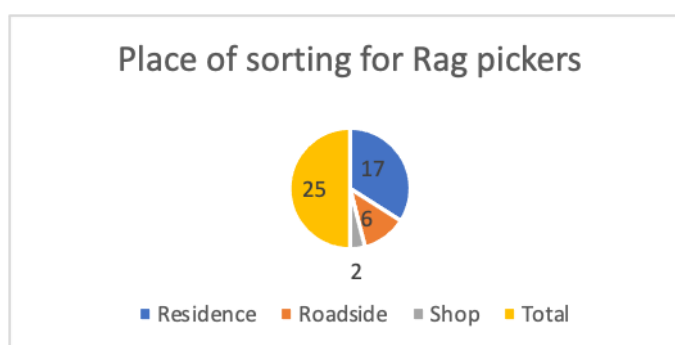
In Shimla city, during the field work, 25 rag pickers were interviewed from different locations. Three respondents were from waste processing and disposal site at Darni ka Bagicha. These rag pickers were working for the contractor at disposal site and were reluctant to interact with researcher at the work place. They were interviewed away from the work place and reported that no other rag picker is allowed access to processing plant and disposal site other than hired by contractor for sorting the mixed waste received at disposal site. One of the rag pickers, who had denied to give his interview at processing plant and disposal site and was interviewed at distant location after few days told me *‘bhaiya site par hum kisi se baat nahin kar sakte, thekedar mana karta hai. Bahar ka koi adami vahan se katchra nahin utha sakta. Kutthh din pahle jab aap baat kar rahe the aur bade log aaye the tab bhi thekedar se daant padi thi’*.

22 rag pickers were toiling to collect the garbage from garbage bins put up by the municipal body, the thrown away waste discarded into the nallahs, drains, *dhallaw* or from the dhabas and hotels. Very few of them had contacts with government offices to collect the discarded waste from there as well.

Table: 5.5 Place of sorting for Rag Pickers

Place of sorting	No. of workers	Valid Percent
Residence	17	68
Roadside	6	24
Shop	2	8
Total	25	100.0

Figure: 5.7 Place of sorting for Rag Pickers



Discarded waste is often disposed off without the expectation of compensation for its inherent value. However, it is increasingly being recognized that some of the value of refuse could and should be recovered. In economically less developed countries, poverty is the major reason why thousands of people are involved in the (informal collection), sorting and processing of solid waste.

Waste picking offers flexible working hours and is often a family enterprise where women also participate in collection and sorting. It requires little knowledge and training. For majority of the poorest people, it is the only livelihood options. Waste workers are often subject to social stigma, facing harassment and work in poor working conditions. In the sampled population these rag pickers toil from one place to the other in search of different kinds of discarded waste material and collect them from different places and carry in their garbage bags over their back. Majority of them used to bring it to their shelter places for sorting and some of them would sort it on roadsides to be finally taken to itinerant buyers to sell it to them in lieu of money. It is noteworthy that for all these activities no place for segregation is available, although they engage in an important activity of segregation in the process of

waste management. They use their ‘personal’ spaces – dwelling units or roadside close to it or with which they are familiar and have no fear of being chased away.

Solid Waste Management in Urban Centres of Himachal Pradesh

The process of Solid Waste Management involves numerous activities and stages i.e. collection, segregation, storage, transport, processing and disposal of solid waste. The urban centres in Himachal Pradesh generates approximately 342.35 MT³ (metric tonnes) of solid waste per day.

The 74th Constitution Amendment Act, has bestowed the responsibility of solid waste management in urban areas to Urban Local Bodies (ULBs). The Himachal Pradesh Government has enacted the Himachal Pradesh Municipal Act 1994, imbibing the provisions of the 74th Constitution Amendment Act, 1992 to decentralize the function of solid waste management in urban areas to all 54 ULBs in the State. Solid Waste Management Rules, 2016 notified by Government of India describes the process vis a vis solid waste management. It mandates that the waste to be collected from generators in segregated form i.e, biodegradable, non-biodegradable and domestic hazardous waste through door-to-door collection which needs to be transported through covered vehicles to secondary storage facilities or the materials recovery facility (MRF) to facilitate segregation, sorting and recovery of recyclable material.

The segregated biodegradable and non-biodegradable waste are to be then transported to their respective processing facilities such as composting plants or waste-to-energy plants. Finally, the residual solid waste not suitable for recycling or further processing is to be safely disposed of in sanitary landfills, specifically designed to prevent pollution of soil groundwater, and air.

³ Estimated by the Directorate of Urban Development, Government of Himachal Pradesh (February 2017).

Table: 5.6 Details of manpower in Urban Local Bodies

Sl. No.	Name of Post	Sanctioned Strength	In Position	Vacant
1.	Executive Officer	31	15	16 (52)
2.	Secretary	21	10	11 (52)
3.	Sanitary Inspector	33	26	07 (21)
4.	Sanitary Supervisor	43	21	22 (51)
5.	Safai Karamchari	2,794	2,842 [#]	--
	Total	2,922	2,914	

Note: Data was supplied by the Director, Urban Development during the CAG audit
Position in respect of Sr. No. 1 to 4 is for all 54 ULBs of the state; position in respect of Sr. No. 5 is for the 16 test-checked ULBs.

through contractor: 1656; through SEHB society (in Shimla): 850; own staff of ULBs: 336

Figure in parantheses is in (%)

Source: CAG Report Himachal Pradesh (2021)

There is an acute shortage of man power in urban local bodies in Himachal Pradesh. Although 1656 safaikaramcharis have been recruited on contract through contractors and 850 persons are working with Society for Heritage and Environmental Beautification (SEHB), an organization in Shimla city engaged with door-to-door garbage collection activities. Less than half of what SEHB employees i.e., 336 persons are working as own staff i.e., permanent employee of urban local bodies. More than half the positions are lying vacant across different levels of posts except of the safai karamcharis and sanitary inspectors. The safai karamcharis are more in number (although hired through contract) than the sanctioned positions (Table 5.6) need to be increased. On the other hand, while the deficit continues for the position of sanitation inspectors, quantum is lesser than the other position. The training component is likely to add some value to the idea of ‘decent work’ aimed in the Sustainable Development Goals. This would also incentivise the prospective workers. The larger share of vacant positions at higher levels are also an extension of this. Therefore, need to be addressed similarly.

Formal Waste collection in Shimla

The formal agency dealing with SWM is Municipal Corporation, Shimla. The road sweeping is usually done by permanent municipal employees. The garbage collection and transportation are undertaken by SEHB workers who are engaged on daily basis. Then this waste is transported to the waste processing plant at Darni ka Bagicha now at a new site at Bharyal. Municipal solid waste

management plan for Municipal Corporation Shimla (2012) mentions that the Solid Waste Management division in Shimla is under the administrative control of Health Officer of the Municipal Corporation Shimla. He is supported by Project Coordinator, Chief Sanitary Inspector, Sanitary Inspectors and Safai Karmacharis. A total of 592 employees across all categories including permanent staff, daily wagers and contractual workers are engaged in providing SWM services within the city. Though slight segregation is done at the plant by a family dealing with rag picking and has sought a contract for a year for waste segregation against some payment on monthly basis. Finally, the waste is left for few days and then treated in processing plant to prepare compost out of it.

Solid Waste Management in the informal sector in Shimla

Informal sector also plays a significant role in Shimla in handling Solid waste, though there is no statistics either with Municipal Corporation or any other government and non-governmental agency for that reason. But still the contribution of this section is tremendous in resolving the solid waste management problem. On the basis of interviews that were administered on some of the rag pickers, thekedars and itinerant buyers very pertinent aspects of this problem have come up and the interactional role of the informal sector has been discussed in the later section.

The limited resource of municipalities for solid waste management increases the need for cost effective options to manage urban waste. Parallel with 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 principle 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 is often understood as the result of using disposable items by the modern materialistic societies, instead of reusing and recycling of using reusable items.

The separation of waste at the source of generation and would provide clean material for the recycling industry. Often some households and certain enterprises separate recyclable matters before dumping the waste and sell these

materials to street hawkers and specific vendors. From there the material enters the recycling stream. Additional recycling of waste is also practiced by the waste management workers during waste transportation activity. Gandhi (2020) in his article mentions of hepatitis-B outbreak in Gujarat's Sabarkantha district in March 2009 where total 593 confirmed cases had been registered with 94 deaths of unfortunate victims. The investigations revealed the use and re-use of unsterilized syringes and needles as the root cause for this unfortunate event. Fig. displays red colour plastic bag immediate outside the bin and gloves hanging on the garbage bin (both items should not have been there) and a waste worker passing nearby. There could be such incidences out of ignorance or carelessness. 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. Municipalities in the developing world seem to be ignorant of this fact and rarely recognize the benefits of waste recycling and recovery.

Figure: 5.8 Waste Worker passing nearby garbage bin



Source: Photograph taken by the Researcher

Reflections on Waste Management scenario in Shimla

- 1) Shimla city generates approximately 86.01 MT of solid waste per day. But the municipal body is able to collect approximately 70-75 MT of the generated waste through door-to-door collection and community bins.
- 2) With increasing urbanization, 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 rate of increase has not been consistent.
- 4) The wards with affluent population are served better in a better way than the one that are towards the periphery.
- 5) The 3 R principle's benefits i.e., Recovery, Reuse and Recycling, is not practically visible as the mixed waste is reaching the disposal site.
- 6) In such situations when municipal bodies are not able to manage the burden of solid waste effectively, the active participation of community and informal sector is an evident and inevitable phenomenon.
- 7) Solid waste is a solid asset, which needs to be recovered directly or indirectly through formal/informal stages for reuse and recycling and this potential is not harnessed at the moment as the mixed waste is reaching to the disposal site.

Interplay of various actors engaged in waste management

The Municipal Corporation Shimla while looking after the entire process of waste management engages different kinds of employees viz. permanent safai karamchari who are engaged with street sweeping, some of them engaged on contract as well, SEHB workers who are engaged on daily basis and are endowed with task of door-to-door garbage collection. Similarly, there are contractual waste workers engaged through contractors deployed for taking care of biomedical waste. At incinerator site 2 workers were permanent (regular) employee of Municipal Corporation while one was working fixed contractual amount. The fleet of waste management workers was supervised was supervisor and sanitary inspectors.

There are various actors engaged in the business of waste picking right from the rag pickers to the kabariwalas and then thekedars. Though apparently the relationship between them seems to be exploitative but it is equally cooperative as rag pickers do not have any complaints against them. The respondents who were interviewed during this study from amongst rag pickers, kabariwalas, and thekedars, most of them were not bonafide residents of Himachal Pradesh.

Perceptions of the waste pickers about *Thekedars* (contractors)

Understanding the perceptions of wastepickers about the contractors who provide them work or purchase the material collected by them has been an important constituent of this study. Therefore, qualitative approach has been used to highlight some aspects of planning the SWM. It is important to understand the propensity of interactions taking place between different actors at different stages. Understanding the perceptions of community and the service providers in this case, waste pickers, directly or indirectly become important. Therefore, their perception has also been taken into account. This section of the present study deals with the perception of waste pickers about kabariwalas (itinerant buyers), with whom they are competing and about the thekedars (dealers) to whom they sell their collected waste materials. They are directly related to each other as far as their socio-economic relationships are concerned.

Waste pickers were not critical about the role of the dealers. On the contrary they argued in favour of the dealers, who otherwise seem to be the exploiters to us, similar to Stockholm syndrome⁴. Waste pickers express that the *thekedars* usually help them in number of ways. Based on the in-depth interviews with waste pickers, their responses have been clubbed into the following categories:

a) *As bank-* for waste pickers the dealers act as the bank, where they keep their extra income and take loan in case of emergency. One of the waste pickers said '*mein apna paisa saath nahin rakh sakta, barish mein gal jata hai, paseene se geela ho jata hai aur kahin sambhal kar bhi nahin rakh sakte. Mere pass koi bank khata nahin hai, isliye mein paisa thekedar ke pass hi rakhta hun, jaroorat padne par le leta hun. Kabhi jyada ki jaroorat padti hai to thekedar de dete hai*'. 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 them other than their trusted and tested *thekedars*. He lends the required money and waste pickers repay it in installments.

b) *One who provides them shelter* – some waste pickers were found living in godown of thekedar, who usually do not charge rent from them. Waste pickers

⁴ Stockholm syndrome is a theorized condition in which hostages develop a psychological bond with their captors

argued that dealers are providing a free-living space even godown is of great help to them. Waste picker who was living near disposal site in a temporary shed covered with plastic *tirpal* reported '*hum yahin rahte hain, samman ki jagaali (lookafter) ho jati hai aur humein rahne ki jagah mil jati hai*'. They cannot afford an accommodation with their little income, a part of which they send to their family, which is staying in the village.

Willingness to avail Health and Educational facilities

Waste management workers 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 service, as their tolerance level gets entirely exhausted in their work during the process of waste handling and recovery. They were interested in knowing the benefits of education and showed the willingness to put their children in school, if they can manage their two square meals a day without their help in waste collection. Thus, likelihood to ensure food security was the determinant for access to education among their children. Availability of accessible and affordable health and educational facilities to the waste workers is of immense importance and in making their lives better. Only with access to health facilities, can they be kept away from the cycle of indebtedness; and with education they can be made aware about their ongoing exploitation; thus equipped to come out of it.

Impact of poor health on the economic condition of waste workers

The problems of waste disposal are severe in cities as well as in small and medium towns. Door to door collection in expensive 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 hazardous chemicals. However fecal matter such as diapers, sanitary napkins is often mixed with domestic waste, which gets contaminated. Solid waste is not kept in close containers and often is not removed regularly. In such a scenario, solid waste often creates one of the most visible environmental problems resulting in health risks to the people who come in contact with this, and the most commonly affected group is that of waste workers in various parts of the city who have

been handling it on daily basis. 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. Waste pickers in most cases are exposed to the following mentioned kinds of health hazards while discharging their duties in Shimla:

- Snake, scorpion bites.
- Cuts from sharp wastes leading to infections.
- 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. Address the health risks are abysmally low in the priority list amongst this section of the people, who are lacking the basic needs of survival like food, shelter and clothing. They have no money to take preventive measure of health for their children or for themselves. Even the curative measures put them in a continuous cycle of indebtedness.

Working in waste management sector as a compulsion or vocation

Evidences from the in-depth interviews and discussion with the waste workers, rag pickers and itinerant buyers suggest that economic deprivation is one of the major determinants of taking up this work as a vocation. The outcome of interactions can be listed as follows:

- 1) Root cause of poverty is unemployment and lack of means to earn a livelihood. The poor people work with waste material for survival as they are denied access to resources including job opportunities that are available to the others with better access to resources and historical privileges.
- 2) Waste is a flexible source of employment. Waste recovery and recycling not only serves the production cycle but also enable poor

to meet some of basic needs without any or very little capital investment, if at all.

- 3) The social and economic status of waste workers is directly linked with their nature of job viz. permanent, contractual, daily wager or rag picker. The working hours also vary for different groups.
- 4) Waste management workers are vulnerable to various types of exploitation. They become victims of different types of subjugated behaviour besides economic and social exploitation.
- 5) Capitalization of dealer has increased manifold over the years due to which many people face difficulties in entering into this trade.
- 6) Itinerant buyers enjoy a better social space in the society but in economic terms they are marginally better than the waste pickers. Dealers form the main link in chain of waste recovery and recycling processes.

Characteristics of Non-Formal Institutions engaged in Waste Management

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

Recent years have witnessed a growing interest among communities as well as governments and the donor agencies in the development initiatives of NGOs in popular use. 'The term NGO refers to those private organizations registered as public trusts or societies, which is voluntary association of people working at the grassroots to help the poor and needy through charitable or development work on a non-profit basis' (Sunder 1994, 312). The common characteristics of NGOs can be listed as mentioned below:

- In development parlance NGOs have provided an alternative to the bureaucratic process of large-scale programme.

- 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 programme.
- They encourage and ensure public participation in the community-based programmes.

Rooted in this idea of Humanitarian services, the approach of the NGO 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 government, the 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.

Some of the Delhi based NGOs working in the field of Solid Waste Management are Chintan, Toxic Link, Hazard Centre, Vatavaran etc. these organizations have made their significant contributions in the respective field. Shimla has experience of private/voluntary sector in SWM (the Elephant Energy Private Limited – waste to Energy) and Bio-Medical Waste (Green Carpet and Vatavaran Shudhi Sansthan).

While waste gives the opportunity to produce recycled material, it also provides food to the income generating animals like pigs, yet the unmindful littering of the waste also attracts the other set of animals like monkeys to intrude in domestic spheres.

Plate 5.1

A) Man collecting food item for animals(pigs) from garbage



Source: Photograph taken by researcher

B) Bio-compost prepared at Processing Plant C) Hoardings put up by forest department



Source: Photograph taken by researcher



Source: Clicked by researcher from the hoarding

Plate 5.1 A portrays a person sorting out the thrown biodegradable waste which appears to be vegetables, bread and cooked wasted food from some hotel/restaurant and could have been collected or utilized through some collection mechanism. This

person when interviewed was collecting it for his pigs, which he has been rearing and are a major source of his income. Plate B shows the picture of bio compost prepared at processing plant and the worker reported that there is very demand for this also, owing to the very nature of mixed plastic and other materials which was received in mixed waste and the orchardists and farmers are also disinterested to purchase this biocompost. Plate C shows hoarding put up by the Forest department cautioning the citizens not to feed monkeys, which is a great menace to the people in the city of Shimla and create nuisance to the tourists, as they snatch their belongings which they might be carrying with them.. The monkeys are feeding on the scared waste around the municipal garbage bin.

Impact of Solid-waste Management

The unscientific waste disposal has enormous impact on human health, environment and the socio-economic well-being of the waste management workers who are handling this waste at different stages of waste management system. The work force is impacted as they get exposed to this waste, for instance, SEHB workers who have to carry the load of mixed waste over their head or back have complaint of skin allergies and back pain owing to the very reason that they have to lift the sacks and the mixed waste oozes over to their body.

Chaturvedi and Gidwani (2010) estimated that two million waste-pickers exist in India today and these are families that live off dump yards and eke out their living by way of collection and sale of recyclables from the dumped mixed waste. She also highlights the incidence of extortion by ‘agents’ of contractor, in Ghaziabad that borders metropolitan Delhi, who were demanding a payment of Rs. 400-600 per month from each waste picker in exchange for letting them continue their work. This kind of incidence of ‘exploiting the exploited’ are prevalent in one or the other forms. Sometime the waste pickers are intimidated or chased away from the place where they are picking/sorting the waste. Some studies have estimated that nearly 40% of the waste-pickers are children aged below 18 years. The waste pickers live in extreme poverty, and work in unhygienic and hostile environments. This makes them one of the most vulnerable workers along with the SWM/BMW management workers.

Observations from CAG Report (2021)

CAG report (2021) which conducted an audit of 16 ULBs i.e., 2 Municipal Corporations, 12 Municipal Councils and 2 Nagar Panchayats and made following observations:

- 1) There were shortcomings in door-to-door waste collection, waste collection through community bins and modern under-ground bins in all 16 test-checked Urban Local Bodies resulting in overflow, littering and open dumping of waste. (Paragraph 2.2.7)
- 2) Waste in segregated form was neither being collected from the waste generators nor were there any facilities for segregation at the secondary level or at the time of transport. (Paragraph 2.2.8)
- 3) Deficiencies in the transportation of waste included lack of capacity to handle segregated waste in vehicles used for transporting waste, and 73 per cent of the vehicles were un-covered in the 16 test-checked Urban Local Bodies. (Paragraph 2.2.9)
- 4) Biodegradable and non-biodegradable waste processing plants had been constructed in only 11 Urban Local Bodies and none of the facility was fully functional. (Paragraph 2.2.10)
- 5) Sanitary landfill facilities for safe disposal of solid waste had not been created in any of the 54 Urban Local Bodies of the State, and mixed waste was being dumped in open dump sites. (Paragraph 2.2.11)
- 6) In five out of 16 test-checked urban areas, community bins had been removed which resulted in littering and dumping of waste as floating populations, households and other establishments of these urban areas had no facility except door-to-door collection for depositing waste.
- 7) Littering and dumping of waste was observed at several locations in 15 out of 16 ULBs during joint physical inspection in February-July 2020.
- 8) None of the 16 test-checked ULBs had neither constructed any material recovery facility for sorting of recyclables nor constructed secondary storage facilities with provision for storing segregated waste at the ward or street level.

Worker's Welfare and Protection

Safety of workers

The Municipal Solid Waste (Management and Handling) Rules, 2000, manual handling of wastes, if necessary, should be carried out under proper precautions for safety of workers.

- (i) The ULBs had not provided personal protective equipment (gloves, gum boots, face masks, etc.) to workers engaged in handling solid waste. Only the waste management workers at Incinerator have reported that personal protective equipment to workers only occasionally i.e., one orange glove once in three months. Similarly, the biomedical waste carrying vehicle while unloading was observed wearing gloves only, no mask, no apron. The agency which had hired his services did not provide the same (as was reported by the respondent).
- (ii) During the field work it was observed that the 5 ragpickers were residing near to the area of the dump sites, posing serious risk to their health.
- (iii) SEHB workers reported that mixed waste used to ooze on to their body and sometime would wet their clothes.

Social security

Employees Provident Fund (EPF) scheme

The EPF Scheme, 1952, provides that every eligible employee shall be entitled/ required to become a member of the Fund, and employer and employee EPF contribution shall be deposited with the EPF Commissioner.

Non-providing of EPF facility

The EPF facility was not provided to the workers engaged through contractors; neither was any EPF provided to SEHB workers during the conduct of field work (but recent development has been that the Municipal Corporation Shimla has started deducting EPF to the SEHB workers).

Employees' State Insurance scheme

The Employees State Insurance Scheme is designed to protect employees against impact of sickness, maternity, disablement, death due to employment

injury and to provide medical care to insured persons and their families. The Scheme is financed by contributions from the employers and the employees.

Non-providing of ESI facility – only the regular employee of Municipal Corporation Shimla are entitled for medical reimbursement under this scheme, the other waste management workers are not provided the benefits of this scheme.

Community participation in waste management system

The role of community in waste management cannot be ignored and any policy, programme or initiative certainly cannot become successful or sustainable unless it has an acceptance and support from the community. Several success stories of community participation and individual initiatives within the community have strengthened the view of government and local bodies that they cannot work in isolation and require active participation of all the stakeholders to manage waste effectively. People attitude toward waste and the understanding toward the consequences, if it is left unattended play a significant role in encouraging their participation in waste management. “Swachh Bharat Mission” striving to achieve the dream of a clean India which practices safe sanitation with an objective ‘open defecation free India’ and transformed into a people’s movement as a national flagship program could not have been possible without involvement of community. This flagship programme was aspiring to imbibe swachhata as a way of life for all Indians. This would certainly improve the standard of living of the poor, by focusing on improving the sanitation and hygiene practices across the country. India is a young country with a favourable demographic dividend, and with the ambition and potential to become a global economic superpower. This cannot be achieved without the country achieving freedom from open defecation and unsanitary practices.

The Ugly Indian⁵, a masked man who introduces himself as *Anamik Nagrik* (anonymous citizen) while presenting a TED Talk in Bengaluru, poses a bitter, bold and blunt question Why is India so filthy?”. Being a proud Indian, he raises

⁵ a masked man, call himself an *anamic nagrik* who presented a TED Talk in Bengaluru, and represents a movement cleanliness that aims to clean up India through the public-spirited actions of individual citizens.

the question over dirtiness and made an attempt to resolve it. He represents a movement of the same name “The Ugly Indian” that aims to clean up India through the public-spirited actions of individual citizens. With exemplar demonstration and involvement of community they have been making an attempt to clean city of Bangalore by cleaning the dirty spots which were avoided by people and now happily thronging those places in masses. The people involved in this movement take up individual and group initiatives by staying anonymous and working for the cause of cleanliness in society. The encouraging story of Jabir Karat ⁶, a boy from Kerala who in his video on “Waste Management – A New Perspective” describes his own experience with waste management. How after completing his post graduate in History from Delhi University had to work as ragpicker to earn his bread and butter in initial days of struggle and now is a successful social entrepreneur in waste management system by making jobs more dignified and processing waste in a sustainable and responsible way. He is Founder of Green Worms. This is a remarkable example of how an organization has been able to minimize the waste generation, maximize waste recovery and recycling, and dignify people working within the waste management industry. "Zero waste wedding" an initiative by this organization has been widely recognized throughout the country to reduce the food wastage and other wastes.

⁶ A post graduate in History from Delhi University who worked as ragpicker and now is a successful entrepreneur in waste management system.

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Chapter VI

Summary and Conclusion

A distinctive viewpoint that highlights socio-economic dynamics in their cultural and historical contexts emerges from a deeper understanding of urban problems. The current study has attempted to view the current urban crisis as the result of a confluence of factors, including unplanned development, inadequate infrastructure, unsustainable growth, poverty and unemployment, etc., and that too within a "generally affluent" society, rather than something inherent to urban life.

In the nature of creation and destruction, all processes are cyclical, where waste does not accumulate. The matter, living and non-living, decomposes and become new matter. Nature could well be the best example of a sustainable process in action. Human beings are the only specie on earth that generates the real waste in the process of conquering the nature. Dealing with waste should follow the natural process of replenishment and renewal rather than destruction and disposal. For a sustainable system of waste management, we have to stop looking at discards as waste that needs to be removed from sight and begin looking at their use. Waste can even help build communities, as the path to reuse, reduction, composting and safe recycling passes through essential social and political processes, networks and micro level interdependencies.

In this era of rapid Urbanization of cities like Shimla, it is inevitably the right time to take a fresh look at waste and instead of adopting the crude disposal methods of indiscriminate dumping, incineration and landfills we must go for integrated solid waste management system. We should go for an approach that is participative, integrative, functional, and sustainable. From the existing studies and the experiences in the field study one can infer that waste management can follow two different perspectives, which certainly are not mutually exclusive. One is centralized techno-managerial approach, which failed simply because it did not have the public participation. The other one is the process centered approach which focuses on sources of waste and aiming at some sort of integration of the

various social, political and environmental processes. The needed technologies are only part of the process. The primordial objective in the process centered approach is to ensure participation of the stakeholders in waste management. Public participation avoids putting into place mechanisms, which are incompatible with public perceptions and attitude.

For incorporating this paradigm shift into the health and sanitation functions of Local Self-Governing Bodies (LSGBs), an immense political and administrative effort is needed, mainly to change the mindset and behaviour of planners, administrators, and other involved players. In principle, and as a policy, the practice of waste disposal needs to be stopped. The source of waste should become the focus of operations more than waste per se and the discards should be handled according to their type. Efforts should be put towards developing Shimla city so as to cater to the expanding waste generation consequent of Urbanisation in Shimla. This means that the organization of waste management system by LSGBs should change and their efforts should shift to creating public awareness, imparting training to workers, and designing and building proper in-house and community discards collection mechanism. The focus of planning and managing waste should be at the sources themselves with full participation of the generators of waste, thereby ensuring the decentralization of waste management in real sense. Waste management workers forms an important link in the entire process both within formal and informal system of waste management and the work conditions must be given due attention to make it safer and sustainable.

Segregation at source is the most important step and the rest of the system follows from that. Responsibility and participation have become very important subjects in the waste management regime. Resource conservation, resource recovery and waste reduction should get incorporated into policy statements, and action plans must spell out how they can be achieved. In Shimla's waste treatment plant too, many materials used today are toxic; their production and use need to be reviewed and reduced to the extent possible, as they contaminate the waste stream and affect safe resource recovery. The involvement of the farming community in the rural peripheries of Shimla can be a vital link in the

organic cycle process and its needs and perceptions of reviving the fertility of the farming land also needs to undergo appropriate change. In place of costly and contaminating chemical fertilizers, the farmer should be provided with good quality manure generated from organic urban waste. While the benefits of recovery processes are obvious, they need to be assessed and quantified in terms of financial benefits as well as resource use reduction. This investigative approach further provides good scope for research because one needs to know the impact of this change in approach on society and economy.

The issue of garbage collection and disposal has gained importance due to the rapid urbanization which got impetus due to the industrial revolution and population explosion, and it has drawn the attention of civic leaders and the government, who are working to standardize the system to make it applicable at the national level.

The production of solid waste is a byproduct of practically all human endeavours. Large cities and towns are experiencing an acute urban solid waste crisis, due to the lack of adequate disposal facilities. As a result, solid wastes are carelessly thrown or littered in various areas of the city and municipality, creating major health hazards in addition to environmental problems. The composition and properties of these wastes reflect the diversity of human action. Characterization of waste is generally allied with broad description of sources of waste. Shimla is facing a similar problem. The only positive aspect of Shimla is its magnitude in comparison to other big cities.

The process of managing garbage is difficult, and it will only get more difficult as our cities expand. Waste and the issues pertaining its disposal are primarily urban phenomena, particularly in a country like India. The majority of the waste produced in rural India is biodegradable in nature, such as agricultural waste, animal waste, food scraps, etc. this waste is either composted or fed to animals. The residents in rural areas handle their waste themselves.

The vast, decaying garbage piles that are a frequent sight in cities are not actually seen in rural areas. However, with rising consumerism, it has also begun to appear in most rural

areas of India that disposable items like plastic bags, bottles, and packaging waste have also started making its appearance in most parts of rural India.

While on the one hand, environment appears to be of utmost importance in waste management systems, there are also echoes of the care for the workers involved in the disposal process. Therefore, this makes it desirable to investigate the waste management and disposal process, as well as the health of those involved in its linked activities, as well as its results and responses.

This study looked at the waste generation and management issues, with focus on Shimla city in Himachal Pradesh. This involved understanding traditional and recent ways of waste management, patterns of urbanization and waste generation, problems pertaining to them, organization of waste management and public awareness, participation and responsibility.

This is an analytical study. Understanding the workings of the waste management system requires a thorough understanding of both the formal waste collection system and the informal waste recovery process. Shimla Municipal Corporation is the official waste collection agency for Shimla, the state capital of Himachal Pradesh. However, Shimla also relies on a sizeable number of independent waste collectors who lighten the load of the city and in a way support the urban local body and free the area of uncollected garbage.

The study methodology included field investigations in the role of stakeholders playing in solid waste management in Shimla, differently in their capacities. Purposive convenient sampling was used in this study. The study methodology has been divided into two parts:

- 1) related to the Municipal Solid Waste Management, and
- 2) Biomedical waste management at the hospital/health facilities.

The data was generated through canvassing a semi structured interview schedule. The information regarding services provided by local Municipal Corporation and problem

related to garbage disposal has been included in it. Some information based on observation has also been taken into account while analyzing the data. Personal observation, focused group discussion and in-depth interview were the principal source of information for this study.

The sample of this study included respondents from each category viz. Municipal safai karamcharis (Permanent), municipal safaikaramcharis (Contractual), Door to Door Collection workers engaged by SEHB, Contractual Bio-Medical Waste (BMW) workers hospital/centre, Incinerator BMW workers, waste pickers and officials from all categories mentioned above. The total sample comprises of 131 persons engaged in waste management process of different categories and ten officials in different categories were interviewed and the selected sample in each category is shown in the Table 1.3. This study has interviewed some officials from the municipal corporation and other concerned departments as well. These respondents/individuals were selected based on prior contacts and appointments during the field work.

The general particulars of the respondent, housing amenities, illness history, occupational risks, information regarding services provided by Municipal Corporation and problem related to waste management were included in the questionnaire. Some information based on personal observation has also been taken into account while analyzing the data.

The reports, articles and data available through different sources, have been used for analysis. The study has also used information available in the City Development Plan as well. Field investigation is the other method of data collection which has been employed by the researcher in carrying out an empirical study. This was required in order to understand the waste management system as a whole and moreover to get insight into the aspects related to waste management workers due to the lack of data regarding the contribution of the informal sector. Thus, the study methodology combines primary sources, secondary sources and field investigation to draw data on the role of participants in waste management in Shimla, in their different capacities.

Findings

The present study focused on the interaction between the different agencies dealing with garbage generation and disposal both SWM and BMW management in Shimla. It has tried to understand the problem in an integrated and comprehensive perspective taking into account the perceptions of communities (the recipients) and the agencies i.e., the municipal corporation and N.G.O; (the providers), waste management workers both within formal and informal waste management system and across all categories of waste workers i.e., permanent, contractual and daily wagers as well as the rag pickers. This study reveals that the problem of garbage disposal in Shimla is acute and in dilapidated condition. The problem of garbage disposal is not the new one it has been there since the very beginning. The population of town has increased tremendously in last 30 years and simultaneously the amount of garbage has also increased. Shimla city, being the state capital and favourite tourist destination has a large number of populations living with high standard of living. There is large number of shops, restaurants, and government institutions, private and commercial institutions that also generate a huge amount of garbage. Along with these, the residential area of town is primary source of garbage generation. Besides this there are other areas also which are contributing in garbage generation such as commercial areas, industrial units, hospitals, nursing homes and some slum pockets as well. Solid wastes are collected from different collection points by the Safaikaramcharis, along with door-to-door collection in majority of the wards especially within the core city carried in dumpers to the disposal and treatment plant at initially at Darni ka Bagicha and now at Bharyal on Totu bye pass near Shoghi.

The life style and eating habits of the people of Shimla city have changed considerably. People now mostly prefer fast food, eating out packed food and bakery items. Therefore, in last two decades keeping in view the broader trend visible, disposable plastic, packaging material and thermocol plates are more in trend now which is certainly not biodegradable. There are large scale variations in the population distribution, per capita income and garbage generation from one ward to another. Highly populated wards having high per capita income generate more waste than the one with low population and low per capita income. There are serious concerns regarding the garbage disposal. Cleanliness is

important for good health. Placing covered bins and improving the existing mechanised device for collection and disposal of solid waste is an immediate requirement. The public lavatories should be provided to cater to the needs of squatters such as construction workers.

As has been observed by Banta, (2008) 'due to terrain and hill slopes most of the areas with the MC limits are inaccessible by vehicles, out of 500 bins only 50 (10%) are emptied daily, 31.5% (157) of the bins are placed at a distance of 50 meters from the road'. The insufficient and damaged or broken garbage collection bins brimming with refuse, extend open invitation to birds, monkeys, stray dogs and animals. Even at waste disposal site and manure making plant regular movement of birds and stray animals is apparently common. The number of Safaikaramcharis has been reduced, since 2002 onwards there has not been any government recruitment of Safaikaramcharis in the municipal corporation only the contractual or daily wage karamcharis are recruited. The municipal corporation disposes the collected waste at the treatment plant and makes compost from these wastes. There is no proper system of segregation at plant site for obvious reasons, one it is very difficult to segregate such a huge quantum of waste at the end point, and secondly the space is too limited which is almost filled up. Over deposition of this kind is thus finally burnt. Even Safaikaramcharis also burn the garbage at the places of their collection. This unsafe mode of burning the waste releases the poisonous gases in the surrounding which results in air pollution.

Collection and Transportation

As more than 50 % areas are not accessible by vehicles, therefore it is imperative to enforce the Door-to-Door collection scheme on nominal charges from the households and establishments. Shimla being a hilly terrain poses certain topographic constraints in Door-to-Door garbage collection scheme. Therefore, despite DTD garbage collection through SEHB workers, collection of municipal solid waste remains a challenge and resultantly collection efficiency also remain poor. What troubles the DTD garbage collectors more is the mixed garbage which sometimes becomes a dirty affair when it drips out of their carry bags over their bodies as they have to lift these bags over their

backs. Uncollected waste gets disposed off arbitrarily on the valley slopes. It was noted that citizens and businesses were unwilling to use the DTD collecting services, which remain a great hurdle towards its aspired coverage. A timing of garbage collection also remains an issue. Since DTD collection services are offered in the morning, which is inconsistent with the times as people are in a hurry to move to work places. Secondly Shimla is a tourist destination, receives a huge number of tourists round the year but the check timings of hotels are at noon time and DTD collection services are provided in morning hours which are again not consistent with checkout timings of hotels and office working hours.

Cleanliness is a major factor that influences development of any town, city and nation, which is otherwise hampered due to improper disposal of solid waste. 'Healthy cities' attract investors which boost 'industries' and ultimately generation of employment opportunities. From literature on MSW it is evident that there are two major problems due to poor solid waste management. One is the loss/underutilization of resourceful material, which otherwise is wasted without realizing its potential as a 'resource' and other is social cost due to health impact on public health. The most important contribution in waste management process is made by 'the warriors of cleanliness' i.e., the work force engaged in waste management process. This work force comprises of *municipal safai karamcharis* (permanent, contractual and daily wager) as part of formal system and *rag pickers*, who contributes tremendously as part of informal system, who have been carving out their livelihood by toiling around streets, garbage bins, surroundings dump or disposal site, landfills and relieves the from improper or no collection of waste from streets resulting in nuisance and spread of diseases. So, in other words this work force from informal system is supplementing the task of workforce of formal system. This study tries to look at the significant contribution made by safai karamcharis both from formal and informal system within the waste management system and tries to explore the health of these waste workers.

Policy Recommendations and Suggestions

Adoption of an integrative, comprehensive strategy that is people-centric and represents the people in every aspect at many levels is strictly necessary in order to make the SWM system participatory in the real sense. All agencies, whether public or private, must cooperate with one another. The NGOs in such sector may be good in 'software' (interacting with the people), but they were ill equipped in 'hardware' (expertise or resources) to give the long-lasting results and to attain sustainability.

We need to make sure that the public authorities are practicing responsible governance, which is the main requirement for initiating this paradigm change. While the provision for proper sanitation and clean-living conditions is the privilege of the citizens, a shift of responsibility can be suggested. In the waste management system, citizens are responsible for their own garbage, and the government must focus on the overall welfare of the people. In this situation, the government's job is to set up the proper institutional capacity, social infrastructure, to provide the right kind of environment and legislative framework to encourage public adoption of waste management programmes. Composting, recycling, and recovery all require the development of new infrastructure, training facilities, and capacity. By expanding the involvement of the informal sector, the capabilities of the formal system can be improved. Reviewing the country's legal structure for waste management is also necessary. The relevant laws should focus on a resource conservation and recovery approach and clearly spell out guidelines for waste management. The pertinent rules and laws should take into account the most recent waste management tools, such as Extended Producer Responsibility (EPR), take-back programmes, and packaging laws. The tax payer's money should not be used to purchase "obsolete" or "dumped" technology, but rather should be invested in infrastructure that is explicitly designed to recover resources as well as generate returns on investment. In addition, there is a constant need to raise public awareness of the responsible and proper handling of waste. This can be accomplished through campaigns at the local level and direct interaction programmes with community through schools, educational institutions, festivals etc. by invoking the tool/instrument/process of Information, Education and Communication (IEC) effectively. These regional initiatives ought to be guided by a

global vision and take into account the evolution of global paradigms for the use and management of resources.

The following recommendations can be made for resolving the issue of waste disposal within Waste Management System in Himachal Pradesh in general, and specifically in Shimla city, on the basis of the literature review and the field study conducted:

- To encourage the segregation of solid waste or garbage at the household level itself. For this purpose, marked bags should be provided. Biodegradable waste may be processed and utilized as compost. Non-biodegradable and recyclable waste should be channelized through organized waste pickers.
- Door-to-door collection should be practiced effectively either by municipal corporation Safaikaramcharis or through a contractual arrangement (with due recognition to the involved human resource) or voluntary organizations/NGOs and also by encouraging the public participation in the collection of garbage.
- The most important aspect which needs to be taken care of is the safety, social security and remuneration of the involved work force. The occupational hazards involved with waste management cannot be undermined or ignored under any circumstances.
- To adopt the appropriate methods for collecting garbage produced by businesses involved in the trade of fruits, fast food outlets, etc.
- Waste from slaughterhouses needs to be adequately regulated, and the solid waste they produce should not be mixed with municipal waste.
- Hospital waste and other infectious waste should not be put in community bins. The criteria and recommendations outlined in the bio-medical rules should be followed while disposing of bio-medical waste.
- There must be a quarterly review of hired contractors pertaining facilities provided to waste management workers and the renewal of contract should be only in strict compliance to the Standards of Procedure (SoPs). The contractors must mandatorily abide by the SoP or else contract should be cancelled.
- Random inspection or audit should be conducted for waste management workers.

- Sensitization, vaccination and routine checkup of waste workers routinely.
- Convergence and collaboration of different agencies with regard to awareness and social security related aspects of waste workers. The waste management workers should be given occasional trainings and orientation regarding handling waste. The enthusiastic workers should be facilitated affordable loan, if they may want to start their own enterprise.

RECOMMENDATIONS SPECIFIC TO BIOMEDICAL WASTE MANAGEMENT

In light of the observations of the present study, following recommendations are given to improve biomedical waste management practices:

- The infection control team in hospital must include some waste management specialists as well as environmental health specialists. This will improve the ability and effectiveness of the infection control team to carry out its operations.
- The hospital should develop detailed plans and policies that adhere to the biomedical waste management policy for the proper management and disposal of biological waste. This should be done by a multidisciplinary team including environmental health experts. This team should also ensure pre-placement examination and immunization of the cleaning workers and supply of full personal protective gear to all the cleaning workers.
- The hospital must setup a subcommittee to be responsible for biomedical waste management in the hospital. The sub-committee will be in charge of periodical reviewing and resolving biomedical waste management issues in the hospital. Internal monitoring system should be strengthened and all the hospitals should maintain the injury register.
- It is important to measure and quantify the amount of biomedical waste generated in each unit of the hospital periodically to ascertain which unit or department generates the highest and lowest amount of waste. This could have implications for resource allocation in managing biomedical waste.
- There is the need for proper segregation of biomedical waste. The improper handling of which at any stage in the sequence of chain can lead to serious problems, as the waste received at Centralised Common Waste treatment was found mixed and not as per the

instruction as mentioned in the BMW management policy. The provision of plastic bags and strong containers for infectious waste such as empty containers of antiseptics used in the hospital is necessary. Bags and containers for infectious waste should be marked with the Biohazard symbol.

- Adherence to segregation practices within the hospital will give rise to a clean waste stream which can be easily, safely and cost-effectively managed. The hospital should implement an efficient sharps management system, which should include the proper equipments and containers at all sharps generation locations, a safe accounting and collection system for moving contaminated sharps for treatment and disposal, and the appropriate training of hospital staff on the handling and management of sharps.
- To increase awareness on environmental, health, and safety issues, proper training is required. It is important for workers to know and understand the potential risks associated with healthcare waste.
- Transporting biomedical waste requires the use of special, leak-proof, wheeled containers. They should be visibly marked and regularly cleaned. The biomedical waste must be transported in a specific truck or in a container that is leak-proof and has a lid.
- Municipal corporation must upgrade the incinerator plant, as one of the incinerators' pipes was rusted and completely torn, still was used to incinerate BMW resulting in billowing out the smoke inside the incinerator and that too mostly at midnight which is completely against the BMW (management and handling) Rules as prescribed in the policy. This is why all three workers at waste treatment facility were having persistent coughing and chest pain for long. The Common treatment facility should have a full-fledged biomedical waste management facility, including autoclave and shredder.
- Strictly a proper coordination is required between the officials from Himachal Pradesh State Pollution Control Board and Municipal Corporation, Shimla with regard to strictly enforce the biomedical waste (management and handling) rules 1998 in order to effectively manage the biomedical waste management system.

Conclusion

'Alma Ata' declaration way back in 1978 had envisioned "Health for All by 2000" irrespective of their paying capacity. The Alma Ata declaration views Health as a means for development and not as the end result of development. Therefore, every individual has the fundamental right to seek a healthy environment to live in. Associated with fundamental rights are fundamental duties, so every individual has the fundamental duty to keep the environment safe and free from pollution. Creating environmental awareness among general masses is equally important. There is a need to sensitize masses towards the environment and related problems by inculcating environmental ethics and creating civic sense. Since the benefits of 3R's i.e. Recovery, Reuse and Recycling, have not been formally recognized till now in SWM system in the town, so there is an inevitable need to adopt three R's principle at each level.

The solid waste affects the natural environment to a large extent and poses a serious threat as these materials remain in one particular place for a relatively longer period of time unless removed, burnt, washed away or otherwise destroyed. As of today solid waste has become a major environmental problem for want of proper waste management techniques, which involve all the appropriate and cost effective methods for waste reduction and above all lack of coordination between the dealing agencies. According to the nature of solid waste appropriate and effective methods can be used for its management at the source generated and during the process of disposal. The solid wastes produced from different sectors have different properties; some of them are highly toxic. The "contamination at home" continues to be an area of great concern. The greater production of waste has posed the problems concerning their management which includes collection, transportation and safe disposal.

Storage of the waste is an extremely important link in generation and disposal of waste. Municipal corporation should ensure the adequate number of garbage bins placed at reasonable distance to the residential localities. It would be advisable to replace conventional, concrete or brick bins with modern scientifically designed ones,

which would suit the tipper or dumper whatever be the convenience to transport the waste out of it.

These community bins should be well maintained and regularly inspected by the sanitary staff. The civic bodies should ensure to curtail the entry of stray animals near the vicinity of scouring community bins and inside receptacles. Spillage of garbage, entry of stray animals and unorganized rag picking should be prohibited. Along with this the civic authorities should be vigilant enough to check out the indiscriminate disposal of garbage at non designated or unidentified places. In such cases penalizing violators will act as a deterrent.

Manual handling/lifting of waste should be prohibited; multiple handling of waste should be avoided, if unavoidable, gloves and masks should be provided to the Safaikaramcharis. Throwing away the wastes in open sites should be prohibited. Movable bins should be kept for collection of wastes at sites of social gathering like marriage party etc. Municipal committee should provide bins in commercial areas as well as in official complexes. Market associations could be involved in the upkeep of civic facilities. Roping in the market associations will also lead to the participation of the local business community and also help in penalizing offenders, in form of levying fines.

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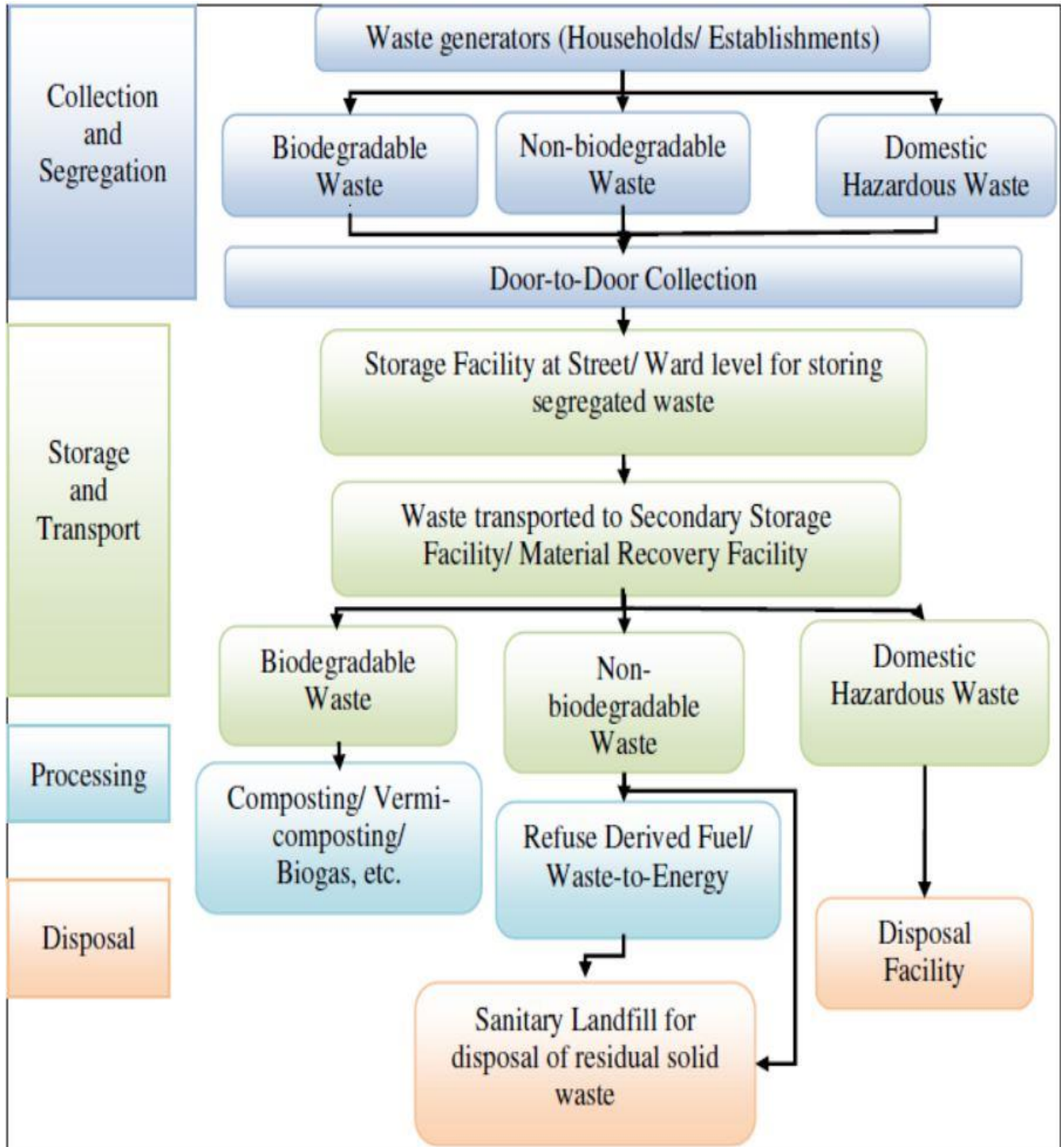
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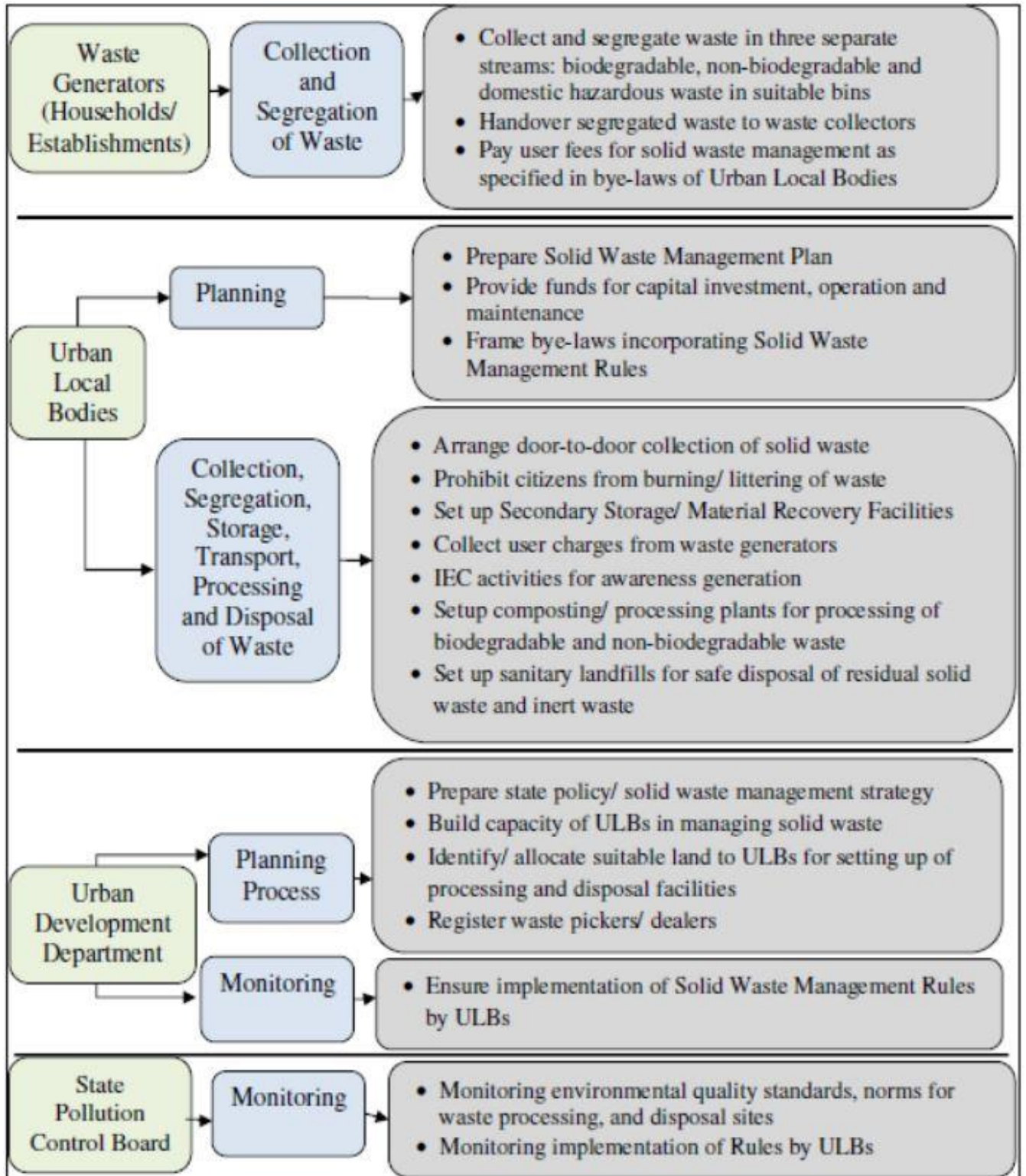
ANNEXURE 1

Flow chart showing handling of solid waste at various stages



ANNEXURE 2

Flow chart showing responsibility framework for management of solid waste



ANNEXURE: 3

Sl. No.

Date:

Interview Schedule

Safai Karamchari (Permanent/Contractual/Daily wager) SEHB worker/ Waste Pickers

Name of the Respondent :

Age : Sex : Male/Female

Marital Status: Married/Unmarried/Other

Religion: Caste:

Place of Interview :

A. Family Profile

Sl. No.	Name	Relationship with the respondent	Age	Education	Occupation	Income
1						
2						
3						
4						
5						

B. History of Migration

Respondent's Status of Migration: Migrant/Non-migrant:

If migrant

a) Year of migration :

b) Place of origin :

c) Reason(s) for migration :

C. Place of Current Residence:

Facilities of the house:

1. Type of house: Tiled/Concrete/Asbestos/Thatched
2. Floor : Cement/Mosaic/Tiles/Cow dung
3. Ownership : Own/Rented
4. Drinking water : Well/Bore well/ Government water supply/Others (specify)
5. Toilet Yes/No : If Yes, then sharing or non sharing

- 6. Fuel used for cooking: Wood/Kerosene/LPG/Bio gas
- 7. Other Amenities (Cattle shed/ Vehicles/TV/Telephone/Mobile Phone etc.):

D. Educational Profile of the Respondent

Level of Education in completed years:

Reasons for Dropout / Non enrollment:

- i. Inability to pay the fees
- ii. Indifferent behavior of the classmates/teachers
- iii. Migration being the reason
- iv. Not interested to go to school
- v. School not available in the vicinity
- vi. Others (please specify).....

E. Employment Details

E.1 Whether employed before opting this occupation? (Yes/No)

If yes, where and the nature of job (Part time/Full time)

Remuneration

Reasons for changing previous occupation:

E.2 When did you join the present occupation?

Designation and Nature of the current Occupation:..... (Part time/Full time)

How did you get information about this occupation?

Reason to choose this occupation:

Remuneration (Monthly):

E.3 Journey to work

How do you go to work?

- i. By walk
- ii. Bicycle
- iii. Bus
- iv. Any other (Specify)

Time taken for travel:

Cost incurred for travel (per day):

Per Month:

E.4 Average number of days worked in a month:

Hours of work per day:

Average Income per day:

Per month:

E.5 Do you get enough resting time/lunch-tea break during work? Describe.

E.6 Do you avail any benefits from governing agency like allowances, provident fund, pension etc. Describe.

F. Nature of Waste

i. What kind of wastes do you collect usually?

Category	Place of Collection	Average Quantity (per day)	Average Selling Price (Rs.)

ii. Whether you wear hand gloves/chappals/shoes while collecting waste material? Yes/No

If no, reasons:

iii. Place of sorting:

iv. Where and whom do you sell the sorted material/waste?

v. Average time taken per day for:

Collection:

Sorting:

Selling:

G. Health & Safety of the Worker

1. Problems faced while collecting and sorting Waste:

- i. No equipments
- ii. Inadequate equipments
- iii. Inability to use (even if the equipments is available)
- iv. Any other (please specify)

2. What are the possible risks/injuries often occurring at the work place?

3. Do you face any problems due to stray and scavenging animals (like dog, cattle, pig etc. and other animals like rats, snakes etc.?) while at work?

If yes, please explain.

4. After finishing your work do you take bath? If yes, what are you using (soap/detergent) to clean your body/clothes etc. Please describe.

Is bathing facility available near to your work site? Yes/No

5. Are you suffering from any illness at present? Yes/No

If no, when did you last suffer any illness (provide details)?

Category	Duration	Recent episode	Frequency of occurrence (last 6 months)			
			once	twice	thrice	More than thrice
Fever						
Backache						
Respiratory Problems						
Skin Related						
Others						

a) Break in the work due to illness (in days)

b) Expenses incurred for treatment (in Rs.):

c) How did you manage the expenses?

If loan, then how did you repay?

d) Place of visiting doctors (Govt. Hospital-1, Private Hospital-2, Private Clinic-3, Any Other-4 (indigenous healers))

i. What are the problems, if any, faced for obtaining the treatment?

ii. Are you satisfied with the treatment? Yes/No

d) Do you use Tobacco/pan masala/alcohol/other?

H. Average Monthly Expense

- i. Monthly Average expenditure for Food:
- ii. Per month Rent:
- iii. Total Average Monthly Expenditure:
- iv. Approximate health care expenditure for the last six months:

I. Source of Credit

- i. What are the sources of credit available to you when there is a need?
- ii. Total amount of debt, if any, at present:
For what purpose did you take the loan?
- iii. Do you have any savings? Bank account/RD etc. Yes/No
If yes, please provide details.

J. Membership in Worker's Union

- i. Is there any rag-pickers/Safai karamchari/Sewerage workers union in your area?
Yes/No/Do not know
- ii. Are you member of any rag-pickers/Safai karamchari/Sewerage workers union?
Yes/No
- iii. If yes, then how far they are helping rag pickers//Safai karamchari/Sewerage workers when they suffer from any problem?

K. People's Attitude towards Waste Pickers/Safai karamchari/Sewerage workers

How do you describe the attitude of

- i. Other municipal workers towards you?
- ii. Your neighbours towards you?
- iii. General public towards you?

How is your relationship with other waste pickers (in terms of the activities done together)?

If not waste picking/Scavenging, then what are the alternative job opportunities available to you?

Annexure 4

Interview schedule for BMW workers, Incinerator workers

Name of the Respondent :

Age : Sex : Male/Female Marital Status: Married/Unmarried

Religion: Caste:

Place of Interview :

1. Name of the ward/ laboratory
2. Have you been imparted any training in hospital waste management?
 - a. Yes
 - b. No
3. Are you a permanent or contractual employee?
 - a. Permanent
 - b. Contractual
4. How do you close the waste bags before taking them to the hospital waste management site?

5. How often are the bins emptied?
6. Are the sharp bins emptied regularly or how often?

7. How do you carry the waste bags from the ward/laboratory?

8. Do you wear protective gears while handling waste?
 - a. Gloves
 - b. Boots
 - c. Aprons
 - d. Masks
 - e. Caps
 - f. Goggles

- a) Year of migration :
- b) Place of origin :
- c) Reason(s) for migration :

C. Place of Current Residence:

Facilities of the house:

- 1. Type of house: Tiled/Concrete/Asbestos/Thatched
- 2. Floor : Cement/Mosaic/Tiles/Cow dung
- 3. Ownership : Own/Rented
- 4. Drinking water : Well/Bore well/ Government water supply/Others (specify)
- 5. Toilet Yes/No : If Yes, then sharing or non sharing
- 6. Fuel used for cooking: Wood/Kerosene/LPG/Bio gas
- 7. Other Amenities (Cattle shed/ Vehicles/TV/Telephone/Mobile Phone etc.):

D. Educational Profile of the Respondent

Level of Education in completed years:

Reasons for Dropout / Non enrollment:

- i. Inability to pay the fees
- ii. Indifferent behavior of the classmates/teachers
- iii. Migration being the reason
- iv. Not interested to go to school
- v. School not available in the vicinity
- vi. Others (please specify).....

E. Employment Details

E.1 Whether employed before opting this occupation? (Yes/No)

If yes, where and the nature of job (Part time/Full time)

Remuneration

Reasons for changing previous occupation:

E.2 When did you join the present occupation?

Designation and Nature of the current Occupation:..... (Part time/Full time)

How did you get information about this occupation?

Reason to choose this occupation:

Remuneration (Monthly):

ANNEXURE 5
Ward wise list of delployed Municipal Safai Karamchari by
Municipal Corporation Shimla

पाषर्द वार्ड न01 श्री रजनी21 बरार,सफाई निरीक्षक,श्री सु2ील पु0पम्मी,एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्रीमति ज्ञानों पत्नि मेहर चन्द	सैनिक गेस्ट हाउस से पुलिस लाईन तक ।
2 ^प	श्री सुखपाल पु0 गुल्ला राम	डोगरा कोल कम्पनी से हरमिन्टन तक ।
3 ^प	श्रीमति बिमला पत्नि सोहन लाल	चैपसली स्कूल से हरी निवास भराड़ी रोड ।
4 ^प	श्री राजू पु0 शिबू	कैंगडू क्षेत्र की सड़के ।
5 ^प	श्री मोहन लाल पु0 देरू	कैलेस्टन की सड़के ।
6 ^प	श्री राके21 पु0 रूप लाल	लौंग बुड टाईप 2 ऐरिया ।
7 ^प	श्रीमति मिन्दो पत्नि फकीर	गैस कम्पनी से अग्रवाल धर्म2ाला रोड ।
8 ^प	श्री बूटा पु0 बाबू राम	भराड़ी बाजार का पूरा क्षेत्र व शौचालय ।
9 ^प	श्रीमति संजोगित पत्नि जैल सिंह	चैपसली से ग्रीन गेट तक ।
10 ^प	श्री केवल पु0 मुन्शी	अप्पर लौंग बुड क्षेत्र ।
11 ^प	श्री रूप लाल पु0 ग्यारू	लौंग बुड भराड़ी क्षेत्र के पहाड़ों की सफाई ।
12 ^प	श्री जोगिन्द्र पु0 हरि राम	लौंग बुड भराड़ी क्षेत्र के पहाड़ों की सफाई ।
13 ^प	श्री बलराम पु0चन्दू	लौरेंट स्कूल से पुलिस लाईन तक ।
14 ^प	श्री ज्ञान चन्द पु0 रतू	वाईट होटल सडक,सीढ़ियों,टनल ऐरिया तथा यूरिनल ।
15 ^प	श्रीमति कमले21 पत्नि सन्दे21 राज	रिक्शा रोड से कार्ट रोड तक तथा चैपसली क्षेत्र के अन्दर की सड़क ।
16 ^प	श्री रामलुभाया पु0 गुरमेल	लौंगबुड से कार्ट रोड चैपसली तक ।
17 ^प	श्री भरतवाज पु0 बिश्नदास	शांकली क्षेत्र ।

पाषर्द वार्ड न02 श्री रजनी21 बरार तथा भारत भूषण,सफाई निरीक्षक,श्री दलबीर तथा क2ामीरी ,एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्रीमति कमले21 पत्नि 2ंकर	रेन्डवेज से रिवोली गेट तक तथा पी0एण्ड0टी रोड
2 ^प	श्रीमति रानी पत्नि देवराज	रिवोली गेट से कार्ट रोड ओल्ड एस0बी0आई0 तक ।
3 ^प	श्री पन्ना लाल पु0 ओम प्रका21	रिवोली मार्किट, तिब्बतीयन मार्किट के डस्टबीन ।
4 ^प	श्री राजेन्द्र पु0 माम चन्द	रूलदू भट्टा के डस्टबीन और शौचालय ।
5 ^प	श्री बूटा राम पु0 रूलदू	पांच घर की लाईन कार्ट रोड से शांकली तक ।
6 ^प	श्रीमति सुरे21 कुमारी पत्नि बलिस्टर	रिवोली बस स्टैण्ड से रूलदू भट्टा व ईदगाह कालौनी ।
7 ^प	श्री दलबीर पु0 पूरन	आशीवाद होटल से शांकली क्षेत्र ।
8 ^प	श्री काला पु0 बिहारी	कार्ट रोड से कोर्टहिल ऐरिया व बिजली दफतर तक ।
9 ^प	श्री बलदेव पु0 कर्मचन्द	रूलदू भट्टा क्षेत्र व नालों की सफाई ।
10 ^प	श्री रमे21 पु0 प्यारा	रूलदू भट्टा व शांकली क्षेत्र के नालों की सफाई ।
11 ^प	श्री सुरे21 कुमार पु0 चमन लाल	कुफटा धार ऐरिये की सफाई ।
12 ^प	श्री अ2ोक पु0 निरंजन	स्टेट बैंक से फिगांस्क तक और मनोरमा काटेज वाला रोड ।
13 ^प	श्री बलबीर पु0 ओम प्रका21	ग्रेन्ड होटल क्षेत्र और काली बाड़ी मन्दिर की पौडियों और शौचालय ।
14 ^प	श्री सन्त राम पु0 माटू	फिगांस्क क्षेत्रों के पहाड़ों की सफाई ।
15 ^प	श्री सुरे21 कुमार पु0 चमन लाल	मिनी कुफटाधार के क्षेत्र की सफाई

पार्षद वार्ड न03 श्री भारतभूष्ण,सफाई निरीक्षक,श्री अ2ोक,कार्यवाहक दफेदार ।

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्रीमति बाला पत्नि जगन	लाल कोठी से अड़डा विला तक तथा गोल पहाड़ी का रोड ।
2 ^प	श्री बीर सिंह पु0 मनोहर सिंह	लोयर कैथू डिस्पैन्सरी से लेकर चुगी खाने तक तथा 2ौचालय की सफाई ।
3 ^प	श्रीमति आ2ा पत्नि मोहन	पीली कोठी से लेकर लाल बाग,लोयर कैथू बाजार तक ।
4 ^प	श्री नरे2ा पु0 रम्मी	लोअर कैथू बाजार से सरसवाल भवन तक तथा भरती दफतर तक ।
5 ^प	श्री पाली पु0 पूर्ण	तारा हाल से लोअर कैथू डिस्पैन्सी तक ।
6 ^प	श्रीमति सरवती पत्नि बिरमा	गुरु निवास नीचे वाल रोड से मोरनिंग वियू तक ।
7 ^प	श्रीमति छिन्दों पत्नि परगन	थापा विल्ला रोड से शिव मन्दिर लोयर कैथू स्कूल तक ।
8 ^प	श्री सुखबीर पु0 नानक	लोयर कैथू टप व तारा हाल टप ।
9 ^प	श्री तिलकराज पु0 सोम नाथ	कैथू ऐरिया के नालों की सफाई करना ।
10 ^प	श्री चमन पु0 बंगाली	कैथू ऐरिया के नाले व पहाड़ों की सफाई करना ।
11 ^प	श्रीमति उषा पत्नि रामकिशन	लाल कोठी से क2ोट वाली पौडियों तक ।
12 ^प	श्री नेगी राम पु0 बिक्रम	कैथू ऐरिया के पहाड़ों की सफाई ।
13 ^प	श्री मोहन लाल पु0 अमरनाथ	पैट्रोल पम्प से कार्ट रोड सनोव्यू तक ।
14 ^प	श्रीमति राधा पत्नि अशोक	स्टेट बैंक से लेकर मालरोड तथा बाबा मार्केट तक ।
15 ^प	श्रीमति मनजीत पत्नि रामलाल	फिगांस्क गेट से ताराहाल चौक तक ।
16 ^प	श्री राजकुमार पु0 सोनी	हंस होटल से पैट्रोल पम्प व सी0पी0डब्लु0डी0क्वाटर की पौडियों ।

पार्षद वार्ड न04 श्री भारतभूष्ण,सफाई निरीक्षक,श्री प्यारे लाल,श्री 2याम लालए एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्री अनिल पु0 दास	अड़डा विल्ला से आन्नाडेल स्कूल तक तथा एम0पी0रोड । कैपिटल होटल से लेकर हवाघर तक तथा पुरानी आवकारी तथा 2ौचालय ।
2 ^प	श्रीमति सरोज पत्नि रविन्द्र	पुलिस लाईन हवाघर से लेकर पावर हाउस तक तथा ठाकुर बाग ऐरिया ।
3 ^प	श्री सुरजित पु0 द2ान	आन्नाडेल स्कूल से धोबीघाट तक तथा पी0टी0स्कूल का ऐरिया ।
4 ^प	श्रीमति बिमला पत्नि बलदेव	कैपिटल होटल से लेकर हवाघर तक तथा पुरानी आवकारी तथा 2ौचालय । अड़डा विल्ला से आन्नाडेल स्कूल तक तथा एम0पी0रोड ।
5 ^प	श्री बलविन्द्र पु0 सोहन	पुलिस लाईन हवाघर से चिटकारा पार्क तक तथा रामजीदास रोड ।
6 ^प	श्री प्रेमनाथ पु0 प्यारा	चिटकारा पार्क से अड़डा विल्ला तक ।
7 ^प	श्री रामसिंह पु0 सन्तू	आन्नाडेल के पहाड़ों की सफाई ।
8 ^प	श्री बृजपाल पु0 बनास्पति ,दैनिक वेतन भोगी ।	आन्नाडेल स्कूल से पुल तक बिहारी लाल रोड ।
9 ^प	श्री निर्मल पु0 पम्मी ।	सन्नी साईड रोड और शिव मन्दिर की पौडियों की सफाई करना ।
10 ^प	श्रीमति उषा पत्नि सुरिन्द्र	विकटरी टनल से हंस होटल तक तथा डिंगल इस्टेट क्षेत्र तक ।
11 ^प	श्रीमति जसबीर पत्नि नरे2ा	मियुजियम रोड तथा 103 रोड ।
12 ^प	श्री 2क्ति पु0 मदन	चौड़ा मैदान पान की दुकान से पीटर हॉफ तक तथा रॉक हाउस क्षेत्र ।
13 ^प	श्री जीता पु0 रखा	विधान सभा क्षेत्र ।
14 ^प	श्रीमति चन्द्रावती पत्नि भगवत	सैनीटोरियम से चौड़ा मैदान पान की दुकान तक ।
15 ^प	श्री रमे2ा पु0 बूटा	कौमली बैंक के क्षेत्र की सड़के ।
16 ^प	श्री ओम प्रका2ा पु0 साधू	चौड़ा मैदान डाकखाने से एडवान्स स्टडी तक ; लगातार अनुपस्थित ह

पार्षद वार्ड न05 श्री भारतभूषण,सफाई निरीक्षक,श्री प्रेमचन्द तथा अश्वनी, एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	रामलाल पु0 करतारा	एडवान्स सटैडी के टप
2 ^प	रमेशा पु0 रखा	मै बिला रोड,बिलासपुर हाउस से ब्रिजव्यू रोड
3 ^प	बिमला पत्नि कुलदीप	चैरीटन रोड
4 ^प	सुमन पत्नि 2याम लाल	समरहिल पोस्ट ऑफिस से ए0आई0आर0 रोड
5 ^प	सत्या पत्नि माधो	रेलवे स्टे2ान से हवाघर चौकी वाला रोड
6 ^प	मदन पु0 बव2ी	समरहिल चौक से नीचे हवाघर तक
7 ^प	अ2ोक पु0 गुरमेल	समरहिल मन्दिर से बालूगंज करोसिंग तक ।
8 ^प	गुरमेज पु0 बि2ाना	आर्मी ब्रेक ऐरिया
9 ^प	पवन पु0 प्रेम लाल	शिव मन्दिर बाड़ी बालूगंज रोड
10 ^प	मोहन पु0 चूडू	समरहिल चौक से एडवान्स स्टेण्डी चौक
11 ^प	बीना पत्नि हरीनन्द	बालूगंज से रेलवे स्टे2ान तक
12 ^प	रणजीत पु0 कां2ी राम	समरहिल क्षेत्र के पहाडों की सफाई
13 ^प	राजू पु0 इतवारी	बालूगंज बाजार ऐरिया ।
14 ^प	श्रीमति किरन बाला पत्नि सुरजू	बालूगंज रोड से तवी रोड
15 ^प	श्रीमति कौ2ाल्या पत्नि चरणदास	बालूगंज शौचालय माल रोड हवाघर तक ।
16 ^प	श्रीमति सर्वनी पत्नि गिरधारी	माल रोड हवाघर से दीपक प्रजौक्ट तक ।

पार्षद वार्ड न0 6 श्री सोहन लाल,सफाई निरीक्षक,श्री कां2ी राम, एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्री बिटू पु0 तुनबा	रेलवे स्टे2ान से टूटू चौक तक ।
2 ^प	श्री सुरजीत पु0 2याम लाल	पावर हाउस से रेलवे स्टे2ान तक ।
3 ^प	श्री सुख राम पु0 सावन राम	टूटू चौक से यादगार तक ।
4 ^प	श्री डेविड पु0 सरदारा	लक्ष्मी नारायण मन्दिर से एस0एस0स्कूल तक की गलियाँ ।
5 ^प	श्री संजय कुमार पु0 प्रेम	गैस एजेन्सी से लोअर टूटू नाले तक ।
6 ^प	श्री देवेन्द्र पु0 श्री रामू	टूटू के पहाडों की सफाई ।
7 ^प	श्री 2याम लाल पु0 जमकू राम	लक्ष्मी नारायण मन्दिर से गैस एजेन्सी तक गोविन्द मुहल्ले वाली गली ।
8 ^प	श्री परस राम पु0 मनसा राम	गोविन्द मुहल्ला गलियाँ ।
9 ^प	श्री अनिल कुमार पु0 रतना ।	टूटू चौक से गैस एजेन्सी वाले डम्पर तक ।
3 ^प	श्री अनिल पु0 ओम प्रका2,दैनिक भोगी	टूटू चौक से गैस एजेन्सी वाले डम्पर तक ।

पार्षद वार्ड न07 श्री भारतभूषण तथा श्री सोहन लाल, सफाई निरीक्षक,श्री अ2वनी, तथा कां2ी राम, एस0जे0 ।

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	नगे2ा पु0 कि2ान	बालूगंज बाजार से सी0एम0पी0.0 कार्ट रोड तक तथा एग्रीकलचर के टप करता है ।
2 ^प	कि2ोर पु0 टिनवा	गोपाल मन्दिर पड़ाव से कार्ट रोड तक
3 ^प	जोगिन्द्र पु0 भगत राम	न्यू बैरियर बाई पास से चक्कर बाई पास तक ।
4 ^प	सुशील पु0 महिन्द्र	सी0एम0पी0चैक पोस्ट से न्यू बैरियर तक तथा बारह घर की लाईन की शौचालय ।
5 ^प	विनोद पु0 जय प्रका2ा	बालूगंज चौक से लकसरी राम रोड और डिगंरा इस्टेट ।
6 ^प	बिरमी पत्नि गोपी	लकसरी राम रोड से चक्कर चौक रोड तक तथा पार्षद रोड तक ।
7 ^प	विजय पु0 राम लाल	टिंगरा इस्टेट, मोटर बैरियर , बाग गांव , पानू राम इस्टेट के टप ।
8 ^प	श्री दे2ा राज पु0 सोनू राम	चौडा मैदान पहाडों की सफाई ।
9 ^प	श्री सुरेन्द्र पु0 बाबू राम	चक्कर बाई पास रोड की सफाई ।
10	श्री कुलदीप पु0 गिरधारी	दरगाहा वाले मोड से सत्यम पैराडाईज होटल तक मोड से प्राइमरी स्कूल तक गली
11	श्री डेविड पु0 सरदारा	होटल ऐरिया दी डाउन से तारा देवी बाजार तक ।

पार्षद वार्ड न08 श्री सोहन लाल,सफाई निरीक्षक,श्री गिरधारी,श्री केवल तथा दलबीर एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	धर्मपाल पु0 मुन्नी लाल	टूटीकण्डी हवाघर से नीलकण्ठ लौज तक तथा टब ।
2	कमला पत्नि केवल	गीता मन्दिर वाली सड़क से चिडियाघर तक के चौक तक ।
3 ^प	मीना पत्नि बलबीर	गीता मन्दिर से नाले वाली सड़क व कृषि विभाग वाली सड़क ।
4 ^प	दीप सिंह पु0 विनोद	कार्टरोड के पास,जनता स्टोर के पास,खन्ना लोज के पास,चेत विल्ला के पास,ऐगरकिलचर के पास,चौहान कुट्टी के पास,स्कूल के पास,पांजडी गांव के कूड़े दानों की सफाई तथाकूड़ा उठाता है ।
5 ^प	मदन पु0 चैनराम	नील कंठ लौज से चेत विल्ला तक तथा चौहान कुटी से बंगाली बगीचे तक ।
6	विजय पु0 कि2ान	ऐ0जी0 कालौनी,जंगली क्वाटर,लम्बी लाईन के डस्टबीन,लम्बी लाईन और डोगरा लौज का नाला ।
7 ^प	श्री बलजीत सिंह पु0 श्री मोहिन्द्र पाल	टूटी कण्डी मन्दिर से चिडियाघर तक तथा रिडुका गांव तक सड़क ।
8 ^प	श्रीमति आशा पत्नि राम लाल	कैथ इस्टेट से बंसल बिलडिंग तक तथा रामनगर लायल निवास वाली सड़क ।
9 ^प	श्रीमति कैलाशों पत्नि धर्मपाल	डोगरा लॉज मन्दिर से टूटीकण्डी स्कूल तक ।
10	श्री रमे2ा पु0 प्रितू	गर्वमेन्ट प्रेस के डस्टबीन,आर0टी0ओ0ऑफिस प्रेस वाला रोड ।
11 ^प	श्री बृजपाल पु0 पूरन चन्द	जंगली क्वाटर रोड,लम्बी लाईन रोड तथा नालियों ।

पार्षद वार्ड न0 9 श्री सोहन लाल,सफाई निरीक्षक,श्री रमेश,प्यारे लाल, दलबीर तथा केवल एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	रानी पत्नि सत प्रकाशा	103 से लेकर संस्कृत कालेज तक ।
2	श्री ओम पाल पु0 राम चरन	संस्कृत कालेज से लेकर फागली ग्राउन्ड तक ।
3 ^प	श्री रविन्द्र पु0 मोहन लाल	ब्लाक न0 ऐ0 1,ऐ 2 के दो रोड हिल साईड व नाले ।
4 ^प	श्रीमति विद्या पत्नि ओम प्रकाशा	फागली लाल कोठी से फागली स्कूल तक तथा ब्लॉक न0 ऐ 2 तक ।
5	श्री कुलदीप पु0 करतारा	नाभा ब्लॉक न0 28 से बाईपास रोड तक ।
6 ^प	श्री महन्त पु0 साधू	ऐ0जी0 कालौनी से डाबरी लाईन तक सी0पी0डब्ल्यू0 डी0 ऐ0जी0कालौनी के 6 ब्लाक ।
7 ^प	श्रीमति कान्ता पत्नि मोहन लाल	बाईपास हवाघर से कागडू राम कालौनी तथा डाबरी लाईन तक न्यू ब्लाक ऐ0 .3 ऐ .4
8 ^प	श्रीमति छिन्दों पत्नि 2याम लाल	103 सुरंग से लेकर स्टे2ान तक ।
9 ^प	श्रीमति अजमेरों पत्नि जीत सिंह	103 सुरंग से लेकर ऐंएल0ऐ0 क्वाटर चैक पोस्ट तक ।
10 ^प	श्रीमति सुमित्रा पत्नि कि2ान चन्द	103 सुरंग से लेकर टूटीकण्डी ऐ0जी0कालौनी तक ।
11 ^प	श्री सन्त राम पु0 टिम्बल	ऐ0आई0 आर0 से एडवान्स स्टैडी चौक तक ।
12 ^प	श्री बृज लाल पु0 अनन्त राम	चौड़ा मैदान के पहाड़ों की सफाई ।

पाषर्द वार्ड न010 श्री सोहन लाल,श्री रामसिंह ,श्री भारतभूषण तथा श्री ज्ञान चन्द सफाई निरीक्षक, श्री केवल, कि2ान, रामराज,बलराज तथा कुलदीप एस0जे0

1 ^प	श्री सोमनाथ पु0 कर्मा	रामनगर मन्दिर के पास की सीढ़िया,रामसिंह हाउस तक की सफाई तथा रामनगर धोबीघाट और रामनगर स्कूल के शौचालयों की सफाई ।
2 ^प	श्री हरके2ा पु0 पुरन	लाल पानी के पुल से रामसिंह हाउस तक सड़क,रामनगर हवाघर के नीचे की पौडियों एम0सी0 लाईन तक ।
3 ^प	श्री सन्नी पु0 अशोक	राम मन्दिर कॅनल इस्टेट हवाघर के नीचे पांच कूड़ेदान तथा राममन्दिर की पौडियों की सफाई ।
4 ^प	श्री रणधीर पु0 माम राज	फागली बाईपास रोड से रामनगर हवाघर तक तथा सी0 15 व सी 17 तक ।
5 ^प	श्री संजय पु0 मदन	सी0पी0डब्ल्यू0डी0 ब्लॉक सी 9, सी 11 से सी 14 तक और फागली बाजार ।
6 ^प	श्री मनोज पु0 बलबीर	टूटी कण्डी गीता मन्दिर के नीचे वाली सडक ।
7 ^प	श्री ज्ञान चन्द पु0 दलीपा	जूह रोड के चौक से नीलकंठ लौज तक की सड़क ।
8 ^प	श्रीमति कौ2ाल्या पत्नि सोहन लाल	नाभा चौक से लेकर फागली स्कूल तक ब्लॉक न0 ६ 7६42ए ६६25ए ६६40 सी0पी0डब्ल्यू0डी0 ।
9 ^प	श्री गुरमीत पु0 सुरपा	६4६13ए ६4६18ए ६19६24 बर्चणक की सड़को की सफाई ।
10 ^प	श्रीमति सलोचना पत्नि 2याम लाल	फागली स्कूल से लेकर काली केरी रोड ।
11 ^प	श्रीमति कमला पत्नि कि2ान लाल	रेलवे गेट से लेकर कोढी बस्ती तक तथा काली केरी रोड ।
12 ^प	श्री रमे2ा पु0 बि2ाना	फागली स्कूल के पास,कूडादान,लालकोठी के पास,धनु ग्वाले के पास वाले कूड़ेदान और पहाड़ की सफाई ।
13 ^प	श्रीमति रानी पत्नि रमे2ा	एम0एल0 ए0 क्वाटर वाली सड़क व नालियाँ ।
14 ^प	श्री अशोक कुमार पु0 श्री फूजा	हॉटल सन एण्ड सनो, मौलवी अहाता व कृष्णा गली ।
15 ^प	रानी पत्नि कि2ोर	मे फिल्ड एम0सी0 कालौनी ।
16 ^प	2ारदा पत्नि चतरदेव	पंचशील हॉटल वाली सड़क गर्वमैन्ट स्कूल तक ।
17 ^प	सवित्री पत्नि मोहन	बस स्टैण्ड से नीचे पुराने डाकखाने तक की सड़क ।
18 ^प	श्री विजय पु0 ओम प्रका2ा	कोट शेरा कालेज ऐरिया ।
19 ^प	श्री जसवन्त पु0 दास	कनैडी हाउस माल रोड से बहू समाज तक ।
20 ^प	श्रीमति उर्मिला पत्नि छोटे लाल	कनैडी हाउस माल रोड से सैनीटोरियत तक ।
21 ^प	श्री रानी पत्नि सोहन	मेन बस स्टैण्ड से राजदूत हॉटल,बंसल हॉटल वाली सड़क और संजय सूद पाषर्द की बिलडिंग तक ।

पाषर्द वार्ड न0 11 श्री ज्ञान चन्द, श्री कुलदीप, एस0जे

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्रीमति कौ2ाल्या पत्नि प्रेम	कार्ट रोड से बाल्मीकी मन्दिर चौक तक व शौचालय ।
2 ^प	श्री रतन पु0 दिक्ता राम	बाल्मीकी मन्दिर से मस्जिद तक व सिख लाईन तक तथा शौचालय ।
3 ^प	श्री सुरिन्द्र पु0 मोहिन्दर	मस्जिद से गुगा मन्दिर व लेबर होस्टल की गली ।
4 ^प	श्री राजकुमार पु0 जीत राम	वालीदास बिलडिंग व सुन्दर बिलडिंग का क्षेत्र ओर 2 शौचालय ।
5 ^प	श्री जोगिन्दर पु0 जागर	कार्ट रोड घोड़ा सरायें,जो2ी मुहोल्ला की सड़क व स्कूल तक सड़क लेबर होस्टल कृष्ण नगर तक ।
6 ^प	श्री पप्पू पु0 मिसरी	गुरुद्वारा साहिब से कृष्णा नगर लेबर होस्टल तक ।
7 ^प	योगे2ा पु0 मदन	गुगा मन्दिर से लाल पानी वरिष्ठ माध्यमिक पाठशाला तक व स्लाटर हाउस की शौचालय ।

8 ^प	श्री रवी पु० राम लाल	कूड़ेदानों की सफाई,साहिब मोहल्ला,मे फिल्ड सैंट एलविन के पीछे वरिष्ठ पाठशाला लालपानी,कालीदास बिल्डिंग,गडीखाना व लालपानी ।
9 ^प	श्री सतपाल पु० बंसी	कृष्णा नगर क्षेत्र की पहाड़ियों की सफाई ।
10 ^प	श्री सुरेश पु० चमेला	ब्लाक न० 6 से अवकारी तक व लेबर होस्टल लालपानी की गली तथा इनकी शौचालय ।
11 ^प	श्रीमति जीवना पत्नि रतन	लेबर होस्टल लालपानी से दाड़नी का बगीचा व पुल सड़क ओर दाड़नी के बगीचे का शौचालय ।
12 ^प	श्री बन्टी पु० जसबीर	कृष्णा नगर के नालों की सफाई ।
13 ^प	श्री अश्वनी पु० रमेश	कृष्णा नगर के नालों की सफाई ।
14 ^प	श्री मदन पु० ओम प्रकाश	कृष्णा नगर के नालों की सफाई ।
15 ^प	श्री जसवन्त पु० भजना	रिच्ची क्वाटर से सी०पी०डब्ल्यू०डी० कालौनी,लालपानी ब्लाक न० 1 से ब्लाक न० 9 तक ।
16 ^प	श्रीमति प्रीतो पत्नि रतना	ब्लाक सी.4 से ब्लाक न० 9 सी तक,सी०पी०डब्ल्यू०डी० क्षेत्र,बैमलोई व सी 10 तक ।
17 ^प	श्री सतपाल पु० रूलिया	बैमलोई बस स्टैण्ड से सी०पी०डब्ल्यू०डी० की सड़क डी० 1 व डी० 4 तक ।
18 ^प	श्री प्रेम पु० केसर	बैमलोई क्षेत्र के 4 कूड़ेदानों की सफाई ।

पाषर्द वार्ड न० 12 श्री राम सिंह,सफाई निरीक्षक, श्री खुशी राम, रमेश,नागणू, कुलदीप,दलवीर और महिन्द्र, एस०जे

क्र०स०	कर्मचारी का नाम	क्षेत्र
1 ^प	श्री राज पत्नि दिवान	इन्दिरा गांधी परिसर से शौलेडे स्कूल तक बाया यू०एस०क्लब ।
2 ^प	श्रीमति बक्शों पत्नि चमन	इन्दिरा गांधी परिसर से विलो बैंक माल रोड तक ।
3 ^प	श्रीमति मोहिन्द्र कौर पत्नि राज कुमार	विलो बैंक से शिमला क्लब तक माल रोड
4 ^प	श्री राजकुमार पु० दर्शन	उच्च न्यायालय गेट से वन विभाग कार्यालय तक व होलीडे होम तक कार्ट रोड ।
5 ^प	श्रीमति कुलविन्द्र पत्नि केवल	वैटनरी अस्पताल से वन विभाग कार्यालय तक ।
6 ^प	श्री अश्वनी पु० पूरण	बैमलोई क्षेत्र ए० 1 से ए० 7 तक दोनों सड़के ।
7 ^प	श्री कान्ता पत्नि मदन	कर विभाग का पूरा क्षेत्र
8 ^प	श्री सुशील पु० दलबीर	बैमलोई ओर लिफ्ट क्षेत्र की पहाड़ियों पर पड़े हुये कूड़े की सफाई
9 ^प	श्री हंस राज पु० जगदीश	बैमलोई क्षेत्र के पहाड़ों की सफाई
10 ^प	श्रीमति शान्ति पत्नि अशोक	यू०एस०क्लब माल रोड से हाईकोर्ट गेट व हाईकोर्ट गेट से बैमलोई बस स्टाप तक ।
11 ^प	श्रीमति फुलवती पत्नि सतपाल	स्लवरीन होटल की सड़क व मरीना होटल के साथ अन्दर की तरफ का रास्ता ।
12 ^प	श्री विद्या पत्नि फकीर चन्द	पुलिस गुमटी से नीचे चर्च तक ।
13 ^प	श्रीमति करतारी पत्नि सोहन लाल	चर्च से लेकर सन्थोमस स्कूल तक तथा आधा क्षेत्र गलमार्ग होटल का ।
14 ^प	श्री रघुबीर पु० रखा	स्टेट बैंक के नीचे से विकटरी होटल तक तथा गूलमार्ग होटल, डी०ए०डी० तक ।
15 ^प	श्रीमति नीलम पत्नि रमेश	सन्थोमस स्कूल से लेकर विकटरी टनल नीचे वाली सड़क तक
16 ^प	श्री राकेश पु० तुलसी	डी०ए०डी० से लेकर नीचे रॉयल होटल तक और रॉयल होटल गेट से लेकर हरजी चौक तक राम बाजार
17 ^प	श्रीमति आशा पत्नि प्रेम	अजीत पैंटर से पंचायत भवन तक
18 ^प	श्री नन्त राम पु० भाग	द्वारका गढ़ से लेकर यू०बैंक रामबाजार तक ।
19 ^प	श्री केवल पु० तेजू	डी०सी०ऑफिस का नाला,सन एण्ड सनों का नाला
20 ^प	श्री विजय पु० दास	द्वारका गढ़ का टप साफ करना व डी०ए०डी० के डम्पर के बाहर पड़े कूड़े को डम्पर के अन्दर डालना
21 ^प	श्रीमति पूनम पत्नि जोगिन्द्र	डी०सी०ऑफिस की बैंक साईड सारी सीढ़ियों व एस०डी०स्कूल का शौचालय

22 ^प	श्री सतपाल पु० रखा	डी०सी०ऑफिस का नाला,सन एण्ड सनों का नाला
24 ^प	श्री राके२१ पु० मदन	यू०को० बैंक से लेकर हरजी चौक तक
25 ^प	श्रीमति कृष्णा पत्नि राजू	गुलमर्ग होटल से विन्टर फिल्ड तथा लोकल बस स्टैण्ड तक
26 ^प	श्री विपन पु० रहैमा	दयानन्द व विन्टर फिल्ड की पहाड़ियों की सफाई ।
27 ^प	श्रीमति सत्या पत्नि मदन लाल	भगत सिंह कार्ट रोड से बसन्त होटल तथा शौचालय व सड़क
28 ^प	श्री रमे२१ पु० पूर्ण	विकट्री टनल कार्ट रोड से विधान सभा कार्ट रोड तक
29 ^प	श्रीमति कमला पत्नि चमन लाल	विकट्री टनल से कमान्ड की सड़क उपर की ओर तक
30 ^प	श्रीमति कमले२१ पत्नि श्री श्याम लाल	रिपन की चढाई से लोकल बस स्टैण्ड तक की सड़क
31 ^प	श्री नरेश पु० पूर्ण	पूर्णमल धर्मशाला से मैन बस स्टैण्ड
32 ^प	श्री मसन्तु पु० श्री बृज लाल	लिटर कैरियर
33 ^प	श्रीमति मीना पत्नि पत्नि चन्दू	मैन बस स्टैण्ड से बिन्दू राज होटल तक
34 ^प	श्री राजकुमार पु० चमन लाल	घोडा अस्पताल से लेकर गंज वाली सड़क आधी व पौड़ियों
35 ^प	श्री गगन पु० श्री राम लाल	पूर्णमल धर्मशाला से मिलाप ढाबा तक सीढ़ियाँ व शौचालय तथा गलियाँ
36 ^प	श्री रमेश लाल पु० बोनी	लोकल बस स्टैण्ड के शौचालय,पे२१ाबदानी तथा आरामघर पूरा क्षेत्र
37 ^प	दे२१ राज पु० द२१ान	डस्टबीनों की सफाई करना गंज व अनाज मण्डी
38 ^प	सन्त राम पु० बालक राम	लिटर कैरियर
39 ^प	राम सरन पु० छिन्दा	पुर२१ार्थ बस्ती की सीढ़ियाँ व दो शौचालय पुरुष व स्त्री
40 ^प	कमलजीत पु० करतारा	सब्जी मण्डी निलामी वाला क्षेत्र
41 ^प	इन्दू भूषण पु० ओम प्रका२१	लोअर बाजार चौक से आधी सब्जी मण्डी,शौचालय की पौड़ियाँ व सदर थाने की सीढ़ियाँ
42 ^प	गुरमीत पु० रो२१ान	आधी सब्जी मण्डी व निलामी वाला क्षेत्र
43 ^प	सुरिन्द्र पु० फकीर	मेरू हलवाई से नीचे सब्जी मण्डी की तरफ
44 ^प	जगदेव पु० कर्मचन्द	सब्जी मण्डी से एच०पी०एम०सी०दुकान व बाबा फर्नीचर वाली सभी सीढ़ियाँ व आस पास का क्षेत्र
45 ^प	संजीव पु० मोहन लाल	नालों की सफाई
46 ^प	जितेन्द्र पु० भाग	नालों की सफाई
47 ^प	सुरिन्द्र कौर पत्नि मनोहर	गंज बाजार से मस्जिद,भगत सिंह वाली सड़क तथा रिपन के साथ लगती सड़क
48 ^प	बिमला पत्नि मोहिन्द्र	खाना की दुकानसे गंज चौक वाया श्री कृष्ण मन्दिर तथा गंज का बीच की सड़क
49 ^प	सुनिता पत्नि प्रका२१	नाई वाली सीढ़ियाँ,गंज बाजार की उपर तथा नीचे वाली सड़क व पे२१ाबदानी
50 ^प	श्रीमति निर्मला पत्नि हरीकि२१ान	एच०पी०एम०सी० से कार्ट रोड तथा सदर से कार्ट रोड तक की सीढ़ियाँ
51 ^प	श्रीमति छिन्दों पत्नि खु२१ी राम	राम बाजार से कार्ट रोड वाया रिपन तक व सिडिकेट वाली सीढ़ियाँ
52 ^प	श्रीमति किरन पत्नि दपीक	सन्दुर पंसारी से गंत वाली सड़क व सीढ़ियाँ
53 ^प	श्रीमति सुनिता पुत्री बिहारी	सुन्दर पंसारी से भगत सिंह रोड व सीढ़ियाँ व पुर२१ार्थी बस्ती की गलियाँ
54 ^प	श्री मदन पु० सीता	सूजी लाईन का पूरा क्षेत्र व शौचालय सीढ़ियाँ से लेकर निलामी वाला क्षेत्र से शौचालय तक
55 ^प	श्री बालकू पु० आलमू	लिटर कैरियर व अन्य कार्य
56 ^प	श्रीमति लक्ष्मी अ२१ोक	लगातार अनुपस्थित
57 ^प	श्री रामानन्द पु० मुख राम	सब्जी मण्डी चौक से गोयल मार्केट की दुकान तक व सूजी लाईन की सड़क ।
58 ^प	श्री अ२१ोक कुमार पु० २याम लाल	गोयल मीट वाले की दुकान से झटका मीट मार्केट तक
59 ^प	श्री रामपाल पु० टेनी राम	आफिस, रामपाल बेकरी व पहाड़ियाँ ।
60 ^प	श्री बलविन्द्र पु० सीता	मीट ,हलालद्ध मार्केट की डम्पर की सफाई व दफतर की सीढ़ियाँ व सड़क
61 ^प	श्रीमति निर्मला पत्नि र्व० महेन्द्र	सब्जी मण्डी गाउन्ड और अन्दर की मार्केट
62 ^प	श्री अ२१ोक कुमार पु० बसन्ता	एम०सी लाईन डम्पर के ईद गिर्द व पहाड़ों की सफाई
63 ^प	श्री विक्रम सिंह पु० राम सिंह	ओकसन प्लेस के स्थान से पिछली गली और सीढ़ियाँ ।

64 ^प	श्री रमेश कुमार पु० चैन	झटका स्लाटर हाउस
65 ^प	श्री राजकुमार पु० प्रेम चन्द	हलाल स्लाटर हाउस
66 ^प	श्री हिमा राम पु० बुद्ध राम	वी०पी०एच०के कार्यालय में
67 ^प	श्री पोसू राम पु० सेवक राम	वी०पी०एच०के कार्यालय में

पाषर्द वार्ड न० 13 श्री राम सिंह, सफाई निरीक्षक, श्री बलबीर तथा श्री किशन, एस०जे०

क्र०स०	कर्मचारी का नाम	क्षेत्र
1 ^प	श्री छोटू पु० ओमप्रकाश	रिज मैदान क्षेत्र
2 ^प	श्रीमति नीरज पत्नि संजय	निगम कार्यालय ए०पी०ब्रांच, आर०बी०लेखा शाखा ।
3 ^प	श्रीमति सावित्री पत्नि सोम लाल	रिज मैदान क्षेत्र
4 ^प	श्री सुरजीत पु० भाग	रिज व माल क्षेत्र में कूत्ते भगाने के लिए ।
5 ^प	श्रीमति सुनिता पत्नि श्याम लाल	रिज मैदान क्षेत्र ।
6 ^प	श्री राजू पु० फकीर	लेडिज पार्क की सड़के तथा शौचालय ।
7 ^प	श्रीमति अमिता पत्नि कमल	मेयर ऑफिस, कमीशनर ऑफिस व मुख्या कार्यालय
8 ^प	श्री सुनिल पु० घसीटा	लिद उठाने हेतु सांय 2 बजे से 8 बजे तक ।
9 ^प	श्री सुभाष पु० गोली	लिद उठाने हेतु 6 ^प 30 बजे से सांय 2 बजे तक व अन्य कार्य
10 ^प	श्री हरकेश पु० प्यारा	रिज मैदान व अन्य पहाड़ इत्यादि की सफाई ।
11 ^प	श्रीमति कृष्णा पत्नि कु०हाल	ग्रेन्ड होटल से काली बाड़ी मन्दिर एस०बी०आई के पीछे की सड़क
12 ^प	श्री विजय पु० टई राम	रिज के नीचे पहाड़ों की सफाई ।
13 ^प	श्री धर्मपाल पु० कर्मचन्द	छोले वाली पौडियों से लेकर स्कैन्डल पाउन्ट तक ।
14 ^प	श्री भगवान दास पु० संत राम	भाखड़ा निवास रोड व पहाड़ियों की सफाई ।
15 ^प	श्रीमति माया पत्नी कमलजीत	तारघर से लेकर काली बाड़ी तक ।
16 ^प	श्री राजेश पु० सोहन लाल	खादी भन्दार की सीढ़ियाँ, हिल साईड, गली न० 14, 15 ओर 16 तथा लावरिशा लातों उठाने हेतु ।
17 ^प	श्रीमति निर्मला पत्नी सुरिन्द्र	खादी भन्दार से लेकर छोले वाली पौडियों तथा सड़क व सत्य जैवेलर व गेन्डामल की आधी सीढ़ियाँ ।
18 ^प	श्रीमति उषा पत्नि चमन लाल	गेन्डामल की आधी सीढ़िया व खादी भन्दार की सीढ़ियाँ ।
19 ^प	श्रीमति बिमला पत्नि रूलदू	स्कैन्डल पाउन्ट से ग्रेन्ड होटल तक तथा नीचे वाली सड़क
20 ^प	श्री तरुण पु० कि०शान	सभी पार्कों की सफाई ।
21 ^प	श्री जसबीर पु० स्वर्ण	स्कैन्डल से तारघर तक तथा आस पास के पहाड़ों की सफाई ।
22 ^प	श्री टिकू पु० गुरुदयाल	नौकरी से सस्पेन्ड ।
23 ^प	श्री विलसन पु० तरसेम	खादी भन्दार से शिरे पंजाब तक व लावरिशा लातों ।
24 ^प	श्री राजेश पु० सन्त राम	लिद उठाने हेतु सांय 2 बजे से 8 बजे तक ।
25 ^प	श्री अजय पु० रूलदू	शिरे पंजाब से लिफ्ट तक तथा लावरिशा लातों ।
26 ^प	श्री जगदीश पु० कि०शान	माल रोड प्रातः 12 बजे से सांय 8 बजे तक ।
27 ^प	श्री राजकुमार पु० रूलदू	माल रोड प्रातः 12 बजे से सांय 8 बजे तक
28 ^प	श्रीमति मुन्नी देवी पत्नि प्रकाश	डी०सी०ऑफिस से जगदीश पानवाला तथा गली न० 1
29 ^प	श्रीमति कैलाश पत्नि बक्शी	जगदीश पानवाले से नथू हलवाई तक ।
30	श्रीमति भोली पत्नि जगदीश	नथू हलवाई से सुरंग तक साथ सीढ़ियाँ
31 ^प	श्री अशोक पु० रामदास	लोअर बाजार सुरंग से सुन्दर पंसारी तक
32 ^प	श्री सोनू पु० दीपक	लोअर बाजार सुरंग व राम बाजार रोड द्वारका गढ़ तक
33 ^प	श्री विजय पु० निरजन	सुन्दर पंसारी वाली पेशाबदानी व नथू वाली पेशाबदानी और दो डस्टबीनों का कूड़ा ईद गिर्द से उठाना व अन्य कार्य ।
34 ^प	श्रीमति कमला पत्नि अशोक	गली नव 3ए4ए5ए रोड और सभी सीढ़ियाँ

35प	श्री विजय पु0 मुन्नी लाल	डी0सी0ऑफिस से सुन्दर पंसारी तक सभी नालें है उनकी सफाई
36प	श्री केसर पु0 चमन	सिडिकेट बैंक से नथू हलवाई तक की सीढ़ियाँ व गली न0 2 का रोड व गली न0 3 की सीढ़ियाँ आधी
37प	श्रीमति प्रकाशों पत्नि बूटा	जैनहाल की सीढ़िया व कम्पलैक21 की सीढ़ियाँ व छत ।
38प	श्री रूलदू पु0 दलीपा	शेरे पंजाब से ठाकुर भराता,कम्पलैक21 की सीढ़िया तथा बराड़ा और काटनमरी की सड़क
39प	श्री सिम्बल पु0 बहादुरी	सब पोस्ट ऑफिस से सुन्दर पन्सारी तक कांगड़ा होटल की सीढ़ियों तक ।
40प	श्रीमति नीलम पत्नि दीप कुमार	म्हा21य ज्वेलर्स से सब्जी मण्डी चौक और डा0 मोनिका व दयाल स्टोर की सीढ़ियाँ ।
41प	श्री दीप कुमार पु0 दास राम	सब्जी मण्डी से सब पोस्ट ऑफिस पुराना तक,जय भारत मैडीकल स्टोर के साथ वाली सीढ़ियाँ व गली न0 8 वाली आधी सीढ़ियाँ
42प	श्री विनोद कुमार पु0 ओमप्रकाश	लोअर बाजार के सारे नाले व अन्य कार्य ।
43प	श्री मनसा राम पु0 दुर्गा	गली न0 9ए10ए11ए12एकी सारी सीढ़ियाँ व सड़क
44प	श्री अशोक कुमार पु0 दास राम	मिडिल बाजार गुरुद्वारा की सीढ़ियाँ और गली न0 8 के इर्द.गिर्द का क्षेत्र
45प	श्री जनक राज पु0 फकीर	स्वास्थ्य विभाग जन्म मृत्यु कार्यालय हैलपर ।
46प	श्री परस राम पु0 बालक राम	डी0सी0ऑफिस की पहाड़ियाँ व लोअर बाजार की नालियों की सफाई ।
47प	श्री अशोक पु0 निरंजन	ठाकुर भ्राता से महा21य ज्वैलर तक गली न0 15 और 16
48प	श्रीमति सुनिता पत्नि महिन्द्र	मिडल बाजार क्षेत्र ।

पार्षद वार्ड न0 14 श्री किशोर चन्द, सफाई निरीक्षक,श्री रमे21,कार्यवाहक एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1प	श्री कैलाश चन्द सपुत्र बूटा	21020 वाली कोठी से होली लौज ।
2प	श्री दीप चन्द पु0 तुलसी	हौली लौज से अमर भवन तक ।
3प	श्री बलबीर चन्द पु0 पूर्ण	अमर भवन से फाईव बैंच तक ।
4प	श्री कैलाश पु0 हरबन्शा	रो21न टी स्टाल से जाखू मन्दिर ।
5प	श्रीमति सुरेखा देवी पत्नि कुलदीप	रिज लाईबेरी से ड्रीम लैण्ड ।
6प	श्रीमति बलबीर कौर पत्नि बृज लाल	चर्च से रिटिज रोड यू0एस0 क्लब गेट तक ।
7प	श्रीमति राजरानी पत्नि सूरजभान	केन्द्रीय विद्यालय रोड ।
8प	श्रीमति रवि बाला पत्नि राजन	वायेलट हिल रोड ।
9प	श्रीमति मुन्नी देवी पत्नि रमे21	ड्रीम लैण्ड से हौली लॉज गेट तक
10प	श्रीमति उषा देवी पत्नि अमरनाथ	जोधा निवास पार्किंग से उपायुक्त निवास तक
11प	श्रीमति सुरेन्द्र कौर पत्नि अशोक	यू0एस0क्लब गेट से ब्लाक न0 34
12प	श्री सोमनाथ पु0 बाबू राम	हौली लॉज परिसर व डस्टबीन
13प	श्री अनोखी राम पु0 मनसा राम	जाखू क्षेत्र के पहाड़ों की सफाई ।
14प	श्री सुरेन्द्र कुमार पु0 बृज लाल	अमर भवन से जाखू रोड हवाघर
15प	श्री राजकुमार पु0 मदन लाल	फाईव बैंच से जंगल हाउस तक ।
16प	श्री जैल सिंह पु0 मेहर चन्द	रिज से फ्लोरा होटल की सड़क ।
17प	श्रीमति मोहिन्द्रो पत्नि रमे21	फ्लोरा होटल से रैन थैल्टर पुलिस चौकी
18प	श्रीमति आशा पत्नि लाल चन्द	रैन थैल्टर से कल्याण लॉज और कास्टफन की सीढ़ियाँ
19प	श्रीमति कमले21 पत्नि धर्मपाल	कल्याण लॉज से पम्प हाउस और सत्कार होटल की सडक
20प	श्री लाल चन्द पु0 सन्त राम	डी0ऐ0वी0स्कूल से कास्टाफन ऐरिया ।
21प	श्रीमति राज पत्नि 2याम लाल	पम्प हाउस से डैन्टल कालेज तक ।

पार्षद वार्ड न0 15 श्री ज्ञान चन्द , सफाई निरीक्षक,श्री प्रेम चन्द, एस0जे0

1 ^प	श्री रमेश कुमार पु0 बूटा राम	टोक ओवर चौक से राज भवन चौक ।
2 ^प	श्रीमति 21ला पत्नि केवल	ओक ओवर से चौक तक ।
3 ^प	श्रीमति विद्या पत्नि प्रेम	राजभवन चौक से रजत होटल ।
4 ^प	श्री दे2ा राज पु0 प्रकाश	रजत होटल से किस्टन हॉल तक ।
5 ^प	श्री राजेन्द्र पु0 रामदिया	शिमला क्लब से ओक ओवर ।
6 ^प	श्री संग्राम पु0शयम लाल	बुडविल होटल से राजभवन गेट तक ।
7 ^प	श्री अशोक पु0 दलीपा	सचिवालय से नवबहार चौक तक ।
8 ^प	श्रीमति माया पत्नि ज्ञान	यू0एस0क्लब से डाक्टर वोरहा की कोठी तक ।
9 ^प	श्रीमति सुरेन्द्र कौर पत्नि तिलक राज	डाक्टर वोहरा की कोठी से राम चन्द्रा चौक ।
10 ^प	श्री नानक चन्द पु0 राजू	फौरस्ट रोड से द्रानजिट आवास हाउसिंग बोर्ड जाखू ।
11 ^प	श्री मनोहर लाल पु0 श्याम लाल	रामचन्द्रा चौक से हाउसिंग बोर्ड कालौनी तक ।
12 ^प	श्रीमति भगवन्त कौर पत्नि गुरदेव सिंह	हनीमून होटल का रास्ता
13 ^प	श्रीमति सीमा पत्नि ओमप्रकाश	यू0एस0क्लब ब्लॉक न03 के साथ वाली गली व सड़क ।
14 ^प	श्री मंगी राम पु0 दर्शन	वार्ड के कूड़ादानों की सफाई तथा स्टोक प्लेस की सड़कें ।
15 ^प	श्री विनोद पु0 चन्द्रपाल	नालों की सफाई हेतू ।
16 ^प	श्री हरिनन्द पु0 जाहरू	वैनमोर क्षेत्र के पहाड़ों की सफाई ।
17 ^प	श्रीमति उषा पत्नि महिन्द्र	सचिवालय के पीछे वाली सड़क फलावरडेल तक ।
18 ^प	श्री रामस्वरूप पु0 बगुला	ट्रिब्यूनल रोड से दुर्गा काटेज तक ।
19 ^प	श्रीमति आशा पत्नि प्रेम	किस्टल हाल से छोटा शिमला चौक तक ।
20 ^प	श्री सतपाल पु0 रूलिया	मैडीकल बायज होस्टल रोड ।
21 ^प	श्रीमति अन्जू पत्नि विनोद	वेरनर हाउस रोड तक ।

पार्षद वार्ड न0 16 श्री किशोर चन्द, सफाई निरीक्षक,श्री सेवा राम, एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्री सुरेन्द्र पु0 प्रभु	ओल्ड पुलिस पोस्ट से चिल्डन पार्क ।
2 ^प	श्री तिलक राज पु0 बरखा	चिल्डन पार्क से अली मंजिल की सड़कें ।
3 ^प	श्रीमति सुरेश बाला पत्नि रमेश	संजौली चौक से गर्वमैन्ट स्कूल कार्ट रोड तक ।
4 ^प	श्री राम गोपाल पु0 गुरुदास	इन्जनघर की सड़कें
5 ^प	श्री सुनिल पु0 राम लाल	इन्जनघर की सड़कें,नालियाँ व पहाड़ियाँ ।
6 ^प	श्री रामराज पु0 बरखा	संजौली चौक से ओल्ड पोस्ट औफिस तक ।
7 ^प	श्री सुरिन्द्र पु0 निक्कू	मस्जिद क्षेत्र ।
8 ^प	श्री राजू	डिस्पैन्सरी रोड ।

पार्षद वार्ड न0 17 श्री किशोर चन्द, सफाई निरीक्षक,श्री सेवा राम, एस0जे0

1 ^प	श्री महावीर पु0 रामदिया	संजौली चौक से कार्ट रोड ।
2 ^प	श्री राकेश पु0 गिरधारी	डिगू माता रोड कूड़ादान ।
3 ^प	श्री रणजीत पु0 सोहन	चिल्डन पार्क से पेट्रोल पम्प ।
4 ^प	श्री दीना नाथ पु0 मनसा	डिगू माता मन्दिर रोड ।
5 ^प	श्री मोहिन्द्र पु0 मगत राम	ट्रिगू बोड़ी रोड और खन्ना हाउस रोड ।
6 ^प	श्री हरी कृष्ण पु0 भाग	ओल्ड पुलिस औफिस से चलौन्टी गांव तक की सड़क ।
7 ^प	श्री गुज्जर पु0 पूरन	संजौली चौक से गर्वमैन्ट कालेज हवाघर तक ।
8 ^प	श्रीमति दयावती पत्नि अमीचन्द	नोर्थ ओक क्षेत्र ।
9 ^प	श्री हरी सिंह पु0 पाखर	डैन्टल कालेज से हवाघर तक ।
10 ^प	श्री राजकुमार पु0 कशमीरी	डैन्टल कालेज से एम0सी0कार पार्किंग का रोड ।
11 ^प	श्री चन्दर पाल पु0 काबुल	हवाघर से गर्वमैन्ट कालेज हवाघर तक ।

पार्षद वार्ड न0 21 श्री लायक राम, सफाई निरीक्षक,श्री पदम देव, एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्री विकास पु0 धर्मपाल	गेरखू लॉज रोड, लक्ष्मी नारायण मन्दिर रोड से घाटडू रोड ।
2 ^प	श्री राहुल पु0 इन्दूभूषण	टाटा इन्डरकू से रिलयान्स दफतर तक एस0डी0ए0 कम्पलेक्स तक ।
3 ^प	श्री अनिल पु0 ओम प्रकाश	रिलयान्स दफतर से हैल्थ डायरेक्टर तक रोड ।
4 ^प	श्री अमित पु0 सोहन	हैल्थ डायरेक्टर दफतर से स्टेट बैंक रोड व विकास नगर चौक तक ।
5 ^प	श्री सुरेन्द्र पु0 गिरधारी	पंचायती राज दफतर से बाईपास तक पौडियाँ व सी0आई0डी0 रोड ।
6 ^प	श्री विपन पु0 मदन	पंचायत भवन कसुम्पटी से इन्डियन आयल दफतर तक रोड ।
7 ^प	श्री चतरदेव पु0 सुखराम	कसुम्पटी ब्लाक न0 1 से 5 तक व ब्लाक न0 22 की पार्किंग ।

पार्षद वार्ड न0 22 श्री लायक राम, सफाई निरीक्षक,श्री पदम देव, एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्री दर्शन सिंह पु0 चमन	छोटा शिमला सचिवालय से चौक तक व गुरुद्वारा साहिब की सीढियाँ ।
2 ^प	श्री सुनील कुमार पु0 बाबू राम	छोटा शिमला चुंगी खाना से पाईन लॉज का क्षेत्र
3 ^प	श्री कमल पु0 दीप चन्द	छोटा शिमला बाजार से चुंगी खाना तक ।
5 ^प	श्री अजय पु0 रूलदू	छोटा शिमला चुंगी खाना से बाउन्डरी तक
6 ^प	श्री टोमस पु0 मोहन	छोटा शिमला बाउन्डरी से साधनाघाटी रास्ता न्यू फलावर डेल चौक तक
7 ^प	श्री राजिन्द्र पाल पु0 बृज लाल	बाउन्डरी से ब्रोकहस्ट तक व गुगा मन्दिर वाला रास्ता
8 ^प	श्रीमति भोली पत्नि मथुरा	स्ट्राबरी हिल से कसुम्पटी चौक तक पिछला रोड ।
9 ^प	श्री यशपाल पु0 मोहन	अकूर डेल स्कूल कूड़ेदान व सडक स्ट्राबरीहिल का कूड़ादान ।
10 ^प	श्रीमति पम्पलू पत्नि कनकू	छोटे शिमला के पहाड़ों की सफाई ।
11 ^प	श्री विक्की पु0 बिशानदास	स्ट्राबरीहिल क्षेत्र ।
12 ^प	श्री कुलदीप पु0 अशोक	साधनाघाटी का पिछला रास्ता हिमलयन भवन तक तथा चढढा प्रैस का रास्ता ।
13 ^प	श्री प्रवीण कुमार पु0 बली राम	छोटा शिमला के पहाड़ों की सफाई ।
14 ^प	श्री मदन मोहन पु0 प्रितम	छोटा शिमला बाजार,गुगा माडी चौक तक ; कार्ट रोड द नवरतन गैस्ट हाउस पोस्ट ओफिस ।
15 ^प	श्रीमति आशा पत्नि प्रेम	माल रोड
16 ^प	श्रीमति उषा पत्नि महिन्द्र	मजीठा हाउस ।
17 ^प	श्री राम स्वरूप	द्वीविन्त से दुर्गा काटेज ।

पार्षद वार्ड न0 24 श्री लायक राम, सफाई निरीक्षक,श्री हरस्वरूप, एस0जे0

क्र0स0	कर्मचारी का नाम	क्षेत्र
1 ^प	श्रीमति वकी पत्नि बरकत	नौलज बुड कालौनी
2 ^प	श्रीमति कौशल्या पत्नि 2याम लाल	हवाघर नजदीक निगम बिहार से ग्रीन पार्क का रास्ता और टालैण्ड हवाघर से राशन का डिपों तक ।
3 ^प	श्री अमरीक पु0 गिरधारी	ग्रीन पार्क डम्पर से खलीनी बाजार कोपरेटिव बैंक व शौचालय की सफाई
4 ^प	श्री हरबंस पु0 दास	खलीनी चौक से बी0सी0एस0 के नाले तक बाय विजीलैन्स कार्यालय व परस राम के मकान तक ।
5 ^प	श्री संजय पु0 रूलदू	कोपरेटिव बैंक से लेकर खलीनी बाजार व मिस चैम्बर मोड तक ।
6 ^प	श्री बलबीरों पत्नि भजना	बाईपास टॉसफामर से हनुमान मन्दिर व डिसपैन्सरी रोड मिस चैम्बर नीचला रोड

7 ^ण	श्री मनोज पु० दुर्गा	सी०पी०डब्ल्यू०डी०की कालोनियों ,खलीनीद्वव कूड़ेदान ।
8 ^ण	श्री राजकुमार पु० प्यारे	बाईपास रोड खलीनी ।
9 ^ण	श्री रामलुभाया पु० दौलत राम	ग्रीन पार्क गालियों व कूड़ेदान ।
10 ^ण	श्री धर्मदास पु० देवी दास	खलीनी क्षेत्र के पहाड़ों की सफाई व सड़क किनारों का घास ।
11 ^ण	श्री विजय पु० रतू	नौलज बुड से बाया गुगा माडी व विजिलेन्स कार्यालय के नाले तक ।
12 ^ण	श्रीमति इन्दूबाला पत्नि रके21	लगातार अनुपस्थित
13 ^ण	श्री प्रवीन कुमार	ठाकुर गुलाब सिंह की कोठी से कार्ट रोड तथा पावर हाउस खलीनी वाला डम्पर ।

पार्षद वार्ड न० 25 श्री ज्ञान चन्द, सफाई निरीक्षक,श्री सन्त सिंह, एस०जे०

क्र०स०	कर्मचारी का नाम	क्षेत्र
1 ^ण	प्यारे पु० खुशिया	एडवर्ड स्कूल से बाईपास तक सड़क
2 ^ण	बाबू राम पु० फजला	शिवपुरी से सी०पी०आर०आई० तक
3 ^ण	मदन पु० फकीर	क्नलोग 210चालय से 21ान्डील निवास तक सड़क व सीढ़िया ।
4 ^ण	तेज सिंह पु० सन्तू	क्नलोग क्षेत्र की पहाड़ियों पर पड़े कूड़े की सफाई हेतू ।
5 ^ण	श्रीमति सतो देवी	ओक ओवर से पोर्टमोर स्कूल तक
6 ^ण	जोगिन्द्र पाल पु० प्रका21	डायरटन और बीरखाना की सड़के बाईपास तक व सीढ़ियाँ ।
7 ^ण	वेद प्रका21 पु० रामलोक	सी०पी०.०आर०आई० से बाईपास सड़क तक ।
8 ^ण	सुरेश पु० चन्ना	टिम्बर हाउस से पालिका भवन तक कार्ट रोड ।
9 ^ण	अनिता पत्नि पवन	बाईपास कनलोग से कल्याणा मन्दिर तक ।
10 ^ण	परगन पु० ज्वाला	बैमलोई हवाघर से सी०पी०आर०आई तक ।
11 ^ण	सुरेन्द्र पु० प्रीतू	बाल आश्रम व ओक ओवर के कूड़ादानों की सफाई व बाल आश्रम के साथ वाली सड़क की सफाई ।
12 ^ण	फूल सिंह पु० खचेडू	वे०एन०एच०के नीचे वाली सड़क से चिलिंगम हाउस तक ।
13 ^ण	कुमार गौरव पु० जीत राम	बैमलोई बस स्टाप से टिम्बर हाउस तक कार्टरोड व न्यू लाईन इस्टेट ।
14 ^ण	सुभाष चन्द पु० बालकि21न	क्नलोग दुर्गा मन्दिर वाला रोड तक ।
15 ^ण	चिन्टू पु० रमे21	मरीना होटल से टिम्बर हाउस तक ।
16 ^ण	इन्द्रा देवी पत्नि राजकुमार	चाली विल्ला से पालिका भवन व रजत होटल से कालिया बिल्डिंग तक सड़क ।
17 ^ण	श्री स्वर्ण लाल पु० उदों	गैस कम्पनी टालैण्डू से नौलजबुड पानी की टैकियों तक ।