

**Water Supply and Sanitation: An inquiry into  
Intersectionality between Policies, Provisioning and  
Providers in Bhubaneswar City, Odisha**

*Thesis submitted to Jawaharlal Nehru University in the partial  
fulfilment of the requirements for the award of the degree of*

**DOCTOR OF PHILOSOPHY**

**AJIT KUMAR LENKA**



**Centre of Social Medicine and Community Health**

**School of Social Sciences**

**Jawaharlal Nehru University**

**New Delhi – 110 067**

**India**

**2019**



CENTRE OF SOCIAL MEDICINE & COMMUNITY HEALTH  
SCHOOL OF SOCIAL SCIENCES  
**JAWAHARLAL NEHRU UNIVERSITY**  
NEW DELHI - 110067

Dated: 15-07-2019

DECLARATION

I hereby declare that this thesis entitled “**WATER SUPPLY AND SANITATION: AN INQUIRY INTO INTERSECTIONALITY BETWEEN POLICIES, PROVISIONING AND PROVIDERS IN BHUBANESWAR CITY, ODISHA**”, is being submitted by me in partial fulfillment of the requirements of the award of the degree of DOCTOR of PHILOSOPHY of Jawaharlal Nehru University. This thesis has not been submitted for the award of any other degree of this university or any other university and is my original work.

*Ajit Kumar Lenka*  
(AJIT KUMAR LENKA)

CERTIFICATE

We recommend that the thesis be placed before the examiners for evaluation and consideration of the award of Degree of Doctor of Philosophy.

*Sanghmitra Acharya*

**Prof. Sanghmitra S. Acharya**  
Supervisor

PROF. SANGHMITRA S. ACHARYA  
Centre of Social Medicine & Community Health  
School of Social Sciences  
Jawaharlal Nehru University  
New Delhi - 110067

*Sanghmitra Acharya*

**Prof. Sanghmitra S. Acharya**  
Chairperson

PROF. SANGHMITRA S. ACHARYA  
Centre of Social Medicine &  
Community Health, SSS  
Jawaharlal Nehru University  
New Delhi - 110067

## Acknowledgement

I consider this page is as a very important part of my research, because here I am getting an opportunity to pay my gratitude to everyone who helped me in this endeavour. I am grateful to Prof. *Sanghmitra Acharya* for supervising the preparation of thesis with utmost meticulousness. It is indeed a matter of privilege and pleasure to do research under her guidance. I express my inner heartfelt thanks to her for being extremely helpful to me and also for her timely guidance, constructive criticism, constant encouragement, and valuable suggestion from the conceptualization of the research proposal to final Thesis. I am also thankful to all the faculty members of CSMCH, for their valuable suggestions and intellectual assistance. This will always remain unforgettable for me throughout my life. I express my sincere thanks to the non-teaching staff of the CSMCH for their constant support and help to process official paper work thorough out the course of my Ph.D work.

I am extremely indebted to the inhabitants of Bhimpur (Kelasahi Basti) and Naharakanta area for their cooperation and support to complete the study. I am also thankful to my friend *Subrat* who helped me during the field study.

This data collection would never have been possible without the help of Mr. Kartik Chandra Seti (Sanitation Inspector) in health department and the BMC staff members. I extend special thanks to *Rajshree*, my life partner, for her whole hearted support and encouragement throughout my doctoral research. I am indebted to her, for always being there with her crucial inputs and feedback, and playing a key role in shaping a quality of this work. I would also like to express my profound gratitude to my seniors namely: *Jagannath, Golak, Smritima, Alok, Eshita, Sabina and Kanhaiya* for their constant support, advice, and true inspiration to complete my research.

I would like to thank all my friends who were of great strength to me right from the beginning and sparing their valuable time in finalizing this thesis.

Last but not the least, I express my deep sense of gratitude to my parents, who have really been my pillar of strength, my brother (*Manoj*) and sister (*Laxmipriya*) who

have always been there supporting me in every step of my life. My brother-in-law (*Sambit*), sister-in-law (*Sanjukta*), and nephew (*Binayak*) deserve a special mention and my sincere thank you for being there and supporting all my decisions. Finally, I extend my inner heartfelt gratitude to the almighty to surpass me in all kinds of adverse and difficult situation.

**Ajit Kumar Lenka**

## Table of Contents

Acknowledgement .....	i
Table of Contents .....	iii
List of Tables .....	vii
List of Figures .....	x
List of Maps .....	xii
<b>Abbreviations</b> .....	xiii
Chapter-1.....	1
Water Supply and Sanitation- Relevance Today .....	1
1.1: Background of the Study.....	1
1.2: Water Supply and Sanitation: Issues of Health.....	3
1.3: Water Supply and Sanitation at Global Level.....	4
1.4: Water Supply and Sanitation Condition in India .....	5
1.5: Water Supply and Sanitation Condition in Odisha .....	6
1.6: Water Supply and Sanitation Policies, Provisioning and Providers: A Review of Literature.....	7
1.7: Schemes of Water Supply and Sanitation in Bhubaneswar City .....	20
1.8: Five Year Plans for Water Supply and Sanitation .....	27
1.9: Provisioning of Water Supply and Sanitation.....	29
1.10: Providers Engaged in Water Supply and Sanitation Work.....	38
1.11: Conclusion.....	45
Chapter-2.....	46
Conceptual Framework and Research Design .....	46
2.1: Introduction.....	46
2.2: Defining Key Concepts .....	53
2.3: Conceptual Framework .....	57
2.4: Statement of the Problem.....	58
2.5: Rationale of the Study.....	59
2.6: Research Questions .....	60
2.7: Objectives.....	60
2.8: Research Methodology and Study Design .....	61
2.9: Data Source .....	63
2.10: Tools of Research.....	64
2.11: Framework for Data Analysis .....	68

2.12: Scoring and Coding.....	68
2.13: Pilot Study.....	69
2.14: Process of Data Collection:.....	69
2.15: Statistical Tools.....	73
2.16: Major Obstacles During the Process of Data Collection .....	74
2.17: Ethical Consideration .....	76
2.18: Limitation of the Study .....	76
2.19: Chapter Plan.....	76
Chapter-3.....	79
Study Area: Location and Socio-Demographic Profile .....	79
3.1: Introduction .....	79
3.2: Socio-demographic Characteristics of Population of Odisha .....	79
3.3: Geographical Location of Bhubaneswar City .....	81
3.4: Bhubaneswar Municipal Corporation (BMC).....	81
3.5: The Geographical Location of Study Area .....	83
3.6: Demographic Profile of the Study Areas .....	85
3.7: Migration Pattern .....	96
3.8: Housing Condition in the Study Area .....	104
3.9: Electricity Facilities in the Study Households .....	114
3.10: Water Supply Facilities in the Study Area.....	115
3.11: Toilet Facility in the Study Area.....	117
3.12: Public Toilet Facilities .....	117
3.13: Garbage Bin Facilities in the Study Area.....	117
3.14: Drainage Facility in the Study Area.....	118
3.15: Road and Street in the Study Area .....	118
3.16: Transportation Facilities in the Study Area .....	119
3.17: Street Light.....	119
3.18: Angan wadi centre (AWC).....	120
3.19: Educational Facilities .....	122
3.20: Post Office.....	124
3.21: Health Care Facilities .....	124
3.22: Bank and ATM Facilities in the Study Area.....	125
3.23: Conclusion.....	125
Chapter-4.....	127
Water Supply and Sanitation: Provision and Use .....	127

4.1: Introduction .....	127
4.2: Sources of Water Supply.....	127
4.3: Availability of Toilets within the House .....	147
4.4: Disposal of Household Garbage.....	160
Chapter-5.....	175
Water Supply and Sanitation in Bhubaneswar City - Experiences of the Sanitation Workers.....	175
5.1: Introduction .....	175
5.2: Bhubaneswar Municipal Corporation (BMC) and Basic Services .....	176
5.3: Duties of Sanitation Workers .....	177
5.4: Socio-Demographic Profile of the Providers .....	177
5.5: Migration of Providers .....	182
5.6: Work profile of the Service Providers .....	185
5.7: Health Condition of Sanitation Workers.....	202
5.8: Awareness about the Government Schemes .....	205
5.9: Housing Condition .....	206
5.10: Sources of Water Supply.....	212
5.11: Voter ID and Access to Social Security Facility.....	221
5.12: Conclusion.....	222
Chapter-6.....	224
Reported Illness and Reflections from the Field.....	224
6.1: Introduction .....	224
6.2: Morbidity Experience in the Study Area .....	224
6.3: Classification of Diseases .....	225
6.4: Demographic Profile and Morbidity Pattern.....	226
6.5: The Condition of Water Supply in the Study Area .....	232
6.6: Toilet Condition in the Study Area .....	238
6.7: Drainage Condition in the Study Area .....	240
6.8: Housing Condition .....	245
6.9: Road Condition .....	248
6.10: Condition of Anganwadi Centre (AWC) .....	249
6.11: Youth Club:.....	250
6.12: Poor Housing Condition of Sanitation Worker.....	251
6.13: Conclusion.....	258
Chapter-7.....	259

Discussion and Conclusion .....	259
7.1 Summary .....	259
7.2: Discussion .....	260
7.3: Major Findings .....	264
7.4: Migrant and Migration Pattern .....	265
7.5: Water supply and Sanitation Facilities in the Study Area.....	265
7.6: Lack of Toilet Facilities in the Study Area .....	271
7.7: Morbidity Experience and Health Issues among the Study Population.....	274
7.8: Condition of Service Providers .....	275
7.9: Conclusion and Policy Suggestions .....	276
Bibliography.....	279
Appendix .....	300



## **List of Tables**

Table 1.1	Urban Population and Open Defecation in Districts of Odisha
Table- 1.2	Population Growth Trends in Bhubaneswar City
Table- 1.3	Bhubaneswar Municipal Corporation (BMC) Profile Details
Table-1.4	Water supply and Sanitation in Five Year Plans
Table-2.1	States with Highest Percentage of Open Defecation Households in Urban Area
Table-2.2	Tools and Techniques of Research
Table- 2.3	Contents of the Questionnaire Schedule
Table 3.1	Socio-Demographic Characteristics of Population of Odisha
Table-3.2	Age Group Composition of the Study Population
Table-3.3	Marital status
Table- 3.4	Occupation of the Study Population
Table-3.5	Household Income Per Month
Table-3.6	Duration of stay in the area
Table-3.7	Perceived Benefits of the Place of Current Residence
Table-3.8	Record of the House Ownership
Table-3.9	Household Rent Per Month
Table-3.10	House Size and Type
Table-3.11	Cooking Space and Fuel for Cooking
Table-3.12	Electricity and Light Facilities in the Study Households
Table-3.13	Source of Water Supply Facilities
Table-3.14	Toilet Facility
Table-4.1	Treatment of Drinking Water
Table-4.2	Distance Travelled to Fetch Water
Table-4.3	Duration and Perceived Quality of Water Supply in the Area
Table-4.4	Domestic Water Storage Capacity
Table-4.5	Problems Caused due to no Water Supply

Table-4.6	Grievance Redressal Machinery Related to Water Supply
Table-4.7	Awareness about the Government Scheme of Water Supply Facilities
Table 4.8	Suggestion to Solve the Water Related Problems
Table-4.9	Result of Binary Logistic Regression Model: Effect of Socio-Economic Factors on access to Water
Table-4.10	Location of Toilet
Table-4.11	Awareness about Government Toilets Scheme
Table-4.12	Agencies Providing Toilet Facilities
Table-4.13	Use of Toilet
Table-4.14	Perceived Benefit of the Toilets in House
Table-4.15	Households Without Toilet Facility
Table-4.16	Result of Binary Logistic Regression Model: Effect of Socio-Economic Factors on Access to Toilet Facility in the Study Area
Table-4.17	Frequency of Garbage Collection by BMC Workers
Table-4.18	Frequency of Drain Cleaning by Self
Table-4.19	Frequency of Drainage Cleaning by BMC Workers
Table-4.20	Distance of Complaints Office
Table-4.21	Problem of Registration Complain
Table-4.22	Problem of Registration Complain
Table-5.1	Government and Non-Government Organization Engaged in Sanitation Services in Bhubaneswar City
Table-5.2	Type of Workers, Sex and Age Composition of Workers
Table- 5.3	Social Identity and Sub-Caste
Table- 5.4	Family Composition
Table 5.5	Migration Patterns and Reasons
Table-5.6	Work Profile of the Service Providers
Table- 5.7	Nature of Work

Table-5.8	Health Issues and Treatment-Seeking Practices of Sanitation Workers
Table-5.9	Medical Coverage in Case of Accident in Worksite
Table-5.10	Housing: Ownership and Place of Stay
Table- 5.11	Structure and Ventilation of Housing
Table-5.12	Cooking Space and Fuel
Table-5.13	Frequency Garbage Collection
Table- 5.14	Drainage Clean and Frequently Drainage Clean
Table- 6.1	Sex Wise Difference in Reported Illness
Table-6.2	Type of Illness and Caste
Table-6.3	Type of Illness and Treatment
Table-6.4	Type of Illness and Out of Pocket Expenditure (OOPE)
Table-6.5	Type of Illness and Toilet
Table-6.6	Type of Illness and Water Resources

## List of Figures

- Figure 1.1 States with more than 10 % Urban Open Defecation in India, 2011
- Figure-1.2 Average per-capita piped water supply and coverage in ULBs of Odisha 2012-13
- Figure- 1.3 Slums' Access to Water Supply and Sanitation Facilities in Bhubaneswar City
- Figure-2.1 Conceptual Framework
- Figure- 2.2 Designing of Sample and Data Collection
- Figure-2.3 The Procedure of Data Collection
- Figure- 3.1 Male and Female Population in the Study Area
- Figure-3.2 Education Attainment Among the Study Population
- Figure- 3.3 Social Identity
- Figure- 3.4 Working Conditions
- Figure- 3.5 Migration Pattern
- Figure- 3.6 Type of House
- Figure- 3.7 Space for Cooking
- Figure- 4.1 Sources of Water Supply in the Study Area
- Figure- 4.2 Cost of Water Supply
- Figure-4.3 Reasons for no awareness about the government schemes of water supply
- Figure-4.4 Availability of Toilet Facility within the House
- Figure-4.5 Reasons for Lack of Awareness about the Government Schemes for provision of Toilet Facilities
- Figure-4.6 Place Used for Defecation by Households with No Toilet Facility
- Figure-4.7: Dispose Households Garbage
- Figure-4.8 Type of Drainage outside Households
- Figure-4.9 Drainage Clean
- Figure-4.10 Sanitation Related Problems
- Figure- 4.11 Awareness about the Government Schemes of Sanitation

Figure-4.12	Reasons for not being Aware of Government Schemes about Sanitation
Figure-4.13:	Suggestions to Solve the Sanitation Problems form the Community
Figure-5.1	Educational Level
Figure-5.2	Marital Status of the Service Providers
Figure 5.3	Year of Migration
Figure-5.4	Monthly Income in INR
Figure-5.5	Training Programme and Protectives Gears/Equipment Provided to Workers
Figure-5.6	Problem Faced During Work
Figure-5.7	Life Style Habits
Table-5.8	House Rent in INR
Figure-5.9	Source of Electricity
Figure-5.10	Sources of Water Supply
Figure-5.11	Distance Travelled to Fetch Water
Figure-5.12	Treatment of Water
Figure-5.13	Sources of Water for other than Drinking Purposes
Figure-5.14	Access Toilet Facility
Figure-5.15	Use of Toilet
Figure-5.16	Types of drainage Outside the Households
Figure-5.17	Voter ID and Access to Social Security Schemes
Figure -6.1	Reported Illness Profile of the Respondents (users)

## **List of Maps**

- Map- 1.1: Zone Map of Bhubaneswar Municipal Corporation
- Map: 3.1 Map of Odisha
- Map- 3.2 Ward Map (Bhubaneswar Municipal Corporation)
- Map-3.3 Social Map of Bhimpur (Area 1)
- Map-3.4 Social Map of Naharakanta (Area 2)

## Abbreviations

ADB	Asian Development Bank
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
ANM	Auxiliary Nurse Midwifery
ASHA	Accredited Social Health Activist
AUWSP	Accelerated Urban Water Supply Programme
AUWSP	Accelerated Urban Water Supply Programme
AWC	Anganwadi Centre
AWW	Anganwadi Worker
BBSR	Bhubaneswar
BDA	Bhubaneswar Development Authority
BMC	Bhubaneswar Municipal Corporation
BPL	Below Poverty Line
BPTSL	Bhubaneswar Puri Transport Services Limited
BSUP	Basic Services to the Urban Poor
CE	Chief Engineer
CDA	Cuttack Development Authority
CDP	City Development Plan
CLR	Contractual Labour Role
CMC	Cuttack Municipal Corporation
CPCB	Central Pollution Control Board
CSP	City Sanitation Plan
DA	Development Authority
DLR	Daily Labour Role
DPR	Detailed Project Report
DUs	Dwelling Units
EWS	Economically Weaker Section
FGD	Focus Group Discussion
GDP	Gross Domestic Product
GDP	Gross Domestic Product
GEN	General
GO	Government Organization

GoI	Government of India
GoO	Government of Odisha
H & UD	Housing & Urban Development
HH	Household
HPEC	High Powered Expert Committee
HUDCO	Housing & Urban Development Corporation
IDI	In-depth Interview
IDSMT	Integrated Development of Small & Medium Towns
IDSMT	Integrated Development of Small and Medium Towns
IHSDP	Integrated Housing and Slum Development Project
IHSDP	Integrated Housing and Slum Development Programme
IWSSD	International Drinking Water Supply Sanitation Decade
JICA	Japan International Cooperation Agency
JMPWSS	Joint Monitoring Programme for Water Supply and Sanitation
JnNURM	Jawaharlal Nehru National Urban Renewal Mission
KI	Key Informants
LCSP	Low Cost Sanitation Programme
LIG	Low Income Group
LMIG	Low-Medium Income Group
LPCD	Litres Per Capita Daily
MA	Major Illness
MDG	Millennium Development Goals
MHA	Ministry of Home Affairs
MI	Minor Illness
MLD	Million Litres per Day
MoHUPA	Ministry of Housing and Urban Poverty Alleviation
MoUD	Ministry of Urban Development
MP	Master Plan
NAC	Notified Area Council
NFHS	National Family Health Survey
NGO	Non-Government Organization
NSDP	National Slum Development Programme
NSSO	National Sample Survey Organization



NUSP	National Urban Sanitation Policy
OBC	Other Backward Caste
OD	Open Defecation
OUIDF	Odisha Urban Infrastructure Development Fund
OWSSB	Odisha Water Supply & Sewerage Board
PHEO	Public health Engineering Organization
PHD	Public Health Division
PHED	Public Health Engineering Department
PMU	Programme Management Unit
PPP	Public Private Partnership
RAY	Rajiv Awas Yojana
RD	Rural Development
RLTAP	Revised Long Term Action Plan
RWSS	Rural Water Supply and Sanitation
SBA	Swachh Bharat Abhiyan
SBM	Swachh Bharat Mission
SC	Schedule Caste
SDG	Sustainable Development Goals
SI	Sanitary Inspector
SKA	Safai Karmachari Andolan
SPSS	Statistical Package for the Social Sciences
SS	State Share
SSNA	State Urban Sanitation Nodal Agency
ST	Schedule Tribe
STP	Sewerage Treatment Plant
SUDA	State Urban Development Agency
SW	Sanitation Workers
SWM	Solid Waste Management
TSC	Total Sanitation Campaigning
U.D	Urban Development
UGSS	Underground Sewerage Schemes

UIDSSMT	Urban Infrastructure Development Scheme for Small & Medium Towns
ULB	Urban Local Bodies
UN	United Nation
UNDP	United Nation Development Programme
UNICEF	United Nations International Children's Emergency Fund
UPA	Urban Poverty Alleviation
USAID	United States Agency for International Development
USEP	Urban Self-Employment Programme
USS	Urban Sanitation Strategy
UWEP	Urban Wage Employment Programme
UWSP	Urban Women Self-help Programme
VAMBAY	Valmiki Ambedkar Awas Yojana
WHO	World Health Organization
WSIS	Water Supply and Improvement Scheme
WSP	Water and Sanitation Programme
WTP	Water Treatment

# Chapter-1

## Water Supply and Sanitation- Relevance Today

### 1.1: Background of the Study

Economic growth and good health conditions are known to depend on improved water supply and sanitation facilities. More than 10 per cent of the global burden of disease increase is attributed to inadequate water supply and sanitation. The MDG<sup>1</sup>s addressed the issue of water supply and sanitation under Goal 7 which aimed to 'ensure environmental sustainability'. The Target 7c of this Goal was to reduce by 50 per cent the proportion of the population without sustainable access to safe drinking water and basic sanitation by 2015. Some improvements have been made in this regard. Data shows that between 1990 and 2012, 2.3 billion people gained access to improved drinking water sources. In 2012, however, 748 million people remained without access to an improved source of drinking water. While over a quarter of the world's population has gained access to improved sanitation since 1990, about one billion people still resort to open defecation. Of this, 82 per cent live in middle-income, populous countries. Despite this progress, about 2.5 billion of the population in developing countries still lack access to improved sanitation facilities (Hutton and Haller, 2004).

This study is an attempt to understand the issues of water supply and sanitation in the city of Bhubaneswar. Water supply and sanitation have interlinkages with a wide range of issues such as poverty, hunger, education, mortality and gender. Illnesses caused by unsafe drinking water and inadequate sanitation can generate health costs that can claim a large proportion of income. Families with ill adult and those who look after the ill household members are likely to be less productive. In rural areas as well as in small cities and towns' people spend more time on fetching water. Hence the time spent for collecting water cannot be used for livelihood activities (PEP,

---

<sup>1</sup>In 2000 the Member States of the United Nations signed the Millennium Declaration, which later gave rise to the Millennium Development Goals (MDGs). Goal 7, to ensure environmental sustainability, included a target that challenged the global community to halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation.  
[http://www.wssinfo.org/fileadmin/user\\_upload/resources/JMP-Update-report-2015\\_English.pdf](http://www.wssinfo.org/fileadmin/user_upload/resources/JMP-Update-report-2015_English.pdf)

2006). Access to water resources impacts the life of women more especially their education. Studies show that relatively easy access to drinking water is particularly important for the education of the girls because relieving them from fetching water, allows them to attend school (Sommer et al., 2015). The availability of separate sanitation facilities for girls in schools increases their school attendance. Access to the water supply source is likely to reduce illness related to water and sanitation, including injuries caused while carrying water, improve school attendance, especially for girls. In addition, water and sanitation facilities closer to home put women and girls at less risk of sexual harassment and assault while travelling to gather water and searching for privacy to defecate (Baker et al., 2018; Sommer et al., 2015).

Sanitation, safe water and access to health care facilities also helps to ensure clean delivery and reduces neonatal deaths (WSD, 2018). Improved sanitation, safe drinking water sources, and greater quantities of domestic water for washing reduces infant and child morbidity and mortality. Mothers with improved access to water supply and sanitation services are able to take care of their children, both because they have fewer illnesses and they devote less time to water-fetching and seeking privacy for defecation. Safe drinking water and basic sanitation help prevent water borne diseases. About 1.6 million deaths per year are attributed to unsafe water, poor sanitation, and lack of hygiene (UNICEF, 2003).

The long term rate of return is high in case of the investment in provision of water and sanitation facilities. The UNDP<sup>2</sup> estimated recently that an investment in water supply yields an average economic return of \$4.4 to \$1 and investment in sanitation could give a return of \$9.1 to \$1 (UNDP, 2010). The World Bank's Water and Sanitation Program estimated that inadequate sanitation caused India economic losses equivalent to 6.4per cent of India's GDP<sup>3</sup> in 2006 at US\$53. 8 billion. The report indicates that premature mortality and other health-related impacts of inadequate sanitation were the costliest with 72per cent of total impacts, followed by productive time lost to access, sanitation facilities or sites for defecation with 20per cent, and drinking water-related impacts with 7.8per cent (WSP, 2010). As far as the coverage of water supply and

---

<sup>2</sup> UNDP: United Nation Development Programme. In 1990 UNDP published its first Human Development Report, with its newly devised Human Development Index. [http://hdr.undp.org/sites/default/files/reports/270/hdr\\_2010\\_en\\_complete\\_reprint.pdf](http://hdr.undp.org/sites/default/files/reports/270/hdr_2010_en_complete_reprint.pdf).

<sup>3</sup> GDP: Gross Domestic Product

sanitation is concerned, more than half of the country's population still has poor access to water and sanitation.

## **1.2: Water Supply and Sanitation: Issues of Health**

Adequate water supply and sanitation are essential to ensure human health (Eid, 2015). Due to the lack of water supply and sanitation every year, millions of people are affected by waterborne diseases and 361 000 children under five year die of diarrhoea globally (WHO, 2018). Globally, 844 million of people are living without access to basic drinking water service and more than 2 billion of people are using drinking water sources contaminate with faeces. Poor water supply and sanitation is the main reason for diarrhoea, malaria, fluorosis, guinea worm diseases, malaria, trachoma, typhoid (Buttenheim, 2008; Bhunia, 2009; Hunter, et al., 2010; Acharya, 2015). Every year 502 000 deaths happen due to contaminated water (WHO, 2018). In developing countries, economic growth and good health conditions depend on improved water supply and sanitation facilities. Over 10 per cent of diseases at global occur because of inadequate water supply and poor sanitation (Min and Hung, 2011). In a study Tiwari and Nayak (2016) found that, households who do not get sufficient public taps or hand pumps water have a higher chance of suffering from waterborne diseases.

The effects of poor water supply and sanitation seep into every aspect of life such as health, nutrition, development, economy, dignity and empowerment. Globally, water and sanitation hygiene practice are responsible for 90per cent of diarrhoea-related mortality, which is much higher than combined mortality from malaria and HIV. Inadequate access to safe drinking water and poor sanitation can lead to under nutrition, water borne diseases, gastro-enteropathy along with diarrhoea and dysentery (Kuberan et al., 2015). WHO estimates that exposure to inadequate drinking water and sanitation was responsible for 58per cent of deaths from diarrhoea, adding up to 840,000 deaths in low and middle-income countries, in 2012 (WHO, 2012).The safe, adequate water supply and sanitation reduces diseases, improves the health condition and reduces household costs (Karan and Harada, 2002; Howard and Bartram, 2003; GoI, 2012).

Evans (2007) in his study shows that millions of urban dwellers are excluded for getting water supply and sanitation service delivery from formal system. Katukiza et al. (2012) in their study mention that poor sanitation in urban slums results in increased prevalence of diseases and pollution load into the slum environment and pose a risk to public health. Buitenen (2009) in his study shows that the inadequate sanitation is a leading cause of diarrheal disease and mortality among children in urban slums. The result of the study show that the improve sanitation reduces diarrheal disease and produce maximum health gains. Scallar et al. (2005) in their study note that the inadequate water supply and sanitation cause of communicable diseases in overcrowded slums.

### **1.3: Water Supply and Sanitation at Global Level**

Most of the countries are expected to meet the Target 10 of MDG and provide safe drinking water to all. The Sustainable Development Goal (SDG) 6 ensure universal access to safe drinking water, adequate infrastructure, provide sanitation facilities and encourage hygiene at every level by 2030. It has eight targets including 6.1 to ‘By 2030, achieve universal and equitable access to safe and affordable drinking water for all’; and 6.2 to ‘By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations. (SDG, 2015). Safe drinking water supply problem is major a problem in every continent. About one billion people still do not have access to safe drinking water, and today more than 2.5 billion people are still devoid of improved sanitation facility (UNICEF, 2015).

Today 892 million people worldwide still practiced open defecation and 856 million people worldwide used an unimproved sanitation facility (UNICEF, 2018). Based on the data more than 40 per cent of the population around the world is facing scarcity of water due to increase the global temperatures as a result of climate change (UNICEF, 2018). Maddocks et al. (2015) their study mention that thirty-three countries face extremely high water stress by 2040. A recent study commissioned by the WHO and UNICEF estimated that more than 1.8 billion people around the globe use fecal contaminated drinking water and this is more than twice according to official figure from WHO/UNICEF joint monitoring programme. Every year approximately 842,000 people die in low and middle income countries as result of inadequate water supply

and lack of sanitation facilities (WHO/UNICEF, 2017). It includes 58 per cent of total diarrhoeal deaths globally. It is projected that by 2030 half of the world population will be living under water stress (WHO, 2018).

#### **1.4: Water Supply and Sanitation Condition in India**

As per the 2011 census, still 70 per cent of India's rural and 650 million slums population is exposed to water borne diseases and vector-borne diseases due to lack of water supply and sanitation facility (RGI, 2011). According to WHO report, although India is on track to meet MDGs, still millions of people are living without access to improved sanitation facilities (WHO, 2012). In India, still 60 per cent of population defecate open. In India diarrhoea is the third most common cause of death. Amongst under five-year age children 13 per cent of deaths occur because of diarrhoea in India (Jaiswal and Joon, 2017). States like; Jharkhand, MP, Odisha, Bihar, Rajasthan, Uttar Pradesh, and Tamil Nadu higher percentage of population defecate open (UNICEF, 2013). As per the Millennium Development Goals, India is bound to provide improved sanitation to at least half of its urban population by 2015 and 100 per cent access by 2025 (Bhagat, 2014). It is projected that states such as Madhya Pradesh and Odisha will reach the MDG target only by the next century Madhya Pradesh expected to achieve the goal in 2105 and Odisha achieved 2116. According to Dhar (2012) some of the states and union territories have achieved the MDG target while others are very close to achieve it. States like Kerala, Haryana, Meghalaya, Himachal Pradesh, Punjab and most Union Territories, had already achieved the MDG target while Assam, Andhra Pradesh will achieve it in next ten years.

Water supply and sanitation continues to be a serious concern and challenges in urban India. As per the 2011 census, 31.16 per cent of the population is living in urban area. In absolute numbers, urban population of India is larger than the entire population of United States (IIHS, 2014). Total 17.4 per cent, of the population in urban areas was living in slums (RGI, 2011). In India, one-third of the urban households do not have access to piped drinking water in 2011. Only two percentage points progress is made to provide piped drinking water during 2001-2011 (Bhagat, 2014).

In urban area, 70 per cent of households have access to tap water supply out of which 62 per cent per cent of households have access to treated tap water. Only 49 per cent

of households have access to piped water supply within their premises and 40 per cent of households have to depend on other sources of water (RGI, 2011; IIHS, 2014).

In the urban areas toilet facility inside the house is lacking. Approximately 10 million of households defecate open in urban areas. Around 81 per cent of HHs have toilet facility within their premises, six per cent HHs have access to public toilets and 12 per cent of households defecate open (RGI, 2011). Thus about one-fifth of urban households do not have access toilet facility. The rate increase in toilet facility during last ten years from 2001 to 2011 was just one per cent every year. At this rate India could achieve universal sanitation only by 2081(Bhagat, 2014).

### **1.5: Water Supply and Sanitation Condition in Odisha**

Odisha ranks 24<sup>th</sup> in the level of urbanization among the states of India. About 17 per cent of the state population lives in urban area. In urban area the local bodies and municipality are responsible to provide safe drinking water supply and sanitation to all urban dwellers (Sathapthy, 2011). In Odisha total 138 town and cities are governed by 103 urban local bodies, two municipal corporations and 101 municipalities all over the state. Odisha is one of the state which is performing very poor in terms of provision of water supply and sanitation facilities. As per the 2011 census, 78 per cent of households do not have toilet facility in the state (RGI, 2011). There exists a huge rural urban gap in terms of access to toilet facility in the State. As 85.9 per cent of households in rural area as compared to 35.2 per cent of households in urban area do not have toilet facility. Regarding the water supply too only 48.0 per cent urban households use tap water for drinking, while 31.7 per cent use hand pumps and tube wells and approximately 18 per cent depend upon wells in the state (RGI, 2011).

It is, therefore, imperative to understand water supply and sanitation policy and programs; coverage and peoples' perception of provisioning and access to sources and facilities and what goes into planning all of it. At the core of the planning process is the endeavour to improve the existing services. This entails understanding the present situation. The basic planning of water supply and sanitation facilities which are envisaged to be provided to the community is designed to take into account the status of existing facilities on the one hand and peoples' needs on the other who is doing the planning. The planning process is often considered to be based on the feedback



received from the people. It allows to determine the resources required for bridging the gap between existing facilities and actual requirements/demand. The central theme of the proposed research is to understand the process in a configuration consisting of planning the provisioning, people for whom it is to be planned and those who execute the plan. The study seeks to examine the factors affecting the planning of water supply and sanitation; and to identify and bridge the gaps between linkages that connect provisioning mechanism, providing agencies, users and coverage, policies and programmes. While it is important to understand the genesis of the policies and their implementation, it is also important to understand their effectiveness from users' perspective. If coverage is important to ensure the health of the people, also important is the health of the providers. Thus, the stated inquiry into the providers' perspective too.

## **1.6: Water Supply and Sanitation Policies, Provisioning and Providers: A Review of Literature**

The present section reviews the existing literature on condition of water supply and sanitation facilities in India in general and Odisha in particular. This chapter tries to understand the State's policies for water supply and sanitation in urban areas in terms availability and accessibility. In the current study, the review of existing literature helped in understanding the gaps between policies, planning, provisioning and providers of water supply and sanitation facilities. The review begins with the impact of water supply and sanitation on health, then the condition of water supply and sanitation at global, national as well as state level. Second part is introducing various central and state level policies on water supply and sanitation. Third part covers planning and various schemes of water supply and sanitation in urban areas. This is followed by next section on the condition of water supply and sanitation in the country in terms of availability and accessibility. The concluding section covers the condition of workers who are engaged in water supply and sanitation work.

### **1.6 (1): Water Policy in India**

Water plays an essential role in the economic growth. For all most all kind of industry access to water is pre-requisite. Hence water resources need to be developed, planned, preserved and managed from a national perspective which is environmentally sound.

In India the first national water policy was introduced in year 1987. The policy gave importance to build information system, maximizing availability, project planning, maintenance and modernization, safety structure, ground water development, water allocation priorities, drinking water, irrigation, water resources, participation of farmers and voluntary agencies, water quality, water zoning, conservation of water, flood control and management, land erosion, by sea river, drought management, science and technology and training. Providing drinking water to the entire population by the end of year 1991 was one of the key points of the policy.

In 2002 a new national water policy was introduced in India which focused on some new areas such as resettlement and rehabilitation, financial and physical sustainability, participatory approach to water resources management, monitoring project, water sharing/distribution among the states, performance improvement and maintenance and modernization. In this policy, the concern of the community was taken into account. It was felt that the local community can play a crucial role in development of water resources and its management. National water policy also determined the water allocation priorities in the following order as: drinking water, hydropower, ecology, agro-non agro industries, navigation and other uses.

National water policy 2012 has focused on water crises management. As lack of water governance and management has led to critical situation in some part of the country. Climate change is also another reason for water crises due to water related disaster, increased soil erosion and increased frequency of droughts. In India, most of the households are facing problem in accessing safe drinking water facilities. There is lack of scientific planning and utilization of modern techniques and adequate number of trained personnel. The public agencies responsible for water distribution and management often ignore the concerns of stakeholders such as farmers, local residents while planning water distribution. Hence public policies on water resource planning needs to be governed by certain basic principles keeping in view the interest of poor and marginalised population.

### **1.6 (2): Water Policy and Water Supply in Odisha**

According the 73<sup>rd</sup> amendment, responsibility of supply of drinking water and sanitation services lies with the local governments (Fletcher, 2002). The state of

Odisha holds 11 per cent of the total water resources in India. First Water Policy in Odisha was introduced in 1994 following the National Water Policy 1987. Following the National Water Policy 2002, Odisha Government revised the policy in 2007 and it was approved by the State Water Resources Board, Odisha. The main aim of the 2007 water policy was to take into account all the emerging factors and lay down the principles for wise and judicious use of available water. Both the national and state water policy highlighted that all human beings and livestock in both urban and rural area should be provided drinking water. The state water policy like the national water policy gave importance to provide drinking water for households as well as livestock use.

The first Odisha urban water supply policy was introduced in 2013. The main aim of the policy was to address the complex, technical, institutional, social, environmental challenges faced by the urban water supply agencies and insure universal access to potable water supply to all citizens living in urban areas at an affordable price.

The policy emphasised on strengthening of infrastructure, institution, monitoring mechanism and regulatory framework for provision of water services at all levels. To ensure better service provision incentives such as development funds, individual performance recognition was suggested. It is also recommended that proper training and skill up gradation programmes should be organised for the individuals involved in water provision services from time to time.

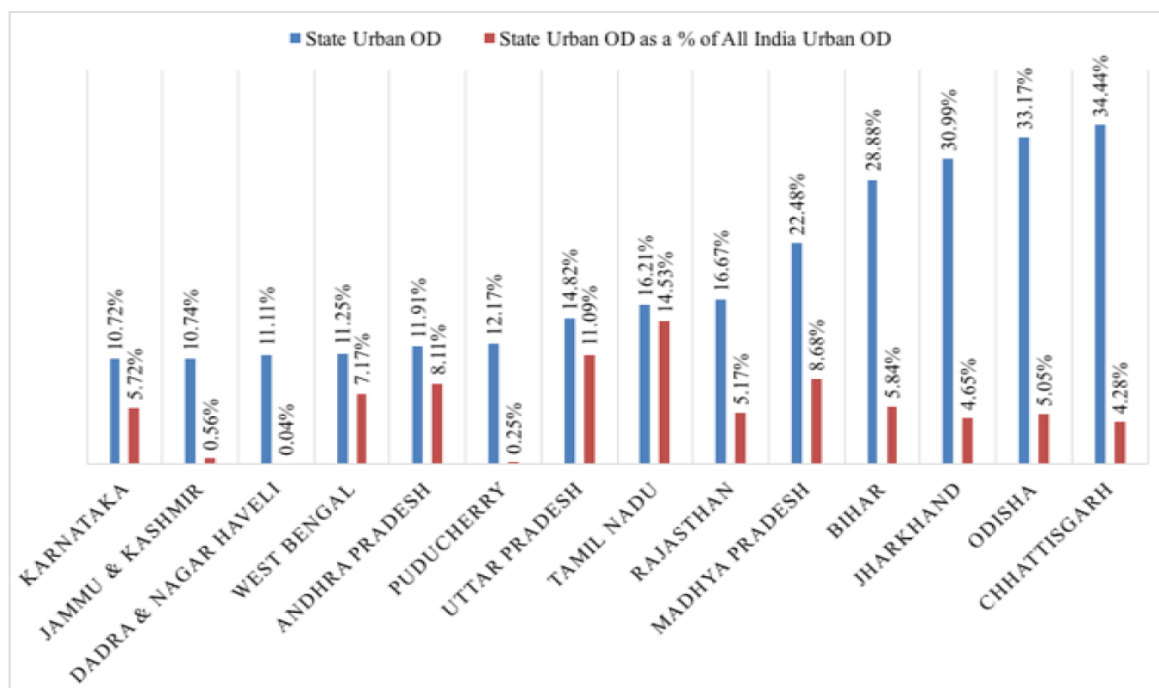
### **1.6 (3): National Urban Sanitation Policy**

In India due to rapid urbanization, every year thousands of people migrate from rural areas to urban areas. The rapid pace of urbanisation is not matched with the expansion of sanitation facilities in the urban areas. As per the 2011 census more than 31.61 million of population lives in urban areas. The government of India under the Ministry of Urban Development (MoUD) launched the National Urban Sanitation Policy (NSUP) in October 2008 to provide sanitation facilities to all urban households. The main aim of the NSUP is “All Indian cities and towns become totally sanitized, healthy and liveable and ensure sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women” (NSUP, 2008).

According to government of India only 32.7 per cent sewerage were connected to a pipe sewer system and only 30 per cent sewerage treatment plants were installed. The data shows that more than 14 million households do not have any kind of sanitation facilities. The figure 1.1 shows that, 7.8 per cent of the HHs do not have access to any toilet facilities and defecate open. Due to the poor sanitation, more than 60 per cent of the country GDP is being lost in addition to environmental damage. More than 37 per cent of the total human excreta generated remain un-disposed. In addition, it is estimated that more than 30 million households are connected to a septic tank. However, the sludge management continues to be a major issue in most of the cities and towns. The situation has detrimental effects on water resources. As more than 75 per cent of all surface water is contaminated and it adversely impacts the health of the population (GoI, 2012).

As per the 2008 National Urban Sanitation Policy (NSUP), the key sanitation issues in India are lack of awareness, social and occupational aspects of sanitation, fragmented institutional roles and responsibilities, lack of integrated city-wide approach, limited technology choice, reaching the un-served poor and lack of demand responsiveness, figure 1.1 shows that in 14 states across India people defecate in open.

**Figure 1.1: States with more than 10 % Urban Open Defecation in India, 2011**



[Source: Census of India, 2011, CPR Analysis]

According to the NSUP the specific goal will be achieved based on some broader areas such as awareness generation and behavioural change on issues of sanitation, open defecation free cities, Focus on integrated city wise sanitation, hundred per cent sanitation and safe disposal of waste will be providing, proper operation and maintenance of all sanitation installations and implementation support shall be extended to the agencies engaged in sanitation service sector.

#### **1.6 (4): Sanitation Policy in Odisha**

According to the government of India, “sanitation is a state subject ground on implementation and sustenance of public health and environmental outcomes require strong city level institutions and stakeholders” (RGI, 2008). In India there are some common elements existing in all urban areas and some of factors, specific situation varies from state to state and city to city with respect to sanitation climate, economic, socio-political and institutional set up. Therefore, each state needs to plan its own strategy and their respective city sanitation plan which is overall in conformity with the national level plan. To improve sanitation condition in Odisha the first Urban Sanitation Strategy (USS) was started in 2011 with the aim to make the cities and towns of Odisha totally sanitised, safe, healthy, and liveable. National Urban Sanitation Policy (NSUP) 2008 was lunched under the guidance of Housing and Urban Department, Government of Odisha.

In urban Odisha the condition of water supply and sanitation is dismal and access to safe drinking water is a major issue. Almost half of the HHs did not access safe drinking water supply and only 42 per cent have access to treated drinking water and less than 57 per cent have sources within their premises. The data on sanitation shows that more than 35 per cent of the urban HHs didn't have access to any type of toilets facilities. As per 2011 census, Urban Odisha is second highest open defecation State in India. Odisha is second in the five most critical states (Chhattisgarh, Odisha, Jharkhand, Bihar, and Madhya Pradesh) with very high urban open defecation (RGI, 2011). Table 1.1 shows district wise average urban population Open Defecation (OD) per cent to district urban population and proportion of district urban population to total urban population in Odisha. In Khordha district, approximately 48 per cent of population lives in urban area. The data also shows that, more than half of the urban population (53per cent) practices OD. Bhubaneswar is the capital city of Odisha

situated under the Khordha district. Where highest government and non-government funding is being allocated for infrastructural development, still more than half of the population is going for OD Which has shown a negative impact on the development and growth of the capital city.

**Table- 1.1: Urban Population and Open Defecation in Districts of Odisha**

District Names	Proportion Of District urban population to total urban population in Odisha (%)	Average OD(%) in different Districts of Urban Odisha
Khorda	15.51	53
Ganjam	10.98	54
Sundargarh	10.52	43
Cuttack	10.47	55
Sambalpur	3.79	50
Puri	4.41	50
Baleshwar	3.62	43
Kendujhar	3.62	47
Jharsuguda	3.31	37
Koraput	3.23	38
Anugul	2.95	36
Mayurbhanja	2.76	44
Balangir	2.75	52
Bhadrak	2.66	55
Bargarh	2.15	56
Rayagada	2.10	47
Jajapur	1.93	52
Kalahandi	1.74	45
Dhenkanal	1.68	55
Jagatsinghapur	1.66	44
Nabarangapur	1.25	46
Kendrapara	1.19	42
Nayagarh	1.14	46
Kandhamal	1.03	48
Gajapati	1.01	61
Sambalpur	0.71	65
Malkangiri	0.71	53
Nuapada	0.49	50
Debagarh	0.32	45
Baudha	0.29	46

Source: Census of India, 2011 file:///C:/Users/hp/Downloads/Policy-Manual-Guidelines\_OUSPpercent20Policypercent202017percent20(2).pdf

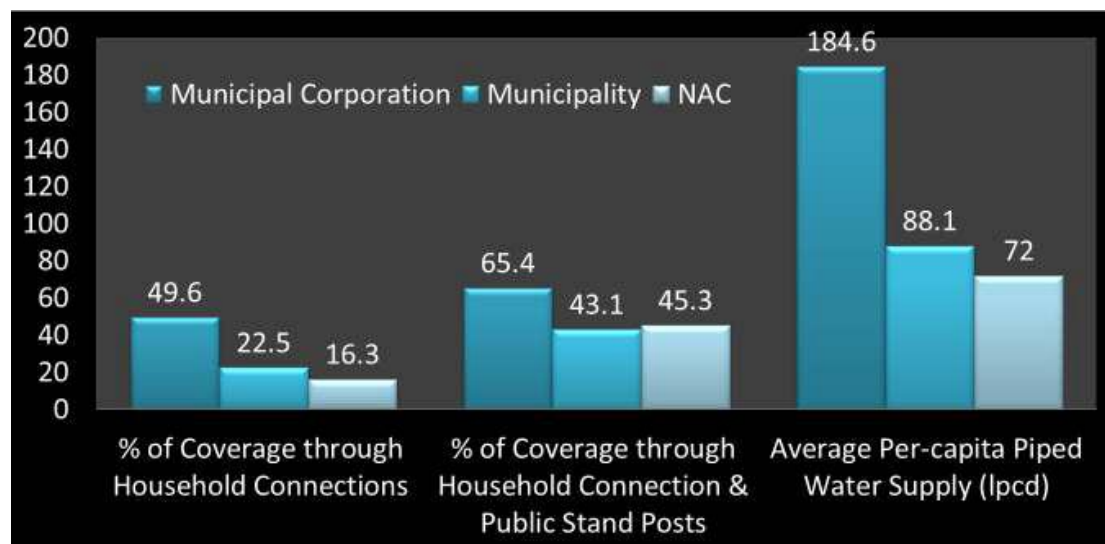
### **1.6 (5): Coverage and Per Capita Water Supply in Urban Odisha**

In Odisha, there are 103 urban local bodies (ULBs) in 30 districts, three municipal corporations, 36 municipalities and 64 Notified Area Councils (NACs). In Odisha, the

public health engineering organization (PHEO) provides drinking water to all the Urban Local Bodies (ULBs). The sources of drinking water supply in urban Odisha are surface water and ground water. Daily 793.642 million litres of drinking water is supplied in 103 ULBs. In Odisha under 103 ULBs a total of 1872 wards are there out of which 1153 wards have piped water supply, 564 wards are partially covered by piped water supply and 155 wards do not have piped water supply (GoO, 2013).

Various studies show that in Odisha, 6.1 million of the population is getting pipe water supply and average 127 litres per capita per day (lpcd) from PHEO. The rate of supply of water varies from town to town, at present in Bhubaneswar the water supply rate is 265 lpcd, 199 lpcd in Balungao, 169 lpcd at Cuttack, 165 lpcd Koraput, Hirakud, and 165 lpcd in Sambal Pur. Many areas get very less water supply for example 12 lpcd in Belpahar, Kotpad, followed by Rairkhol at 21 lpcd, Choudar 24 lpcd, Athagher at 25 lpcd, Binka at 29 lpcd and the maximum level of 70 lpcd in the towns. Figure 1.2 shows the coverage of household with piped water supply, public stands post and average per capita water supply in the Bhubaneswar city by the municipality corporation (Rath, 2010; Satapathy, 2012).

**Figure-1.2:** Average per-capita piped water supply and coverage in ULBs of Odisha 2012-13



Source: Housing and Urban Development Department of Odisha. [http://www.urbanodisha.gov.in/\(S\(mmsysc45j1g52d55er0ffn45\)\)/pdf/annual\\_activity\\_report/Annual\\_Activities\\_Report\\_2012-13.pdf](http://www.urbanodisha.gov.in/(S(mmsysc45j1g52d55er0ffn45))/pdf/annual_activity_report/Annual_Activities_Report_2012-13.pdf) Access on 24/11/2015

### 1.6(6): Condition of Water Supply and Sanitation in Bhubaneswar City

Population of Bhubaneswar is growing very fast. As per the 2011 census, the population density in Bhubaneswar city is 6533 persons per square kilometre which is

higher than the state average population growth. Table 1.2 shows that, the growth of population in Bhubaneswar has increased 50 times during the period from 1951 to 2011. The geographical area of the city also has expanded in the same duration (Census, 2011)

**Table- 1.2: Population Growth Trends in Bhubaneswar City**

<b>Census Year</b>	<b>Population</b>	<b>Decadal Growth Rate</b>	<b>Area (Sq.Km.)</b>	<b>Density Per Sq. Km.</b>
<b>1951</b>	16512	-	25.90	638
<b>1961</b>	38211	131.41	50.25	760
<b>1971</b>	105491	176.07	65.03	1622
<b>1981</b>	219211	107.80	92.91	2359
<b>1991</b>	411542	87.45	124.91	3299
<b>2001</b>	648032	57.46	135.00	4800
<b>2011</b>	881988	36.10	135.00	6533

Source: Census Report 2011, CDP, Bhubaneswar (2006)

With urbanisation slums have also grown in the city where 30 per cent of population lives in slums (Praharaj, 2017). The data also mentioned that, in the city there are 436 slums and only 116 slums are authorised by state government and fall under the jurisdiction of Bhubaneswar Municipal Corporation. The condition of water supply and sanitation facilities remain poor in slum areas. More than 80 per cent of the population practice open defecation due to various reasons such as poor economic condition and lack of space to construct toilet inside the house. In slum areas, only 18 per cent of the population uses toilets inbuilt in the house while two per cent of the households used community toilets (Sathpathy, 2012).

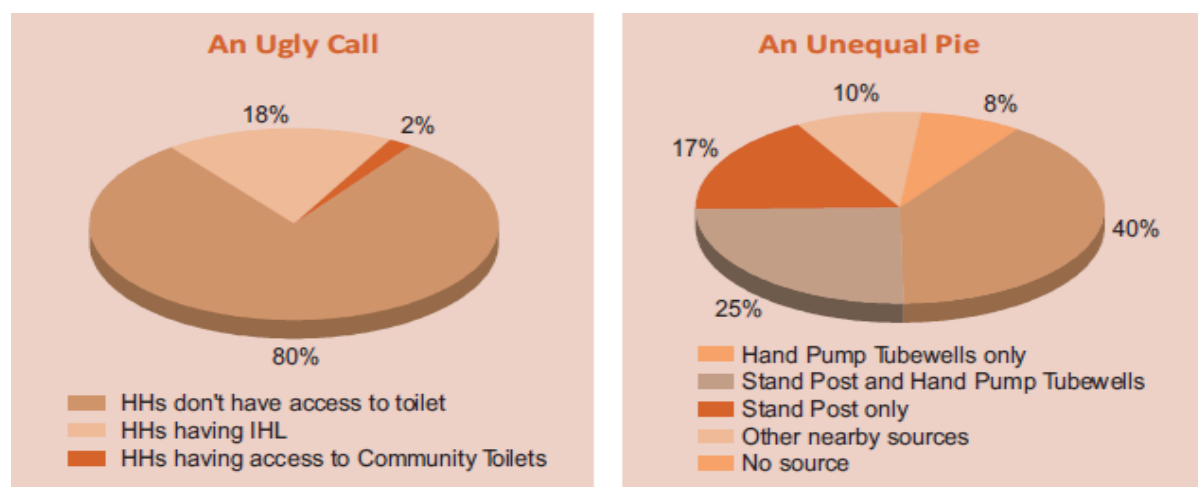
In Bhubaneswar city, PHEO and BMC have taken an initiative role for providing water supply facilities. In the city also surface and ground water is the main source of drinking water. Data shows that 75 per cent of daily requirement of potable water are from 'Manhanadi' and 'Daya' rivers and rest of the water requirement is fulfilled by open wells and tube wells. In the city presently water supply is 275 lpcd. Data shows that everyday 206 Million Litres Daily (MLD) (surface: 166 MLD+groundwater 40 MLD) water supply for nearly 7.50 lakhs population in 2005. Currently, water supply per capita is 181 lpcd but demand is 242 lpcd per capita. The pipe water supply covers 911km and it covers about 55 per cent of the total road length of 1600 km by PHED in other words Only 17 wards are fully covered by piped water supply and 26 wards out of 46 wards are partially covered while rest of wards do not have water supply facilities. Other wards are mainly covered by Tube wells and wells for fulfilling their



everyday water needs. The coverage of water supply does not fully cover the majority of the population. Especially in urban poor (slum) areas, water coverage of local point distribution of network, public stand post tube wells details are not available. Even in peripheral areas, water supply information in terms of distribution where the water supply is weak, where is water distribution inequitable, where is water supply services connection is illegal/uncountable is not available. In these areas there is a need for equitable system of water supply facilities and cost also needs to be recovered (USAID, 2006).

The current water supply is insufficient to meet the people’s demand for maintaining their day to day life activities. Every year population grows rapidly in the city and the demand for water supply is increases. Data also highlights that two third of slum areas do nothave access to safe drinking water facilities (BMC, n.d; USAID, 2012). Only 17 per cent of the slum areas have access to pipe water supply facilities through public stand posts in their locality and one fourth of slums depend upon both public stand post and hand pump/tube wells across the city. The duration of water supply is a major problem for accessing water facilities, data reported that water accessed only two hours a day in 69 slums while 17 slums reported that they accessed water an hour a day and some of the slums accessed for less than that. Data also mentioned that 10 per cent of the sources are from open wells and ponds. Eight per cent of slums did not have access drinking water facilities (Satpathy, 2011). Figure 1.3 presents the access to water supply and sanitation facilities in slums of Bhubaneswar city (USAID, 2012).

**Figure- 1.3: Slums’ Access to Water Supply and Sanitation Facilities in Bhubaneswar City**



Sources: USAID 2012, <http://populationfoundation.in/wp-content/uploads/2015/09/WASH-Fact-n-Factors-Bhubaneswar.pdf> Accessed 13/05/2017

### **1.6(7): Bhubaneswar Municipal Corporation (BMC)**

Bhubaneswar Municipal Corporation is divided into three zones namely North-zone, South-zone and South-West Zone on the basis of ward to provide better services and facilities. Figure shows the Zone map of BMC. BMC provides basic facilities such as: proper housing, drinking water supply, sanitation, electricity, road, medical, education and transportation facilities under the various central and state government schemes. Currently BMC extended over an area of 135 squares Km and as per the new master plan city area has been extended over 233 Km. including nearby towns such as Khurda and Jatani. Table 1.3 picts the profile of BMC in Bhubaneswar city. Every year city is expanding due to various reasons and migration is one of the major factors. Due to the high density of population, BMC fails to provide basic infrastructural facilities to all parts of the city. In the city as per the 2011 census more than nine lakhs of population are living but the quality of service and infrastructural facilities is very poor especially in terms of water supply and sanitation.

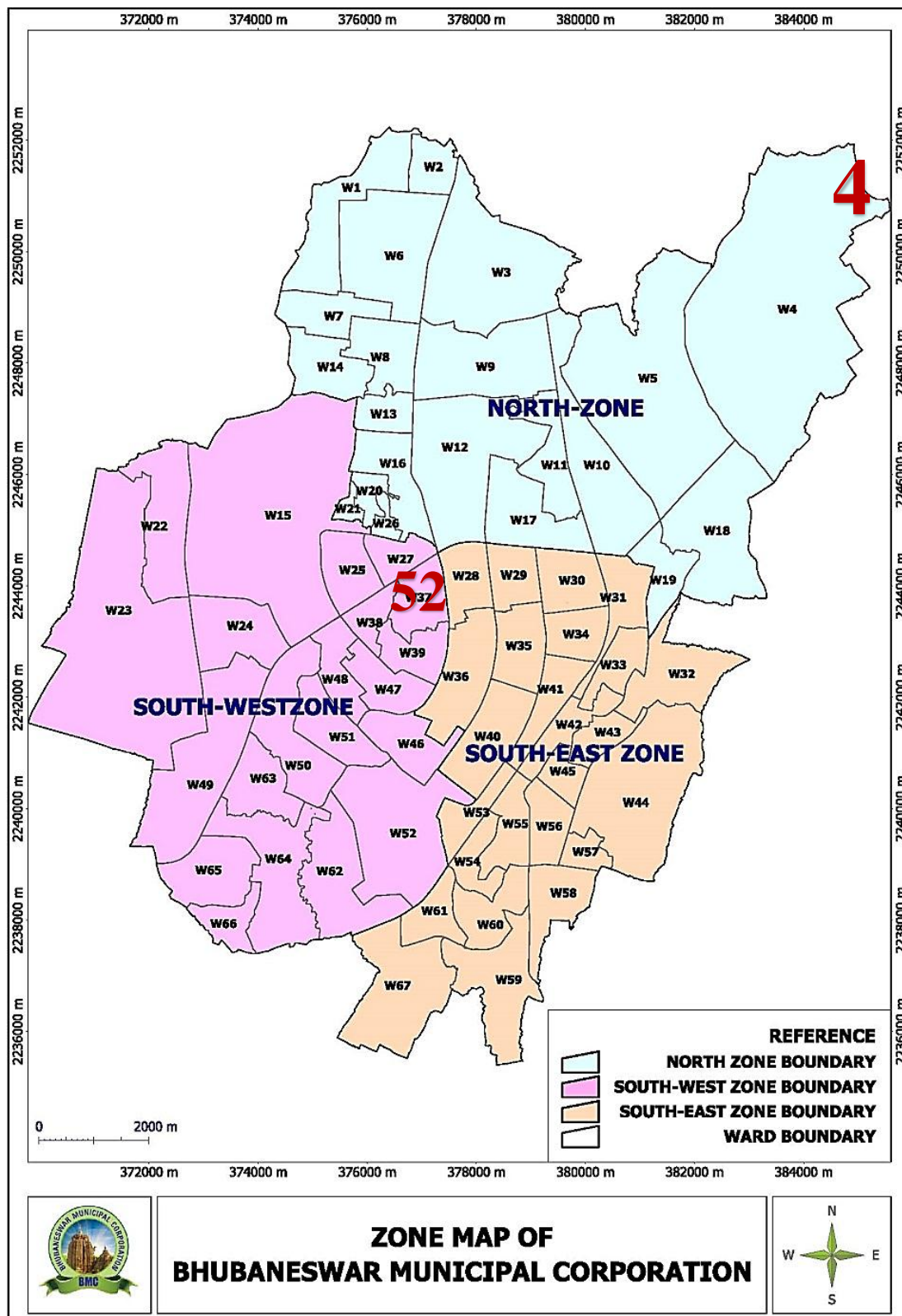
**Table- 1.3: Bhubaneswar Municipal Corporation (BMC) Profile Details**

District	Khordha
State	Odisha
Country	India
Area	135 Sq.km
Height from Sea Level	45 Mtrs.
Population	8,40,683 lakhs ( as per 2011 census)
No. of Wards	67
No. of Revenue villages	46
No. of Houses assessed to Tax	78,846 ( approximately)
Head Office	1
Officers Quarters	4
Staff Quarters	181
Slum Quarters	187
Public Library	1
Hospital	1
Allopathic Dispansary	5
Homeopathic Dispansary	11
Market	13
Sulabha Sauchalaya	11
Public Toilet	6
Public Urinal	9
Public Park	7
Ponds	20
Fountain	3
Bacteria free Cold Drinking Water Supply System	4
Water Supply Centre	5
Water Supply Pump House	10
Anganwadi Centre	111
Balwadi Centre	2
Burial Ground and Crematorium	1
Veterinary Dispansary	1
Kine House	3
Slaughter House	1
Temple	3
Club	4
Kalyan Mandap	7
Jatri Niwas	1
Working Women's Hostel	1
Total Road Length	915.12 Kms.
Black Topped	563.39
Cement Concrete	51.00
Metalled	181.75
Un-metalled	67.12
Earthen	51.86
Length of Drain	541.60
Street Light Points	
Slums	377
Slum Population	3,08,614
Slum Household	60,126
Kiosks	55
B.M.C Park	14

Source: Bhubaneswar Municipal Corporation Profile

<http://bmc.gov.in/BMCProfile.asp?lnk=1 andPL=4-As> Accessed on 11/05/2015

**Map- 1.1: Zone Map of Bhubaneswar Municipal Corporation**



Source: Zone Map of Bhubaneswar Municipal Corporation <http://bmc.gov.in/ZoneOffice.aspx>  
 Accessed on 21-1-2016

### **1.6(8): Sanitation Facilities in Bhubaneswar City**

In Bhubaneswar City, BMC is taking most challenging role to provide city dwellers a healthy life and clean city. Availing central assistance under the Central Pollution Control Board, BMC prepared a Detailed Project Report (DPR) for management of solid waste in corporation area with a total project cost of Rs.23.68 crores. Sanitation workers have been engaged in cleaning work to provide healthy life and clean city. Sanitation worker is mainly engaged to provide sanitation services such as segregation of waste at the source of generation, house -to-house collection of wastes, cleaning of roads, night cleaning on busy and important roads, market areas and transportation of waste from different areas up to the selected disposal site, collection of wastes from a particular area/lane in a fixed time by using wheel barrows/pedal bicycles etc. For providing better sanitation services to citizens, BMC has privatized sanitation/cleaning services in respective 57 wards out of 67 wards and rest of 10 wards are under the BMC supervision for sanitation/cleaning work. Number of wards taken by three private agencies such as Jagruti, PMR and Ramky are 28, 14, and 15 to start initiatives for providing sanitation service facilities in city under the supervision BMC (BMC, n.d; USAID, 2006). From Table 4 we can see that there are Sulabha Sauchalya (11), Public Toilet (6) and Public Urinal (9) in the city. The condition of public toilets is very poor and majority of population do not use public toilets due to lack of water supply and cleanliness, most of the people do not use as there are high chances of infection (BMC, n.d).

In Bhubaneswar city, BMC is mainly taking responsibility of solid waste collection, transportation and disposal within the city municipal limits which is mainly handled by the municipal organization body. Every day approximately 300 MT municipal solid waste is generated (both the biodegradable and non-biodegradable) in the city. Every day per capita 400 grams' waste is generated which is higher than the normative standards of 250 grams per capita. Various sources of waste generation are domestic chores, fruits and vegetable markets, hotels and restaurant, fish/ meat shops, market, street sweeping, hospital, office and institutions are generated more solid waste in the city. Report mentioned that a scientific and well developed process of source segregation and storage of waste at sources was observed to be generally absent resulting in a disorganized and ad-hoc primary collection. Report also

mentioned that there are possibilities of introducing source segregation initially at few areas especially in commercial and high class well developed residential areas of the city. Otherwise most of the places did not have bin storage of domestic, trade, institutional waste sources and very less household use buckets, plastic bins and plastic bags to keep the waste. In most of the residential areas, they throw waste on streets, drains or public and private open spaces and it affects the quality of general environment (USAID, 2006).

Many private organisations have also been participating in solid waste management which is encouraged by ULB. In the city, BMC is taking initiatives to collect garbage from households and establishments of store waste so that it is not to thrown on the street or any other open places and deposit these in the community storage bin. Another important point that needs to be addressed are issues concerning guideline related to kind of storage, receptacles, segregation of waste so that it will be easy for those who are engaged in this work. At streets or any other source, wastes are collected by the sanitation workers but non degradable waste are not separated so it hampers uniformity with biodegradable waste (USAID, 2006).

### **1.7: Schemes of Water Supply and Sanitation in Bhubaneswar City**

In Bhubaneswar, the Municipality Corporation/ Committee (MC), Urban Local Bodies (ULBs) and Public Health Division (PHD) are primarily responsible for providing basic services such as water supply and sanitation in urban areas. But due to the high growth of population and lack of resources these agencies are unable to handle the current situation and incapable for increasing the quality of basic services in urban areas. To overcome the problem, the government of India formulated and implemented some schemes like Jawaharlal Nehru National Renewal Urban Mission (JnNRUM), Accelerated Urban Water Supply Programme (AUWSP), Low Cost Sanitation Programme (LCSP), National Slum Development Programme (NSDP), Mega city schemes like Swarna Jayanti Shahari Rozgar Yojana (SJSRY), Basic Services for Urban Poor (BSUP), Valmiki Ambedkar Awas Yojana (VAMBAY), and Integrated Development of Small and Medium Towns (IDSMT) for infrastructure development in urban areas with the special focus on water supply and sanitation (GoI, 2009). But even after the implementation of various programmes for water

supply and sanitation the results are still not satisfactory to addressing the issues. Some of these schemes are discussed as follows:

### **1.7(1): Smart City**

The government has introduced smart city mission in India on 25 June 2015. The main objective of the programme is to provide core infrastructure and decent quality of life to its citizen and to provide a clean sustainable environment and application of smart solutions. The core infrastructure provided in smart city includes adequate water supply and sanitation, electricity supply, affordable housing for poor, soild waste management, efficient urban mobility, public transport, robust IT connectivity, digitalization, good governance, especially e-Governance and citizen participation, sustainable environment, safety security of citizens particularly women, children and elderly, health and education. The report also mentioned that the area redevelops including urban slums, into better planned human settlement and improving liability of the whole cities. The living standard will also improve through the employment and enhances income for all especially urban poor and leading to inclusive Cities. Regarding coverage, 100 cities will be selected and duration will be five years (2015-2020). In first round 20 cities were selected, where Bhubaneswar is ranked one to implement the smart city programme. In second round 63 potential smart cities participated of which, 27 cities have been selected in 2016. In third round 45 potential smart cities participated of which, 30 cities have been selected in June 2017. Both state and central government share fifty/fifty financial support after selection of smart cities and total investment of Rs.1, 89, 155 crores have been proposed for 90 cities under the smart city plans.

### **1.7(2): Atal Mission for Rejuvenation and Urban Transformation (AMRUT)**

The government of India has launched the Atal Mission for Rejuvenation and Urban Transformation (AMRUT). The main aims of the AMRUT scheme are providing basic amenities facilities such as households, water supply and sanitation, sewerage and infrastructural facilities which will improve the quality of life for all especially poor and the disadvantaged. Regarding water supply the scheme has mentioned water supply including augmentation water supply, water treatment, water treatment plants and universal metering. Then rehabilitation of old water supply system as well as old

treatment plants, rejuvenation of water bodies especially for drinking water supply and recharging of ground water. Special water treatment agreement should be initiated for difficult areas, hill and coastal cities, including those having water quality problems.

Then the scheme involves that decentralization, networked underground sewerage system including augmentation of existing sewerage system and sewerage treatment plants, rehabilitation of old sewerage system and treatment plants. Under the scheme there is plan to initiate work for recycling of water for beneficial purposes and reuse of waste water. The scheme works on seepage, storm Water drainage, Urban transport, green space and parks, bring reforms in the management system, and support and capacity building. The scheme also will be giving importance on lands, staff salaries of both the state/ULBs, power, telecom, health, education and wage employment programme and staff components. The mission will be completed over a period of five years i.e from 2015 to 2020. During 2011, The High Powered Expert Committee (HPEC) estimated 39.2 lakhs corer for urban infrastructure of the funds required over a 20-year period, at 2009-10 prices (MoUD, 2015)

The JnNURM programme shows that infrastructure facilities have direct impact on people's needs such as providing tap water connection and toilet facilities to all households that's why the purpose of Atal Mission for Rejuvenation and Urban Transformation (AMRUT) is to ensure that every household has access to a tap water with assured supply of water and a sewerage connection, to increase the amenity value of cities by developing greenery and well maintained open spaces (e.g. parks), to reduce pollution by switching to public transport or constructing facilities for non-motorized transport (e.g. walking and cycling). All these outcomes are valued by citizens particularly women, and indicators and standards have been prescribed by the Ministry of Urban Development (MoUD) in the form of Service Level Benchmarks (SLBs) (MoUD, 2015)

### **1.7(3): Jawaharlal Nehru National Renewal Urban Mission (JnNRUM)**

In 2005 the central government introduced JnNRUM scheme for integrated planning for infrastructure development of the basic services for urban poor. The JnNURM aimed to create economically productive, efficient, equitable, responsive cities. It



focuses on improvement of economic and social infrastructure of cities, to improve and ensuring basic service facilities to the urban poor, initiating wide range urban sector reforms to remove legal, institutional and financial constraint that have implication for investment in urban infrastructure services and strengthening municipal government and their functioning. JnNURM is implemented to improve the standard of living of the urban poor in the country (Chatterjee, 2013; USAID, 2006). The Mission has two broad objectives:

- 1- Urban infrastructure development
- 2- Basic services for urban poor

The first objective has two components to cover 65 selected cities in the country in the first Stage-Component; One, Urban Infrastructure and Governance (UIG), and two, urban Infrastructure Development Scheme for Small and Medium Towns or (UIDSSMT).

The second objective addresses the needs of the urban poor through the Basic Services to the Urban Poor (BSUP), and Integrated Housing and Slum Development Programme (IHSDP) under the JnNRUM programme. In Odisha the JnNRUM programmes covers mainly Bhubaneswar, Puri. The Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) covers Cuttack, Sambalpur and Berahmpur cites in the first stage (GOI, 2005; GoO, 2006).

#### **1.7(4): Swachh Bharat Mission (SBM)**

The government of India has lunched Swachh Bharat Mission (SBM) on 2<sup>nd</sup> October 2014 to make India free from open defecation by the end of 2<sup>nd</sup> October 2019 on occasion of the 150 birth anniversary of Mahatma Gandhi. The SBM also planned to provide hundred per cent scientific management of solid waste in 4, 041 statutory towns of the country. The main objective of the mission is elimination of open defecation, eradication of manual scavenging, use of modern scientific methods for solid waste management, bring behavioural change to inculcate healthy sanitation practices, to generate awareness about importance of sanitation and its linkages with public health. The SBM also aims to improve capacity augmentation for ULB's and to create an enabling environment for private sector participation. The target of the mission is to construct 66.42 lakhs individual household toilets, 2.52 lakhs

community toilets, 2.56 lakhs public toilet and achieving hundred per cent door to door garbage collections (GoI, 2017).

### **1.7(5): Urban Infrastructure Development Schemes for Small and Medium Towns**

The government of India also started urban infrastructure development schemes for small medium town under the JnNRUM schemes. The scheme was funded by both state and central government where 80per cent of funding is provided by centre and rest by the state government. The main objective of the programme is to improve infrastructural facilities and help create durable public assets and quality oriented services in small cities and towns. Take steps to, enhance public-private-partnership in infrastructural development and promote planned integrated development of towns and cities. In Odisha under the urban infrastructure development schemes for small medium town seven projects were being started in different towns. One of the projects includes development of an integrated storm and drainage system in Bhubaneswar city at the cost of Rs 567.24 crores (GoI, 2009).

### **1.7(6): Accelerated Urban Water Supply Program**

The accelerated urban water supply programme (AUWSP) was started by the ministry of urban development. The broader objectives of the programme are to provide safe, adequate water supply and betterment of the life in towns. The programme focuses to provide water supply in those towns where the total population is less than twenty thousand. In Odisha, 35 towns are selected under the AUWSP Schemes. The estimated total cost of the programme is Rs 7,523.97 Lakhs and approximately 8.15 lakh population will get its (Sathpathy, 2012).

### **1.7(7): Odisha Integrated Sanitation Improvement Project**

The Odisha integrated sanitation improvement project is started under the government of India and the Japan International Cooperation Agency (JICA). The JICA is the only financial agency that provided over Rs 2,291 crores to Odisha water supply and sewerage board (OWSSB). The first phase of the project is started in Bhubaneswar city and Rs 754 crores are allocated for construction of sewerage system. Another project is also started in Cuttack with an estimated of cost around 954 crores. The similar sewerage system is also purposed in four different cities in Odisha like Sambalpur, Berhampur and Rourkela (Satapathy, 2011).

### **1.7(8): Basic Services to Urban Poor (BSUP)**

As mentioned earlier basic services to urban poor (BSUP) is one of the objective of the JnNRUM. The main aim of the programme is alleviation of poverty amongst the slum dwellers. The basic services include provision of shelter, basic services and other civic amenities to urban poor. The programme aims to provide support in various sectors such water supply and sanitation, sewerage, soil waste management, urban transportation, renewal of inner city areas, preservation of water bodies and integrated development of slums. In Odisha six projects are started in different cities under the BSUP scheme. In Bhubaneswar under the schemes four projects have been started in different places namely Bharatpur Vikash, Dumuduma, Damana and Gadakana. (1) For the development of Baharatpur Vikash Nager slum 1135 houses are sanctioned, Rs 3023 lakhs are allocated for the same under the supervision of Bhubaneswar Municipal Corporation. (2) For Dumuduma area, 735 houses are sanctioned the estimated budget of Rs 1922.66 lakhs is provided to the society for the promotion of area resource center (SPARC) under the guidance and supervision of BMC. (3) In Nayapalli Sabar Sahi 73 houses are sanctioned which will cost Rs 174.37 lakhs under the SPARC. (4) In Damana and Gadakana 92 houses are sanctioned a cost of Rs 677.51 lakhs under the supervision of Bhubaneswar Development Authority (BSUP, 2010; GoO, 2011).

### **1.7(9): Integrated Housing and Slum Development Programme (IHSDP)**

As per the 2001 census the cities/towns not covered under JnNRUM, the Government of India introduced The Integrated Housing and Slum Development Programme (IHSDP) for improvement of slums in town/cities. The Valmiki Ambedkar Awas Yojana (VAMBAY)<sup>4</sup> and the National Slum Development Plan (NSDP)<sup>5</sup> are two schemes under the IHSDP to improve housing conditions and development of basic

---

<sup>4</sup> The Valmiki Ambedkar Awas Yojana (VAMBAY) is primarily meant to provide shelter or upgrade the existing shelter for people living Below Poverty Line in Urban Slums, with a view to achieve the goal of "Shelter for All". The objective is also to utilize this initiative to achieve the Habitat goal of slumless cities. Equally important is the objective to provide not just shelter for the urban poor but also a healthy and enabling urban environment, to help them to come out of their poverty level. To this end, there is need to dovetail VAMBAY with NSDP and SJSRY to ensure that shelter delivery, environment improvement and income upgradation for the urban poor are synergised. <http://www.saciwaters.org/watsan/pdfs/vambay.pdf>

<sup>5</sup> Integrated Housing and Slum Development Programme aims at combining the existing schemes of VAMBAY and NSDP under the new IHSDP Scheme for having an integrated approach in ameliorating the conditions of the urban slum dwellers who do not possess adequate shelter and reside in dilapidated conditions. <http://mhupa.gov.in/writereaddata/IHSDPper cent20revisedper cent20guidelinesper cent202009.pdf>

infrastructure for slum dwellers. In Odisha, two districts; Bhubaneswar and Puri are covered under the JnRUM for the infrastructure development of slum areas and the rest of cities/towns are covered by the IHSDP. Eighty per cent cost of the scheme is sponsored by the central government and the rest of the cost is beard by the state government. The beneficiaries from general caste have to contribute 12 per cent of the housing cost while and SC/ST/BC/OBC/PH have to pay 10 percent. This cost also includes the infrastructure development like water supply, sanitation facilities, roads, electricity, education facilities etc. The government of India has already sanctioned 32 projects in 29 ULBs under IHSDP for 12, 773 houses along with infrastructure facilities with an estimated cost of Rs 258.79 lakhs (Satapathy, 2012).

### **1.7(10): Integrated Low Cost Sanitation (ILCS)**

The integrated low cost sanitation schemes (ILCS) is introduced by the Ministry of Housing and Urban Poverty Alleviation. The main aim of the scheme is to provide new latrines to economically weaker sections in urban areas who do not have latrine in their houses. The main target of the scheme is to improve overall sanitation in urban areas. Under the scheme, the centre provides 75 percent, state 15 per cent and beneficiary has to share 10 per cent of the cost for built latrine in urban area. The government provides an amount of Rs 12, 500 for the states with difficult and hilly terrain under the schemes. Under the schemes the government of Odisha constructs latrine in two phases. The first phase covered 12 municipalities and 13 Notified Area Council (NACs). The second phase covered 18 NACs in both the cities Bhubaneswar and Sambalpur (Satapathy, 2012; GOI, 2008; GOI, 2012).

### **1.7(11): Water ATM**

In Bhubaneswar, the BMC provides water from the ATM for urban poor. In the city the BMC has installed water ATM at different places. One ATM can store a minimum of five hundred litres and maximum of forty thousand litres. So far the BMC has installed 40 water ATMs in different places in the city and the ATM water runs on solar power. The urban poor get free drinking water by smart card and for that people need to pay Rs-25 to fetch water from the ATM (Times of India, n.d.).

### **1.7(12): PIYUSH**

In urban area, unauthorised water connections lead to loss of revenue collections, negative impact on people's health due to contaminated water and inadequate treatment. The Odisha government has launched PIYUSH schemes to provide the universal water access to all the section society. The main aim of this programme to access safe drinking water supply connection for urban poor's to paying only 500 rupees in 5 equal monthly instalments. In Odisha, Public Health Engineering Department (PHED) supplied water all 103 local bodies, 13 divisions, 11000 staffs and 300 engineer spared in the state. The Public Health Engineering Organization (PHEO) organised one-day "*connection mela*" for the connection water supply in local areas. The local dwellers put their application and get the connection same day (GoO, 2014; Satapathy, 2012).

Even after the implementation of all the schemes and programmes in the urban Odisha, the overall water supply and sanitation coverage are not satisfactory due to various reasons. For example, Jawaharlal Nehru National Urban Renewal Mission (JnNURM) and Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) covers only few towns of Odisha. As per the 2011 census in India, 137.49 lakh households or 17.4per cent urban population are living in slum areas. In state like Andhra Pradesh, Madhya Pradesh, Chhattisgarh, Odisha, West Bengal more than one in every five urban households lives in slum. Water supply and sanitation are major problems in the city and especially for urban poor due to various issues.

### **1.8: Five Year Plans for Water Supply and Sanitation**

The government of India has introduced various plans for water supply and sanitation facilities through different five year plans. Table 1.4 shows that water supply and sanitation facilities that have been introduced since the first five-year plan to twelfth five-year plan.

**Table-1.4: Water supply and Sanitation in Five Year Plans**

<b>Year</b>	<b>Silent Features</b>
<b>1951-56 (1<sup>st</sup> Five-Year plan)</b>	Water Supply and Sanitation added to a national agenda. Sanitation not accorded any importance and barely mentioned under Water Supply
<b>1954</b>	First National Water Supply and Sanitation programme launched as part of Health Plan. Equal funding provided by central and state governments for rural piped water supply schemes and digging of wells and bore wells. Rural schemes provided in settlements with fewer than 5,000 people
<b>1956-61 (2<sup>nd</sup> Five-Year Plan)</b>	The sector did not figure at high priority level, but funding was provided to develop and strengthen State Public Health Engineering Departments (PHEDs)
<b>1961-66 (3<sup>rd</sup> Five-Year Plan)</b>	“Problem Villages” were identified as those without drinking water source within distance of 1.6 kilometres (in the plains) or an altitude of 100 meters (in hill areas), those endemic to waterborne diseases and those where water sources contain excess salinity, iron, fluoride or toxic Elements.
<b>1968</b>	The state was given financial authority to sanction rural water supply schemes, which were expanded to include population units less than 20,000. Priority was given to villages with acute scarcity of drinking water
<b>1972-73</b>	Accelerated Rural Water Supply Programme (ARWSP) launched to supply water to villages with “backward class” populations
<b>1975</b>	ARWSP was replaced by the 20-Point Minimum Needs Programme (MNP) aimed at full coverage
<b>1980-85 (6<sup>th</sup> Five-Year Plan)</b>	Importance given to the sector increased, keeping in view the UN Mar del Plata declaration of March 1977 about the International Decade of Drinking Water Supply and Sanitation from 1981-90
<b>1980-81</b>	Low-cost sanitation scheme initiated in urban areas
<b>1985</b>	Rural Water Supply and Sanitation, which was under the Ministry of Urban Affairs and Employment, was handed over to the Department of Rural Development, then it came under the Ministry of Agriculture
<b>1986</b>	Central Rural Sanitation Programme and National Technology Mission launched. Latter was created after a midterm assessment of the progress under the ARWSP during the International Drinking Water Supply and Sanitation Decade revealed that progress was slower than expected.
<b>1987</b>	National Water Policy drafted for the first time by the Ministry of Water Resources, with an emphasis on domestic water supply, protection of groundwater sources, and water quality monitoring and mapping.
<b>1991</b>	National Technology Mission renamed as Rajiv Gandhi National Drinking Water mission aimed at covering rural areas in a cost-effective manner before the end of the 8 <sup>th</sup> Five-Year Plan
<b>1992-97 (8<sup>th</sup> Five-Year Plan)</b>	(8 <sup>th</sup> Five-Year Plan) Problems with the sector identified and reform agenda put forward. The Emphasis on treating water as a commodity, privatisation, local bodies for operation and maintenance, proper linkage between water supply and sanitation
<b>1993-94</b>	Accelerated Urban Water Supply Programme (AUWSP) initiated to provide water to towns.
<b>1994-95</b>	Mega-City Scheme launched in five metro cities

<b>1999</b>	After many changes back and forth, the Ministry of Rural Development was created in its current form. Within it, the Department of Drinking Water Supply started to oversee rural water supply and sanitation programmes. Urban water supply and sanitation allocated to the counterpart Ministry of Urban Development, under overall guidance for planning and coordination from ministry of water resources.
<b>1997-2002(9<sup>th</sup> Five-Year Plan)</b>	Objective: 100 per cent water supply coverage in urban and rural areas, 60 per cent sanitation coverage in urban areas and 30 per cent in rural areas, emphasis on decentralization and privatization, both in rural and urban sectors
<b>2002</b>	National Water Policy (NWP) amended. Shift in focus: priority to provide drinking water to humans and animals, regular monitoring of surface and ground water quality, regulating the use of ground water
<b>2002-07 (10<sup>th</sup> Five-Year Plan)</b>	Objective: 100 per cent coverage of urban and rural population, water to be managed as Commodity, change in the role of government from direct service provider to facilitator leading to privatization. Focus not only on investment requirements, but on institutional restructuring, better services, people's participation, and also managerial improvement
<b>2007-2012 (11<sup>th</sup> Five Year Plan)</b>	Department of Drinking Water and Sanitation upgraded as separate Ministry of Drinking Water and Sanitation
<b>2012-2017 (12<sup>th</sup> Five Year Plan)</b>	Sanitation coverage from the present levels to cent per cent rural sanitation coverage by focussing on issues such as sustaining toilet usage and behaviour change, variable performance across states and districts, accelerating the programmes to address the uncovered as well as population growth, improved targeting of the poorest households, addressing solid and liquid waste management, improving accountability for performance, and improving data-collection systems and reconciling different estimates of coverage and behaviour change.

Source: Access of the Poor to Water Supply and Sanitation in India: Salient Concepts, Issues and Cases: <http://www.ipc-undp.org/pub/IPCWorkingPaper62.pdf> Accessed on 19/5/2014

From the Table 1.4 we can conclude that both Central and State government are equally responsible to provide water supply and sanitation facilities. The central government is dealing with planning, designing, construction, operation water supply and it is further maintained by the state government (Acharya, 2015). Under government supervision, various agencies play important roles and try to give an improved quality of water supply and sanitation for public usage. Despite these policies and programmes approximately 32 per cent of the households (RGI, 2011) across the country still lack to access safe drinking water and sanitation.

### **1.9: Provisioning of Water Supply and Sanitation**

Social and economic inequalities mediate and/or obstruct access to water supply and sanitation services (Masson and Messello, 2017). There are various issues such as

policies, provisioning, economic, political, socio-cultural, environmental, infrastructural, administrative, technological and educational issues to find out urban people face the problem to access water supply and sanitation facilities. Various studies have discussed these issues related to water supply and sanitation.

### **1.9(1): Policies and Provisioning**

The study conducted by Panda and Agarwal (2013) study on public provisioning of water and sanitation in slums of Delhi shows that inadequate provisioning and poor implementation of schemes and programmes affects water and sanitation services. The adequate policy priorities can be fixed to provide essential facilities such as water supply and sanitation in slums of Delhi. The study also mentioned that issues such as lack of decentralised planning, centralised budgeting, shortage of human resources and poor convergence among implementing agencies need to be surmounted for the smooth implementation of programmes and schemes. Another study by (Wankhade, 2015) on 'urban sanitation in India- key shifts in the national policy frame' shows that the inadequate sanitation remains a major cause of disease in India. The study concludes that the sanitation policy needs to take cognizance of gaps in the entire waste cycle and to ensure they are addressed. Special attention should be paid to service provision to the urban poor and the state needs to extend focus to all cities, irrespective of size (Wankhade, 2015). Robert and Rouse (2013) in their study found that slow policy responses, are largely inadequate to address the challenges of maintaining water security. Therefore, hundreds of millions remain water insecure in the country.

### **1.9(2): Economic Factor**

Economic issues play a major role in accessing water supply and sanitation facilities Haller et al. (2007) study shows that high access cost of water supply and sanitation facilities is a major reason for high mortality rate in developing countries. Inadequate water supply and sanitation leads to 1.8 million diarrhoeal deaths which includes 90 per cent of children under age five. WHO-UNICEF (2002) study shows that poor economic condition is a main reason for people to fail to access safe drinking water and sanitation facilities in developing countries. Unsafe water supply and poor sanitation causes an increase of 10 per cent in the total global burden of disease.



Bajpai and Bhandari (2001) in their study show that in India many cities and towns people cannot access tap water supply facilities provided by municipality due to poor economic condition. Anand (2007) conducted a study in Chennai's slums and found that, slum dwellers face problems in accessing water supply. Robert and Rouse (2013) in their study shown that the risk to universal drinking water security are accelerating due to rapid demographic, climate and economic change. People are forced to pay high cost to private tanker to get drinking water. NSSO (2009) report findings indicate that the lower the Monthly Per Capita Expenditure (MPCE) quantile, the higher possibility of lack of access to toilet facilities. Gupta and Ghosh (2006) in their study mentioned that the urban poor suffer the most because of inadequate water supply as they can't afford to pay for bottle water nither they cannot afford to spend time standing in lines to get water.

### **1.9(3): Political Factor**

Politics plays an important role in provision of water supply and sanitation facilities. Bapat and Agarwal (2003) in their study show that politics plays a crucial role in accessing supply water and sanitation facilities. In Mumbai municipality election where voters demanded that '*whoever will give us water is going to get our votes*'. Edelman and Mitra (2006) study shows that in slum areas mainly low income households are living therefore government need to make rational policies to provide basic facilities. Bouselly (2006) study shows that most of the slums are unplanned settlement and have limited access to basic services. The social position, political links, and cost play a crucial role in accessing water supply. Truelove (2011) study shows that water distribution in Delhi is based on the power. Study also finds that powerful affluent families get access to clean water easily and poor people suffer a lot. Due to scarcity of water poor people, especially women and girls are forced to illegally to fetch water from tankers to fulfil their basic needs. Both government and nongovernment organizations implemented various programme to solve water supply and sanitation issues in slums. But these programmes reach only some families (Agarwal and Tanjena, 2005).

The current government has introduced Swachh Bharat Mission (Clean India Campning) on 2 October 2014 of Gandhi Jayanti, inaugurated by the Prime Minister India. The SBA sets of goals to make India clean by 2019. In SBA all citizens to be

part of this mission but some of issues which are unobserved and not discussed for the duration of SBA lunch ceremony. It is very important to understand why SBA campaigning for cleanliness should start from a Valmiki colony which is mainly occupied by sanitation worker? So that indicated to symbolism and trained by casteism. Otherwise why that cleanliness campaigning programme only started from Valimiki colony? In SBA campaigning both politician and celebrities for brandishing new brooms at the launch venue when particular caste has been engaged in cleaning activates. Another important point is that, as per the 2011 census more than 68 million populations are living in slums. If sanitation workers collect waste and garbage, then where will they dispose it off? The reality is that if workers are collecting the garbage they do not have place to dump and they do not have any technology for recycling the garbage and converting to energy, which can be used as fuel (Kumar, 2014).

The current government has also introduced a 'Smart Cities' mission which has been inaugurated by the Prime minster India on 25 June 2015 as mentioned earlier. The concept of 'smart city' is not accepted universally and it varies from city to city and also country to country. In India there is no proper definition of smart cities but it's an imagination of citizens to develop infrastructure and get better service facilities. The urban planner mentioned that it will provide better infrastructural and service facilities in smart cities which mainly deal with the four things such as development-institutional, physical, social and economic infrastructure point of views. In a smart city for Infrastructural facilities one of the core elements is to provide adequate water supply and sanitation facilities for the citizens. To provide better sanitation facilities in smart cities it will need more importance on sanitation worker who directly and indirectly involve contributing clean environmental and clean infrastructural facilities. The current government distributed hundred smart cities among the states and United Territories (UTs) in India. Without involvement and contribution of sanitation workers in sanitation work it is not possible to imagine smart cities in India. Government need more important worker's point of view and use advance technology for cleaning purposes. Otherwise in India without providing proper sanitation facilities and safety of workers, who are engaged in this work, it seems quite impossible to achieve smart cites mission (GoI, 2015).

#### **1.9(4): Socio-Cultural Factors**

Socio-cultural issues are important factors to access water supply and sanitation facilities. In a study Jha (2010) finds that people have strong faith in religion, and believe in purity and pollution. Therefore, notion of pollution and purity acts as a strong barrier to accept indoor toilets. Caste system plays a crucial role to access to basic service facilities like water supply and sanitation (Acharya, 2013). Coffey and Spears (2017) in their study mention that purity and pollution plays an important role reject government latrine offered by Pradhan in western Uttar Pradesh. Noga and Wolbring (2012) in their study show that in Bangladesh disabled people cannot use public toilets because people believe that disability is a transmitted disease and it spared by infection. Chaplin (2011) in his study finds that in mega cities like Mumbai, Delhi and Kolkata government is unable to provide water supply and sanitation facilities due to high growth in population. To cover the large areas, the government is allocating public funds to private organisations to provide water supply and sanitation facilities. Sabot (2012) in his study shows that the scarcity of water resource is result of uncontrolled population growth, deforestation, poor sanitation and improper solid waste management. Another study by Kundu (1991) finds that river water is mainly polluted by sewerage and discharge of untreated chemical waste from the factories. In urban areas people face problem to access drinking water and due to water pollution. Vijaya et al. (2010) study finds that lack sewerage system is responsible for the dwindling quality of ground water.

#### **1.9(5): Administrative Factor**

Poor administrative management is another cause for poor water supply and sanitation provision. Evan (2007) in her study shows that millions of urban dwellers are excluded from water supply and sanitation services because of lax administration. Due to limited access of water supply and sanitation they pay high cost and get poor quality of water from unreliable sources. In these urban poor areas safe sanitation and hygienic practices are totally absent. The root cause of poor water supply and sanitation is inability of city manager and their advisory plan. The study also shows that the physical location, lack of voice and day by day reality of many poor urban people from their greater vulnerability in accessing services which are captured by the urban elites. Bownder and Chatrri (1984) in their study show that poor management is

responsible for poor water supply. Study describes that a person openly defecates due to poor sanitation, lack of awareness, no availability of toilets, available public toilets are grimy, dark, stinky, or unattractive (due to non-maintenance), toilets are available but there is a risk, e.g. the public toilets are common for all, public toilets are not available as part of the household but only at some distance and it may be dangerous to go there at night. Ajibade et al. (2015) in their study show that to provide adequate drinking water supply and proper sanitation to public, the government needs to adopt a better management strategy. Those organizations have taken the responsibility of water and sanitation services have to coordinate with each other. Without better management strategy and cooperation level of water and sanitation, coverage would remain poor. Evans (2005) in his study found that the root cause of lack of water supply and sanitation service in urban poor due to inability of utility and city manager and their advisor to plan and implement the policy.

#### **1.9(6): Technological Factors**

Indian states have the worst infrastructure for water supply and sanitation (Dutta et al., 2016). In the current situation of the high growth in urban population, use of technology can play a crucial role in designing water supply and sanitation system (Ali, 2008). Another study shows that the per capita urban water use can be significantly reduced through the use of new water technology. The technology deals with saving water, leakage and pressure control, domestic water recycle and large scale interventions (Suzenet et al., 2002). Another study mentioned that, it is not only the quantity that matters, but also the quality. This means that technology design of toilets and its fit to environment and providing quality of water supply (Dutta et al., 2016). Kumar (2014) in his article cites the example of European countries who are using technology for cleaning work, for example to clean sewerage, robotic technology. Indian government needs use modern technology for cleaning sewerage.

#### **1.9(7): Gender Related Factors**

Every person has the equal set of rights such as civil, political and social right. When it comes to water insecurity then it compromises all these rights. A woman spends long hours collecting water, or who suffers from constant water-related illness has less capacity to participate in society (HDR, 2006). Another study shows that the

women are responsible for fetching water from distant sources (Venkatachalam, 2011). The girl child is four times more accountable than male child for fetching water from distance sources (Poulos et al., 2012). Women are forced to collect water faraway from household and spend hours in long queues as water is not accessible or not within the vicinity in both rural and urban areas. The lack of water availability/ accessibility is a root cause of poverty and gender inequality. Lack of ownership of land by women is a major challenge to access water. It is a key reason for the greater poverty of female headed households. For the household uses the women need water like men need for cultivators but it is rarely recognised by policy makers, donors or academicians (Paul, 2017). Koonan and Bhullar (2014) in their studies show that due to lack of sanitation facilities, women face several health, safety, and dignity issues including physical and sexual violence.

### **1.9(8): Caste Factors**

In India, improving the access to water supply and sanitation for all sections of society is has become a significant development priority in recent decades (Shreyaskar, 2016). Caste plays a crucial role in determining access to water supply and sanitation. Banerjee (2015) in his study mentioned that the caste/tribe status has direct link with access to water supply and sanitation. Only 55 per cent of SC and 57 per cent of ST households have drinking water within premises whereas the national average for the same is 71 per cent access to drinking water within premises. Similarly, double number of SC and ST defecate in the open as compared to the national average. Joshi (2011) in his study mentions, there is complex interlinkages between caste and gender that define water allocation and access among users. This is a result of entrenched fractures in the structure and culture of the policy implementation and institutional regulation.

Kumar (2014) in his article mention, the government had introduced Total Sanitation campaign to providing proper sanitation facilities. For the total sanitation campaign the budgetary allocation approved is only 0.04 per cent of India's GDP in 2011-12. For India, which is one of the second highest populated country in the world it is impossible to maintain cleanliness with such less budget? In the country political leader should raise the issues when campaign was being launched by the government. Why this issue is not pointed out by any political party is a big question mark in the

history of Indian politics. Strong caste politics by upper caste tends to discriminate lower caste because in sanitation work majority of workers are from lower caste. Only launching the campaign and completing right words will not affect the programme. If SBA is to be a fact, then both government and citizens have to engage in sanitation work like: sweeping, garbage collection toilet cleaning, dumping garbage, creating separate place for garbage collection and other work related to sanitation then it will be possible to make India clean (Kumar, 2014).

### **1.9(9): Environmental Factor**

The decline of ground water is a major challenge today. According to central ground water board (CGWB) report said that only 3per cent well structures registered a rise in water level more than four meters, 35per cent showed lesser rise and 64per cent well showed decline in water level in the year ending January 2016 (Goodpal, 2017). Increased number of tube wells and a decline in average annual rainfall are the cause of decline ground water in India (Reddy, 2007). In Bhubaneswar city, the ground water is rapidly declining. As per the CGWB report the trend of ground water is decreasing from 2006 to 2015. The water level fluctuates during pre-monsoon and post-monsoon seasons. The deforestation and rapid urbanization do not let the rainwater to infiltrate the soil (Pradhan, 2016). Sabat (2012) in his study found that in Bhubaneswar, during summer seasons the ground water level decreases which results in water scarcity in the city. In long term, the water demand will increase. So government need to focus more on proper planning, programme provisioning and coverage point of view for water supply facilities to all.

More than 21 cities are going to be get water worse mainly run out groundwater by 2020 (Oak and Pingale, 2019). Now some cities are facing ground water crises severely like Chennai, has lost 33 per cent of its wetlands in the last one decade (Dutta, 2019). According to the central water commission, 44% rainfall deficit in Tamil Nadu till June 13- 2019. Majority of the city population are dependent on water tankers for fulfil the requirement of daily drinking water. The municipal stop supply for daily requirement of drinking water. Scarcity of water supply the sanitation condition very poor. People are waiting for hours for long queues to get water from tanker. The packaged water also gone up four times higher than actual rate. Many restaurant and hotels are shut down due to stop supply water. The IT sectors

companies asked to employees to work from home. The Centre for Climate Change reported that Chennai has lost huge areas water bodies due to development project and illegal encroachments over decades (Dutta, 2019).

In Ranchi, Kishorganj area where municipal water tank sharing resulted in a fracas with five persons stabbed. All are admitted in government hospital. One of the victim who stabbed five times during the incident. A case under attempt to murder and other charges have been booked in police station. The water crises Ranchi severely due to ground water depletion and the lack of water supply to the tail end through surface reservoirs. The ground water depletion mainly due to lack of ground water recharge. Less rainfall and rain water passing as run offs. Deep borings in apartments and households, shrinking natural water bodies have also lowered the ground water according to exports (Indian Express, 2019).

### **1.9(10): Conflict over River Water Sharing**

In India, more than 500 million people are affected severely form water scarcity this year and 40 percent of India is facing drought condition. Most of the cities are build at river banks. Hence, river water is a major source of water supply and irrigation in all the states (Oak and Pingale, 2019). There are disputes over sharing of river water amongst the states in India Odisha and Chhattisgarh are fighting over the distribution of Mahanadi river water. Tamil Nadu and Karnataka are fighting over Cauvery river water. Detail of Inter-State Water Disputes Tribunals mentioned in Appendix D. In last few years Chhattisgarh government constructed six barrages namely Kalma, Saradihi, Mironi, Basantpur, Seorinarain and Samoda, which could store 27.48 million acre-feet (MAF) water. Seven other barrages are under construction to extract more water from Mahanadi river (Firstpost, 2019). The Odisha government claimed that the Chhattisgarh has “illegally” obstructed water of the Mahanadi river and its tributaries through a number of barrages. Chhattisgarh can stop the natural water inflow into the Hirakud reservoir in Odisha. If the water flow is affected, then it will severely impact whole of Odisha. Mahanadi river water plays crucial role in agricultural and economic development of the state. Therefore, on May 16, 2019 the current ruling party (Biju Janata Dal) of Odisha announced the ‘Janasachetanta Yatra’ an awareness campaign across the 15 district where the Mahanadi river flows. The BJD sent a 12-member team to Chattishgarh to inspect the construction of barrages

(Ratha and Patra, 2017). The team is supposed to provide the technical advice, the team involved of three former engineers-in-chief of Odisha government. The team found that the Chattishgarh government has been providing water to industries, instead of irrigation and drinking purposes (Firstpost, 2019).

On July 2016, the Chief Minister of Odisha wrote a letter to the Prime Minister of India regarding the concern of barrages construction by Chhattisgarh government on Mahanadi river. These barrages would hamper the water flow into Hirakud dam which affects irrigation and supply of drinking water in the state (Newslick Report, 2018; Ratha and Patra, 2017). He also demanded an immediate stay on these projects but the central government take less interest to resolve the issue. So the state government moved to the Supreme Court. The supreme court gave order to Union government to set up Mahanadi tribunal. In India, various states government are politicising inter-state water sharing disputes (Newslick Report, 2018).

### **1.10: Providers Engaged in Water Supply and Sanitation Work**

In urban areas municipal and PHDE bodies play a major role in provisioning of safe drinking water supply and sanitation. Sanitation workers also play major role in providing accesses to sanitation facilities. In India, under the municipality bodies, more than 1.2 million sanitation workers are engaging in sanitation work such as garbage collection, sweeping, drainage cleaning, disposing of animal dead bodies, cleaning community toilets those results in the direct contact of human excreta, liquid waste from the toilets and domestic waste. One of the important question is how can any human being be impelled picking up other's faeces?

The *Shudra* are consider as untouchables because of polluting nature of their occupation which include skinning dead animals, disposing carcasses, butchery, removal of human waste, attendance at cremation grounds, washing clothes. They face social distance as well as exclusion is common in both villages and cities. In the urban areas, those who are involved in sanitation work make up 98 per cent of the workers belonging to this particular caste (Desai & Kulkarni, 2008).

Persons engaging in sanitation hail from Dalit communities. They are known by different caste names across the country. In northern India they are called Bhangi, Balmiki, Chuhra, Mehtar, Mazhabi, Lal Begi, Halalkhor etc. Har, Hadi, Hela, Dom



and Sanei etc. In eastern India; Mukhiyar, Thoti, Chachati, Pakay, Relli etc are calling in northern India. In southern India they are calling Mukhiyar, Thoti, Chachati, Pakay, Relli etc. In Southern India; and Mehtar, Bhangias, Halalkhor, Ghasi, Olgana, Zadmalli, Barvashia, Metariya, Jamphoda and Mela etc. In western and central India, they made an effort to get united to have a common name. As per the 1911 census they were listed as Adi Dharmi, Adi Dravida, Adi Karnataka and Adi Andra (Tiwari, 2014). Total 1,80, 657 sanitation workers were working across the whole of India as per the socio-economic caste census of 2011 (Ghosh, 2017). But government have very less emphasis on condition of sanitation workers those contribute and play major role in public health. Even government have failed to provide minimum safety measures and basic equipment for sanitation workers (Sharma, 2015).

### **1.10(1): Socio-Economic Condition of Sanitation Worker**

Exclusion and discrimination in India is as old as the country's history (Banerjee, 2015). D'Souza, (1990) in his study shows that in urban areas there is ample of evidence that shows that workers belonging to the particular schedule caste, are paid less wages in informal sector. Various studies have shown that in different parts of India, there is perpetuation of low socio-economic status of schedule caste in urban areas (Ramachandran, 1989; Kosambi, 1994; Gill, 1987; Sinha, 1984; Kumar and Venkateshwarlu, 1980). Shamlal (1992) conducted a study in Jodhpur on Bhangi caste. The study found that the Bhangis occupy low position and they are involved in cleaning job. They are forced to live in isolated place and denied the use of public facilities such as: public wells, schools, hotels, temples, and common sitting places etc. Vivek (1989) in his study found that, these sections of people in Mumbai are more discriminated and neglected. These workers have crucial roles in life Mumbai city but they are most neglected and suffer from illiteracy, poor living condition, poor health and financial constraints.

Kumar (2014) argues that Indian society has been showing that upper caste has wide range of choice in occupation and polluted jobs are connected with lower caste with lower wages. Still more than 700,000 Indians are engaging in manual scavenging for earning money to maintain their day to day life and family needs as per the estimated by Asian Development Bank (ADB) in 2009. The Article 17 of the constitution in India, mentions that manual scavenging historically linked to practice untouchability

and this continuation practices have disallowed. Under the 1993 act concerned that ban to continue construction of dry latrines, construction of water-seal latrines and prohibition of employment of manual Scavengers. After implementation of law, still employment of manual scavenging and dry latrines is continuing and particular section of population is engaging in this work. A study in Gujarat shows that total 2.5 per cent of population is involved in sanitation work and majority of workers belonged to Valmiki Caste. Majority of the sanitation workers live illegally on government land in kutcha houses<sup>6</sup>. Most of the households lack toilets and drinking water is purchased from private providers. Generally, people were going outside open defecation.

Kumar (2014) study also shows that most of sanitation worker's children did not go to schools. Many dropped out after primary school. Those who discontinued school were engaged in cleaning work, garbage collection, or worked as a child labourer. In the sanitation work those are engaging as contractual worker they are getting only hundred rupees which is very less than permanent workers or as daily labourer. Study also shows that after death of a worker who was engaged in sanitation work, if any of his family member joins sanitation work they did not get full wage. Mohanty (2013) in his study found that the low socio-economic status and low level of parental education are responsible for their engagement in sanitation work.

Most of the households engaged in sanitation work are economically poor. Study illustrates that 88 per cent of the households do not have any saving account or health insurance. Many of times they have to borrow money from moneylenders, contractors, private loans at very high interest rate. Such workers spend approximately 25 per cent of their income in repaying the loan (Sharma, 2011).

A study conducted in Jaipur City in Rajasthan, shows that in sanitation work most of the time female member are engaged in sweeper work. Male members are engaged in garbage collection, drainage cleaning, garbage dumping etc. Every day sanitation workers are working for 8 hours under the contractor. Majority of workers did not get salary and most of time they are spending their own money to buy broom. Every

---

<sup>6</sup> Kutcha House: The walls and/or roof of which are made of material other than those mentioned above, such as unburnt bricks, bamboos, mud, grass, reeds, thatch, loosely packed stones, etc. are treated as kutcha house. [http://mospi.nic.in/Mospi\\_New/upload/statistical\\_year\\_book\\_2011/SECTOR-4-SERVICEper cent20SECTOR/CH-28-HOUSING/HOUSING-WRITEUP.pdf](http://mospi.nic.in/Mospi_New/upload/statistical_year_book_2011/SECTOR-4-SERVICEper cent20SECTOR/CH-28-HOUSING/HOUSING-WRITEUP.pdf)

month workers are getting salary 2400-2600 which is very less after working eight hours daily. Most of the workers did not use safety equipment and contractor also did not give any safety measure such as boot, mask, gloves, soap and uniform during on work time. When they are working in field area they did not get basic facilities such as toilets and drinking water. Especially female members are facing more problems than male members in odd times. During working time if anybody have any health related problem or meets with an accident the contractor did not provide any medical facilities (Das & Takahashi, 2009, p. 4). Every year thousands of workers die inhaling poisonous gas and perilous working conditions in sewers. Sanitation workers did not get safety gears from municipalities and government did not pay adequate attention to them when unnecessary deaths have been occurring.

Gender plays an important role in sanitation work. As per the 2011 census, there are 794,390 dry latrines in India from which the human excreta are removed by human beings, mostly by Dalit women (Joy and Bhagat, 2016). In sanitation work; female members are more engaged in door to door garbage collection and street sweeping work. Mostly female members are engaged in sweeping work. It is important to find out why female members are more engaged in sweeping work in sanitation? The idea mainly came from the patriarchal notions of women who keep the houses clean and in the Indian tradition and culture, women are mainly involved in early morning sweeping work to clean in front of house daily. The point is that for maintaining cleaning work, women hold more responsibility than male member. In both the government and private sector women sanitation worker are paid lower wages than men. So the double burden of paid and unpaid work creates extreme poverty of working women. Majority of female workers face health related problems due to dust and suffers heart and lung related problems. The data also show that majority of female workers reported that they are facing internal problems such as stomach and chest pain (Bhalla and Kaur, 2011). Venkatesh (2014) in his study found that women sanitation workers faced the viral and bacterial infections and that affect their skin, eyes, limbs, respiratory and gastrointestinal.

Koonan (2013) in his study found that in India manual scavenging is a serious sanitation challenge. Those female workers are working in the street, majority of them are facing toilets related problem and control in odd times. So in working areas

due to the lack of toilet facilities, people do not allow them to use personal toilet. In summer time also they are facing problem for drinking water due to lack of drinking water facilities and colonies people do not give them drinking water because of caste feeling. That is why V. Geeta (2011) defines humiliation as an experience because it is felt; it is held and savoured in the very gut of one's existence, in the core of our being. For Dalits, their body, it is ontological wounds, is prison, her/his corporal being precedes her/him and is considered as evidence of lowness. Servility, form of untouchability, denies authenticity to a being and postpones the possibility of an insight into humiliation. For example, a person who lacks self-respect, and does not aspire to attain it, cannot be humiliated because s/he lacks the capacity to aspire for self-respect (Anbarasu and Narmadha, 2015; Geeta, 2011).

Educational factor is playing major role in sanitation work, the data shows that majority of workers who are engaged in sanitation work are less educated. But upper positions of sanitation section mainly belong to higher caste people. It is directly indicating that illiterate people are more engaged in sanitation work. Another important point is that those people who are engaged in sanitation work also retire as sanitation worker because of less education and unskilled worker. When the municipal corporation has policy to give promotion lower level worker to higher level job if the worker is equipped with training and additional qualification. But majority of sanitation workers in India those are engaging in sanitation work they do not provide any training programme given by the municipality when they joined as sanitation workers. But in the same time for promotion they want skilled worker (Anbarasu and Narmadha, 2015).

In sanitation work both government and private organization have taken initiative for sanitation work due to the introduction of public private partnership (PPP) by the government. Those government workers who are in sanitation work in urban areas have less work load than the Daily wage labourer and contractual labourer. In private organization working condition is very poor and wage is very less than the government regular worker. Due to the shortage of daily wage work, majority of workers join sanitation work. Most of the days they work for more than eight hours but are not paid any extra wage by the contractors (Tam, 2002).

Kumar (2014) in his study mentioned that contractors have cheated the workers in the name of PF and ESI. Data shows that 11 per cent of workers have been cheated by the contractors. In the study most of respondent responded that they did not attain any training programme or awareness programme. If anybody is absent then per day contractor will impose a fine of hundred rupees which is deduct from the salary. If anybody will raise voice, then definitely he/she will be suspended from the job. Study also mentioned that in time of interview they have fear to loss their job. The issue of the sanitation workers is side-lined within current discourse and policy debates in India and is thus ignored by the policy makers, international development agencies, political parties and NGOs.

### **1.10(2): Health Condition of Sanitation Worker**

In sanitation work, workers are facing health related diseases due to hazardous work condition. Sanitation workers are facing health related problems due to harmful gases such as methane and hydrogen sulphide, cardiovascular degeneration, musculoskeletal disorders like osteoarthritis changes, infections like hepatitis, leptospirosis and helicobacter, skin problems, respiratory system problems and altered pulmonary function parameters (Tiwari, 2013).

Mishra, Dodiya, and Mathur (2012) in their study found that the health condition of sanitation workers is poor and sanitation work is hazardous in nature. Most of the death incidents are happening due to poisonous gases, highly toxic, road accidents, communicable such as TB, asthma, cough, backache and infections. In the study most of the respondents responded that their relatives who were engaged in sanitation workers had dies from such diseases as cancer, TB, and asthma. The data shows that 52 per cent of workers did not have any medical or health insurance facilities. Study also shows that; those are working in sewerage line reported to suffer from respiratory problems. Another important thing is because of harmful gases workers face sub-acute symptoms are including sore throat, cough, chest tightness, breathlessness, thirst, sweating, irritability and loss of weight (Mishra, Dodiya and Mathur, 2012).

Most of the time workers have been affected by infection mainly during drinking, eating, and smoking by hand to mouth. Study also found that leptospirosis another disease which is coming from contacted dead animals and their discharges. Study

concluded that, problems will be prevented to take initiative through engineering, medical and legislative measures (Kumar, 2014; Sutul and Vijay, n.d.).

Sanitation work is jeopardous work in terms of accidental injuries, infections, deaths and many other life threatening diseases. The data also shows that every year more than one thousand man die at work place. In western countries, technology is used largely and before engaging in sanitation work, workers receive proper training. But in India, there is no proper training for those who are involved in sanitation work with government, NGO and contractors. Even those who are involved in man whole work, they are also not wearing protected dress, majority of working work in loin cloth of half pants. Because they have no other options, if they use their own dress, after work it would not be usable for other time (Koonan, 2013).

### **1.10 (3): Committees and Commissions for Sanitation Workers**

Maharashtra government for the first time appointed Barve committee to study scavengers' living conditions under the supervision of Shri.V.N Barve. In 1952 Barve committee submitted report to the government. Committee reported the need of various methods for improving their condition of work and need to fix minimum wages for scavenging work. This report was distributed to each state by Ministry of Home Affairs (MHA) requesting all state to follow these recommendations. Then Kaka Kalekar Commission was introduced in 1953. The report described the condition of sweepers and scavengers as sub human and report was submitted in 1955. The committee had recommended that need to introduce new mechanical methods of cleaning latrines. So that inhuman practices should be obviated and provide schemes for covering every sphere of life to uplift workers from their Sub-human level of existence (LARRDIS, 2013).

In 1956, Ministry of Home Affairs appointed a committee called Central Advisory Board of Harijan Welfare under the chairmanship of Pandit Gobind Ballabh Pant. This committee reported on working and living condition of sweepers and scavengers in the country and recommended that government need to introduce centrally sponsored scheme for this purpose. Then Malkani Committee introduced in 1957 under the chairmanship of Prof. N.R. Malkani. The committee had taken role to understand the condition of Scavenging and submitted report on December 1960.

Committee recommended to eliminate not only practice of carrying night soil but also for filth and dignity. The committee concluded that there is need to improve working, living conditions and social status of the workers (LARRDIS, 2013).

Under the chairmanship of Prof. N.R. Malkani in 1965 the central Department of Social Welfare appointed a committee for examining the questions of abolition of customary rights of the Scavengers. The committee found that scavengers inflicted hereditary rights to clean private latrine as against another scavenger by an understanding and agreement. A customary relationship develops between householder and scavenger for which later receive some payments. Another committee under the chairmanship of Bhanu Prasad Pandya also looked at the service condition of sweepers and scavengers. The committee reported that the “*Central Government should undertake a comprehensive legislation for regulating their working, service and living conditions which should also provide for adequate inspectorate and enforcement machinery*” (LARRDIS, 2013).

### **1.11: Conclusion**

To conclude this chapter, we can say that there is a strong connection between water supply and sanitation policies, provisioning, and providers. There is huge gap between the demand for water and the actual resources available to fulfil that demand at national as well as local level, especially in Bhubaneswar city. Issues of water and sanitation have been addressed through the five year plans and other programmes and schemes like JnNURM, AMRUT, AUWSP, PIYUSH, Water ATM and SBM. Many efforts have been made by the government from the point of view of the coverage and access to water and sanitation services. The issues and concerns of the workers who provide the services have remained less addressed. The literature review clearly highlights the disproportionate share of Dalit workers in sanitation and water supply considering that they are at the lowest rung of the social ladder, there is element of apathy towards them.

## Chapter-2

### Conceptual Framework and Research Design

#### 2.1: Introduction

The present chapter covers conceptual framework, research design, sampling methods, selection of the study sites, sampling procedure, criteria for selecting respondents of the study, data source, tools of used for the research. It also explains the statistical tools used for scoring and coding, pre-testing tools, and, major obstacles during the process of data collection, ethical consideration and limitation of the study.

Considering the importance of water and sanitation services for human survival, United Nations General Assembly acknowledged that clean drinking water and sanitation are essential to the realisation of all human rights (UN, 2014). The United Nations Secretary General Kofi Annana once said, *“Access to safe water is fundamental human need and therefore a basic human right”* (Kofi, n.d). The UN Committee on Economic, Social and Cultural Rights Comment No.15 on the right to water. Article I.1 states that *“The human right to water is indispensable for leading a life of human dignity. It is a prerequisite for the realization of other human rights”* (UN, 2002). The UN Committee on Economic, Social and Cultural Rights, also emphasises the importance of sanitation facilities, the statement on the Right to Sanitation, 2010 says, *“the sanitation is fundamental for human survival and for leading a life in dignity, the right to sanitation is an essential component of the right to an adequate standard of living, enshrined in Article 11 of the International Covenant on Economic, Social and Cultural Rights”*.

As per the constitution of India, Article 21 mentions that *“the right to life is a fundamental right. Enjoyment of life and its attainment including the right to life with human dignity encompasses within its ambit...sanitation without which life cannot be enjoyed”* (Joy and Bhagat, 2016). Under the Article 21, water is defined as right to life but the fact is that the water is far away from reach of all of us (Shreyaskar, 2016). Article 246 mentions that, *“water, that is to say, water supply, irrigation and canals, drainage and embankments, water storage and water power are subject to the provisions of Entry 56 of List I. It is the Union List which deals with Inter State Water*



*Disputes, whereas Entry 6 List II deals with Public Health and Sanitation*". Therefore, the state should take responsibility to provide safe drinking water and sanitation facilities to all (Shreyaskar, 2016). Policies of water supply and sanitation are discussed below in detail.

As per the 73<sup>rd</sup> and 74<sup>th</sup> amendments passed by parliament in December, 1992. Through these amendments ensured the local-self-government in rural and urban areas. In rural area 'panchayats' and urban area 'Municipality' taken role of the "institutions self-government". Article 243G provides power, authority and responsibilities to the panchayat to provide drinking water, plans for economic development and social justice. According to Article 243W municipalities are responsible to provide water supply for domestic, industrial and commercial purposes in urban areas.

## **2.1(1): Water Supply and Sanitation Policies**

To provide adequate water supply facility, the government of India first introduced National Water Policy (NWP) in September 1987. Under the 1987 NWP various provisions are made by the government for the development of water resources and management. Then after that 2002 NWP was introduced to update the 1987 NWP through the supervision of Ministry of Water Resources (MoWR), government of India. In 2012, again NWP was prepared by the ministry of agriculture, government of India in consultation with National Water Board (NWB) and National Water Resources Council (NWRC). The objective of the 2012 NWP is to take cognizance of the existing situation, to propose a framework for creation of a system of laws and institutions and for a plan of action with a unified national perspective (GoI, 2012)

The first urban sanitation<sup>7</sup> policy was introduced in 2008. The main objective of the policy is "*All Indian cities and towns become totally sanitized, healthy and liveable and ensure and sustain good public health and environmental outcomes for all their citizens with a special focus on hygienic and affordable sanitation facilities for the urban poor and women*". In urban areas, various issues in sanitation such as: poor awareness, social and occupational aspects of sanitation, fragmented institutional

---

<sup>7</sup> Sanitation is defined as safe management of human excreta, including its safe confinement treatment, disposal and associated hygiene-related practices.

roles and responsibilities, lack of an integrated city-wide approach, limited technology choices, reaching the un-served and Poor, lack of demand responsiveness towards water and sanitation services (GoI, 2008).

### **2.1(2): Schemes and Programmes for Water Supply and Sanitation**

Through the five year plans, the central government made various policies and programmes to address the issues of water supply and sanitation facilities in India. In the first five-year plan, water supply and sanitation were added to the national agenda (Pangare, 2006). In tenth five year plan the government emphasized on urban sanitation (Pagare, 2006). To provide adequate water supply and sanitation facilities the central government introduced various schemes such as: AMRUT, Smart city, Jawaharlal Nehru National Renewal Urban Mission (JnNRUM), Accelerated Urban Water Supply Programme (AUWSP), Low Cost Sanitation Programme (LCSP), National Slum Development Programme (NSDP), Mega city schemes like Swarna Jayanti Shahari Rozgar Yojana (SJSRY), Basic Services for Urban Poor (BSUP), Valmiki Ambedkar Awas Yojana (VAMBAY), and Integrated Development of Small and Medium Towns (IDSMT) for infrastructure development in urban areas with the special focus on water supply and sanitation in urban areas (GoI, 2009; GoI, 2014).

### **2.1(3): Policies Assessing Water and Sanitation Requirements**

The requirements of water vary from place to place. A number of factors like climate, culture, food habits, work and working condition, level and type of development and physiology determine the requirement of water. As per the Bureau of Indian standards, the minimum water supply of 200 lpcd is required for domestic consumption in cities. The BIS also mentioned the amount of water supply is reduced for lower income group and economically weaker sections of the society in most of the cities and towns in the country. The water of amount required is reduced from 200 lpcd to 135 lpcd (Modi, 1989). In ninth five-year plan, the government of India mentioned that the requirement of water for the planned (sewerage) cities is 125 lpcd, 70 lpcd in cities without planned sewerage system and 40 lpcd for those who collect water from stand post (GoI, 1997). In tenth five year plan the water supply based on population, that is megacities/ metropolitan cities (150 lpcd) and 135 lpcd in non-metropolitan cities (GoI, 2002). In 1988, the national commission on urbanization

recommended that a per capita water supply (100-90 lpcd) is needed to maintain a hygienic life and ensured the same amount of water gets to all citizen (Ramachandraiah, 2001).

The main goal of total sanitation campaign is to provide “sanitation for all” by 2012 in India (ADB, 2009). As per the Millennium Development Goals, India is bound to provide improved sanitation to at least half of its urban population by 2015 and 100 per cent access by 2025 (Bhagat, 2015). In 2008, for the first time new urban sanitation policy came under the ministry of housing and urban development affairs (GoI, 2008). The NUSP’s central focus is slums where maximum number of urban poor lives. The NUSP instructed the state government to prepare detailed urban sanitation strategies and city sanitation plan. For providing proper sanitation to urban poor the funds are sanctioned from the central and state government or through the public-private partnership. Under the JNNURM second phase the urban sanitation is funded by the central government (Bhagat, 2015). To achieve universal coverage on sanitation in India, the government launched Swaccha Bharat Abhiyan (SBA) on 2<sup>nd</sup> October 2014. The main aim of the programme is to provide sanitation facilities to all by 2<sup>nd</sup> October 2019 (GoI, 2014). To achieve the total sanitation and adequate water supply goal, it is essential to create substantial financial resources and technical support to the service providing bodies such as the municipal corporations and other local bodies in urban as well as rural areas. The next section discusses the role of providers in water and sanitation work.

#### **2.1(4): The role of Providers in Water Supply and Sanitation Work**

The urban local bodies are responsible to provide water supply and sanitation facilities in urban area. World Bank (2004) also acknowledges that providers play a crucial role in improving the water supply and sanitation services. The providers are mainly responsible for collection, treatment, distribution, quality control and reuse of water. They are also responsible for establishing, maintaining and upgrading the water supply and sanitation system (GWP, 2017). Urban local bodies are required to develop and build institutional capacity and management proficiency to meet the ever increasing demand of water and sanitation facilities. To achieve it they, require financial, technical and managerial support from the government. The state water supply and sanitation departments need to provide proper training, financial and

technical support to the people engaged in water supply and sanitation service provision. Along with these it is also essential to ensure accountability on the part of service providers (GoI, 2012). In addition, to strengthen the water and sanitation policy, the government is required to give priority to improve the efficiency of providers (World Bank, 2004). It is one of the essential parts at the level of service providers to meet the policy goal, measuring progress with reference to national objectives.

### **2.1(5): The Condition of Water Supply and Sanitation**

With rapid urban growth the demand for water and sanitation has increased over the period. In India, every year thousands of people migrate from rural areas to urban area in search of livelihood. As per the 2011 census, 31.16per cent of the population was living in the 4,378 town and cities across the India. The data shows that the growth of urban population increased by 91.0 million between 2001 to 2011 (RGI, 2011). As per the 2011 census, 17.4per cent of population was living in slum areas. The growth of urban slums posed a major challenge in access of basic facilities like housing, water, sanitation, electricity, road and transportation for the urban poor. Most of the slums grew on vacant government land which often remains an illegal settlement where the state authorities are not responsible to provide basic services. The condition of slums areas is grave where people face various problems to fulfil their basic needs due to irregular and informal structure. The water supply and sanitation are one of the major problems in slums areas. Due to the poor water supply and sanitation, there is increase of 10per cent in global diseases burden. Due to the poor water supply, every year 37.3 millions of people are affected by waterborne diseases and every year 1.5 million of children die due to diarrheal disease (Joshi et al., 2014; Dhingra et al., 2008; USAID,2012).

In slums areas, the condition of water supply and sanitation is very poor. In slums, poor have less knowledge regarding improved water supply and sanitation due to their poor socio-economic condition. According to the Joint Monitoring Project (JMP) report in 2013, half of the Indian population is still practicing open defecation. The data also reported that there were 2.5 billion people who lacked access to improved sanitation (WHO/UNICEF, 2013). Poor water and sanitation not only impacts people's health and increased mortality but also is a major cause of loss to economy.

Improper planning and implementation of schemes of water supply and sanitation leads to a loss of trillions of rupees every year which was equal to 6.4 per cent of India's Gross Domestic Product (WSP, 2011; Joshi et al., 2014). Every year millions of deaths occur due to diarrhoea and the disease is more severe than any other diseases amongst young children. The poor water supply and sanitation in urban slums results in increased prevalence of various diseases and pollutes the environment. Human excreta, grey water and solid wastes are the major causes of pollution in the slum environment and are a hazard to public health in general. The high growth rate of urbanization, growth of population, poor accessibility of basic facilities and lack of legal status of slums creates a barrier to improve their access to of water supply and sanitation (Katukiza et al., 2012).

People health is directly related to safe water supply and sanitation. In slums, poor water supply and sanitation is the cause of waterborne diseases and bacterial infections. Slums people are facing various diseases such as cholera, dysentery, diarrhoea and malaria (Mara et al., 2010; Nakagawa et al., 2006; Dasgupta, 2006). The poor water supply and sanitation is the cause of poverty and create diseases, illness and low productivity (Genser et al., 2008). Acceptance of solutions for improved water supply and sanitation by the slum population is very challenging today. The poor accessibility, lack of implementation, lack of planning, lack of investment in water supply and sanitation facilities is a major problem in slums areas (Katukiza et al., 2010). Although there has been considerable annual investment in water supply and sanitation sector but it seems that the sanitation investments are reduced and the attention is more focused on water supply (Isunju et al., 2011; Joyceet al., 2010; Moe and Rheingans, 2006). In India, due to the poor policies, planning and lack of provisioning of water supply and sanitation, schemes in slums areas is unable to achieve results in consonance with the MDG target.

Table 2.1 show that Odisha ranks second highest in open defecation especially in urban area (Census, 2011) after Chhattisgarh.

**Table- 2.1: States with Highest Percentage of Open Defecation Households in Urban Area**

Sl. No	State	Total HHs	OD HHs	(%) OD HHs
1	Chhattisgarh	1,238,738	426,637	34
2	Odisha	1,517,073	503, 239	33
3	Jharkhand	1,495,642	463,521	31
4	Bihar	2,013,671	581,606	29
5	MP	3,845,232	864,280	22

Source: Census Report 2011

In Odisha there are total 138 towns/cities. The town/cities are governed by 112 urban local bodies, five municipal corporations, 45 municipalities and 65 NACs in the state (GoO, 2017). Bhubaneswar is the capital city of the state and where highest portion of population lives. The city is amongst the fastest growing cities of Odisha, more than 12 lakhs population is living in the city and 30per cent of population lives in the slums (Rout, 2008). The BMC is responsible for the provision of basic service facilities such as water and sanitation to the city population. BMC spreads over an area of 135 square kilometres divided in 67 administrative wards (Census, 2011). The city is expanding every year and rural area is coming under the urban area. In the city, people are migrating from different districts and out of the state for earning their livelihood. Due to poor socio-economic condition, they are mainly living in slums area. In the city, there are 436 recognised slum settlements. Out of these 436 slums, 320 are unauthorised slums while 120 are authorised (GoO, 2017). The total slum population, 301, 611, lives in 80, 665 households across the city (Anand and Deb, 2017).

Safe water supply and sanitation is a need of every citizen and it creates a healthy environment. It is responsibility of the BMC and ULBs to ensure its provisions related to water supply and sanitation to all urban population in Bhubaneswar city. In the city, safe water supply and sanitation facilities is the key responsibility of BMC and PHED department. All the sections of people need access to safe water and sanitation. As per the 2011 census, 35.2per cent of the urban households have no latrine facility and they defecate in open. Unsafe water supply and sanitation is harmful for the urban poor, women, children and old age people. Both state and central government have made various polices and schemes for the development of water supply and sanitation condition but still the situation has barely improved.

## **2.2: Defining Key Concepts**

Some of key concepts are defined for the present study as follows:

### **2.2(1): Urbanization**

Urbanization is an ongoing process and the urban population has grown rapidly. Today 4.2 billion of population are living in urban areas (UN, 2018). The process of urbanization has a long history (Davis, 1955). In India, the first city seems to be developed in the Indus valley civilization in the middle of 3<sup>rd</sup> millennium BC (Bhattacharya, 1979). Scholars have attempted to define urbanisation in various ways. *“In present era Urbanization is broadly defined as a process in which a large number of people are settled in a specific geographical area and people in such areas are mainly dependent on non-agricultural activities for their subsistence and government support to them”* (Orum and Anthony, 2004). According the Louis Wirth (1938) *“Urbanization, produced any of several important social consequences among people: impersonality and anonymity, loss of trust among the people and various forms of social disorganization as in higher rates of crime than in rural areas”*. Kundu (2003) highlights the that the process of urbanisation is selective and only big cities are able to harness the benefits of urbanisation. *“The process of urbanisation has also become exclusionary in nature, as only a few large cities with a strong economic base are able to raise resources for development, leaving out small and medium towns”* (Kundu 2003, 1).

### **2.2(2): Urban Poor**

Those households living below poverty line as per the government criteria or who are close to it and deprived of basic services like housing, health, nutrition, water supply and sanitation and having poor living condition. It is found that majority of the urban poor live in slums.

### **2.2(3): Slums**

In slums, people live in compact area in temporary built settlement in the cities. Usually slums are characterised by inadequate housing, overcrowding, and miserable conditions. NSSO (2001) defines slum as a *“compact settlement with a collection of*

*poorly built tenements, mostly of temporary nature, crowded together usually with inadequate sanitation and drinking water facilities in unhygienic conditions*". As per the 2011 census, slums are mainly three types such as: Notified, recognised and identified. In case of Bhubaneswar, as per the special state government act slum are categorised on the basis of land rights such as authorised<sup>8</sup> and unauthorised<sup>9</sup>. Authorised slums are approved by the BMC, existing within BMC boundaries and dwellers retain their land rights. Unauthorised Slums, are illegal settlements, on the government land and BMC do not approve of these and the dwellers do not have any land right (BMC, Officials).

*Notified Slum "All notified areas in a town or city notified as 'Slum' by State, Union territories Administration or Local Government under any Act including a 'Slum Act' may be considered as Notified slums". Recognised slum "All areas recognised as 'Slum' by State, Union territories Administration or Local Government, Housing and Slum Boards, which may have not been formally notified as slum under any act may be considered as Recognized slums". Identified slum "A compact area of at least 300 population or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitation and drinking water facilities. Such areas should be identified personally by the Charge Officer and also inspected by an officer nominated by Directorate of Census Operations. This fact must be duly recorded in the charge register. Such areas may be considered as Identified slums"* (Census, 2011).

---

<sup>8</sup>The present study uses the define the Odisha property right to slum dwellers and prevention of new slum Bill, 2012 to defines authorised as "Competent Authority means the Authority empowered under the Odisha Public Premises Act, 1972 and the Odisha Prevention of Land Encroachment"

<sup>9</sup>The present study uses the define the Odisha property right to slum dwellers and prevention of new slum bill, 2012 to defines unauthorised as "Act, 1972 to exercise power of eviction and demolition over the land on which such encroachment or construction of illegal structure or building has been reported".



#### **2.2(4): The Core and Periphery Area**

With rapid urbanisation the limits of metropolitan cities are expanding towards the periphery encompassing the nearby villages and towns in India (Bose, 1980; Prakasa Rao, 1983; Beckinsale and Houston, 1970; Premi, 1983 Shaw, 2005). These areas are termed as peri-urban as these lie between urban settlement and rural hinterland. Sita and Bhagat (2005) cited in Shaw (2005) using census data show that large metropolitan cities continue to expand laterally and are called ‘urban agglomeration’ by census. The peri-urban area is undergoing rapid change in terms of provision of infrastructure and land use pattern. Given the relatively lower land prices these are attractive spaces to establish small scale industries, build new housing colonies for the ever growing urban population (Gupta, 2015). Hence along with the core city the periphery is also bustling with economic and social activities. According to ‘World System Theory’ the concentration of power and resources lies at the core and poor resources and infrastructures are found at the peripheral area. The socio-economic status of the core and periphery may vary according to the investment made by the state as well as private developers. The present study located in Bhubaneswar city tries to understand the status of sanitation and water supply in two selected ‘core’ and ‘periphery’ areas.

#### **2.2(5): Water Supply and Sanitation Services**

The BMC and PHED provides drinking water supply in the city. The water is supplied through pipe, tanker and BMC provides public hand pump. Sanitation is defined as safe management of human excreta, including its safe confinement treatment, disposal and associated hygiene-related practices. The BMC take the responsibility to provide city dwellers a healthy and clean city. In order to provide better services to its citizens BMC has privatized sanitation services in 50 wards out of 60 wards.

#### **2.2(6): Sanitation Workers**

The sanitation workers are employed by the Bhubaneswar municipal bodies; both public and private agencies. In Bhubaneswar city more than two thousand five hundred sanitation workers have been providing sanitation services. The sanitation services include segregation of Wastes at the Source of Generation, house-to-house collection of Wastes, cleaning of roads, night cleaning on busy and important roads,

market areas, transportation of wastes from different areas up to the selected disposal site, collection of wastes from a particular area/lane on fixed time through wheel barrows/pedal bicycles, non-retention of wastes in a particular place for more than 24 hours. They work as regular or permanent employee, or daily wage worker in agencies under the supervision of BMC.

### **2.2(7): Reported Illnesses**

In the present study the reported illness refers to the illness reported by the respondents. Sometime these illnesses are not necessarily diagnosed or tested by physicians. For many illnesses the patients do not get any medical treatment. These illnesses are mainly cold, fever, weakness, headache and body pain etc. These illnesses are seen as minor and are neglected by the patient. So reported illness includes are both the diagnosed and felt illness by the respondents.

### **2.2(8): Minor Illness**

In the present study the minor illness is one that does not prolong beyond one week including the treatment period, require minimal treatment/ no hospitalisation; the treatment expenditure exceeding 500 INR not more than 1000 INR during the time of illness which may not affect the normal and functional life of the person. These criteria have been taken as the reported cases of minor illness in the study area (Lenka, 2014).

### **2.2(9): Major Illness**

The major illness affects the normal life of the person, prolongs more than one week, and requires long-term treatment/hospitalization, the treatment expenditure exceeds more than 1000 (INR). The illness hampers work and causes loss of work for the person suffering and other members of the household. It affects the economy of the households. Both minor and major illness classification is flexible in nature.

### **2.2(10): Health Expenditures**

In the study, expenditure on health is calculated on the basis of respondent's reporting. The health expenditure includes the cost of treatment like diagnosis, medicine, equipment's, transportation, food for the patient and the attendants. All expenditures on health in last six months prior to the fieldwork is added to the calculation.

### **2.3: Conceptual Framework**

Water supply and sanitation are basic elements in quality of life. Water is the most essential element to sustain life. Therefore, its supply and quality determines quality of life and impacts health. It is not only the quality of water but quantity of water supply is also important to ensure adequate average of population or households for their utilization. Sanitation has a complex association with water, its supply and quality. Inadequate water supply affects cleaning of drains and toilets and other defecating spaces. Its accesses cause water logging and over flow of drains.

Such conditions are detrimental to living spaces and environments. Besides stench and filth, it is not only hazardous to health, but also can lead epidemic if prolonged. Therefore, the state machinery for providing water and sanitation has to functioned with the guidelines emanating from the policies framed after adequate deliberations. Simultaneously, people have to be responsible in using underwater meticulously, minimising wastage; and judiciously, ensuring cleanliness in drains, toilets and others spaces used for defecation. The government has a number of schemes and programmes to address water supply and sanitation. Information about these needs to be disseminated to the people regularly and adequately. In this process the NGO and other Agencies are of equal partners.

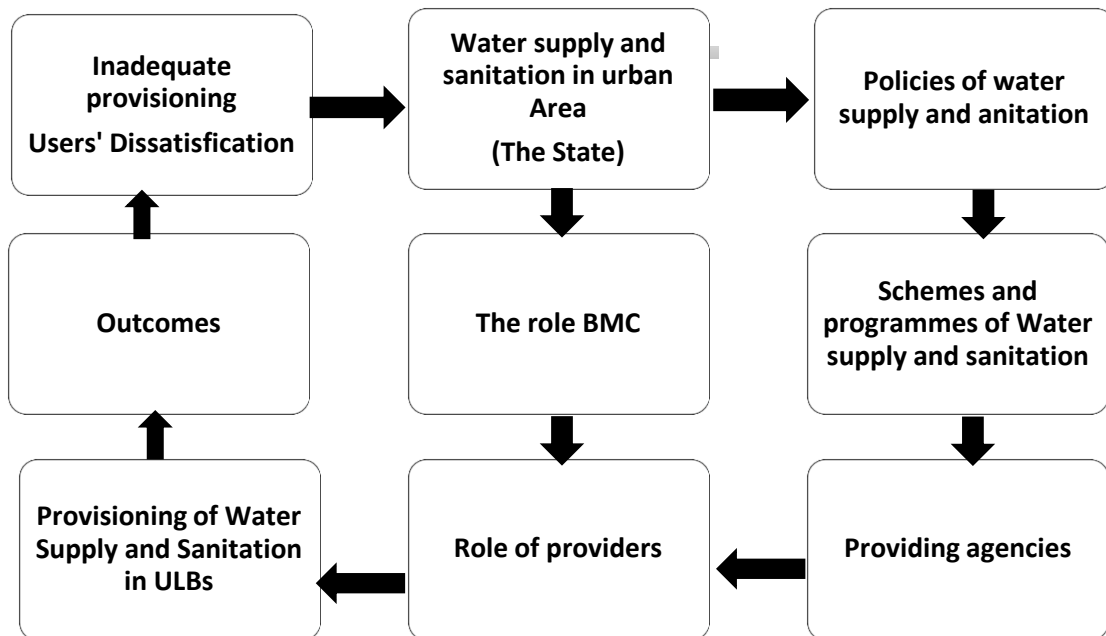
In this cycle of access and provisioning, both users and providers have specific roles to play. Their roles and responsibilities, therefore, are determined by the mechanism which state and other supporting agencies employ for provisioning. Inadequate water supply is compensated by tankers. In vulnerable spaces like slums, water comes at a cost and often there are fights.

Another aspect of this chain is the interaction between the users and providers; and among users off the water supply and sanitation. While inadequate water supply is known to cause regular fights among people (or women) because they are mostly responsible for fetching water. There are payments for water and toilet use both official and unofficial. Public toilets are facilitated for common use and construction of personal toilets is encouraged through various schemes. Monitoring of provisioning through providers and payments has to be done by state and state supporting agencies. Users' participation becomes important in ensuring provisions and utilisation both.

Therefore, implementation of policies for water supply and sanitation through a series of programs will function to yield meticulous used and meaningful results. The urban local body, BMC, in this case, is a crucial agency and requires to function along with a series of different kinds of providers.

Figure 2.1 present the conceptual framework of the study. This study tries to understand the water supply and sanitation from an intersectional perspective focusing on the analysis of state policies, provisioning and provider’s in the city of Bhubaneswar city, focusing on two specific study area.

**Figure-2.1: Conceptual Framework**



#### 2.4: Statement of the Problem

Water supply and sanitation is a major public health issue in India today. Water supply and sanitation as associated with economic development. The states which are performing poorly in provision of water supply and sanitation facilities are also economically poor. Odisha is one of the states where water supply is poor and it is ranked second highest state in open defecation in India. In Odisha, 16.9 per cent of the population live in urban areas (RGI, 2011). Khordha is one of the most urbanised districts in the state of Odisha. The capital city Bhubaneswar is also located in Khordha district. In the city more than 12 lakh people and thirty per cent of the population live in slum areas (Rout, 2008).

Bhubaneswar is the fastest growing city in Odisha and due to city growth; rural areas are being incorporated under the urban areas. In these ‘new’ areas, coming under the urban areas, the condition of water supply and sanitation is not abysmal. In urban Odisha, average piped water supply is 127 litres per capita per day (lpcd) from Public Health Engineering Organization (PHEO)<sup>10</sup> and pipe which varies from town to town. In Bhubaneswar, 265 lpcd from PHEO but after that majority of the population is still not getting the adequate with amount of water supply. In majority of households, the condition of water supply and sanitation are very poor compared to the central areas of the city. The government has introduced various schemes and policies of water supply and sanitation but (Sathpathy, 2012) still the condition water supply and sanitation facilities remain very poor. Due to poor water supply and sanitation facilities number of disease occurred among people. Nearly half of the population have no latrine facilities and the condition of water supply is very poor (Sathpathy, 2012).

Thus, the current study seeks to examine the factors affecting the planning of water supply and sanitation; and to identify and bridge the gaps between linkages that connect provisioning mechanism and providing agencies, users and coverage, policies and programmes. While it is important to understand the genesis of the policies and their implementation, it is also important to understand their effectiveness from users’ perspective. If coverage is important to ensure health of the people, the health of the providers is also important.

## **2.5: Rationale of the Study**

The city of Bhubaneswar is growing fast and rural areas are transforming into urban areas as the city is expanding. With urbanisation, cities, towns and villages experience water shortage. In rural and peripheral areas, the condition of sanitation is poor compared to the urban areas and centre of the city. Both the state and central governments have implemented various schemes and policies for water supply and sanitation in urban areas but water supply and sanitation condition is still very poor. As mentioned in Bhubaneswar city, 30 per cent of the population lives in slum areas

---

<sup>10</sup>The main aim and objective of the organisation, Public Health Engineer Organisation (PHEO), is the inspection and Monitoring of Water Supply and Sewerage System of all Urban Local Bodies and Census towns of Odisha.

where most of people face the problem in accessing the basic amenities, especially water supply and sanitation. A major proportion of the population is deprived of piped water supply facilities. The workers who are engaged in water supply and sanitation work live in very poor conditions. Though there are large number of studies which have been undertaken to examine and understand water supply and sanitation mechanism in Bhubaneswar city, none of them have examined factors affecting planning of water supply and sanitation; and to identify and bridge the gaps between linkages that connect provisioning mechanism and providing agencies, users and coverage, policies and programmes. Based on this broader understanding, the present study focuses on the following research questions and objectives.

## **2.6: Research Questions**

1. What is the condition of water supply and sanitation work in Bhubaneswar City?
2. What are the policies and the planning process of water supply and sanitation in Bhubaneswar city?
3. What is the relationship between providing agencies, providers and users of water supply and sanitation facilities?
4. What is the condition of the workers engaged in the provisioning of water supply and sanitation services?

## **Purpose**

To understand the planning process in water supply and sanitation and the related policies and to identify the gaps in the goals envisaged and achieved by the state.

## **2.7: Objectives**

1. To understand the planning process for water supply and sanitation in Bhubaneswar city
2. To find out the gaps between provisioning and requirement of water supply and sanitation facilities in the study area

3. To examine the interaction between providers and users
4. To understand the condition of the workers engaged in water supply and sanitation work

## **2.8: Research Methodology and Study Design**

This is a cross-sectional study design is based on two different study sites selected on the basis of particular criteria to fulfil the purpose of the study. Mixed method<sup>11</sup> approach which is a combination of qualitative and quantitative data collection is used. The researcher collected qualitative and quantitative data from the research participants through interviews, observation and questionnaire. Both primary and secondary data is collected. Purposive sampling has been used to collect the data. Qualitative data is collected using semi structure interview schedule, case studies and Focus Group Discussions (FGD). The quantitative data have been collected with the help of structured interview schedule. Binary logistic regression was used to understand the impact of socio-economic factors on access to water supply and sanitation. A pilot study was carried out to finalize the methodology. Based on the Pilot Study, a household survey on a selected sample households were drawn from the two study sites- Bhimpur and Naharakanta. In Bhimpur 150 households and in Naharakanta 200 households were selected using convenient sampling.

### **2.8(1): Selection of the Study Areas and Study Sites**

The two study areas were selected from two different wards which are situated in two different zones in Bhubaneswar city. One study site is (Naharakanta) selected from ward No. 4 which has the highest proportion of population and is situated at the periphery of the Bhubaneswar city. Naharakanta is situated North Zone at the border of BMC which is situated 10.9 K.m. away from the main centre of the city.

Another study area (Bhimpur-Kela Sahi) selected from ward No.52 with lowest proportion of population and located in the core of the Bhubaneswar city. Bhimpur-Kela Sahi area (Authorised slum) situated South West Zone near the BMC within 2 Km. of the main centre of the city. The ‘core areas’ and ‘periphery areas’ mainly

---

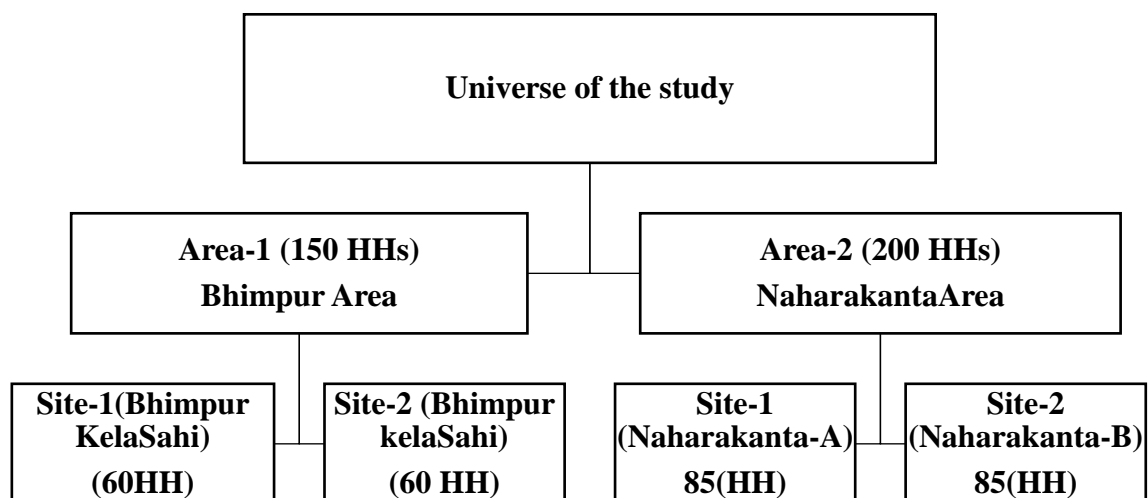
<sup>11</sup>“Mixed methods involve the collection and ‘mixing’ or integration of both quantitative and qualitative data in a single study” (Creswell, 2013).

selected on the basis of their distance to the Bhubaneswar Municipal Corporation. Then compared the condition of water supply and sanitation in both the areas and found out certain issues on water supply and sanitation.

### 2.8(2): Sampling Procedure

Purposive sampling has been used to identify primary and secondary units of the study. Household has been taken as the Sampling Unit. Two clusters from each area have been selected as sampling units for this study. Initially, a total of 350 households were selected from both the study sites. Two hundred households selected in Naharakanta area under the ward No.4 which is at the periphery of Bhubaneswar city, an one hundred and fifty households were selected from Bhimpur (KelaSahi Basti) area under the ward No.52 which is the core area in the city. However, in the course of fieldwork, respondents from about 60 households could not spare time to complete the HHs questionnaire (Figure 2.2). To understand the perspective of the sanitation workers who are engaged in sanitation work under private agencies (working in partnership with government) as well as government, a total of 110 workers were interviewed. Then one hundred sanitation workers have been selected from each area, and from each area fifty workers were selected under the organization on the basis of private and government partnership.

**Figure- 2.2: Designing of Sample and Data Collection**





### **2.8(3): Respondent Selection**

At the household level, head of the household had been selected as the respondent for the proposed study. In case the head of the household was unavailable at the time of visit, any other responsible member of the household was treated as the respondent for the study. Only those households' members who were above the age of 18 years and below the age of 70 years were considered as respondents. The socio-demographic profile of the respondents has been mentioned in Appendix A. Furthermore, some interviews were also conducted with Key Informants<sup>12</sup> such as: community leaders, councillors, school teachers, ward members, service provider's health personnel, sanitation inspector, sanitation workers, NGO workers, Anganwadi workers, ASHA, shop keeper and youth club members.

### **2.9: Data Source**

The data have been collected for the study using both primary and secondary sources.

#### **2.9(1): Primary Data**

The primary data which has been collected is both quantitative and qualitative in nature through structure and semi-structured interview schedule. In addition, primary data has also been collected through case studies and focus group discussions (FGD) in both study areas. Both quantitative data were collected from households of both the study areas. The data were also collected from sanitation workers who have been engaged in sanitation work. The qualitative data are collected from Key Informants like: community leaders, councillors, Anganwadi workers, ASHA, Youth club members, Shop keeper, private organizations like Ruchika<sup>13</sup>, Jagruti, PMR and OVHA<sup>14</sup>. The qualitative data was also collected from Bhubaneswar Municipal Corporation, Bhubaneswar Development Authority, Health department of Odisha, Public health Division Bhubaneswar, Sewerage Workers, Sanitation workers, inspectors and supervisors of BMC.

---

<sup>12</sup> Profile of the Key Informants has been mentioned in Appendix C and also specific code has been given to every Key Informant.

<sup>13</sup> *Jagruti, Ramki and PMR (Pravakr, Manoj and Ramesh)* are private organizations working on sanitation under the Bhubaneswar Municipal Corporation.

<sup>14</sup> OVHA-Odisha voluntary health association has been working in the health sector across the state of Odisha with a goal to make health a reality for the people.

## **2.9(2): Secondary Data**

For this study, secondary data was used mainly for the purpose of literature review, conceptualization and giving statistical information on water supply and sanitation condition in the city of Bhubaneswar. The secondary data was collected mainly from secondary sources like: various books, Journals, Magazines, Newspaper, Gazetteer, National Family Health Surveys (NFHS), National Sample Survey (NSS), District Household and Facility Survey (DLHS), Odisha Town and Village Directory, Census and Odisha Municipality documents and reports. In addition, the city specific data was also collected from local NGOs, local newspapers (*Samaj, Sambad and Dharitiri*) and media clippings for the present study.

## **2.10: Tools of Research**

Table 2.2 mentions the tools and techniques used in current research. Different interview schedules have been prepared for different categories of respondents especially households and key respondents (NGO workers/ government representatives). In addition, few Focus Group Discussions (FGDs) and Case studies were carried out for which separate interview guide was prepared (Appendix G). Closed and open ended questions have been prepared to conduct structured and semi-structured interviews. The close ended questions were answered using ‘Yes’ or ‘No’ or a possible choice of answers from a given list. The open ended questions were used for qualitative tools. In structured interview were prepared for household survey. Households were carefully selected to ensure a mix of persons engaged in sanitation works as well as those in other works. Semi-structured schedule was prepared for key respondents for in-depth interview. All the interview schedules and FGD guides were translated in ‘Odia’ language because in both the study areas respondents were comfortable with conversing in Odia. Almost all the conversations with respondents were held in *Odia* language and some of the local terminologies were written in *Odia* for a better understanding. The meanings of the terms were explained in English subsequently in the thesis. In addition, the quality of water available to these study areas was also examined and for that purpose, water sample was collected from both areas and tested in laboratory.

**Table- 2.2: Tools and Techniques of Research**

Objectives	Methods	Sample	Techniques	Tools
To understand the planning process for water supply and sanitation in Bhubaneswar city	Analytical Readings	Secondary Literature (Books, Journals, Published and unpublished Reports)	Literature Review	Thematic Review
	Qualitative	BMC Officers, Health Officer	In-depth interviews	Semi structure interview schedule
To find out the gaps between provisioning and requirement of water supply and sanitation facilities in the study area	Quantitative	Total 290 HHs	Households survey,	Structured Questionnaire Schedule with close and open ended
	Qualitative	Bhimpur area 110 HHs (core area), Naharakanta 160 HHs (Periphery)	Case Study and FGD conducted, Water Testing	Semi-Structured interview schedule
To examine the interaction between providers and users		290 HHs	HHs	Structured Questionnaire Schedule with close and open ended
	Qualitative	Key Informants (concern BMC Officials, Medical Officer, NGO workers, Community leaders, ASHAs, AWWs, Activist, Shopkeepers, Youth club members, Academicians)	In-depth Interview through telephonic or email, Case study, FGD conducted	Semi-Structured Interview schedule
To understand the condition of the workers engaged in water supply and sanitation work	Quantitative	110 HHs of Sanitation Worker.	Household survey	Structured Questionnaire Schedule with close and open ended
	Qualitative	Key Informant like Health Workers (ASHA, MPW, Anganwadi, NGO workers)	In-depth Interview, Case study, FGD conducted	Semi-Structured Interview Schedule
To test the water quality	Lab test	Sample water collected from both study area	Lab test	Test examine
			In-depth Interview	Semistruature guideline

### **2.10(1): Construction of Questionnaire Schedule**

Considering the mixed method used in the research, structured as well as semi-structured research instrument are utilized. There are different kinds of respondents in the study such as household's members, officials in the government bodies (BMC etc.) NGOs; community leader, ward councillors, Anganwadi workers, and ASHA. Therefore, a set of tools were prepared for different respondents. Table 2.3 mentions the construction of questionnaire for different respondents. The structured questionnaire was canvassed to the respondents in the households of all workers engaged in water supply and sanitation; other work; semi structured questionnaire used for IDIs from the Key Informants (KIs). The questionnaire used in household's survey was prepared using multiple choice questions which are assigned specific codes. These codes were used for data processing. For in-depth interviews with KIs, open ended interview schedule was used. The domains of inquiry included personal information, work profile and working condition and their perceptions about water supply and sanitation services, dignity of work, government schemes, utilization of schemes and ideas of improving the work and living conditions (Appendix F).

Most of the questions were of multiple choice answer type. In the first category, the questions were prepared for the household, in the second category for Key informants and the third category is prepared for the sanitation workers who have engaged in sanitation work in the study areas. The household questionnaire has been divided in 12 sections. The first section has five items on the profile of the study area. The section of the questionnaire on the respondent's profile has ten items. The third section has nine items on the profile of the households. The fourth section is on migration which comes under the forth section. The fifth section is on housing conditions which includes eighteen items and all questions have options and only one is descriptive type. The sixth section questionnaire on water supply has 20 questions and seventeen questions option type and only three questions are descriptive type. The seventh section on toilet facilities has twelve questions and out of the twelve questions, nine are option type while three are descriptive type. Eighth section questionnaire is on drainage and sanitation which has sixteen questions. All questions are option type and only one question is descriptive type.

**Table- 2.3: Contents of the Questionnaire Schedule**

S. No	Types of Respondents	Sections	Nature/ Descriptions of the tools and techniques
1	Household	Profile of the study area	Structured Questionnaire Schedule with close and open ended  Individual Interview
		Respondents Profile	
		Profile of the Households	
		Migration	
		Housing Condition	
		Water supply	
		Toilet Facilities	
		Drainage and Sanitation	
		Govt. Schemes and Benefits	
		Coverage under Life/health insurance	
		Health Profile	
2	Key Informants	Sanitation Inspectors	Semi-structured open ended  In-depth Interview
		Sanitation workers in specific area	
		Aganwadi workers	
		NGO workers	
		Local leaders	
		Youth Club members	
		Health worker s/visitors	
3	SWs	SWs HH Survey	Semi-structured open ended
4	FGDs	1 <sup>st</sup> FGD conducted Women Group in Area-1, Site 1	Special guideline prepared
		2 <sup>nd</sup> FGD conducted Male Group in Area-1, Site 2	Special guideline prepared
		3 <sup>rd</sup> FGD conducted Male Group in Area-2, Site 1	Special guideline prepared
		4 <sup>th</sup> FGD conducted Female Group in Area-2, Site 2	Special guideline prepared
		5 <sup>th</sup> FGD conducted sanitation workers	Special guideline prepared
		6 <sup>th</sup> FGD conducted PHED workers	Special guideline prepared
5	Case study	10 case studies carried out in the study	

The ninth section of the questionnaire is based on availing benefit under the various government schemes which has four questions and all questions are option type. The tenth section questionnaire is on coverage of life/health insurance and half of the questions are multiple choice questions, while others are descriptive type. The eleventh section questionnaire is on health profile (illness profile of the household member during last six months) which has seven items and most of the questions are descriptive type and only one question is based on multiple choice. The last section of the questionnaire is on any major illness experienced by the respondents during the last six months in their place of origin which has six questions.

Different questionnaires schedules were prepared for all the Key Informants such as sanitation inspector, Anganwadi worker, NGO workers, local leaders, health workers, and youth club members. Each questionnaire has both descriptive and multiple choice questions. A total of six questionnaires were used for the purpose.

A separate questionnaire was prepared to capture the experiences of the sanitation workers who engage in sanitation work. The question aimed to understand their working conditions as well as their health status. The FGD and case studies were also conducted with sanitation workers (Appendix G).

### **2.11: Framework for Data Analysis**

The present study uses mixed method approach for data collection and analysis. Hence both quantitative and qualitative data were collected. Both quantitative and qualitative data were collected through questionnaire, groups discussion and observation. The quantitative data was collected category wise and analysed under the sub-heading of respondent profile, profile of household, migration, housing, electricity, water supply, toilet, sanitation, government benefit, coverage of life/health insurance, and health profile. After complete data collection the questionnaire schedule was analysed using excel and SPSS. Cross tabulations, frequencies, percentage, ratio and correlation analysis in accordance with the study objectives were done.

Qualitative data collected through FGDs, case study, in-depth interviews, and Observations were also analysed. The socio-economic status of the respondents in terms of gender, caste, class, marital status, income status, and family status was recorded in the study. Issues and concerns, perceptions and ideas were evolved from the narratives.

### **2.12: Scoring and Coding**

Each multiple type question was allotted specific codes. In all three categories of questionnaire, most of the questions were given codes like (a)/ (b)/ (c)/ (d)/ (e) which were later coded (1)/ (2)/ (3)/ (4)/ (5). Some of the questions were given Yes/No type options and for that, coding was given as: 1 for 'Yes' and 2 for 'No'. Then for data

processing coding was fed in the Excel Sheet and then uploaded to SPSS for further analysis.

### **2.13: Pilot Study**

The pilot study plays a crucial role in proper planning and a good study design in a research. It is also pre-testing the research instruments and modify subsequently before going for the final fieldwork or data collection (van Teijlingen & Hundley, 2002). It helps the researcher to get a preliminary sense of the study area so that it would be easy to conduct the actual fieldwork or data collection. For the present research, the pilot study was conducted for a period of twenty-five days starting from 24 March 2015 to 30-April-2015. After the pilot study some questions were later modified. Some of the questions related to the female member's issues especially internal problems due to the lack of water supply were modified. Other issues were modified with respect to asking caste names. After conducting the pilot survey, the interview schedule was finalised for the main field survey.

### **2.14: Process of Data Collection:**

The whole process of data collection was completed in five phases. The duration of fieldwork was one year starting from 2016 to 2017.

#### **2.14(1): First Phase: Preparatory**

In the first phase of the data collection initial visits were made to Municipal Corporation office in Bhubaneswar to seek permission for data collection from the concerned authorities. The researcher visited the Assistant Commissioner of BMC to appraise the research topic. In the first week the researcher was unable to get the permission to meet him due to his busy schedule. Then the researcher submitted the institutional letter for the purpose of the field study in the BMC office. Then the official member told the researcher to submit the interview schedule which was prepared by the researcher for data collection. Subsequently, the next day the researcher submitted all the documents related to the field work along with the interview scheduled to the BMC office. Then after that, Commissioner gave a date to researcher for meeting and allowed the researcher to explain the purpose of the visit. The researcher met the Commissioner and explained the importance of this study. The

Commissioner discussed about various programmes and schemes launched by both the state and central government in the Bhubaneswar city. He also discussed the role of public private partnership (PPP) in provision of water and sanitation facilities in the city. BMC issued a letter to the researcher for data collection in both study areas and also the Assistant. Commissioner gave reference of some of the key officials who could provide relevant information about the condition of water supply and sanitation in the city.

#### **2.14(2): Second Phase- Permission Seeking from Health Department**

After getting the permission from BMC the researcher went to the health department. The Sanitation Department is under the Health Department but BMC looks over the management and supervision of sanitation work in the city. In health department, the Chief Medical Officer and ten Sanitation inspectors are employed for supervision of sanitation work in the city. Therefore, the researcher needed to take permission of the Chief Medical Officer for data collection and information on planning, policies and the programme on sanitation. The researcher met the head sanitation inspector and showed the permission letter from BMC as well as the institution. Then after showing the letter he took permission from Chief Medical Officer. Then on the next day the researcher went to the health department to meet the CMO to discuss the purpose of the study and the current sanitation situation in city. At that meeting the Head Sanitation Inspector, who was also present there, gave information about the sanitation in the city. After discussing with the CMO, he told the sanitation inspector to provide all the information on sanitation in the city. Then the researcher discussed details on sanitation such as coverage, services by the providers, issues on sanitation, sanitation workers, equipments, salaries, organizations engaged in sanitation work etc.

After getting the permission and information on sanitation from the health department, the researcher went to the Public Health Engineering department (PHED) for getting information on water supply and the situation in Bhubaneswar city. In the city a total of three PHDE departments provide piped water supply for the whole city. The PHDE department couldn't help the researcher much for getting information on water supply. The researcher approached the head engineer but they did not have the time to speak with researcher. Then some PHDE officials helped to get the



information on water supply system, timing, situation and current issues of water supply in the city.

### **2.14(3): Third Phase- Initiation of Filed Work**

After getting permission from both BMC and the health department, the researcher proceeded to the study areas. In the study, the researcher took two study areas namely, Bhimpur Kela Sahi area and Naharakanta area. Bhimpur Kela Sahi area is near BMC and falls under ward No. 52. In first two weeks, the researcher went to the area to build a rapport with the members of the community, especially with the local shopkeeper, leaders and youth club. After fifteen days the researcher went to Angana Wadi Workers and showed them the official letter and discussed the purpose of the visit. After seeing the letter, the AWW discussed about the details of the area. The researcher discussed with AWW about the basic facilities such as the type of housing, road, electricity, water supply, toilet facilities in the study area. The researcher also collected information on total households, population, Sex ratio, education, government facilities provided by the government like PDS, Old age pension, Widow/ Disability pension and health facilities in the study areas.

After that the researcher requested AWWs to introduce him to some households. During the initial days of the household survey the AWW introduced the researcher to some households and explained the households about the purpose of the researcher's visit to their area. The next day the researcher went to the area and according to the plan and collected data from the households. Every day the researcher was only able to collect data of four to five households due to household members' absence. Because most of the household members worked as daily wage labourers, they left for work early in the morning. The researcher also tried to gain an in-depth understanding of the study areas. The household survey was completed in three months.

After completing household data collection from Bhimpur Kela Sahi, the researcher started to visit the second site, Naharakanta for household data collection. The researcher met with the local councillor first and explained him the purpose of the study. The local councillor asked the researcher to fix an appointment and meet him again. In-between the researcher also tried to contact the community members, shop keepers, local leaders, and youth members for rapport building and gaining additional

information about the area. The researcher met the councillor on the scheduled date. Then the councillor discussed the current situation of the area, concerning the infrastructure, housing, government and health facilities in the area. After the meeting, the researcher went to meet four AWW centres in the area and discussed the purpose of visit. Then the researcher took information on the population, caste, class, social identity, infrastructure, health, and government facilities provided in the area.

Once relevant information was collected from the AWWs, the researcher started to visit the households living in Naharakanta 'A' and 'B' respectively. It took four months to complete the household survey in Naharakanta. After completing the households survey the researcher further took interviews from local leaders, youth clubs, AWW, ASHA, Shop Keepers, and health facilitators.

#### **2.14(4): Fourth Phase- Data Collection from Service Providers**

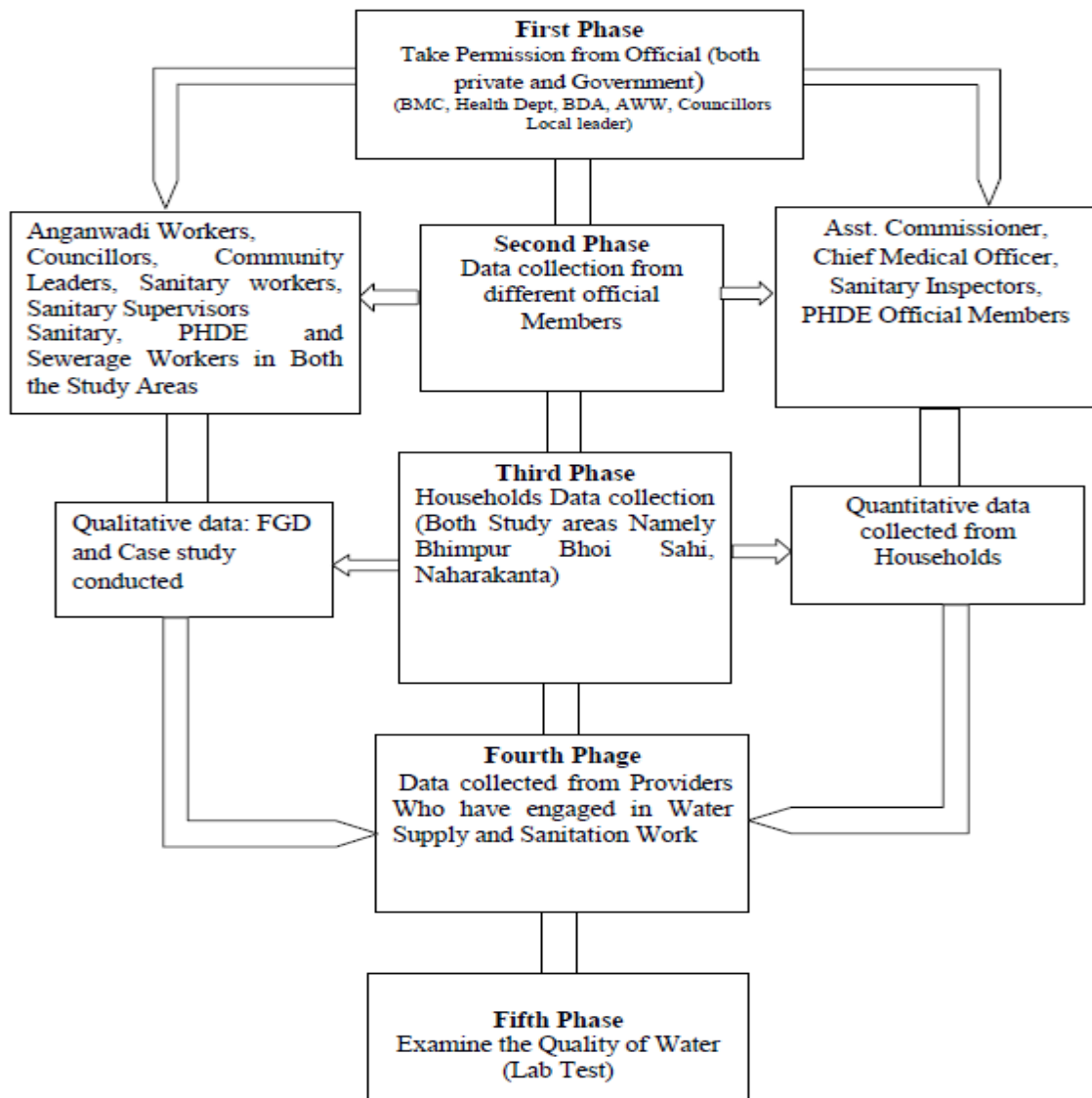
In the fourth stage of data collection the services providers who were involved in water supply and sanitation work as well as sewerage workers were contacted and a rapport was built with them. Service providers played a crucial role in providing water supply and sanitation services. The researcher first discussed with sanitation inspectors about the information providers point of view. Sanitation inspector discussed the areas they were living in the city, schemes and benefits they got from the government, health dept., equipment facility, timing and hours of work. Data of hundred households' data was collected from providers' point of view. The researcher went through the study area and collected provider household information who had engaged in water supply and sanitation work. The researcher took a month for completing the household survey. Data was also collected from Key Informants' mainly sanitation inspectors, supervisors of both the private and government organizations.

#### **2.14(5): Fifth Phase- Data Collection (Officials)**

In Fifth phase, data was collected from BMC office which was helpful in social mapping of both the study areas. Data was also collected on facilities such as supply of water tanks and amount of fee charged for the same by BMC. BMC constructed green toilets and community toilets in various places of the city which was also discussed with BMC Officials. Afterwards the researcher went to the census

department office to collect population data. Finally, the researcher submitted some water samples collected from the field sites at Odisha government Public Analyst Department (PAD) to get its quality checked. The researcher also discussed water examination procedure with the PAD official. The results of the water sample were collected later. Figure 2.3 shows the process of data collection.

**Figure-2.3: The Procedure of Data Collection**



**2.15: Statistical Tools**

In the study, the researcher has used both quantitative and qualitative data as per the study objectives. After the completion of the data collection, the researcher

established different variables for different research questionnaires. After coding for analysis of the data was completed, statistical package for social science (SPSS) was used to analyse the data. Different techniques and methods were used for data analysis through the use of SPSS. The researcher used descriptive statistics of simple percentage to describe characteristics of the respondents. The researcher also used cross tabulation, standard of living index, correlation and regression analyses have executed to fulfil the objectives of this study. The SPSS software has been used for the statistical analyses carried out for this study.

### **2.16: Major Obstacles During the Process of Data Collection**

The obstacles that the researcher experienced while collecting the data are given below:

During the seven months of data collection the researcher faced various difficulties. Now a days getting permission from government intuitions is very difficult. In the study the researcher took two study areas in Bhubaneswar city, to know the planning process of water supply and sanitation in both the study areas as well as in particular and Bhubaneswar city in general. For this purpose, without official permission from the government institution, it would have been very difficult to do the field work for data collection. Therefore, the researcher went to take permission government officials such as BMC, BDA, Health Dept. and PHE department. The researcher approached these officials several times and. Each time an official member gave different statements for getting permission for data collection. The process was physically and mentally strenuous for getting permission for data collection. Research paves the wat towards development a country and for that government official should help the researcher in their fieldwork. Instead of this the researcher has faced various problems in getting permission from officials for fieldwork. Then the researcher realized that without a reference, getting permission for fieldwork is very difficult. After spending a month, the researcher got the permission for fieldwork. At various points of time researcher observed that official members were ignoring the researcher and they were not comfortable giving any data to researcher.

In urban areas various organizations (both government and private) are doing field work and for that they have chosen slums, urban villages and other areas in

accordance to their study purpose. The general perception of the communities was that the researchers used them to obtain money in their names. When this researcher entered the study area, the first question he encountered from the community members was which agency he belonged to. After explaining the purpose of research by the researcher, the community people did not show an interest in answering the researcher's questions. Then the researcher met Key Informants who could clear the doubts of the community people. After that researcher approached the local AW community leader who could explain the purpose of the research visit and importance of the study. With the help of Key Informants, the households and respondents were willing to talk to the researcher and answered the questions.

In Bhimpur Kelashai area, most of the people were working as daily labourers. When the researcher went for a field visit most of the household members were absent and were at work. As adults from the household were absent, data could not be collected. For that, the researcher went early in the morning, or otherwise waited for them when they returned in the evening. Sometimes the researcher had to collect household data late in the evening.

The researcher faced many problems during the data collection in Naharakanta area. Initially AWWs did not provide any general information regarding the study area such as population, sex ratio, occupation etc. The researcher then tried to convince AWWs to help the researcher in collection of data in the area. It took more than one week to convince AWWs. Transportation was also a major problem for the researcher. One of the study area didn't have any public transportation facility and people used their own vehicles.

Researcher faced problems while collecting data from private organizations who are engaged in sanitation work. During the field visit, the researcher went to get information from sanitation workers who have worked under a private organization. For that, the researcher went and met with the supervisor, who said directly that he would not provide any data. They feared the publication of data in newspapers or any other places. After few attempts to convince him and showing the permission letter provided by the BMC, the supervisors agreed to talk to the researcher. When the researcher was in conversation with sanitation workers, they did not talk properly about the problems faced by them in sanitation work. Only after the supervisor left the

place, sanitation workers felt free to talk to the researcher and share their problems. It was a challenge to get the water quality test done as finding the laboratory for same was difficult to locate.

### **2.17: Ethical Consideration**

Prior consent was taken verbally from the respondents of the study for their participation in the study. The participants were also explained the aim and purpose of the study before the commencement of the interview. The respondents were also informed that the data collected from them will be used only for academic purpose. Participation and cooperation from the respondents was voluntary in nature. Interviews were conducted according to the convenience of the respondents and given their nature of work, they requested to give time and complete the interviews in three-four sittings. During the interview, the researcher also took permission from the respondents to click photographs and record audio for voice during the interview. To protect the identity of the respondent's pseudonyms are used in the study.

### **2.18: Limitation of the Study**

The study restricted to selected two areas therefore may not be replicated other spaces. The study has water and sanitation workers. The share is tilted towards sanitation workers.

### **2.19: Chapter Plan**

The present thesis has divided seven chapters and below all the chapters have been discussed the details.

### **Chapter-1: Background of the Study and Review of Literature**

This chapter is based on the back ground of the study and review of literature. The literature reviews focus on policies and programmes for water supply and sanitation in India in general and Odisha in particular. This chapter describes policies and planning of water supply and sanitation in urban Odisha with focus on Bhubaneswar City. It tries to examine the water supply and sanitation policies and programmes implemented in the city and explore the gaps existing in policies provisioning, provider's perspective and programmes.

## **Chapter-2: Conceptual Framework and Research Design**

This chapter deals with research design and methodology. The research methodology chapter has covered research design, sampling methods, selection of the study sites, sampling procedure, respondents of the study, data source, tools of research, scoring and coding, pre-testing tools, process of data collection, Statistical tools, Major obstacles during the process of data collection, ethical consideration, limitation of the study

## **Chapter-3: Study Area: Location and Socio-Demographic Profile**

In chapter three describes the socio-demographic profile of the selected study areas in the city of Bhubaneswar. The first section describes geography of Odisha. Then the second section discusses on Bhubaneswar city. It discusses the local administrative authority responsible for the provision of water and sanitation facilities in the city. BMC, population, wards, and various services provided by the BMC. The third section describes the study area and the purpose of the study. The fourth section describes the socio-economic and demographic conditions of both study areas which are based on survey data. Then the next subsection describes demographic profile including sex, Age, Social Identity, Religion, Education, Social Identity, Marital status, Occupation, and Income. Then the next part discusses migration, causes of migration, the benefit of the destination place and losses in the place. The fourth part makes discussion on housing condition, no of rooms, ventilation, cooking, electricity facilities, ownership of the house and rent per month. The fifth section discusses social facilities and civic amenities such as water supply and sanitation, electricity, health facility, school, Anganwadi, post office, Road, and Transportation.

## **Chapter-4: Water Supply and Sanitation: Provision and Use**

Chapter four is based on the survey data, provisioning and requirement of water supply and Sanitation in the study area. This chapter is broadly divided into three sections to understand the condition of water supply and sanitation in both the study areas in Bhubaneswar city. The first section mainly discusses the mechanism of water supply facilities. Then it talks about provisioning in litres per day, gap between amount provided and requirement of water supply facilities in the study areas. Each section is divided into sub sections to fulfil the research questions and study

objectives. The second section discusses toilet facilities and mechanisms of toilet facilities. Then it discusses schemes of toilet facilities provided by the government, awareness, get benefit of the schemes. Third section discusses mechanisms of sanitation facilities in the study areas. It then discusses the sanitation schemes, existing conditions, level of awareness, and requirements.

#### **Chapter-5: Water Supply and Sanitation in Bhubaneswar City - Experiences of the Sanitation Workers**

This chapter analyses the condition of providers who are involved in water supply and sanitation work in the city. It also tries to understand the working condition of water supply and sanitation workers and the problems they face in their day to day work at the sites. It also tries to understand the type of interaction that takes place between the service providers and user in the study area.

#### **Chapter-6: Reported Illness and Reflections from the Filed**

In chapter six is divided into two sections. It discusses the reported illness among the study population in the first section. The next section illustrates the condition of the conditions of water supply and sanitation though the use visual documentation.

#### **Chapter-7: Discussion and Conclusion**

In Chapter-7, the summary, findings, conclusion and the policy suggestions for implication of the study are discussed.



## Chapter-3

### Study Area: Location and Socio-Demographic Profile

#### 3.1: Introduction

This chapter discusses the socio-demographic profile of the study area namely Bhimpur (Kela Sahi) and Naharakanta, located in the Bhubaneswar city. The first section of this chapter describes geographical location of Odisha in India. The second section describes Bhubaneswar city for which the social mapping of the area is provided. It discusses the services provided by Bhubaneswar Municipal Corporation (BMC) to the different wards. The third section describes the socio-economic condition and demographic profile of both the study areas. The fourth section discusses access to civic amenities and facilities such as water supply and sanitation, electricity, health care, school, Anganwadi, post office, road, and transportation.

#### 3.2: Socio-demographic Characteristics of Population of Odisha

Odisha is a one of the costal state of India. Odisha has total 30 districts, 314 blocks/317 Tehsil, 51313 villages and 223 towns as per the 2011 census. Native language is Odia, more than 80per cent of population speak Odia language and it is the official language of the state.

Table 3.1 shows the socio-demographic profile of Odisha (RGI, 2011; GoO, 2014). In Odisha, 17 per cent of the population lives in urban area and it is fourth least urbanised state of the country after Himanchal Pradesh, Bihar and Assam. As per the 2011 census there are 223 urban centres, 103 urban local bodies ULB, five corporations, 35 municipalities, 63 notified area councils in the state of Odisha (GoO, 2016).

**Table 3.1: Socio-Demographic Characteristics of Population of Odisha**

Total Population (According to the 2011 census of India)	41974218
Population Size (Males)	21212136
Population Size (Females)	20762082
Literacy rate	72.87 per cent
Literacy rate (Male)	81.59 per cent
Literacy rate (Female)	62.46 per cent
Growth in nominal GDP (2013-14)	12.90 per cent
Growth in capital income (2013)	Rs. 49,489 (18.1per cent Growth)
Population Density (Per Sq. Km)	270

Sex Ratio (Females Per 1000 Males)	979
Total Urban Population (According to the 2011 census of India)	7003656
Urban Population Size(Males)	3625933
Urban Population Size (Females)	3377723
Urban Sex Ratio (Females Per 1000 Males)	932
Urban Literacy rate	85.75 per cent
Urban Literacy rate (Male)	90.72 per cent
Urban Literacy rate (Female)	74.31 per cent
Total Rural Population (According to the 2011 census of India)	3,49,70562
Rural Population Size (Males)	1,75,86203
Rural Population Size (Females)	17384359
Rural Sex Ratio (Females per 1000 males)	989
Rural Literacy rate	70.22 per cent
Rural Literacy rate (Male)	79.65 per cent
Rural Literacy rate (Female)	59.95 per cent
Religion wise population (in per cent)	
Hindu	93.6per cent
Christian	2.8per cent
Muslim	2.2per cent

Source: Census 2011

**Map: 3.1 Map of Odisha**



Source: Districts of Odisha: <https://www.mapsofindia.com/maps/orissa/orissa.htm> Access on 25-04-2016

### **3.3: Geographical Location of Bhubaneswar City**

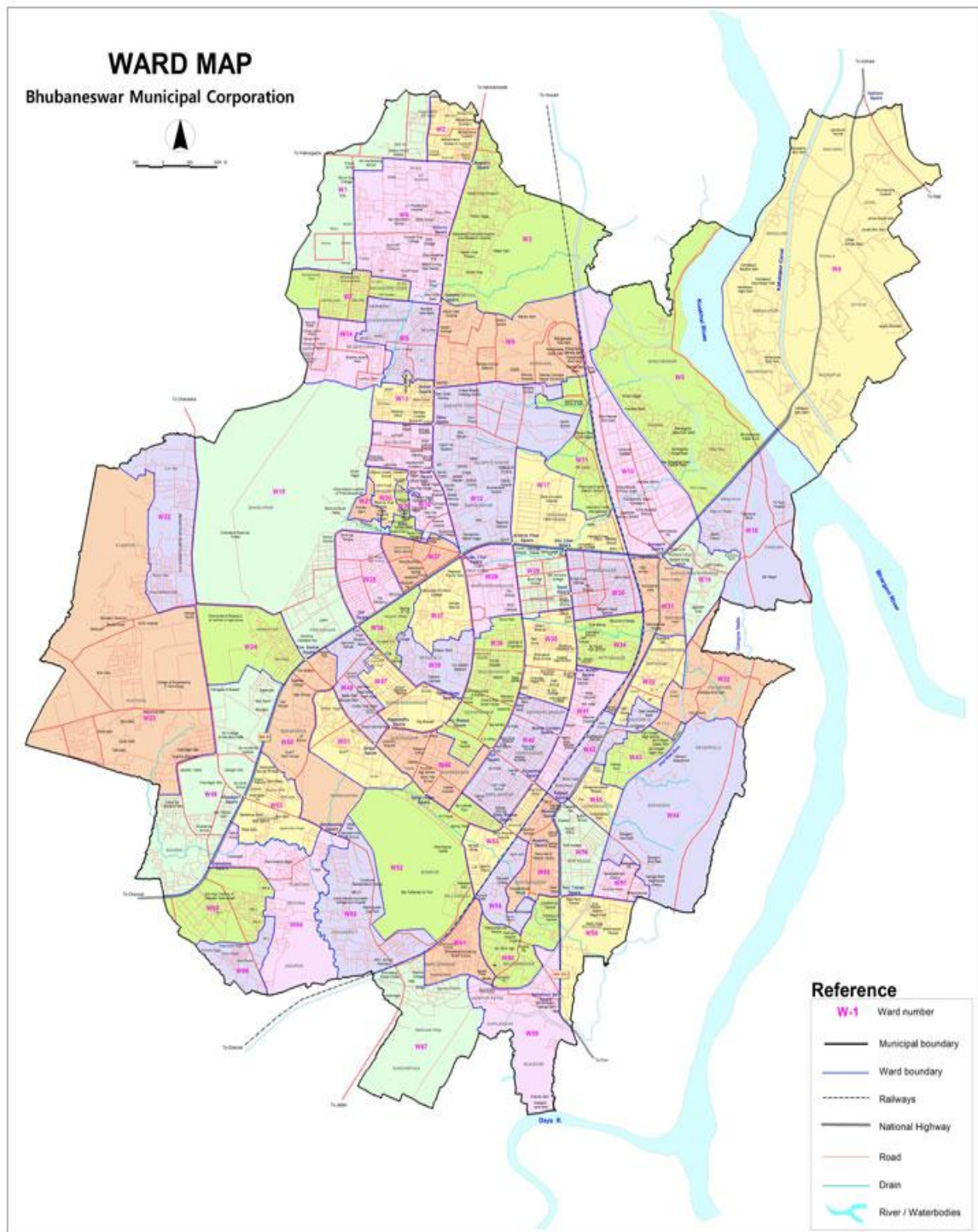
Bhubaneswar is situated in Khorda district, which is the capital city of Odisha. It is also called temple city of India. Bhubaneswar is located in the Mahanadi delta region. It is a first planned city along with Chandigarh and Jamshedpur. It was designed by Otto Konigsberger in 1946. Earlier Cuttack was the capital city of Odisha. Officially Bhubaneswar was declared the new capital of Odisha on 13<sup>th</sup> April, 1948. It is one of the most populous city in the state (BMC, 2016)

### **3.4: Bhubaneswar Municipal Corporation (BMC)**

The Bhubaneswar Municipal Corporation (BMC) is spread across an area of 135 square kilometre. Currently BMC has 67 administrative wards. The boundaries of BMC are Daruthenga to Kacharamala on the North, Janmejyapur to Raghunathpur in the East, Daya River in the South and Nuagan to Patha-rgadia in the West (IIHS, 2017; RGI, 2011; GoO, 2017). The population of the city is 885,363. Around 18.5 per cent of total population lives in slums. In the city, the total number of slums is 436. Among the 436 slums, only 116 are authorised slums approved by the BMC while rest of slums are unauthorised (BMC, 2016).

As a local body administrative unit many departments work under the ambit of BMC. At present thirteen departments fall under the BMC, these departments are: engineering, holding tax, licence, market, electrical, environment, finance, health and sanitation, urban poverty alleviation, IT-PMU, establishment, land and assets, recovery and enforce departments. Each department has specific responsibility for smooth functioning of the city (IIHS, 2016; BMC, n.d). The BMC is responsible for providing various basic services to the residents such as healthcare and sanitation, disaster management, city beautification, citizen services, efficient solid waste management, underground sewerage system in the city, efficient urban planning and development including slum development, online services, vending zones and parking zones (GoO, 2017).

**Map- 3.2: Ward Map (Bhubaneswar Municipal Corporation)**



Source: BMC. <http://bmc.gov.in/BMCMaps.aspx> Accessed on 23 December 2016

In Odisha, Bhubaneswar city is densely populated as compared to other cities. Every year thousands of people migrate to the city in search of livelihood. A higher proportion of population migrated from neighbouring districts. Majority of the migrated population is poor. Due to the poor economic condition they are forced to live in slum area and are known as urban poor. In the slum area people face various

problems in fulfilling their basic needs as there is lack of safe drinking water and sanitation facilities. The primary data collected from both slum and non-slum area helps us to understand the condition of water supply and sanitation facility.

### 3.5: The Geographical Location of Study Area

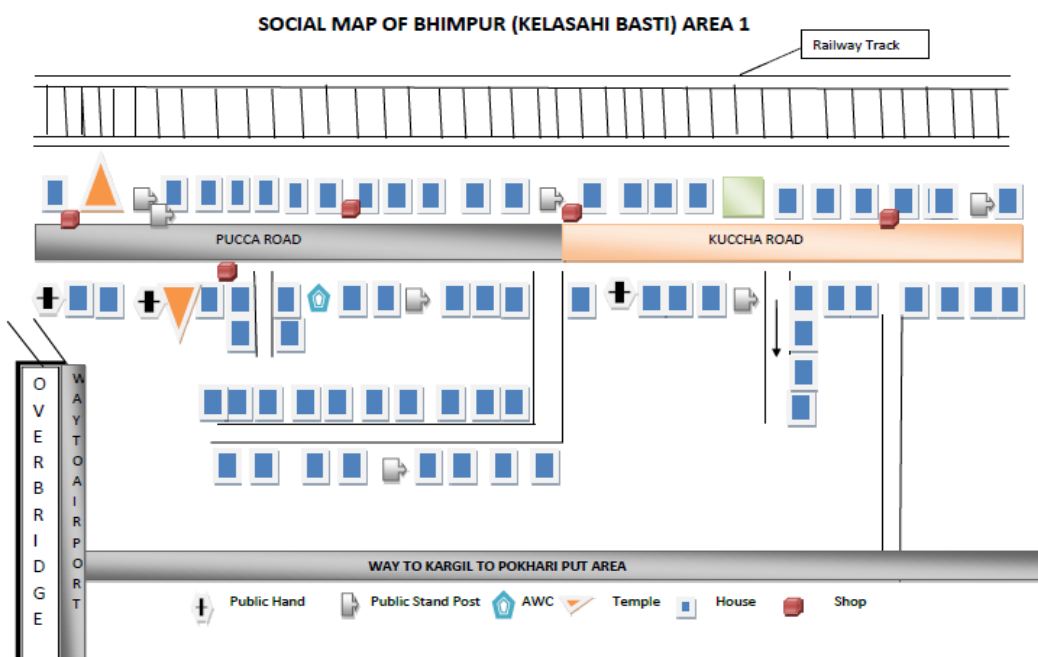
#### 3.5(1): Study area 1-Bhimpur (Kela Sahi)

As mentioned, two areas located in two different wards of Bhubaneswar city were selected for the study. One study area is known as Bhimpur-Kela Sahi which is situated in the ward N 52. The Bhimpur (KelaSahi) area is 5 km. to the west of the BMC. In the area total 436 households are there. They are all migrated from different districts in the state (KI6, Bhimpur Area).

#### 3.5(2): Social Mapping of the Bhimpur (KelaSahi) Area

The area is situated near Biju Patniak International airport. The railway line is passing near the Bhimpur Kelashai area. Map 3.3 shows the location of the Bhimpur (Kela Sahi) area.

**Map-3.3: Social Map of Bhimpur Area 1**



Source: Fieldwork

The pink block represents shops in the area which cater to the daily requirement of the local population. The orange triangle represents the temple. The higher per cent age of the households belonged to Hindu community. One crossing has made in the area, where people are gathered for celebrating festival or organising meeting. Here the blue block represents the houses on both side of the road. The navy blue triangle represents the Aganwadi centre (AWC) situated in the area. Only one mini AWC is situated in the area. Total four public hand pump are there in the area which are marked by black in the figure. Out of the four public hand pumps only two are functional and 436 households are dependent on two public hand pumps. In the area total twelve public stand post made by the BMC but now all are public stand post dysfunctional.

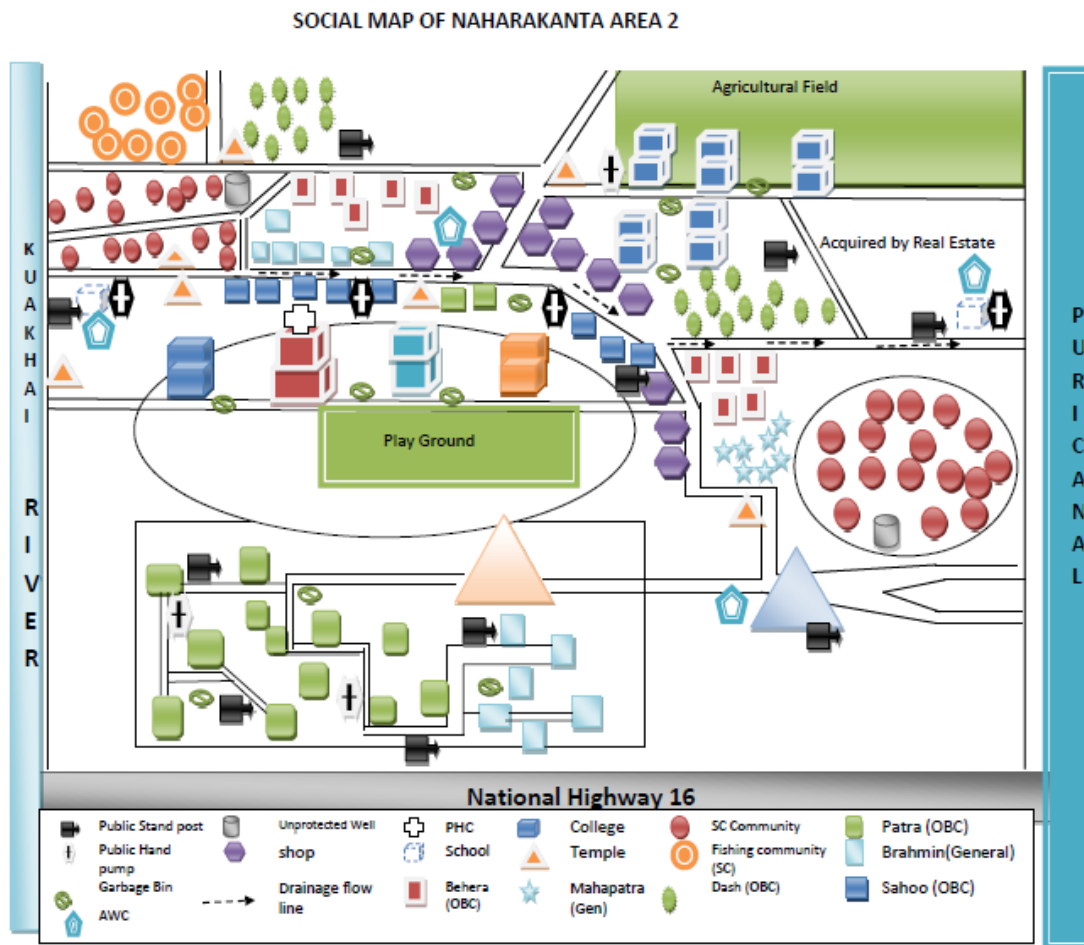
### **3.5(3): Study Area 2-Naharakanta**

Naharakanta is situated at periphery of the city in north zone ward no 4 of the BMC. The '*Jaydev*' college of education and technology is situated in the area. A total of 640 households are there in the area and all are from Hindu community.

### **3.5(4): Social Mapping of the Naharakanta (2)**

Naharakanta is divided in two parts called Naharakanta 'A' and Naharakanta 'B' as shown in map 3.4. The playground and the '*Jaydev*' college of education and technology are the middle point in both areas. Naharakanta is located near '*Kuakhai*' river and '*Puri*' canal also passes by the area. The red block represents the Scheduled Caste households and Bhoi sub caste. The green square represents '*Mahapatra*' community, Navy blue square represents Brahmin community. The green point represents '*Patra*' and the yellow point represents the fishing community. The blue point represents shops in the area. The black point represents the public stand post supply water in the area. The Scheduled Caste community did not have any public stand post and they are forced to take water from unprotected well. Garbage bins are installed in the area but in SC community no garbage bins are provided by the BMC.

**Map-3.4: Social Map of Naharakanta Area 2**



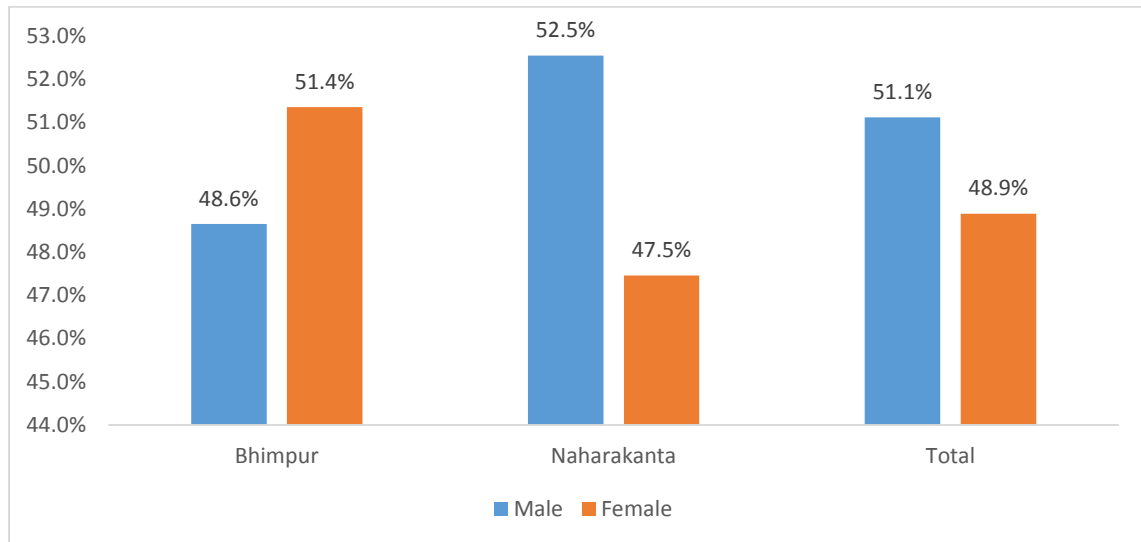
Source: Fieldwork

### 3.6: Demographic Profile of the Study Areas

In Bhimpur and Naharakanta data was collected from a total of 290 households. Total information of 1211 person was collected from 290 houses and the average family size is 4. Figure 3.1 shows the sex ratio within the study population. There were total 619 (51.1per cent) males and 592 (48.1per cent) female among the surveyed population. In Bhimpur area total number of males and females is 216 (48.6per cent) and 228(51.4per cent) respectively. In the surveyed households as compared to males number females was more. In Naharakanta area total of 403(52.5per cent) were males and 364 (47.5per cent) were females. Numbers of males were more in the households surveyed as compared to females. The Figure 3.1 below shows that in Bhimpur the ratio of females is higher 51.4per cent and Naharakanta shows the lowest per cent age of females to males 47.5per cent. In Naharakanta the data shows a higher per cent age

of males 52.5per cent and Bhimpur shows the lowest per cent age of males to females 48.6per cent in the study population.

**Figure- 3.1: Male and Female Population in the Study Area (%)**



Source: Fieldwork

### 3.6(1): Age Composition of the Study Population

Table 3.2 provides information on the age composition of the study population.

**Table-3.2: Age Group Composition of the Study Population**

Age Composition in Years	<b>Bhimpur (KelaSahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>
<5	45 (10.1)	80(10.4)	125(10.3)
5 to 15	126(28.4)	163(21.3)	289(23.9)
15 to 45	205(46.2)	385(50.2)	590(48.7)
45 to 55	45(10.1)	72(9.4)	117(9.7)
>55	23(5.2)	67(8.7)	90(7.4)
Total	444(100.0)	767(100.0)	1211(100.0)

Source: Fieldwork

The data shows that groups between the ages of 15 to 45 years make up the higher per cent age 49 per cent followed by 5 to 15 years 24 per cent, children below five years' age 10 per cent, 45 to 55 years 10 per cent and only 7 per cent of population belonged to 55 years and above.



### **3.6(2): Religious Composition**

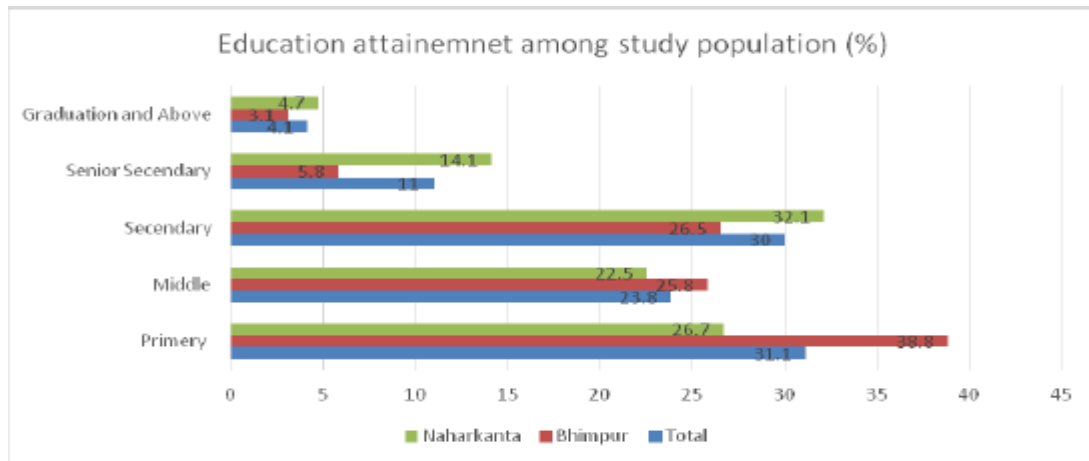
In both study areas, a higher per cent age of households belong to Hindu religion. The data shows that in Bhimpur, 99 per cent of the households practised Hinduism. Only one household was Muslim. In Naharakanta, almost all households belonged to the Hindu community.

One of the respondent in Bhimpur area reported that the two community people are living in the area. One is Bengali speaking people and another one Odia speaking. In the area population growth happened after 1999 super cyclone. After 1999 super cyclone, they lost their livelihood and they came to the city. Some 20 years ago only few households had settled in the area but now more than four hundred households are living here. Now they have got all the facilities from the government such as voter ID, Adhar card, ration card, old age pension, and the BMC given RAY number so that could get house facility under the schemes. If any problem happens then the whole community stands together and they cooperate with each other for betterment of their life. When conflict rises in the community the local politicians always intervene because of their political interest (KI6, Bhimpur Area, Site 2).

### **3.6(3): Educational Attainment**

In both the area most of the population is non-literate. In Bhimpur a higher per cent age of the population 23 per cent and in Naharakanta 16 per cent of population had completed primary school. In Naharakanta the data shows that 12 per cent and in Bhimpur 10 per cent of the population had completed metric level education. The data also shows that in Naharakanta a higher per cent age of the population 10 per cent and in Bhimpur the lowest per cent age of population 4 per cent had completed intermediate level education. Only 3 per cent of the population had completed graduation and post-graduation in Naharakanta. In the area people are more conscious about education and the importance education in job market for the family development (Figure 3.2).

**Figure-3.2: Education Attainment Among the Study Population**



Source: Fieldwork

One of the factors responsible for the low literacy amongst the sample population is non availability of schools during 1990s. At present also there are only two government schools in the areas. A few private schools have also come up but these are not accessible to the poor households. Highlighting the poor quality of the government schools, one of the Key Informants said:

*“In the area there are only two government school. One is till primary level while other is a secondary school. The condition of government schools is not good and the quality of education is poor. In the area, total four private English medium schools are there. People are sending their children to private English medium school because they are conscious about education and they want to send their children to good educational institution. The private schools in the area provide good infrastructure. So those who are economically strong they only send their children to private school”* (KI10, Naharakanta area, Site 2).

Amongst most of the parents it is a popular perception that private schools provide better education. They want to send their children to English medium private schools. It is believed that children studying in the Odia medium schools are unable to compete with those who receive education in the medium of English (KI11, Naharakanta Area, Site 1).

For instance, a respondent said the following:

*“He sends his children to private English medium school to provide them better education. Whatever he earns half of the money goes on his children education. He works hard so that he is able to meet the needs of his children. Now a day’s high competition is there in job market. If your children study in regional language (Odia) then they would never be competent with English medium student. After high school, if their children want to study in*

*commerce, science or any other technical course then whole syllabus will be based on English medium and where they would be faced serious problem. They do not competent with other students so better to teach them on English medium. Our condition may not be good today if they study well and achieve their goal then the condition will change. Education is a powerful weapon which can change life” (Ramesh 35-year-old, Naharakanta area, Site 2).*

Another respondent reported:

*“Her children are studying in government high school. Elder one is in class six and younger one in class four. They did not send their children to private school because of lack of money. Her husband is a daily wage worker and whatever he earns is not sufficient to fulfil their family needs then where they got money to send their children to private school. They want to send their children but high fee structure creates hurdles for them. So they send their children to government school, where they get free food under the mead-day meal<sup>15</sup> scheme and low fees” (Sasimani, 38 years old, Naharakanta Area, Site 2).*

At present the educational status of the Bhimpur population is relatively poor as compared to those living in Naharakanta. In urban area, for getting any job in the market the candidate must be educated and skilled as well. Otherwise getting job in market will be very difficult. In the area people are aware of the importance of education but there are various barriers to access schools. The dropout rate is very high at school level and higher educational level as well. Girls dropout rate is higher in comparison to boys. Generally, parents do not want to send the girl child to school especially families from lower economic status. The girl child takes the responsibility of house chores such as cleaning, washing, cooking and taking water from the tube well/ public stand post/ well. These things never happen in boy’s case. Generally, parents never want to spend money on girl’s education like giving extra tuition/ coaching class due to certain mind-set of our society as per which one-day girl have to married off so instead of spending on her education, that money can be spend on her marriage. People are living in urban area but there are strong gender biases (KI11, Naharakanta Area, Site 1). As evident from one of the respondents:

---

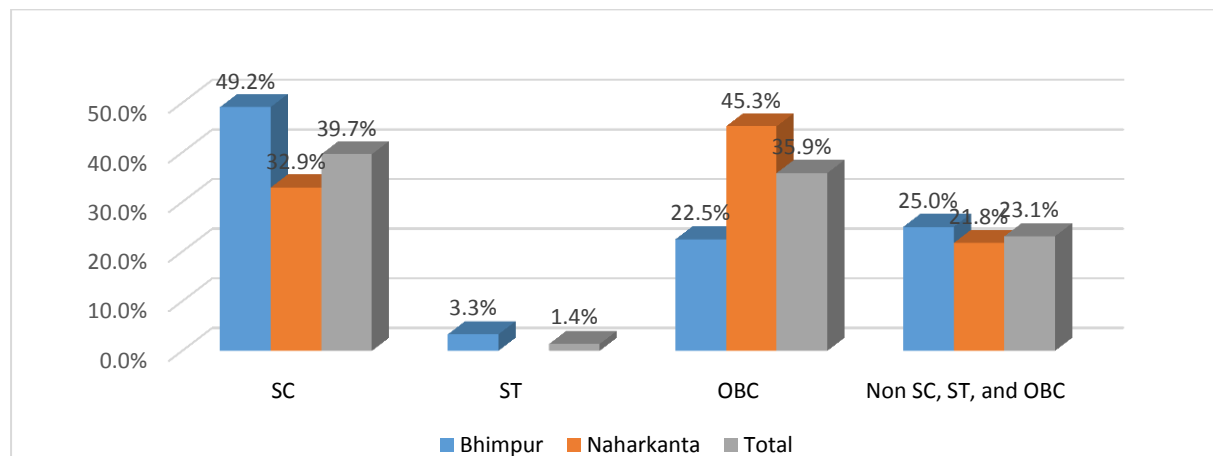
<sup>15</sup>Mid-day Meal -With a view to enhancing enrolment, retention and attendance and simultaneously improving nutritional levels among children, the National Programme of Nutritional Support to Primary Education (NP-NSPE) was launched as a Centrally Sponsored Scheme on 15th August 1995. In 2001 MDMS became a cooked Mid-Day Meal Scheme under which every child in every Government and Government aided primary school was to be served A Prepared Mid-Day Meal with a minimum content of 300 calories of energy and 8-12-gram protein per day for a minimum of 200 days. The Scheme was further extended in 2002 to cover not only children studying in Government, Government aided and local body schools, but also children studying in Education Guarantee Scheme (EGS) and Alternative and Innovative Education (AIE) centres

*“I have been living in the slum from more than five years with my family. Last year I got my elder daughter married and two daughters are living with me. Two daughters passed 10th class and after that they want to continue their education. I also admitted them in college but continue higher studies but they need more money. Recently I given my elder daughter marriage and whatever I earned that invested on her marriage. So I did not have more money to continue their education. Finally, they dropout form their college and live with me” (Prakash 55-year-old, Bbhimpur Area, Site 1).*

### 3.6(4): Social Identity

Regarding the social identity of the study population, the figure 3.3 shows that a higher per cent age of households 40 per cent belonged to the SC community followed by OBC 40 per cent, Non-SC/ST/OBC 23 per cent and only 1 per cent households belonged from the ST community. In Bhimpur higher per cent age of households 49 per cent and Naharakanta the lower per cent age of households 33 per cent belonged to SC community. The data also shows that Naharakanta has a higher per cent age household 45 per cent and Bhimpur the lowest per cent age of households belonging to the OBC community. In Bhimpur 25 per cent and Naharakanta 22 per cent of households belonged to Non-SC, ST, and OBC community. Only 3 per cent of households belonged to the ST community.

**Figure- 3.3: Social Identity (%)**



Source: Fieldwork

### 3.6(5): Marital Status

Table 3.3 provides information on the marital status of the surveyed population. The data shows that a higher per cent age of the population (55 per cent) was married and (41 per cent) of the population were unmarried. The data also shows that 4 per cent of the population were widows/separated/ divorced in the surveyed population. The data

also observed that Bhimpur reported a higher per cent age of the population were married 251 (57 per cent) and Naharakanta showed the lowest per cent age 416 (54 per cent) of the population were married. Naharakanta shows a higher per cent age 325(42 per cent) and Bhimpur shows that the lowest per cent age (39 per cent) of the population was married. Data also shows that Bhimpur had a higher per cent age of population divorced and widowed than Naharakanta. More women were separated than men in Bhimpur area. They lived separately from their families and most of the women worked as a labourers. It is observed that, in the city those who are single and working face more problems than those live with family. Especially single working women, widow and divorced women are facing more problem in the slums where people see and think differently. So one of the respondents reported:

*"Living separately from the family is very difficult and especially living in slum area is even more difficult. As a young woman living in a slum is very difficult as everyone thinks about me negatively. Sometimes I felt uncomfortable when the male members tried to touch me intentionally and used some abysmal sign. Now I have become habituated of it and do not mind it"* (Sabitri, 25-year-old, Bhimpur Area, Site 2).

**Table-3.3: Marital status**

Marital Status	<b>Bhimpur (KelaSahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>
Married	251 (56.5)	416(54.2)	667(55.1)
Unmarried	174(39.2)	325(42.4)	499(41.2)
Divorce/ Separate/ Widow	19(4.3)	26(3.3)	45 (3.7)
Total	444(100.0)	767(100.0)	1211(100.0)

Source: Fieldwork

It is also observed that, in the slums family conflict mainly happen due to less income and extra marital affairs. One of the daily labourer Kailash shared his experience and said:

*"Me and my wife have been living together from more than ten years in the slum. We have two daughters. She always blames me due to low income. As a daily labourer what I earned I gave to her daily. She always quarrels with me and wants more money for living better life. Finally, she left me. I tried to convince her many times but she did not want to come again back to my family. Now I have taken all responsibility of my two girls. They are studying in government school. Last year I remarried my wife's younger sister and now we are living happily"* (Kailash 40-year-old, Bhimpur Area, Site 1).

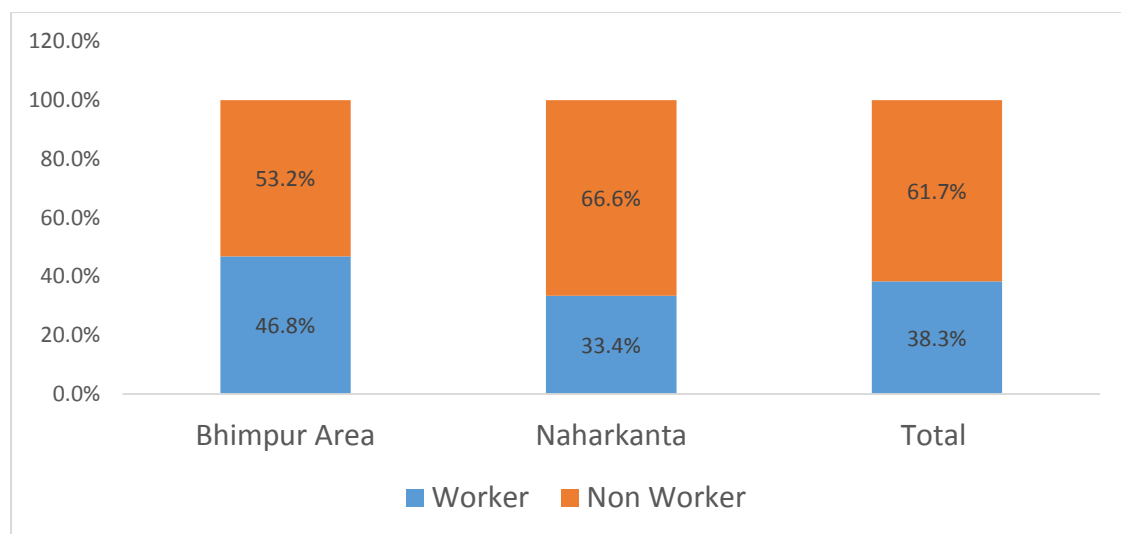
Another respondent reported:

*“I have been living in the slum from more than ten years. My husband died after my first child was born. My father in laws’ family had not supported me and every time they tortured me. After getting physical and mental torture from the family members I decided to leave the house and stay in the city. When I came I did not have any money. In first two days I had not taken food properly and slept on the street. That time I’m very fear about my child because his only one year and I could not leave him. So I decided to work as a daily labourer. First two months I faced lot of problems in the city. Then I decided to take a room and after ten fifteen days I got a room and paid one thousand rupees rent per month. As a widow and single mother I faced lot of problems in the city. The city is giving me many lessons and I learnt so many new things from the city. Now I have my own house and my son also helps me during my work. Now the area is overcrowded. People are in conflict with each other. Various type of illegal work happens in the area like Ganja, Liquor and prostitute business. The condition of the area is getting worse day by day” (Manju 55-year-old, Bhimpur Area, Site 2).*

#### 4.6(6): Working Conditions

Figure 3.4 provides information about the working conditions of the surveyed population. The data shows that the per cent age of the non-working population (62 per cent) is higher than the working population (38 per cent) in the surveyed population. It can be observed that the Bhimpur shows a higher per cent age of the population (47 per cent) and Naharakanta shows lowest per cent age (33 per cent) of the population was employed. Naharakanta shows a higher per cent age of the population (67 per cent) and Bhimpur shows the lowest per cent age of the population 236 (53 per cent) were not working.

**Figure- 3.4: Working Conditions (%)**



Source: Fieldwork

It is observed that those populations living in the core area and city centre are those who mainly work in various sectors and the working per cent age is higher in those areas than in the periphery or those settled far away from the city centre. The population in the core city are mainly migrants from different districts. They have acquired government land and they are engaged in various kind of work.

KI-1 in Bhimpur Area reported:

*"Most of the households migrated from different places of the state and they acquired government land here. Most of the population is engaged as daily wage labourers, small vendors, and most of the female members worked as domestic workers in the colonies"* (KI 1, Bhimpur Area, Site 2).

### 3.6(7): Occupation

Table 3.4 provides information about the occupation of the population in the study area. The data shows that a higher per cent age of the population are unemployed. Among the working population, the data shows that a higher per cent age of the population works as daily labourers 59 per cent, followed by petty business 17 per cent, company jobs 10 per cent, Drivers 8per cent and government jobs 4 per cent. Only1 per cent of the population reported that they are engaged in farming activities. In Bhimpur, higher per cent age of population worked as daily wage labourer 73 per cent then the Naharakanta. Very less parentage of population is engaged in government and private company job.

**Table- 3.4: Occupation of the Study Population**

Occupation	Bhimpur (KelaSahi)	Naharakanta	Total
	N (%)	N (%)	N (%)
Daily Labourer	142 (73.2)	122(47.7)	264(58.7)
Driver	17(8.8)	19(7.4)	36(8)
Business	32(16.6)	46(18)	78(17.3)
Farmer	0	6(2.3)	6(1.3)
Govt Job	2(1)	17(6.6)	19(4.2)
Company Job	1(5)	46(18)	47(10.4)
Total	194(100.0)	256(100.0)	450(100.0)

Source: Fieldwork

It is found that, most of the people migrated from rural area to urban area due to lack of work opportunity and smaller landholding. Most of the migrated population work as unskilled labourer as evident in the following narrative:

*“Due to lack of work in rural area and less agricultural production I migrated from my native place to the city. First two months I worked as a daily labourer and most of time I do not get any work. Now I am working under a contractor so that I get work daily. Every month I send money to my family”* (Ragunath, 34-year-old, Bhimpur Area, Site1).

Another respondent said:

*“His family belonged to Bhusundapur and fishing is the primary occupation of his family. They are mainly dependent on fishing in ‘Chilika lake’. Due to declining profit in fishing, his family migrated to the city and he worked as a rickshaw puller. (Jami achi kintu chasa nai, ketebele marudi helani ta au ketebele banya helani). They have land but it is not cultivable due to repeated drought or flood condition in the area from past many years. Due to heavy family burden, his family migrated from village to the city”* (Sukanta, 53-year-old, Bhimpur Area, Site2).

This was corroborated by KI as follows:

*“In Naharakanta most of the heads of the households were engaged in different kinds of job to maintain their life. Ten-twenty years back the area was not very developed and people mainly depended on agriculture. But after the real estate business boomed the land rate went high by ten times the actual price. Most of the upper caste households who had more land, sold their land and started their own business. Some of the households constructed buildings for renting purpose and earned a good amount of money. Some of the households started hotel and restaurant business near national highways and earned a lot of money”* (KI 9, Naharakanta Area).

Another key informant reported along similar line:

*“In our area some of the upper caste people have more land and most of the lower castes did not have much land. That land also was given by their king decades back. Those who have land received a higher profit from and started their own business. Various companies like Tata, Honda, Bajaj and others ‘showrooms in their area. In the area local people did not get job due to lack of education. Where hundreds of worker from outside are working in these companies. These workers mainly stay in rented houses which are provided by the upper caste people in the area. Therefore, the livelihood status is higher among the upper caste community. While lower caste became poorer”* (KI 10, Naharakanta area, Site 1).

### **3.6(8): Household Income Per month**

Table 3.5 provides information about per month household income of the surveyed population. The data shows that majority of the population i.e. is 64 per cent did not have any income. Among the employed population, 21 per cent of the population

---

<sup>16</sup>Chilika Lake is a brackish water lagoon, spread over the Puri, Khurda and Ganjam districts of Odisha state on the east coast of India.



reported that they have an income of below five thousand and 11 per cent of the population reported that they have an income of five thousand to ten thousand in a month. The data shows that the numbers of people earning in the range of ten thousand to fifteen thousand are 3 per cent and only one per cent of the population have an income between fifteen thousand to twenty thousand per month. The data also shows that one per cent per cent of the population has an income between twenty thousand to twenty-five thousand and only 1 per cent of the population has an income of more than twenty-five thousand. It is also observed that Bhimpur shows a higher 35 per cent and Naharakanta shows at the lower 14 per cent per cent age of the population of incomes below five thousand in a month. At the same time Naharakanta shows 14 per cent and Bhimpur shows only six per cent of the population who have an income between five thousand to ten thousand in a month. In the Table 3.5, the data shows that in Naharakanta a higher per cent age of the population have an income group of more than Bhimpur.

**Table- 3.5: Household Income Per Month**

HH Income in Rs	<b>Bhimpur (KelaSahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>
No Income	259 (58.3)	514(67.0)	773(63.8)
>5000	153(34.5)	105(13.7)	258(21.3)
5000 to 10000	28(6.3)	104(13.6)	132(10.9)
10000 to 15000	2(.5)	23(3.0)	25(2.1)
15000 to 20000	1(.2)	10(1.3)	11(.9)
20000 to 25000	1(.2)	7(.9)	8(.7)
25000<	0	4(.5)	4(.3)
Total	444(100.0)	767(100.0)	1211(100.0)

Source: Fieldwork

One of the respondents reported:

*“In the city without money you can’t walk also. When I first came to the city fifteen years ago and the living standard was very low. Now the standard of living is high in the city but the level of income has not increased much. I am a daily wage labourer. It is difficult to get work every day due to increase in the population of the daily wage workers. Due to high migration, the number of daily labourer is increasing and is difficult to get work here every day I have to stand near the square along with five to seven hundred daily labourers. The owners and contractors will come and bargain with our group leader if the amount is suitable for us then we go for work together. The situation keeps changing some days I do not get any work and sometimes I get paid less. Whatever money I get is insufficient to sustain my family. I am unable to provide good clothes, food, and education to my children. My family is just*

*surviving here, because in my native place I did not get work at all. My family do not have much land so I can't cultivate and maintain my family. Therefore, I came here to earn livelihood for my family” (Raghunath, 44-year-old, Naharakanta Are, Site1).*

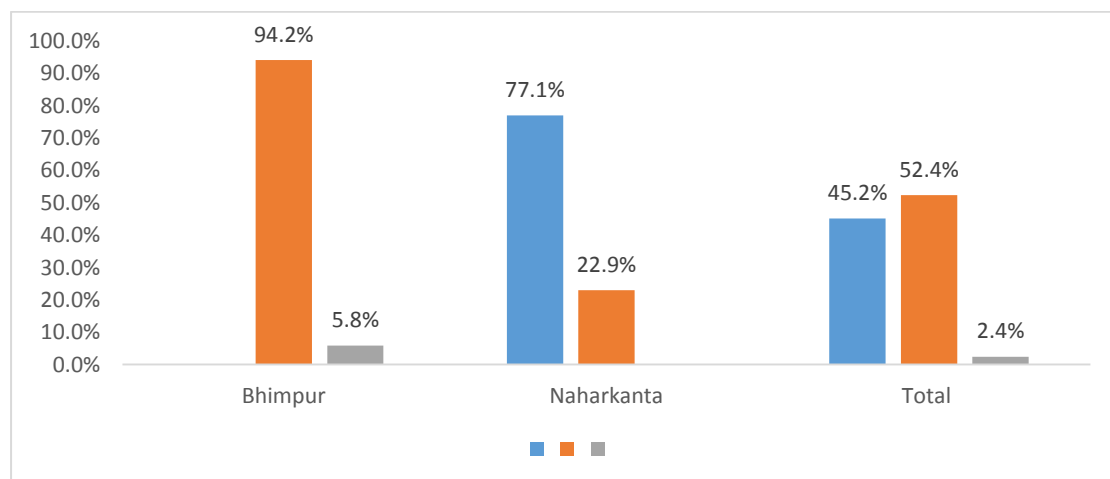
In Naharakanta another respondent mentioned:

*“My family is mainly dependent on agriculture. I take the land on lease and every year we have to pay a particular amount to the landlord. Our family sells vegetables such as cauliflowers, pumpkins, potato, brinjal, cabbage, radish, cucumber, carrot and greens near at market. Whatever earns we maintain our family but now the situation totally changed. When the area came under BMC the landlords did not agree to provide their land to us. Many landlords sold their land to real<sup>17</sup>estate in the area. Now the land rate is ten times higher than the actual rate. The condition has drastically changed in the area, now my father and I work as daily labourer. When I cultivate my whole family helped me and the workload was not much. But now I can't ask my wife to join me as daily labourer and my father also became old so he can't work daily as a labourer. I am a single earner it is my responsibility to take of my parent as well as family. The income has decreased but the workload has increase for me” (Ramesh, 49-year-old, Naharakanta, Site 2).*

### 3.7: Migration Pattern

In India every year thousands of people migrate from one city to another city, one state to another state. In Odisha every year thousands of rural people migrate to the urban areas to find a better life. In the study areas, the data shows that a higher per cent age of the population (52 per cent) had migrated from rural to urban areas and only two per cent of the population had from one town to another town (Figure 3.5).

**Figure- 3.5: Migration Pattern (%)**



Source: Fieldwork

<sup>17</sup>Real estate is "property consisting of land and the buildings on it, along with its natural resources such as crops, minerals, or water; immovable property of this nature; an interest vested in this an item of real property; buildings or housing in general.

In Bhimpur the data shows that a higher per cent age 94 per cent and Naharakanta shows a lower per cent age 23 per cent of the population had migrated from rural areas to urban areas. In Bhimpur only five per cent of the population reported that they had migrated to from another town to the city.

### 3.7(1): Duration of Stay in the Area

Table 3.6 shows information about the duration of the stay in the study area. The migration from last place of the residence to the place of current residence of a person or family is used for the purpose. The data shows that out of the surveyed population, 45 per cent of the population reported they did not remember the year of migration and 54 per cent of the population had migrated from different places to both the study areas. The data shows that 12 per cent of the population had migrated during the last five years, 13 per cent had migrated five to ten years ago, 13 per cent of had migrated ten to fifteen years ago and 11 per cent migrated fifteen to twenty years ago to the city. Only 1 per cent population had migrated thirty years ago. The data shows that majority of the population had migrated in Bhimpur than the Naharakanta area.

**Table- 3.6: Duration of stay in the area**

Duration and Reason	<b>Bhimpur (KelaSahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>
Duration			
Place of Origin	0	131(77.10)	131(45.20)
Below Five Years	25(20.80)	10(5.90)	35(12.10)
Five to Ten Years	23(19.20)	15(8.80)	38(13.10)
Ten to Fifteen Years	31(25.80)	8(4.70)	39(13.40)
Fifteen to Twenty Years	30(25.0)	3(1.80)	33(11.40)
Twenty to Twenty Five Years	6(5.0)	3(1.80)	9(3.10)
Twenty Five to Thirty Years	3(2.50)	0	3(1.0)
Above Thirty Years	2(1.70)	0	2(0.70)
<b>Reasons of Migration</b>			
Not Migrated	0	131 (77.10)	131(45.20)
Job Opportunity	86(71.70)	27(16.0)	113(39.10)
Natural Calamities	13(10.80)	0	13(4.50)
No Land	6 (5.0)	0	6(2.1)
High Rent	4 (3.30)	0	4(1.40)
Marriage	8(6.70)	7(4.0)	15(5.20)
Forcefully Removal	3(2.50)	5(3.0)	8(2.80)
Total	120 (100.0)	170(100.0)	290 (100.0)

Source: Fieldwork

### **3.7(2): Reason of Migration**

Both push and pull factors are responsible for individual or family migration from one place to another. The push factor is when people leave an area and the pull factor is when people come from an area due to socio-economic and political reasons. Under the push factors, people leave the area mainly due to poor services, lack of education, poor medical facilities, unemployment, low pay, hazardous working conditions, persecution, and war etc. With respect to pull factors, people come to an area for better services, job opportunities, higher quality of life, good pay, democracy, and freedom (Jayaraj, 2013; Kainth, 2015).

In the study areas, data shows that a higher per cent age of the population migrated from rural areas to Bhubaneswar city. Table 3.6 shows that 39 per cent population reported that they had migrated for job opportunities in the city. The table also shows that for four per cent each migrated due to natural calamities and marriage. No land possession was a push for two per cent and higher rents in other parts of the Bhubaneswar city for one per cent were the main reasons for migration to the slum area. The data shows that in Bhimpur a higher 71 per cent and in Naharakanta a lower 39 per cent of the population had migrated due to job opportunities in the city. In Bhimpur a higher per cent age of people 10 per cent, migrated to the cities due to natural calamities, five per cent households having no land and high rents three per cent Bhimpur shows six per cent and Naharakanta shows 3 per cent of the population reported they migrated due to marriage. Naharakanta shows 3 per cent and Bhimpur only two per cent of the population reported they had migrated to the city due to forced removal. It can be observed that people had more reasons to migrate to Bhimpur than they did to migrate from Naharakanta.

In Bhimpur area higher population has migrated than the Naharakanta. The FGD reported that, most of Bengali households migrated to the area after 1999 super cyclone in Odisha. Majority of the households lost their livelihoods and they come to the city in search of livelihood. Most of the migrants live in the slum areas. When they came to Bahimpur area, that time the area was not much developed. People lived without basic facilities. During 1990s very few households were settled in the area. Now more than four hundred households are living in the area.

One of the respondents from Bhimpur area said:

*“Her family migrated to the city due to family conflict. In joint family they did not get much space, and there were fights over income and no one wanted to take the responsibility. Therefore, her family migrated to the city. Her husband worked as daily labourer, his younger son work as an office assistant in a private firm. Her elder son work as a driver and her daughter is married but due to family conflict her daughter is also living with them”* (Sebati 44-year-old, Bhimpur Area, Site 1).

The inter caste marriage is also one of the factor for migration. In the area some of the respondents eloped from their native place and now they live in the Bhimpur slums. One of the respondents said that they eloped from their home to get married. Her family did not approve of their alliance and they got married without their family’s consent. Her husband belonged to the lower caste community and she is from upper caste. Her family threatened them and warned that they will spoil their life. So they ran away from the house and started to live in the city. Due to the poor financial condition they are living in slum area. When they came, her husband did not have any job in his hand, first three months they stay in a rented house. Whatever money and gold they had they spent it on their day to day life maintenance. After two months the house owner asked them to vacate the room as they couldn’t pay the rent on time. Finally, they moved to the slums five year ago and built their own house. Now her husband works as a daily labourer. She has two girls. Now her family wants to build the family relation but they do not want to continue. In her bad time nobody helped her, bad time has already passed, when she needed her family support the family escaped her now she is happy with her husband and two daughters (Rita, 31-years-old, Bhimpur Area, Site 2).

Landlessness is another reason for people to migrate from one place to another place. During focus group discussions it came to notice that many people migrated to the city because of very small land holdings in the village. The agricultural production also decreased. The cost of seed, labour and other instrument is high. Famers also face problem to sell their produce in the market. Therefore, people are not interested in cultivation any more as it is not sustainable. Now days those households with less land cannot maintain their family life. So they are bound to seek alternative work. In rural area very limited chances are there to get work in non-agricultural sector. Therefore, people migrate to urban area. Another thing is that in rural area people are very close to each other and occupation based on their caste occupation or family

occupation. A higher caste person may not be doing the lower caste work but in urban area people have many options and they can get a work as per their qualification and experience.

A respondent from Naharakanta area said:

*“My father has five children, four boys and one girl. Now we four brothers are married and we have 11 children. Total four families have to share the same limited household land. Now we are facing more problems. The government also did not provide any land to us. In this time of urbanization, we can't buy new piece of land for us. The economic condition of the family is very bad. We are emotionally attached to our homeland”* (Krushna 35-year-old, Naharakanta Area 2, Site 2).

### 3.7(3): Perceived Benefit of the Place of Current Residence

The data in Table 3.7 shows the perceived benefits or advantages of the place of current residence. The data shows that a higher per cent age of the population (54 per cent) reported that the availability of job is one of the benefits of the place of destination. The data also shows that in Bhimpiur a higher per cent age 98 per cent and Naharakanta a lower per cent age 23 per cent of the population had reported the availability work as the main benefit of the place destination. In Bhimpur only 2 per cent of the population had reported better living condition as a benefit of the place destination.

**Table- 3.7: Perceived Benefits of the Place of Current Residence**

Perceived Benefits	Bhimpur (Kela Sahi)	Naharakanta	Total
	N (%)	N (%)	N (%)
No Response	0	131 (77.10)	131(45.20)
Availability of Work	118(98.30)	39(22.90)	157(54.10)
Better living Condition	2(1.7)	0	2(0.70)
<b>Losses in the place of destination</b>			
No Response	0	131(77.10)	131(45.20)
Over Crowding	19(15.80)	0	19(6.60)
Poor Infrastructure	42(35.0)	4(2.40)	46(15.90)
Community Conflict	13(10.80)	0	13(4.50)
Illegal Business	14(11.70)	0	14(4.80)
Cost of Living	32(26.70)	35(20.60)	67(23.10)
Total	120(100.0)	170(100.0)	290 (100.0)

Source: Fieldwork

**Case 1:** Jibna a 36-year-old small business man, is living in Bhimpur area. He said that, his family is living in Bhimpur area since 2008. Due to unemployment he came to the city for searching job. First one year, he worked as saree shop and per month he paid 5000 per month. After one year he set up their own saree shop and for that he invested 2 lakhs rupees. He arranged some amount of money from his friends and rest of money he borrowed from money lenders. The business is going well and he lives with his family. When he came he did not have enough money. Now he built his own house in the area and got a small land for the future. His family members also helping him in his business. He has two children, elder daughter is studying in English medium school and younger one only a year old. His wife is a house maker who helps him in his saree business. After coming to city their standard of living has also changed. Those people in rural area not talking to him now they talking to him nicely and give respect to him. He is helping their relatives and their friends in their bad situation. In rural area people do not have better medical facilities, in the city many hospitals are opened where they can get better facilities. Most of his area people come for the medical purpose and he always helps them financially as well as provides moral support. Some time he went with patient and their relatives. In spite of being busy in the business, he helps people with medical cases as much as possible. It only possible for him, as he is living in the city and is economically well off otherwise it is very difficult for him to help others.

#### **3.7(4): Perceived Disadvantages of the Current Residence**

Table 3.7 shows that the higher i.e. 55 per cent of the population reported that they faced the multiple problems at their current residence. As mentioned earlier 45 per cent of the population is born and brought up in Naharakanta hence they did not perceive any kind of locational disadvantage. Among the migrated population that faced problems at the place of destination, the data shows that a higher per cent age 23 per cent of the population reported the cost of living was very high in the city. The data also shows that 15 per cent of the population reported lack of infrastructure, crowdedness six per cent, illegal businesses four per cent and four per cent of the population had reported they faced community conflict in the area. In Bhimpur the data shows that higher per cent age 35 per cent and in Naharakanta a lower per cent age two per cent of the population reported they have faced problem due to lack of infrastructure. In Bhimpur higher per cent age 26 per cent and in Naharakanta a lower per cent age 20 per cent of the population reported the cost of living in the city was too high in the city. In Bhimpur, 15 per cent of the population was felt an impact of crowdedness, 11 per cent of the population was troubled by illegal businesses and

only 10per cent population experienced community conflict in the place of destination.

**Case 2:** Shanti a 45-year-old living with her family Bhhimpur area. She said that she first came to Bhubaneswar after 1999 super cyclone with her family. Her family was mainly dependent on fishing at *Chilka lake*. In super cyclone her family lost their house and boat. That boat was bought by borrowing money on high interest rate from the local money lenders. When they lost everything in cyclone, after one month the money lenders were asking the money back. Due to much pressure the whole family migrated to city. Whole family was living in a rented house for few months. After that they came to the area, that time very less houses (fifty to sixty) were built in the area. That time situation was very difficult people were living without basic facilities such as electricity, pucca road, water supply and sanitation. Even after seven or eight pm people were not going outside. That time the area was covered by forest and people were fearing about animals.

Now days the area is totally changed more than four hundred families are living here. Every year population grows in the area. Due to growth of population various issues arise in the area such as drugs, liquor business, prostitution, conflict, poor water availability and lack of sanitation. The water supply very slow in the area, most of the households are dependent on hand pump water. In the area, two hand pumps were dysfunctional and one of hand pump water quality is poor and is undrinkable. Only two hand pumps are functional and all households are dependent on it. There is always rush at both hand pumps, always conflict raise due to collect water and most of time female are conflicting are each other on collect water. Her family also faced water crises. During summer seasons they faced more problem to get water for drinking, bath and cooking. The pipe water supply facilities they have their house but water is not coming regular. So they mainly dependent on hand pump water. Her family practiced open defecation due to lack of toilet facility. Under the government schemes they did not get any toilet facility. Her husband approached the ward councillor to get toilet but still her family did not get any. If she gives money to the local political leader, then it would easy to get toilet. Without bribe to get toilet from the BMC office is very difficult now days.



She also mentioned that, she throws household garbage outside her house. The garbage bin facility is not available outside the house so they are throwing garbage outside. Outside house also did not have drainage facility and most of time water stagnates on the road. Due to lack of drainage facility they face more problem during rainy seasons. Her elder son's health condition was not good. Her son having left side ear problems and they have spent more than two lakhs rupees on visits to hospitals and medicine. One of her married daughter is also living with her because her husband always beats her daughter and he has doubted that she is having extra marital affairs with some other man. Her daughter also has a five-year-old son who live with her. Every time her son is having health related problems and her family take care him. As she is her daughter she couldn't ignore her.

**Case 3:** Sundari sixty-nine-year-old living who separated and living alone in Bhimpur area. She mentioned, her both sons are not taking care of her. She is living separately in another house in the same slum. When her husband was alive that time the condition was good and her husband was taking care of everything. She has two sons and both are married. They are living separately with their respective families. When her husband was alive they were living together and whatever they money earned they used give it to their father. When her husband died, they lived together hardly for two-three months. After that many times conflict happened to in her family as who will take responsibility of the whole family. Her family member tortured her physically and mentally. They threw her out forcefully from her own house which was built by her husband. She has to go without any food for many days.

She never told anyone about the incidents but her neighbours knew about the matter. Some days neighbours also gave her foods and clothes. Her sons were not happy with the neighbours who used to help their mother. Finally, the matter came to the community leader and other members. They came to her house and asked her both sons about the matter. After listening to both sides, the community leader told her sons that she will be live in the house because of her husband constructed that house. Finally, she got a room to live. But none of her sons take conscience of her wellbeing or other basic needs such as food, clothes or medicine. To sustain herself she started to work as a domestic help in other peoples' houses. The ward councillor took pity on her condition and helped her to get widow pension and fifteen kg rice per month

under the government scheme to support the elderly. She is very disappointed that her sons have abandoned her in old age. She suffers from loss and pain of her husband's death.

### **3.8: Housing Condition in the Study Area**

Table 3.8 shows ownership of households in the surveyed population. In Bhimpur area people had illegally occupied the government land and constructed their house and some households have also rented out few rooms. The data shows that 76 per cent respondents reported to have their own house and 23 per cent respondents reported they are living in the rented house in the area. In Naharakanta, where 96 per cent of the respondents reported they own house and only 9 per cent respondents were living in rented houses.

In Bhimpur one of the Key Informants (Community Leader) reported:

*"In the area, most of the population have acquired government land and made their households. Several times the BMC have given notices to them to vacate their place but due to political interference and people's unity the BMC has been unable to eradicate them. But they are not sure they would get to stay there for life or one day be removed by the government. Most of the people believed that if the government would evict them, then they would definitely get the house under government schemes and get permanent settlement any other place"* (KI6, Bhimpur Area, Site 1).

One of the Key informant (AW) said:

*"Most of the households have been living more than thirty years to forty years in the place. These households were also numbered under the RAY schemes and the houses were number plated by the government. Most of the households in the area have been getting various government facilities such as ration card, old age pension, and Adhaar card, voter ID, and bank account facilities. They are legal citizens of the country. No one would evict them without providing permanent settlement"* (AW1, Naharakanta Area, Study Site 2).

Another key respondent reported:

*"Those people have more land they built more house because of the market demand and growth of urban area. Year by year the population have been increasing. The outsiders are more in the area, the higher per cent age of population migrated from West Bengal, Bihar and Jharkhand. These populations are engaged in different types of job such as daily labourer, street vendors, construction workers, carpenter and painter etc. When large population comes in the city they need place to stay. In core city they are required to pay high rent. Therefore, more population comes to the periphery*

*area where they can rent rooms at relatively low price” (KI 6, Naharakanta Area, Site 2).*

From the above quote we can conclude that, people living in Naharakanta are entitled to get benefits from government schemes such as RAY, old age pension, ration card while people in Bhimpur area live under constant threat of eviction by the BMC as it is an illegal settlement.

### **3.8(1): Record of the House Ownership**

Table 3.8 provides information on the record of the house ownership in both study areas. The data shows that a higher per cent age of households 195 (67per cent) reported they did not have any house ownership records with them and only 92 (32per cent) of households reported they had household records.

**Table- 3.8: Record of the House Ownership**

	<b>Bhimpur (Kela Sahi)</b>	<b>Naharakanta</b>	<b>Total</b>
Housing Record	N (%)	N (%)	N (%)
Have Record of the House	14(11.7)	81(47.6)	95(32.8)
Have House Elsewhere	90(75.0)	39(22.90)	129(44.50)
Do not have House	27(22.50)	131(77.10)	158 (54.50)
House in the Place of Origin	90(75.0)	39(22.90)	129(44.50)
Housing in other City	3(2.5)	0	2(1.0)
Household provided by the government	0	10 (5.90)	10(3.40)
<b>Total</b>	<b>120(100.0)</b>	<b>170(100.0)</b>	<b>290(100.0)</b>

Source: Fieldwork

It is observed that Naharakanta reported higher 81 (47 per cent) and Bhimpur a lower per cent age 14 (11 per cent) of households which had household records. At the same time, in Bhimpur a higher 106 (88 per cent) and Naharakanta a lower per cent age 89 (52 per cent) of households reported they did not have any house ownership records with them.

One of the respondents from Bhimpur area reported:

*"Those who have been living in the place are mostly outsiders and that they are occupying government land where they would not get the land record. They have the hope that the state government will be provide permanent settlement for them but they are not sure when they will get it" (HH 30, Bhimpur Area, Site 1).*

Another key informant from Naharakanta reported:

*"...those belonging to the lower caste communities especially from the area did not have land records as they have acquired government land. They were receiving all facilities from the government and they are permanent members here. The land rate is very high and the poor people are unable to buy land here. As the city grew, the area gradually came under the BMC and land rate increased and most of the non-locals bought land here by paying a higher price" (KI 10, Naharakanta Area, Site 2).*

The community leader reported:

*"...the king 'Jaydev' gave land to the lower caste community. Our forefathers were engaged in different type of work in the palace. That time the king provided land to our forefathers and they settled here and provided free services to the king. Now we do not have any Pata (written record) with us. Here my grandfather died, my father died and this is my birth place and one day I will also die here. My whole family is living with me" (KI 6, Naharakanta Area, Site 2).*

It can be concluded that most of the people in Bhimpur area do not have any paper record of the houses. In Naharakanta the lower caste community also does not have any land record has they say that the land was allocated to them by the king Jaydev.

It is observed that in Naharakanta the higher caste community grabbed the government land. The higher caste is dominant here. They acquire government land and doing business such as milk dairy, fishing, broiler farm, tend house, brick factory, and plantation. All the land acquired by the government land and they paid to temple fund. Many people acquired the government land and they built houses on the land. In the area higher caste community are stronger than the lower caste community because they have land power, financial power, and man power (Table 3.8). This is illustrated by the following narrative:

One of the respondents said:

*'I wanted to build one house on the government land. Other community people have acquired government land and constructed house. Therefore, I also acquired a small land and wanted to build a house for my family. As I*

*belong to a lower caste other caste people did not allow me to build the house. They threatened me and I also filed a case against them at the nearest police station. But finally the case did not work and I left the government land. Then I requested the councillor to allot me a piece of land under the Vasundhara schemes<sup>18</sup>. My family faced more problems and I still did not get land under the landless schemes” (Ananta 45-year-old, Naharakanta Area, Site 1).*

### **3.8(2): House Elsewhere**

As most of the population has migrated to the city many of them still own houses at their native place. Table 3.8 provides information on the location of the house in the study area. As 44per cent of the respondents reported they had household elsewhere. In Bhimpur the data shows a higher per cent age 75per cent reported they have house at their origin of the place. In Naharakanta a lower per cent age (22per cent) of respondents reported they had house in the place of origin and some respondents reported they had house in other places in the city and outside the city. Bhimpur shows a lower per cent age 25per cent and Naharakanta shows a higher per cent age 77per cent of respondents reporting they had no house elsewhere (Table 3.8). Only 2 (1.per cent) of respondents reported they had a house in another city. The data shows that in Naharakanta a higher per cent age 77per cent and Bhimpur only 22per cent of the respondents reported that they did not have households any other place. In Bhimpur the data shows that a higher per cent age 75.0per cent and Naharakanta shows a lower per cent age 22per cent of respondents reported they have their households at the place of their origin. Only 2per cent of respondents reported they have a house in another city.

### **3.8(3): Houses Provided Under Government Schemes**

Table 3.8 provides information on households provided under the government schemes in the study areas. The data shows that a higher per cent age of households (96per cent) reported they did not get any household facilities under the schemes. Only (3per cent) of respondents reported they received housing facility under Indira Awas Yojana (IAY) and Rajiv Awas Yojana (RAY) schemes. Which schemes were provided by the central government? The data shows that in Bhimpur none of the households reported to recipients of a housing facility under the government schemes.

---

<sup>18</sup>The management of land and its distribution to the needy persons are the foremost responsibilities of the Revenue and Disaster Management Department, Odisha. Government land up to the extent of four decimals was being provided free of premium to each homestead less family for house site purpose since 1974-75.

In Naharakanta only 10 per cent of the respondents reported they got housing facility under the IAY, RAY schemes. There are lot of mal practices and corruption at local level in distribution of houses under the government schemes such as IAY. It is reported that people have to bribe the local politicians to get allocation of the house under IAY. This was corroborated in Naharakanta by a respondent who reported:

*“Those who bribed the Sarpancha they only got the IAY. Poor people do not have money to give to the politician to avail IAY. The government only implemented the schemes but the needy people did not get any benefit from the schemes”* (Rakesh 36-Year-old, Naharakanta Area, Site 2).

Another respondent corroborated this as follows:

*“The corrupt politician and corrupt government officer get more benefit from IAY. Those who got the housing facility under the schemes they gave ten to fifteen thousand rupees to the politician. Otherwise you cannot get a house”* (Gopalia55-year-old, Naharakanta Area, Site 2).

In Naharakanta, Narayan, 40 year-old said:

*“If you do not bribe the politician then you cannot get house under IAY or Biju Pucca Ghar Yojana (BPGY)<sup>19</sup>. If you want to get house under the government schemes, then you have to give bribes. In case you did not get the house allotment even after giving money then it is difficult to get the money back from them”* (Naharakanta Area, Site 2).

### **3.8(4): Housing Tenancy Status and Rent**

Regarding house rents, the data shows that 84per cent of the population own a house, and only 15per cent of the population reported they lived in a rented house. It was observed that in Bhimpur a higher per cent age of the population lived in rented houses compared to Naharakanta. In Bhimpur a higher per cent age of households 18per cent and Naharakanta a lower per cent age 1per cent of households paid a rent of one thousand to fifteen hundred rupees in a month. In Bhimpur 6per cent of the households paid a rent of eight hundred rupees per month. In Naharakanta 5per cent of the households paid fifteen hundred to two thousand rupees rent monthly (Table 3.9).

---

<sup>19</sup>BijuPuccaGharYojana (BPGY) lunched 2014 by the Odisha Government. The main aim of the schemes, provides Pucca house to all the rural households living in kutcha house.

**Table- 3.9: Household Rent Per Month**

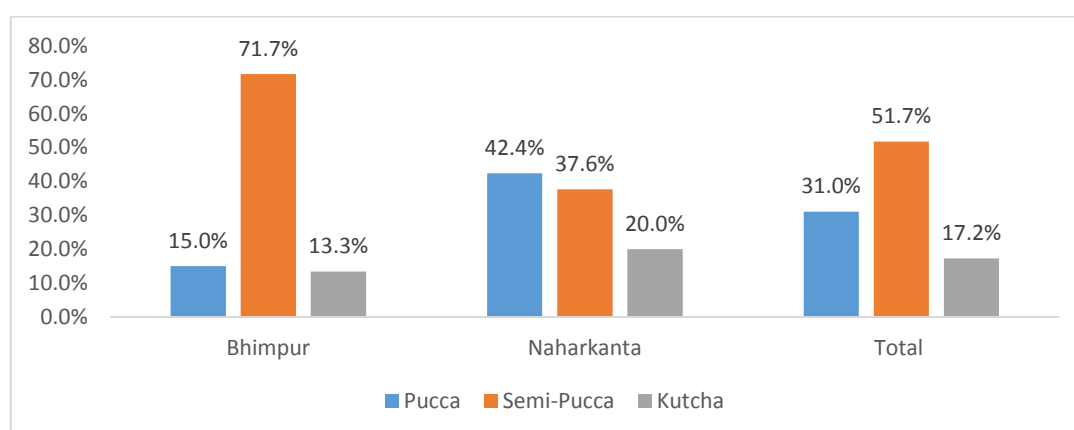
Ownership/Tenancy and Rent (in INR)	Bhimpur (KelaSahi)	Naharakanta	Total
	N (%)	N (%)	N (%)
Own House	89(74.2)	155(91.2)	244(84.1)
<b>Rent in INR</b>			
Below 1000	8(6.7)	0	8(2.8)
1000 to 1500	22(18.3)	2(1.2)	24(8.3)
1500 to 2000	0	9(5.3)	9(3.1)
2000 to Above 2000	1(.8)	4(2.4)	5(1.7)
Total	120(100.0)	170(100.0)	290(100.0)

Source: Fieldwork

### 3.8(5): Type of House in the Study Population

Regarding the availability of the type of house in surveyed population, figure 3.6 data shows that a higher per cent age 51per cent of the population were living in Semi Pucca houses<sup>20</sup>, 31per cent of the population were living in Pucca houses and 17 per cent were living in Kutcha houses. The data shows that in Naharakanta a higher 42 per cent and in Bhimpur a lower per cent age 15per cent of the population were living in pucca houses. In Bhimpur a higher 71per cent and Naharakanta a lower per cent age 37per cent of the population were living in semi-pucca<sup>21</sup> houses. In Naharakanta higher 20per cent and Bhimpur shows a lower per cent age 13per cent of population were living in Kutcha houses (Figure 3.6).

**Figure- 3.6: Type of House (%)**



Source: Fieldwork

<sup>20</sup> Pucca House: A pucca house is one, which has walls and roof made of the following material. Wall material: Burnt bricks, stones (packed with lime or cement), cement concrete, timber, ekra etc.

<sup>21</sup> Semi -Pucca house: A house that has fixed walls made up of pucca material but roof is made up of the material other than those used for pucca house

The evidence also shows that, with increasing standard of living, proportionate of households living in Pucca houses is increasing. The bivariate result shows, 10 per cent of households belong to low standard of living, 32 percent of belonging to medium standard of living and 97 percent belonging to high standard of living household are living in pucca houses. Caste also plays crucial role for living in pucca houses in the communities. The data shows, 18 percent of households belong to SC and ST category, 38 percent of households belong to OBC category and 45 percent of households belong to Other caste are living in pucca houses (Appendix B).

### 3.8(6): Crowding (Number of Persons Per Room) in the Study Population

Among the surveyed population, the data shows that a higher per cent age of 44 per cent households live in single room houses. The data also shows that 38 per cent of households have three room houses, and 37 per cent households live in two room houses. Only 5per cent of households have four and more rooms in both study sites. It is observed that Bhimpur has a higher (61 per cent) and Naharakanta (32 per cent) a lower per cent age of the households had just one room. At the same time, Naharakanta shows higher 42 per cent and Bhimpur a lower per cent age 29 per cent of households having two rooms. Naharakanta shows a higher 17 per cent and Bhimpur shows only seven per cent of households have three rooms. Regarding the Kutcha house, the data shows that in Naharakanta a higher eight per cent and Bhimpura lower per cent age one per cent of households had four rooms and over four rooms in the study area (Table 3.10).

**Table- 3.10: House Size and Type**

	<b>Bhimpur (KelaSahi)</b>	<b>Naharakanta</b>	<b>Total</b>
House Size	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>
One Room	74(61.1)	54(31.8)	128(44.1)
Two Rooms	35(29.2)	73(42.9)	108(37.2)
Three Rooms	9(7.5)	29(17.1)	38(13.1)
Four Room and More	2(1.7)	14(8.2)	16(5.5)
<b>Ventilation in House</b>			
Window	44(36.7)	123(72.4)	167(57.6)
Skylight	13(10.8)	22(12.9)	35(12.1)
No Ventilation	63(52.5)	25(14.7)	88(30.3)
Total	120 (100.0)	170(100.0)	290(100.0)

Source: Fieldwork



### **3.8(7): Source of Ventilation in House**

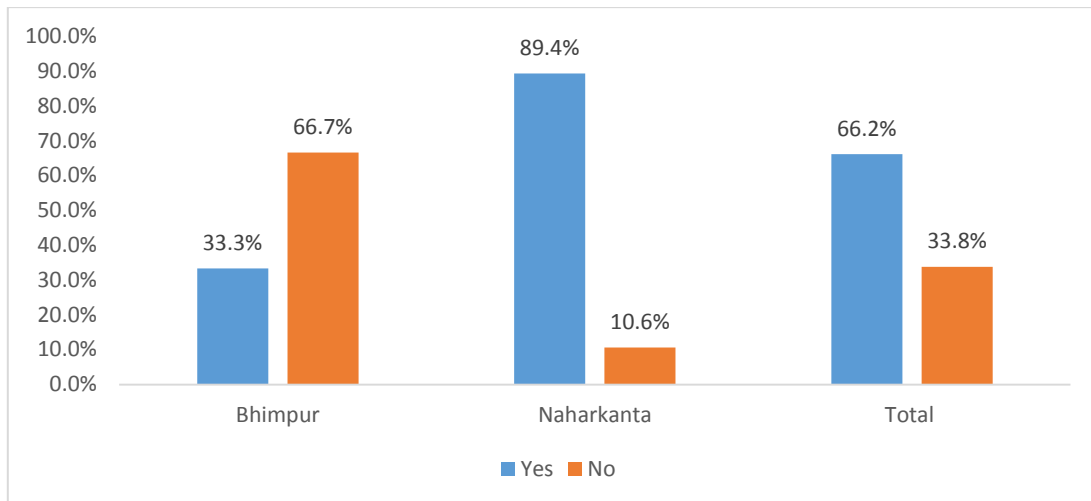
Table 3.10 provides data on the type of ventilation facilities households have in the study population. The data shows that 58 per cent of households reported they have a window and 12 per cent of the population households have a skylight for ventilation. Even the data shows that more than 30 per cent of the population reported they were not any ventilation facilities in their households. It can be observed that Bhimpur shows a higher 53 per cent and Naharakanta a lower per cent age 15 per cent of the population reported they did not have any ventilation facility.

It was observed that in Bhimpur area the rooms were very congested, most of the house were semi pucca and kutcha in nature. The condition of house very poor, the room size was also very less space. Majority of houses have no proper ventilation facilities. When houses have no electricity, then the room were totally dark in day time too. Most of the houses do not have window and skylights due to extra money. Some of the rent houses have window and skylight made by the owner so that the house owner gets good amount of money. Some of the households reported that they made houses on government land, they did not spend much on house if BMC eradicate them.

### **3.8(8): Space for Cooking**

Figure 3.7 data provides information on a separate space for cooking facility in the household. Among the surveyed population in both study areas, the data shows that 66 per cent per cent of households reported that they had a separate space for the cooking and 33 per cent of population reported that they did not have any separate space for the cooking. It is observed that Naharakanta shows higher 89 per cent and Bhimpur a lower per cent age 33 per cent of households reported they had separate spaces for cooking. In Bhimpur a higher 66 per cent and Naharakanta a lower per cent age 10 per cent of the households reported they did not have any separate space for cooking facility.

**Figure- 3.7: Space for Cooking**



Source: Fieldwork

One of the respondents stated:

*“my house does not have sufficient space to sleep my family member, where I get the space for separate cooking space. I cook here in Chula and after cooking the food. I keep chula outside and clean the room so that my children can sleep on the floor”* (Sasmita 42-year-old, Bhimpur Area, Site 1).

Some households also reported to have separate cooking space. Table 3.11 data shows that a higher percentage of the households reported they have separate space for cooking. Among the surveyed population, 30 per cent of the population reported they have separate space for cooking facilities outside the households, 25 per cent of the population reported they have separate space for cooking inside the households. Only 10 per cent of the population reported they have a kitchen in their households. In Naharakanta 17 per cent households and in Bhimpur only one household reported to have kitchen inside the house. In Bhimpur a higher percentage of the households 26 per cent and Naharakanta 25 per cent of households reported that they had separate space for cooking inside the household. The data shows that in Naharakanta higher the percentage of households 47 per cent and Bhimpur a lower percentage seven per cent of households had a separate space for cooking outside households.

**Table-3.11: Cooking Space and Fuel for Cooking**

Cooking Space and Fuel	<b>Bhimpur (KelaSahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>
Do not have Kitchen	78(65.0)	18(10.6)	96(33.1)
Kitchen	1(.8)	29(17.1)	30(10.3)
Separate Space inside House	32(26.7)	43(25.3)	75(25.9)
Separate Space outside House	9(7.5)	80(47.1)	89(30.7)
<b>Fuel for Cooking</b>			
LPG	79(65.8)	89(52.4)	168(57.9)
Kerosene	17(14.2)	4(2.4)	21(7.2)
Wood	24(20.0)	77(45.3)	101(34.8)
Total	120 (100.0)	170(100.0)	290(100.0)

Source: Fieldwork

### 3.8(9): Fuel for Cooking

Regarding fuel used for cooking purposes among the surveyed population, the data shows that most of the households used LPG as a preferred cooking fuel. Data shows that in Bhimpur a higher per cent age of the households 65per cent and Naharakanta a lower per cent age of households 52 per cent used LPG for cooking. In Bhimpur a higher 14 per cent and in Naharakanta only two per cent of households used kerosene for cooking. In Naharakanta higher 45 per cent and Bhimpur lowest 20 per cent of households were used wood for cooking (Table 3.11). Though the government has provided LPG connection at subsidise rate most of the lower income respondents were unable to refill the LPG gas cylinder. Most of the households complain about increasing prices and showed their inability to continue using LPG for cooking. Most of the women started using wood for cooking. For instance, one of the respondents said:

*“The LPG rate has doubled and her family is unable to filled up again. The LPG price increases every month, when they got consumer only four hundred thirty rupees take to fill-up a cylinder. But now to fill-up LPG cylinder needs more than nine hundred rupees per month. Day by day the family expenditure increase but our income still same”* (Hema 43-year-old, Bhimpur Area, Site 2).

Another respondent from Naharakanta said:

*“The government provide LPG gas very less amount. We thought our bad time is over and we get relax from wood chula. But after one month the gas rate is*

*double. I felt that, my husband income very less if I pressurise him to fill up the LPG gas so he may be worried for that. So better that I will again cook on wood” (Kanchan, 39-year-old, Naharakanta Area, Site 2).*

Another respondent reported that

*“The government provide to BPL family for free LPG cylinder so that they will cook easily. Earlier we fill up fifteen KG gas cylinder four hundred fifty rupees but now the rate is double. In the area many houses stop use LPG due to high price. In my house again we cook on wood Chula because unable fill up LPG” (Sujata, 45-year-old, Naharakanta Area, Site 2).*

### 3.9: Electricity Facilities in the Study Households

Regarding the electricity facilities of surveyed population, the data shows that higher per cent age of the population had electricity facilities. The data shows that 97 per cent population had electricity facility but every day power cut as a major problem in both areas. Only 2 per cent of households have no electricity facility (Table 3.12).

**Table-3.12: Electricity and Light Facilities in the Study Households**

	<b>Bhimpur (KelaSahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>
Electricity and Light			
Yes have Electricity	117(97.5)	166(97.6)	283(97.6)
<b>Sources of Light</b>			
Electricity	112(93.3)	166(97.6)	278(95.9)
Kerosene Lamp	4(3.3)	4(2.4)	8(2.8)
Gaslight	3(2.5)	0	3(1.0)
Electronic Charger Light	1(.8)	0	1(.3)
<b>Duration of Electricity</b>			
24 Hours supply of Electricity	117(97.5)	166(97.6)	283(97.6)
<b>Source of Electricity Taken From</b>			
Do not have Electricity	3(2.5)	4(2.4)	7(2.4)
Electricity Dept.	94(78.3)	100(83.5)	194(81.4)
Neighbours	23(19.2)	24(14.1)	47(16.2)
<b>Total</b>	<b>120(100.0)</b>	<b>170 (100.0)</b>	<b>290(100.0)</b>

Source: Fieldwork

Regarding households that had no electricity facilities among the surveyed population the data shows that those households that had no electricity facilities used kerosene lamp three per cent, Gaslight one per cent and electric charge facilities in the study areas. Regarding duration of electricity facility, the data shows that 97 per cent of the population reported they have twenty-four hours' electricity facilities. It was observed that during the field work most of the time there was a power cut in the summers which was more often due to the high burden of electricity used. So, therefore, most of the time people were living in sum area and they faced more power cut than any other area (Table 3.12). One of the respondents from Bhimpur area reported: "*In the area, there was a power cut every day, Power cuts were most frequent in the daytime time but near the market, it was possible to get regular electricity*"(Ramesh 45-Year-old, Bhimpur Area, Site 2).

With respect to the data on source of electricity taken among the surveyed population it shows that 81per cent of households reported they had taken electricity connection from electricity department, 16per cent of households reported that they had taken the connection from a neighbours' house (Table 3.12).

### **3.10: Water Supply Facilities in the Study Area**

In both study areas, the water supply facilities were different. The data shows that a higher per cent age of households 35 per cent were dependent on tap water, followed by 30 per cent on public tap stand post and 24 per cent of household were dependent on public hand pump. The data also shows that two per cent of households were dependent on tube well and three per cent of households were dependent on water tank provided by the municipality (Table 3.13).

In Bhimpur, most of the households were dependent on public hand pump and supply water. In Bhimpur the data shows that 38 per cent of households were depending on public hand pump, 34 per cent of the households were dependent on tap water and 25 per cent of the population were dependent on public tap stand post for water supply facilities. Only three per cent of the population were dependent on water tank facilities.

**Table- 3.13: Source of Water Supply Facilities**

Source of Water Supply	Bhimpur (KelaSahi)	Naharakanta	Total
	N (%)	N (%)	N (%)
Tubewell	0	6(3.5)	6(2.1)
Public Hand Pump	45(37.5)	25(14.7)	70(24.1)
Tap Dwelling	41(34.2)	61(35.9)	102(35.2)
Public Tap Stand post	30(25.0)	58 (34.1)	88(30.3)
Public Unprotected Well	0	20(11.8)	20(6.9)
Municipality Tank	4 (3.3)	0	4 (1.4)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

In Naharakanta a higher 36 per cent per cent of the population used tap dwelling, 34 per cent of the population used public stand post and 15 per cent of the population used public hand pumps for water. The data also shows that 12 per cent of the population used public unprotected well for water supply facilities and only four per cent of the population used tube well for water supply facilities (Table 3.13).

In Bhimpur one of the key respondents (community leader) reported:

*“...the condition of water supply was very bad. Most of the time people had to queue for a bucket of water and after one to two hours of waiting they would receive water. In the area more than four hundred thirty-five households as per the AWW but only two public hand pump was in a working condition. Pipe water supply was not regular, therefore, most of the people depended on public tube well water”* (KI 6, Bhimpur Area, Site 1).

Another key respondent from Bhimpur area reported:

*“Most of the time conflict arises when it comes to access water supply facilities in the area. In a year more than one hundred to two hundred cases have been filed in the police station. Sometimes conflict turns into community level fight for water. Most of the time women quarrel for water. Sometime the quarrels turn big where men and even whole family gets involved. Many people would write applications to the BMC and request the councillor but they would never receive a response”* (KI 4, Bhimpur Area, Site 2).

Another respondent reported:

*“The timing of pipe water supply is a major factor for them. In the mornings the water supply duration would only be half an hour and the people would be unable to collect water. Most of the time people are dependent on public hand pump”* (Santi, 35-year-old, Bhimpur Area, Site 1).

### 3.11: Toilet Facility in the Study Area

In the study areas, the data shows that 62 per cent of the households did not have any toilet facilities. Only 37 per cent of the households had a toilet. Naharakanta shows higher per cent age 38 per cent and Bhimpur shows a lower per cent age of households have toilet facilities in their households. In Bhimpura higher per cent age 65 per cent and in Naharakanta a lower per cent age of the households 61 per cent did not have any toilet facilities in their households (Table 3.14).

**Table- 3.14: Toilet Facility**

	Bhimpur (BhoiSahi)	Naharakanta	Total
	N (%)	N (%)	N (%)
Available	42 (35.0)	66 (38.8)	108 (37.2)
Not Available	78(65.0)	104 (61.2)	182 (62.8)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

### 3.12: Public Toilet Facilities

In Bhimpur, only one public toilet is available outside the community. The public toilet was constructed by the BMC two years ago. Most of the respondents reported that they never used it: this toilet was made outside of their community and one has to pay before using it. Therefore, most of the people do not use this public toilet. In most of the household's inhabitants go outside the village for open defecation, and a few households have toilets constructed. In Naharakanta, there is no public toilet (by BMC). Most of the households have their own toilets and some of the people go for open defecation.

### 3.13: Garbage Bin Facilities in the Study Area

The data reported that in Bhimpur the BMC did not provide any garbage bin facilities and people throw garbage into open space (outside of their houses). Most of the respondents reported that the sanitation workers never entered the area for garbage collection thus most of the people throw garbage into open space outside their homes.

In Naharakanta, there are garbage bins for household garbage collection installed in a few places by the BMC. Most of the respondents claimed that these bins were not regularly emptied by the sanitation workers. Therefore, most of the day garbage

remains spared on road and area population face problem due to stinking badly. It was also reported that even after many complaints, the situation remains unchanged.

### **3.14: Drainage Facility in the Study Area**

The drainage facilities in both study areas are different. In Bhimpur the drainage facilities were very poor. Majority of the households had no drainage system, while some the households used open drainage, very close to the house. The sewage workers never entered the area to clean the drainage, so inhabitants have to do it on their own. Due to lack of drainage facilities, people have faced more problems. In Naharakanta 41 per cent of the households had open drainage and 18 per cent of households had close drainage outside of their houses. The data also shows that 40 per cent of the households had no drainage facilities outside their houses. It is also reported that the drainage systems were constructed only five to six years ago, and some of the areas still lack drainage facilities. Absence of proper cleaning and stagnant water creates major problems, such as mosquitoes and bad odour. These problems are the reasons for unhygienic conditions. Most parts of the drainage were opened which leads to accidents. As the planning of this system is very limited, most household had no appropriate access to drainage.

### **3.15: Road and Street in the Study Area**

In Bhimpur the road facilities were very poor. In 30 per cent of the area concrete roads were built, while the rest of the roads were kutchha type. The latter posed many problems (mainly related to transportation) for the local population, mostly in raining seasons. It is reported that the inhabitants of Bhimpur many times requested (orally) BMC to provide pucca roads submitted many, to no avail. Eventually the community member also requested the council or given through the application, however it took a long time for money sanction to make construct of pukka road. In Naharakanta the road facilities were poor as well. The road conditions can be described as very rough which leads to many road accidents in the area. Another important factor is storing materials (such as sand, rock and iron rods) on the construction site, which causes problems for local community. Most of the times BMC issues warnings and fines people, but it does not improve the situation.



### **3.16: Transportation Facilities in the Study Area**

In Bhubaneswar, safe and comfortable transport is provided. Passengers can use governmental and private means of transportation, which have a variety of vehicles, such as AC buses, non-AC buses, auto-rickshaws, cycle rickshaws, taxis, and e-taxi (UBER, OLA). Local government provides city bus facilities more than 100 buses are in operation. Various schemes are introduced for public transportation, such as Bhubaneswar and Puri Road Transport Service Limited (BPTSL) and Dream Team Sahara (DTS) under Public Private Partnership (PPP).

However, in both study areas the transportation facilities is very poor. In Bhimpur, majority of the population uses auto-rickshaws and public buses, and very few people use their own vehicles. The latter include cycles, two wheelers, and autos. Most of the Bhimpur inhabitants are engaged in daily work, they have to walk one to two kilometres to access public transport. So that they can transport from one place to another place for work and reached on time.

In Naharakanta lack of appropriate transport options is a major problem. The area is situated three to four kilometers from National Highway (NH)-16. To access public transport, people have to walk more than three to four kilometers. Thus, most of the households have their own vehicle, such as two-wheeler, cycle, auto, and four-wheeler. Most of the respondents reported facing transportation problems. In case of emergency time they were facing more problems. Now in the area more private vehicles are more available and paid the high charge of amount.

### **3.17: Street Light**

There is no public street lights system in Bhimpur. Some households have their own lights installed outside, which sheds some light on the dark parts of the area. Lack of adequate lighting facilities is a cause of physical injuries, dog and snake bites, robberies, accidents, etc. The community members approached electricity department and BMC many times, but there was no answer. Government provides street lights in Naharakanta, but in some places they do not work. Here, the members of the community complained to the electricity, which took a long time to fix the problem.

One of the respondents reported:

*“Without light we face various problems. Mainly old age people face more problem than any other age group member. They informed the BMC office regarding the issues of street light but they never respond”* (Ramakanta, 38-year-old, Naharakanta area, Site 2).

### **3.18: Angan wadi centre (AWC)**

There was one mini Anganwadi Centre (AWC) in Bhimpur. The Anganwadi worker reported that the government provides many facilities to the other AWCs, but no facility is given to this particular centre. Bhimpur AWC is operating in a rented house. The AWC did not have any basic facilities, such as water supply, toilet and electricity. As per the attendance, 25-35 children were registered in the centre. Some of the children did not get admission because of lack of space. The AW already approached the higher official members on that matter, but there was no progress reported. Sometimes she felt bad because of it: some poor children did not get admission while their parents worked on a daily basis. The AW took personal interest in providing water supply and sanitation. On some days it was difficult to cook mid-day meal for children (due to lack of water).

As the AWC had no toilet facilities, majority of the children urinate in the open space, and go home for defecation. There was no other option to buy used by the AW. As mentioned, AWC has no electricity. This causes a lot of difficulties for children in the summers. The issue was reported to the higher official, but no answer was received.

The AWC also faced issues in food supply. The AW reported that every month government provides rice, dal, dry food and some amount of money to buy eggs, spices and vegetables. Government provides five rupees per egg, but the market price of this item is seven rupees. Sometime the prices of vegetables also increase, so it is very difficult for the AW to manage. Sometimes she had to pay from her own pocket. The AW also reported that 50 kilograms of rice is required per month, but the government provides 40 kilograms only. The difference, that is 10 kilograms of rice, is arranged by the AW. In spite of informing the higher officials about the situation, it remains unchanged.

There are four Anganwadi centres located in Naharakanta (two in Naharakanta-A, and two in Naharakanta-B). Before household data collection, the first data collection started in Naharakanta-A AWC, after obtaining permission from Anganwadi workers. There were 25-30 children registered, most of them from SC community. The AWC temporarily works from the youth club and lacks of basic facilities, such as water supply, toilets, electricity etc. In rainy seasons they faced problems due to water logging in the club house. Those days the AWC remains closed and the children were being taught by the AW at her own house veranda. The water supply was another major problem. The AWC is provided with government hand pump and the quality of water was very poor. Most of time they have to carry water for cooking and drinking from faraway places. It is observed that students from a particular caste come to different AWC as per their locality.

The Anganwadi worker reported as follows:

*“In the Naharakanta-A higher per cent age of the population belongs to the SC. Most of the children who come to the centre are mainly from SC community. Earlier the SC community students were going to another AWC but due to discrimination most of the children stopped going there. They were served food in the last, separate seats were provided to higher caste children, discontinuation of dry foods are the main reasons for children not going to that AWC. Many parents wrote complain to higher official but no action was taken. So many parents stopped sending their children to AWC. Then after one year the new AWC was started for SC community children by the help of local political leader” (KI 4, Naharakanta Area, Site 1).*

In another Anganawadi Centre which was on also situated in Naharakanta-A. In the centre, very few students (6-8) in fact attended whereas the documents showed that more than 25 children attended. The AW reported that most of parents did not want their children to go to AWC and instead preferred to send them to private English medium school. They believed that the quality of education in private schools would be better than in government schools. In AWC all children begin their education in Odia medium schools. But most families did not want their children studying in regional language schools and preferred English language. Therefore, the per cent age of children attending AWC was very low.

The Naharakanta- 'B' also had two AWC's. One AWC was located in Naharakanta primary school. This school enrolled than 25-30 children but only 20-25 children attended the centre daily. The AW reported that due to high heat of, summer the

school was opening in the morning time. The mid-day-meal system provides by the Self Help Group (SHG) in Naharakanta school. The SHG group was providing cooked food to children. They received their payments direct to the office.

An AW worker reported:

*“The AWC work is very difficult due to workload. Each month they have to submit a report to the higher officer. The monthly salary is very low and it did not come regularly at the end of the month. Sometimes their salary comes after four to five months. Due to low pay and untimely salary, they faced several problems. Some also had to suffer family disturbances. Due to a low salary they were unable to maintain their family life. Due to salary problems, they had to work extra for government such as household survey, ration card survey, pension survey and other welfare programmes. Recently they trained for government sponsored nutritional programme. If the government would provide salary on time and then they would take care their family.” (KI 4, Naharakanta Area, Site 2).*

Another AWC was running under the Naharakanta girl’s high school. The high school was under the private agencies and the private agencies tool all the responsibility. In the AWC more than 15 to 23 children were studying but the 25 children attendance was maintained. The AW centre did not have basic facilities such as electricity, water supply and sanitation.

### **3.19: Educational Facilities**

#### **School**

In Bhimpur the nearest government school is two kilometres away. During the data collection, people were more aware about their education but very few children continued their education. The government primary and secondary school was situated about two kilometre away. The high school was situated more than two kilometres away. In Bhimpur area the dropout rate in schools was very high among the girl children. The parents were not comfortable to send their girl child due to the lack of social security. It was also observed that some of the girl children involved in the care of the house when parents went for work. In some households, girls took care of her younger siblings. One of the respondents reported: *“Early morning we go for work and we would not get the time to collect water. So someone is needed to fill the empty buckets and my girls are engaged in it”* (Sangita40 Year old, Bhimpur Area, Site 2).

Another respondent reported:

*“Our condition is not good and we are living below the poverty line. How would it be possible for us to spend money on education when we are trying to earn a livelihood? We wish for their children’s education and whatever we face a problem in day to day life, we do not want their children to face same. But we have no other option to spend money on education. If girl children get more education, then there would be a marriage problem we would require more money for dowry. If she is less educated, then she can easily find the candidates for her”* (Naresh, 46-year-old, Bhimpur Area, Site 2).

In Naharakanta, the primary, secondary as well as high school is available. One girls’ high school and one common high school is also situated in the area. The common high school is run by the government of Odisha, which is under the Board of Secondary Education Odisha (BSEO). The girl’s high school is run by a trust, where more than two hundred to three hundred children are enrolled. Most of the school children are going to government school. Those who are economically better send their children to private English medium school. It was also observed that a higher per cent age of boys went to private school than the girls (KI 11, Naharakanta Area, Site 1).

One of the respondents said as follows:

*“I have two children, a boy and a girl. The boy is in class five and the girl is studies in class seven. The boy is going to private English medium school and the girl is going to government school. Due to poor economic condition I did not send both to English medium school. The private school fees are higher than government schools”* (Ramesh 39-year-old, Naharakanta Area, Site 2).

## **College**

Bhimpur area did not have any college and some of the students were continuing their studies in different colleges in the city. They have to travel six to eight kilometres every day from their house. In Naharakanta Sri Jayadev college of education and technology was established on 6<sup>th</sup> may, 1981, the birthday of the sage poet Sri Jaydev. The college has three different streams – Science, Commerce, Humanities and Social Science. More than four thousand students are enrolled in Jaydev college.

### **3.20: Post Office**

In Bhimpur for the accessing post office, people had to go two kilometres away from their own place. In Naharakanta the post office is available in the area.

### **3.21: Health Care Facilities**

Bhimpur area did not have any health dispensary facility. If people faced any health related problems, then they went to private, government medical and traditional healer. The government medical is two kilometres away from Bhimpur. Most of the time they take medicine from medical shops if they have minor health problem problems like cold, cough, fever, body pain, headache, and loose motion etc. Most of the respondents reported that in government health centre the doctor only prescribes the prescription but no medicine is provided by the government. A few respondents alleged that the medicines provided by the government health centre are sold to private medical shops by the employees of the centre. It is observed that the doctor uses the medical shops' pamphlet so that the patients buy medicine from there and the doctor gets some profit. The people of the area mainly prefers private medical because they provide immediate treatment, 'proper care', and relatively better services, therefore, most of the population preferred going to private medical hospital. In government medical hospital the process of the check-up is a long procedure and for that, they need to spend more time, the infrastructure of government medical very poor, need to buy medicine from outside, the service facilities also very poor, therefore, people prefer private medical than the government medical.

Naharakanta had one health dispensary and people were going regularly to that dispensary for the health check-ups. The dispensary provides free medicine which is provided by the state and central government in India. Most of the respondents reported that for minor cases they are going to the dispensary. Otherwise for major health-related problems they go to private medical facilities. In the city, hundreds of big and small private medicals have been opened. According to their popularity and quality of health care is always a matter of people attraction. Most of the respondents reported that private clinics are highly expensive much more so than government health facilities. Those people who have higher incomes prefer private healthcare, poor people go for government healthcare. The class always matters for accessing

good health care facilities. In government clinics mainly time taking and for the patient, it is very difficult to wait for time. Sometimes situations are more complex where people cannot decide which medical to access according to easy accessibility and availability.

One of the respondents reported:

*"Last time his wife had her delivery in a private clinic where he had to spent more than seventy thousand rupees. He recalled that his first baby girl was born in government hospital. Where he only spent twelve thousand rupees as charges for delivery. In a private clinic the amount is six times higher than government hospital"* (Ketana, 45-year-old, Naharakanta Area Site 2).

*"... people are preferring private medical services to save their time. People are preferring government medical for minor illness such as (cold, fever and cough). For major illness people prefer to go to private medical"* (KI 4, Naharakantara Area, Site 2).

### **3.22: Bank and ATM Facilities in the Study Area**

Naharakanta has one State Bank of India (SBI) and one private bank, where people deal with their financial matters. Bhimpur did not have any bank facility so for accessing bank facility people are going more than two K.m. Regarding the ATM facility, today ATM plays a very important role to access cash easily at any time. Naharakanta has the ATM facility but in Bhimpur there no ATM facility. To access ATM people, have to travel more than two kilometres.

### **3.23: Conclusion**

In both study area, the male members are in higher per cent age than female members. In Bhimpur area, the higher per cent age of population is migrated than the Naharakanta area. In Bhimpur area the literacy rate is lower than Naharakanta area. In Bimpur area, higher per cent age houses are Kutcha and Semi-pucca in nature. Higher per cent age of houses with no ventilation facility and majority of family are living in a single room in the area. Most of the households acquired government land and most of them did not have the land record with them. In the area higher population worked as daily labourer. In Naharakanta higher per cent age of the houses are Pucca and Semi-pucca in nature. In both study areas higher per cent age of population works as daily labourer.

In both study area, people are mainly dependent on Public hand pump and well water. The duration of pipe water supply is very less so people are more dependent on public hand pump. The flow of pipe water supply is also very slow. Many times water shortage has led to conflicts, including registering FIRs in the police station. In Naharakanta higher number of households are dependent on public stand post for water supply. Data shows that the SC community mainly depends on unprotected well water. In both study areas the community toilet facility is also not available. In Bhimpur higher per cent age of houses do not have toilet facility and they defecate in open (mostly along railway line or near the jungle). Every month people died on railway track during odd time. Women especially faced more problems than male to defecate open. In Naharakanta lower caste households as well as people from lower economic status do not have toilet facility and they defecate in the open. The BMC did not provide any type of garbage bin in the Bhimpur area. In Naharakanta the garbage bin condition is poor and BMC do not restore it. Regarding the drainage condition, Bhimpur area does not have any type of drainage facility. In Naharakanta, SC community households do not have drainage facility and those higher communities have drainage facility that condition very poor due to lack of drainage cleaning. The civic facilities are poor in Bhimpur as compared to Naharakanta area.



## Chapter-4

### Water Supply and Sanitation: Provision and Use

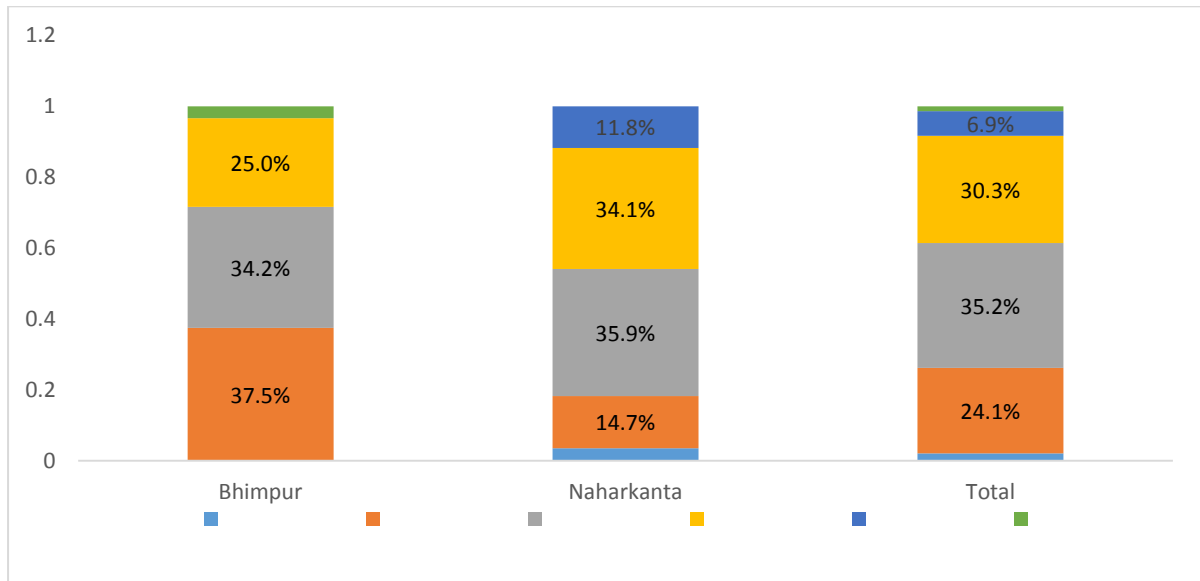
#### 4.1: Introduction

This chapter is divided into three sections in order to describe the conditions of water supply and sanitation in two study areas in Bhubaneswar city. The first section discusses the mechanisms of water supply. Provisions of water in litres per day and the gap between the supply and demand in terms of quantity of water required in the study areas are analysed. The second section is concerned with toilet facilities. Government schemes and their benefits, as well as awareness about the same are discussed. In the third section sanitation facilities in the study areas are described, followed by the discussion on sanitation schemes, existing condition, awareness, and requirements. Each section is additionally divided into sub sections in order to fully answer research questions and objectives.

#### 4.2: Sources of Water Supply

Figure 4.1 gives information about the sources of water supply in the study areas. The data shows that a higher percentage of households 35 per cent reported accessing water from tap dwelling and 30 per cent of them from public stand post. In addition, data shows that 24 per cent of households accessing water from public hand pumps and 7 per cent from unprotected well. In Bhimpur data shows that a higher percentage of households 37 per cent and Naharakanta shows least percentage of households 15 per cent reported access from public hand pump. In Naharakanta a higher percentage of households 39 per cent and Bhimpur shows the least percentage of households 34 per cent accessed water from tap dwelling. It was observed that Naharakanta shows that a higher percentage of households 34 per cent and Bhimpur least percentage households 25 per cent which accessed water from public stand posts. In Naharakanta higher percent of households reported accessing water from public unprotected wells. In Bhimpur some households three per cent reported using municipality tank.

**Figure- 4.1: Sources of Water Supply in the Study Area**



Source: Fieldwork

It also found that, Standard of living of households has direct relation with the access to improved source of water in the communities. With increasing standard of living, proportionate of households access to improved source of drinking water is increasing. The bivariate result shows, 10 percent of households belong to low standard of living, 44 percent belonging to medium standard of living and 98 percent belonging to high standard of living access to improved source of drinking water. Caste also plays crucial role with the access of water in the communities. The data shows, 14 percent of households belong to SC and ST category, 40 percent of households belong to OBC category and 64 percent of households belong from Other caste access improved source of water supply (Appendix B).

The community leader from Bhimpur discussed about water supply as follows:

*“The population of Bhubaneswar depends on Daya river water for fulfilling their day to day needs. In the community people are depending on pipe supply water, public hand pump, and municipality water tank. In the area people are mostly used hand pump pipe water. Most of the households in the area did not take pipe water supply and they mainly take water from public stand post and public hand pump. A year ago the local government pressured water consumers and now they need to register, according to the local government rules. Some of the households also registered in the area. The public stand posts were removed by the PHDE officials. The pipe water supply is working*

*properly and people face various problem for getting water” (KI6, Bhimpur Area, Site 2)*

This was also evident form the group discussions:

*“In the area pipe water supply is irregular, people face problems in getting water. Only three public hand pumps are operational; one is not used due to poor quality of water. In absence of pipe water supply, most households depend on public hand pump. There are many conflicts over water supply. Many cases were registered at police station” (FGD1, Bhimpur area, Site 1)*

In Naharakanta the FGD3 also reflected similar issues:

*“for water, people mainly depend on supply water, public hand pump and well water. Pipe water covers more than fifty-five percent of the area and rest of the area need to work. Supply water generally comes in the mornings and evenings. When there is a lack of it, people mainly use public hand pump for drinking purpose. Some households have their own water bowring in the area” (FGD3, Naharakanta Area, Site 1).*

The AWW also corroborated:

*“The main problem in the area is lack of water. Without water people face many problems, especially children, women and the elders. Women take the responsibility of collecting water, while men generally work outside. The pipe water never reaches households due to the poor pressure. People collect drinking water from outside of their colony. The situation is very difficult, especially in the summers” (KI4, Bhimpur Area, Site 2).*

Another key informant from Naharakanta said:

*“The community mainly depends on well water. Most of the households in our community do not have access to pipe water supply or public hand pump. We demanded access to proper water facility many times, but the local councillors never paid any heed to our requests. People use well water, while the other community uses supply and public hand pump water” (KI4, Naharakanta area, Site 2).*

Raghunath, a 39-year-old also expressed similar ideas:

*“...people are now being more politicised on basics facilities provided by the government, including water supply. Nowadays, particularly lower caste people are targeted and disbarred from using basic facilities provided by the government. In the community, majority of the household’s dependent on well water for drinking, while others use canal water” (Raghunath, Naharakanta Area, Site 1).*

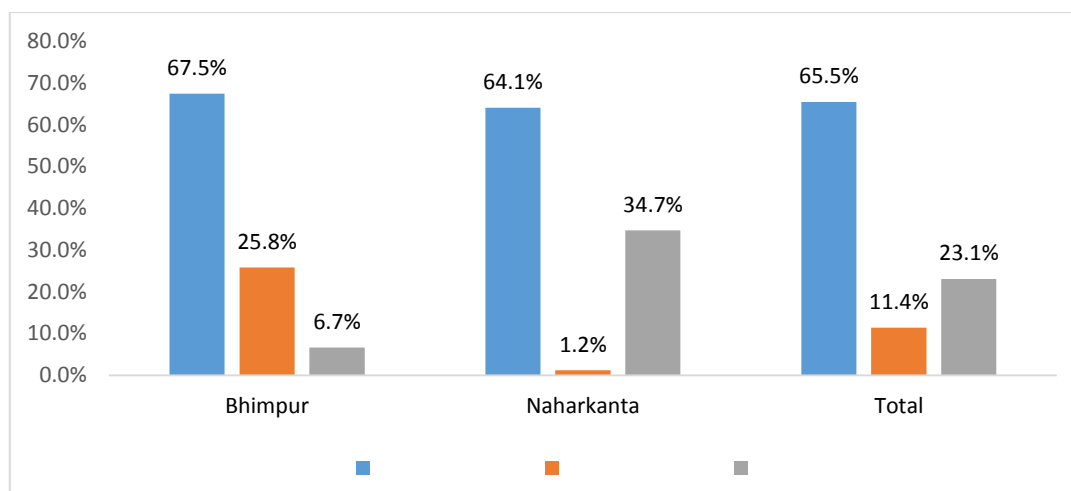
The issues of water supply and sanitation is evident in the following case: Santosh a 37 years old graduate who worked in a private company. He is living with his family in Naharakanta-A. He has two daughters; elder daughter is 13 years' old who is studying in class five in an English medium school. Younger daughter is five years old. They belonged from the SC community and being from the SC community he has to face various problems in area. He mentioned that in Naharakanta people strongly following caste system. Their community people, can't enter in temple, can't use temple well and hand pumps. Even the lower caste people can't use the higher caste public stand. If any lower caste people touch the higher caste people during the filling of water, then again the water would be thrown and refilled. The higher caste people never take water from lower caste people. The lower caste community do not have piped water supply, garbage bin and drainage facilities. The higher caste people have water supply, garbage bin and drainage facility. The sanitation workers also never enter in their community. People throw garbage in open area. Any festivals and programmes organised in the area then the lower caste people are very less involved. The lower caste people also have different cremation ghat and bathing ghat in the area. One bigger conflict happened in 2016, where lower caste people made body cremated near the higher caste cremation ghat, due to which the higher caste community attacked the lower caste people. Almost hundred people were injured and one died in the incident and the case was also registered. The police declare section 144 in the area. Caste conflicts on various issues occur frequently. This area is under the smart city

#### **4.2(1): Cost of Water Supply**

Figure 4.2 two provides information on the cost of water supply in the areas covered by this study. A higher percentage of households did not pay any cost. Out of the total number of households surveyed, 65 per cent households reported no costs of water supply. Only 11per cent of households reported they paid 100 INR of costs, and 23 per cent 150 INR a month. In Bhimpur 67 per cent, and in Naharakanta 64 per cent of surveyed households reported no costs of water supply. In Bhimpur 25 per cent and in Naharakanta 1per cent reported paying 100 INR. In Naharakanta 150 INR was paid by 54 per cent of housholds and 6 per cent in Bhimpur. There were also instances

where the households were billed for water even where there was no piped water connection. It is evident from the narratives of Susma.

**Figure- 4.2: Cost of Water Supply (%)**



Source: Fieldwork

Susma, a 31-year-old Bhimpur resident, stated:

*“Every month we receive water bill, but there is no pipe or other water supply. I had opted for pipe water connection, but the water never reaches our household. I complained in the PHDE office, but the situation has not changed. My family faces many problems everyday due to lack of water”* (Susma, Bhimpur Area, Site 2).

The community leader in Bhimpur further supported this:

*“The pipe water was available 3 or 4 years ago. We submitted the petitions to the councillor and BMC office many times. After years of struggle, the pipes for water supply were installed. However, even now there is a problem with supply water because of the poor pressure. Most of the day’s water is not regular, so people in the community depend on public hand pump”* (KI6, Bhimpur Area, Site 1)

In Naharakanta, the lower castes people do not have any water connection in their houses, but still receive a bill every month. More than ten to fifteen households reported and shown their original bill receipt to investigator.

Ranjan, a 35-year-old from Naharakanta said:

*“Our community has been always neglected by the political leaders and upper castes. The politicians and some affluent families in the area never allowed to make public stand post for pipe water in our area. We complained to the councillor many times, but due to vote bank politics our community always get neglected. In the next election we would definitely raise a slogan no pipe*

*water, no vote. We will support any leader who will be ready to solve our problem” (Ranjan, Naharakanta Area, Site 1).*

#### **4.2(2): Treatment of Drinking Water**

Table 4.1 gives information about treatment of drinking water in the study areas. It is reported that a higher percentage of households 90 per cent drink water without any additional treatment, while only two per cent households uses electric purifiers. Some households (6 per cent) use filters. Only one household reported to use bleaching powder to purify water. In Naharakanta a higher percentage of households 12 per cent use filter and only three per cent households use electric purifier. Bhimpur shows that highest percentage of households (97 per cent) and Naharakanta the least percent of households (85 per cent) to report drinking water without any treatment.

**Table- 4.1: Treatment of Drinking Water**

Source and treatment	<b>Bhimpur</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>N (%)</b>	<b>N (%)</b>	<b>N (%)</b>
Electric Purifier	2 (1.7)	5 (2.9)	7 (2.4)
Filter	0	20(11.8)	20(6.9)
Bleach	1(.8)	0	1(.3)
Without Treatment	117(97.5)	145(85.3)	262(90.3)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

One of the respondents from Bhimpur area reported that most of them used untreated water:

*“We directly drink water, without any treatment. We do not have money to buy a water filter and boiling water takes more time to drink. So it is better to drink water directly” (Anjana 37-year-old, Bhimpur Area, Site 2).*

Sima, a 29-year-old graduate student stated:

*“The quality of water is not good; it has to be purified before consuming. Especially, there is a need to boil water before giving it to the children”.*

The community leader in Naharakanta reported:

*“Majority of the household’s drink water directly. Those who are economically better off use water filter and electronic purifiers” (KI6, Bhimpur Area, Site 1).*

#### **4.2(3): Distance of Travelled to Fetch Water**

Table 4.2 provides information on distance of travelling to fetch water. The data shows that in the 23 per cent of households, members have to walk fifteen to hundred

meters to fetch water. The data also shows that in 14 per cent of the households this distance is from fifty to hundred meters, in 105 households - hundred to two hundred meters, and nine per cent of households - two hundred to three hundred meters. Only 15 per cent of respondents reported not knowing their distance to the water supply.

**Table- 4.2: Distance Travelled to Fetch Water**

Distance Travelled to Fetch Water	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Door step	37(30.8)	47(27.6)	84(29.0)
Do not Know	19(15.8)	24(14.1)	43(14.8)
15-50 Meters	37 (30.8)	29(17.1)	66(22.8)
50-100 Meters	21 (17.5)	20(11.8)	41(14.1)
100 to 200 Meters	6(5.0)	23(13.5)	29(10.0)
200 to 300 Meters	0	27(15.9)	27(9.3)
<b>Source of Water Used for Other than Drinking Purposes</b>			
Same Purposes	103 (85.8)	132(77.6)	235(81.0)
Others	17(14.2)	38(22.4)	55(19.0)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

The FGD 3 reflect on the issues of distance travelled to fetch water:

*“The main problem arises when water supply closes. When pipe water is not being received, the water burden is higher and the majority of households depend on public hand pump. The latter is undrinkable. So the members of many households go outside of the community to collect water, far away from their households. Otherwise rest of uses they are using public hand pump water” (FGD 2, Bhimpur Area, Site 2). Kusuma, a 45-year-old, reported that “when water in the community is not available, I collect water from government school premises and the school situated one kilometre from our household. It is easy on holidays, but very difficult on the working days” (Naharakanta Area, Site 1).*

#### **4.2(4): Source of Water Used for Other than Drinking Purposes**

Table 4.2 provides information on sources of water used for other than drinking purposes. Data shows that highest percentage of households 81 per cent use the same source of water for drinking and other purposes. Only 19 per cent of households reported using sources of water for other than drinking purposes. In Bhimpur higher percentage of households 86 per cent and in Naharakanta a lower percentage of households 78 per cent report using the same source of water for drinking purpose. More households in Naharakanta than in Bhimpur (22 per cent versus 14 per cent) different sources of water for other than drinking purposes.

In Bhimpur AWW stated:

*“Most of the households use the same sources of water for both purposes, that is supply and public hand pump water for drinking, bathing, cooking, cleaning and other purposes” (KI6, Bhimpur area). In Naharakanta AWW reported that “most people use supply water, public hand pump, and well water for drinking and other purposes. Most of the households use river and canal water for bathing, washing, cleaning and other purposes” (KI4, Naharakanta area, Site 1).*

Raghu, 38-year-old from Naharakanta, said:

*“In our community we use well water for drinking, for other purposes we use canal water. The community people not strong if we will not raise our voice then we will face problem. Sometimes I am thinking in a city like Bhubaneswar if we are not getting proper drinking water then what would be the condition of tribal who are living in the hilly areas. The reality is whatever facilities government provides for poor never reaches them” (Naharakanta Area, Site 2).*

#### 4.2(5): Duration of Water Supply in the Mornings

Figure 4.3 show that a majority of households’ i.e. 77 per cent receives water only for half an hour in the morning. When 23 per cent of households reported not receiving water supply at all. In Bhimpur the data shows that higher percentage of households 38 per cent and Naharakanta least 13 per cent of household reported not receiving water supply. In Naharakanta higher percent of households 87 per cent and Bhimpur the least percentage of households 62 per cent reported that the duration of water supply only for half an hour in morning time.

**Table-4.3: Duration and Perceived Quality of Water Supply in the Area**

Duration of water supply in morning time	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Not Supplied	46(38.3)	22(12.9)	68 (23.4)
Half an hour	74(61.7)	148(87.1)	222(76.6)
<b>Duration of water supply in evening time</b>			
Not Supplied	98(81.7)	3(1.8)	101(34.8)
Half an hour	22(18.3)	91(53.5)	113(39.0)
One hour	0	76(46.5)	76(26.2)
<b>Perceived Quality of water supply</b>			
Clean	99(82.5)	91(53.5)	190(65.5)
Dirty	9(7.5)	79(46.5)	88(30.3)
Satisfaction	12(10.0)	0	12(4.1)
<b>Treatment of water</b>			
Clean Not required	119(99.2)	159(93.5)	278(95.9)
Needs to be Boiled	1(.8)	11(6.5)	12(4.1)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork



The duration of water supply is very less. In both study areas people are facing water shortage due to the less duration of water supply. One of the respondent from Bhimpur area reported-

*“The duration of water supply is only half an hour and we are facing various problem due to very little water. we collect water form public stand post and more than thirty to thirty-five family are dependent on the stand post. The timing of water supply is very rush and we do not collect water on time. we did not have any water and we prefer to far place to collect water only for drinking purposes”* (Kanchan, 35- years-old, Bhimpur Area, Site 1).

Susma, 36-year-old mentioned:

*“In morning time we need more water than the any other time. In the area day by day we are facing more water problem. In summer time, the duration of water supply is very short. The duration of water is half an hour and during the time we can’t collect water. We can’t afford to buy water. The BMC need to increase the time so that our community people get sufficient water”* (Bhimpur Area, Site 2).

Gitanjali 37-year-old, a resident of Bhimpur area reported:

*“My hands are swollen from fetching water from faraway places. When water is not coming in morning time I have to go with my children to collect water. Some days my children did not go to school because they have to come with me for water. Without water what can you do, so we collect water first then do other work later”* (Bhimpur Area, Site 2).

FGD 2 mentioned:

*“Water is supplied for half an hour in morning but the pressure is very slow. In the area men go for work, women and children have to run to collect water. when water is not coming some people go on motorcycle or auto for water at near area. Sometime people buy bottle water but it is very costly for us”* (FGD2, Bhimpur Area, Site 2).

FGD 4 brought the issues related to duration of water supply:

*“In the area the duration of water supply only half an hour in morning time. People have complained to PHED officials and written a letter regarding the situation. Even after written letter many times to PHED official the situation remains same. We have complained every official (BMC, PHED) but no one pays any attention”* (FGD 4, Naharakanta Area, Site 2).

Another Key respondent corroborated:

*“Supply water is a major issue everywhere in the city. The high growth of population in the city is the main reasons for the water scarcity. We are working daily sincerely if anywhere problem happened then immediately we go and handle the situation. If situation is critical then it takes some time.*

*Supply water problem will be solved in some time, the city people need to have some faith on us” (KI6, Naharakanta Area, Site 2)*

#### **4.2(6): Duration of Water Supply in the Evenings**

Table 4.3 information on duration of water supply in the evenings. Data show that 35 per cent of the households get no water supply at this time of the day. In addition, 39 per cent of households reported water was being delivered in the evenings for half an hour only. 26 per cent of the respondents received water for one hour. In Bhimpur the higher percentage of households 82 per cent and in Naharakanta the least percentage of households two per cent has no water supply in the evening. In Naharakanta a higher percentage of households 53per cent and in Bhimpur a lower percentage of households 19 per cent reported receiving water for half an hour, while in Naharakanta also higher percentage of the households 45 per cent reported receiving water supply for one hour in the evenings.

As extent in the Table 4.3 the timing of water supply is a major issue that the communities face. The community leader said:

*“When both the amount and duration of water reception are severely limited, people are not able to collect water from public stand posts. Sometimes there are conflicts over these issues” (KI6, Bhimpur area). Sasmita, a 39-year-old, reported: “Pipe water comes with very low pressure and for a limited time, which causes difficulties in water collection. The crowd around the stand posts does not make it easier” (Bhimpur Area, Site 2).*

Another respondent stated:

*“The duration of water supply is a major problem in the case of pipe water. Every day they are conflicts over water, people use slang language during water collection. The main reason is short time of water reception. There are more conflicts among women during the time of water collection. Many case have registered in police station. In the area women are running all the direction to fetch water for drinking purposes” (Binita 37-year-old, Bhimpur Area, Site 2).*

#### **4.2(7): Perceived Quality of Drinking Water**

The Table 4.3 provides information about perceived quality of drinking water in the households surveyed. Data shows that 65 per cent of respondents considered water to be clean. In both study areas 30 per cent of the households reported that drinking water was dirty. Only four per cent seen water quality as satisfactory. More residents of Bhimpur 82 per cent than of Naharakanta considered drinking water to be clean. More respondents in Naharakanta 46per cent than in Bhimpur seven per cent seen

drinking water as unsafe. Higher percent of households 10 per cent in Bhimpur reported that drinking water was satisfactory.

One of the respondents reported:

*“The quality of water so poor in the area. We have no better option and belonged from poor socio-economic background we need to be struggling every day for accessing basic facilities. The struggle will never end it will continue. Because the situation remains same and the problems happen in the area increase day by day”* (Bhimpur Area, Kanchan, 42 year old, Site 1).

Bubuna 37-year-old supported as follows:

*“The quality of water very poor in the area. To get water we are facing more struggle then who will care about the quality of water. Either the water good or bad quality. We just use the water to fulfil our need”* (Bhimpur Area, Site 2).

#### **4.2(8): Treatment of Water**

Data shows that more households 96 per cent reported that the supplied water is clean and there is no need to boil it before consumption. Four per cent who it to require prior boiling. Bhimpur shows higher percentage of households 99 per cent and Naharakanta shows lower percentage of households 93 per cent reporting supplied water to be clean and in no need of boiling. More respondents in Naharakanta six per cent than in Bhimpur seen a need to boil water before consumption (Table 4.3).

Rita a 35-year-old woman stated:

*“The supply water quality not good, as more amount of bleaching powder is used. It is not drinkable. My family use hand pump water for drinking purposes. During winter seasons we did boil water for drinking purposes”* (Bhimpur Area, Site 2).

The discussions in the FGD 1 supported the issues and is evident as follows:

*“In the area, majority population are dependent on public hand pump. Only three hand pump are workable and rest of hand pump unworkable. The quality of water in the area not good. in the area one of the hand pump water undrinkable due to iron contain more. So majority of the population are dependent on two hand pump in the area. Most of time crowdedness happened to get water. Sometime water coming very slow and more than half an hour take to get full bucket of water”* (FGD 1, Bhimpur area, Site 1).

Another respondent reported:

*“My family is mainly dependent on well water. In rainy seasons the quality of water not good and so that we boil water for drinking purposes. In summer time the well water reduced and very difficult to collect water from the well*

*because ten two twelve families are dependent on this well water. If we do not get water from other sources, then anyhow we get water from the well. We requested to councillor to settle a public hand pump in the area but we do not when it will happen” (Ramesh 37-year-old, Naharakanta Area, Site 1).*

#### **4.2(9): Water Storage Capacity**

Table 4.4 provides information on water tanks capacity. More households 75 per cent reported not to have a water tank and using plastic buckets and tubs for the storage of water. Only 17 per cent of respondents have water tanks with a capacity of over one thousand litres for household use. Only two per cent of households reported two hundred to three hundred litres water tanks, and two per cent below hundred litres. The data also shows three per cent of households have four hundred to five hundred litres of water storage capacity. Bhimpur shows that a higher percentage of households 91 per cent and Naharakanta shows a lower percent of households 65 per cent which have no water tank for household use. More households in Naharakanta 29 per cent than in Bhimpur have above one thousand litres water storage facility.

**Table- 4.4: Domestic Water Storage Capacity**

Water storage capacity	<b>Bhimpur (Kela Sahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>No. (%)</b>	<b>No. (%)</b>	<b>No. (%)</b>
Do not Have Storage	109(90.8)	110(64.7)	219(75.5)
<100 litres	6(5.0)	0	6(2.1)
200 to 300 litres	1(.8)	4(2.4)	5(1.7)
400 to 500 litres	3(2.5)	7(4.1)	10(3.4)
>1000 litres	1(.8)	49(28.8)	50(17.2)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

The discussion in FGD 2 corroborated it further as follows:

*“In the area people mainly store water in Buckets, cans, jars and very few people have made water tank. Those who made water tank can store water up to one thousand to two thousand litres, when water will not come they can use that water. But very few households have made concrete tank and some of households by plastic tank which is available in market. Those have water tank facilities in the area they are mainly belonged well background but majority households do not have any tank facilities to storage water. Earlier BMC made concrete water tank in the area but when supply water come in the area then the water tank was dismantled by the BMC. When piped supply water was not there generally people used water from the tank. But now people are facing problem to get water” (FGD2, Bhimpur area, Site 2).*

In Naharakanta area, majority houses have water tank facility for storage water and most of them are belonged form higher caste community. People from lower caste do not have any type of water tank facility. The FGD 3 also reflected on similar issues:

*“Most of the people use well water in their community. The BMC did not installed tank for storage of supply water. People approached to the councillor. They were assured by the councillor that the tanker will be made next year in the community”* (FGD3, Naharakanta area, Site 1).

#### **4.2(10): Problems Related to the Lack of Water Supply**

Table 4.5 provides information about the problems faced in daily life without proper water supply. The data shows that a higher percentage of households 97 per cent reported that they were facing drinking water supply problem. Data shows that only three per cent of the households reported that they were facing cooking problems with no water supply. Only one household reported bathing problem without water supply. In Naharakanta the data shows that a higher percentage of households 100 per cent and Bhimpur shows 92 per cent the least percentage of households reported they were facing drinking related problem without water supply. In Bhimpur the data shows that a higher percentage of households seven per cent and only one per cent of the households were facing bathing problem if no water supply.

**Table-4.5: Problems Caused due to no Water Supply**

Problem	<b>Bhimpur (Kela Sahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>No. (%)</b>	<b>No. (%)</b>	<b>No. (%)</b>
Drinking	111 (92.5)	170 (100.0)	281(96.9)
Cooking	8(6.7)	0	8 (2.8)
Bathing	1(.8)	0	1(.3)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

One of the respondents reported:

*“Lack of water is a major problem in the area because the unequal distribution of the water by BMC/PHED officials. In some areas the duration of water supply one hour to two hours then why only half an hour water supply in our area. This is happened because we are coming from poor background. Lack of leadership in the area is the main reasons to get less duration of water supply. In other area people get one hour to two hours the duration of water supply. then why we get only half an hour”* (Anil, a 37-years-old, Bhimpur area, Site 2).

*“Majority of the population in the area is daily labourer. Every day, early morning they go for work and they do not have time to get supply water. Most of the workers and take water from work site for drinking purposes. When they do not get water from worksite so they face more problem for drinking purpose. Other things like cooking, bathing, washing and other things they are face problem but that can manage by the other sources water. But for the drinking purpose need to gate clean water” (FGD2, Bhimpur area, Site 2).*

Another respondent reported:

*“My family mainly dependent on hand pump water. The supply water is not available near my house. I do not know when the supply water come to my home. Without supply water, we face various problem. For dirking purposes, we use hand pump water and for bathing, washing, and cooking purposes we are dependent on river water” (Bidulata 49-year-old, Naharakanta area, Site 2).*

The cause of Rabi further illustrates this:

**Case 2:** Rabi a 49-year-old, worked as daily wage labourer Naharakanta. He told that the natural calamities made poor us, especially every due to cyclone people are faced various problems and water supply one of them. Last seven years four cyclones mainly; Philini-2013, Huduhud 2014. After the cyclone the electricity supply was stop so that pipe water supply closed. All the area people were dependent on hand pumps, unprotected well, canal and river water in the area. Other purposes such as bathing, cleaning, washing people are mainly dependent on canal and river water. But the drinking purposes people are mainly dependent on hand pump water and unprotected well water. Due to the limited number of hand pumps and well in the area people are mainly face various problems. His family also get problem to get water after *Huduhud* cyclone. The pond water quality totally changes after cyclone. Whatever water they consume that finished within two days. The pipe water supply closed because of no electricity facility and the well water not used due to full of leaves, straws and cubes in water. The market even closed due to cyclone and people could not get drinking water. Those shops are opened majority of them did not have bottle water. The BMC tanker also not provided water due to insufficient water tank. Whole the city people are facing water crises. People can live without foods for some days but they can't live without water. The situation has drastically changed everywhere people were roaming here and there. The government is unable to provide drinking water to all people. people were their houses, trees were fell down on road, building and all

electrify polls also fell down on same way. The transportation facility also very worst condition after the cyclone. Due to lack of water supply facility lakhs of people leave the city and went to the native place. Without water, people face various health related diseases such as diarrheal, jaundice and typhoid. The government has taken initiative and announced ward wise awareness programme about the certain disease.

#### 4.2(11): Grievance Redressal Machinery

Table 4.6 gives information on grievance redressal machinery concerning water supply problems in the study area. Data shows that a higher percentage of households 97 per cent reported they were not facing any problems with machinery with respect to water supply. Data shows that only three per cent of the households reported they were facing machinery problem on water supply function in their area. Naharakanta shows that a higher percentage of households 97 per cent and Bhimpur shows the least percentage of households 94 per cent reported they did not face water supply problem due to machinery. Bhimpur shows that a higher percentage of households (6 per cent) and least percentage households reported they faced machinery problem on water supply.

**Table-4.6: Grievance Redressal Machinery Related to Water Supply**

Grievances Redressal	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Yes	7(5.8)	1(.6)	8(2.8)
<b>Made complain related to water supply</b>			
Yes	9 (7.5)	27 (15.9)	36 (12.4)
<b>Know the procedure of issuing complaints related to water supply</b>			
Do not make Complain	112 (93.3)	143(84.1)	255(87.9)
Phone Call to PHED	6(5.0)	27(15.9)	33(11.4)
Written to PHED	2(1.7)	0	2(.7)
<b>Taken Time to get redressal</b>			
Do not know	113 (94.2)	72 (42.4)	185(63.8)
One week	6 (5.0)	38 (22.4)	44(15.2)
Two week and more than two weeks	1 (.8)	60 (35.3)	61(21.0)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

#### **4.2(12): Registered Complaints Related to Water Supply**

Table 4.6 provides information about complaints made regarding shortage of the water supply. Data shows that a higher percentage of households 88 per cent reported they did not make complaints related to water supply. Only 12 per cent of households reported they made complaints related to water supply. Bhimpur shows that a higher percentage of households 92 per cent and Naharakanta shows the least percentage of households 84 per cent reported they did not give complaints on water supply. In addition, Naharakanta shows that a higher percentage of households 16 per cent and least percent of households (7 per cent) made complaints related to water supply.

#### **4.2(13): Information regarding the Procedure to Complaints about Water Supply**

Table 4.6 provides information on the place where complaints were made related to water supply. The data shows that a higher percentage of households 88 per cent reported that they did not know the procedure to make complaints regarding water supply. The data also shows that 11 per cent of households reported that they gave complaints to PHED by phone call. Only one per cent of the households reported they were giving complaints to PHED in the written format.

One of the respondents reported:

*“In the area, some day supply water is not coming, I called to the PHED office many times but they did not receive the call at all. Even they did not provide any information, when supply water come. Every month, two to three days the PHED will stop supply water without any information. If they will provide some additional information so that we can arrange the water before”*  
(Sujata 34-year-old, Bhimpur area, Site 2).

Kailash a 33-year-old corroborated:

*“In our area supply water coming and some place pipe water leakage continuously so that the water waste more and the pressure vary slow. Many times we made call to PHED worker for repairing but no one responded yet”*  
(Naharakanta area, Site 2)

#### **4.2(14): Time Taken for Redressal**

Table 4.6 provides information on the time taken to redress water resource related problems. The data shows that a higher percentage of households were not aware of the amount of time taken for redressal. The data also shows that 15 per cent of



households reported that it took up to one week and 21 per cent of the households reported that it took up to two-weeks' time to get redressal for water resource related problem. It was also observed that in Bhimpur a higher percentage 94 per cent and Naharakanta a lower percentage of households 42 per cent didn't have knowledge on redressal of water resource related problems.

#### **4.2(15): Awareness about Government Schemes Related to Water Supply Facilities**

Table 4.7 gives information on the awareness about government schemes related to water supply facilities. Data shows that a higher percentage of households 95 per cent reported they were not aware of any government schemes related to water supply facilities. Only five per cent of households reported they were aware of government schemes related to water supply facilities. Naharakanta shows that a higher percentage of households 95 per cent and Bhimpur shows the least percentage of households 93 per cent reported they were aware about government schemes with respect to water supply facilities. In Bhimpur data shows that a higher percentage of households seven per cent and in Naharakanta the least percentage of households four per cent reported they were aware about government schemes.

**Table-4.7: Awareness about the Government Scheme of Water Supply Facilities**

Awareness about the government schemes	<b>Bhimpur (Kela Sahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>No. (%)</b>	<b>No. (%)</b>	<b>No. (%)</b>
Yes	8(6.7)	7(4.1)	15(5.2)
Do notKnow	112(93.3)	163(95.9)	275(94.8)
<b>Know the sources of government schemes</b>			
Do notKnow	112 (93.3)	162(95.3)	274(94.5)
BMC	8(6.7)	8(4.7)	16(5.5)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

#### **4.2(16): Knowledge about the Sources of Government Schemes for Water Supply**

Table 4.7 provides information about the knowledge of the sources of government schemes for water supply. The data shows that a higher percentage of households 94 per cent reported they were not aware of the sources of water schemes. Only 5 per

cent percent households were reported that the BMC provides schemes related to water supply facilities.

This was supported by one of the respondents as follows:

*“I am not aware about any water schemes. We take water form public hand and that has installed by the BMC”* (Renu 43-year-old, Bhimpur Area, Site2).

Another respondent reported:

*“I do nothave any idea about the government schemes of water supply. I worked as daily labourer. I did not study much therefore I worked as labourer. We did not get any facilities from govt regarding water supply. Then how I will aware about the schemes”* (Punachnadra 36-year-old, Bhimpur area, Site 1).

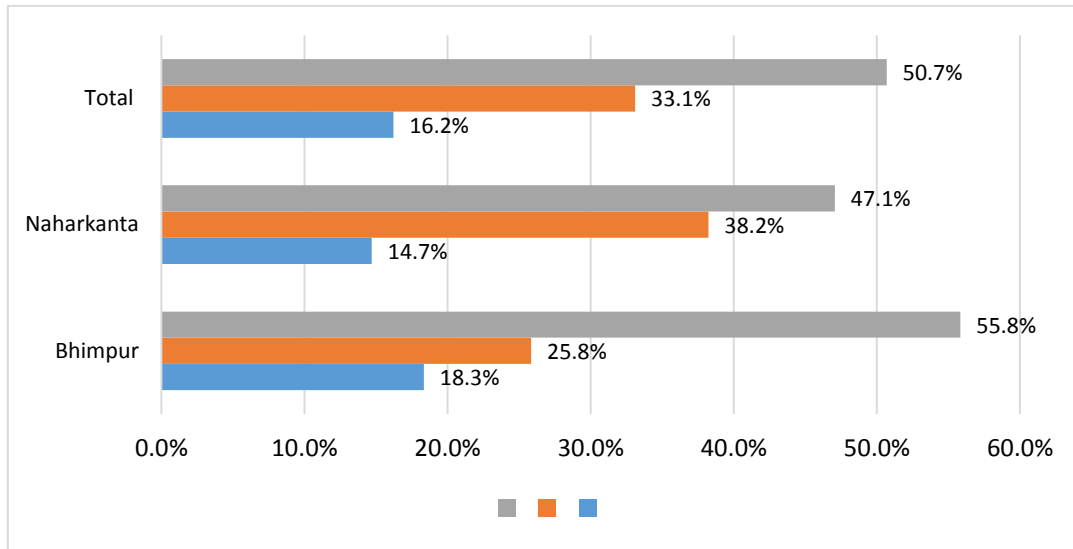
In Naharakanta, one of the respondents reported:

*“The PHED provided water supply in the area. He does not know the about government schemes of water supply”* (Prabhakar 58-year-old, Naharakanta area, Site 2).

#### **4.2(17): Reasons for Lack of Awareness about Government Schemes of Water Supply**

Figure 4.3 provides information on reasons for not being aware of the water supply schemes. A higher percentage of households 51 per cent reported that they were not aware of government schemes for water supply due to lack of education. The data shows that 33 per cent of households reported that they were not aware of government schemes related to water supply due to lack awareness. Only 16 per cent of the households reported that they had no reason for not being aware of the government schemes of water supply. From the data, we can observe that Bhimpur shows the highest 56 per cent and Naharakanta shows the least 47 per cent percentage of households reported they were not aware of government schemes of water supply for lack of education. The data also shows that Naharakanta shows a higher 38 per cent and Bhimpur shows the least 26 per cent percentage of households reported they were not aware about government schemes of water supply facilities due to lack of awareness.

**Figure-4.3: Reasons for no awareness about the government schemes of water supply (%)**



Source: Fieldwork

**4.2(18): Community Suggestions to Solve Water Related Problems**

Table 4.8 provides information on suggestions given by respondents to solve water related problems in both study areas. The above data shows that a higher percentage of households 45 per cent reported of the need to increase the duration of water supply in both study areas. The data shows that 34 per cent of households reported they needed piped water supply to their households. Some of the households 8 per cent reported they needed tube well in their area due to lack of water supply. Therefore, they need tube well to fulfil their requirement. With respect to information when water supply is closed, the data shows that 8 per cent of the households reported that they provide additional information on when there was no water supply so that they would be prepared in advance. It also observed that 4 per cent of households reported that they needed to immediately solve machinery problems by the BMC. Only 2 per cent households reported that they needed easier access water tank provide by the BMC.

**Table 4.8: Suggestion to Solve the Water Related Problems**

Suggestion to solve the water related problems	<b>Bhimpur (Kela Sahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>No. (%)</b>	<b>No. (%)</b>	<b>No. (%)</b>
Duration of Water supply Need to increase	51 (42.5)	79(46.5)	130(44.8)
Machinery Problem Solve Immediately	4(3.3)	8(4.7)	12(4.1)
Need to provide additional information for water not coming	0	21(12.4)	21(7.2)
Easily Access Water Tank	6(5.0)	0	6(2.1)
Need a Tube well	23(19.2)	0	23(7.9)
Need Supply Water	36(30.0)	62(36.5)	98(33.8)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

Socio-economic factor plays crucial role to access water supply. Therefore, the binary logistic regression was used in the study to understand the impact of socio-economic background on access to water.

#### **4.2(19): Result from Binary Logistic Regression Model: Access to Water the Study Area**

As the dependent variable is two categories (yes and no), so binary logistic regression has been carried out. The dependent variable is access to safe drinking water. If they access pipe water or hand pump, then that is considered as safe water. And if they access from well (covered or uncovered) and any other open unhygienic source, then that is considered as unsafe water. Table 4.9 binary logistic regression analysis has been carried out to see the net impact of economic and social factors on access to safe drinking water after controlling other factors. Households belong to OBC categories have high chances (OR 2.6) of accessing safe drinking water as compared to households belonging to SC and ST categories. Further, households belonging to general categories have very high chances of getting safe drinking water as compared to households belonging to SC and ST and OBC categories. Similarly, households belong to medium and high standard of living households have very high chances of getting improved source of drinking water as compared to low standard of living households. With increasing educational level of household members, there is increasing chances of getting improved source of drinking water.

**Table-4.9: Result of Binary Logistic Regression Model: Effect of Socio-Economic Factors on access to Water**

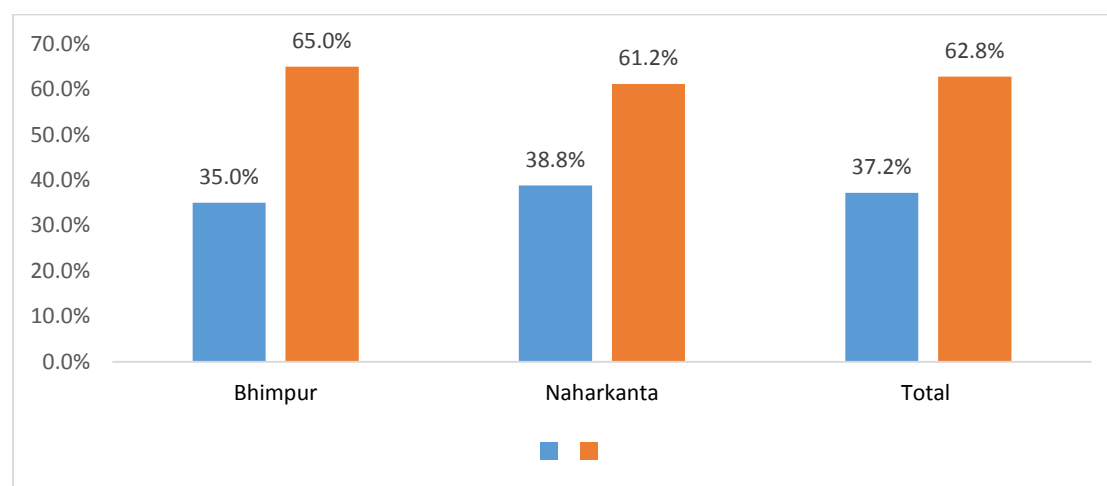
Variable	B	S.E.	Sig.	Exp B
<b>Caste</b>				
SC and ST®				
OBC	.961	.377	.011	2.614
Non SC/ST/OBC	1.886	.428	.000	6.461
<b>Standard of Living Index</b>				
Low SLI ®				
Medium and high SLI	2.324	.353	.000	10.212
<b>Education attained</b>				
Illiterate ®				
Primary	.599	.442	.175	1.821
Middle	1.043	.487	.035	2.839
High school and above	1.085	.496	.029	2.961
<b>Household type</b>				
Nuclear family®				
Joint family	-122	.391	.756	.885

Note: The dependent variable is Access to Water

### 4.3: Availability of Toilets within the House

Figure 4.4 Provides information on toilet facilities in both study areas. The data shows that 63 per cent of households reported that they had no latrine facility.

**Figure-4.4: Availability of Toilet Facility within the House (%)**



Source: Fieldwork

Only 37 per cent of households reported that they had latrine facility. In addition, data also shows that Bhimpur has a higher 65 per cent and Naharakanta has the least percentage of households reporting that they had no latrine facility in their households. It was also observed that Naharakanta shows a higher 39 per cent and Bhimpur shows the lowest percentage of households 35 per cent reporting that they had a toilet facility in their house.

It also found that, with increasing standard of living, proportionate of households access to toilet is increasing. The bivariate result shows, 9 per cent of households belong to low standard of living, 51 percent of belonging to medium standard of living and 100 percent belonging to high standard of living access to toilet facilities in the community. Caste also plays crucial role for accessing toilet in the communities. The data shows, 16 percent of households belong to SC and ST category, 39 percent of households belong to OBC category and 72 percent of households belong form Other caste are accessing toilet facility (Appendix B).

In Bhimpur area, community leader replied:

*“The BMC official member rejected my application forms to get toilet facilities under the SBA programme. I went with some application forms some of households in the community and submitted application form in the BMC office. The official member told to me to come next month so that you will get your information. After completed one month I went BMC office to get information but official member told me to come next week. When I went next week the BMC official member not his place and I went two three hours. Then he told me that he forwarded my application from to another staff member. More than five to six month completed but still I do not get any toilet facility”* (KI6, Bhimpur area, Site 2).

One of the respondents responded:

*“You can get toilet facility if you have good connection with local politicians. In the area same households got two toilets under the SBA but still many households in the area not get even one toilet facility under government schemes. If you give money two thousand rupees in advance, then your chance to get toilet more than who won't paid. So without advance money you can't get toilet facility from the government”* (Jitendra 31-year-old, Bhimpur Area, Site 1).

Rita a 45-year-old respondents reported:

*“I got a toilet facility under the SBA. I got 12,000 rupees for toilet construction. In first phase I got 4000 rupees, I constructed complete toilet but still I did not get whole amount. I requested community leader as well BMC officials but they only give the dates but do not give my money. I borrowed*

*materials from a shop to construct toilet. I thought within a month I paid his money but still I did not get any money (Bhimpur Area, Site 2).*

#### **4.3(1): Location of the Toilet**

Table 4.10 gives information on the location of the toilet facility in both study areas. The data shows that a higher percentage of households 63 per cent reported they had no toilet facility. In the study areas 29 per cent of the households reported that the location of the toilets was outside for at least one household. The data also shows five per cent of the households reported the location of the toilets inside the households. Only two per cent households reported that the toilets were located outside for shared households. It is observed that Bhimpur shows a higher percentage of households 65 per cent and Naharakanta shows the least percentage of households 63 per cent report they had no toilet facilities. Naharakanta shows that a higher percentage of households nine per cent and Bhimpur shows the least percent of households reported a toilet was location inside the house. Data shows that in Naharakanta, a higher percentage of households 30 per cent and Bhimpur the least percentage of households 28 per cent reported that a toilet was located outside for at least one. As for sharing households, Bhimpur shows the higher percentage of households 6 per cent with the location of the toilet in contrast to Naharakanta which had no toilets outside for sharing households.

The FGD two sated:

*“In the Bhimpur area most of the households built their toilet outside households due to lack of space availability in their households. Even some of the households wants to build their toilets but nature of the area and lack of BMC interest are main reasons to create barrier to construct toilet facility in their households. In the area community people are died every year on railway track during defecate time. Last year two people died on railway track. Many times they approached to councillor to build community toilet but always denied by the BMC. Even two times all community approached to Mayor and he also promised to sanction community toilet community but still community toilet not built in the community. When they go to meet BMC officials they replied that they are on processing to build community toilet in the area but still do not have any community toilet in the area” (FGD 2, Bhimpur Area, Site 2).*

FGD four in Naharakanta discussed:

*“In the area majority of the households built toilet outside their houses and some of the households with better economic condition built their toilet inside their houses. Those are built small houses mainly they built their toilet outside their houses. In small room houses people are generally not comfortable to build toilets and they need more space for proper ventilation so that they can get healthy environment. To build toilet inside the house are major reasons to get unhealthy diseases will spread so that make toilet outside the house”* (FGD 4, Naharakanta area, Site 2).

**Table-4.10: Location of Toilet**

Location of Toilets	<b>Bhimpur (Kela Sahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>No. (%)</b>	<b>No. (%)</b>	<b>No. (%)</b>
Do notHave any Toilet	78(65.0)	104(61.2)	182(62.8)
Inside the House	1(.8)	15(8.8)	16(5.5)
Outside the house for one HHs	34(28.3)	51(30.0)	85(29.3)
Outside the house for Sharing HHs	7(5.8)	0	7(2.4)
<b>Specification of the toilet facilities in the study area</b>			
Do nothave toilet	78(65.0)	104(61.2)	182(62.8)
Fully concrete structure	2(1.7)	60(35.3)	62(21.4)
Only base is concrete	37(30.8)	6(3.5)	43(14.8)
Septic tank	3(2.5)	0	3(1.0)
<b>Toile have water supply facilities</b>			
Do nothave toilet	78(65.0)	104(61.2)	182(62.8)
Yes	1(.8)	62(36.5)	63(21.7)
No	41(34.2)	4(2.4)	45(15.5)
Total	120 (100.0)	170 (100.0)	290 (100.0)

Source: Fieldwork

#### **4.3(2): Specification of the Toilet Facilities**

The Table 4.10 provides information on specification of the toilet facilities in the study areas. The data shows that 63 per cent of the households reported that they had no toilet facilities. In addition, the data also shows that 21 per cent of households reported that they had constructed fully concrete toilets. From the data, it is also observed that 15 per cent of the households reported they had toilets made only from concrete and only 1 per cent households reported they made septic tank toilets. In Naharakanta, a higher percentage of households 36 per cent and in Bhimpur the lowest percentage of households two per cent reported toilets made entirely from concrete. In Bhimpur, a higher percentage of households 31 per cent and in



Naharakanta only three per cent of households reported having toilets. Bhimpur shows that a some of households used septic tank toilets.

This was reported by one of the respondents as follows:

*“To made only base concrete toilet spend very less money than fully concrete structure toilet. I made this toilet so that nobody has to go outside to defecate. In odd time female members always are facing problem to go open area now they can use it. If I get toilet from BMC under the SBA programme then definitely I will make fully concrete toilet”* (Ramesh, Bhimpur Area, Site 2).

Rashmita a 43-year-old explained as follows:

*“I go for five years to defecate open, now I use toilet daily. After made toilet in my house I never go to field and shit over there, I must do it here. Going in day time, I’m feeling so shy now I feel more comfortable and get less tension. Whenever I want I can use the toilet”* (Bhimpur Area, Site-2).

#### **4.3(3): Toilet with Water Supply Facilities**

The data (Table 4.10) shows that a higher percentage of the households 63 per cent reported they had no water supply facility in the toilets. Only 22 per cent of the households reported they had water supply facilities in the toilets. The data also shows that 15 per cent of households reported they had water supply facilities in their toilets. It was observed that Naharakanta shows that a higher percentage of households 36 per cent and Bhimpur shows the least percentage of households reported they had tap water with flush facilities in the toilets. Bhimpur shows had a higher percentage of households 32 per cent and Naharakanta the least percentage of households two per cent with no water supply facilities in the toilets.

#### **4.3(4): Awareness about Government Toilets Scheme**

The Table 4.11 provides information on awareness of government toilet schemes. During the first phase of data collection in 2015, the data shows that a higher percentage of households 92 per cent reported they were not aware of any government schemes. Only 8 per cent of the households reported that they were aware of government schemes. It can be observed that Bhimpur shows that a higher percentage of households 95 per cent and Naharakanta shows the least percentage of households 89 per cent reported they were not aware of government toilet schemes. In addition, Naharakanta also shows that a higher percentage 11 per cent and Bhimpur the least percentage five per cent of households reported they were aware of toilet schemes.

But during last phase of data collection in 2017, the data shows that 67 percent of the households were aware about the toilet schemes due to Swachh Bharat Mission.

**Table-4.11: Awareness about Government Toilets Scheme**

Awareness about the toilet schemes (Initial phase of fieldwork, 2015)	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Yes	6 (5.0)	18(10.6)	24 (8.3)
No	114(95.0)	152 (89.4)	266(91.7)
<b>Awareness about the toilet schemes (The final phase of fieldwork, 2017)</b>			
Yes	73(60.83)	123(72.3)	196(67.58)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

#### 4.3(5): Agencies Providing Toilet Facilities

The Table 4.12 gives information on toilet facilities provided by agencies. In both study areas, 90 per cent of households reported they were not aware of any agencies who have been provided toilet facilities.

**Table-4.12: Agencies Providing Toilet Facilities**

Agencies providing toilets	Bhimpur	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Do not Know	109 (90.8)	153 (90.0)	262(90.4)
Govt	7(5.9)	17(10.0)	24 (8.2)
NGO	4(3.3)	0	4(1.4)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

The data shows that only seven per cent of the households reported that they were aware of government schemes under the Swacha Bharat Abhiyan (SBA) where government has been provided toilet facilities. In both study areas, very few of the households reported that both BMC and NGO's were provided toilet facilities. It can be observed that Naharakanta shows a higher percentage of Households nine per cent and Bhimpur the least percentage four per cent of households reported that under the SBA schemes the government has been provided toilet facilities for them. Bhimpur shows that a higher percentage of households reported they were aware about NGO's were providing toilet facilities than the Naharakanta.

The following discussion shows that the higher percentage households do not have toilet facility. Those house who have toilet facility among these very few households got toilet under the government, NGOs and rest of the houses constructed toilet on their own. One of the respondents reported as follows:

*“I have very poor condition and I do not have capacity to build toilet in my house. I have got toilet facility under the government schemes, now my daughters will not complain me to her discomfort to go outside for defecation and I waited for this day since long”* (Hari 33-year-old, Bhimpur area, Site-2).

One of the respondents in Bhimpur area reported:

*“In our area, very few households get toilet facilities under the SBA. Under the programme, the BMC provided 12000 rupees in three phases. I got toilet facility under the SBA programme. The last phase money I applied but did not get yet. My family is very happy when I built toilet in my house under the government initiatives. When we do not have toilet facility we face more problem. Now we do not go outside for open defecation and the condition is very good”* (Ramesh 57-year-old, Bhimpur area, Site 2).

Sukanta 44-year-old corroborated:

*“I do not get toilet facilities from BMC. I submitted application form two times in BMC office. Even I requested to community leader to get toilet facility under the SBA schemes. Those are very close with councillor they got toilet facility and very much politics happen under the SBA scheme to get toilet facility. The needy people won't get toilet facility and those are economically well up they have taken the benefit of SBA schemes”* (Bhimpur area, Site 1).

FGD 3 reflect on similar issues:

*In the area majority people have toilet facility. Those are economically well up they built their toilet by self. People belonged from lower class they are only dependent on government schemes. The government recently introduced the SBA schemes, and many households have applied under the schemes by the local leader. Still very few houses got the toilet facility from the BMC. Some households made toilet in their houses. Rest of the households are applied in BMC but still they are not get toilet facility. People have given extra money as bribe to the local politicians so that they get the toilet facility. But those are not providing money they will not get toilet facility* (FGD3, Naharakanta area, Site 1).

One of the respondent corroborated:

*“Without bribe we can't get toilet facility. I gave one thousand rupees to local politicians but still I did not get any toilet facility. when I asked the person he said again one thousand rupees more. He told me everyone provide two thousand rupees to get toilet facility. Now I decided I will not give him any single rupees. These people are taking money, when thy will have given one thousand rupees to the local leader to get toilet facility. That person is very*

*close with councillor and he collect money for the councillor. Poor people will not get the benefit toilet facility when these people ask the money. As poor person where we will get the money. When they will come to us and ask vote for them then I remind them what they did to me” (Aruna 37-year-old, Naharakanta Area, Site 2).*

Another respondent further added:

*“The BMC did households survey regarding toilet available in the houses. Those houses do not have toilet they can get toilet facility under the government schemes. But more than four year happened we did not get toilet facility. we are waiting when we get toilet. Some houses get double time toilet schemes under the same scheme but we did not get at all” (Sasmita 27-year-old, Naharakanta area, Site-2).*

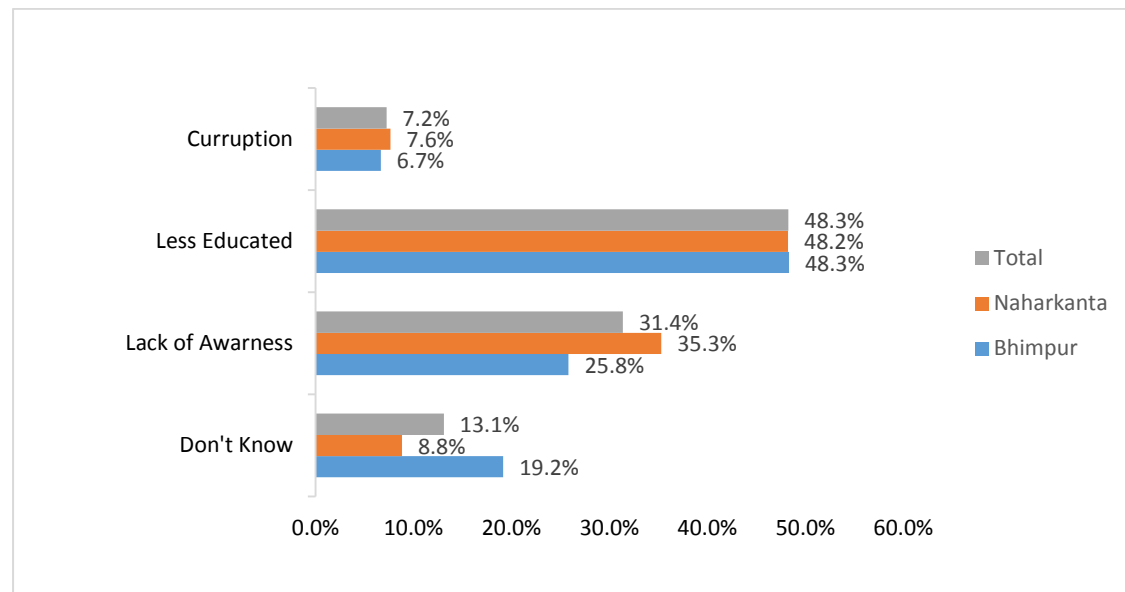
Jagurti an NGO which works in sanitation and providing services in slums for last 15 years, during interview, the Field Officer in Bhimpur area, told:

*“Our NGO provided free toilet facilities in the area. The main problem in the area is overcrowded, lack of space, poor housing and lack of infrastructure facility especially poor water supply and sanitation. Majority of the population are defecating open and people face various health related problems. So our organization provided toilet facility in the area. We make first plan to provide community toilet facility in the area but after visited to filed we realised that community toilet will not possible to area. So that we provided households toilets. But lack of water supply and lack of awareness are the main reasons people are not using the toilet” (KI5, Bhimpur area, Site 2).*

#### **4.3(6): Reasons for Lack of Awareness about Government Schemes for Provision of Toilet Facilities**

The Figure 4.5 gives information on the reasons for a lack of awareness about the government schemes of toilet facilities among the total surveyed population. Data shows that 13 per cent of households reported they did not know and 31 per cent of households were reported that the lack of awareness is the main reason for not aware about the government schemes of toilet facilities. The data shows that a higher percentage of households 48 per cent reported less education and seven per cent percent households reported corruption was the main reason they were not aware about any government schemes for toilet facilities. It can be observed that Bhimpur shows a higher percentage of households 19 per cent and only nine per cent of households reported they had no knowledge about government schemes for toilet facilities.

**Figure-4.5: Reasons for Lack of Awareness about the Government Schemes for provision of Toilet Facilities (%)**



Source: Fieldwork

Due to various reasons such as lack of education, less awareness, and corruption are the main reasons people are not aware about the government toilet schemes in the study areas. One of the graduate respondent categorically said:

*“If we know the schemes then what will happen. The local politicians are doing rampant corruption on government schemes and facilities. The current government ruling since fifteen years and party politicians are doing rampant corruption in the city as well as state. Whatever facilities come from the government did not reach to the ground level. Schemes and welfare programme exists only on paper. If schemes are properly implement, then only the condition will improve. The sate need to think about proper implementation of any government schemes and policies. The bureaucrats only sit in their office and they do not come to the ground level. If they come to ground level and monitor implementation of SBM then the things can improve. It seems the bureaucrat and politicians are two part of same coin. If the government only declares schemes and not brother about proper implementation, then the situation will not change at all” (Amit 25-year-old, Naharakanta area, Site 1).*

This finding is echoed by one of the female member as follows:

*“The current councillor threaten to us and use slang languages when we went to meet him. He told us that who did not vote to me they will not get a single benefit from the govt. Whom you vote and support during election time just go to them. They will fulfil all your demand. Whatever facilities come from the government, we will not get the benefit due the lack of political will” (Rebati 39-year-old, Naharakanta area, Site 2).*

#### 4.3(7): Use of Toilet in the Study Areas

As regards the use of toilets in the study areas, the data shows that 63 per cent of the households reported they did not use toilets. Only 33 per cent of households reported that they all the members in the family used toilets regularly and three per cent of the households reported that toilets were used only by female members. Bhimpur shows that a higher percentage of households 71 per cent and Naharakanta shows the least percentage of households 59 per cent reported that they were not using any toilet facilities. Naharakanta shows a higher 38 per cent and Bhimpur shows the least percentage 27 per cent of households reported that toilets were regularly used by all family members. In Naharakanta the data shows that a higher per cent of households and Bhimpur the least per cent of households reported that toilet was used only by female members of the family (Table 4.13).

**Table-4.13: Use of Toilet**

Use of Toilet	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Do not Use Toilet	85 (70.8)	99(58.2)	184(63.4)
Regularly used by All Family Members	32(26.7)	65(38.2)	97(33.4)
Used by Female Members only	3(2.5)	6(3.5)	9(3.1)
Total	120 (100.0)	170 (100.0)	290 (100.0)

Source: Fieldwork

Another respondent reported:

*“We moved to this place eight year back. When we moved here, at that time my whole family went outside for open defecation. In urban area, it is very difficult to defecate open. Especially for women it very huge task. Having the toilet is very comfortable and you can go at any time when you want. Otherwise it is very difficult. In night time you always feel fear, many times snakes beaten when you go for open defecation. In the area, two to three incidents already happened. I also suffered from snake bite once. Since then I am scared to go for open defecation”* (Usharani 39-year-old, Bhimpur area, Site 1).

Ramesh a 46-year-old also supported this as follows:

*“In the area, majority of the population are going for defecate in open area. In my childhood I seen people are going at river site and defecate open and wash their hand with sand. Still majority of the male members are going open defecation then the female member. Many houses have toilet facilities but very*

less used. In summer time people are more defecate open area and rainy and winter seasons very less people are going open defecation” (Naharakanta Area, Site-2).

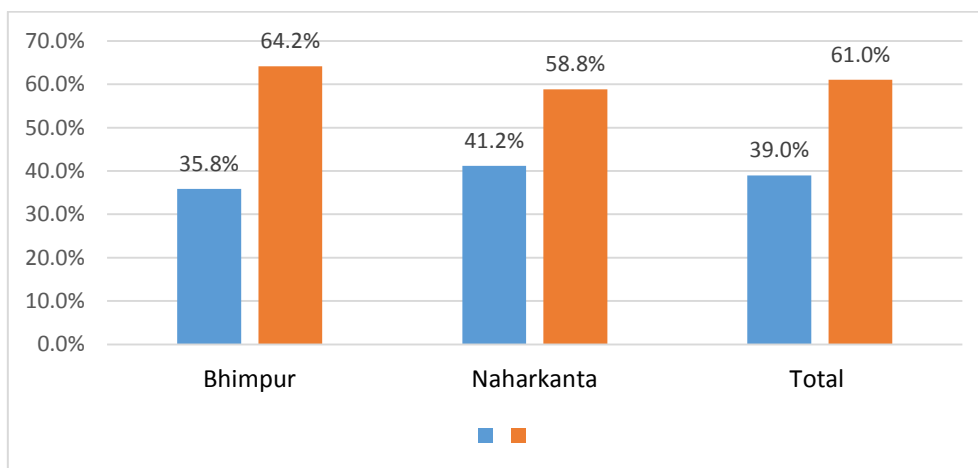
Baidhar a 31-year-old respondents reported:

“I am staying in a rent house. More than three to four families are using one latrine. I do not like to share latrine and defecate open. Every day early morning me and my friend go together near at filed so that we have time to talk and get some fresh air. Now it is habituated for me and I can’t feel comfortable when I used toilet. So I feel comfortable and get relax to defecate open” (Naharakanta Area. Site-1).

#### 4.3(8): Place Used for Defecation by Households with No Toilet Facility

About 61 percent of households which do not have toilet facility practised defecation in the open. Only 39 per cent of the households reported that they were using their own toilets and public toilets for defecation. Naharakanta shows a higher percentage 41 per cent and Bhimpur shows least percentage 36 per cent of households reported they were using their own toilets and public toilets for defecation. In Bhimpur the data shows that a higher percentage of households 64 per cent and Naharakanta the least percentage 53 per cent of households reported that they were using open space for defecation (Figure 4.6).

**Figure-4.6: Place Used for Defecation by Households with No Toilet Facility (%)**



Source: Fieldwork

#### 4.3(8): Perceived Benefit of the Toilet inside the House

Information on perceived benefit of toilet inside the house is evident in Table 4.14. Data shows that a higher percentage of households 43 per cent reported they did not feel ashamed if they had toilet in the house. In study areas 33 per cent percent of

households reported that toilets were essential healthy life and 20 per cent households reported that it was an important facility to have in case of emergencies. Some of the households also reported that they faced fewer diseases and reduced fear for life when toilet facilities were available in the household. In Bhimpur the data shows that a higher percentage of households 38 per cent and in Naharakanta the least percentage of households 30 per cent reported that to maintain a healthy life, households have toilet facility. In Naharakanta, a higher percentage of households 46 per cent and in Bhimpur the least percentage of households 38 per cent reported that they felt no shame if toilet facilities were available for household members. The data also shows that in Naharakanta, a higher percentage of households 23 per cent and in Bhimpur, the least percentage 17 per cent of households reported the need for emergency if households had toilet facility.

**Table-4.14: Perceived Benefit of the Toilets in House**

Perceived benefits	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Do not Know	6 (5.0)	0	6 (2.1)
Good for Healthy Life	46 (38.3)	51 (30.0)	97 (33.4)
Not ashamed	46 (38.3)	78 (45.9)	124 (42.8)
Good for Emergency	20 (16.7)	39 (22.9)	59 (20.3)
Less Diseases	0	2 (1.2)	2 (.7)
Less fear to Life	2 (1.7)	0	2 (.7)
Total	120 (100.0)	170 (100.0)	290 (100.0)

Source: Fieldwork

#### **4.3(9): Households without Toilet Facility**

There are many problems faced by the people if they do not have toilet facility in the house. The data shows that a higher percentage of households 61per cent reported that they were facing poor health conditions if they had no toilet facility in house. In addition, 18per cent households reported that they felt shame and 19 per cent of the households reported awful for emergency if households had no toilet facilities. Some of the households also reported that they would face communicable diseases if households had no toilet facility. It can be observed that Naharakanta shows that a higher percentage of households 70 per cent and Bhimpur shows the least percentage of households 47 per cent perceived that not having toilet facilities is bad of health. Naharakanta shows that a higher percentage of households (20 per cent) and Bhimpur



shows the least percentage of households 16 per cent reported that they felt shame if they had no toilet facility. Bhimpur shows that a higher percentage of households (32 per cent) and Naharakanta shows the least percentage of households (10 per cent) reported poor for emergency if they had not toilet facility. Some of the households in Bhimpur reported they faced communicable diseases due to lack of toilet facilities (Table 4.15).

**Table-4.15: Households Without Toilet Facility**

HH without Toilet	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Do not know	1 (.8)	0	1 (.3)
Bad for health	57 (47.5)	119 (70.0)	176 (60.7)
Feel ashamed	19 (15.8)	34 (20.0)	53 (18.3)
Discomfort when stomach problem	39 (32.5)	17 (10.0)	56 (19.3)
Diseases/ Infections	4 (3.3)	0	4 (1.4)
Total	120(100.0)	170 (100.0)	290 (100.0)

Source: Fieldwork

The FGD conducted among women reflected as follows:

*“Lack of toilet facility is one of the key issue in the area. We are facing problem every day to defecate open space. During the day time we can’t go to the open filed. The community toilet is not built yet even after giving application mayor and BMC official. In the are more than four hundred households have settled but only few houses have toilet facility and all of them defecate in open. Due to open defecation people are facing various health related problems”* (FGD2, Bhimpur Area, Site-1).

#### **4.3(10): Regression Analysis for Access to Toilet**

A binary logistic regression has been carried out to understand the access to toilet across social characteristics. The dependent variable is access to toilet. Table 4.16, binary logistic regression has been carried out to see the net impact of socio-economic factors on access to toilet facilities. Households belong to OBC categories have high chances of accessing toilet facilities as compared to households belonging to SC and ST categories. Further, households belonging to general categories have very high chances of accessing toilet facilities as compared to households belonging to SC and ST and OBC categories. Similarly, households belong to medium and high standard of living households have very high changes of accessing toilet facilities as compared

to low standard of living households. With increasing educational level of household members, there is increasing chances of accessing toilet.

**Table-4.16: Result of Binary Logistic Regression Model: Effect of Socio-Economic Factors on Access to Toilet Facility in the Study Area**

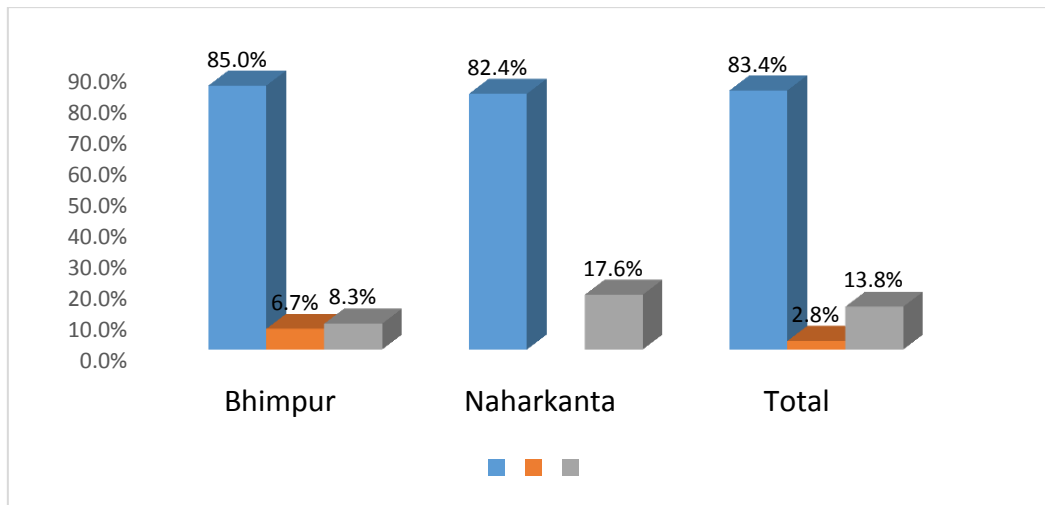
Variable	B	S.E.	Sig.	Exp B
<b>Caste</b>				
SC and ST®				
OBC	.662	.390	.090	1.939
Non SC/ST/OBC	2.287	.476	.000	9.842
<b>Standard of Living Index</b>				
Low SLI ®				
Medium and high SLI	2.807	.389	.000	16.559
<b>Education attained</b>				
Illiterate ®				
Primary	.725	.463	.117	2.065
Middle	1.266	.524	.016	3.546
High school and above	1.444	.531	.007	4.239
<b>Household type</b>				
Nuclear family®				
Joint family	.414	.424	.329	1.512

Dependent variable: Toilet facility (Yes-1, No-0)

#### **4.4: Disposal of Household Garbage**

Figure 4.7 provides information on disposal of household garbage. The data shows that a higher percentage of households, 83 per cent reported that they disposed household garbage in open spaces outside the house. Only a small percentage of households two per cent reported that they disposed garbage in open space away from their house. The data also indicates that 14 per cent households disposed garbage in the bin provided by the BMC in both study areas. In Bhimpur area the data shows that a higher percentage of households 85 per cent and in Naharakanta the least percentage 82 per cent of households reported they disposed garbage in open spaces outside the house. The Figure 4.7 also shows that in Bhimpur seven per cent of households reported that they disposed their garbage in the open space away from their house. At the same time, in Naharakanta area, none of households reported that they disposed their household's garbage in the open space away from the house. It can be observed that Naharakanta shows a higher 18 per cent and Bhimpur the least percentage of households 8per cent reported they were using garbage bin provided by the BMC.

**Figure-4.7: Dispose Households Garbage (%)**



Source: Fieldwork

In the Bhimpur area, the BMC did not provide any type of garbage bin. People throw garbage on available open space in the area. The BMC workers do not enter to the community for garbage collection. Due to more garbage on streets people face various problem.

The FGD 2 reflected on this issue very clearly:

*“In the area people throw garbage on road, so after some days that garbage stinks and people face problem while crossing the road. Our committee requested all not to throw the garbage on road. Deposited one place so that we can kindle the garbage. They did it two three times but the situation still same. In the area some households made their own garbage bin otherwise higher percentage of households through garbage in open space in the area”* (FGD2, Bhimpur area, Site 2).

One of the respondent further corroborated:

*“People are throwing garbage near at the hand pump, after one year the test of water change. Now days no one uses the water for drinking purposes. The BMC did not install garbage bin in the area so the area is more polluted”* (Sitarani 53-year-old, Bhimpur area, Site-2).

Another respondent also voiced the same:

*“The central government made SBA and for that government spend corers of rupees. In the city, the BMC takes responsibility to install garbage bin in the area. But BMC do not provide garbage bin in our area. Households are throwing garbage bin in open area and people face various health related problem due poor condition in the area. When BMC will install the garbage bin we are waiting for the day”* (Purnachnda 53-year-old, Bhimpur area, Site 2)

In Naharakanta area one of the respondents' said:

*“Whatever garbage is generated in the house is mainly collected by the female members. As a female member in house where do we go to throw it. If BMC provides garbage bin in the area, then we will be thrown in the garbage bin or garbage collector come to our house then we will give to him. In both things not happened in our community then we do not have other option. So we are throwing garbage in open area which near at my house”* (Kalpana 27-year-old, Naharakanta Area, Site 1).

This was further strengthened as follows:

*“The sanitation workers never entered in to the community. In the SC community, BMC do not provide garbage bin, garbage collector and sweepers do not come in the community. When the sanitation workers are going to the other community for garbage collection but they do not come to our community. We complained many times to the sanitation inspector regarding the issue but nothing happened. When politicians, general meeting, and any other important celebration happened in our area, the day before sanitation worker come to the area for sweeping road, collect garbage. Otherwise rest of days they never enter to the community”* (FGD4, Naharakanta area, Site 2).

#### **4.4 (1): Frequency of Garbage Collection by BMC Workers**

The Table 4.17 provides information on the frequency of garbage collection by the BMC workers in both study areas. In Bhimpur the data shows that a higher percentage 68per cent of households reported that the sanitation workers never came to their localities for garbage collection. Only 28per cent of households reported that sanitation workers were coming once a week for garbage collection. The data shows that only three per cent of the households reported that sanitation workers came once a month for garbage collection. In Naharakanta the data shows that 37per cent of the households reported that sanitation workers never entered their localities for garbage collection. A total of 25 per cent of households reported that once a week and 23 per cent of households reported that more than twice a week sanitation workers came to their locality for garbage collection. It can be observed that one per cent of households reported that the BMC workers collected garbage regularly in their locality. The data also shows that (12 per cent) of households reported that twice a week sanitation workers were coming to the locality for garbage collection. In both study areas the data shows that a higher percentage of households (50per cent) reported that sanitation workers never came to their localities for garbage collection when BMC had introduced schemes for door to door garbage collection. Only (27 per

cent) of households reported once a week and (14 per cent) of households reported more than twice a week for garbage collection by the BMC workers.

**Table- 4.17: Frequency of Garbage Collection by BMC Workers**

Garbage Collection Frequency	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Do not come	82 (68.3)	64 (37.6)	146 (50.3)
Daily	0	2(1.2)	2(.7)
More than Twice a Week	0	40(23.5)	40(13.8)
Twice a Week	0	21(12.4)	21(7.2)
Once a Week	34 (28.3)	43(25.3)	77(26.6)
Once a Month	4 (3.3)	0	4(1.4)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: fieldwork

It observed in both study areas the garbage collection was not happened properly. In Bhimpur area, the sanitation workers never entered to the area for collecting garbage. In Naharakanta, very rarely sanitation workers were coming for garbage collection. One of the Key respondents reported:

*“The sanitation workers are not coming to the area for garbage collection. They are complaining sanitation inspector but the nature of sanitation workers is not changing”* (KI7, Bhimpur Area, Site2).

Another Key Informant state:

*“Most of time conflicts occur between sanitation workers and local people for garbage collection, road cleaning and drainage cleaning. Sometime councillor also intervene in to the matter and solve the problem but after one week or two weeks the saturation same again”* (KI9, Naharakanta Area, Site 1).

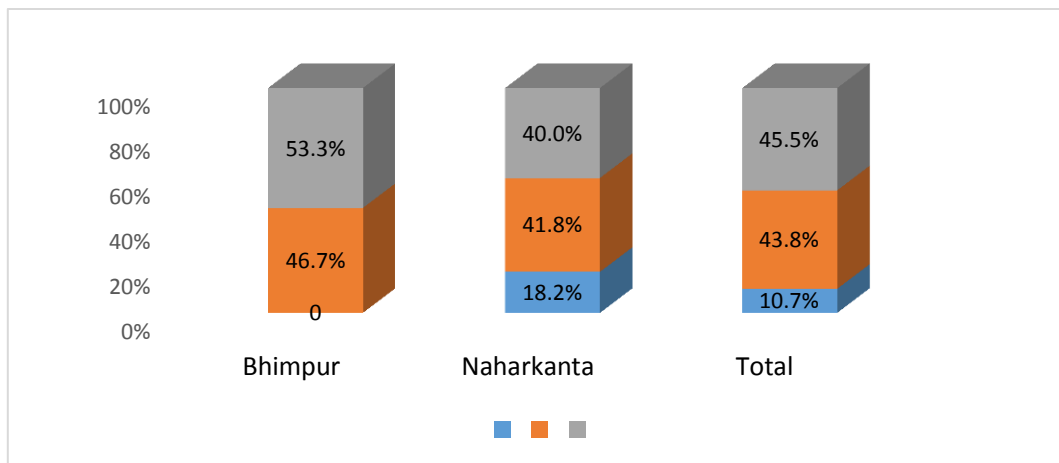
The sanitation inspector reported as follows:

*“There were various issues in sanitation department. Due to the lack available instruments such as brooms, wheel bar, try cycle, gloves, boots, uniform etc. There is lack of funds in the department how the cleaning work will be done. If government provides better instrument to sanitation department or sanitation workers then only we can provide better services to the city population”* (KI1, Naharakanta Area, Site 2).

#### 4.4(2): Type of Drainage outside Households

Figure 4.8 shows the types of drainage outside households in the study areas among the surveyed population. The data shows that 45 per cent households replied that they had no drainage facilities outside the house. It was observed that 44 per cent households replied that they had open drainage outside the house and only 11 per cent replied they had closed drainage outside their house. In Bhimpur area, there were no closed drainage in front of the house while in Naharakanta area 18 per cent households replied that they had closed drainage outside the house. In Bhimpur a higher percentage of households 53 per cent and Naharakanta the least percentage of households 40 per cent reported that they had no drainage facilities outside their households. It was also observed that in Bhimpur a higher percentage of households 47 per cent and Naharakanta the least percentage of households 44 per cent reported they had open drainage facilities outside the house.

**Figure-4.8: Type of Drainage outside Households (%)**



Source: Fieldwork

The community leader said:

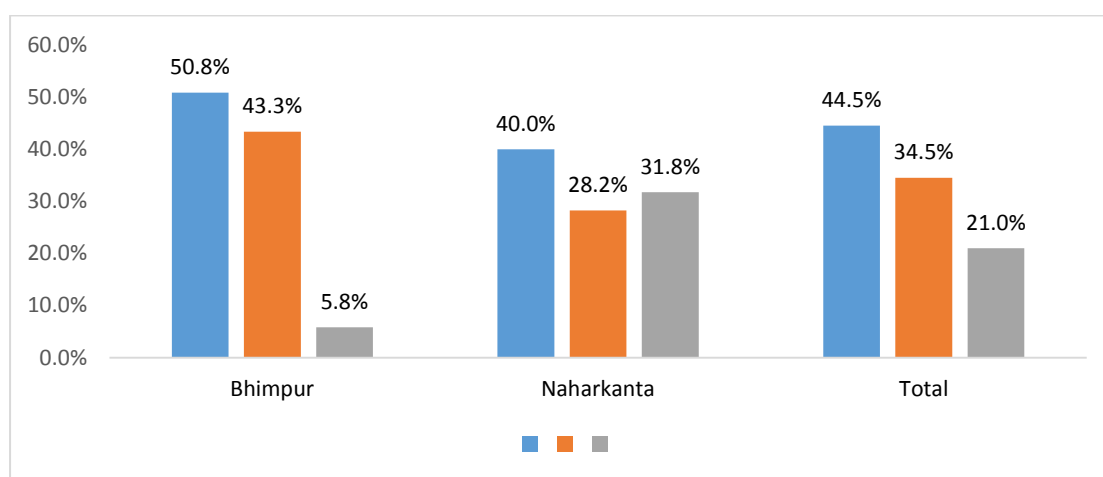
*“We do not have drainage facility in the area, and people are facing problem without drainage facility. We requested to the councillor for giving drainage proposal and he promised us to make drainage in the area. The process not easy at all it takes time so we have to patience and there is no other option”* (KI6, Bhimpur Area, Site 1).

#### 4.4(3): Drain Cleaning by the Sewerage Workers

Figure 4.9 presents information on drainage cleaning in the study area. The data shows 44 per cent households replied that they did not clean their drains. The data also shows that, 34 per cent of the households replied that they cleaned the drains by

themselves and only 21 per cent households replied BMC workers cleaned the drainage outside their households. In Bhimpur, a higher percentage of households 51 per cent replied that they cleaned their own drains and in Naharakanta the least percentage 40 per cent of households reported they did not clean their drains by themselves. It was also observed that Bhimpur shows a higher percentage of households 43 per cent and Naharakanta only 28 per cent households reported they were cleaning drainage by themselves. Naharakanta shows that a higher percentage 31 per cent and Bhimpur shows the least percentage 6 per cent of households reported that the BMC workers were cleaning the drains.

**Figure-4.9: Drainage Clean (%)**



Source: Fieldwork

In Naharakanta, the structural barrier is a major problem for drainage. The drainage system in the area is very poor and drainage is blocked most of times. So that people are face more problem during rainy seasons. Sometime drainage water into their house and situation is uncontrolled. The similar responses were reported by the male participants of the FGD 4 they shared the following:

*“... the drainage facility in the are very poor planned. The drainage blocked many times due to stagnant water. Even the drainage water not properly cleaned by the sanitation worker. Most of time we can't sit in front of our house due to odd smell comes from drainage. In rainy seasons the drainage water come to road and last year due to heavy rain the drainage water entered into the house. The situation is not controlled when the drainage water not wend properly” (FGD 4, Naharakanta area, Site 2).*

#### 4.4(4): Frequency of Drainage Cleaning

Table 4.18 gives information on the cleaning of drains by self in both study areas. The data shows that 65 per cent of households reported they did not clean the drainage and five per cent households replied they cleaned their drains daily by themselves. Data also reported that 24 per cent of households said that they cleaned the drainage twice a month and only five per cent of households reported that their drains were cleaned once a month. It was also observed that Naharakanta shows a higher percentage of households 74 per cent and Bhimpur the least percentage 51 per cent of households reported that they did not clean their drains at all. In Bhimpur 12 per cent of the households reported that they cleaned the drainage every day. In Bhimpur the data shows that a higher percentage household 30 per cent and Naharakanta the least percentage of households 20 per cent reported that they cleaned the drainage once a week.

**Table-4.18: Frequency of Drain Cleaning by Self**

Frequency of drain cleaning	<b>Bhimpur (Kela Sahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>No. (%)</b>	<b>No. (%)</b>	<b>No. (%)</b>
Do Not Clean	61 (50.8)	126(74.1)	187 (64.8)
Every Day	14(11.7)	0	14 (4.8)
Once in three Days	0	3(1.8)	3(1.0)
Once a week	36(30.0)	34(20.0)	70(24.1)
Twice a Month	0	1 (.6)	1(.3)
Once a Month	9(7.5)	6(3.5)	15(5.2)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: fieldwork

This finding is echoed by one female member:

*“When BMC workers do not come to clean our area then what will we do? We always clean drainage by self. Without cleaning drainage, we can’t seat in front of the house. so need to clean drainage every so that we can live healthy”* (Sujata 37-year-old, Bhimpur area, Site 2).

This is echoed with the findings of the FGD with male member in the Bbhimpur area who shared:

*“In the area very few households have made drainage by self in front of their houses. Majority houses do not have drainage. Without drainage people are face various problem. Households used water not pass properly and the water always stagnant on road. The people are face problem when they walk on road. Many times the area member request to mayor and councillor regarding to make drainage. But after request many times still drainage not make in our*



*area. last all female member in the area strike in front of BMC office and they assure to us that they will start work soon” (FGD1, Bhimpur area, Site 1).*

#### **4.4 (5): Frequency of Drainage Cleaning by BMC Workers**

Table 4.19 shows information with respect to the cleaning of drainage by the BMC workers in the surveyed population. The data shows that in both study areas 82 per cent of the households reported that BMC workers never cleaned their drains. Only 4per cent households reported their drains were cleaned once in a week and 13 per cent of households reported that BMC workers cleaned the drainage once a month. Bhimpur shows that a higher percentage of households 85per cent reported that sanitation workers did not come for drainage cleaning. In Naharakanta, the least percentage of households 79 per cent reported that sanitation workers did not come to clean the drains. Further it is interesting to note that in Bhimpur a higher percentage of households 6per cent and Naharakanta the least percentage of households (2per cent) reported that sanitation workers cleaned the drainage once a week. In Naharakanta a higher percentage of households 17 per cent and Bhimpur the least percentage of households (8per cent) reported sanitation workers cleaned drainage once a month.

**Table-4.19: Frequency of Drainage Cleaning by BMC Workers**

Cleaning by BMC	<b>Bhimpur (Kela Sahi)</b>	<b>Naharakanta</b>	<b>Total</b>
	<b>No. (%)</b>	<b>No. (%)</b>	<b>No. (%)</b>
No Cleaning	102(85.0)	135(79.4)	237(81.7)
Once a Week	8(6.7)	4(2.4)	12(4.1)
Twice in a Month	0	2(1.2)	2(.7)
Once a Month	10 (8.3)	29(17.1)	39(13.4)
<b>Pay sanitation workers for cleaning work</b>			
Yes	0	21(12.4)	21(7.2)
<b>Amount paid (INR) to sanitation worker for cleaning work</b>			
Below Fifty Rupees	0	21 (12.4)	21(7.2)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

#### **4.4(6): Pay the Sanitation Workers for Cleaning Work and amount paid (INR)**

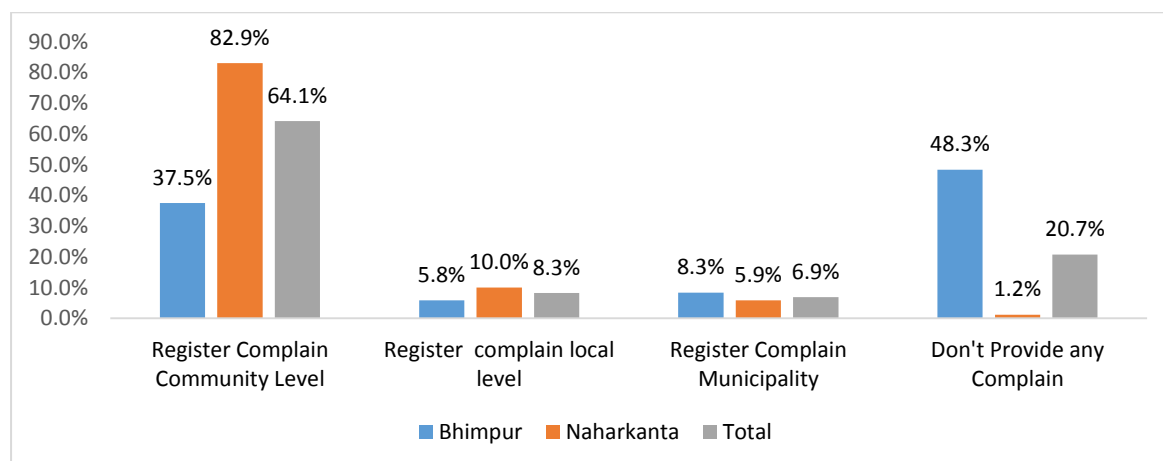
Table 4.19 Provides information on the pay of sanitation workers for cleaning work in both study areas. In the below Table, it is mentioned that seven per cent of the households reported they paid for cleaning work for sanitation workers. In

Naharakanta, 12 per cent of households reported that they paid sanitation workers for cleaning work. In Bhimpur the respondents reported that they did not pay the sanitation workers for cleaning work. The data shows that seven per cent of households reported that they paid fifty rupees for cleaning work. In Naharakanta a higher percentage of households 12 per cent reported they paid fifty rupees for cleaning work. In Bhimpur the data shows that no payments were made for cleaning work.

#### 4.4(7): Sanitation Related Problems

With respect to the registration of complaints about water supply related problem in both study areas., the data shows that a higher percentage of households 64 per cent reported that they had registered complaints at the community level related to the sanitation problem. Some of the households eight per cent reported that complaints were registered at the community level and only seven per cent of households reported that they registered complaints to the BMC when they faced water sanitation related problem (Figure 4.10). Data also shows that 21 per cent of the households did not register complaints regarding sanitation problem in both study areas. It can also be seen that Naharakanta shows a higher percentage of households 83 per cent and Bhimpur shows the least percentage of households 37 per cent reported that they registered complaints related to sanitation at the community level. Bhimpur shows that a higher percentage of households 48 per cent and Naharakanta shows the least percentage of households 1 per cent did not register any complaints related to sanitation.

**Figure-4.10: Sanitation Related Problems (%)**



Source: Fieldwork

#### 4.4(8): Distance of Complain Office

Table 4.20 presents information on distance of the complaint office in study areas. The table below shows that a higher percentage of households 73 per cent reported five hundred meters to one kilometre distance of the complaints office in the study areas. Only 11 per cent of the households reported they did not know about the distance of the complaints office. It can be observed that Bhimpur shows that a higher percentage of households 27 per cent reported they did not know distance of the complaint office. In Naharakanta the data shows that higher percentage of households 87 per cent and in Bhimpur the least percentage of households 53 per cent knew the exact distance of the complaints office.

**Table-4.20: Distance of Complaints Office**

Distance of complains office	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Do not Know	32(26.7)	0	32(11.0)
Below Five Hundred Meters	7(5.8)	4(2.4)	11(3.8)
Five Hundred meters to One Km	64(53.3)	148(87.1)	212(73.1)
Two Km to Three Km	10(8.3)	8(4.7)	18(6.2)
Four Km to Five	4(3.3)	0	4(1.4)
More than Five Km	3(2.5)	10(5.9)	13(4.5)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

#### 4.4(9): Problems of Registration Complain

Table 4.21 provides information on problem for registering complaints for sanitation issues. The data shows that a higher percentage of the households 45 per cent reported they did not know of registration complaints in both study areas. The data shows 13 per cent households reported they do not have time and nine per cent of households reported due to the great distance to the of complaint office they did not go for registering a complaint. Some of the households 11 per cent reported that official members did not receive phone calls on the numbers provided by the BMC. Due to lack of knowledge 15 per cent of households reported that they never registered complaints. In both study areas, Bhimpur shows that a higher percentage of households 52 per cent and Naharakanta shows the least percentage of households 40 per cent reported they did not know of a complaint office for sanitation issues. In

Bhimpur the data shows that a higher percentage of households 27 per cent and Naharakanta the least percentage of households four per cent reported that due to distance they never went to register complaints.

**Table-4.21: Problem of Registration Complain**

Registration of Problems	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
No Idea	62(51.7)	69(40.6)	131 (45.2)
Do not have time	32(26.7)	7(4.1)	39(13.4)
Distance More	6(5.0)	20(11.8)	26(9.0)
Lack of Awareness	0	8(4.7)	8(2.8)
Never Responds	3(2.5)	7(4.1)	10(3.4)
Do not take helpline call	8(6.7)	25(14.7)	33(11.4)
Less Educated	9(7.5)	34(20.0)	43(14.8)
Total	120(100.0)	170 (100.0)	290(100.0)

Source: Fieldwork

#### **4.4 (10): Problem of Registration Complain**

Table 4.22 Provides information on problem of registration complain for sanitation issues. Below table shows 83 per cent of households reported they faced problem while they went registered complain. Only 17 per cent of household reported they did not face any problem while they went for register complain. It can be observed that in Bhimpur shows that a higher percentage of households 92 per cent and Naharakanta shows least percentage of households 76 per cent reported they faced problem for registration complain. In Naharakanta shows that higher percentage of households 23 per cent and Bhimpur shows least percentage of households eight per cent reported they never faced any problem when they registered complain.

**Table-4.22: Problem of Registration Complain**

	Bhimpur (Kela Sahi)	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Yes	110 (91.7)	130(76.5)	240 (82.8)
No	10(8.3)	40(23.5)	50(17.2)
Total	120(100.0)	170 (100.0)	290(100.0)

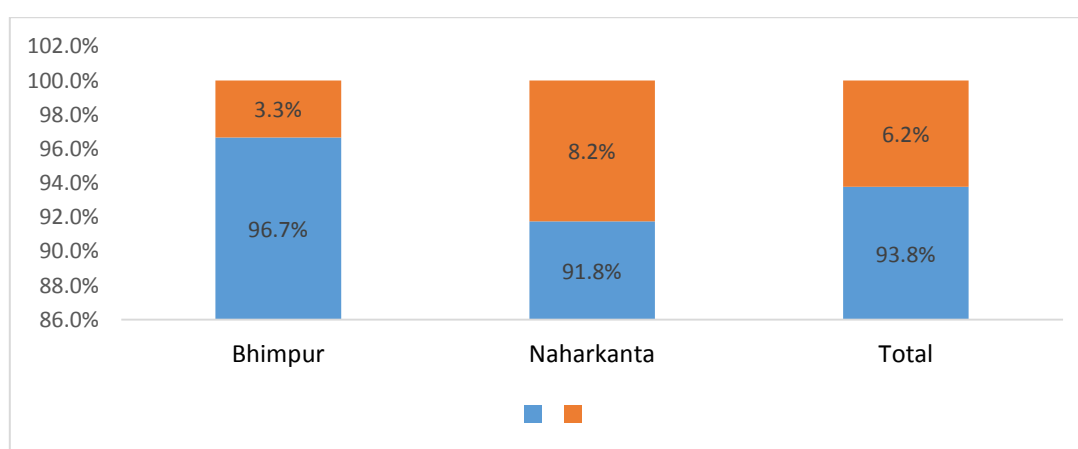
Source: fieldwork

#### **4.4(11): Awareness about the Government Schemes regarding Sanitation Facilities**

Regarding aware of the government schemes, the figure sixteen shows that higher percentage of households 94 per cent did not aware about the government schemes of

water supply facilities. Only six per cent of households reported that they knew about of government schemes of water supply facilities. Further data observed that Bhimpur shows that higher percentage of households 97 per cent and Naharakanta shows least percentage of households 92 per cent reported they did not aware about the government schemes. In Naharakanta shows that higher percentage of households eight per cent reported that they knew about the government schemes and Bhimpur shows least percentage of households three per cent reported they knew the sanitation schemes (Figure 4.11).

**Figure- 4.11: Awareness about the Government Schemes of Sanitation (%)**



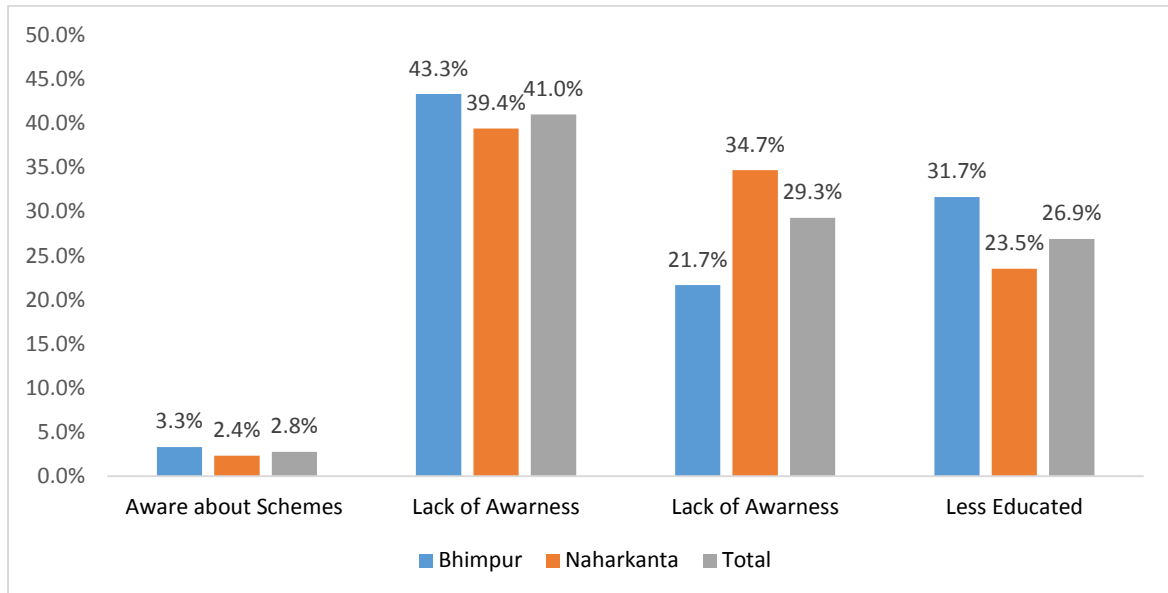
Source: Fieldwork

#### **4.4(12): Reasons for not being aware of Government Schemes about Sanitation**

Figure 4.12 Provides information on reasons for not aware about the government schemes. The data shows that higher percentage of households 37 per cent reported they did not know about the government schemes. In both study areas the data shows that lack of awareness 28 and less education 29 per cent were the main reasons of people not aware about the government schemes. It can be observed that Bhimpur shows that higher percentage of households 43 per cent and Naharakanta least percentage of households 33 per cent reported that they did not aware about the government schemes. In Naharakanta the data shows that higher percentage of households 32 per cent and Bhimpur the data shows the least percent of households 22 per cent reported they were not aware of government schemes due to lack of awareness. In Bhimpur the data shows that a higher percentage of households 32 per cent and Naharakanta shows least percentage of households (27 per cent) reported the

lack of education as a major reason people not aware about the government schemes on sanitation.

**Figure-4.12: Reasons for not being Aware of Government Schemes about Sanitation (%)**

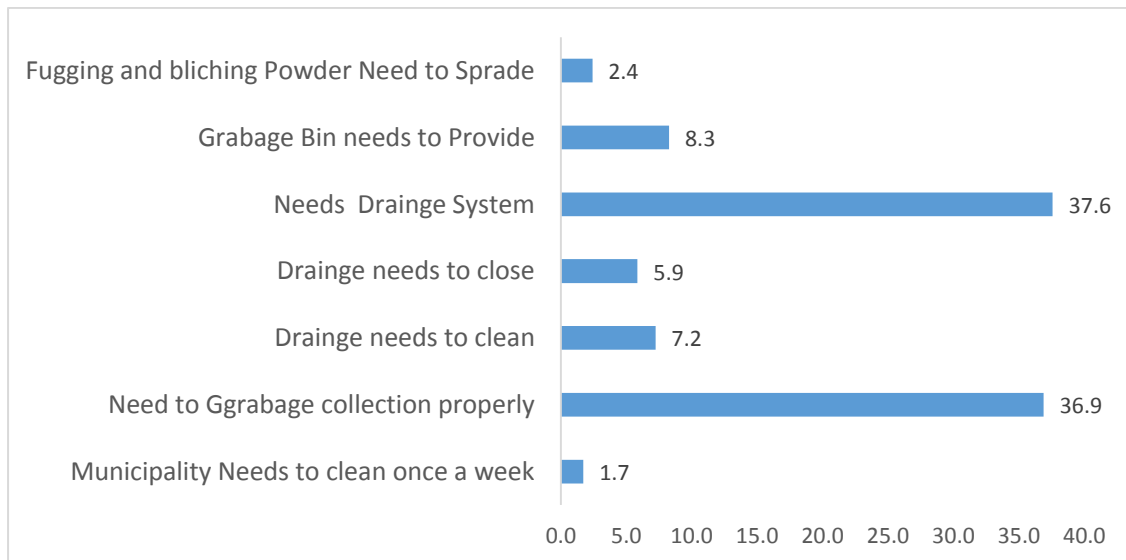


Source: Fieldwork

#### 4.4(13): Suggestions to Solve the Sanitation Problems in the Study Area

Figure 4.13 gives information on the suggestions to solve sanitation related problems in both the study areas.

**Figure-4.13: Suggestions to Solve the Sanitation Problems form the Community**



Source: Fieldwork

The data shows that 37 per cent of households suggested to garbage collection needs to be carried out properly. The data shows that 38 per cent of households suggested they need a drainage system in the area. The data also shows that eight per cent household reported that the BMC needs to install garbage bin in their area. Some of the households seven per cent reported that the BMC workers need to clean drainage and only two per cent of households suggested municipality needs to clean drainage once a week. The data shows that six per cent households reported that drainage need to close. In both study areas, and two per cent of households reported municipality need to spread fog and bleaching powder once a month.

#### **4.5: Conclusion**

In both the study areas water supply and sanitation problem exists different levels. The accessibility and availability of water supply and sanitation also exists at different levels. In both areas due to various issues such as economic, political, socio-cultural, educational, administrative, structural, technology, lack of awareness and environmental factors are create barriers to access water supply and sanitation. The duration of water supply very less and majority household's dependent on hand pump water. When there is no water supply, most of the households travel long distance to collect water. Sometimes they would collect water from nearby colonies, temple and government official's premises. The quality of drinking water supply in the area was not good and majority of the people take water directly without any purifying treatment. The drinking water was highly contaminated of bleaching powder so most of the time the water could not be used for drinking purposes. Without water supply the higher percentage of households faced problems such as: drinking, cooking and bathing etc.

Regarding toilet facilities, in both study areas a higher percentage of households did not have toilet facilities and most of the households went outside for open defecation. Those who have toilets did not have water supply connectivity in the toilet. Most of the households use water buckets. Majority of households throw garbage in open space outside the house. The higher percentage households did not have drainage in front of their houses. The sanitation workers are not regular in terms of garbage collection, road and drainage cleaning in the study area. In the area people are face sanitation problem and for that they gave complaints to different levels like: registration of complain at community level, local level, and municipality. The

distance to the complaint office was far from the study area which restricted people from registering complains. In the study area people faced registration problem like: no time, more distance, less education, lack of awareness and did not receive helpline number. A majority of the households were not aware about the government schemes on sanitation. Lack of awareness and less education are the main reasons people are unaware of the government schemes.



## Chapter-5

### Water Supply and Sanitation in Bhubaneswar City - Experiences of the Sanitation Workers

#### 5.1: Introduction

The fifth chapter discusses the provisioning of water supply and sanitation in the study area. This chapter analyses the condition of providers who are involved in water supply and sanitation<sup>22</sup> work in the city. It tries to understand the working condition of water supply and sanitation workers and the kind of problems they face in their day to day work at the sites. It also tries to understand the type of interaction that takes place between the service provider and user in the study area. Water supply and sanitation providers play a major role in the success of the programme and goals achieved. But water supply and sanitation policies and schemes do not mention anything about provider's point of view though they are the key players in achieving success in any stated policies and schemes. Therefore the theoretical understanding is developed about water supply and sanitation and intersectionality of issues between policies, provisioning, and providers. The conditions of providers in terms of caste, gender, educational, social, economic, political, working conditions and especially focused on health issues.

In the complex intersectional associations present in water supply and sanitation provisioning and use, there is a hierarchy of providers which is evident. While the policy makers and the bureaucrats and other officials are positioned at the highest level, like superiors and at the bottom of the hierarchy lie the grassroots level providers. For water supply there is not visible grassroots level provider except in case when water is supplied through tankers. In that case, the drivers and helpers are considered as the grassroots level providers. In case of sanitation, persons employed to collect garbage, clean drains and toilets, sweep public and common spaces, have been considered as the grassroots level providers. Unlike the water tanker drivers and helper, the sanitation worker also experiences forest propensity of all kinds. They are at the lowest rung of social ladder as most of them hail from lowest of the lowest caste. Their education level is low and there is very little ownership of resources.

---

<sup>22</sup> Sanitation is related to public health directly, especially the provision of clean drinking water and adequate sewage and garbage disposal.

Therefore, in the hierarchical order of the providers of water supply and sanitation, they are at the lowest rung and most vulnerable. Considering these attributes, the present study has given special attention to these workers and detailed analysis has been done.

## 5.2: Bhubaneswar Municipal Corporation (BMC) and Basic Services

Bhubaneswar Municipal Corporation provides various basic services to the city. Under the BMC supervision, both private and government organization are responsible to provide sanitation services. Table 5.1 shows that there are a total of 67 wards in BMC, only 10 wards are under the BMC, where government sanitation workers have been employed. In rest of the wards, sanitation services are being provided by three private organizations namely Jagruti<sup>23</sup>, Ramki, and PMR. Total two thousand four hundred sanitation workers, one assistant health officer, one assistant unit officer, ten sanitation inspectors are engaged in sanitation work. Both private and government sanitation worker are engaged in hazardous work due to the lack of machinery and equipment facilities provided by the agencies. Every day sanitation workers who are engaged in sanitation work face injuries, accident, illness, death on the work site. Government and private organizations do not provide any medical facilities and health insurance facilities to them. The condition of daily wage based contractual sanitation works is worse than those having permanent tenure. The contractual sanitation workers do not have any job security and access to any other social security provisions like a regular employee.

**Table 5.1: Government and Non-Government Organization engaged in Sanitation Services in Bhubaneswar City**

Sl No	Organization	Govt/ NGO	Ward
1	BMC	Government	10
2	Jagruti	NGO	28
3	PMR	NGO	14
4	Ramky	NGO	15
Total			67

Source: Fieldwork

<sup>23</sup>Jagruti, Ramki and PMR are private organization are working on sanitation under the BMC.

### 5.3: Duties of Sanitation Workers

The duties of sanitation workers are mainly door to door garbage collection, waste collection and transportation, bins not overflow, street sweeping, drain cleaning, picking dead animal bodies, complain redress, conservancy cleaning bush cutting and dwelling in the study area.

### 5.4: Socio-Demographic Profile of the Providers

#### 5.4(1) Sex and Age Composition of Workers

Table 5.2 provides information on type of worker, sex and age composition of workers who are engaged in water supply and sanitation work. The data mainly collected two type of workers in the study, one is PHED workers, who have engaged in water supply work and another sanitation worker. It observed that the higher percentage workers are involved in sanitation work than the PHED workers. Out of 110 workers, 97 (94 per cent) workers are engaged in sanitation work. Only seven per cent workers are employed in PHED.

**Table- 5.2: Type of Workers, Sex and Age Composition of Workers**

Type of Workers	Bhubaneswar N (%)
Sanitation worker	103(93.6)
PHED Worker (Grass root level)	7(6.4)
<b>Sex Composition</b>	
Male	50 (45.5)
Female	60(54.5)
<b>Age Group</b>	
<25 Years	11(10.0)
25-34 Years	44(40.0)
35-44 Years	40(36.4)
45-54 Years	13(11.8)
55< Years	2(1.8)
Total	110(100.0)

Source: Fieldwork

In term of gender, it appears that more number of females are employed in sanitation work. The data shows that a higher percentage of female workers 54 per cent than the male workers 45 per cent. The data shows that a relatively younger age group people are engaged in the water and sanitation provision services. From the table it is clear that 40 percent of the employees are between the age group of 25 years to 35 followed by 36 per cent (35 to 45 years), 12 per cent (45 to 55 Years) and 10 per cent below 25 years of age group population were engaged water supply and sanitation in the study area. The data also shows that only two per cent of workers are above 55 years. It can be said that sanitation work requires a lot of physical strength and relatively better health on the part of the workers.

#### 5.4 (2) Social Identity and Sub Caste

There are changes in the traditional occupational structure in India. Industrialization and advent of other modern institutions and access to education have given opportunities to the lower castes also to change their traditional occupation. However, given the India social structure, certain occupations such as sanitation work are still the pejorative of specific caste groups within the Schedule Castes also. Amongst the SCs castes such as Bhangis still, continue to as manual scavengers. Table 5.3 provides information about social Identity and sub-caste of the sanitation workers. The data shows that 98 per cent of the workers belong to SC community and rest two per cent percent workers are from ST community who have engaged in water supply and sanitation work. As far as the sub-caste is concerned, the data shows that higher percentage of workers i.e 54 per cent are from ‘*Harijan*’ sub-caste, 26 per cent of workers belong to ‘*Hadi*’ sub-caste and 12 per cent of workers had reported that they belong to *Naik* subcaste. Approximately six per cent of the worker did not reveal their sub-caste.

**Table- 5.3: Social Identity and Sub-Caste**

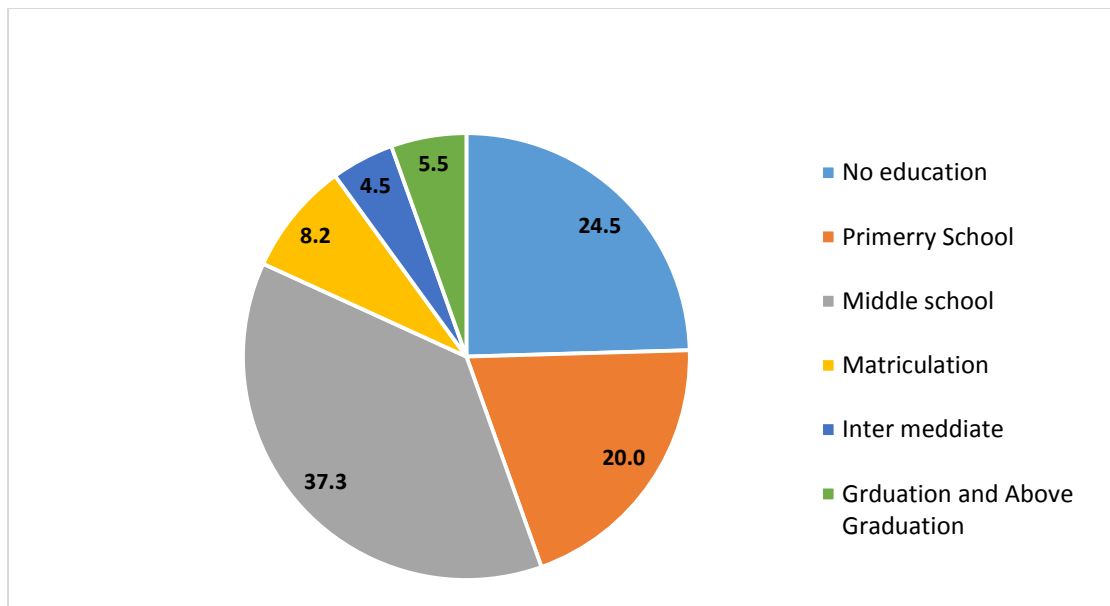
<b>Social Identity</b>	<b>Number of Workers. (%)</b>
SC	108(98.2)
ST	2(1.8)
<b>Sub Caste</b>	
No response	7(6.4)
Harijan	60(54.5)
Hadi	29(26.4)
Naik	14(12.7)
Total	110 (100.0)

Source: Fieldwork

### 5.4(3): Educational Attainment

Figure 5.1 shows the level of education attained by the workers engaged in water supply and sanitation work. The data depicts that the people involved in sanitation work have a relatively lower level of education where the ‘lowest’ level is primary and ‘highest’ being post-graduation (MA). The data shows that 37 per cent of workers completed middle school. Twenty-four percent of workers are non-literate and only 22 per cent of workers completed primary school. The data also shows that only eight per cent of workers completed matriculation, four per cent completed intermediate and five per cent of workers completed graduation and above graduation under the study.

**Figure- 5.1: Educational Level (%)**



Source: Fieldwork

Lower educational level of the sanitation workers corresponds to their lower socio-economic status. Most of the worker said that they had to discontinue education to take responsibility of the household and earn a living. For instance, a 26-year-old sanitation worker named Sankar who is engaged in sanitation work from past eight years recalled:

*“I am doing this work from past eight years. After I completed tenth standard, I was unable to continue further studies because of lack of financial support from the family. My father’s health condition was also very poor and he is the only earning person in the family. I had to leave studies and join sanitation work in place of my father. I had to take responsibility of the family and take care of my father’s health” (Sankar, 26-year-old).*

Sanitation work is seen polluting in nature and the people who are engaged in this work are filled with remorse especially those who join it at a young age. Sanitation workers are paid very low. Hence many of them have to work in two-three shifts to earn enough money to support their family. For instance, another worker, Manoj who is 26-year-old mentions because of the poor economic condition of his family, he could not continue his education. He was forced to take up sanitation work to support the family. He is aware of the polluting nature of the work and his caste association with it. In his words:

*“This is the worst kind of work and nobody wants to continue this type of job at his age. I am not very educated and belong to lower caste I am forced to continue this work. My family is dependent on me hence even if I wish I can’t leave this job. Whatever I earn monthly is not sufficient to raise the family. So I have to do extra work in different shifts to make the ends meet”* (Manoj, 26-year-old).

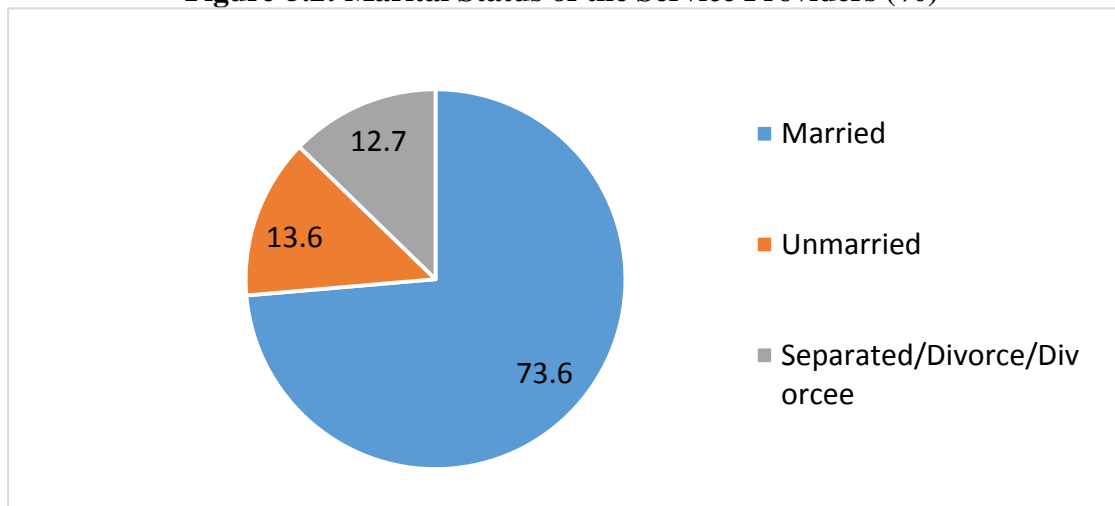
Other studies also revealed that due to the low educational status of sanitation worker they are unable to take on other occupations. The low level of parental education is also an important reason of high drop-out rate amongst their children high dropped out and became crucial factors for their exclusion (Shyamla, 1992; Gulalia, 2003; Mohanty, 2003). Another study reports that Dalit women sanitation worker’s life is prone and unhealthy due to deprived education. Most of the workers are illiterate because most of the respondents are from slums where access to education is very limited. At the same time, less awareness about educational programmes, schemes and institutions among sanitation workers is another reason to get disinterested in education (Selvamani and Rajan 2015). This is illustrated in the case of Ramakanta, a 45-year-old sanitation worker who lived in Salia Sahi. He migrated to Bhubaneswar city ten year back. He migrated because of lack of work opportunity and small agricultural land. Whatever land they have, after partition with the joint family that land got further divided into smaller pieces. It was difficult for him to maintain his family. So he migrated from rural area to urban area. Because of low educational qualification and lack of skill he has to work as a labourer for more than one year in the city. Whatever he money earned he sent to his family and very little money he maintains his whole month. When he worked as labourer under the supervisor some time payment was not regular so he faced various problem. One of his friends introduced him to one of the private contractor on short term to transport garbage. This work was done in the morning so he was able to earn relatively high wage. After five to four month the contractor offered him sanitation job and he accepted because

after doing the sanitation work for two hours in the morning he can do other work during the day to supplement his earning. So finally he joined as sanitation workers under the private organization. When he joined the work that time he was not comfortable at all but after two to three months he got habituated. The private organization did not provide any other facilities except for the salary. The has not increased since he had joined the sanitation work.

**5.4(4): Marital Status of the Service Providers**

Figure 5.2 provides information marital status of workers who have engaged in water supply and sanitation work. The data shows that a higher percentage of workers 74 per cent reported that they got married. The data also shows that about 14 per cent of workers are unmarried and 12 per cent of workers are separated/ Divorced.

**Figure-5.2: Marital Status of the Service Providers (%)**



Source: Fieldwork

**5.4(5): Family Composition**

Table 5.4 provides information on the status of family and the number of members in the households who have engaged in water supply and sanitation work. The data shows that 89 per cent of workers have nuclear family. Only 11 per cent of workers belong to the Joint family. The data shows that members in the households, 45 per cent households having four to five members. The data also shows that 24 per cent of households having six to eight members. Approximately 15 per cent of households comprise of a single person that means many of the sanitation workers live alone in the city. Only 14 per cent of households have two to three members, who are engaged in water supply and sanitation work.

**Table- 5.4: Family Composition**

Family	Bhubaneswar N (%)
Nuclear	98(89.1)
Joint	12(10.9)
<b>Family Composition</b>	
One Member	17(15.5)
2 to 3 member	16(14.5)
4 to 5 members	50(45.5)
6 to 8 members	27(24.5)
Total	110(100.0)

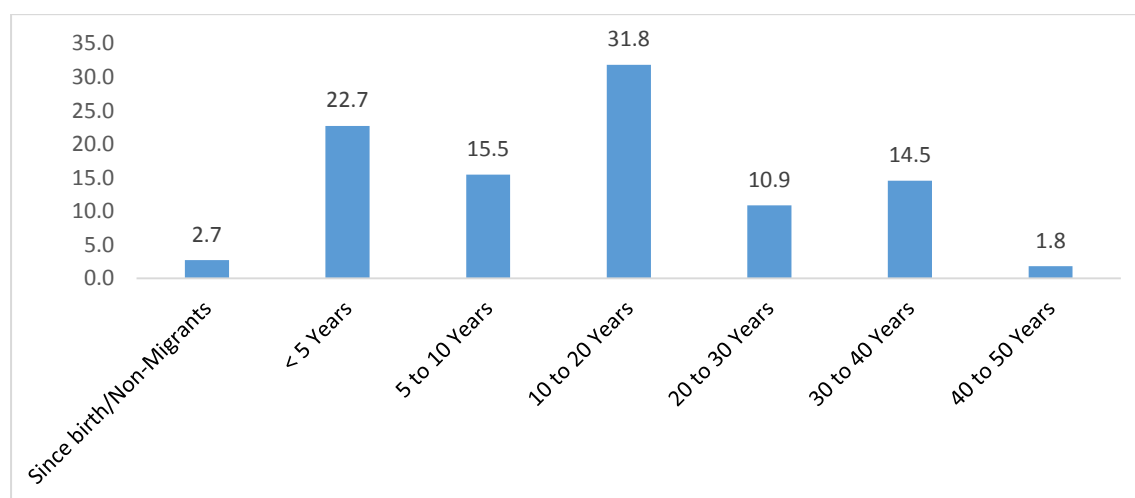
Source: Fieldwork

## 5.5: Migration of Providers

### 5.5(1): Duration of Stay in Bhubaneshwar

Most of the sanitation workers in the study reported that they migrated to the city in search of livelihood. Figure 5.3 provides information about the duration of stay of the sanitation workers in the city. The data shows that approximately 31 per cent of the workers migrated to the city ten to twenty years ago. The data also shows that 22 per cent of workers reported they came to the city five years ago. Fifteen-point five percentage of workers reported they migrated five to ten years back in the city followed by 14 per cent of worker reported they migrated thirty to forty years back. Only a few workers said that they were born and brought up in the city. Only 1per cent of workers reported they migrated forty to fifty years back.

**Figure 5.3: Year of Migration (%)**



Source: Fieldwork



### 5.5(2): Migration

Table 5.5 provides information on migrated from and reasons for migration of workers who have engaged in water supply and sanitation work. The data shows that 63 per cent of workers migrated from rural areas and only 33 per cent of workers migrated from other urban areas. Only two per cent of workers were born and brought up in the city. Further we look at the reasons for migration the data shows that higher 43 per cent of workers reported they migrated in search of better job opportunity in the city and 23 per cent of workers moved out in search of better work opportunity in the city. The data also shows that 27 per cent of workers cited multiple reasons for outmigration to earn for their livelihoods. Only one per cent of workers reported due to relative staying in the city and due marriage they were migrated. The respondents cited a variety of reason to migrate from their village to the city. The city provides relative better life and there are chances to get employed in non-farm activities which are better paid than farm labour.

**Table 5.5: Migration Patterns and Reasons**

<b>Migration From</b>	<b>Bhubaneswar N (%)</b>
Non Migrants	(3)2.7
Rural	(70)63.6
Urban	(37)33.6
<b>Reasons for Migration</b>	
Non-Migrants	3(2.7)
Got/ Expectation of job	41(43.6)
Better work opportunity	26(23.6)
Relatives staying in place of Destination/because of marriage	2 (1.8)
Crop failure/Natural calamity at the place	(.9)
Multiple Reasons	30 (27.3)
Total	110(100.0)

Source: Fieldwork

The sanitation inspector explained that since these people have no education or very low level of education. They fail to get employment in other sectors. He also highlights that the government has started many schemes to train unemployed people but sanitation workers are unable to get the benefit of these government schemes. One of the Sanitation Inspectors mentioned as follows:

*“Most of the sanitation worker, who migrated from different districts to the city of Bhubaneswar are landless and from lower caste and lower class*

*families. Almost all workers are living in the slum area. Across the city, all sanitation workers face the universal problems of housing, water supply, toilet and electricity facilities. Because of the low educational level and lack of skills, most of them were unable to find other avenues of employment. The government has implemented various schemes for unemployed people. There is training through various schemes to make them skilled for employment. But for sanitation workers, all schemes seem to have failed” (KI1).*

Like the sanitation inspectors, the sanitation workers also mentioned that usually landless lower caste families who have migrated from the rural areas constitute the large chunk of labour engaged in the provision of sanitation services.

One of the sanitation worker mentioned:

*“Most of the workers migrated from rural area to urban area in search of employment. Mainly lower caste people are involved in sanitation work. They settled here approximately fifteen to twenty year ago. Due to the poor economic condition, they are forced to live in a poor environment” (Sanju, 47-year-old).*

Despite the problems faced in terms of housing, water, sanitation, and electricity most of the workers said that they never want to go back to their native place. They wish to settle in the city on a permanent basis. These workers work hard and aspire to provide future for their children and think that living in the city can provide them with relatively better access to educational facilities as compared to a rural area.

Another key informant who is a sanitation inspector said:

*“In the city, 98per cent of the workers engaged in sanitation work are mostly from the SC community. Most of the workers are landless and economically backward. Due to the poor economic condition, most of the workers are living in slum areas. Most of the workers who are engaged in water supply and sanitation work as unskilled labours. Therefore they are more interested to engage in cleaning job. Now a day’s the younger population is also joining this work due to job scarcity” (KI 1).*

The following case study also illustrate this:

Hari 25-year-old is engaged in sanitation worker for more than five. He is staying in Salia Sahi Basti with his family. Due to the poor economic condition of his family, he could not continue his studies further. The family burden is another reason that forcefully pushed him into this unclean job. Nobody wants to engage in this type of job at his age, but he has no other option due to his poor economic condition and lack of family support. He has been working under the Jagruti organization and collects garbage from door to door.

## 5.6: Work profile of the Service Providers

Table 5.6 provides information on the work profile of the workers in the study area. The data shows that a higher percentage of workers 52 per cent reported that they were working under the government organization and 31 per cent of workers reported that they were working under the Private organization. Only 15 per cent of workers reported that they were worked under the various NGO who are involved in water supply and sanitation work. Regarding the type of work, the data shows that a higher percentage of the workers 81per cent reported that they work on a temporary basis. Only nine per cent of workers were recruited on permanent basis and two per cent of workers reported that they were non worker.

**Table-5.6: Work Profile of the Service Providers**

<b>Name of the Employer</b>	<b>N (%)</b>
Non workers	2(1.8)
Government	57(51.8)
NGOs	17(15.5)
Private	34(30.9)
<b>Type of Work</b>	
Non-workers	2(1.8)
Permanent	9(8.9)
Temporary	89(80.9)
Other	
<b>Work in a Month</b>	
Non- workers	2 (1.8)
21-26 days	78(70.9)
27<	30 (27.3)
<b>Number of working Hours in a Day</b>	
Non-workers	2(1.8)
<4 hrs	10(9.1)
5-8 hrs	94(85.5)
8 hrs<	3(2.7)
Not Answered	1(.9)

Source: Fieldwork

Like other departments the PHED (Water Supply) has also not recruited employees on regular basis. Most of the workers are on contract. Another worker, Gangadhar recalls:

*“Since 1995 I am working as a driver under the PHED but still I did not get permanent employee status. I am working on contractual basis. The department is giving only hopes and but they never keep their wards. Many officers come and go in the department but no one takes cognizance of our poor condition. I have worked in this department my whole life, I cannot quite*

*this job as I hope may be some day I will be a permanent employee. My family is living with me in the Isaneswar slum. I have two daughters. Elder daughter going to the government school near at my place. The younger one is going to Anganwadi centre. Younger daughter's health condition is poor every month I have to take to her medical. I have to spent a substantial amount of money on medicines. I do not have extra income hence it is very difficult to survive as the prices of everything are soaring. I am unable to provide basic things to my family and we live in misery” (Prafula 43-year-old, Naharakanta area, Site 2).*

Regarding number of working days in a month the data shows that the higher percentage of workers (71 per cent) reported they worked twenty-five to twenty-six days in a month. While approximately 27 per cent of workers reported that they worked entire month. As far as the number of working hours in a day are concerned 85 per cent of workers reported that on an average they have to work for five to eight hours a day. Given the low paid nature of the job, around three per cent of workers reported they had to work for more than eight hours' a day (Table 5.6).

Change in the political power and the changing nature of policies concerned with sanitation and water provision has not made any change in the social and economic life of the sanitation workers. On contrary, they live under the fear of being jobless. They face threats by the contractors. Most of the contractual workers said that they are working for many years but there is no increase in their wage. Their families continue to live in poverty.

One of the sanitation workers shared his experience:

*“I have been engaged in sanitation work since 1996. Due to political interference and changes in local government we are facing more problems. New rules and working conditions are set by the new authorities (private contractors). In the city, one has to buy everything to fulfill the family's needs. We get Rs.5000 in a month which is not paid timely. I have worked for twenty years but still, I am a contractual worker. Sometime supervisor and inspector demoralize and pressurise us to leave the job. After giving twenty years of my life I can't simply leave this job” (KI 2).*

This is illustrated by the case of Sumitra 35-year-old lives in Science park Basti Jaydev Vihar slum with her family since 2008. Her family migrated to Bhubaneswar because of poor economic condition and small piece of agriculture land. They have one semi-pucca house with no electricity, water supply and toilet facilities. All family members are defecating open. In the area the government was not built community toilet facility. Her husband is an auto driver in the city, his income is not sufficient to support the family. So she started working as a sanitation worker in 2014 under the Jagruti organization. When she joined sanitation work, she had no idea how to do this

work. The organization also did not provide any type of training. So first in first month of job she faced lot of problem. First of all, the sanitation work was new for her, as women she had never worked outside and felt inferior in the work. The condition of sanitation workers is very poor; the organization do not provide any safety equipment facilities to the workers. Most of times, workers are facing minor injuries and no fast aid is provided to the workers. Whatever incidents happen during work time workers have to take responsibility. Most time the workers ignore and if the situation is out of control then they go to nearby hospital.

Regarding the salary, the private organization pay less salary than that of daily wages labourer. The per month salary paid to sanitation workers is four thousand five hundred rupees which was very less than the government sanitation workers. The salary also does not come regularly, most of the workers are paid in cash and they do not have a bank account. They are not getting any other facilities from the organization as well as government. Majority of the workers do not have any health insurance facilities and medical facilities. Regarding the training programme, most of the workers are not aware about any training programme. Without training programme the sanitation works are very dangerous. Every year the many sanitation workers die due to lack of training programme. The government spends crores of rupees on sanitation but workers do not get any facilities from the government.

#### **5.6(1): Nature of Work**

The Table 5.7 provides information on the nature of work in which the sanitation works are involved. From the table, it is clear that the majority of the sanitation workers are engaged in cleaning the roads/street and garbage collection. For instance, the data shows that 58 per cent of workers are engaged in cleaning roads/streets. Another 22 per cent of workers are engaged in all type of water supply and sanitation work such as garbage collection, cleaning road, helper in the water tank, drainage cleaning, cleaning floors and toilets etc. The data also shows that 10 per cent workers were engaged in garbage collection and a small proportion of workers (4 per cent) are involved in collecting biomedical waste.

Regarding secondary occupation, the data shows that higher 90 per cent of workers reported that they did not engage in any secondary occupation. Only eight per cent of worker reported they were engaged in the secondary occupation. In secondary occupation they were mainly engaged as domestic helpers engaged in cooking, cleaning utensils, sweeping, mopping, washing clothes etc. They mostly work in nearby colonies adjoining the slum (Table 5.7).

**Table- 5.7: Nature of Work**

<b>Nature of Work</b>	<b>Number of Workers Engaged N(%)</b>
Non-workers	2(1.8)
Garbage Collection	12(10.9)
Clean Roads/ Streets	64(58.2)
Clean floors and toilets	1(.9)
Biomedical wastes collection/storage/disposal	5(4.5)
Involved in more than one or all works	25(22.7)
Others	1(.9)
Total	(100.0)
<b>Secondary Occupation</b>	
No secondary occupation	100(90.9)
Domestic help; cooking/cleaning utensils/sweeping/mopping/washing clothes	9(8.2)
Any other	1(.9)
<b>Payment</b>	
Monthly Payments	98(89.1)
Weekly Payments	10(9.8)
Pay day	2(1.8)
Total	110 (100.0)

Source: Fieldwork

The Table 5.7 also provides information on payment of workers who have involved in water supply and sanitation work. The data shows that a higher percentage of the worker 89per cent reported that they are paid on monthly basis. While 10 per cent of workers reported they were getting their salary on weekly basis and 2per cent of workers reported that they were getting paid on daily basis (Table 5.7).

The following illustration corroborates this:

Ramesh a 53-year-old, PHED worker (Water supply) staying in Pathar Bandha Basti of, Bhubaneswar city. Ramesh is working as a contractual worker for more than fifteen years at Vani Vihar PHED office in Bhubaneswar. When he joined that time he used to get only two thousand rupees per month. Many of his friends left the job due to low salary and did not get permanent job under the PHED. He hoped that he would get permanent status but still he has been working as a contractual worker. In office time he is doing his duty and other time he is engaged in part time job so that he can earn more money. He gets only six thousand which is not enough to maintain a family so he is doing part time job. His family lives with him in the slum. In the slums there is lack of proper basic facilities. His family lives in a semi-pucca house and they do not have water supply and toilet facility in the house. His family collects water from public hand pump which is situated in government school premises. They face

problem once the school is closed otherwise rest of the day his family can collect water from the school premises. The government do not provide any facilities to the contractual workers and they work without safety equipment's. He is working under the supervisor and the work load also more. Every time he is alert during the duty time because most time people complain regarding leakage, damage, and pipe water supply is not coming their area as well as house. The workload is so heavy here. Under this PHED office very less contractual workers are working. Those workers are permanent they did not work properly and they work their wish. The contractual workers are exploit more than government workers. Even after working for more number of hours he is getting very less salary. Even he does not have any medical facilities and health insurance from the government. His health condition is also not good and every month he spends money his medicine and medical check-up.

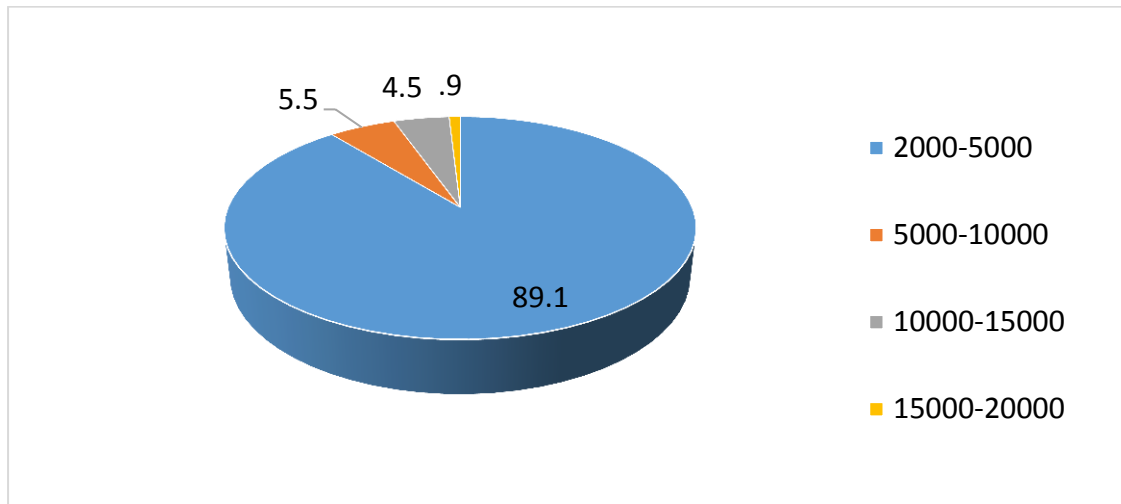
### **5.6(2): Monthly Income**

Sanitation work low paid, where the average monthly salary is five thousand. Figure 5.4 provides information on monthly household's income. The data shows that approximately 89 per cent of the household's monthly income falls between Rs. 2000 to Rs. 5000. Only a small proportion of workers (5 per cent) manage to earn Rs. 5000 to 10000 per month. Another 4per cent of households reported they have an income ten thousand to fifteen thousand per month. Only those workers who are employed on a permanent basis in the government department get more than Rs.15000 as monthly salaries.

Most of the workers find it hard to survive and run the family in such a meager monthly income. To compensate for the low income, in some of the household husband and wife both are engaged in sanitation work. For instance, Sitamani a female worker shared that it was difficult for her family to sustain on the single earning of her husband. To contribute to the family income, she decided to join the sanitation work two years ago. At present both of them work on a contractual basis with SMC. In her words:

*“I am doing this work since last two years. It was difficult for us to survive on a single person's earning. Per month we both get six thousand rupees, it is very difficult for us to manage the family in such fewer amounts. Our family is staying in a rented house and per month rent is three thousand rupees. We spend rest of the money on the family”* (Sitamani, 26-year-old).

**Figure-5.4: Monthly Income in INR (%)**



Source: Fieldwork

The workers employed on a contractual basis are aware of the fact they are paid less but the quantum of work they do is quite huge. They also work for the longer duration. They say that people with a permanent job are placed relatively better and the working hours are also regulated according to the government norm. The agencies try to take out maximum work from the contractual workers.

For example, Renubala 46-year-old sanitation worker said:

*“The permanent workers get high salary and are eligible to get other facilities from the government. While the contractual and semi-contractual workers did not get any facilities from the government. Contractual workers are doing more works and the workload is also high than the permanent workers but still, they are getting lower wages than the permanent workers. Permanent workers get six to eight times higher salary than the contractual workers per month” (Renubala 46-year-old).*

The contractors who offer the sanitation job quite often promise the workers that if they will work for many years then their salary will also increase gradually. In this hope, many workers tend to work on Holidays including Sundays.

For instance, Shantilata who is 39-year-old is doing sanitation work from more than five years said:

*“Every year contractors mention that the salary will increase but our salary is still below five thousand rupees per month. We work on every Sunday but there is no additional amount paid to us in lieu of this service. Women workers face more problem in this work. We do not have any facilities at work sites. During odd time we face more problem, the BMC also never provide rest room at work site”.*



During the focused group discussion, it also came to light that the contractual workers do not have access to nay of health care facilities. Their wage is way less as compared to daily wage labourers. To quote FGD 5:

*“The contractual workers lack access to any kind of medical facilities and health insurance facilities”. They also say that a daily labourer gets Rs.400 a day while a sanitation worker gets only Rs.150 for 8 hours’ work” (FGD 5).*

Like sanitation workers the PHED (Water supply) workers also said they do not get paid on regular basis. One of the worker said

*“I am not getting salary on time and I have no other source of income. It makes our survival hard. When I go to the office and enquire about the salary in the department they reply that due to some technical problem the funds are not released on time. sometimes they make an excuse by saying that the finance staff is on leave. I work whole month and expect to get salary to at the end of every month. We are forced to borrow money on interest to keep the family feeding. This creates an extra burden and the monthly expenditure is three times more. I work under so much of pressure and stress” (Jaynta 39-year-old, Bhimpur Area, Site 2)*

**Case 4:** Sita (35 year) who is class 12<sup>th</sup> pass, is engaged in sanitation work from last five years on contract basis. Earlier she was working as a cleaner in a private hospital. She left that job and joined the sanitation work with hope to become a permanent employee of BMC. But her hopes were shattered as there was no regularisation of sanitation workers by BMC. Nowadays the BMC is out sourcing sanitation work to private agencies. Sita explains that she wanted to have some job security hence she left the job at the private hospital. She believes if she continues to work under BMC as a sanitation worker, then after some year she would become a permanent municipal worker. Now she has less hoped about it because some sanitation workers are working more than ten to fifteen years and still they work as contractual worker under the BMC. She recalls that when she joined as sweeper under the BMC she had faced many health related problems such as throat infection, itching, urinal problem etc. Her husband also does not like such type of job. Sometime her husband criticises her and says that she is looking like ‘kalika mata’ and she looks older than him. Some of her friends also told her to her discontinue sanitation work and search some other job. But for the sake of her children’s future she continues to be a sanitation worker. So that she can afford to pay for her children’s education so that they have a better future. The BMC gives very less salary to her and the work load also more.

### **5.6(3): Lack of Training on Sanitation Work**

According to the prohibition of employment as manual scavengers and their rehabilitation act, 2013, chapter VIII it is the responsibility of the local authority and other agencies to use appropriate technology and appliances for cleaning septic tanks and sewers so that manual handling of the excreta is avoided (GoI, 2013). Despite this the agencies involved in the provision of sanitation facilities grossly ignore these directions. Most of the agencies have a lax attitude towards providing any training to the workers to make them aware of the conditions in the sewers and ways to protect them in case of some emergency. Given this, the respondents of the study were asked about the kind of training (if any) and protective gears such as masks and boots are provided to them or not. A majority of the workers (92 per cent) said that they were not provided with any kind of training and other safety equipment's when they entered to clean the sewers.

Ramesh a 35-year-old sanitation worker who is working in BMC and cleaning manholes described his plight of lack of training to handle the poor working conditions in a manhole and how to handle an emergency. In his words:

*“When I joined, that time I did not get any training. Without training, it is very difficult for me to work inside the manhole. One day I fell unconscious inside a manhole and my friend admitted me into the hospital. That time the organization did not provide any financial help”* (Ramesh, Sanitation Worker).

Despite the laws, the condition of the sanitation workers remains abysmal since the last century. As most of the workers belong to most marginalized poor sections of the society their voices are unheard. In the focused group discussion also the issues of lack of safety equipment came up. The data shows that 56 per cent of workers were provided the only uniform as a protective gear and 23 per cent worker mentioned that they were not provided any protective gear and equipment for sanitation work. Without protective gears, most of the sanitation workers faced various health problem when they work on site (Figure 5.5).

The FGD discussion further held in highlighted the fact that:

*“BMC has very limited machines to clean the sewerage system in the city. Hence workers are forced to enter in the main sewerage lines through the manholes and clean it. In the name of equipment, these workers are provided with a rope and a bucket. They have to remove solid substances responsible for blockage of the flow in*

*the sewerage system. Entering regularly into the manholes exposes them to very poisonous gasses. They are provided with a rope and bucket to clean the manhole while working in the manhole they suffer injuries, irritation in eyes, skin problem and other related health problems” (FGD 6).*

There is machinery available to clean the manhole but these are hardly used by the BMC. The workers enter the manhole to clear the blockages. In the focused group discussion, the worker showed concern about the health risks they are exposed to as well the threat to life. They are aware of the deaths happening every day in the manholes.

The FGD 6 also reflected on the poor safety measure:

*“Entering the manhole without any safety measures such as gas mask entails high health risk and the workers suffer from many types of lungs and skin diseases. Manhole work is one of the most hazardous works under the municipal corporation. Every day manhole worker died in India. If the government would give proper training and advance technology, then definitely the incident rate would be decreased” (FGD 6).*

The apathy on the part of the government as well as the local bodies responsible for the sanitation service provision is evident in the narratives of most of the sanitation workers covered under the study. There are no alternative avenues to earn a livelihood for most of the sanitation workers which further reinforces them to continue the work despite the grave danger to cause to health and life itself. It came to light that to avoid public glare, the worker are asked to enter the manhole in the night time which is a clear violation of the laws.

A worker engaged in cleaning of the manhole described his health condition as follows:

*‘I have suffered stomach and heart-related problem due to work in a manhole. Doctors strictly said to me not to work inside the manhole. If I would stop working how my family would survive. The government did not provide any safety gears to us when we work inside the manhole. There are no medical facilities or health insurance facilities for us by the government. If I would die, the at least my family should be given some financial compensation. In night time most of the works entered into manhole. Sometimes private owner also hires to them for two-three hours of work and they are paid a relatively better amount” (Jiban, 43-year-old).*

The risk involved was highlighted in the FGD 6:

*“Entering the manhole is very risky. Apart from the very poor work condition and workers lose their dignity. While working inside the manhole they face the risk of exposure to harmful gasses and suffer infections like hepatitis, leptospirosis, and helicobacter, skin problems, respiratory system problems, and altered pulmonary function. The government did not provide any facilities for them, although they are dying every day to work inside manhole still government did not take any supportive action for them” (FGD 6).*

This was further corroborated by the FGD 6:

*“The few types of equipment provided by the government are of poor quality. Also, most of the sewage workers are not educated to use protective equipment. Most of the sewage workers are recruited on a contract basis and on daily wages. A large number of sewer workers die before retirement. If the government provides proper training for them, good quality of equipment, medical facilities, health insurance, and life insurance facilities then definitely the quality would be improved” (FGD 6).*

The private agencies hired to provide sanitation services in the name of public-private partnership tend to evade all the norms and law and exploit the sanitation workers in different ways, loner working hours, not giving any kind of leave and paying less than the minimum wages decided by the law. These agencies further denigrate the condition of the workers as they do not bother to provide any protective gears and any other kind of safety net such as access to health services.

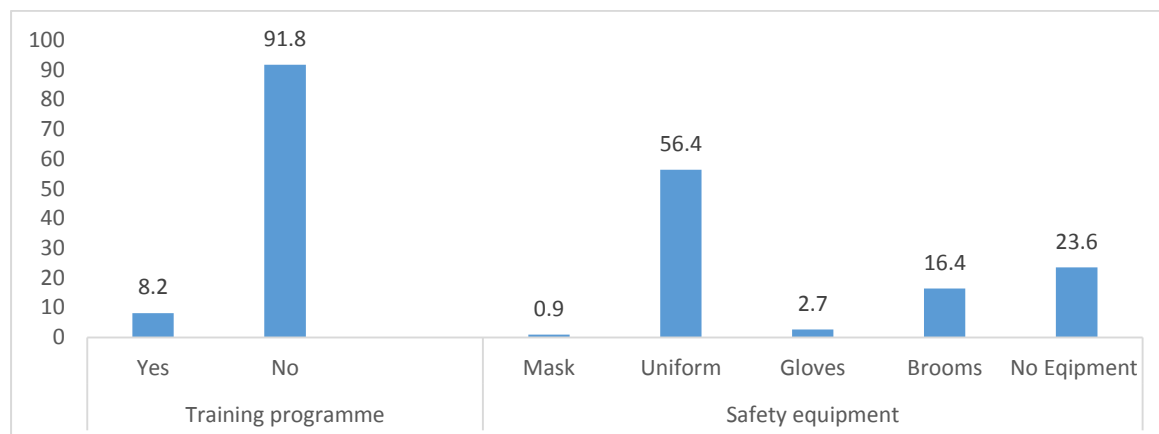
Raghunath 39-year-old of sanitation worker reported about working condition:

*“The working condition of the sanitation workers is so poor under the private organization. The private organization did not provide any protective gears to workers. Every day workers are facing health-related problems for that they spend their own money. The question of the minimum wage- we only get 120 rupees per day wages, which is very less according to the government rule”.*

The government also did not allocate sufficient budget to the local authorities to purchase new machinery and other necessary equipments. Lack of provision of funds on the part of the government to procure new equipment is also one reason for non-availability of these.

One of the sanitation inspectors reported: *“government did not provide any fund of equipment since 2006. Whatever equipment they were provided; for sanitation workers mainly managed the sanitation budget. Very little fund has been allotted for protective equipment and gears through the state initiative” (KI 1).*

**Figure-5.5: Training Programme and Protectives Gears/Equipment Provided to Workers (%)**



Source: Fieldwork

Some five years ago Municipal Corporation did provide some safety gears such as a pair of shoes, uniform, two soaps in a month. In recent years BMC has stopped providing any such material. This was discussed during the FGD 5 held in fieldwork. It illustrates the following:

*“More than five hundred workers have engaged in sanitation work under the supervision of BMC. Then the BMC also never provided any protective gears to them like helmet, gloves, mask, and uniform which are basic needs for their safety. They complained many times to sanitation inspectors and health officer to provide basic equipment’s but nothing worked at all. Without safety equipment’s workers are facing various problems during work such as accidents, health-related problems and sometimes deaths also happened on the work site” (FGD 5).*

These workers are vulnerable as they fail to get any financial help from the employer agency in case some incident happens or a worker dies due to poisonous gases in the manhole. Many times such dreadful incidents remain unreported as other workers fear to lose their jobs. Most of the sanitation workers suffer injuries while working in drainage or manhole. They donot get any kind of medical or financial support from the BMC. The workers and their families suffer hard during the injury period. The workers have to either seek financial help from their peers or have to borrow money from friends and other sources. Sukanti who works as a sweeper in BMC from past eight years shared her experience when her husband suffered an ankle injury during work.

In her words:

*“My husband has been engaged in sanitation work in BMC from last 15 years. He faced serious ankle injury on work site. He stayed for more than three months in the hospital and they spent more than two lakhs rupees for his medical expenditure. We gave application to BMC for financial support and for that we went many times but we did not get any help from the BMC. We borrowed money from friends, family relatives and half of the amount from Self Help Group (SGH). Every month we have to pay interest which is five thousand rupees to SHG”. Even after spending so much of money my husband is still not getting well. My family is still spending money on medicine and medical check-up. I am facing problem to manage my family needs. I am also unable to take proper care of my children” (Sukanti, 49-year-old).*

Another sanitation worker mentioned:

*“When he joined BMC as a sanitation worker, first two and three months he faced serious health problems such as chest pain, throat infection, urinal infection, stomach problem, body pain, gastric, diarrhea, cough, cold, fever etc. The BMC did not provide any medical facilities and health related check-up for him. He had to spend money from his pocket. His wife also working with him and both are working as a contractual worker under BMC. Those are contractual workers they did not get any facilities from the BMC. Even for the extra duty, they did not get any extra payment. Those are a contractual worker in BMC they are working unhygienic condition. BMC did not give any protective gears such as gloves, soap, uniform, boots etc. Even for equipments sometimes we also paid out of pocket. In BMC did not provide basic facilities such as toilet, drinking water, and restroom for the workers. In odd time they are going outside. If government at least provide basic facilities such as Medical, protective gears then definitely condition will be developed” (Ramesh, 35-year-old).*

Given the low educational level and lack of any other skills, most of the sanitation workers are forced to continue the work. Many of them shared that they wished to leave this polluting job but survival is a key concern. They lack any other alternative job. Hence they couldn't leave their current occupation.

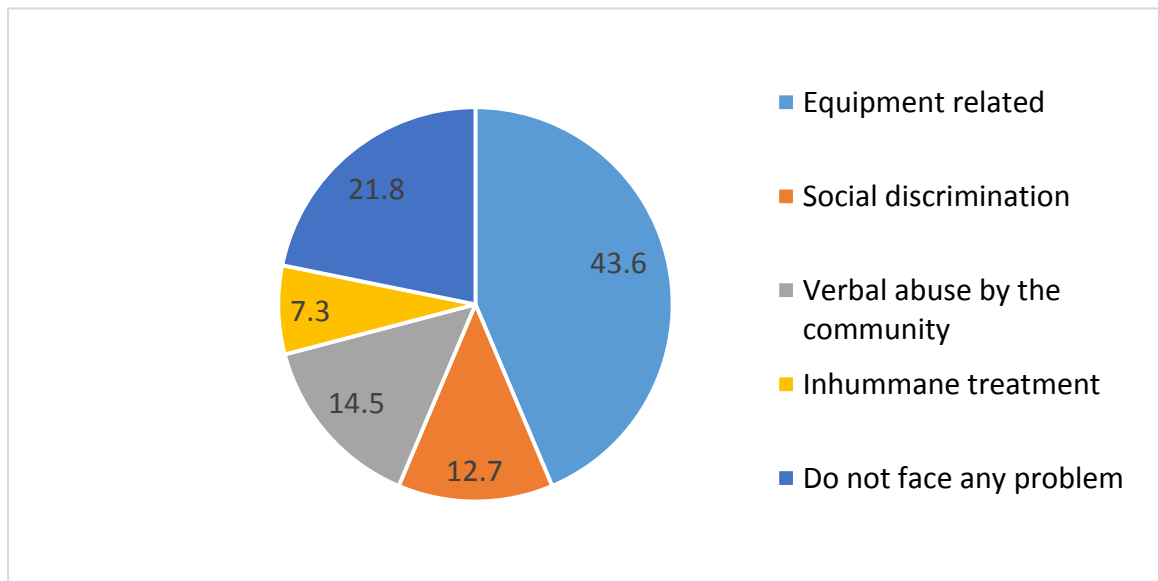
For instance, Rabi 28-year-old, mentioned:

*“He wanted to leave this job. But it is question of survival for his family. He could not leave this job. His family is totally dependent on him. If I will leave the job, then my family will die. No one is interested to be engaged in such type of job but due to lack of option, I am a sanitation worker” (Rabi, Sanitation Worker)*

#### 5.6(4): Problem Faced at Work Sites

Figure 5.6 provides information on workers face problem during provide services. The data shows that 22 per cent of workers had reported that they did not face any problem while they were providing services. The data also shows that 43 per cent of workers were faced equipment related problem, 14 per cent of worker were faced verbal abuse by community members, 12 per cent of workers were faced social discrimination and seven per cent of workers were faced with inhuman treatment

**Figure-5.6: Problem Faced During Work (%)**



Source: Fieldwork

Other than financial and health related problems the sanitation workers also face discrimination on the job site. Both male and female workers suffer the social stigma. While woman have to work under conditions which can be said hostile. About 77 (33 per cent) of sanitation workers reported they were faced social discrimination when they are working on the site, 27 (12 per cent) reported they were faced inhuman treatment while on work site. Some of the women workers mentioned that people perceive them differently. Sometimes supervisors behave indecently in front of other people. They do not feel comfortable to work in the colonies. The majority of the sanitation workers were reported that in summer and rainy seasons they faced more problems. Access to drinking water is a key issue during the summer seasons. People still hesitate to give water to these workers. In summer they felt thirsty and when they approached anyone for drinking water in the colonies they were ignored. In the rainyseason, the sanitation workers are not allowed to stand in the veranda of the

people living in the colonies. Hence they have no place to hide themselves during the rain.

One of the PHED (Water Supply) worker, Ramesh mentioned:

“I am working as a driver under the PHED department. Every day I drive the water tank to different place to provide drinking water to people. Most of the time people are booking tanker for party and other functions. During summer time people require more water. Those who can afford the cost of water tanker get water easily. While in slum areas water scarcity is at its peak in summers. Sometimes we also take the water tanker to the slums where brawls happen over getting tanker water. Most of the time me and my help have to face the wrath of the angry crowd who could not get water. We are harassed by the slum residents quite often. Since only small water tankers can enter the slums water quantity is insufficient to fulfil the demand and many people have to go without water. Also there are limited number of water tanker under PHED hence we can't meet the demand of tanker from everywhere. Hence the officers send water tankers alternatively to different locations”.

Sanitation workers also mentioned: *“They faced social discrimination, verbal abuse and they are often beaten up and abused; and not allowed to set in a place if they entered”* (FGD 5). Most of them reported that when they worked in mohallas and colonies they felt more insecure because of people's attitude. Most of the workers would feel more comfortable to work on sites other than colonies. Women workers especially reported that they did not feel 'safe' when they worked in colonies. Most of the sanitation workers have faced the equipment related problem. Most of them faced equipment related problems while they were working and therefore many times they had injuries. They also reflected on the differential treatment given to them because of their social identity.

Another study also shows that in India the sanitation workers face discrimination as they are from a particular caste which is treated as 'untouchables'. This discrimination is not limited only in terms of job opportunities they also live in acute poverty, low level of literacy and almost nil job mobility (Kalaiyarasan and Kumar, 2014). A study on 'sanitation workers at Tiruchirappalli' conducted by Sophia and Pavithra (2017) reveal that the majority of the workers are harassed by their supervisors and discriminated by the larger society. Tracing the historical disabilities imposed on the lower caste, Ibbeston (1916) argues that socially they are the lowest of the low, even lower perhaps than the vagrant sansi and the gypsy. Another study shows that the hardships of Dalit women sanitation workers are not simply because of their poverty



or lack of education, but are a direct result of the severe exploitation and suppression by the upper classes, which is legitimized by Hindu religious scriptures (Selvamani and Rajan, 2015).

Hari Age 25-year-old expressed his ideas as follows:

*“I am working under the Jagriti organization. I have to collect garbage from door to door in the colony. I face problems as many households do not give garbage after ringing the bell many times. If they would give the garbage on time so it would be easy for me. Sometimes households throw garbage outside on road and sometimes into the drainage. So I need to work twice and pick the garbage from the drainage. If the supervisor finds the garbage here and there he will fine me. It is very difficult for me to work in colonies. After working for eight hours a day I am getting only one hundred thirty rupees which is less than the wage of a daily labourer”* (Hari, Sanitation Worker).

Ranjan Age 31 elaborated the concern as follows

*“Me and my wife are engaged in sanitation work under the Jagriti (NGO) from last three years. My native place is in Nayagad district. I came to Bhubaneswar searching for a better job. But due to less education, I did not get a job in market complex or any other places. Then I worked as a daily laborer three to four months in the city. After that, I did not continue to work as a daily labourer due to the scarcity of daily wage work. One of my friends was working under Jagriti as a sanitation worker. My friend helped me to get sanitation work. I joined under the Jagriti as a sanitation worker, where whole month I am working regularly. In this sanitation work I get daily 130 INR only but as a daily laborer, I got more than three hundred rupees which is two times higher. Initially I faced many health related problems due to sanitation work. For sometime I discontinued to work because of ill health. My wife is also working under the same NGO. In this work, I am not satisfied because there is no increase in salary. Most of the time the supervisor did not cooperate with us. Sometimes the supervisor assigns us more areas to clean which is very difficult to manage. Where two workers should be appointed to cover particularly large area or colony, only one person is assigned the task. Greater workload is also a reason for poor health conditions amongst the sanitation workers”* (Ranjan, Sanitation Worker).

Susanta 46-year-old sanitation worker reported: *“When he joined the job they used to provide various facilities like; uniform, soap, gloves but from last six years government did not provide any such things to them”*.

This aspect is reflected from the case of Prakash a 55-year-old, sanitation inspector with the BMC. He joined as sanitation inspector under the state health department. Under the supervision of BMC, the sanitation work continues in all wards in Bhubaneswar city. All the logistics, man power and other instruments are given by the BMC. In sanitation management BMC has done excellent work and the city has now found its place in the list of world's top 20 smart city list-2017. The sanitation

workers are doing hard work for twenty-four hours to keep the city clean. Lack of awareness on sanitation is one of the main reasons which makes the city dirty. Every day 500-hundred-tons garbage originate from the city. The major problem of garbage collection is that majority of the households throw garbage directly on road or into the drainage. When door to door garbage collectors are collecting the garbage, many households do not give garbage on time. This increases the burden of garbage collectors. The construction work and destruction of old houses and other materials are the major reasons of pollution in the city. The building owners never follow the BMC guidelines. Randomly people deposit construction materials so that they acquired the road and people are facing problem. Under the BMC Guideline if any one deposits construction material on road then that person is fined for 200 hundred rupees per month but no one pays the fine. The class four employee take the responsibility of ward officer and no one following their instruction. If government provide the power class two offer, then definitely the work would be developed. Otherwise only giving designation that person won't work if that person was not capable to work properly and fails to collect fine. People are throwing garbage in open space. The small vendors are also not following the BMC guideline and they are throwing garbage in open and on road. The BMC failed to provides basic facilities, safety equipment's, health insurance and health facilities to sanitation workers. Every year workers die due to the nature of work and the government neglects them. Without sanitation workers involvement the city cannot function properly.

#### **5.6(5): Lifestyle Habits**

The WHO report also points out that tobacco use has encompassed our lives in all spheres – social, occupational, economic and political. Currently, 5.1 million people die every year globally from tobacco use, of which 1.2 million are from the SEA Region alone. It exceeded 1.69 billion in 2005 and is projected to reach 2 billion by 2025 (WHO, 2010).

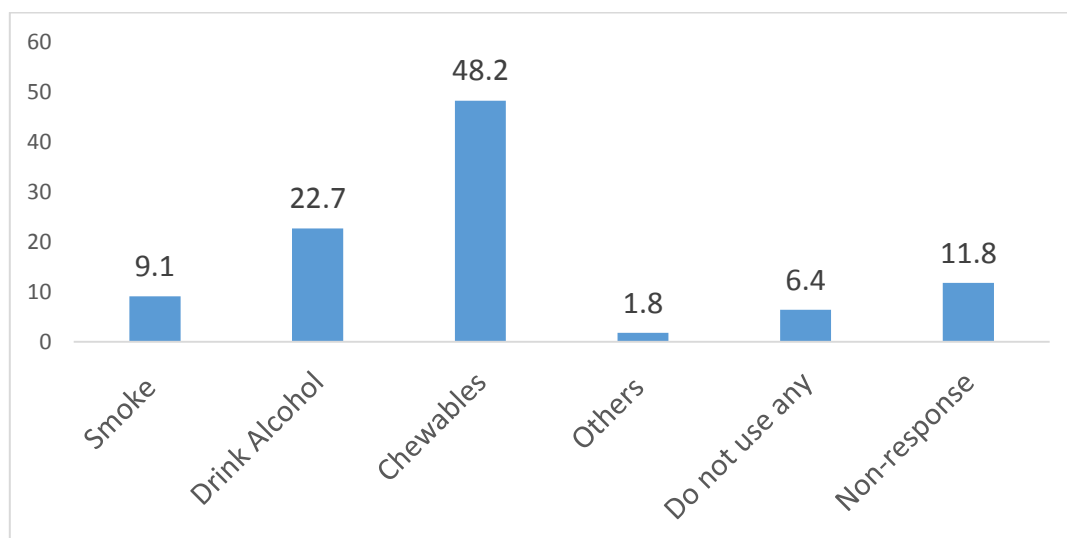
Given the low self-esteem and the nature of work, most of the sanitation workers were found to chew tobaccos, smoke and consumed alcohol (Figure 5.7). They said that chewing tobacco or smoking helps them to ease and forget the filthy site they have to clean. These impacted on physically, socially and economically on sanitation worker and as well as their families too. The data shows that a higher percentage of workers 48 per cent chewed tobacco. The data also shows that 23 per cent of workers used alcohol and nine per cent of workers smoked when they engaged in water supply and sanitation work. Therefore, most of the workers have faced health risk including cancer and heart-related problems because of chewing tobacco and smoking. The families of sanitation workers are left on their own to take care of a patient suffering

from life threatening disease such as cancer. Gopal (56 years old) working in Bani Vihar University from past three years recounted the sufferings of one of this co-worker's family and said:

*“My friend who worked with me as a sanitation worker died last year due to mouth cancer. His family spent more than two lakhs rupees on him but he died. His family did not receive any compensation from the BMC”* (Gopal, Sanitation Worker).

Meanwhile, 6.4 per cent of workers reported that they never used any abuse substance while they have engaged in sanitation work. It was observed that the sanitation worker felt uncomfortable to give an answer regarding substance abuse. They thought it would have a negative impact on their career. Sometimes in the presence of sanitation inspectors, they were scared to mention that they have such habits. A few sanitation workers seem aware of the health problems caused due to consumption of tobacco and alcohol. But they find themselves helpless as they say the stink from the decaying garbage and sewer is unbearable. These substances keep them working and make them forget the stink.

**Figure-5.7: Life Style Habits (%)**



Source: Fieldwork

Ramesh 45-year-old shared his plight, *“We know that chewing tobacco, smoking and drinking alcohol are harmful to our health but without having this we can't work. During the work time due to heavy stinks we are taking these things otherwise we will not work properly”*.

In addition, sanitation inspector said that ‘majority of sanitation workers are drinking alcohol, chewing tobacco (Khaini<sup>24</sup>, Gutuka) and smoking (Cigarette, Bidi). Among the sanitation workers, the higher percentage female sanitation workers are chew tobacco and while male workers smoke and drink alcohol. The male sanitation workers are face more problems due to alcohol consumption. Many times they suffer from accidents, sometimes they quarrel with each other for drinking more alcohol.

### **5.7: Health Condition of Sanitation Workers**

As discussed in the last paragraph, given the lifestyle habits such as smoking, drinking sanitation workers are exposed to further health risks. Many studies highlight this fact. Rangamani et al. (2015) argue that the health and safety of sanitation workers have been inadequately addressed in public health research. Sanitation work lacks specific protective regulatory guidelines to address health hazards, unlike other hazardous occupations. The health condition of sanitation worker is very poor and they are exposed to certain health problems by virtue of their occupation. Certain diseases such as gastrointestinal, orthopedic, skin related and asthma and other respiratory problems and hepatitis, leptospirosis are common amongst the sanitation workers (Tiwari, 2008; Mariammal et al., 2012; Sophia and Pavithra, 2017). Yan et al. (2015) in his study ‘occupational skin diseases and prevention among sanitation workers in China’ shows that Poor working conditions such as the long working hours, large cleaning areas, high working intensity and poor environment, caused increasing health issues and safety concern amongst the sanitation workers. Study concludes that exposure to multiple health hazards and the poor use of protective equipments causes skin diseases amongst sanitation workers. Other than health related causalities, accidents and injuries at workplace lead to death of many sanitation workers (Mathur et al., 2012). In a study of sanitation workers in Trichipalli city, Kerala Challema et al. (2015) report that low education status, large family size, the absence of the provision of personal protective equipment are the main reasons of acute illness and these are significantly associated with males.

The sanitation works are considered to be one of the most hazardous jobs. Those engaging in these jobs are vulnerable to various kinds of illnesses. On the basis of discussions with respondent sanitation workers the reported illness was segregated broadly in three types (a) Injuries, (b) Recent Illness- occurred in last three months, (c) Continuing Illness- suffering for more than three months. Table 5.8 shows the

---

<sup>24</sup> In Odisha Khaini one type of chewing tobacco which is available in local markets.

most common ailments suffered by both male and female sanitation workers. For instance, 40 per cent of sanitation workers suffered injuries on the work site. While many others suffer from continuous illness such as common skin allergies, gastric, cold and cough. During the focus group discussion, it came to light that many of the health issues such as breathing problems, skin allergies are caused by the lack of safety equipments such as face mask, hand gloves.

For instance, the FGD 5 brought the issues as follows:

*“The BMC does not provide any safety equipments to sanitation workers. Majority of the workers fall ill because of lack of safety equipments. The sanitation workers responsible for sweeping the roads face breathing issues due to continuous exposure to heavy dust. While the garbage collectors and sewerage workers face acidity, stomach pain and skin related problem. The sanitation workers suffer from common health related problem such as fever, cold, cough, skin, gastric, headache, stomach and chest pain” (FGD 5).*

There is lack of health services and support for the sanitation workers hence they are unable to continue the treatment for long time. They have to bear the cost of medicine and consultation fees in private hospital which is an added burden. To avoid this many times sanitation workers go for self-medication and purchase few medicines from the medical store. In many cases they do not seek medication from a trained medical professional and take self-medication and rely on home remedies. It came to light that women sanitation workers tend to neglect taking medicines immediately. Ruparani, a 47-year-old said: *“During work time they are faced minor injuries and most of the time they neglect injuries and do not seek any kind of medicine and continue to work”.*

Susanta demands that the government needs to provide health insurance and medical facilities to them as they are engaged in such a dangerous work. He recounted:

*“At the time of my accident, I was severely injured and fractured my left leg. In the hospital, I had to spend more than one lakh rupees. The BMC never gave me a single rupee. After the accident, he did not go to work for more than four to five months and did not get a salary from the BMC” (Susanta, 37-year-old).*

The present study also found that the poor economic condition of the household is one of the main reasons for male sanitation workers to continue work once they receive preliminary treatment/dressing. In cases where men suffer grave injuries, they have to take leave and rest. While women get very less time to rest even though they also suffer many injuries (Table 5.8).

**Table-5.8: Health Issues and Treatment-Seeking Practices of Sanitation Workers**

Health Issues	Male		Female	
	<i>Nature of Illness</i>	<i>Treatment seeking practice</i>	<i>Nature of Illness</i>	<i>Treatment seeking practice</i>
<b>Injuries</b>				
	<ul style="list-style-type: none"> <li>-Glass pieces bruising the foot and legs</li> <li>-Bruises in hands and fingers by hurting against stone slabs</li> <li>-Bruises/cuts/swelling in legs</li> <li>-Fall from garbage tractor/truck</li> <li>-Bruises, cuts on hands and legs and other body parts while hitting against the garbage collecting tractor /truck</li> <li>-Burns while handling acid solutions thrown in waste-bins</li> <li>-Eye irritation, watering due to dust inside eyes;</li> <li>-Bruises, cuts on hands and legs including feet, while removing sewage debris in drains and sewers</li> </ul>	<ul style="list-style-type: none"> <li>-Continue working</li> <li>-Medicine or dressing from medicine store after work hours</li> <li>-Allowed rest at workplace and got medicines from the pharmacy</li> <li>-Visited Government /private hospital</li> </ul>	<ul style="list-style-type: none"> <li>-Bruises due to vehicles hitting against them</li> <li>-Cuts from the glass pieces in the hands and the feet</li> </ul>	<ul style="list-style-type: none"> <li>Self-remedies</li> <li>-Home remedies</li> <li>-Government Hospital</li> <li>-Medicine store</li> </ul>
<b>Recent Illness</b>				
	<ul style="list-style-type: none"> <li>-Chest Pain</li> <li>-Body ache/headache</li> <li>-Tiredness/lethargy</li> <li>-Cough and cols</li> <li>-Leg pain</li> <li>-Redness in the eyes</li> <li>-Giddiness</li> </ul>	<ul style="list-style-type: none"> <li>-Over the counter medicines</li> <li>-Drink alcohol before work to prevent onset of illness</li> <li>-Drink alcohol after work for chest pain, tiredness and aches.</li> <li>-Wash minor wounds with alcohol</li> </ul>	<ul style="list-style-type: none"> <li>-Swelling in the legs</li> <li>-Backache</li> <li>-Cramps in the legs and stomach</li> <li>-Chest pain</li> <li>-Body-ache</li> <li>-Fever</li> <li>-Sneezing</li> </ul>	<ul style="list-style-type: none"> <li>Pharmacy</li> <li>Private Doctor</li> <li>Home Remedies</li> </ul>
<b>Continuing Illness</b>				
	<ul style="list-style-type: none"> <li>-Injuries at work place</li> <li>-Repetitive episodes of chest pain, backache/neck ache</li> <li>-Lingering pain in legs</li> <li>-Discomfort in lower abdomen</li> <li>-Persistent cough</li> </ul>	Without treatment	Repetitive episodes of cough and cold; sneezing; aches; fever; headache	Without treatment

Source: Abridged from Rangamani et. al., (2015); Fieldwork

Subash 47 years old sanitation worker reported:

*“After joining the sanitation work my health started to deteriorate. Every month I have to spend money on medicine. I have been facing Gastric, cough, fever and skin infection from long time. Most of the time I have been taken medicine from medical store without consulting a doctor. Because to go the doctor requires a lot of money and consumes more time. The organization didn’t provide any medical check-up, medicines, or any health insurance. If there is any problem at work site, the organisation did not supported them.*

*Whatever incidents happens at worksite the workers try to solve on their own way. In the city everyone is worried about garbage collection if workers would not work for one day. The city would be dysfunctional if sanitation workers do not work. But no one is worried about condition and even workers do not basic facilities from the government as well as private organization which employ us. We have one association which fights for their rights and raises their voices. But some affluent people always try to silence our voice. State government is also negligent towards to our development. Majority of the workers are less educated so that we are exploited by the sanitation service providing agencies” (Subash, Garbage Collector).*

### **5.8: Awareness about the Government Schemes**

Most of the workers were unaware of the government schemes run for their welfare such as The National Scheme for Liberation and Rehabilitation of Scavengers 1992, Self-Employment Scheme 2007. The table 5.9 provides information on medical coverage in case accident, awareness of government schemes and legal benefit in case of an accident. The data shows that almost all workers reported that they did not get any medical coverage in case of the accident who are engaged in water supply and sanitation.

Table 5.9 nine mentioned that 97 per cent of workers did not have knowledge of medical coverage in the case of an accident at the worksite. A very small proportion of workers (only one or two) reported that they knew about government schemes. Approximately 10per cent of the workers did not respond. Majority of workers (99 per cent) lacked information about the legal benefits for which they are entitled in the case of an accident.

**Table-5.9: Medical Coverage in Case of Accident in Worksite**

<b>Medical coverage in case of accident in worksite</b>	<b>Bhubaneswar N (%)</b>
Non-workers	2(1.8)
No	107(97.3)
Non-response	1(.9)
<b>Knowledge about any of the Govt. Schemes</b>	
Yes/Know	1(.9)
No/ do not know	97(88.2)
Non-response	12(10.9)
<b>Awareness about Legal benefits in case of accident</b>	
No/unaware	109 (99.1)
Non-Response	1(.9)
Total	100.0

Source: Fieldwork

Few workers have got the healthcard from their employers but its remains either underused or unused. Satikanta 45-year-old of sanitation worker reported:

*“They have health card but that card is not useful in case he or she faces major health related problem. They always referred to other medical, where they did not get any facilities and they spent money out of pocket expenditure. The BMC also not organize any health check-up for workers who have engaged in water supply and sanitation work. They did not have any health insurance also if they have health insurance then definitely they would be benefited on that when they faced any problem”* (Satikanta, Sanitation Worker).

Another Key Informants also mention:

*“Now the system does not function properly because of less experienced person have acquired upper post in the department. They have only degree and very less field experienced. In his thirty year of services, he has faced many problems but he has handled very nicely. Today sanitation workers have faced more problems such as lack of medical, equipment, protective gears and uniform facilities. His suggestions to the government that every month government should check up compulsory health condition sanitation worker, give health insurance facilities to all workers, quarter facilities, educational facilities for their children’s, and every year government should increase their salary. He also mentioned that, in developed countries and other developing countries are expenditure more budget on sanitation and sanitation employees. They also get good salary, proper training, use modern technology, health insurance, life insurance. At the same time our country’s expenditure is very less on sanitation and workers. If the government provide all the above facilities, then definitely their condition would be improved”* (KI 1).

## **5.9: Housing Condition**

In metropolitan cities housing is becoming a big issue given the fact the there is inward migration from rural as well as other small towns. The migrant population is forced to under improvised conditions in the city as these can’t afford to live in relatively better places given a poor economic condition. In the Bhubaneswar city, also poor people are forced to live in slums and other deprived locations. In the present study, the sanitation workers are living in slums called Science Park Basti which is located near at Acharya Bihar, Bhubaneswar. Given the illegal status of the slum, most of the houses are either Kutcha or semi-pukka. In science Park Basti, more than three hundred families to four hundred families are living. The population living in the slum is approximately one thousand. More than sixty percent of households have engaged in sanitation work. When he came the area in 2005 that time approximately two hundred families are living there but now the situation has over crowded due to more. In the area the government did not provide any facilities,



households made their own house and other facilities. In rainy seasons the condition of the area is abysmal due to overflow drainage water. That time they were living on the roadside at least one month they were not able entered to their house. The majority of the households in the area poor condition, most of the houses made Kutchain nature, only a few have Semi Pucca. Most of the workers (68 per cent) are living in a rented house. Only 31 per cent of the workers reported that they own a house. Regarding Records of Rights of the households, 68 per cent of households reported that they stayed in the rented house. The data also shows that 31 per cent of households reported that they did not have any records of the households (Table 5.10).

One of the sanitation workers explained that the slum was located on the government land as follows: *“Most of the sanitation workers were living in slum areas and most of these are on the government land”* (Raghu 47-year-old, PHD Worker).

One of the Sanitation Inspector mentioned

*“most of the sanitation worker who have migrated from different place to Bhubaneswar they are mainly living in different slums in the city. Due to the poor economic condition, they mainly forced to live in the slums where they have faced various problems”* (KI, 5).

One of the female Sanitation workers said:

*“In the slums they are not required to pay rent hence it becomes relatively easy for them to survive and live with the family. In her words, “due to the poor economic condition, we could not pay room rent, therefore we are living in the slum with our family”* (Sita, 25-year-old).

Another female worker said:

*“The government has been providing housing facilities under various schemes such as Rajiv Awas Yojana, Ambedkar Awas Yojna for poor people like them but they are not getting anything because of corruption”* (Sangita, a sanitation worker in Salia Sahi).

Somnath 32-year-old sanitation worker reported:

*“Government has provided government houses for all workers those who have worked under the BMC. But those engaged in lower rank like us did not get any facilities from the government. Some of my friends travel more than twenty km daily to reach the sanitation work site. Even the government or other agencies didn’t pay for transportation charge. If sometimes they are late to worksite some amount is deducted from their salary as a punishment”* (Somnatha, Sanitation Worker)

Bikram 38-year-old a sanitation worker explained:

*“He has come to city five years back and his family staying in science park Basti near Achajya Bihar. His family did not get any housing facilities. His family is staying in kutcha house and the condition of house very poor, without electricity, water supply and toilet facility”.*

**Table-5.10: Housing: Ownership and Place of Stay**

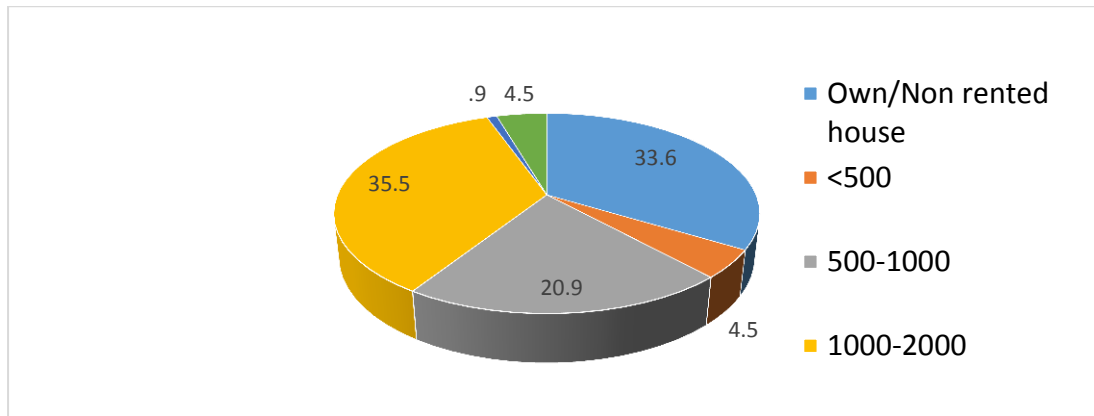
<b>Ownership of the House</b>	<b>Bhubaneswar N (%)</b>
Own	35(31.8)
Rented	73(66.4)
Other	2(1.8)
<b>Ownership of the House Records</b>	
Yes	1(.9)
No	34(30.9)
Staying other than own house	75(68.2)
<b>Ownership of House Elsewhere</b>	
Yes	89(80.9)
No	21(19.1)
<b>Place of Owning Second House</b>	
At place of origin	88(80.9)
In another place	1(.9)
Do not own second house	21(19.1)
Total	110(100.0)

Source: Fieldwork

### **5.9(1): House Rent**

Those who are living in rented accommodation have to pay rent from Rs. 500 to 3000 per month depending upon the number of room taken and the condition of the house. Figure 5.8 provides information about the amount of house rent paid per month. The data shows that around 35 per cent of household reported they are paying Rs.1000 to 2000 per month as room rent. Approximately 20 per cent the of households paid Rs. 500 to 1000 as monthly room rent. A small proportion of households (5 per cent) reported that they paid five hundred rupees per month as room rent. A few households (5 per cent) did not respond.

**Figure-5.8: House Rent in INR**



Source: Fieldwork

### **5.9(2): Structure of House**

The government under various schemes such as Rajiv Awas Yojana (RAY) tries to provide affordable housing facilities to the urban poor and slum dwellers. Under Rajiv Awas Yojana the government provides Rs.75000 to the economically weaker sections (EWS)/Low income groups (LIG) Dwelling Units (DUs) of 21 to 40sqm. One has to get registered with under the Rajiv Awas Yojana and get help to construct a pucca house. Taking a note on spread of slum areas across the city and the condition of sanitation workers and delays in the implementation of government housing scheme one of the Key Informants reflected:

*“Majority of the sanitation workers are living in the slum area across the city. Most of the works were living in Kutcha and Semi Pucca houses. Government officials visited the slum and registered their house for converting it into pucca houses under the Rajiv Awas Yojana (RAY). This registration had happened more than five years ago and these workers still wait for the government money to arrive and start the construction of the house” (KI 2).*

Some ten years back the government used to provide accommodation to sanitation workers appointed on permanent basis. As the population has increased in the urban areas the number of sanitation workers has also increased. However, this increase in the number of sanitation workers does not correspond to the increase in the number of government quarters. There is very limited number of government quarters available for sanitation workers to live in. At present, the central, as well as state government, is trying to provide accommodation to the sanitation workers but there is a lack of funds and government will to implement it at a rapid pace. For instance, one of the sanitation inspectors mentioned:

*“BMC has been provided government quarters to sanitation workers those who have engaged as a permanent worker under the BMC. Now BMC is trying to provide government quarter for all sanitation workers but due to lack of funding from state government and the central government it is unable to do so” (KI 1).*

As mentioned earlier, the contractual workers under BMC are not entitled to get government-provided accommodation and hence they are forced to live in slums as they cannot afford to pay rent.

Community leader further elaborated as follows:

*“In the slum, approximately sixty percent of households have been engaged in sanitation work with various agency and some of them also have been engaged under the BMC. These slums have very poor infrastructure. Most of the houses are made Kutcha and roof is covered by Polythene. Most of the household have no electricity, water supply, and toilet facilities. He also mentioned that through the government workers have housing and HRA facilities but they have not been able to get anything from the government (KI 6).*

Another key informant reported:

*“Majority of the household in the slum has been living in Kutcha and Semi Pucca houses. Which have been numbered by the government worker for getting Pucca houses under the Ambedkar Awas Yojana (AAY). Numbering of the houses has happened more than two years. But nothing has to move toward. They hope that, they get their Pucca houses under the government scheme one day” (KI 6).*

**Table- 5.11: Structure and Ventilation of Housing**

<b>Structure of Housing</b>	<b>Bhubaneswar No (%)</b>
Pucca	4(3.6)
Semi-pucca	72(65.5)
Kutcha	34(30.9)
<b>Number of rooms in the house</b>	
One room	62(56.4)
Two rooms	35(31.8)
Three rooms	5(4.5)
More than four rooms	1(.9)
Non-response	7(6.4)
<b>Type of ventilation in the room</b>	
Window	46(41.8)
Skylet	10(9.1)
Others	15(13.6)
No ventilation	39(35.5)
Total	110(100.0)

Source: Fieldwork

The condition of the slums is very abysmal and most of the time the rooms lack proper ventilation. It can be observed from the table 5.11 that 35 per cent of houses did not have any type of ventilation facility. Approximately 41 percent of houses have windows which provide the necessary ventilation in the room. The data also shows that 14 per cent of households have managed to get other type of ventilation facilities in their room. Around nine per cent of households reported that they have Skylight facility for ventilation in their room (Table 5.11).

### 5.9(3): Cooking Space and Cooking Fuel

As mention above most of the sanitation workers live in slums in one room accommodation. The room is very small and there is no separate space for cooking. The data shows that around 84 per cent of households 84 per cent do not have separate space for cooking inside the house. The data shows that 14 per cent of houses have a separate kitchen inside their house.

Given the poor economic condition, approximately 76 per cent of sanitation workers use wood and coal as the main fuel for cooking. Only around 15 per cent of household can afford to use kerosene stove for cooking. Only two of the respondents were able to get LPG connection (Table 5.12). The LPG price increasing every month, earlier they used to fill up four hundred fifty rupees per tank but now the price is double to fill upper tank. In the community, most of the houses have LPG cylinder under Pradhan Mantri Ujjwala Yojana<sup>25</sup> (PMUY) but now they are unable to fill up tank due to high gas price. Now they compromise their health in smoky kitchens and wander in unsafe areas collecting firewood.

**Table-5.12: Cooking Space and Fuel**

<b>Space for Cooking</b>	<b>Bhubaneswar No (%)</b>
Kitchen	14(12.7)
Space outside the house	3(2.7)
No space/cooking inside the House	93(84.5)
<b>Cooking Fuel Used</b>	
LPG	2(1.8)
Kerosene stove	17(15.5)
electric heater	2(1.8)
Wood and Coal	85(70.9)
Others cow dung/Agri wastes/hay/dry leaves	4(3.6)
Total	110(100.0)

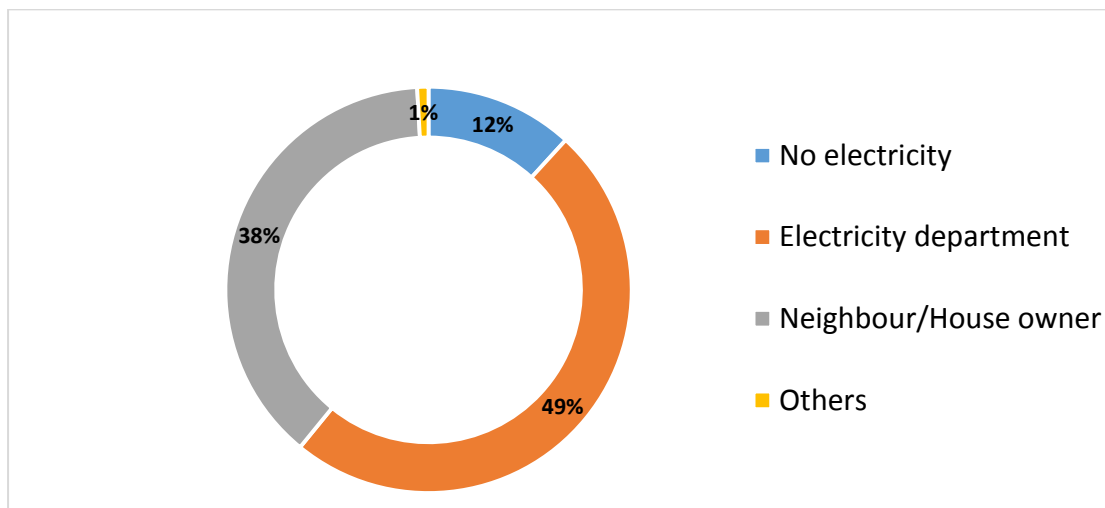
Source: Fieldwork

<sup>25</sup>PMUY aims to safeguard the health of women and children by providing them with a clean cooking fuel – LPG, so that they do not have to compromise their health in smoky kitchens or wander in unsafe areas collecting firewood.

#### 5.9 (4): Source of Electricity

Given the horizontal spread of electricity facilities in the city, people in slum areas are also able to get electricity connections. Figure ten shows that 87 per cent of households have electricity facility in their house. Only 12 per cent households reported they did not have any electricity facility in their house. The data shows that around 49 per cent of households have taken electricity connection from the electricity department. There are a few incidents of subletting of electricity connection. In such cases, a few sanitation workers said that they were not able to pay the initial cost to get an electricity connection from the department. Hence they have taken it either from a neighbour or the house owner. As the data also shows that 38 per cent of households have taken connection of electricity from neighbour/owner house.

**Figure-5.9: Source of Electricity (% HHs)**

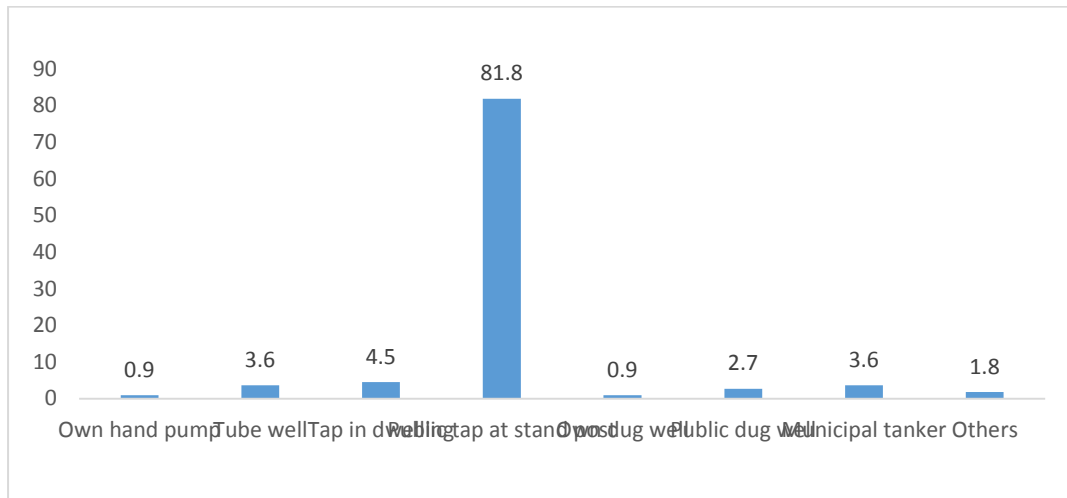


Source: Fieldwork

#### 5.10: Sources of Water Supply

The slums lack a proper supply of piped water and the people living in these slums depend on public stand post to get water. In the present study of the majority of the respondents lacked access to piped water connection in their houses. The data shows that higher 81 per cent of households were using public stand post for the source of water supply. The data shows that 4per cent of households were used tap in a dwelling, 4per cent households were used tube well, 4per cent of households used municipal tanker and only three per cent of households were using public dug well (Figure 5.10).

**Figure-5.10: Sources of Water Supply (% HHs)**



Source: Fieldwork

Access to safe drinking water is one of the most challenging problems in the slum areas. The quality of water is not up to the mark in the slum areas. There are very limited sources of water which can be used by the slum dwellers. Sometimes the high use of public hand pump leads to the deterioration of the water quality and it's unfit for drinking. For example, one of the sanitation workers said: *“they are facing more problems due to lack of water supply facilities in their area. They mostly dependent on public hand pump for water. Many times due to high uses the quality of water changes and it becomes undrinkable”* (Hari, 36-year-old, Isaneswar slum). One of the sanitation inspectors reported: *“those people have engaged in sanitation work they are mostly living in slums in the city. They are facing basic problems such as safe drinking water and sanitation facility”* (Prakash 49-year-old, Salia Sahi).

In the cities drinking water is becoming scare commodity and people have to pay for packed drinking water. The sanitation workers living in slum find it very hard to purchase packed drinking water. Another worker Sukanta (39-year-old) living in Achajya Bihar Slum from past six years shared the water woes and said: *“We find it difficult to get drinking water. If we have money then only we can buy drinking water, no money then no water”*.

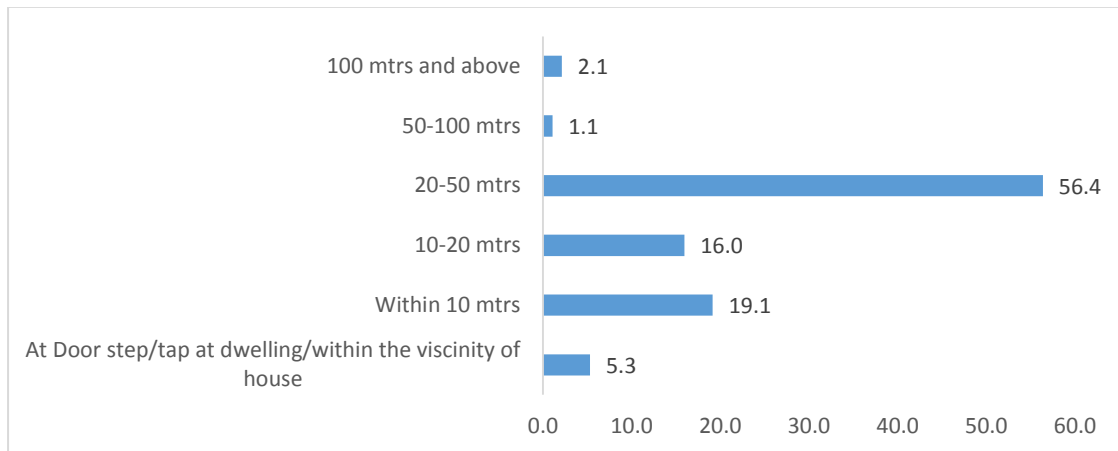
Further PHED (Water Supply) Chief Engineer, informed about the reducing ground water as follows

*“The ground water level reduces every year in the city. The high growth of population and development works are happening all over the city so the demand for water is high. The natural water resources are also polluted due to dumping of household drainage water, untreated sewerage water, industrial waste. The government needs to set sewerage water treatment plant so that the water can be used for other activities. If the government ignore it then the condition will worst after some year” (Sitakanta 39-year-old).*

**5.10 (1): Distance Travelled to Fetch Water**

In the slum, people have to travel to fetch water. Figure 5.11 shows the distance traveled by the respondents living in the slums to fetch water. The figure shows that the majority of the households 56 per cent were going twenty to fifty meters’ distance to fetch water. The data shows that 19 per cent of households reported that they were going within ten-meter distance followed by 16 per cent of households ten to twenty meters and only two per cent of households were going hundred meters’ distance traveled to fetch water collection. The data also shows, only five per cent of households reported that they were getting water facilities in their households and household premises.

**Figure-5.11: Distance Travelled to Fetch Water (% HHs)**



Source: Fieldwork

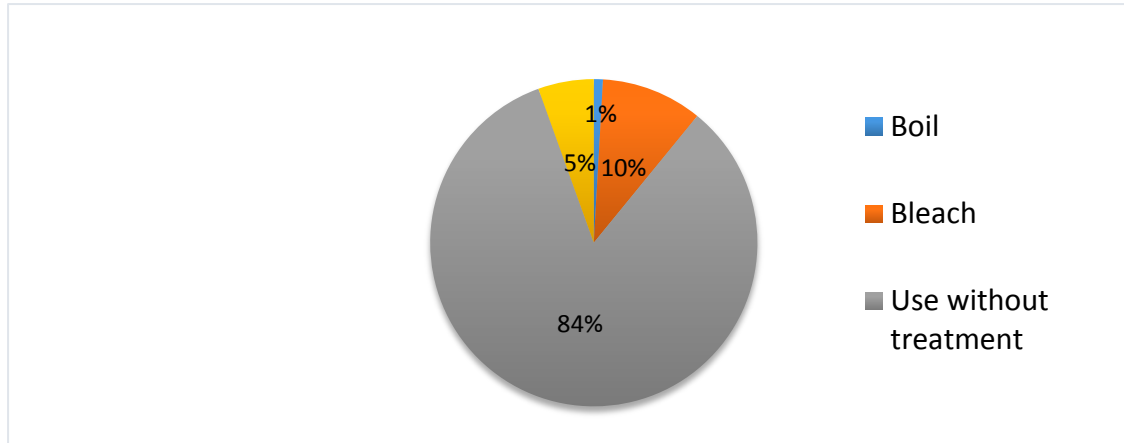
**5.10(2): Treatment of Water**

Considering that the water quality is not very good. It was observed that the water was treated in various ways before consumption. Those who cannot afford to purchase packed drinking water are forced to drink water which is unfit for drinking. Figure 5.12 shows that majority of the households in the study are forced to drink the water without any kind of purification to make it fit for consumption. Only 10 percent of the households were aware of the fact that the water they are getting is not fit for drinking



and hence they used bleaching powder to treat the water and make it drinkable. Only one per cent of households were able to boil water before drinking it.

**Figure-5.12: Treatment of Water (% HHs)**

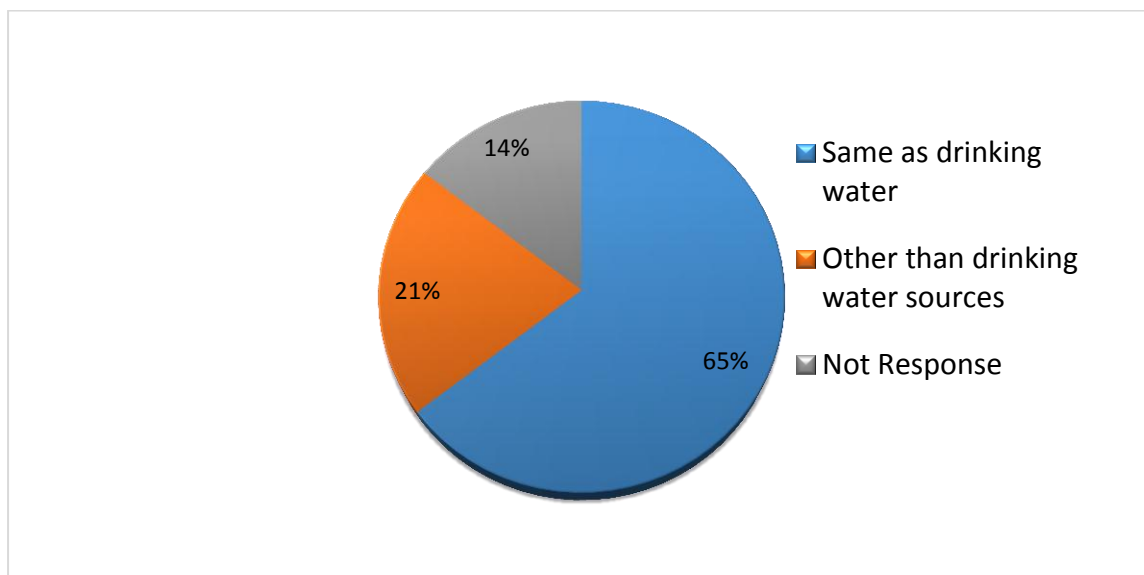


Source: Fieldwork

### 5.10(3): Source of Water Used

Figure 5.13 provides information on sources of water used for other than drinking. The data shows that higher 65 per cent of households were reported they were using the same source of water used as drinking water. Twenty-one percent of households reported other water resources used other than drinking water resources and only 14 per cent of households did not respond.

**Figure-5.13: Sources of Water for other than Drinking Purposes (% HHs)**



Source: Fieldwork

Ramesh 35-year-old a sanitation worker mentioned:

*“They face problem in getting drinking water. In the area no tap water facility is available. People are getting drinking water from far away. In the summer season, they have to face more problems due to lack of water facility. BMC also did not any facilities for them after complained many times to the BMC office. The BMC provides water tank sometime and one tanker couldn't sufficient for all households. If the government provide pipe water supply facility to their area, then definitely their condition would improve”.*

The issues further reflected as follows:

*“Those workers have engaged in water supply and sanitation work to provide a healthy life to people and for that, they are working hard and getting lower attention by the government. They themselves are living in unhygienic condition and poor infrastructure. Most of the workers are living in slum areas with no water supply facilities and most of them mainly dependent on water tank provided by the BMC. The quality of drinking water also not good, and contaminated the high belching powder. Due to lack of supply water facilities they are facing various health-related problems and children, women, and elders are facing more problem than the others” (Sukanti year a 45-year-old, Sanitation worker).*

Another Sanitation worker reported:

*“Some people are using water to clean their vehicles but they are struggling for getting water to survive their life. For getting the water they are going daily more than one km and carried water for only drinking purposes. Otherwise, for other purposes, they are using unprotected well water. If the government provide drinking water supply facilities, then definitely their condition would improve. They ought to do their duty sincerely for make city clean and healthy life but what government did for them nothing even unable to provide clean drinking water to them” (Tukuna 39-year-old, Achajya Vihar slum).*

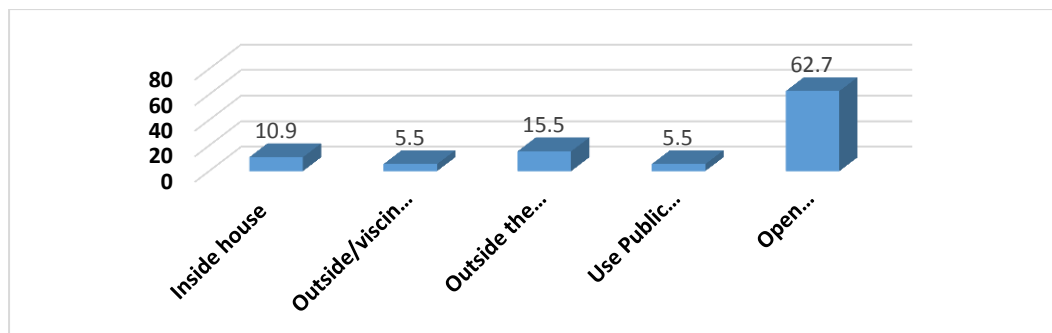
Key Informant too mentioned as follows:

*“The Government provides various facilities for city population and water supply facilities one of them. In urban areas inequality existence to distribute water supply and slums are especially neglected by the government. Those staying in the slum area are neglected in terms of provision of water supply by the state. Water tankers do not come regularly. Tank only comes once a week so that it would be very difficult to manage for a whole week. Water is essential for everyone; safe drinking water is the key to healthy life. The government made some cement water tank in the area but that is not sufficient as there is huge increase in the population during the last two decades. The capacity of the cement tanker is one thousand litres. So that it is very difficult for them to manage their day to day life” (KI 6).*

### 5.11: Toilet Facility

It is reported that the majority of the population living in slums is forced to defecate in open. In the absence of adequate toilet facilities. In the present study also it was found that most of the households have no toilet facility in their home. Figure 5.14 provides information on access to toilet facility in the slum areas. The data shows that a major chunk of the respondents i.e. 62 percent of had no access to toilet facility and they were going for open defecation. The data shows that 15 per cent of households reported they were used sharing toilet facility which located outside their households. Only 10 per cent of households reported that they had toilet facility inside their households. Around 5 per cent of households use public toilet facility.

**Figure-5.14: Access Toilet Facility (% HHs)**



Source: Fieldwork

#### 5.11(1): Use of Toilet

Figure 5.15 shows the information on use of toilet. The data shows that higher 63 per cent households were not using any toilet facility. The data also shows that 33 per cent of households reported that toilet is irregularly used by all family members. Four percent of households reported they use the toilet only during the water supply.

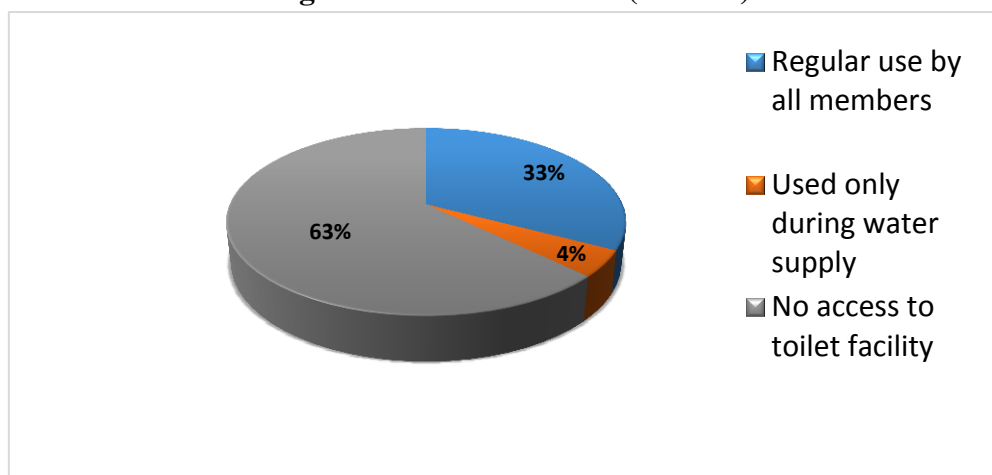
FGD 5 reported:

*“Most of the sanitation workers are living in slum areas and the majority of the houses do not have toilet facility. Therefore all households’ members are going outside to defecate. The BMC has provided community various places in the city but in the area did not have any community toilet. For the accessing public toilet, they have to walk more than three to four km, which is very difficult for them. It's better they prefer to go outside for open defecation to near the forest area” (FGD 5).*

A female sanitation worker reported:

*“On the working site they face more problems during odd time. Most of the times they try to control the natural call. Some women workers faced internal health problem because of holding back the urine for long time in absence of toilet facility at work site. Many times they complained to supervisors but no one listens to them. When livelihood matter and there is no other option they have to go for work. Always they have fear of losing their job” (Sukanti, 43-year-old).*

**Figure-5.15: Use of Toilet (% HHs)**



Source: Fieldwork

### 5.11(2): Garbage Collection

Regarding garbage collection, in Table 5.13 the data shows 37 per cent of households reported that the garbage was collected daily by the sanitation workers. In same time 30 per cent of households reported that the garbage was not collected at all and 16 per cent of households reported that garbage was collected by the sanitation workers once a week. The table also shows that 10 per cent of households reported that the garbage was collated more than twice in a week and only two per cent of households reported that garbage collected twice a week (Table 5.13).

**Table-5.13: Frequency Garbage Collection**

Garbage Collection from HHs	Bhubaneswar N(%)
Daily	41(37.3)
More than twice in a week	11(10)
Twice in a week	2(1.8)
Once in a week	18(16.4)
No timing for collection	33(30)
No collection	5(4.5)
Total	100(100)

Source: Fieldwork

Another Key Informants reported: “The majority of sanitation worker are living in slum areas the condition of the area is very poor due to improper settlement of housing, lack of electricity, road, water supply and sanitation facilities” (KI 3).

Susanta 44 years old a sanitation worker mentioned:

“His family has been living in the slum more than ten years. The condition of the slum is not that much well. But they are managing to survive their life. He also said that, they are living dirtiest place in the city. In the area no one came for cleaning, they are cleaning for themselves. People are throwing garbage outside their households and sometimes they blocked the road. But municipality vehicle never entered to collect garbage. In rainy seasons they faced more problem due to the unhygienic and stinky condition. The sanitation workers also never entered to the area for garbage collection”.

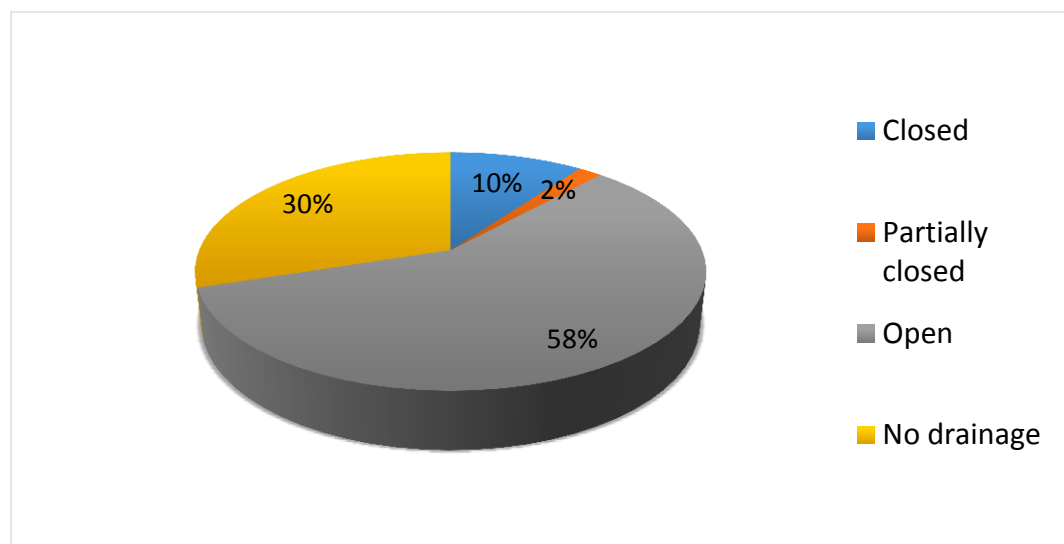
Another sanitation worker mentioned:

“Where they are living, the condition of the area is extremely poor. People throw garbage in open area. They did not have knowledge how it directly impacts their health. BMC also did not provide any garbage bin in their area where they can put their garbage. People have thrown garbage outside their house and municipal worker also did not enter into the community to collect garbage” (KI 1).

### 5.11(3): Drainage Type

The areas where sanitation workers live lack close drainage facilities. Most of the drains remain open and water keeps stagnating. Figure 5.16 shows that the drainage outside the households who engaged in water supply and sanitation work.

**Figure-5.16: Types of drainage Outside the Households (%)**



Source: Fieldwork

The data shows that a higher percentage of households i.e. 58 per cent have open drainage outside their households. The data also shows that 30 per cent of households did not have any type of drainage outside their households. Ten percentage of households reported that they have closed drainage and only two per cent of households have partially closed drainage outside their households.

The poor living conditions impact the healths of elders as well as children in the slum. The open drainage is the breeding ground for mosquitoes and another kind of contagious disease. Commenting on the dismal living situation of the science park basti, a sanitation worker mentioned:

*“In the area the standard of living is very poor and unhygienic. No drainage facilities and water flowing on open land and evening time unable to stand outside their households because of mosquito’s bite. BMC also not fogging their area and not provide garbage bin so that people throw garbage in the bin. In rainy season it is very difficulties to manage here because sometimes rainwater also enters their house. If government provide drainage facilities, then definitely they would live better”* (Raghuram 53-year-old).

Shanti a 55-year-old sanitation worker expressed:

*“More than five years her family has been living in a slum area. Her children fell down sick regularly due to the poor environment and unhygienic condition in the area. Her family has no other option to live at any other place and her family could not afford a house rent where they would able to get all facilities”* (Sahnti, Sanitation Workers).

#### **5.10 (4): Frequency of Drainage Cleaning**

As regards information on the frequency of cleaning the drainage. In Table 5.14, the data shows that 30 per cent of households reported that the drainage was cleaned by the sanitation workers. The data also shows that 30 per cent of households reported that they did not have any type of drainage system outside their households. Only 16 per cent of households reported that they cleaned the drainage themselves and 12 per cent of households reported that they were cleaned drainage by self as like a municipal worker.

**Table- 5.14: Drainage Clean and Frequently Drainage Clean**

<b>Drainage cleaned</b>	<b>Bhubaneswar N (% HHs)</b>
Self	18(16.4)
Self as a municipal worker	9(8.2)
Municipal/Sanitation Worker	34(30.9)
Both '1'and '3'	2(1.8)
Natural flow/never clean	14(12.7)
Do not have access to drainage system	33(30)
Total	100 (100.0)
<b>Frequency of Drainage Cleaning</b>	
Every day	18(16.4)
Every two days	3(2.7)
Every three days	1(0.9)
Once in a week	31(28.2)
Twice in a month	3(2.7)
Once in a month	4(3.6)
When the line blocked	3(2.7)
Never clean/No access to the drainage system	47(42.7)
Total	100 (100.0)

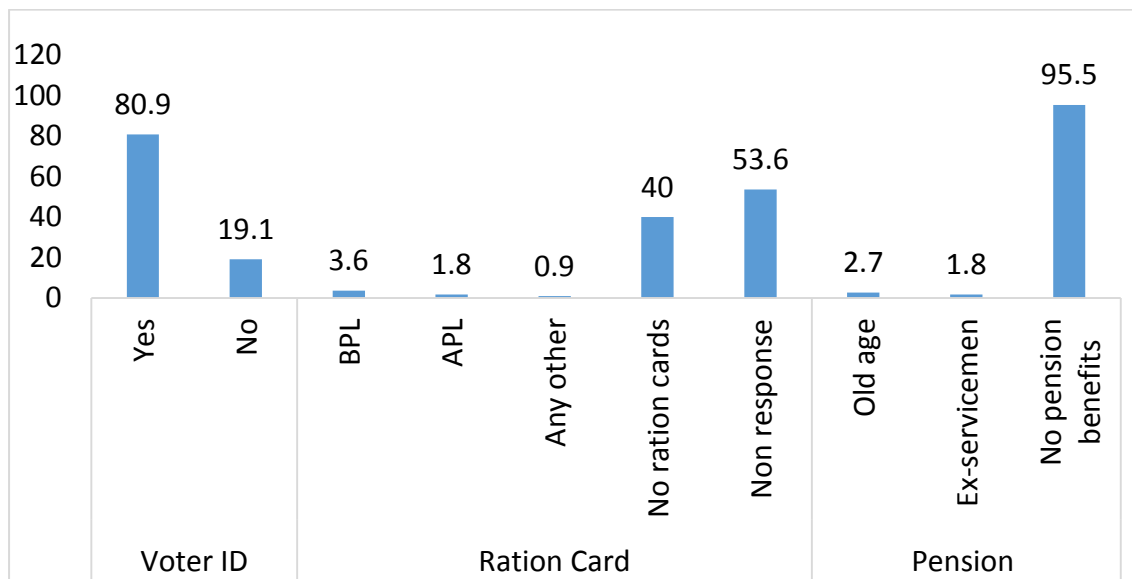
Source: Fieldwork

The workers are threatened that they would be sacked if they refused to clean septic tank and they were not provided any safety equipments, told by the survivors. Kumar one of the worker reported that “Cleaning the sewage treatment plant is not a part of my duty. When I objected, I was told not to report for duty anymore. Soon after one worker stepped into the plant, he fell unconscious. Another worker entered to check on him, but he too fainted. Later, three others entered one by one, but they all fainted”. They are pressurised to workers to enter in septic tank without any equipment. All the workers died due to asphyxiation (Hindustan Times, 2018).

### **5.11: Voter ID and Access to Social Security Facility**

Figure 5.17 provides information on entitlement and social security of workers who have engaged in water supply and sanitation work. The data shows that majority of workers (81 per cent) have voter ID card. Only 19 per cent of did not have voter ID in the city who have engaged in water supply and sanitation work.

**Figure-5.17: Voter ID and Access to Social Security Schemes (% Workers)**



Source: Fieldwork

Under the public distribution system, the state provides some of the essential commodities such as rice, kerosene at subsidized rate to those who have ration card. As far as ration cards are concerned, the data shows that 53 percentage of household did not responded. The data also shows that 40 per cent of household reported that they did not get any type of ration card facilities. The data also shows that four per cent of households have BPL, and only two per cent of households have ration card facility. It can be observed that the higher percent of the population who have engaged in water supply and sanitation work they did not have any type of ration card facility.

As discussed earlier most of the sanitation workers are contractual. Hence they lack access to any kind of pension benefits once they reach the age of retirement. The data shows that the majority of households (95 per cent) did not have any pension benefit. The data shows that 2 per cent of households reported that they have old age pension and old age pension run by state government and only two per cent of households reported that they have ex-servicemen pension facility.

## 5.12: Conclusion

It is evident from this chapters that most of the workers who are engaged in sanitation work have migrated from rural areas. They migrated from rural areas to urban areas in search of livelihood. Lack of any skill and lower educational status forced to them to engage in sanitation work. Under the BMC (in addition to other organization



collaborating with BMC) majority of the sanitation workers work as a contractual labourer. The housing condition of sanitation workers is abysmal. As poor economic condition forces to them live in slums across the city. In the slums majority of houses are semi pucca and kutchain nature. In the slums also the majority of the workers live in rent houses. They live in abject poverty and lack basic facilities such as water supply and sanitation.

The sanitation workers face many problems at work. Majority of the workers lack safety equipment and face various health related problems from major accidental injuries, life threatening diseases to minor illness. Most of the workers are vulnerable to diseases such as fever, cold, cough, skin related problems, TB, stomach, chest and leg pain to name few. Given the low social status of sanitation work, most of the workers face discrimination on work site as well as in the hands of their supervisor(s). Being contractual workers they have a lot of workload and there is a threat of losing the job. In worksite they do not have access to toilets and other basic facilities. Most of the workers reported that to keep them sane and ease the pain they smoke, chew tobacco and drink liquor during work. Otherwise the burden of the filth they clean become too heavy. All the workers are paid very low wages in cash and they do not have a bank account. Both government and NGOs evade the norms and do not provide any medical facility and health insurance facility to workers.

## Chapter-6

### Reported Illness and Reflections from the Field

#### 6.1: Introduction

The present chapter is divided into two sections. It discusses the reported illness among the study population in the first section. The next section illustrates the condition of the conditions of water supply and sanitation through the use of visual documentation.

#### 6.2: Morbidity Experience in the Study Area

In India health is a state subject. As per the WHO (1948), definition health is “*A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*”. In both study areas, the self-reported morbidity for last six months is recorded at the time of data collection. This section mainly discusses the health condition and health-related problems faced by people because of poor water supply and lack of sanitation facilities in the study area. National sample survey organization defines morbidity as “*Any deviation from the state of physical and/or mental well-being arising out of ailments (illness / sickness / injury / poisoning). A person will be considered as sick if he / she reports that he / she feels sick*” (Govt. of India, 2001).

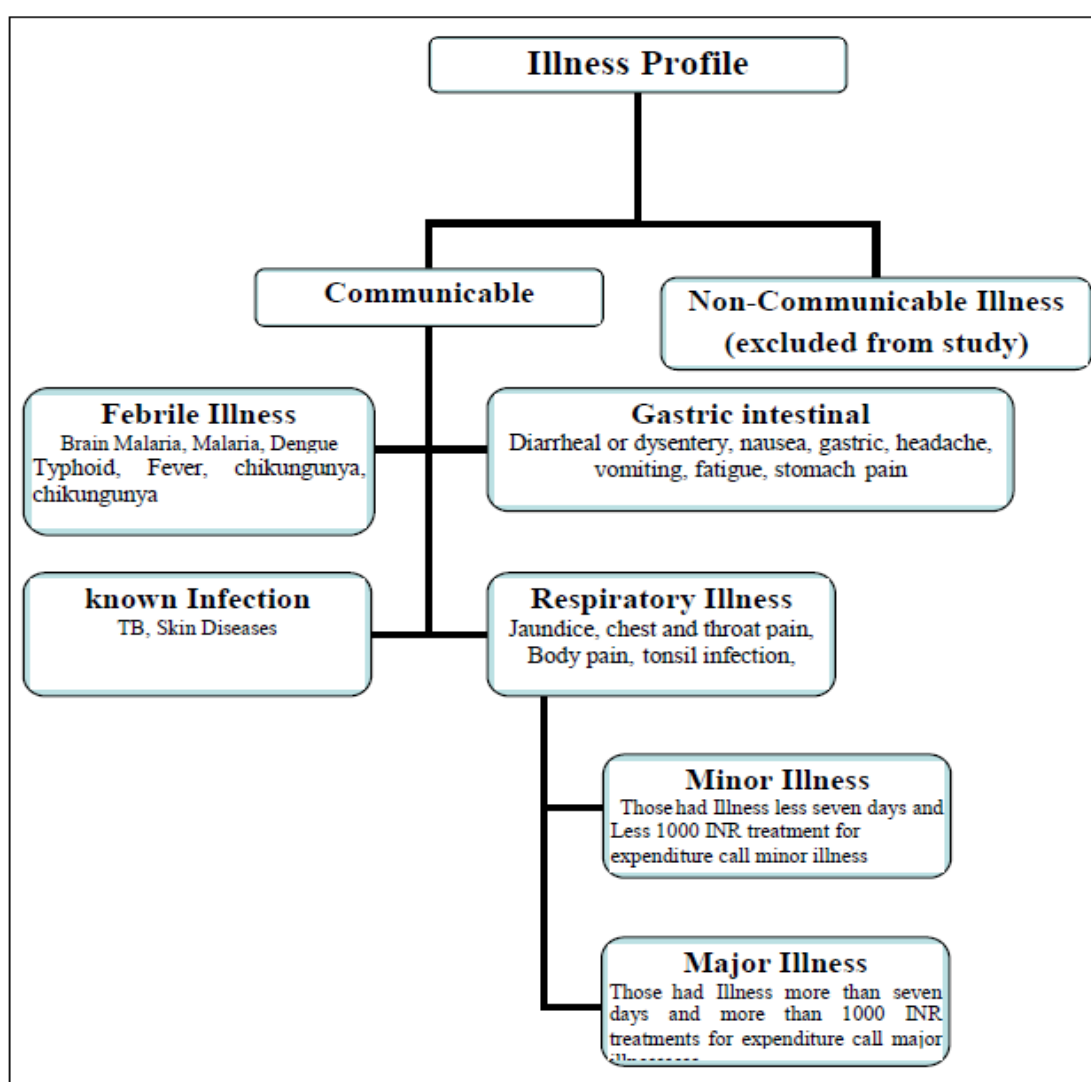
This section attempts to understand the morbidity experience of the surveyed population in the study area by examining the correlation between social and physical factors and its influence on their health condition. The categories of diseases are mainly divided into two types; i.e. major and minor illness. Based on the way disease spreads these are divided into communicable and non-communicable. As we are discussing about the issue of water supply and sanitation, communicable diseases reported by the respondents are only considered to understand the issues of water supply and sanitation. Because most of the water and sanitation-related diseases are transmissible in nature. The communicable diseases are mainly divided into four broad types such as: Febrile illness, Gastrointestinal, Infection condition, Respiratory illness. The below figure mentioned the details on communicable and non-communicable diseases.

### 6.3: Classification of Diseases

#### 6.3(1): Minor Illness

To understand the morbidity pattern in the study areas, minor illness is one that doesn't prolong beyond one week including the treatment period, require minimal treatment/ no hospitalisation; the treatment expenditure not more than 1000 INR during the time of illness which may not affect the normal and functional life of the person. These criteria have been taken as the reported cases of minor illness in the study area (Patra, 2012).

**Figure -6.1: Reported Illness Profile of the Respondents (users)**



#### 6.3(2): Major Illness

The major illness affects the normal life of the person, prolongs more than one week, and requires long-term treatment/hospitalization, the treatment expenditure exceeds more than 1000 INR and the illness hampers work and causes loss of work for the

person suffering and other members of the household. It affects the economy of the households. Both minor and major illness classification is flexible in nature (Patra, 2012).

### **6.3(3): Communicable Diseases**

The high growth urban population and lack of water supply and sanitation are major reasons for the spread of communicable diseases in urban India. As per the Vermont and department of health communicable diseases as “*An infectious or contagious disease that can be transmitted from one person to another by direct physical contact, infected airborne droplet, etc.*”. Communicable diseases are further divided into four types; (i) Febrile illness (brain malaria, typhoid, fever), (2) Gastrointestinal (diarrhoea, fever, gastric, stomach pain, cold cough etc), (3) known Infection condition (TB, Skin Diseases), (4) Respiratory illness (Jaundice, chest and throat pain, Body pain etc) (GoI, 2011; Vermont, 2010; Lenka, 2014).

### **6.3(4): Non-communicable Diseases (NCD)**

The Non-communicable diseases are mainly chronic diseases. The non-communicable diseases are more in developed countries but the developing countries are also facing problem of non-communicable diseases. The NCDs include high blood pressure, obesity, diabetics, physical inactivity, hypertension and high blood cholesterol etc. (Reddy, 2003; Bradshaw, n.d; Lenka, 2014).

## **6.4: Demographic Profile and Morbidity Pattern**

### **6.4(1): Illness Experienced in the Study Area**

The total sample of 290 HHs from the two study areas were studied for illness. Information was collected from a total of 1211 individuals. A total of 389 (32 per cent) reported to have some kind of illness. Out of these 352 (90 percent) reported to suffer from communicable diseases and from non-communicable diseases 37 (10 per cent). In the study the non-communicable diseases were not accounted.

### **6.4(2): Type of Illness Suffered**

As mentioned out of a total sample 1211 individual 352 respondents reported to suffer from illness (communicable) in the last six months. Out of these 352 respondents, 191 respondents reported major illness and 161 respondents reported minor illness. In both the study areas female members had reported more major illness than male members.

The major illness cases were included 57 per cent of female and 43 per cent of male members. In case of major illness also women appear to suffer in relatively higher numbers. For instance, 56 per cent of females reported to suffer from some kind of major illness while in case of males it was 43 per cent. The data shows that in Naharakanta a higher percentage of females i.e. 62 per cent reported major illness than Bhimpur area. In Bhimpur area the higher percentage of male members had reported minor illness than Naharakanta area. The female members had more illness than male members (Table 6.1).

**Table- 6.1: Sex Wise Difference in Reported Illness**

Respondents	Bhimpur Area (Kela Sahi)		Naharakanta Area		Total	
	Ma (N. %)	Mi(N. %)	Ma(N. %)	Mi(N. %)	Ma(N. %)	Mi(N. %)
Male	50(47.2)	38(55.1)	32(37.6)	32(34.8)	82(42.9)	70(43.2)
Female	56(52.8)	31(44.9)	53(62.4)	60(65.2)	109(57.1)	91(56.8)
Ma=Major Illness						
Mi=Minor Illness						

Source: Fieldwork

### **6.4(3): Type of Illness and Caste**

Out of the total 352 respondents who reported to suffer from communicable diseases most belong to SC community. The Table 6.2 shows that the people from SC community were prone to illness as to compared ST, OBC and general. The data shows that among the SC population had higher percentage reported major illness followed by OBC 32 per cent, general 26 per cent. Among the SC population 43 per cent had reported miner illness than as followed by OBC 31 per cent, General 23 per cent.

**Table-6.2: Type of Illness and Caste**

Social Categories	Bhimpur Area (Kela Sahi)		Naharakanta Area		Total	
	Ma (N. %)	MI(N. %)	Ma(N. %)	Mi(N. %)	Ma(N. %)	Mi(N. %)
SC	43(40.6)	28(40.6)	33(38.8)	41(44.6)	76(39.8)	69(42.9)
ST	5(4.7)	5(7.2)	0	0	5(2.6)	5(3.1)
OBC	29(27.4)	14(20.3)	32(37.6)	36(39.1)	61(31.9)	50(31.1)
Non SC, ST and OBC	29(27.4)	22(31.9)	20(23.5)	15(16.3)	49(25.7)	37(23.0)
Ma=Major Illness						
Mi=Minor Illness						

Source: Fieldwork

#### 6.4(4): Type of Illness and Treatment

Table 6.3 shows that the higher percentage of the population preferred to get treatment from private hospital in case of any illness rather than going to the government (public) hospital. Only in case of major illness 51 per cent of population were preferred public hospital and 49 per cent population had preferred private hospital. Among the minor illness, the higher percentage of population 73 per cent had preferred private hospital and only 27 per cent of population had preferred public hospital. In Naharakanta area, higher 79 per cent of population had preferred private hospital when they faced minor illness than the government hospital (Table 6.3).

**Table-6.3: Type of Illness and Treatment**

Place of Treatment	Bhimpur Area(Kela Sahi)		Naharakanta Area		Total	
	Ma (N. %)	Mi (N. %)	Ma (N. %)	Mi (N. %)	Ma (N. %)	Mi (N. %)
Public Facilities	52(49.1)	25(36.2)	45(52.9)	19(20.7)	97(50.8)	44(27.3)
Private Facilities	54 (50.9)	44(63.8)	40(47.1)	73(79.3)	94(49.2)	117(72.7)
Ma=Major Illness						
Mi=Minor Illness						

Source: Fieldwork

One of the Key Informants reported:

*In Bhimpur (Kela Sahi) there is no public hospital. People are forced to go to private hospitals as the government hospital is very far. It takes a long time to reach the government hospital and receive the treatment. That's the reason people prefer private hospitals (KI4, Bhimpur Area, Site 2).*

#### 6.4(5): Type of Illness and Out of Pocket Expenditure

Table 6.4 the data shows that the higher percentage of population who had suffered minor illness for the treatment they spent below one thousand rupees, followed by 23 per cent population spend one thousand to two thousand rupees, 22 per cent spend two thousand to four thousand rupees and only one per cent population spend six thousand to eight thousand rupees. The Table 6.4 also indicates that, 27 per cent those who had suffered major illness they spent below one thousand rupees, followed by 25 per cent spent two thousand to four thousand rupees, 23 per cent spent one thousand to two thousand rupees and 13 per cent spent eight thousand to ten thousand rupees and above ten thousand rupees

**Table-6.4: Type of Illness and Out of Pocket Expenditure (OOPE)**

OOPE (INR)	Bhimpur Area(Kela Sahi)		Naharakanta Area		Total	
	Ma (N.%)	Mi (N.%)	Ma (N.%)	Mi (N.%)	Ma (N.%)	Mi (N.%)
> 1000	24(22.6)	17(24.6)	28(32.9)	34(37.0)	52(27.2)	51(31.7)
1000 to 2000	28(26.4)	19(27.5)	17(20.0)	18(19.6)	45(23.6)	37(23.0)
2000 to 4000	31(29.2)	17(24.6)	17(20.0)	18(19.6)	48(25.1)	35(21.7)
4000 to 6000	12(11.3)	9(13.0)	12(14.1)	8(8.7)	24(12.6)	17(10.6)
6000 to 8000	3(2.8)	0	2(2.4)	2(2.1)	5(2.6)	(1.2)
8000 to 10000 and Above 10000	8(7.5)	7(10.1)	9(10.6)	12(13.0)	17(8.9)	19(11.8)
Ma=Major Illness						
Mi=Minor Illness						

Source: Fieldwork

In Naharakanta area one of the Health worker responded:

*... due to the less man power and the lack of availability of medicines in the dispensary the quality of work also gets affected. There is lack of facilities in the health centre (KI8, Naharakanta).*

The lack of medicines in the health centre is further corroborated by one of the resident of Naharakanta:

*“In Naharakanta health centre they only prescribe medicine and do not provide it. We have to purchase medicines from the medical store. (Kedarnath 33 year old, Naharakanta Area, Site2).*

#### **6.4(6): Type of Illness and Toilet**

The Table 6.5 data shows that the people who had access to toilet facility reported less incidences of illness than those who with no toilet facility. The data shows that, 59 per cent of population suffered major illness who had not used toilet facility and 41 per cent population reported major illness who had toilet facility. The data also indicates that the higher percentage of population 63 per cent had reported minor illness who hadn't use toilet facility. Only 37 per cent of population had suffered minor illness who had toilet facility in the study area.

**Table-6.5: Type of Illness and Toilet**

Toilet Facility	Bhimpur Area (Kela Sahi)		Naharakanta Area		Total	
	Ma (N. %)	Mi (N. %)	Ma (N. %)	Mi (N. %)	Ma (N. %)	Mi (N. %)
Yes	44(41.5)	30(43.5)	35(41.2)	29(31.5)	79(41.4)	59(36.6)
No	62(58.8)	39(56.5)	50(58.8)	63(68.5)	112 (58.6)	112(63.4)
Ma=Major Illness Mi=Minor Illness						

Source: Fieldwork

#### **6.4(7): Type of Illness and Water Resources**

Water borne diseases appear to be one of the major reasons for the reported major and minor illness amongst the respondents. As the Table 6.6 shows that, the approximately 25 per cent of people who use water from public stand post and 23 per cent of respondents who use water from unprotected well reported higher to suffer from major illness than those who use other water resources. As same like people had used public stand post 24 per cent had reported they suffered minor illness followed



by unprotected well water 23 per cent, public hand pump 22 per cent, Tap dwelling 17 per cent and municipality tanker 13 per cent had reported they suffered minor illness.

**Table-6.6: Type of Illness and Water Resources**

Water Sources	Bhimpur Area(Kela Sahi)		Naharakanta Area		Total	
	Ma(N. %)	Mi (N. %)	Ma (N. %)	Mi (N. %)	Ma(N. %)	Mi (N.%)
Tube well	0	0	2(2.4)	1(1.1)	2(1.0)	1(0.6)
Public Hand pump	34(32.1)	24(34.8)	5(5.9)	12(13.0)	39(20.4)	36(22.4)
Tap Dwelling	15(14.2)	4(5.8)	24(28.2)	24(26.2)	39(20.4)	28(17.4)
Public stand post	41(38.7)	31(44.9)	8(9.4)	7(7.6)	49(25.7)	38(23.6)
Unprotected well	15(14.2)	10(14.5)	30(35.3)	27(29.3)	45(23.6)	37(23.0)
Municipality Tanker	1(0.9)	0	16(18.8)	21(22.8)	17(8.9)	21(13.0)
Ma=Major Illness Mi=Minor Illness						

Source: Fieldwork

Health narratives from Key Informants in Bhimpur area:

*Due to lack of drinking water people are facing many health related problems such as diarrhoea, stomach pain, gastrointestinal problems and skin diseases. Children and women suffer frequently from diarrhoea and stomach pain (KI12, Bhimpur Area, Site1).*

Another Key Informants reported:

*In Bhimpur area due to the short duration of water supply residents are forced to use other sources of water such as unprotected wells. This poses serious health issues for most of the people (KI4, Bhimpur Area, Site 2).*

This section highlights the patterns of reported illness among the study population. It concentrates on communicable diseases only since these are associated with water and sanitation. It is evident from the gender breakup that more women as compared to men reported both major and minor illness. Most of the illness (major and minor) occurred among the SCs. It is noteworthy that the place of treatment was a public hospital for major illness (51 per cent), while it was private facilities for minor illnesses (73 per cent). However, in Bhimpur, roughly the use of public and private medical facilities was 50-50 in case of major illnesses. The share in case of major illness was about 36 per cent (public) and 64 per cent (private) medical facilities. Naharakanta, however has more use of public facilities (53 per cent) for major illness and 9 per cent for minor illnesses. The highest out of pocket expenditure reported is

less than Rs.1000 for both major and minor illnesses. However, Bhimpur reported highest out of pocket expenditure in the range of INR 2000-4000 (29 per cent) and INR 1000-2000 (28 per cent) for major and minor illness respectively. The Households with no toilet facility reported more illness as compared to the households which had toilet facilities in their home. Also noteworthy is the association between the source of water and reported illness. Most of the illness-both major and minor was reported by households which used public stand post as a source of water. Almost a quarter of Households reported illness used public stand post water for drinking and other purposes. While Bhimpur has a similar pattern, in Naharakanta households using unprotected well as a source of water reported highest illnesses-both major and minor. Thus the above discussion corroborates association between illness and availability of toilets and safe drinking water. It also reflects on the intersectionality with the governance and the enforcement which facilitates provisioning and access through users and providers.

### **6.5: The Condition of Water Supply in the Study Area**

In Bhimpur area most of the households get drinking water from hand pump and pipe water supply by the public health division. The supply of piped water is for limited duration hence most of the households in the area are dependent on public hand pump. Earlier in the area, people used public stand post supply water and they faced less problem. However, in year 2012 BMC removed all the public stand posts in the area. People faced a lot of problem in accessing pipe supply water since then. Plate one shows the condition of the public stand post after BMC disconnected the water supply (Plate 1).



**Plate 1:** Condition of the Public Stand Post (Bhimpur Area, Site 1)



**Plate 2:** Women are waiting to fetch water from public hand pump (Bhimpur Area, Site 2)

BMC issued notice to the people living in the area to take water connection and every month they need to pay water bill to BMC. Earlier people were easily accessing water from public stand post as water came with high pressure. Now the water pressure is very low and they are unable to collect sufficient amount of water during the limited duration of water supply.

### **6.5(1): Issues of Access Water**

Limited duration of piped water supply forces women to fetch water from the public hand pump. As shown in Plate two, women are waiting for their turn in a long queue to fill water. Women spend a substantial amount of time in fetching water. It takes more than 20 minutes to fill one bucket of water from the hand pump. For collecting water, they have to travel long distance and they are likely to get exposed to sexual and verbal harassment. Most of the time brawls arises to get water among the people living in the neighbourhood. Gender disparity is found in terms of water collection responsibilities where women have the sole responsibility of collecting water in both study areas. During summer the water pressure is very low due to decrease in groundwater level and it takes more time to fill a bucket of water (Plate 2).

### **6.5(2): Water Contamination**

Plate 3 shows condition of non-functional public hand pump and the garbage collected around it. The seeping of garbage waste and other harmful chemicals in the ground water is also responsible for changing its Ph level<sup>26</sup> (Appendix H). For instance, people have stopped using a public hand pump in Bhimapur because of presence of heavy iron content in the water. The quality of water is poor as there is high percentage of contamination which makes it unfit for drinking. People use this hand pump water for other purposes such as cooking, bathing and washing. Many times they complained about it to municipality but the BMC did not take any action and the situation remains unchanged.

---

<sup>26</sup> The water samples collected from both the study area was sent for quality check at state food testing laboratory, Bhubaneswar. The results show that the water is not fit for drinking as it is contaminated by E.coli and its Ph value is very low.



**Plate 3:** Unused public Hand pump due to heavy iron water (Bhimpur Area, Site 2) **Plate 4:** The condition of Public hand pump (Bhimpur Area, Site 2)

Poor maintenance of the public hand pumps also results in the contamination of the water in Bhimpur area. The groundwater has been contaminated and the taste of water has also changed over a period. In the area, most of the households are not using water for drinking purpose (Plate 4). Due to lack of drainage facility most of the water waste is stagnant and it gets deposited near the hand pump. In the area, households are also dumping garbage in open area, right beside the hand pump as shown in the image.

### **6.5(3): Distance Travelled to Fetch Water**

In Bhimpur, some of the households reported to walk more than half kilometer to fetch water. Every day people face problems due to lack of water to carry on daily activities and household chores requiring water. Most of the respondents who are daily wage laborer reported that they carry water from their workplace. Caste is an important factor which influences access to public water sources in Bhimpur in particular and in India in general. In Naharakanta Area, people from SC community have to walk longer distance than any other community to fetch drinking water. They collect drinking water mainly from school hand pump which is located approximately one kilometre away from their residence. In Naharakanta majority of lower caste households are dependent on well water and very few households get access to piped water. Accessing water is a huge problem for SC community people. In the area the SC community is mainly dependent on unprotected well water (Plate 5). They are using well water for drinking purposes also. While most of the households belonging to other caste use the well water for other purposes such as cleaning, washing and

bathing. SCs have to take water from piped supply by paying additional charges. The poor households are forced to use well water for drinking. It came to light that there is discrimination in the supply of piped water. In the area where SC community lives still wait for the water supply connection to be provided by the government agencies in present case BMC. A few lower caste households reported that they have applied for piped water connection and have also deposited the requisite amount of fee but still nothing is being done by the BMC to provide the piped water connection to them. In the community even piped water connection has not reached yet. Though BMC selected a place and constructed the public water post in year 2012, no water pipe line was laid to make it functional.

In Naharakanta, caste has been playing a major role for accessing water supply. In the upper caste community more public stand post are present but in SC community they do not have public stand post settled by the BMC. Sometimes conflict also rises due to issues around access to common water resources. SC community is never allowed to access common water places such as temple well and tube well. One of the SC community leader said that they are still struggling to get the water pipe connection. There is resistance from the upper castes hence the BMC is not taking any action to provide access to piped water to the SC community (Plate 7).

The concept of impure and pure and caste based discrimination are still prevalent. The people in the study area follow the caste based hierarchy where the lower caste is not allowed to fetch water from the public stand post located in the upper caste residential area. It was also observed that the lower caste are never allowed to use public stand post in presence of an upper caste women. When SC community people go to upper caste colony for collecting water from the public stand post and for that they wait more time and if the higher caste people are present there then it is difficult for them to collect water. There are fierce retributions in case a lower caste woman touches a higher caste woman during the collection of water.



**Plate 5:** Malfunction of a Public Stand post in Naharakanta Site 2



**Plate 6:** Another Public Hand Pump (Bhimpur Area, Site 2)



**Plate 7:** Unprotected Well water used for drinking (Naharakanta, Site 1)



**Plate 8:** Non Functional Public Hand Pump (Naharakanta, Site 2)

Besides verbal abuse there are incidences of violence against the lower caste. Also to maintain the ritual purity the higher caste woman would bath again and change her clothes to make herself pure again. For washing clothes and taking bath separate ghats are there for different castes. People from the lower caste are not allowed to use same ghat where upper caste people take bath. They have different ghat for their community.

#### **6.5(4): Environmental Factors**

In summer season water crisis is at its peak as people facing severe water crises in both study areas. In Bhubaneswar the groundwater level is decreasing every year. In Bhimpur Area, people are facing more problems due to the scarcity of water. In the area people are mainly dependent on hand pump water and in summer time the groundwater level decreases and they cannot collect sufficient amount of water. Due to decreasing groundwater level to fill a bucket of water takes an hour. In the area people are forced to go to faraway places to fetch water. Majority of the people

reported collecting drinking water from their workplace, colony and temple well if allowed. The condition is very poor in terms of physical structure. In Naharakanta people are mainly dependent on supply water, hand pump and well water. Plate 7 shows the constructed water post.

#### **6.5(5): Issues of Machinery Problem**

It was found in both the sites, Bhimpur and Naharakanta, some public hand pumps remain unused due to machinery problem. Plate eight shows the non-functioning public hand pumps. Some households who mainly dependent on hand pump for water faced a lot of problem when there was no piped water supply (Plate 8). A few respondents said that they have logged complained with the municipality and PHDE department regarding the non-functioning of the public hand pump but in vein.

#### **6.5(6): Duration of Water Supply**

In both study areas the duration of water supply is a major issue. In Bhimpur area majority of the respondents reported that the timing water supply only half an hour. Due to the limited duration of water supply majority of the households cannot collect water from public stand post. Hence most of the households relied on public hand pumps, wells and unprotected well water. In Bhimpur a few well off families have own hand pump.

#### **6.5(7): Access to Water Resources and Conflict Between Communities**

In both the study areas, Bhimpur and Naharakanta conflict over to access water resources is part of everyday life. As mentioned earlier the conflict is often between women from the same community as well as from different caste groups. Sometimes the community members intervene and resolve the conflict. At times the conflict turns more precarious, and the situation goes out of control and police is called for. In Naharakanta, caste based discrimination is most prominent reason of conflict as lower caste people are never allowed to use public sources of water such as public tap, hand pump, well located in upper caste residential area and other resources such as river ghats. A few respondents reported that in year 2008 there was there was big conflict between upper and lower caste people for the use of river ghats. The upper caste vehemently resisted the use of same river ghat by lower caste. Now there are two different river ghats, one used by upper caste members and the other by lower caste community.

## 6.6: Toilet Condition in the Study Area

As discussed earlier in both study areas, most of the people are going for open defecation. It seems BMC has failed to provide toilet facility to all household. In 2014, the government of India started SBA to eliminate of open defecation and the mission will be achieved by the target on 2<sup>nd</sup> October 2019. Under the SBA schemes government is spending crores of rupees. But the ground reality is different. It is unmanageable to be fulfill the SBA target without proper implementation of city sanitation plan.

In Bhimpur area, majority of the people practice open defecation and very few households have latrine facility. The toilets are provided by a NGO (*Jagruti*). The material used for constructing the toilets is of very poor quality. In terms of dimension also the width of toilet is less which makes it unfit for use. Also there is no running water in the toilets constructed. Those who have constructed the toilets near their house hardly used it on regular basis. Only when it is extremely necessary then only the toilet is used otherwise they prefer open defecation. In the area one of the household has shown that the toilet constructed inside the house (Plate 9).



**Plate 9:**Condition of Congested Toilet (Bhimpur Area, Site 2)

**Plate 10:** Condition of Toilet (Bhimpur Area, Site1)

Plate number 10 also shows another toilet structure in a different house. The household constructed toilet by their own money. The condition of the toilet is poor. The base of toilet is made by the concrete and the roof covered by polythene. The toilet did not have flush and pipe water supply facilities. They mainly use it for water storage.



### **6.6(1): Blind Believes and Lack of Public Awareness**

Safe sanitation is directly related with health and environment. In both study areas people are unaware of the importance of safe water supply and sanitation. In Bhimpur areas most of the people are illiterate and very less active on social media such as newspaper and TV so they have very less awareness on various schemes especially on water supply and sanitation.

In the area people have blind believe about constructing toilet inside the house. In the area people have poor mind setup like ‘if anyone builds toilet inside the house then how much he will earn that will be insufficient for his family and he will face financial crisis? His family health condition will be affected also and faced various health related diseases’. His family will not be able to live happily. House is like a temple where god and goddess are living in such place how they built toilet inside their house in respond.

In Naharakanta, Majority of the house hold have toilet facility but most of them are going to riverside for open defecation without any hesitation. In the area some of the household reported that they are using the toilets but in reality they are going outside for defecate open. In rainy season some of the household use toilet but majority of the household members go outside. However, the case of SC community is different as most of the houses do not have toilet facility. They have no option but to go for open defecation.

In Naharakanta area also, those households who have latrine facility, most of the people go for open defecation. Majority of the households reported that due to lack of pipe water connection facility in the toilet most of the people go for open defecation. Most of households use bucket water. Some of the respondents reported that instead of taking water bucket it is better to go for open defecation where they feel more comfortable.

Under the SBM, the government provide community toilets in cities, to reduce the practice of open defecation. It is the responsibility of ULBs to construct community toilets in the area. But it seems the ULBs are unable to provide community toilets to both study areas under the SBM. In Bhimpur area, it was found that the community leaders have given many applications to BMC to construct a public toilet in their area, but no action was taken by BMC in this regard. Government also needs to create

public awareness through ULBs for IEC activities at grass root level so that people understand and solve issues on sanitation.

### **6.7: Drainage Condition in the Study Area**

In Bhimpur area the drainage system condition is very poor. Majority of households in the area do not have drainage facility and some of the households have made drainage in front of their house. Due to lack of drainage people are facing various problem. The community people requested to the councilor many a times for constructing drainage facility in the area. Even the community people went on strike to the BMC office to demand drainage facility in the area but still the condition remains same and people are living without drainage facility. Without drainage facility people are facing various health related issues and many communicable diseases (Plate 11).



**Plate 11:** Without drainage facility (Bhimpur Area, Site 2)



**Plate 12:** Condition of Drainage facility (Bhimpur Area, Site 1)

In Bhimpur some households have drainage facility in front of their households. The sanitation workers never enter the area for cleaning and people clean drains themselves. Some time they hire other people to clean drainage and for that they pay to them (Plate 12).

Households throw garbage in open space outside their house. Some households are throwing garbage in open space far away from their households. The BMC did not install garbage bin in the area. The sanitation workers also never entered the slum. After complaining many a times to BMC the situation is still same. Most of the time, due to more garbage that spread on road and the smell is also very bad. In rainy seasons the condition is worse due to garbage heaps which have create mosquitoes

and housefly breeding. Due to mosquito bites and housefly, people are facing various health-related problems such as malaria, typhoid and diarrhea etc. (Plate 12).

In Naharakanta, most of the households have open and closed drainage in front of their houses. The core area is covered by drainage facility and rest of the area has no drainage facility. Plate 13 shows the stagnating drainage water.



**Plate 13:** Drainage Condition (Naharakanta, Site-2)

Faulty structure made by the sewerage department is also a reason for stagnant water. In rainy seasons people face more problems due to overflowing of drainage water. The situation is also odd due to the foul smell of drainage water and children are falling ill. Another major problem is that in rainy seasons some days' rainwater and drainage water level are at same and accidents also happen due to people falling unconsciously. In some areas the drainage is covered partly and rest remains opened. In SC community area, they have no drainage facility and they are facing more problem.

In Bhubaneswar, due to poor drainage condition in rainy season different parts of the city is water logged. The above picture shows that cars and auto rickshaws were stuck due to heavy rainwater (Plate 14). In the city improper planning, poor management in drainage system, and lack of cooperation sewerage department are the main reasons for water logging in the city. Bhubaneswar city has secured first position amongst smart cities in 2014 but the infrastructure condition is still poor due to poor planning of drainage system.



**Plate 14:** Heavy rain causes waterlogging in Bhubaneswar



**Plate 15:** Water logging in residential area after rain

Due to water logging many households are facing problem and the transportation system is also affected badly. Therefore, the smart city should first provide better drainage facility for the betterment of the city people (Plate 15).

#### **6.7(1): Problem of Coordination and Planning**

The state government and BMC completely failed to make Bhubaneswar a smart city. The city is crumbling due to lack of proper urban infrastructure and civic system and effective management of existing civic facilities. It seems the Bhubaneswar Development Authority has completely abandoned its responsibility to provide proper drainage facilities in the city. In the city JICA mainly funded under the OWWSSB for drainage in different part of the city but after acute waterlogging, it seems the zero ground reality. Every year the situation is repeated. It is realized that there is complete absence of coordination between OWSSB department, BMC, Work Department, and National Highway Authority of India. For instance, the above picture shows that, after heavy rain the households literally turn into pools. The rapid urbanisation and encroachment of the open areas which served as natural drainage in the rainy season has resulted in increasing water logging issues every year. The city has been facing water logging due to poor drainage system and the drainage system has gone from bad to worse.

The loop holes in the planning and designing of the drainage system in Bhubaneshwar city is a major challenge. The faulty design of drainage system by engineers has resulted in non-evacuation of stormwater leading to flooding in residential areas. In

the city many places the drainage work is pending for many years by BMC and OSSWB. In the city most of parts were cut up on the run-up to the monsoon for cable laying, drainage and other works are leaving. Many residential areas people are facing problem due to water logging and now no one has any clue how to resolve the issue

### **6.7(2): Open Garbage in Study Area**

In both the study area the open garbage is a major problem which adds further woes to the drainage system. There is lack of proper garbage management system in the city. More specifically, in Bhimpur as well as in Naharakanta area, the sanitation workers never come regularly for garbage collection. The municipality also never provided any garbage bin in the area and people were throwing garbage on road. Majority of the households throw garbage in the open space available outside their houses (Plate 16 and 17). More garbage dumped on road mainly create unhealthy environment and odd situation. The sanitation workers are coming four to five days in a month and they did not collect garbage properly. Therefore, the people are throwing garbage in open space outside form their houses. When sanitation workers did not collect garbage regularly then the garbage would overflow, it spread in the area and creates foul smell and unhygienic condition in the area.



**Plate 16:** People throwing Garbage open space **Plate 17:** Garbage Overflowing on Road in Bhimpur Area, Site 2)

The above Plate shows that the dustbin is overflowing on road. Most of the garbage originates from households, shops, vending zones hotel, restaurants, and offices. Open garbage affects the day to day life as it creates an unhealthy environment. The attitude of people also matters when it comes to garbage collection and disposal. People are habitual of throwing garbage on the roads daily. Even the BMC has strict

guidelines, like if anyone is throwing garbage on roadside then fine of up to 5000 maybe charged. The BMC official also instructed to vendors, shopkeepers, hotel and restaurant owners to put individual dustbin so that municipality workers can collect easily. Most of the shopkeepers and street vendors are throwing in front of their shops instead of disposing dustbin which is provided by the BMC.

The Bhubaneswar Development Authority (BDA) is mainly looking at land and construction-related activities. As per one of the sanitation inspector, the construction material waste such as demolition waste, sand mud, drain sludge, plastic further contributes to environmental pollution. Despite BMC instructions to keep construction material away from road. Quite often contractors also use road for keeping construction materials. The roads occupied for keeping construction material creates transportation problem and results in traffic jams. The BDA and BMC have taken responsibility to make city clean but it seems cleanliness is not a priority for them to make city clean (Plate 18).



**Plate 18:** Construction Material keep on Road



**Plate 19:** BMC Dustbin not Clean Properly

The above picture shows that the BMC dustbin has not been cleared properly. Without garbage cleaning it gives foul smell and polluting the surrounding atmosphere. Sanitation and hygiene in residential area need more attention and improvement. It has also been observed that the residents of the area blame BMC for not installing sufficient dustbins to their area therefore garbage is overflowing on road.

There is lack of timely disposal of garbage collected in the dustbins and overflow of the same. The garbage bin is another issue of the study area. In Bhimpur area, the BMC never provided any garbage bins therefore people throw garbage on road. In

Naharakanta, the BMC provided limited number of garbage bins which are not sufficient for the whole area. It is also observed that there is no timely maintenance of the dustbins and it was found that at some of the places garbage bins are broken and the BMC has not replaced the bins.

As discussed in chapter 6, door to door garbage collection is a challenge for the sanitation workers. In the Bhimpur as well as Naharakanta area household members never cooperate with the sanitation worker during the time of door to door garbage collection. When the sanitation workers collect garbage in colonies people are not dumping garbage on time and they take more time for giving garbage to sanitation workers. If they would give directly to sanitation workers, then there will not be additional work.

In the city private agencies have taken responsibility for Garbage collection, lifting and transporting. In the city private agencies are collecting garbage from 57 wards and in the remaining 10 wards garbage is collected by the BMC. The garbage would overflow and deposit on road due to poor collection by private agencies and BMC. The residents reported that most of the time they complained to BMC but no one comes for garbage collection. The private agencies are giving time but never come to collect garbage.

### **6.8: Housing Condition**

In Bhimpur area, most of houses are kutchra and semi-pucca. The structure of housing is very poor (Plate 20 and 21). Extremely poor households continue to use broken sheets of roofing. The roof is covered with polythene sheets. Most of the houses lack proper ventilation. They are living under abysmal condition which makes them poorer. The government has listed all houses under the Rajiv Awas Yojana (RAY). The numbering had happened more than ten years ago still they did not get the new house under the scheme. Many of the respondents believed that the current government would definitely provide new houses for them under the scheme.



**Plate 20:** Housing condition in Bhimpur Area, Site 1)

**Plate 21:** Housing Condition Bhimpur Area, (Site 2)

In Naharakanta, the structure of housing condition is very poor for those who belong from lower caste community. In the community most of the houses are made in Semi-Pucca and kutchha household. Most of houses have one room two small rooms. Most of the houses have no proper ventilation. Some of the households do not have electricity facility and they use kerosene lamp. A few respondents were able to get some financial help to construct their house under got Indira Awas Yojana (IAY). However, the house remains half built as depicted Plate 22 in lack of funds.



**Plate 22:** SC Community Household Condition Naharakanta, Site 1)

**Plate 23:** Housing condition Higher caste community Naharakanta, Site-2)

In contrast to this, in Naharakanta, higher caste community have pucca houses and some houses are semi-pucca and Kutchha in nature. Most of the houses are made by the owner themselves. Majority of the houses are well built to resist heavy rain and heat as we can see from Plate 18.

In Naharakanta, almost all households belong from Hindu religion. In the area more than twenty temples have been built by the area people. higher caste community. In



the area all temples are located in higher caste community. The picture shows two temples, a Hanuman temple and another Radhakrishnan temple which has been constructed middle part in area. They celebrate puja as per the Odia calendar. In the area people are more involved in performing religious rituals and norms. The caste based norms for socialisation are strongly implemented. Even food habits are decided as per the day basis. To maintain the ritual status, the lower caste people are never allowed to enter the temple. They never participate in any puja festival organized by the upper caste people. Even the upper caste never drinks tea from lower caste tea seller (Plate 24).



**Plate 24:** Temple Naharakanta, Site2



**Plate 25:** Apartment made by Private company, Naharakanta, Site 2

In the area the real estate business is booming and many private enterprises have entered into it. Given the fact that land is available at a relatively cheaper price it is easy for the real estate companies to make profit. In Naharakanta, the Land prices are so high. Within ten years the land price were ten times higher than the actual price. In the area, if anyone wants to buy land for a built house then it would be very difficult to get a land. The higher caste people have land they sell to private companies, and some of them start real estate business. The below picture shows that the people acquired land through real-estate business (Plate 25).

The Plate 25 shows the newly constructed apartment by a private real estate company. The company acquired land from the owner and built apartments where the land owner got two flats free of cost and rest of flats company sold to the customers. The cost of one BHK flat is around fifty lakhs and the amount may vary flat to flat according to the settlement. As per the dealer is concerned, after demonization the real estate business went down and some of the agencies went out of the business. Earlier they had no time and every day they dealt with at least five to ten customer but after demonetization the business slugged down and the competition high. One of the private agency stated that it will take at least four to five months to improve the situation (Plate 26).



**Plate 26:** Newly built Apartment by Private Company (Naharakanta, Site 2)



**Plate 27:** Land covered by the Real Estate (Naharakanta, Site 2)

### 6.9: Road Condition

The Plate twenty-eight, shows the condition of road facility in the Bhimpur area. In the area, half of the road are made in kutchra nature. The condition of road is very poor. In rainy seasons, they have faced more problems due to stagnation of rainwater on road and the rainwater never passed due to houses made on two sides of the road. The rain water did not pass due to lack of drainage facility. In the rainy season most of the time the road clay due to rainwater. The four wheeler, tractor and other four-wheeler vehicle never entered to the area due to less width range road. Even the garbage wheel never entered to the area for garbage collection due to less width road. Most of the population were facing problem when they transport construction materials to construct a house and any other purposes. In Naharakanta, the road is pacca but the condition of road is poor and bumpy. Many accidents occurred due to the poor condition. Its more than ten years the road has not been repaired by the government (Plate 29).



**Plate 28:** Kutchra Road condition in Bhimpur Area, Site 2



**Plate 29:** Poor Road Condition in Naharakanta Area, Site 2

### 6.10: Condition of Anganwadi Centre (AWC)

The AWCs are designed to provide nutritional and early learning support to the children below five years of age. In Bhimpur area there is one AWC and more than thirty students are registered. In the AWC there is no proper ventilation and most of the time students were not coming due to lack of space in the room. In the center there is no electricity facility, water supply and toilet facility. Most of the children are facing problem due to lack of basic facilities in the centre. In the area, other family also wants to send their children to the AWC but already the strength was high so therefore they did not get admission in the AWC. Those children joined the AWC most of their parents worked as daily laborer. Some of them send their children to the center and go for daily work. The AWC takes care of their children and provides food and water (Plate 30). In Naharakanta area, total four AWC has been situated in different localities. The lower caste community has one AWC where only SC children are coming. During the field visits it was observed that the lower caste children never went to the higher caste AWC because they faced discrimination. They are not allowed to sit and eat food with upper caste children in the AWC (Plate 30).



**Plate 30:** Congested Anganwadi Centre Bhimpur (Site-1)

### 6.11: Youth Club:

In centre to engage youth in creative activities in Naharakanta, one club house made by the MLA fund in 2009. The club has more than hundred memberships. If anyone wants to take the membership, then they need to give five hundred rupees as fees. The club members have organized social, cultural and sports activities. The club members have engaged to clean their area in every six months and clean the ponds. The club members also organize both indoor (play card, badminton, Ludo game) and outdoor games (Kabaddi, football and cricket) by the club member. Sometimes the club member organize tournament where they invite other clubs. The last time they organized cricket tournament. The club also organize *Saraswati Puja* and *Ganesh Puja* festival every year. The club members are actively working on disaster management such as natural calamities like flood, cyclone. The club members also helped if anyone faced accident and serious medical problem. The club members are very closely connected with each other (Plate 31).



**Plate 31:** Club House (Naharakanta Site,2)

Plate 31 provides information on the condition of sanitation workers who are engaged in door-to-door garbage collection. During the garbage collection the sanitation workers are not using any safety equipment such as gloves, mask, uniform and boots. Therefore, they face various health-related problems to collect garbage without any safety equipment.



**Plate 32:** Door to door Garbage collection



**Plate 33:** Houses condition of Sanitation workers

### 6.12: Poor Housing Condition of Sanitation Worker

Plate 33 shows the condition of houses structure who are involved in water supply and sanitation work. The housing structure is very poor. Most of the houses have no basic facilities such as electricity, piped water supply, and toilets. Majority of the houses are single room accommodation with poor ventilation facility.

Both state and central government is providing housing facility to urban poor under various schemes such as AWAAS, RAY, VAMBAY, BSUP, JnNRUM, and IHSDP. During data collection most of the respondents reported that they are not getting any housing facility under any schemes. Majority of the respondents were not aware of the any housing schemes provided by the government. Instead of that, the sanitation worker is very less aware about other social schemes which has provided by the government. The major problems are not getting benefit from social schemes from the government due to lack of awareness and lack of education.



**Plate 34:** Poor Housing and Infrastructure condition of Sanitation



**Plate 35:** Lack of Safety equipments during work

## Workers

The Plate number 34 shows the household condition of sanitation workers who are engaged in city water supply and sanitation work. The Plate also shows that the reality of the household's nature where the condition is very poor. Majority of the households are made of kutchra in nature. In rainy season the houses condition very pathetic due to rainwater enter to house and they are staying in poor condition. The household did not have any type of water supply and toilet facilities. Mainly People were accessing water from different sources that are far away from their household. Most of the houses have no toilet facility and they are going for open defecation.

### **6.12(1): Working Condition of Sanitation Worker**

The most pathetic part is that sanitation workers take responsibility to clean the city and provide a healthy environment to the city population. At the same time, they are living in poor houses, unhygienic condition, no electricity, lack of water supply and sanitation facilities. Most of the households are not aware about any government schemes and they are deprived to get government facilities.

The Plate 35 shows that, during the working time most of the sanitation workers never used any safety equipment's. Majority of workers reported they did not get any type of safety equipments from their recruiter so they did not use during the time of work. Some of workers reported that their salary is very less and they did not get salary every month. The amount they get is very less to manage their family. So they cannot spend the salary amount on safety equipments. Sometimes if the broom is broken or lost, the supervisors denied providing brooms again and they are bound to buy new broom for cleaning their area. Whatever brooms are provided by the agency is not sufficient for them to use in next session. If they would not clean properly their area, then they would not get their salary. They are not only working under pressure but also facing financial and mental pressure during sanitation work. It clearly shows the power structure as well as humiliation existing in sanitation work.

### **6.12(2): Health Safety and Lifestyle Conscious**

The sanitation workers belonged from lower caste and they faced problem on their socio-economic condition. Instead of that they also faced health-related problem for their occupation. The health condition of sanitation worker is very poor. Due to the

poor working condition they faced various health-related problem both major and minor illness. They faced skin infectious, hepatitis and respiratory problem etc.

### 6.12(3): Safety Concern of Sanitation Workers

Regarding the safety equipment's of water supply and sanitation workers. Majority of the workers reported that they are not getting any safety equipments when they are engaging in sanitation work. Both government and private agencies are not much bothering for the worker safety. While interviewing, most of the workers reported that they are facing various problem such as death and serious accidental problems due to lack of safety equipments.



**Plate 36:** Dangerous condition of sanitation worker while working on road



**Plate 37:** Door to door garbage collection by a sanitation worker

Both government and private agencies are not providing any basic safety equipments such as gloves, mask, boot, helmet and uniform. Most of the workers reported that when they are working on the main road and they are mostly facing road accident. The thirty-six Plate shows that a woman sanitation worker is sweeping road when four wheelers and two wheelers going so high seed. It clearly shows that the workers never wearing any safety equipment's when working on road. Many sanitation workers never used any safety equipment while cleaning main city roads, workers who engaged in sweeping, brushing, collecting garbage and lifting dead animals. The government made various rules and regulation for sanitation safety concern for the sanitation workers but that only is a written on paper. In reality the working situation gives practical picture of sanitation workers and their poor working condition. The workers also didn't have any access to health insurance or accidental insurance. If they meet an accident, then they would not get any financial assistance for their

treatment. Most of the workers reported that they did not get any financial help when they faced serious accident. Even the private agencies were not providing any health insurance or medical facility to the workers.

Neither the government nor any private agencies arrange any emergency facility for workers if any accident happens. Some of the workers reported that when accident happens then there are no such immediate facility to take that person to hospitals. Sometimes the person dies due to the late arrival of ambulance at the place of accident.



**Plate 38:** A sanitation Worker Unloading Garbage at Garbage point  
**Plate 39:** Sanitation Workers Sweeping Street

Plate 38 shows a young sanitation worker unloading the garbage at garbage point after collection it from door to door. During unloading garbage, he is not wearing any hand gloves, boot, mask or uniform. He is covering his face with clothe. At the time of garbage unloading he faces hand and leg injuries as the waste contains sharp objects such as used blade, needles and brittle glasses. Usually most of the time he would avoids going for treatment. In case he faces serious injury, he has to go to a local medical shop and take medicine for it. Almost all the garbage collectors have to face similar problem. They avoid treatment due to the out of pocket expenditure. If they spend a part of salary on treatment it becomes difficult to run the family.

In Plate 39 two male sanitation workers are seen sweeping a street. The health condition of workers is poor due to unhygienic working condition. Most of the workers reported that they are engaged sanitation work as per the ward-wise. In worksite they did not get basic facilities such as restroom, drinking water facility and



toilets facility. Without availability of basic facilities, the workers are facing problem. In summer and rainy seasons, they face more problems.

Most of the sanitation workers have reported that they are facing problem when they work on colonies. The public never responds politely towards to them. Both mentally and physically they are harassed by the public. If the public do not cooperate to sanitation workers, then it would be impossible to keep the city clean. The government spends crores of rupees for sanitation, if the public thinks that it would be the government's responsibility to make the city clean then government's mission would never be fulfilled.



**Plate 40:** A female sanitation worker is continues working while it's raining



**Plate 41:** A sanitation worker sweeping the street

Plate 40 shows a woman worker working in rain. She is totally drenched. Even after that she is cleaning the street. It seems that she has much more pressure to work. She is working under a private agency which has not provided any rain coat. Those workers have worked on rainy seasons are facing various health-related problem such as cold and fever. The women workers are facing more problem and they are more vulnerable in sanitation work. The private agencies also violate the labour laws and pay less wages to women workers as compared to the male workers. It clearly shows the gender disparity between male and female workers in terms of wage earning. If the working hours are same and work pressure is same then why pay for daily wage differently. They are not only getting low wages but also undermined by their social position in society.

#### **6.12(4): Inhuman Treatment**

As mentioned in chapter (five) sanitation workers are discriminated across the city at their work place. The sanitation workers are facing various problems at workplace. At the workplace people treat them differently due to their nature of job and identity. When they are working in colonies they face more problem than any other place. The women are facing more problem than the men on work site. When sanitation workers are working in the colonies people are not giving water to them directly and they give in separate glasses. Sometimes people are using abusive language when they are working in colonies.

#### **6.12(5): Lifestyle Habits**

In both Bhimpur and Nrakanta site also it was found that most of the workers consume alcohol, *tobacco, pan masala, gutka, khaini, bidi, ganja, aska forty* etc. They consume it regularly during sanitation work. Most of the workers reported that before entering in manhole, in order to suffers the filthy smell, or when removing the dead bodies of animals on roadside they consume alcohol it helps them overcome stink. Both male and female have substances during work time. They know that having substances will impact on their health but they have no other choice. Even the sanitation inspector and health inspector are aware about such habits but they never take any action on them.

#### **6.12(6): Employment Concerns**

In sanitation work, getting a permanent worker is another issue, when most of the sanitation workers are working as contractual and temporary workers in BMC. Majority of the sanitation workers reported that they have been engaged in sanitation work from more than ten to twelve years but still they are working as contractual worker and daily wage worker. Most of them reported that the government hands over sanitation work to private agencies and workers are forcefully thrown out of job by BMC. Now they lost faith on BMC to get work as permanent employee. But when they joined as sanitation workers BMC promised to give them permanent worker but now BMC backed out from the promises.

#### **6.12(7): Low Salary**

Low salary is also another issue of sanitation workers. In the BMC most of the workers are getting very low salary. During data collection most of the workers

reported that they are getting Rs. 4000 to Rs. 4,500 in a month and which is very less amount than permanent sanitation workers. The daily wage salary is two times higher than sanitation worker daily wage salary. The BMC promised to the workers for increasing the salary but still they are getting same salary. The private agencies are also giving less salary but these agencies are exploiting more for giving salary. The low salary of sanitation worker clearly shows the discrimination and exploitation of particular caste occupation by the BMC as well as private agencies.

### 6.12(8): Garbage Management

The garbage management is a major problem in the city. Everyday six hundred tonnes of garbage originates. The garbage is mainly dumped at 'Sainik School' which is situated in *Kharbela Nagar*. The BMC is unable to manage garbage due to lack of space in the city. After garbage collection from primary sources such as households, public and private places the garbage transportation for disposal on dumping area without any treatment and resource recovery. The sanitation inspector also reported that the BMC never used any machines for garbage treatment. The Sainik school dumping site is now overflowing and due to dumping yard nearby residential area is severely affected. The below picture shows the situation dumping yard at Sainik school and Bhuasuni dump yard area (Plate 42).



**Plate 42:** Garbage Site Near Sainik School, Bhubaneswar

**Plate 43:** Bhuasuni Dump Yard at Daruthenga, Bhubaneswar

In the Bhubaneswar city, garbage is filled up at several places across the city. Due to high garbage collection, the BMC has been unable to handle the situation. Currently the *Bhuasuni* dumping yard (Plate 43), close by the *Daruthenga* villagers is overflowing and the stench is unbearable. The villagers are complaining that they are worst affected due to garbage deposited in their area. The villagers also beat up the

driver for entering the yard with a dump truck. They also damaged the truck and the villagers allege that the municipal corporation forcefully dump garbage in the area. The villagers reported that the *Bhuasuni* is under the eco-sensitive zones and dumping garbage in this area is illegal. Therefore, the villagers demanded to BMC to move the dumping yard to any other place. Recently the BMC declared that the garbage dumping site will be shifted from *Bhuasuni* to *Tulashadeipur*.

### **6.13: Conclusion**

This chapter concludes that in both the research sites, Bhimpur and Naharakanta the condition of water supply and sanitation is very poor. The public water supply is erratic, many of the hand pumps are non-functional and those in working condition have contaminated water which not fit for drinking. The SC community in both the study sites in particular suffers the most. As they cannot take water from upper caste locality many times they are forced to use the contaminated water for drinking. For bathing and washing purposes majority of the households use river ghats and canal

Despite government policy to provide financial help for the construction of toilets, it was found that, in both study area majority of population are going for open defecation. Though a few households in Bhimpur area. the structure of toilet facility very poor and most of the toilet are made outside the house. The NGOs constructed small size, poor quality toilets in some of the houses. All the toilets lack running water which a major reason cited by the respondents for not using it. There is lot of politics involved at local level which influences who will be the beneficiary of the government schemes to construct toilet.

One of the other conclusions is the lack of proper facilities for garbage collection and disposal in the selected study sites. The garbage dumping sites near the eco-sensitive areas creates further problems for the local residents. There is no proper drainage system which results in water logging during the rainy season. The sanitation workers face a lot of financial, social and health problems. They live in abject poverty and shanty homes. The workers did not have any health insurance facility. They lack basic facilities at work sites. They face inhuman treatment at work site. The private agencies and contractors grossly neglect the minimum basic guidelines for employing a sanitation worker given by BMC in terms of number of working hours, timely disbursement of the salary and provision of safety equipment and training to the workers.

## Chapter-7

### Discussion and Conclusion

The current chapter deals with the discussion, major findings, conclusion and policy suggestions which evolve from the of the study. The present study is an attempt to understand the importance water supply and sanitation services to sustain the urban life in city of Bhubaneswar. The researcher has tries to comprehensively discuss the major findings in the connection with the conceptualisation of the study. This chapter concludes with some suggestion on the importance of interlinking and integration of the water supply and sanitation services with major infrastructure projects to provide better living conditions to all the sections of the society including the sanitation service providers in urban areas.

#### 7.1 Summary

To understand the condition of water supply and sanitation two sites located at core and periphery of the Bhubaneswar city are selected. The core area is called Bhimpur while the periphery area is known as Naharakanta. Bhimpur is a notified slum and Naharakanta is a developing area which recently came under the BMC jurisdiction as a result of urbanization. Provision of basic civic amenities is relatively better in Naharakanta than Bhimpur. In terms of availability of education Naharakanta is having five schools and degree college while Bhimpur has only one primary school. Cross sectional study design and mixed method approach is used for collecting qualitative and quantitative data in the study. Purposive sampling has been used to locate the respondents. Initially household survey was conducted to map both the study areas. in the second phase in depth interviews were conducted with Households, sanitation workers, community leaders, Aganwadi work, sanitation inspectors to understand their perspective and ideas about water supply and sanitation facilities in both the study area. A total of 270 households, 110 sanitation workers, two sanitation inspectors, six AWW and two community leaders were interviewed respectively. SPSS version 23 was used to analyse quantitative data. Binary logistic regression also used to understand socio-economic factors impact on access water supply and sanitation. To protect identity of the respondents pseudo names are used.

## 7.2: Discussion

The high growth of population, urbanization, industrialization, irrigation and development are the major reasons for water crises today. In current situation water crises is a issues of national and international concern and debate. In India sharing of river water between states is a matter of contention. For instance, there is continued tension between Tamil Nadu and Karnataka over distribution of Cauvery river water. Likewise, in the Indian cities also the demand for water has increased and quite often it leads to brawls between people. It is a matter of policy planning to ensure proper water supply to all. However, the policy makers and planners give less attention to demand management mechanism to reallocate existing supplies. Improper implementation of water policies at grass root level creates various problems related to water supply in urban areas. The national water policy changed its priorities over a period of time. In 1897 water policy gave priorities on provision of drinking water, irrigation, hydro power, ecology, agro industries, non-agro industries, navigation and other uses. But in 2002 water policy priorities for water allocation have been done away from 1987 draft priorities. The 2002 water policy mentions that private sector participation in planning, development, management of water resources should be encouraged. But in 2012 water policy private participation is dropped out from planning, development, management of water resources. The ground water policy is not properly implemented by the government and it remains unregulated in most of the states. Water policies pays very less attention towards regulations, permits, restriction and penalties to use water especially ground water.

The water policy needs to be modified as per the current attitude towards water recharging, among the agencies as well the public. State have right to frame suitable policies, laws and regulation on water which is in agreement with the national legal framework of general principle on water but it is not recognised clearly in the state water policies. In the water policies very less emphasizes is on service providers point of view at grass root level. In most of the states, the PHED and municipality are responsible to provide drinking water supply.

The National Urban Sanitation Policy (NUSP) give importance to totally sanitised, healthy and liveable cities and towns. To achieve total urban sanitation government, needs to address the following key policy issues such as poor awareness, social and occupational aspects of sanitation, fragmented institutional roles and responsibilities,

lack of an integrated city wide approach, limited use of technology, reaching the unserved and poor, lack of demands responsiveness. In the policy lack of coordination between state and centre so that not fulfil the national target as well as international. The lack of strengthening from provider point of view, when provider has taken essential role for providing sanitation services, and making city healthy.

The government introduced various policies and schemes of water supply and sanitation. All the policies and schemes are talk about coverage and provisioning point of view but very less focus on provider's point. Various studies find that inadequate water policies and provisions are the main issues to hinder achieve the goal of water supply and sanitation to all in urban area. Inadequate provisioning and poor implementation of schemes and programme affect water sanitation services (Panda and Agrwala, 2013; Wankhad, 2015; Robert and Rouse, 2013).

Economic factor plays crucial role in accessing water supply and sanitation services. Poor water supply and sanitation are cause of high mortality and diarrheal death of children. Improved water supply and sanitation can reduce 10 percent of global burden disease (Haller et al, 2007; WHO-UNICEF, 2002). Poor economic condition is one of the main reason, people are not able to access tap water supply. (Bajpai and Bhandari; Anand, 2007) The private tanker also charges high amount for providing drinking water in slums and those who can't pay suffer a lot (Robert and Rouse, 2013; NSSO, 2009; Gupta and Ghosh, 2006)

Politics also plays crucial role in determining access to water and sanitation. In municipality election, people give vote to those who promise to fulfil their water supply and sanitation demand (Bapat and Agrwal, 2003; Edelman and Mitra, 2006; Bouselly, 2006). The water distribution in states based is on power; affluent families get better water supply and sanitation facility than the poor (Truelove, 2011; Agarwal and Tanjena, 2005). Socio-cultural can also play as a barrier in accessing water supply and sanitation in the houses. Strong faith on religion and believe on purity and pollution is a major reason people do not construct toilet inside the house (Jha, 2010; Acharya, 2013). In Bangladesh people with Disability cannot use toilet because people have strong believe that disability is a transmitted disease (Noga and Wolbring, 2012).

The high growth of population is major reason to scarcity of water resources in urban area (Chaplin, 2011). The growth of urbanization, factories, construction of buildings and deforestation are main reason to reduce the ground water and water supply (Sabat, 2012). The water resources are polluted due to untreated chemical waste from factories and lack of sewerage facility is responsible for changing the ground water quality (Kundu, 1991; Vijaya et al., 2010)

Poor administrative management is also a reason for the lack of proper water supply and sanitation in urban area (Bownder and Chatrri, 1984; Evan, 2007; Uthira and Babu, 2018). To provide adequate water supply and sanitation the government needs to adopt better management (Ajibade et al., 2015; Evans, 2005).

In current situation the technology plays crucial role to design adequate water supply and sanitation in urban area. Due to poor infrastructure the Indian states needs to adopt better technology for water supply and sanitation (Ali, 2008; Dutta et al., 2016). The technology deals with saving water, leakages and pressure control, domestic water recycle and large scale interventions (Suzenet et al., 2002; Dutta et al., Kumar, 2014). Various studies have been resulted that gender role have major role to access water supply and sanitation. Every person has equal rights but when it comes to water, female is only responsible for collecting to fetching water where they spend long hours. They suffer from constant water related illness and less capacity to participate society. The girl child is four times more accountable than male child for fetching water from distance sources (HDR, 2011; Venkatachalam, 2011; Poulos et al., 2012; Bhullar, 2014; Paul, 2017). The caste plays as a crucial role in determining to access water supply and sanitation in urban area (Shreyaskar, 2016; Banerjee, 2015; Joshi, 2011; Kumar, 2014).

The decline of ground water is a major challenge today. The rapid urbanization, deforestation and decline in average rainfall water are the cause of decline ground water (Goodpal, 2017; Reddy, 2007; Pradhan, 2016). In Bhubaneswar during the summer seasons the water level decreasing (Sabat, 2016). Water conflict happened due to scarcity of water supply in the city. The ground water run out due to growth of population, urbanization, development projects, illegal encroachment, deep borings in apartments, less rainfall and rain water passing as run offs (Dutta, 2019; India Express, 2019; Oak and Pingale, 2019).



The providers play crucial role to provides water supply and sanitation services under the supervision of municipality and PHED. Those service providers working under the water supply and sanitation services their condition is poor. These workers belong to particular caste which is traditionally involved in scavenging occupation (Desai and Kulkarni, 2008; Tiwari, 2014). Government gives less emphasis on these workers, though they play major role in public health (Sharma, 2015). The socio-economic condition of the workers is poor. They are paid very less, face discriminate at work sites, have limited choices of occupation and they are forced to live in isolated places and denied use of public facilities (Ramachandran, 1989; Kosambi, 1994; Gill, 1987; Sinha, 1984; Kumar and Venkateshwarlu, 1980; Shamlal, 1992; Vivek, 1989; Kumar, 2014).

The gender plays crucial role in water supply and satiation work. The majority male members are engage in garbage collection, dumping, cleaning toilets and pick dead animals while female members are engage in swiping work. The salary payment also varies, the male member gets relatively higher salary than female member but the workload and working hours are same for both. They face more problems on work sites than male worker (Joy and Bhagat, 2016; Bhalla and Kaur, 2011; Venkatesh, 2014; (Koonan, 2013); Anbarasu and Narmadha, 2015; Geeta, 2011).

Most of the workers who are engaged water supply and sanitation their educational status very poor (Anbarasu & Narmadha, 2015). The private organization has taken major role in sanitation under the PPP. Under the private organization these workers paid less and the organisations give less salary in the name of PF and ESI (Tam, 2002; Kumar, 2014). The health condition of the works very poor. They face various health related diseases and the government and NGOs do not provide health facility for them. Majority of the workers do not have health insurance facilities. Those are working in sewerage they suffer from respiratory problems. The workers do not get safety equipment's from the government as well NGO's. There are various policies and laws made by the different committees but no one follows the guidelines. So that the conditions of water supply and sanitation workers remain unchanged (Tiwari, 2013; Mishra, Dodiya, and Mathur, 2012; Vivek, Sutul and Vijay, n.d; LARRDIS, 2013).

### **7.3: Major Findings**

#### **7.3(1): Sex and Age Composition**

The sex ratio is 956 females in per thousand males. The total data was collected 1211 person from 290 households in both study areas and average family size is four. The male numbers 51 per cent is higher percentage than the female 48 per cent in the study. Regarding the age group, the data find that the ages of 19 to 35 years make up the higher percentage 38% followed by 36 to 60 years 29 per cent, 7 to 18 years 22 per cent, children below six-years Age 11 per cent and only three per cent of population belonged to 61 years and above

#### **7.3(2): Literacy Rate and Education Attended by the Study Population**

There is 73% of literacy rate in the study population. Regarding the education, it found that the higher percentage of population are completed primary education 31 per cent followed by secondary school completed 30 per cent, middle school completed 24 per cent and 11 per cent completed senior secondary. Only four per cent of population completed graduation and above.

#### **7.3(3): Religion Composition**

In both study area, the higher percentage of population belonged to Hindu religion. As per the Hindu religion, they all celebrate Hindu festivals and culture. *Ratha jatra Makar sakaranti, Nua kahi, Holi, Diwali, Raja, durga puja and laxmi puja* are major festival in both study areas.

#### **7.3(4): Social Identity**

In the study area, higher percentage of population are belonged from SC community 40% followed by OBC 36 per cent, Non SC/ST/OBC 23 per cent and only 1 per cent of population are belonged from ST community in study areas.

#### **7.3(5): Marital Status**

In the study areas, the higher percentage of population 55 per cent are married followed by unmarried 41 per cent, four per cent divorced widows/separated.

#### **7.3(6): Occupation and Income**

Regarding the working condition, the higher percentage of population 62 per cent are non-working than working population 38 per cent in surveyed population. Among the

working population, the higher percentage of population worked as daily labourer 22 per cent followed by petty business six per cent. company job four per cent, driver three per cent, government job two percent and very less percentage of population are engaged in farming activities. Regarding income, the higher percentage of the population 64 per cent have no income. Among the income population, the higher percentage of population 21 per cent have an income below five thousand, five thousand to ten thousand 11 per cent, ten to fifteen thousand two per cent and only two per cent of the population have an income above fifteen thousand.

#### **7.4: Migrant and Migration Pattern**

##### **7.4(1): Place of the Residence**

The higher percentage of the population 52 per cent had migrated from rural area and two per cent of population migrated from other town to the study areas in the city. The higher percentage of population migrated from rural areas to urban areas in Bhimpur area than Naharakanta.

##### **7.4(2): Causes of Migration**

In the study area, both push and pull factors are responsible for people migrated in urban area. The higher percentage of population 39 per cent migrated to urban areas due to job purpose followed by natural calamities four per cent, marriage four per cent, no land two per cent, high rent one per cent were the main reasons people are migrated in the city. In Bhimpur a higher 72 per cent and in Naharakanta a lower 39 per cent of the population had migrated due to job opportunities in the city.

##### **7.4(3): Housing**

The higher percentage 52 per cent of the population were living in semi-pucca houses followed by pucca houses 31 per cent and 17 per cent were living in kutcha houses. In Bhimpur the higher percentage 72 per cent Naharakanta least percentage 38 per cent of the of the population were living in semi-pucca houses.

#### **7.5: Water supply and Sanitation Facilities in the Study Area**

##### **7.5(1): Water Supply**

In both study areas, the water supply facilities were different. The higher percentage of households 35 per cent were dependent on tap water, followed by 30 per cent on

public tap stand post and 24% of household were dependent on public hand pump. Only 2% of households were dependent on tube well and 1% households were dependent on water tank provided by the municipality.

#### **7.5(2): Toilet**

In the study areas, the higher 63% of the households did not have any toilet facilities. Only 37% of the households had a toilet. In Naharakanta area higher percentage 39% and Bhimpur lower percentage 35% of households have toilet facilities in their households. In both study areas the community toilet was not available.

#### **7.5(3): Garbage Bin**

The data reported that in Bhimpur the BMC did not provide any garbage bin facilities and people throw garbage into open space outside of their houses (85 per cent). Only 8 per cent of households were used garbage bin in the area. In Naharakanta, there are garbage bins (15) for household garbage collection installed in a few places by the BMC. These bins were not regularly emptied by the sanitation workers. Therefore, most of the days garbage remains spared on road and area population face problem due to stinking badly. Even after filling many complaints, the situation remains unchanged.

#### **7.5(4): Drainage**

The drainage condition of the study areas is very poor. Among the surveyed population 45 per cent of households had no drainage, 44 per cent had open drainage and only 11 per cent households had closed drainage facility in front of their houses. In Bhimpur area, there were no closed drainage in front of the house, while in Naharakanta area 18 per cent households had closed drainage outside the house. In Bhimpur a higher percentage of households 53 per cent and Naharakanta the least percentage of households 40 per cent reported that they had no drainage facilities outside their households.

#### **7.5(5): Discussion the Issues of Water supply and Sanitation in the Study Area**

There are various issues of water supply in the study area. In below the findings of water supply and sanitation are discussed details.

### **7.5(6): Issues of Access to Pipe Water Supply**

In both the study areas coverage of pipe water supply is poor. Only 35 per cent of households were getting water from door steps. Rest of the households were dependent on other sources of water supply. In Bhimpur the higher 37 per cent of the households were depending on government hand pump and municipal tanker than Naharakanta area. In Naharakanta, people belonging to lower caste are mainly dependent on unprotected well water (12 percent). They take water from piped supply by paying additional charges. The poor households are forced to use well water for drinking. It came to light that there is discrimination in the supply of piped water. Some households were applied for piped water connection and have also deposited the requisite amount of fee but still nothing is being done by the PHED to provide the piped water connection to them. In the community even piped water connection does not come yet.

### **7.5(7): Cost of Water Supply**

The PHED have taken the responsibility to provide pipe water supply in the city. In the surveyed population the higher percentage of households did not pay any cost for water supply and 23 per cent of households reported to pay 150 INR. Only 11 per cent of households reported to pay hundred rupees a month for water supply. In both study areas the higher percentage of households were not take pipe water supply due to poor economic condition and majority of the population are dependent on hand pump water. Some of the households were used unprotected well water due to lack pipe supply and hand pump water in Naharakanta area. The economic factor plays crucial role to access pipe water in both the area. The cost of registration for piped water supply and material is very high. Majority of the people were not able to afford and access piped water.

### **7.5(8): Lack of Infrastructure**

Lack of infrastructure is a major problem to access water facility in the study area. Bhimpur area is unplanned as people captured the government land and constructed house according to their needs. In the area there no proper roads, half of the area is covered by katcha road. During rainy seasons the water remains stagnant on road as there is no drainage facility in the area. The piped water has not reached most of the households. The BMC tanker also cannot enter into the area due to lack of road

facility. Even the garbage vehicle does not enter in the area for garbage collection due to poor road facility.

#### **7.5(9): Duration of Water Supply**

The less duration of water supply is a major problem in the study area. The duration of water supply in morning is only half an hour and majority of the people who are dependent on public stand post they unable to collect water. In both study areas majority of households reported that the pressure of water supply is very slow and due to the less duration most of time they couldn't collect sufficient amount of water. In evening time, the duration of water supply is one hour in Naharakanta area. In Bhimpur area, the supply water was not coming at all. Most of time people were dependent on hand pump water. Sometime people collect water from far place. In Naharakanta area, the SC community people were dependent on unprotected well water due to lack of piped water supply.

#### **7.5(10): Distance Travelled to Fetch Water**

In Bhimpur, some of the households have to walk more than half kilometer to fetching water. Every day people were faced problems due to lack of water to carry on daily activities and household chores requiring water. Most of the respondents who are daily wage laborer reported that they carry water from their workplace. Caste is an important factor which influences access public water sources in Bhimpur in particular and in India in general. In Naharakanta Area, people from SC community have to walk more than any other community to fetch drinking water. They collect drinking water mainly from school hand pump which is located approximately one kilometre away from their residence.

#### **7.5(11): Caste, Class and Gender Plays Major Role to Access Water Supply**

In the study area the caste and class plays crucial role to access pipe water supply. In the study area, those households have higher standard of living condition they accessed pipe water supply than the middle standard and lower standard living condition. In the study area, caste plays major role to access water resources. In Naharakanta area, caste is a major barrier for lower caste to access water from public sources. The lower caste community, did not get pipe supply water and majority of the households were using unprotected well water. They wrote letter to the BMC and PHED department many times but still they were not getting pipe water supply.

It is found that female member takes the more responsibility to collect water than male member in the study area. It is found that most of time women carry the water pot and water bucket to standing on cue near at public hand pump as well as public stand post to collect water. Some day they have to wait for hours to collect water. Most of time they quarrel with each other to collect water and some case also registered in police station. It is also found that to collect water from the public hand pump and public stand post one of the major burden for them. Most of time they suffer physical and mental disturbance due to the brawls over water collection.

#### **7.5(12): Lack of Treatment of Drinking Water**

In surveyed population, majority of the household's (96 per cent) drink water directly without any treatment. In Bhimpur area the higher percentage of households (99 percent) without any treatment of water they drink directly than the Naharakanta area. Due to the poor economic conditions, high cost, lack of time, lack of knowledge and lack of awareness most of the people were using untreated water for drinking. In both study areas very few households were using water purifiers and some households were boiling water for drinking purposes. It found that the majority of the respondents are not satisfied with the water quality. The water quality is very poor.

#### **7.5(13): Water Contamination**

In the study population, people were not using hand pump due to heavy iron content in the water. The seeping of garbage waste and other harmful chemicals in the ground water also changes so the water was not drinkable. The quality of water is also poor as there is high percentage of contamination which makes it unfit for drinking. People use this hand pump water for the other purposes such as cooking, bathing and washing. Most of the time they complained to municipality but the BMC did not take any action on the grievances and the quality of water remains unchanged. The poor maintenance of the public hand pumps also results in the contamination of the water in Bhimpur area. The groundwater quality has been contaminated and the water taste also changed over a period. In the area, the households are not using water for drinking purpose. Due to lack of drainage facility most of the water waste is stagnant and it gets deposited near the hand pump. In the area, households are also dumping garbage in open area, right beside the hand pump as shown in the image. In pipe

supply water due to the high content of bleaching powder it is difficult to it drink water.

#### **7.5(14): Lack of Water Storage Capacity**

In the study area, lack of water storage is a major problem amongst the study population. In the study areas majority of the households do not have a water tank and they were using plastic buckets and tubs for the water storage. When that limited water gets over then they face various problems related drinking, washing and cooking etc. In the area some of the households made water tank and some house were used a plastic tank for storage water. Those were using water tank, their standard of living condition better than the others. In Bhimpur area people were using less water tank than Naharakanta area.

#### **7.5(15): Problem Related to Everyday Water Supply**

Without supply water people were facing various problems but most common problems are drinking (97 percent), cooking (2 per cent) and bathing (1 per cent) in both study areas. Without water availability the area people were collected drinking water from faraway of the places such as temple well, school tube well, colonies and work places for the drinking purposes. Otherwise for rest of the things like cooking and bathing they faced more problems. In Bhimpur area, people were more faced problem without water supply than Naharakantaarea.

#### **7.5(16): Technological Factor**

Technical factor is crucial role in water supply. in the study area technological barrier as major problem to access water supply. In the both study area, households did not install water meter so households misused the supply water. During the water supply time many stand had not used tap system to close supply water which flowing unnecessarily. The pipe supply water very slow in the area because leakage of pipe water in many places. That leak pipe not prepared therefore the water supply is very slow. In the study area three hand pumps were not working at all, even after registered complained to PHED, these were not repaired.

#### **7.5(17): Lack of Cooperation between PHED and BMC**

The water supply is mainly provided by PHED and BMC department. PHED provides pipe water supply in the study area, when there is some problems with the piped water



supply then the PHED workers never respond on time. Due to delayed response people in the area faced problem. In the Naharakanta area, leakage of water from piped water supply and many times community people reported it to PHED department but the situation unchanged. During summer time people faced more problems and the BMC never sent tanker when supply water was not coming.

#### **7.5(18): Environmental Factor**

In summer season water crises is at its peak as people facing severe water crises in both study areas. In Bhubaneswar the groundwater level is decreasing every year. In Bhimpur Area, people were facing more problems due to the scarcity of water. In the area people are mainly dependent on hand pump water and in summer time the groundwater level decreases and they couldn't collect water properly. Due to decreasing groundwater level to fill a bucket of water takes an hour. In the area people were forced to go to faraway places to fetch water. Majority of the people reported collecting drinking water from their workplace, colony and temple well if allowed.

#### **7.5(19): Awareness About the Government Schemes of Water Supply**

In both the study area, very less households (5 per cent) aware about the government schemes. Majority of the households (95 per cent) were not aware about the government schemes of water supply. Less education (56 per cent) and lack of awareness (26 per cent) were the main reasons people were not aware about the government schemes in surveyed population.

#### **7.6: Lack of Toilet Facilities in the Study Area**

In the study area the higher percentage of the households (63 per cent) had not any type of toilet facility in their house. Those had toilet facility, majority of the toilets (29 percent) were made outside the house and very households made toilet inside the house. Majority of the population were going open space for defecate (63 per cent). In Bhimpur areas majority of the population were going railway track, open filed and forest for open defecation. In Naharakanta, majority of the people were going open space and river sites for defecate. The community toilet also not available in the study area.

### **7.6(1): Poor Toilet Structure and Lack of Water Supply**

Majority of the households who had toilet facility, mainly situated outside the house and the structure of the toilet was very poor. In Bhimpur area, those toilets had mainly provided by the by a NGO (*Jagruti*). The material used for constructing the toilets was very poor quality. The toilet was less which makes it unfit for use. Also there was no running water in the toilets constructed. Those who had constructed the toilets near their house hardly used it on regular basis. Only when it is extremely necessary then only the toilet was used otherwise they prefer open defecation. In the study area lack of water supply facilities in toilets (15 per cent) are the main reasons people are going for open defecation. In Bhimpur area, most of the households (34 per cent) made toilet but due to lack of water supply and lack of water availability are the main reasons people are preferred for open defecation.

### **7.6(2): Lack of Space**

Lack of space is another problem to build toilet in the house. In the Bhimpur area people are living on government land and density of population is high. Due to high population growth in the area and building of new houses on limited land there is hardly any land left to construct toilet. Even those households who made toilet in their house it is of poor quality. Most of the households (16 per cent) made temporary toilet for emergency time. Otherwise they preferred to go outside the for open defecation.

### **7.6(3): Education and Awareness**

In the surveyed population due to lack of education (48 per cent) and public awareness (31 per cent) people were not aware about the government schemes. People were not much worried about the toilet facility but they were much worried about possessing smart phones, two wheelers, television and other material things. So majority of the population practiced open defecation.

### **7.6(4): Political Factors**

To access supply water and toilet facility local political factor plays a vital role. In the Bhimpur area, majority of the respondents reported that the connection to politicians plays crucial role to get toilet facility from the agencies. Without giving bribe to the local politicians it is near impossible to get sanction of toilet under the government scheme. The BMC official members also take bribe from politicians to provide toilet

facility. Even to get passed the next instalment of money the BMC official members also take bribe.

#### **7.6(5): Economic Factors**

Economic factor also plays crucial role to have toilet facility. Those households who were economically well off they were able to get the allotment of toilet facility from the government. Some have also constructed toilet on their own in their houses in the study area. Households belonging to lower economic status were not toilet facility in their house.

#### **7.6(6): Believes about Housing of Toilet**

In the area both the study area people are superstitious and have blind believe about constructing toilet inside the house. People believed that house like a temple where god and goddess are living in such place how they built toilet inside their house. If toilet is built inside the house then they would be facing financial crises, bad health condition and diseases. Due to lack of cooperation people are not constructed toilet inside the house.

#### **7.6(7): Lack of Drainage Facility**

In Bhimpur area the drainage condition was very poor. Majority of households (45 per cent) in the area were not had drainage facility and only 43 percent of the households had made drainage in front of their house. The community people requested to the councilor as well as mayor many a times for constructing drainage facility in the area. The BMC also did not made drainge in the area. people went for strike to demand for constratction of drainage but nothing happened. In Naharakanta, some areas are covered by drainage partly (18 per cent) and 41 per cent of drainage remains opened. In Bhimpur, 46 per cent of households had opened drainage and rest of households had not drainage facility in front of their households. In rainy season people are facing more problems due to overflowing of drainage water. Another major problem is that in rainy seasons on some days rain water and drainage water are at the same level. Accidents also happen as people tend to fall unconsciously into the drainage. In SC community area there is no drainage facility and they are facing more problem.

#### **7.6(8): Lack of Coordination and Planning**

The Bhubaneswar Development Authority has taken the responsibility to provide proper drainage facilities in the city. In the city JICA mainly funded under the OWWSSB for drainage in different part of the city but after acute waterlogging, it seems the zero ground reality. Every year the situation is repeated. Due to lack of coordination between OWSSB department, BMC, Work Department, and National Highway Authority of India. The loop holes in the planning and designing of the drainage system in Bhubaneshwar city is a major challenge. The defective design of drainage system by engineers has resulted in non-evacuation of stormwater leading to flooding in residential areas. In the city many places the drainage work is pending for many years by BMC and OSSWB.

#### **7.6(9): Lack of Garbage Bin**

In the study area, majority of households (83 per cent) are throwing garbage in open space outside their house. The BMC did not provide minimum required number of garbage bin in the area. More garbage dumped on road which creates unhealthy environment and odd situation in the area. People are habitual of throwing garbage on the roads daily. Most of the shopkeepers and street vendors are throwing in front of their shops instead of disposing dustbin which is provided by the BMC.

#### **7.6(10): Irregular Visit of Sanitation Workers**

The sanitation workers never come to the Bhimpur area to collect garbage. People throw garbage open space. Even after complaining so many times to BMC the condition remain same in Bhimpur area. In Naharakanta, the sanitation workers also do not come regularly and sometime they came once a week. In SC community, the sanitation workers never enter. The community member also complained to BMC as well as supervisor too but the condition remains same.

#### **7.7: Morbidity Experience and Health Issues among the Study Population**

Out of the total surveyed population of 1211, 389 about (32 per cent) reported some kind of illness. The communicable diseases are more than the non-communicable diseases. A higher percentage of illness is reported by female members than the male member in the study population. As far as the social identity and illness is concerned, it is found that the SC community faced more illness than ST, OBC and Non SC.

Majority of the population preferred private hospital for treatment than the government hospital. Higher percentage of the population who suffered from illness reported to spend their own money. Very less percentage of the population depend on government medicine. Those households have not toilet facility they suffered more illness than those have toilet facility. Those households are dependent on water resources such as unprotected well, public stand post and hand pump they have suffered more illness than the other water resources.

### **7.8: Condition of Service Providers**

Most of the PHED and sanitation workers who are engaged in sanitation work have migrated from rural areas. They migrated from rural to urban areas in search of livelihood. Lack of any skill and lower educational status (89 per cent) forced to them to engage in sanitation work. Under the BMC (in addition to other organization collaborating with BMC) majority of the sanitation workers (81 per cent) work as a contractual labourer. The housing condition of sanitation workers is abysmal. As poor economic condition forces to them live in slums across the city. In the slums majority of houses are semi pucca (65 per cent) and kutcha (31 per cent) in nature. In the slums also the majority of the workers live in rent houses (66 per cent). They live in abject poverty and lack basic facilities such as water supply and sanitation.

Both PHED and sanitation workers face many problems at work. Majority of the workers lack safety equipment (44 per cent) and face various health related problems from major accidental injuries, life threatening diseases to minor illness. Most of the workers are vulnerable to diseases such as fever, cold, cough, skin related problems, TB, stomach, chest and leg pain to name few. Given the low social status of sanitation work, most of the workers face discrimination on work site as well as in the hands of their supervisors. Being contractual workers they have a lot of workload and there is a threat of losing the job. In worksite they do not have access to toilets and other basic facilities. Most of the workers reported that to keep them sane and ease the pain they smoke (9 per cent), chew tobacco (48 per cent) and drink liquor (23 per cent) during work. Otherwise the burden of the filth they clean become too heavy. All the workers are paid very low wages in cash and they do not have a bank account. Both government and NGOs evade the norms and do not provide any medical and health

insurance facility to workers. It also found that the PHED and sanitation workers were not much aware about the government schemes.

### **7.9: Conclusion and Policy Suggestions**

The study tries to understand water supply and sanitation in intersection with policies, programmes and the state machinery to execute them in Bhubaneswar city. Due to high growth of urban population the water supply and sanitation has become a major issue in urban Odisha, especially in Bhubaneswar City. The SDGs already started but the government of Odisha needs to be required urgent attention so that the state can be achieved the MDG target as soon. Still most of the households have lack access to pipe water supply and sanitation facilities in the city. Majority of the city population defecate in open space. Due to the poor water supply and sanitation most of the population faces various health related problems especially children, women and elders are suffering from more health related problem than others. The government has launched various policies and schemes for water supply and sanitation but due to the various issues existing in polices, provisioning and providers hence the set targets are not achieved. Even the benefits of programme did not rich the grass root level. To implement any water sanitation programme the state and centre have to coordinate with each other. The state agencies have to cooperate with each other so that schemes and programmes can reach to the grass root level. The PHED and BMC need to monitor water supply and sanitation so that the city can achieve the target of total sanitation.

The condition of water supply and sanitation in terms of provisioning point of view, in both study areas has not improved. In Bhimpur area where the majority of the households were dependent on public hand pump water and majority of the population defecate in open (near railway track, open filed). In Naharakanta area most of the households were dependent on pipe water supply and public hand pump. The PHED needs to increase the duration of water supply. The quantity of water also not visible per person as per the PHED guideline. As per the PHED guide line each person gets 211 LPCD water per day but the quantity of water not reached at all in the study area.

Caste and class plays crucial role to access water supply and sanitation services provided by the state. In Bhimpur area economically better off households have

improved access water supply than the poorer. In Naharakanta area, people from the SC community are mainly dependent on unprotected well. Even the SCs cannot take water from the higher caste locality, even they could not touch the water resources. Rituals of purity and pollution are strictly followed. In case an SC touches the water bucket of any upper caste there are serious percussions for the SC individual. Sometimes the whole SC community has to bear the wrath of upper caste. Form in depth interviews and result of binary logistic regression we can conclude that caste and socio-economic status impacts access to water and sanitation facilities in urban areas.

The local political leaders plays crucial role to access water supply and sanitation. In Both the study areas, those with good connection with political leaders are able to get water supply, toilet under SBA, electricity and *Ujjwala* gas facilities under various government schools. The lack of technology and poor infrastructure also hampers access to water supply and sanitation. In the city, the PHED is following the traditional method of water supply. When PHED started still the same water pipes are lying in the area which are worn out. In many areas water pipe line is damaged and water flows continuously during the water supply hours. It can also be concluded the PHED is negligent of the complaints regarding the breakage and leakage of water pipes.

The providers play crucial role to achieve water supply and sanitation programme targets. The government needs to provide basic services facilities like; house, electricity, water supply and sanitation facilities for sanitation workers who have been engaged in sanitation work. The government also needs to provide safety equipment for sanitation workers so that accident and deaths incidents can be reduced. The government needs to use modern technology to improve the condition of sanitation workers. Health insurance and life insurance policies for sanitation workers should be provided along with free medical facilities by the government. Regular health check-up should be organized every month by the municipality and the other employer for sanitation workers. There is a need to increase daily wages of contractual as well as daily wages labourers. It should also be ensured the private organisations pay the wages as per government norms. Government and NGOs should create awareness among the sanitation workers about government schemes and programmes meant for their benefit. There is also need to provide basic facilities on work site so that

sanitation workers would be able to use washrooms. Another important thing is that government should organize training programmes for sanitation workers before their joining sanitation work so that death incidents would be reduced. Therefore, the government needs to be more focused on needs of the sanitation workers and fulfilled their basic requirements. This will be one way to address issues of the sanitation workers and enable to them to be a worker comparable to those in another sectors. The water supply policies, provisioning and providers are closely connected with each other. If one will be giving less focused, then that will be impacted as whole. Policymakers, bureaucrats, and planners needs to form interlinkages between various service providing agencies. Integrated approach for sanitation and water supply provision is required to make the urban as well as rural areas liveable.



## Bibliography

- Acharya, S. S. (2010). Access to Health Care and Patterns of Discrimination: A Study of Dalit Children in Selected Villages of Gujarat, *Working Paper Series Indian Institute of Dalit Studies and UNICEF 2010*. 1(2), 48.
- Acharya, S. S. (2013). Universal health care: Pathways from access to utilization among vulnerable populations. *Indian Journal of Public Health*, 57(4), 242. <https://doi.org/10.4103/0019-557X.123260>
- Acharya, S. S. (2015a). *Access to Water and Sanitation Facilities- Missing Linkages with the Providers and Manifestations on Health'* in Nimse, SB and MK Agarwal (eds.) *Public Health and development in India*, New Delhi Northern Book Centre. Pp 26-45 2015
- Acharya, S. S. (2015b). *Water and Sanitation Policy, Provisioning and Providers in India- Examining the Burden on Public Health'* in Suresh Sharma (Ed.) *Maternal and Child health in India- Policies and Challenges*. 2015. New Delhi Bookwell Publishers.
- Acharya, S. S., Sen, S., Punia, M., & Reddy, S. (Eds.). (2017). *Marginalization in Globalizing Delhi: Issues of Land, Livelihoods and Health*. Retrieved from <https://www.springer.com/in/book/9788132235811>
- ADB. (2009). *India's Sanitation for All: How to Make It Happen* (pp. 1-28). <https://www.adb.org/publications/indias-sanitation-all-how-make-it-happen>
- Adkoli, B., Deepak, K., & Kumar, Y. (2014). Extending professional education to health workers at grass root level: An experience from All India Institute of Medical Sciences, New Delhi. *Indian Journal of Community Medicine*, 39(1), 38. <https://doi.org/10.4103/0970-0218.126358>
- Agrawal, V., Srivastava, S., & Pagare, V. (n.d.). *Study on Social Security of Sanitary Workers , Jaipur , INDIA*.
- Ajibade, F. O., Adewumi, J. R., Ojo, O. M., Babatola, J. O., & Oguntuase, A. M. (n.d.). (2) (PDF) Issues, Challenges and Management of Water Supply and Sanitation in Nigeria: An Overview. Retrieved December 28, 2018, from ResearchGate website:

[https://www.researchgate.net/publication/291697932\\_Issues\\_Challenges\\_and\\_Management\\_of\\_Water\\_Supply\\_and\\_Sanitation\\_in\\_Nigeria\\_An\\_Overview/comments](https://www.researchgate.net/publication/291697932_Issues_Challenges_and_Management_of_Water_Supply_and_Sanitation_in_Nigeria_An_Overview/comments)

AMRUT. (2015). *Service Level Improvement Plan (SLIP) Atal Mission for Rejuvenation and Urban Transformation* (pp. 4-75). Retrieved from [http://www.urbanodisha.gov.in/Admin/Upload\\_Files/AMRUT/SLIPs/Puri.pdf](http://www.urbanodisha.gov.in/Admin/Upload_Files/AMRUT/SLIPs/Puri.pdf)

Anand, G., & Deb, A. (2017). *Planning, 'Violations', and Urban Inclusion: A Study of Bhubaneswar*. <https://doi.org/10.24943/ihsyuva.bhubaneshwar.2017>

Anand, P. B. (2007). Semantics of Success or Pragmatics of Progress?: An Assessment of India's Progress With Drinking Water Supply. *The Journal of Environment & Development*, 16(1), 32–57. <https://doi.org/10.1177/1070496506297005>

Anbarasu, D. Joseph, & Narmadha, S. (2015). International Journal of in Multidisciplinary and Academic Research. *Academic Research (SSIJMAR)*, 4(4), 1–15.

Anbarasu, D. Joshep, & Narmadha, S. (n.d.). *Attitudinal Hindrances of Empowering Women Sanitary Workers*. Retrieved from [http://www.researchgate.net/profile/Joseph\\_Anbarasu/publication/260341108\\_Attitudinal\\_Hindrances\\_of\\_Empowering\\_Women\\_Sanitary\\_Workers/links/0deec530d9464ed6c1000000.pdf](http://www.researchgate.net/profile/Joseph_Anbarasu/publication/260341108_Attitudinal_Hindrances_of_Empowering_Women_Sanitary_Workers/links/0deec530d9464ed6c1000000.pdf)

Angelo, C. D. (2012). *The Women, Water and Sanitation Crisis and the Role of the Transnational Corporation: An Evaluation of Initiatives, Incentives and Impacts*. 51(1), 26–33.

Angad, A. (2019). In thirsty Ranchi, stabbings, fights break out over water. Retrieved July 6, 2019, from The Indian Express website: <https://indianexpress.com/article/india/in-thirsty-ranchi-stabbings-fights-break-out-over-water-5794096/>

Anthony, O. (2004). "Urbanization" *Encyclopaedia of Social Theory*. Sage Publication, 853-858.

Avenue, H. R. W. | 350 F. (2014, August 25). Cleaning Human Waste | "Manual Scavenging," Caste, and Discrimination in India. Retrieved August 2, 2018, from Human Rights Watch website: <https://www.hrw.org/report/2014/08/25/cleaning-human-waste/manual-scavenging-caste-and-discrimination-india>

Azeau, A. P. M., & Eed, B. R. (2010). Assessing people's views of infrastructure: methodologies to study urban shared sanitation. *Young*.

B. Nitin. (2017, March 3). Ban no deterrent: Study says Hyderabad still home to 90,000 manual scavengers. *The News Minute*. Retrieved from <https://www.thenewsminute.com/article/ban-no-deterrent-study-says-hyderabad-still-home-90000-manual-scavengers-58048>

Bakir, H. a. (2001). Sustainable wastewater management for small communities in the Middle East and North Africa. *Journal of Environmental Management*, 61(4), 319–328. <https://doi.org/10.1006/jema.2000.0414>

Balakrishnan, R., Alvis, J. C., Baumgartner, J., Berry, D., Bradley, A., Chokshi, M., ... Schulman, A. (2006). *An Assessment of Sanitation and Human Rights in Paliyad. Submitted to Navsarjan, Gujarat, India*. 48.

Bhagat, R. (2011). *Migrants' (Denied) Right to the City*.

Bhagat, R. B. (2014). Rural and Urban Sanitation in India. *Kurukhetra*, 11-14. Retrieved from [https://www.researchgate.net/publication/269702342\\_Rural\\_and\\_Urban\\_Sanitation\\_in\\_India](https://www.researchgate.net/publication/269702342_Rural_and_Urban_Sanitation_in_India)

Bhalla, S., & Kaur, R. (2011). *Labour force participation of women in India: some facts, some queries*. Retrieved from <http://eprints.lse.ac.uk/38367/1/ARCWP40-BhallaKaur.pdf>

- Bharti, A., & Jalotai, D. (2015). Community-based Water Quality Improvement in a Rehabilitated Slum. *Journal of Pollution Effects & Control*, 3 (1), 3-9.
- Bhubaneswar Municipal Corporation Organization Chart:  
<http://bmc.gov.in/Structure.asp?lnk=1&PL=12>-Accessed on 21/5/2017
- Bhunja, R., Ramakrishnan, R., Hutin, Y., & Gupte, M. D. (2009). Cholera outbreak secondary to contaminated pipe water in an urban area, West Bengal, India, 2006. *Indian Journal of Gastroenterology*, 28(2), 62–64.  
<https://doi.org/10.1007/s12664-009-0020-5>
- Bouselly, L., & Road, L. (2006). *Water and Urban Poor National Institute of Urban Affairs Water and Urban Poor*. (December), 1–27.
- Bowonder, B., & Chettri, R. (1984). Urban water supply in India: Environmental issues. *Urban Ecology*, 8(4), 295–311. [https://doi.org/10.1016/0304-4009\(84\)90016-0](https://doi.org/10.1016/0304-4009(84)90016-0)
- Buttenheim, A. M. (2008). The sanitation environment in urban slums: implications for child health. *Population and Environment*, 30(1–2), 26–47.  
<https://doi.org/10.1007/s11111-008-0074-9>
- Champers, R., & Von-Mendeza, G. (2013). Sanitation and Stunting in India Undre Nutrition's Blind Spot. *Economic Political Weekly*, *xlviii* (25), 1-4.
- Chandrasekhar, S. (n.d.). *Growth of Slums, Availability of Infrastructure and Demographic Outcomes in Slums: Evidence from India*. 22.
- Chaplin, S. E. (2011). Indian cities, sanitation and the state: the politics of the failure to provide. *Environment and Urbanization*, 23(1), 57–70.  
<https://doi.org/10.1177/0956247810396277>
- Chellamma, P., Sudhiraj, & Vijayakumar, A. (n.d.). (14) MORBIDITY PROFILE OF SANITARY WORKERS IN THRISSUR CORPORATION, KERALA. Retrieved October 8, 2018, from ResearchGate website:  
[https://www.researchgate.net/publication/290213148\\_MORBIDITY\\_PROFIL](https://www.researchgate.net/publication/290213148_MORBIDITY_PROFIL)

E\_OF\_SANITARY\_WORKERS\_IN\_THRISSUR\_CORPORATION\_KERA  
LA

- Coffey, D., and Spears, D. (2017). *Where India Goes*. India: Harper Collins Publishers.
- Das, A. K., & Takahashi, L. M. (2009). Evolving Institutional Arrangements, Scaling Up, and Sustainability: Emerging Issues in Participatory Slum Upgrading in Ahmedabad, India. *Journal of Planning Education and Research*, 29(2), 213–232. <https://doi.org/10.1177/0739456X09348613>
- Davis, K. (1955). The Origin and Growth of Urban Population in the World. *American Journal of Sociology*, 60(5), 429-437.
- Desai, S., & Kulkarni, veena. (2008). Changing Educational Inequalities in India in the Context of Affirmative Action. *Demography*, 45(2), 245–270.
- Dhar Aarti. (2012). India will achieve sanitation goals only by 2054,. *The Hindu*. Retrieved from <http://www.thehindu.com/todays-paper/tp-national/india-will-achieve-sanitation-goals-only-by-2054/article3252673.ece>
- Dhingra, C., Gandhi, S., Chaurey, A., & Agarwal, P. K. (2008). Access to clean energy services for the urban and peri-urban poor: a case-study of Delhi, India. *Energy for Sustainable Development*, 12(4), 49–55. [https://doi.org/10.1016/S0973-0826\(09\)60007-7](https://doi.org/10.1016/S0973-0826(09)60007-7)
- Donat Castelló, L., Gil-González, D., Alvarez-Dardet Diaz, C., & Hernández-Aguado, I. (2010). The Environmental Millennium Development Goal: progress and barriers to its achievement. *Environmental Science and Policy*, 13(2), 154–163. <https://doi.org/10.1016/j.envsci.2009.12.001>
- Dutta, A., Hajra, G., & Ramani, S. V. (2016). On Incidence of Diarrhoea among Children in India. *Economic & Political Weekly*, 51(22), 7-8.
- Dutta, P. K. (2019). How Chennai lost its water, a story that should worry you. Retrieved July 6, 2019, from India Today website:

<https://www.indiatoday.in/india/story/how-chennai-lost-its-water-a-story-that-should-worry-you-1555096-2019-06-24>

Edelman, B., & Mitra, A. (2006). Slum Dwellers' Access to Basic Amenities: The Role of Political Contact, Its Determinants and Adverse Effects. *Review of Urban and Regional Development Studies*, 18(1), 25–40. <https://doi.org/10.1111/j.1467-940X.2006.00109.x>

Eid, U. (2015). The importance of water, sanitation, and hygiene as keys to national development (pp. 1-5). Retrieved from <https://www.issuelab.org/resource/importance-of-water-sanitation-and-hygiene-as-keys-to-national-development.html>

Esrey, S. A., Potash, J. B., Roberts, L., & Shiff, C. (1991). Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. *Bulletin of the World Health Organization*, 69(5), 609–621.

Evans, B. (2007). *Understanding the Urban Poor's Vulnerabilities in Water Supply and Sanitation*. Retrieved from <http://eprints.whiterose.ac.uk/42852/>

Firstpost. (2016). Mahanadi water dispute between Odisha and Chhattisgarh: Here's all you need to know about the row. Retrieved July 6, 2019, from Firstpost website: <https://www.firstpost.com/india/mahanadi-water-dispute-between-odisha-and-chhattisgarh-heres-all-you-need-to-know-about-the-row-2958188.html>

Fletcher, T. (2002). *Water Supply and Sanitation in India*. Institute of Manufacturing. *MET II Long Project*, 2-26. <http://www.tristanfletcher.co.uk/WaterSupply.pdf>. accessed on 15/4/2014

Ghosh, J. (2017). Sanitation workers in India | Request PDF. *ResearchGate*, 1–3. Retrieved from [https://www.researchgate.net/publication/319628673\\_Sanitation\\_workers\\_in\\_India](https://www.researchgate.net/publication/319628673_Sanitation_workers_in_India)

- Gleick, P. (1999). *The Human Right to Water*. 1600(July), 1–23. Retrieved from [https://www.un.org/waterforlifedecade/human\\_right\\_to\\_water.shtml](https://www.un.org/waterforlifedecade/human_right_to_water.shtml)
- GoI. (2011). *Millinum Development Goals India Country Report 2011*. Retrieved from [http://mospi.nic.in/mospi\\_new/upload/mdg\\_2011\\_24apr12.pdf](http://mospi.nic.in/mospi_new/upload/mdg_2011_24apr12.pdf)
- GoI. (n.d.). *Concept and Definiation Used in National Sample Survey Organization Ministry of Statistics and Programme Implimentation Govt of India. NSS* (pp. 1–144). Retrieved from [“http://mospi.nic.in/Mospi\\_New/upload/concepts\\_golden.pdf”](http://mospi.nic.in/Mospi_New/upload/concepts_golden.pdf)  
[http://mospi.nic.in/Mospi\\_New/upload/concepts\\_golden.pdf](http://mospi.nic.in/Mospi_New/upload/concepts_golden.pdf)
- GOI. (2008). *Integrated Low Cost Sanitation Scheme, Revised Guide Lines*. Government of India Ministry of Housing and Urabn Poverty Alleviation, New Delhi. [http://mhupa.gov.in/w\\_new/ILCS-GUIDELINES-PLUS-DPR-FORMAT.pdf](http://mhupa.gov.in/w_new/ILCS-GUIDELINES-PLUS-DPR-FORMAT.pdf) accessed on 23/5/2014
- GoO. (2010). *Odisha Urban Sanitation Strategy 2011* (pp. 1–26). Retrieved from [http://www.urbanodisha.gov.in/\(S\(mmsysc45j1g52d55er0ffn45\)\)/pdf/plans\\_policies/Odisha\\_Urban\\_Sanitation\\_Strategy.pdf](http://www.urbanodisha.gov.in/(S(mmsysc45j1g52d55er0ffn45))/pdf/plans_policies/Odisha_Urban_Sanitation_Strategy.pdf)
- GoO. (2016). *Odisha Urban Sanitation Strategy 2017* (pp. 6-45). Retrieved from <http://www.cprindia.org/research/reports/odisha-urban-sanitation-policy-and-strategy-2017>
- GoO. (2007). *Odisha State Water Policy-2007* (pp. 1-17). Retrieved from <http://www.dowrorissa.gov.in/SWP2007/SWP%202007.pdf>
- GoO. (2013). *Odisha State Urban Water Supply Policy-2013* (pp. 1-15) Retrieved from [http://www.indiaenvironmentportal.org.in/files/file/STATE\\_URBAN\\_WATER\\_SUPPLY\\_POLICY.pdf](http://www.indiaenvironmentportal.org.in/files/file/STATE_URBAN_WATER_SUPPLY_POLICY.pdf)
- GoI. (2002). *National Water Policy-2002* (pp.2-10). Retrieved from <http://www.dowrorissa.gov.in/ActsnPolicies/NWP/2002/NationalWaterPolicy2002.pdf>

- GoI. (2008). *Integrated Low Cost Sanitation Scheme, Revised Guide Lines*. Government of India Ministry of Housing and Urban Poverty Alleviation, New Delhi. [http://mhupa.gov.in/w\\_new/ILCS-GUIDELINES-PLUS-DPR-FORMAT.pdf](http://mhupa.gov.in/w_new/ILCS-GUIDELINES-PLUS-DPR-FORMAT.pdf) accessed on 23/5/2016
- GoI. (2012). *National Water Policy-2012 (pp. 1-13)*. Retrieved from [http://mowr.gov.in/sites/default/files/NWP2012Eng6495132651\\_1.pdf](http://mowr.gov.in/sites/default/files/NWP2012Eng6495132651_1.pdf)
- Goodpal. (2017, December 27). Alarming Fall In Groundwater Levels In India. Retrieved December 26, 2018, from Issues and Challenges in India website: <https://socialissuesindia.wordpress.com/2017/12/27/alarming-fall-in-groundwater-levels-in-india/>
- Government of Odisha. (2015). *Report on Solid Waste Management in the Urban Local Bodies in Odisha (pp. 1-134)*. Retrieved from [http://www.urbanodisha.gov.in/\(S\(0ev41rf4jjm1axfqjdmqbj\)\)/pdf/Action\\_Plan\\_NGT\\_SWM\\_Odisha.pdf](http://www.urbanodisha.gov.in/(S(0ev41rf4jjm1axfqjdmqbj))/pdf/Action_Plan_NGT_SWM_Odisha.pdf)
- Government of Orissa, & Housing and Urban Development Department. (2011). *ORISSA URBAN WATER AND SANITATION COMMUNICATION STRATEGY (Including Solid Waste Management)*. Retrieved from [http://www.urbanodisha.gov.in/\(S\(mmsysc45j1g52d55er0ffn45\)\)/pdf/plans\\_policies/Odisha\\_Urban\\_Sanitation\\_Strategy.pdf](http://www.urbanodisha.gov.in/(S(mmsysc45j1g52d55er0ffn45))/pdf/plans_policies/Odisha_Urban_Sanitation_Strategy.pdf)
- Gupta, D. (2015). The Importance of being 'Rurban' Tracking Changes in a Traditional Setting. *Economic and Political Weekly*, 24, June 13, 37-43.
- Haller, M. L., Hutton, G. P. C., & Bartram, J. (2007). Estimating the costs and health benefits of water and sanitation improvements at global level. *Journal of Water and Health*, 5(4), 467-480. <https://doi.org/10.2166/wh.2007.008>
- Hathi Payal and Gupta Ashish. (2014). A sanitation sena for India. *Indian Express*. Retrieved from [http://riceinstitute.org/news\\_post/a-sanitation-sena-for-india/](http://riceinstitute.org/news_post/a-sanitation-sena-for-india/)
- Heyvaert, M., Maes, B., & Onghena, P. (2013). Mixed methods research synthesis: Definition, framework, and potential. *Quality & Quantity*, 47(2), 659-676. <https://doi.org/10.1007/s11135-011-9538-6>



- Hope, R., & Rouse, M. (2013). Risks and responses to universal drinking water security. *Philosophical Transactions. Series A, Mathematical, Physical, and Engineering Sciences*, 371(2002), 20120417. <https://doi.org/10.1098/rsta.2012.0417>
- Housing & Urban Development Department, Government of Odish. *Activity Report 2012-2013*. Housing & Urban Development Department, Government of Odisha. [http://www.urbanodisha.gov.in/\(S\(mmsysc45j1g52d55er0ffn45\)\)/pdf/annual\\_activity\\_report/Annual\\_Activities\\_Report\\_2012-13.pdf](http://www.urbanodisha.gov.in/(S(mmsysc45j1g52d55er0ffn45))/pdf/annual_activity_report/Annual_Activities_Report_2012-13.pdf) Accessed on 20/5/2017
- Housing & Urban Development Department. (n.d.). *Odisha Water Supply & Sewerage Board*. Retrieved July 4, 2014, from Housing and Urban Development Department Web site: [http://urbanorissa.gov.in/water\\_supply\\_sewerage\\_board.html](http://urbanorissa.gov.in/water_supply_sewerage_board.html) Accessed on 15/5/2017
- HRW. (2014). *Cleaning human waste*. Retrieved from <https://www.hrw.org/report/2014/08/25/cleaning-human-waste/manual-scavenging-caste-and-discrimination-india>
- Hutton, G., & Bartram, J. (2008). Regional and global costs of attaining the water supply and sanitation target (Target 10) of the Millennium Development Goals. *World Health Organisation, Geneva*. Retrieved from [http://www.who.int/entity/water\\_sanitation\\_health/economic/mdg\\_global\\_costing.pdf?ua=1](http://www.who.int/entity/water_sanitation_health/economic/mdg_global_costing.pdf?ua=1)
- Hutton, G., Haller, L., & others. (2004). *Evaluation of the costs and benefits of water and sanitation improvements at the global level*. Retrieved from [http://wwwlive.who.int/entity/water\\_sanitation\\_health/wsh0404.pdf](http://wwwlive.who.int/entity/water_sanitation_health/wsh0404.pdf)
- IIHS. (2014). *Urban Water Supply and Sanitation in India* (1-66). Retrieved from [http://iihs.co.in/knowledge-gateway/wp-content/uploads/2017/11/RF-WATSAN\\_reduced\\_sized.pdf](http://iihs.co.in/knowledge-gateway/wp-content/uploads/2017/11/RF-WATSAN_reduced_sized.pdf)
- Ivens, S. (2008). Does Increased Water Access Empower Women? *Development*, 51(1), 63–67. <https://doi.org/10.1057/palgrave.development.1100458>

- Jha, M. K. (n.d.). *Homeless Migrants in Mumbai: Life and Labour in Urban Space*. 7. Retrieved from [http://www.mcrg.ac.in/Rural\\_Migrants/Abstracts/Manish.pdf](http://www.mcrg.ac.in/Rural_Migrants/Abstracts/Manish.pdf)
- Jha, N. (2010). *Access of the Poor to Water Supply and Sanitation in India: Salient Concepts, Issues and Cases*. Retrieved from International Policy Centre for Inclusive Growth, 62. website: <https://ideas.repec.org/p/ipc/wpaper/62.html>
- Joshi, D. (2011). Caste, Gender and the Rhetoric of Reform in India's Drinking Water Sector. *Economic and Political Weekly*, 50(23), 7–8.
- Joshi, R., & Ahmed, S. (2016). Status and challenges of municipal solid waste management in India: A review. *Cogent Environmental Science*, 2(1). <https://doi.org/10.1080/23311843.2016.1139434>
- Joy, K. J. & Bhagat, S. (2016). Right to Sanitation in India, Nature Scope and Voices from the Margins (pp. 1-95). <https://www.soppecom.org/pdf/Right-to-sanitation-in-India-Nature-scope-and-voices-fro-%20the-margins.pdf>
- Kandoi, Vahini. (2018). Water Wives of Danganmal. Retrieved March 25, 2018, from The Brown Page website: <https://www.thebrownpage.com/english/water-wives-of-danganmal-thane-maharashtra/>
- Karan, S. kumar, & Harada, H. (2002). Field Survey on Water Supply, Sanitation and Associated Health Impacts in Urban Poor Communities.pdf. *Water Science and Technology*, 46(12), 279–275.
- Karelia, G. (2018, October 10). Groundwater Is A Finite Source, Will End One Day If We Fail To Reduce Its Exploitation: WaterAid India | Water Supply. Retrieved October 13, 2018, from NDTV-Dettol Banega Swachh India website: <https://swachhindia.ndtv.com/water-crisis-solution-to-groundwater-extraction-in-india-wateraid-expert-26311/>
- Katukiza, a. Y., Ronteltap, M., Niwagaba, C. B., Foppen, J. W. a, Kansiime, F., & Lens, P. N. L. (2012). Sustainable sanitation technology options for urban slums. *Biotechnology Advances*, 30(5), 964–978. <https://doi.org/10.1016/j.biotechadv.2012.02.007>

- Kathpalia, G. N., & Kapoor, R. (2002). *Water policy and action plan 2020: an alternative – A report for the Planning Commission* (pp. 1–33). Retrieved from <https://www.indiawaterportal.org/articles/water-policy-and-action-plan-2020-alternative-report-planning-commission>
- Khatri, D. A. K. (2018). Health Problems among Sanitation Workers in Indore City and Their Knowledge, Attitude & Practices Regarding Preventive Measures Taken At Workplace: A Cross- Sectional Study. *Journal of Medical Science And Clinical Research*, 6(5). <https://doi.org/10.18535/jmscr/v6i5.28>
- Knudsen, A. B., & Slooff, R. (1992). Vector-borne disease problems in rapid urbanization: new approaches to vector control. *Bulletin of the World Health Organization*, 70(1), 1-6.
- Koonan, S. (2013). *Background Note on Prohibition of Manual Scavenging and Protection of the Rights of Sanitation Workers in India*. 44(May), 2–3.
- Krishnan, A., Ramji, M., & Taishi, Y. (2007). *Low Income Housing in India: Challenges and Opportunities for Microfinance*. (June).
- Kuberan, A., Singh, A. K., Kasav, J. B., Prasad, S., Surapaneni, K. M., Upadhyay, V., & Joshi, A. (2015). Water and sanitation hygiene knowledge, attitude, and practices among household members living in rural setting of India. *Journal of Natural Science, Biology, and Medicine*, 6(Suppl 1), S69–S74. <https://doi.org/10.4103/0976-9668.166090>
- Kumar, G. S., Kar, S. S., & Jain, A. (2011a). Health and environmental sanitation in India: Issues for prioritizing control strategies. *Indian Journal of Occupational and Environmental Medicine*, 15(3), 93–96. <https://doi.org/10.4103/0019-5278.93196>
- Kumar, G. S., Kar, S. S., & Jain, A. (2011b). Health and environmental sanitation in India: Issues for prioritizing control strategies. *Indian Journal of Occupational and Environmental Medicine*, 15(3), 93–96. <https://doi.org/10.4103/0019-5278.93196>

- Kumar Karn, S., & Harada, H. (2002). Field survey on water supply, sanitation and associated health impacts in urban poor communities - a case from Mumbai City, India. *Water Science and Technology*, 46(11–12), 269–275. <https://doi.org/10.2166/wst.2002.0749>
- Kumar, V. (2014). Whose Cleanliness? *Economic and Political Weekly*, xlix(43 & 44), 13–15.
- Kundu, A. (1991). Micro Environment in Urban Planning: Access of Poor to Water Supply and Sanitation. *Economic and Political Weekly*, 2167–2171.
- Maiti, S., & Agrawal, P. K. (2005). Environmental Degradation in the Context of Growing Urbanization: A Focus on the Metropolitan Cities of India. *Journal of Human Ecology*, 17(4), 277–287. <https://doi.org/10.1080/09709274.2005.11905793>
- Manasi, S., & Latha, N. (2017). *Toilet Access Among the Urban Poor-Challenges and Concern in Bengaluru City Slums*. 25. Retrieved from <http://www.isec.ac.in/WP%20383%20-%20Manasi%20S%20and%20N%20Latha%20-%20Final.pdf>
- Mara, D. D. (2003). Water, sanitation and hygiene for the health of developing nations. *Public Health*, 117(6), 452–456. [https://doi.org/10.1016/S0033-3506\(03\)00143-4](https://doi.org/10.1016/S0033-3506(03)00143-4)
- Mariammal, T., Jaisheeba, A. A., & Sornaraj, R. (2012). *Work Related Respiratory Symptoms and Pulmonary Function Tests Observed Among Construction and Sanitary Workers of*. 4(3), 1266–1273.
- Mason, N., & Mosello, B. (n.d.). *How to reduce inequalities in access to WASH*. 46. Retrieved from <https://www.odi.org/sites/odi.org.uk/files/resource-documents/11607.pdf>
- Mathur, N., Mishra, A., & Dodiya, I. (2012). *An Assessment of Livelihood and Educational Status of Sanitation Workers in Ahmedabad, Gujarat* (No. WP2012-10–01). Retrieved from Indian Institute of Management Ahmedabad,

Research and Publication Department website:  
<https://ideas.repec.org/p/iim/iimawp/11456.html>

- M-Buttenheim, A. (2008). The Sanitation Environment in Urban Slum: Implication for Child health. *Populationn Enviornment* , 30.
- McKenzieb, D., & Raya, I. (2009). Urban water supply in India: Status, reform options and possible lessons. *Water Policy*, 11(4), 442–460.  
<https://doi.org/10.2166/wp.2009.056>
- Medeazza, G. von, & Chambers, R. (2015). Sanitation and Stunting in India. *Economic and Political Weekly*, 48(25), 7–8.
- Meher, R. (n.d.). *The social and ecological effects of industrialisation in a tribal region: The case of the Rourkela Steel Plant - Rajkishor Meher, 2003*. 37(3), 430–457.
- Minh, Minh, & Nguyen Viet Hung. (2011). Economic Aspects of Sanitation in Developing Countries. *Environmental Health Insights*, 63.  
<https://doi.org/10.4137/EHI.S8199>
- Mintz, E. D., Bartram, J., Lochery, P., & Wegelin, M. (2001). Not just a drop in the bucket: Expanding access to point-of-use water treatment systems. *American Journal of Public Health*, 91(10), 1565–1570.  
<https://doi.org/10.2105/AJPH.91.10.1565>
- Mishra, A., Dodiya, I., & Mathur, N. (2012). *An Assessment of Livelihood and Educational Status of Sanitation Workers in Ahmedabad , Gujarat*.
- Modi, P. N. (2016). *Water Supply Engineering - Vol. 1* (Edition: 5th, Year-2016 edition). Nai Sarak: Standard Book House.
- Mohammed, S., & Latif, P. A. (2014). Possible Health Danger Associated With Gabbage/Refuse Collectors. *Journal of Environmental Science, Toxicology and Food Technology*, 8(9), 22–30.

- MoUD. (2015). *Atal Mission for Rejuvenation and Urban Transformation (AMRUT)* (pp. 4–76). Retrieved from <http://amrut.gov.in/writereaddata/AMRUT%20Guidelines%20.pdf>
- MoUD. (2012). *Improving Urban Water Supply & Sanitation Services: Advisory Note* (pp. 5-26). Retrieved from [http://www.indiaenvironmentportal.org.in/files/file/Advisory\\_Note\\_uwss.pdf](http://www.indiaenvironmentportal.org.in/files/file/Advisory_Note_uwss.pdf)
- MoUD. (2015). *Atal Mission for Rejuvenation and Urban Transmission: Mission Statement and Guideline* (pp. 4-76). Retrieved from <http://amrut.gov.in/writereaddata/AMRUT%20Guidelines%20.pdf>
- MoWR. (1987). *National Water Policy-1987* (pp.1-11) Retrieved from <http://www.rainwaterharvesting.org/Downloads/nwp1987.pdf>
- Mutatkar, R. K. (1995). Public health problems of urbanization. *Social Science & Medicine* (1982), 41(7), 977–981.
- National Institute of Urban Affairs. (2010). *Procedure for Obtaining Water and Sewerage Connections in India: Case Study of Five Cities* (pp. 10–56).
- Nayar, K. R. (2015). Housing Amenities and Health Improvement-Some Findings. *Economic and Political Weekly*, 32(22), 7–8.
- Newslick Report. (2018). Is the Mahanadi Water Dispute Between Odisha and Chhattisgarh Being Politicised? Retrieved July 6, 2019, from NewsClick website: <https://www.newslick.in/mahanadi-water-dispute-between-odisha-and-chhattisgarh-being-politicised>
- Noga, J., & Wolbring, G. (2012). The economic and social benefits and the barriers of providing people with disabilities accessible clean water and sanitation. *Sustainability*, 4(11), 3023–3041. <https://doi.org/10.3390/su4113023>
- NSSO. (2001). *Concept and Definition Used in National Sample Survey Organization Ministry of Statistics and Programme Implimentation Govt of India*. NSS. Golden Jublee Publication

[tp://mohfw.nic.in/WriteReadData/1892s/6960144509Annual%20Report%20to%20the%20People%20on%20Health.pdf](http://mohfw.nic.in/WriteReadData/1892s/6960144509Annual%20Report%20to%20the%20People%20on%20Health.pdf) Accessed on 19/5/2016

- NSSO. (2012). Drinking Water, Sanitation, Hygiene and Housing Condition in Odisha (pp. 1-222). Retrieved from [http://www.desorissa.nic.in/pdf/hygiene\\_household.pdf](http://www.desorissa.nic.in/pdf/hygiene_household.pdf)
- Oak, G. N., & Pingale, V. (2019). India's Local Water Conflicts Are a Looming Threat. Retrieved July 6, 2019, from The Diplomat website: <https://thediplomat.com/2019/05/indias-local-water-conflicts-are-a-looming-threat/>
- Panda, G., & Agarwala, T. (2013). *Public provisioning in water and sanitation study of urban slums in Delhi*. 48, 24–28.
- Pandia, B. P. (2019). “Maha” dispute over the Mahanadi. Retrieved July 6, 2019, from <https://www.downtoearth.org.in/blog/water/-maha-dispute-over-the-mahanadi-60542>
- Pangare, G., Pangare, V., & Das, B. (2006). *Springs of Life: India's Water Resources*. Academic Foundation.
- Paul, T. (2015). Viewing National Water Policies through a Gendered Lens. *Economic and Political Weekly*, 52(48). Retrieved from <http://www.epw.in/journal/2017/48/special-articles/viewing-national-water-policies-through-gendered-lens.html>
- Patra, Golak. (2012). Public Health Issues in Urban Planning: Understanding JnNURM in Bhubaneswar City. Unpublished Dissertation, Centre of Social Medicine & Community Health, Jawaharlal Nehru University: New Delhi
- Permutt, S. D. (2011). The Manual Scavenging Problem: A Case for the Supreme Court of India Note. *Cardozo Journal of International and Comparative Law*, 20, 277–312.
- Pradhan, H. (n.d.). Groundwater depleting fast in capital city: Study - Times of India. Retrieved December 26, 2018, from The Times of India website:

<https://timesofindia.indiatimes.com/city/bhubaneswar/Groundwater-depleting-fast-in-capital-city-Study/articleshow/52020140.cms>

Praveen, J. (2014). *Realizing the goals of Swachh Bharat Abhiyan*. Retrieved from <https://thecompanion.in/realizing-the-goals-of-swachh-bharat-abhiyan>

Priya, R. (1993). Town Planning, Public Health and-Urban Poor-Some Explorations from Delhi. *Economic and Political Weekly*, 28(17), 7–8.

Puone, T., Tsolekile, L., Sandens, D., & Parker, W. *Chronic Non Communicable Diseases*. [http://www.hst.org.za/uploads/files/chap5\\_08.pdf](http://www.hst.org.za/uploads/files/chap5_08.pdf) Accessed as on 18/5/2017

Qadeer, I. (2001). Health Seervice System in inida: An Expression: of Socio-Economic Inequality, *Social Ation. Public Health in India* , 35, 199-223.

Rahman, P. M. S. (n.d.). *Access to Water and Women Empowerment : A Nexus in Cross Cultural Perspective*. 1–11.

Rangamani, S., Bheemappa Obalesha, K., & Gaitonde, R. (2015). Health issues of sanitation workers in a town in Karnataka: Findings from a lay health-monitoring study. *The National Medical Journal of India*, 28, 70–73.

Rashtriya Garima Abhiyan. (2011). Eradication of inhuman practice of manual scavenging and comprehensive rehabilitation of manual scavengers in India – A report by Rashtriya Garima Abhiyan. Retrieved August 6, 2018, from <http://www.indiawaterportal.org/articles/eradication-inhuman-practice-manual-scavenging-and-comprehensive-rehabilitation-manual>

Rath, P. C. (2010). *Water and Sanitation in Odisha: An overview*. Project Municipal and Development, USAIDE FAIRE. [http://www.hdf.ac.in/oec\\_2010/Water%20and%20Sanitation%20in%20Odisha.pdf](http://www.hdf.ac.in/oec_2010/Water%20and%20Sanitation%20in%20Odisha.pdf) accessed on 27/3/2016

Ratha, K. C., & Mahapatra, S. K. (2015). Resolving the Mahanadi Water Conflict. *Economic and Political Weekly*, 52(51), 7–8.



- Reddy, K. S. (2003). *Presentation and Control of Non Communicable Diseases: Status and Strategies*. Research on International Economic Relation, <http://www.icrier.org/pdf/wp104.pdf> Accessed on 23/5/2015
- Reportable and Communicable Diseases Rule. (n.d.). *Department of Health*, 15. Retrieved from [http://www.healthvermont.gov/sites/default/files/documents/2016/12/REG\\_reportable-and-communicable-diseases.pdf](http://www.healthvermont.gov/sites/default/files/documents/2016/12/REG_reportable-and-communicable-diseases.pdf)
- Revi, A. (2008). Climate change risk: an adaptation and mitigation agenda for Indian cities. *Environment and Urbanization*, 20(1), 207–229. <https://doi.org/10.1177/0956247808089157>
- Rockström, J., & Stockholm Environment Institute. (2005). *Sustainable pathways to attain the millenium development goals: assessing the key role of water, energy and sanitation*. Stockholm: Stockholm Environment Institute (SEI).
- Rout, N. R. (2008). Slum Growth in Bhubaneswar: A Problem or Solution? *ITPI Journal*, 5, 59–64.
- Roy, A., Singh, P., & N Roy, U. (2015). Impact of Rural-Urban Labour Migration on Education of Children: A Case Study of Left Behind and Accompanied Migrant Children in India. *Space and Culture, India*, 2, 17. <https://doi.org/10.20896/saci.v2i4.74>
- Sabat, D. A. K. (2012). Analysis of the Underlying Cause of Environmental Degradation in Bhubaneswar City. *International Journal of Engineering Research and Applications*, 2(2), 210-2014.
- Satapathy, B. K. (2014). Safe Drinking Water in Slums. *Economic & Political Weekly*, XLIX(24), 6.
- Satapathy Biraja Kabi. (2012). *Water and Sanitation State Series 2012 Odisha: After Baby Steps, Run!* (pp. 1–24). Retrieved from [http://www.urbanodisha.gov.in/\(S\(mmsysc45j1g52d55er0ffn45\)\)/pdf/plans\\_policies/Odisha\\_Urban\\_Sanitation\\_Strategy.pdf](http://www.urbanodisha.gov.in/(S(mmsysc45j1g52d55er0ffn45))/pdf/plans_policies/Odisha_Urban_Sanitation_Strategy.pdf)

- Secretariat, L. O. K. S. (2013). *Manual Scavengers: Welfare and Rehabilitation*. (18), 1–25. Retrieved from <http://164.100.47.193/intranet/Manual%20Scavengers%20welfare%20and%20Rehabilitation.pdf>
- Sengupta, U. (2010). The hindered self-help: Housing policies, politics and poverty in Kolkata, India. *Habitat International*, 34(3), 323–331. <https://doi.org/10.1016/j.habitatint.2009.11.009>
- Sharma, A., & Khandewal, R. (2014, August 1). The Invisible City Makers: Of migration and migrant workers in India. Retrieved August 2, 2018, from Café Dissensus website: <https://cafedissensus.com/2014/08/01/the-invisible-city-makers-of-migration-and-migrant-workers-in-india>
- Shaw Annapurna (2005) Peri-Urban Interface of Indian Cities: Growth, Governance and Local Initiatives, *Economic and Political weekly* Vol. 40, No. 2 (Jan. 8-14, 2005), pp. 129-136
- Shreyaskar, P. K. P. (2016). Contours of Access to Water and Sanitation in India: Drawing on the Right to Live with Human Dignity | *Economic and Political Weekly*. *Economic & Political Weekly*, 51(53), 144–151.
- Shyamlal. (1992). *The Bhangi: A Sweeper Caste, Its Socio-economic Portraits: with Special Reference to Jodhpur City*. Popular Prakashan.
- Soni, N. K., & Jain, P. (n.d.). JNNURM and Its Impact on the Bhopal City. *Population*, 7(57,143), 8163–3.
- Sophia, N. S., & Pavithra, S. (n.d.). *A study on sanitation workers at Tiruchirappalli*. 3. Retrieved from <http://www.allresearchjournal.com/archives/2017/vol3issue4/PartC/3-4-18-943.pdf>
- Soussan, J., Noel, S., Harlin, J., & Schmidt, S. (2006). Linking poverty reduction and water management. *United Nations Development Programme Stockholm Environment Institute Poverty-Environment Partnership*. Retrieved from <http://dlc.dlib.indiana.edu/dlc/handle/10535/5151>

- Sridher, & Kumar, S. (2013). India's Environment, Air/Water Pollution and Pollution Abatement. *Economic & Political Weekly*, xviii(6), 22-25.
- Subbaraman, R., Shitole, S., Shitole, T., Sawant, K., O'Brien, J., Bloom, D. E., & Patil-Deshmukh, A. (2013). The social ecology of water in a Mumbai slum: failures in water quality, quantity, and reliability. *BMC Public Health*, 13, 173. <https://doi.org/10.1186/1471-2458-13-173>
- Tam, S. (2002). Coprology and Caste: The Status of Sewerage in Ahmedabad, India. *Comparative-Historical Social Science (CHSS) Working Paper Series*. Retrieved from <http://buffett.northwestern.edu/documents/working-papers/CHSS-12-002-Tam.pdf>
- Team, S., Mehta, R., Giri, B. K., Roy, S., & others. (2008). *Review of Concepts and Measurement Techniques in Employment and Unemployment Surveys of NSSO*. Retrieved from [http://www.mospi.gov.in/nsc\\_paper\\_SDRD\\_12jan09.pdf](http://www.mospi.gov.in/nsc_paper_SDRD_12jan09.pdf)
- Tiwari, Rajnarayan. (2013). Occupational health hazards in sewage and sanitary workers. *Indian Journal of Occupational and Environmental Medicine*, 12(3), 112–115. <https://doi.org/10.4103/0019-5278.44691>
- Tiwari, Rashmi, & Nayak, S. (2015). Drinking Water, Sanitation and Waterborne Diseases. *Economic and Political Weekly*, 52(23), 7–8.
- Truelove, Y. (2011). (Re-)Conceptualizing water inequality in Delhi, India through a feminist political ecology framework. *Geoforum*, 42(2), 143–152. <https://doi.org/10.1016/j.geoforum.2011.01.004>
- UNICEF. (n.d.). UNICEF Eastern and Southern Africa - Gender - Gender and water, sanitation and hygiene(WASH). Retrieved January 24, 2019, from [https://www.unicef.org/esaro/7310\\_Gender\\_and\\_WASH.html](https://www.unicef.org/esaro/7310_Gender_and_WASH.html)
- UNICEF. (2012). Social Transformation of Sanitation Workers NSPL'S Socially Responsible Business Model of Urban Waste Management (pp. 1-13). Retrieved from <http://nidan.in/nidanwp/Documents/UNICEF-SI-WATSAN-NSPL-NIDAN-CASE%20STUDY-final%20draft%202012.pdf>

- UNICEF. (2018). *UNICEFs Games Plan to End Open Defecation* (pp. 1-11). Retrieved from [https://www.unicef.org/wash/files/UNICEF\\_Game\\_plan\\_to\\_end\\_open\\_defecation\\_2018.pdf](https://www.unicef.org/wash/files/UNICEF_Game_plan_to_end_open_defecation_2018.pdf)
- UNICEF. (2015). *Progress on Drinking Water and Sanitation – 2015 update and MDG Assessment* (pp. 4-10). [https://data.unicef.org/wp-content/uploads/2015/12/Progress-on-Sanitation-and-Drinking-Water\\_234.pdf](https://data.unicef.org/wp-content/uploads/2015/12/Progress-on-Sanitation-and-Drinking-Water_234.pdf)
- Upadhyay, V. (2005). Water Question in Jharkhand: Present Law and Policy Context. *Economic & Political Weekly*, 4451-4454.
- USAID. (2012). *WASH-Fact-n-Factors-Bhubaneswar.pdf* (pp. 1–4). Retrieved from <http://populationfoundation.in/wp-content/uploads/2015/09/WASH-Fact-n-Factors-Bhubaneswar.pdf>
- van Teijlingen, E., & Hundley, V. (2002). The importance of pilot studies. *Nursing Standard (Royal College of Nursing (Great Britain): 1987)*, 16(40), 33–36. <https://doi.org/10.7748/ns2002.06.16.40.33.c3214>
- Varma, R. A. R. A. and D. (2014, February 28). Internal Labor Migration in India Raises Integration Challenges for Migrants. Retrieved August 2, 2018, from migrationpolicy.org website: <https://www.migrationpolicy.org/article/internal-labor-migration-india-raises-integration-challenges-migrants>
- Verhagen, J., & Ryan, P. (2008). *Sanitation Services for the Urban Poor : Symposium Background Paper*. (November), 19–21.
- Wankhade, K. (2015). Urban sanitation in India: key shifts in the national policy frame. *Environment and Urbanization*, 27(2), 555–572. <https://doi.org/10.1177/0956247814567058>
- World, Bank., & MoUD. (2012). *India: Urban Water Supply and Sanitation Services, Lessons from business plans for Maharashtra, Rajasthan, Haryana and International Good Practices* (pp. 1-45). Retrieved from <http://documents.worldbank.org/curated/en/599581468043490323/Lessons->

from-business-plans-for-Maharashtra-Rajasthan-Haryana-and-international-good-practices

World, Bank. (2004). *Public and Private Sector Roles in Water Supply and Sanitation Services* (pp. 1-32). Retrieved from <http://siteresources.worldbank.org/INTWSS/Publications/20249486/Guidance%20note%20Public%20and%20Private%20Sector%20Roles%20in%20Water%20Supply%20and%20Sanitation%20Services%20Apr%2004.pdf>

World Health Organization, & UNICEF (Eds.). (2010). *Progress on sanitation and drinking-water*. Retrieved from <http://www.sswm.info/category/step-university/module-8-water-and-sanitation-future-challenges/module-8-water-and-sanita-9>

Yadavar, S. (2017, June 17). 'Sanitation Workers Clean Our Cities, But They Are Denied Even Minimum Wage''. Retrieved August 2, 2018, from IndiaSpend-Journalism India |Data Journalism India|Investigative Journalism-IndiaSpend website: <http://www.indiaspend.com/indias-great-challenge-health-sanitation/sanitation-workers-clean-our-cities-but-they-are-denied-even-minimum-wage-72329>

## Appendix

### Appendix A: Socio-Demographic Profile of the Respondents

Sex	Bhimpur	Naharakanta	Total
	No. (%)	No. (%)	No. (%)
Male	96 (80.0)	137 (80.6)	233 (80.3)
Female	24 (20.0)	33 (19.4)	57 (19.7)
<b>Age</b>			
>18 to 25 Years	9(7.5)	8 (4.7)	17(5.9)
25 to 35 Years	37 (30.8)	48 (28.2)	85 (29.3)
35 to 45 Years	41(34.2)	61(35.9)	102 (35.2)
45 to 55 Years	24(20.0)	27 (15.9)	51 (17.6)
55 to 65 Years	9 (7.5)	22 (12.9)	31 (10.7)
Above 65 Years	0	4(2.4)	4 (1.4)
<b>Education Attained</b>			
Illiterate	35 (29.2)	51 (30.0)	86 (29.7)
Primary School Completed	48 (40.0)	45 (26.5)	93 (32.1)
Middle School Completed	22 (18.3)	35 (20.6)	57(19.7)
Matriculation and Above Matriculation	15 (12.5)	39(22.9)	54(18.6)
<b>Religious</b>			
	119 (99.2)	170 (100.0)	289 (99.7)
	1(.8)	0	1(.3)
<b>Social Identity</b>			
SC	59 (49.20)	56 (32.90)	115 (39.70)
ST	4 (3.30)	0	4 (1.40)
OBC	27 (22.50)	77 (45.30)	104(35.90)
Non SC, ST, and OBC	30 (25.0)	37 (21.80)	67 (23.10)
<b>Marital Status</b>			
Married	108 (90.0)	148(87.1)	256(88.3)
Unmarried	2(1.7)	9(5.3)	11 (3.8)
Divorce	0	2(1.2)	2(.7)
Separated	3 (2.5)	5(2.9)	8(2.8)
Widowed	7 (5.8)	6(3.5)	13(4.5)
<b>Family Composition</b>			
Nuclear Family	106(88.3)	119 (70.0)	225 (77.6)
Joint Family	14 (11.7)	51(30.0)	65 (22.4)
<b>Family Members</b>			
One to Two	24 (20.0)	19 (11.2)	43 (14.8)
Two to Four	62 (51.7)	69(40.6)	131 (45.2)
Five to Six	31 (25.8%)	57(33.5)	88(30.3)
Seven to Eight	2 (1.7)	22(12.9)	24(8.3)
Nine to ten	1 (.8)	2 (1.2)	3 (1.0)
Above ten	0	1(.6)	1 (.3)
<b>Total</b>	<b>120(100.0)</b>	<b>170(100.0)</b>	<b>290(100.0)</b>

**Appendix B: % of households access to toilet, improved source of water and living in Pucca houses by stand of living and caste factors**

Background Factors	Access to Improve Source water	Access to Toilet	Living in Pucca houses
Standard of living index			
Low	10.1	8.8	9.5
Medium	43.8	51.0	32.3
High	97.8	100.0	97.8
Caste			
SC and ST	14.3	16.0	17.6
OBC	40.4	39.4	37.5
Others	64.2	71.6	44.8

**Appendix C: Profile of the Key Informants**

Key Informants	Name	Technique Used
KI1	Sanitary Inspector	Face to face interview
KI2	Sanitary worker	Face to face interview
KI3	PHED Worker	Face to face interview
KI4	Angan Wadi worker	Face to face interview
KI5	NGO Worker	Face to face interview
KI6	Community/ Local Leader	Face to face interview
KI7	Youth club	Face to face interview
KI8	Health Worker	Face to face interview
KI9	Shop Keeper	Face to face interview
KI10	Councillors	Face to face interview
KI 11	School Teacher	Face to face interview
KI 12	ASHA Worker	Face to face interview

### Appendix D: Inter-State Water Disputes Tribunals

Name of the Tribunal	States Concerned	Date of Constitution	Present Status
Godavari Water Disputes Tribunal	Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh & Orissa	April 1969	Report & Decision given in July 1980
Krishna Water Disputes Tribunal - I	Maharashtra, Andhra Pradesh, Karnataka,	April 1969	Report & Decision given in May 1976
Narmada Water Disputes Tribunal	Rajasthan, Madhya Pradesh, Gujarat and Maharashtra	October 1969	Report & Decision given in Dec 1979. Narmada Control Authority (NCA) was constituted to give effect to the decision
Cauvery Water Disputes Tribunal	Kerala, Karnataka, Tamil Nadu and Puduchery	June 1990	Report & Decision given on 5.2.2007. Supreme Court slightly modified the decision on 16.02.2018. Cauvery Water Management Authority (CWMA) and Cauvery Water Regulation Committee (CWRC) were constituted to give effect to the decision of CWDT as modified by the Hon'ble Supreme Court
Krishna Water Disputes Tribunal -II	Karnataka, Andhra Pradesh and Maharashtra	April 2004	Report & Decision given on 30.12.2010. SLPs filed pending in the Court. Term of the Tribunal has been extended after the bifurcation of united Andhra Pradesh State. The matter is therefore under adjudication in the Tribunal
Vansadhara Water Disputes Tribunal	Andhra Pradesh & Odisha	February 2010	Report & Decision submitted on 13.09.2017. Further Report is pending
Mahadayi Water Disputes Tribunal	Goa, Karnataka and Maharashtra	November 2010	Report & Decision submitted on 14.08.2018. Further Report is pending
Mahanadi Water Disputes Tribunal	Chhattisgarh & Odisha	March 2018	Under Adjudication by the Tribunal. Report & Decision are awaited



### Appendix E: HH Questioner

#### Water Supply and Sanitation- An inquiry into Intersectionality between Policies, Provisioning, and Providers in Bhubaneswar City, Odisha

<b>(A) Profile of the Study Area</b>		Date: ..... Place:	
.....		.....	
(1) Household Interview Schedule No:		(2) Name of the Slum/Ward/Area:	
(3) Name of the City:		(4) Name of the State:	
(5) Address of the Respondents:			
<b>(B) Respondents' Profile:</b>			
(1) Name of the respondent:		(2) Age in completed year:	
.....		.....	
(3) Sex	Male=1, Female=2, Other=3	(4) Religion:	Hindu=1, Muslim=2, Christian=3, Buddhist=4, Sikh=5, Parse=6, Jain=7, Zoroaster=8
(5) Education Attained:		(6) Social Identity	SC=1, ST=2, OBC=3, GEN=4
(7) Sub-caste (if any):		(8) Marital Status	Married=1, Unmarried=2, Divorce=3, Separated=4, Widow=4
(9)No of the Family Members	1= Total Male Member.....  2=Total Female Member.....	(10) Type of house Hold	Nuclear=1, Joint=2

<b>(C) Profile of the Households</b>								
Sl. No family I.D	Name	Relation to respondent	Age	Sex	Education (completed Years)	Current Marital status	Occupation present	Income present
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Legend:(5) Sex: Male=1, Female=2, Other=3  
(7) Marital Status: Married=1, Unmarried=2, Divorce=3, Separated, Widow / Widower=4  
(8) Work Status: Worker=1, Part time Worker=2, Non Worker=3

<b>(D) Migration</b>	
(1) In which year did you come to place? Year ( )	(2) How long ago / how many years ago did you come to city? Year (.....)
(3) Where have you migrated from?  Village =1, Town=2, District=3, State=4	(4) Why did you migrate?
(5) Perception of benefits in the place of destination?	(6) Perception of losses in the place of destination?

<b>(E) Housing Condition</b>				
(1) Ownership Of the House	Own=1, Rented=2, Others (Specify)=3		(2) If Yes; do you have a record of rights of the house/homestead land of the house?	Yes=1, No=2
(3) Do you own a house elsewhere?	Yes=1, No=2		(4) If Yes, then where is it?	At your place of Origin=1, Another area in this City=2, Others (Specify)=3
(5) If provided by the government; then mention in details:	Name of the scheme..... Total fund allotted..... Year of sanction..... Any other important.....		(6) If rented, amount of the monthly rent paid in Indian Rupees (INR)	
(7) Types/Structure of the House	Pucca=1, Semi-Pucca=2, Kucha=3		(8) Number of Rooms in the House	

(9) Type of ventilation in the room	Window=1, Skylight=2, Others (Specify)=3, No Ventilation=4		(10) Separate space for cooking	Yes=1, No=2
(11) If yes (Separate cooking space); then	kitchen=1, Separate space inside the house=2, Separate space outside the house=3, Others (Specify)=4			
(12) Cooking fuel used (Ranked as 1, 2 & so on if used multiple fuel)	Electric heater (....), Solar heater (....), LPG (....), Kerosene stove (....), Wood (....), Coal (....), Cow dung (....), Hay & dry leaves (....), Agricultural waste (....), Gobar gas (....), Others Specify (.....)			
(13) Whether the house has Electricity			Yes=1, No=2	
(14) If No; Sources of light in the house (Ranked as 1, 2, 3 & so on if used multiple sources)			Kerosene lamp=1, Lantern=2, Petromax=3, Gaslight=4, Candle=5, Others (Specify)=6	
(15) If Yes; then the average duration of supply per day			(16) Electricity connection is taken from	Electricity department=1 Neighbour HH=2 Others (specify)=3
(17) Use specification of electricity	Only for lightening=1, Lightening & fan=2, Light, fan & and others=3, Any Others/business purpose etc. Specify=4			
(18) Ownership of the household's assets				

**(F) Water Supply**

(1) what is the Source of Water	Own hand pump=1, Tube well=2, Public hand pump=3, Tap in dwelling=4, Public tap at stand post=5, Own protected dug well=6, Own unprotected dug well=7, Public unprotected dug well=8, Public protected dug well=9, Municipality tanker=10, Others (Specify)=11			
(2) Cost of water per month, if any (in INR)	For tap water at dwelling (.....), For Tanker (.....) For tap water at community (.....), Any			

	other; Specify ( ..... )		
(3) Treatment of water for Drinking	Electronic Purifier=1, Filter=2, Chlorinate=3, Boil=4, Bleach=5, Use of Alum/ Phitikiri=6, Use without treatment=7, Others (Specify)=8		
(4) Distance traveled to fetch water (in meters)		(5) Source of water used other than drinking (bathing, washing clothes and cleaning/flushing house)	Same as of drinking purpose=1, Others (Specify)=2
(6) Duration of water supply (in case of piped or tank water supply)	Moring: (In hours)	Afternoon: (In hours)	Evening: (In hours)
	Piped: ..... Tanker: .....	Piped: ..... Tanker: .....	Piped: ..... Tanker: .....
(7) Perception supply of the safe drinking rate		Clean=1, Dirty=2, Satisfaction=3, No answer=4	
(8) Perception of the supplied water as self		Clean no need to boil=1, Clean need to boil=2	
(9) How Many litter domestic water storage capacity do you have		1=Litter.....	
(10) What problems do face in day to day life related to the water supply?	Drinking		
	Cooking		
	Bathing		
	Washing		
	Other specify		
(11) What are the supply related problems that you face?			

(12) Where is grievance redressal machinery regarding Water Supply function in your area	Yes=1, Don't Know=2		(13) If Yes please location name .....
(14) Have you ever made a complaint related to the water supply?	Yes=1, No=2		(15) If yes How?
(16) How long did it take get redressal?			One week=1, one week to two week=2, Two weeks to Three week=3, More than three week=4, After one month=5
(17) Are aware of the government scheme of water supply facilities? If yes, have you used any?	(18) If yes please mention the name?		(19) If no Why?
(20) Give Your suggestion to solve the water-related problems in your area?			

<b>(G) Toilet Facility</b>			
(1) Do you have toilet facility	Yes=1, No=2		
(2) If yes, then the location of the toilet	Inside house=1, Outside the house for one household=2, Outside the & sharing=3, Public toilet=4, Others (Specify)=5		
(3) Specification of the toilet	Fully concrete structure=1, Only base is concrete=2, Septic tank=3, Pit latrine=4, Covered dry latrine=5, Others; specify		
(4) Water supply to the toilet	Tap water with flush=1, Tap water without flush=2, No water supply=3, Any Others (Specify)=4		

(5) In case the toilet does not have a regular supply of water to the flush luck then, how do you dispose of the defecated substance?					
(6) Are aware of the government scheme of Toilet facilities? If yes, have you used any?	Yes=1, No=2			(7) If yes please mention the name?	(8) If no Why?
(9) Use of the toilet (Brief description)	Regular use by all members=1, Regular use by Female members only=2, Used only during water supply=3, Used only in specific time=4, Others (Specify)=5				
(10) Where do you go for defecation, if don't have your own toilet?	Public latrine=1, Open space=2, Any other (specify)=3				
(11) Give your suggestion for benefit of using Toilet facilities?					
(12) If You don't have toilet facilities what type of problem do you face?					
(13)					

<b>(H) Drainage and Sanitation</b>					
(1) Where do you dispose household waste?	In the open space outside the house=1, In the open space away from house=2, In the garbage bin provided by ULB/municipality=3, Any other space (Specify)=4				
(2) How often is the garbage collected from the municipal dustbin by the worker	Daily=1, More than twice a week=2, Twice a Week=3, Once a Week=4, Others (Specify)=5				

(3) What is the type of drainage outside your house?	Closed=1, Partially closed=2, Open=3, No drainage=4			
(4) How do you get your drainage cleaned	Self=1, Self as a municipal worker=2, Municipal Worker=3, Both '1' and '3'=4, Any other (Specify)=5			
(5) If self then how frequently do you clean?	Every day=1, Every two days=2, Every three days=3, Once in a week=4, Twice in a month=5, Once a month=6, Any other (Specify)=7			
(6)How frequently do the sanitation workers clean the drainage?	Every day=1, Every two days=2, Every three days=3, Once in a week=4, Twice in a month=5, Once a month=6, Any other (Specify)=7			
(7) Do you pay for this cleaning/ garbage collection?	Yes=1, No=2			(8) If yes; how much? (Per month; give details)
(9) The workers who clean the drain are they?	The employees of the municipality=1, The workers used by the employing of the municipality=2, Any other=3			
(10) If you have sanitation related problems what steps do you take?	Register complains within community level body=1, Register complains local body=2, Register complains of the municipal office=3, If Any other Please mention=4			
(11) What is an exact distance of complain office?				
(12) What problem do you face in registering the complaining?				
(13) Do you know the govt scheme for sanitation facilities?	Yes=1, No=2		(14) If Yes Please mention the name?	[15] If No Why

**(I) Govt. Benefits Under Various Schemes**

(1) Do you have Voter ID Card?	Yes=1, No=2		(2) Do you have Ration Card?	Yes=1, No=2
(3) If Yes; Type of Ration Card	BPL=1, APL=2, AAY=3, Any others (specify)=4			
(4) Do you / any of your family members get the Pension benefits?	Old Age=1, Widow Pension=2, Ex-servicemen=3, Any other (specify)=4, No benefits=5			



<b>(J) Coverage of Life / Health Insurance</b>				
(1) Do you / any of the family members currently have Health Insurance or Life Insurance	Health Insurance=1, Life Insurance=2, Don't have any Insurance=3, Others; specify			(2) Which agency provides it?
(3) How many members of your family covered under it (give details)				
(4) Your opinion about Health Insurance				

<b>(K) Health Profile (Illness profile of the house hold member during last six Month):</b>								
Ill Member	Illness	Duration	Treatment			Expenditure	Source of Finance	The wage of Lost Due to Illness
			Public	private	Traditional Healer			

<b>(H) Any Major Illness experienced last in the place of origin &amp; give Detail as Follows :</b>	
Nature:	
Duration:	
Expenditure incurred:	
Source of fiancés:	
Wages lost	
Any other lost	

## Appendix F: Key Informants

### (a) Sanitary inspector

Name \_\_\_\_\_ Age \_\_\_\_\_ Caste \_\_\_\_\_

Sex \_\_\_\_\_ Education attained \_\_\_\_\_

- (1). Are you permanent or contractual worker?
- (2). Since when are you working as SI?
- (3). Nature of your Work?
- (4). How many workers are working under your supervision?
- (5). How many workers are working in this area under your supervision?
- (6) How many workers are working in this area under your supervision?
- (7). According to you what are the problems they may be facing in area?
- (8). How do you help them overcome the problems?
- (9). What is the health-related problem faced by a sanitary worker in your opinion?
- (10). What is the medical/ health insurance facilities provide to them (List-----)?
- (11). Any comments, opinion, a suggestion for the improvements in the condition of sanitary workers?
- (12). What is the nature of your work and working condition of the workers?
- (13). What are the health benefits for the workers?
- (14) Are any educational facilities are available for the Worker (Children)?

(15) Are you providing the legal benefits to the workers?

(16). Is any housing benefits are available for the workers?

(17) What are infrastructural sources like; water, electricity available in the housing area?

(18) Do you have known schemes for sanitation facilities which are currently going on

(19) Give your suggestions for improvement the condition of sanitary worker condition?

**(b) Sanitation workers specific area**

Name\_\_\_\_\_ Age\_\_\_\_\_ Caste\_\_\_\_\_  
Sex\_\_\_\_\_ Education attained\_\_\_\_\_

1). What is your employer?

2). Are you permanent or temporary worker?

3). How many days (in a week) you have to work?

4). Do you work in other places? (a) Yes ( ), (b) No ( )

5). What work do you do?

6). How much does the employer pay you for this work?

7). Do the community members also pay? (a) Yes ( ), (b) No ( )

8). How much? (a) Employer ( ), (b) community member ( )

9). Do you ever have someone else to do this? (a) Yes ( ), (b) No ( )

10). Has some one paid you to do this work for him/her? (a) Yes ( ), (b) No ( )

11). What all wok do you do?

(a) Garbage collection ( ), (b) Clean drainage ( ), (c) Clean road ( ),

(d) Clean community toilet ( ), (e) Clean other toilets ( )

12). Solid waste disposal: (a) Composing ( ), (b) Dumping ( ), (c) Burning ( ),

(d) Others ( )

13). What are your wages per day/per monthly?

14). Are you given any protective gear? (a) Yes ( ), (b) No ( )

- 15). Do you know what the components of the protective gears are?  
 (a) Helmet (     ), (b) Mask (     ), (c) uniform (     ), (d) Gloves (     ),  
 (e) Brooms (     ), (f) mops (     )
- 16). Do you face any problem in providing service in this area?
- 17). How do you overcome those?
- 18). Medicine/ medical care?

**(c) PHED worker**

Name\_\_\_\_\_ Age\_\_\_\_\_ Caste\_\_\_\_\_  
 Sex\_\_\_\_\_ Education attained\_\_\_\_\_

- 1). What is your employer?
- 2). Are you permanent or temporary worker?
- 3). How many days (in a week) you have to work?
- 4). Do you work in other places? (a) Yes (     ), (b) No (     )
- 5). What work do you do?
- 6). How much does the employer pay you for this work?
- 7). Do the community members also pay? (a) Yes (     ), (b) No (     )
- 8). How much? (a) Employer (     ), (b) community member (     )
- 9). Do you ever have someone else to do this? (a) Yes (     ), (b) No (     )
- 10). Has some one paid you to do this work for him/her? (a) Yes (     ), (b) No (     )
- 11). What all wok do you do?
- 12). What are your wages per day/per monthly?
- 13). Are you given any protective gear? (a) Yes (     ), (b) No (     )
- 14). Do you know what the components of the protective gears are?
- 15). Do you face any problem in providing service in this area?
- 16). How do you overcome those?
- 17). Medicine/ medical care?

**(d) Anganwadi worker**

Name\_\_\_\_\_ Age\_\_\_\_\_ Caste\_\_\_\_\_  
 Sex\_\_\_\_\_ Education attained\_\_\_\_\_

- 1). How many children are registered in your Anganwadi?

- 2). How many children come here every day an average?
- 3). Do you have toilet facilities in Anganwadi?
- 4). Who takes cares of the children when they use the toilet?
- 5). Do you have water supply facility in Anganwadi?
- 6). Who clean the Anganwadi premises?
- 7). Do you face any problem in the community(a) Bringing the children to the AWC(), (b) Cooking (     ), (c) Serving food (     ),  
       (d) Any other (     )
- 8). How do you solve them? \_\_\_\_\_
- 9). Your suggestion? \_\_\_\_\_

(e) **NGO worker**

Name \_\_\_\_\_ Age \_\_\_\_\_ Caste \_\_\_\_\_  
 Sex \_\_\_\_\_ Education attained \_\_\_\_\_

- 1). What are the services provided by your NGO in this area?
- 2). How do you focus on the health of the community?
- 3). Do you have any partnership with the government for any services?

Name of these services \_\_\_\_\_

- 4). What are the arrangements for water supply?
- 5). What are the arrangements for sanitation services in this area?
- 6). What are the major health problems you see in this area?
- 7). Give details of the problems and ways in which you overcome them?

Services	Problem faced	Means to overcome the problems

- 8). Suggestion for empowerment observation?  
 \_\_\_\_\_

---

---

**(f) Community leader/Local leader**

Name \_\_\_\_\_ Age \_\_\_\_\_ Caste \_\_\_\_\_

Sex \_\_\_\_\_ Educations attained \_\_\_\_\_

- 1). What are the water supply facilities is available in this slum?
- 2). What kind of problems people have regarding water supply in this area?
- 3). Where do you go for complaining of water supply problems?
- 4). Are you aware of the govt scheme for water supply?
- 5). Any government schemes for water supply facilities in this area?  
(a) Yes (    ), (b) No (    )
- 6). If yes, please mention name? \_\_\_\_\_
- 7). If no, why do you think it is not these? \_\_\_\_\_.
- 8). Is any NGO is providing water supply facility in the area? (a)Yes (    ), (b) No (    )
- 9). If yes, name the organization?
- 10). Do you have any government schemes for sanitation facilities in this area?  
(a) Yes (    ), (b) No (    )
- 11). If yes, please mention name \_\_\_\_\_
- 12). If no, why? \_\_\_\_\_
- 13). Do sanitation workers regularly work in Area?    (a) Yes (    ), (b) No (    )
- 14). Do sanitation workers properly clean the drainage? (a) Yes (    ), (b) No (    )
- 14). Do sanitation properly collection the garbage?    (a) Yes (    ), (b) No (    )
- 15). If no where you complain?
- 16). How do you think the water & sanitation facilities can be improved in this slum?

**(g) Youth club member**

Name of the Club \_\_\_\_\_ Year of Established \_\_\_\_\_

- 1). How many members are these are present?
- 2). What kind of activities does the club organization?
- 3). How does the club engage with the water supply related activities?

- 4). What kind of problems do people face into accessing water in the area?
- 5). What is a common facility available regarding sanitation in the area?
- 6). What are the major problems of sanitation have in the area?
- 7). Your suggestion to solve it?

(h) **Health worker**

Name\_\_\_\_\_Age\_\_\_\_\_Caste\_\_\_\_\_

Sex\_\_\_\_\_Education Attained \_\_\_\_\_

Organization with which affiliated \_\_\_\_\_

- 1). Since when are you working as health worker here?
- 2). What are the job responsibilities that you have as a health worker?
- 3). What kind of services delivered by you in a areafor health?
- 4). The frequency of visit in a slum? (a) Days (    ), (b) Weeks (    ), (c) Months (    )
- 5). What kind of challenges/problems do you face while working in the area?
- 6). What do you do to those overcome and problem?
- 7). What kind of problems, people have regarding water supply in the area?
- 8). What are the different health problems peoples have in the area?
- 9). Which people are more affected by health problem?  
(a)Women (    ), (b) Children (    ), (c) Old age (    )
- 10). Do sanitation workers regularly work in a area?
- 11). What information do you give to the people regarding water supply?
- 12). What information do you give to the people regarding sanitation?
- 13). What your suggestion for improving water supply & sanitation in this area?

(i) **Shop Keeper**

Name\_\_\_\_\_Age\_\_\_\_\_Caste\_\_\_\_\_

Sex\_\_\_\_\_Educations attained \_\_\_\_\_

- 1). When you open shop in the area?
- 2). What are the major problem in the area?
- 3). What are the water supply facilities are available in the area?
- 4). What kind of problems people have regarding water supply in this area?
- 3). Where do you go for complaining of water supply problems?

- 4). Are you aware of the govt scheme for water supply?
- 5). Any government schemes for water supply facilities in this area?  
 (a) Yes ( ), (b) No ( )
- 6). If yes, please mention name?  
 \_\_\_\_\_
- 7). If no, why do you think it is not these?  
 \_\_\_\_\_.
- 8). Is any NGO is providing water supply facility in the slum? (a)Yes ( ), (b) No ( )
- 9). If yes, name the organization?
- 10). Do you have any government schemes for sanitation facilities in this area?  
 (a) Yes ( ), (b) No ( )
- 11). If yes, please mention name\_\_\_\_\_
- 12). If no, why? \_\_\_\_\_
- 13). Do sanitation workers regularly work in Area? (a) Yes ( ), (b) No ( )
- 14). Do sanitation workers properly clean the drainage? (a) Yes ( ), (b) No ( )
- 14). Do sanitation properly collection the garbage? (a) Yes ( ), (b) No ( )
- 15). If no where you complain?
- 16). How do you think the water & sanitation facilities can be improved in this area?
- (j) Councillor
- Name\_\_\_\_\_ Age\_\_\_\_\_ Caste\_\_\_\_\_
- Sex\_\_\_\_\_ Educations attained\_\_\_\_\_
- 1). What are the water supply facilities is available in this area?
- 2). What kind of problems people have regarding water supply in this area?
- 3). Where do you go for complaining of water supply problems?
- 4). Are you aware of the govt scheme for water supply?
- 5). Any government schemes for water supply facilities in this area?  
 (a) Yes ( ), (b) No ( )
- 6). If yes please mention name?\_\_\_\_\_



- 7). If no, why do you think it is not these?\_\_\_\_\_
- 8). Is any NGO is providing water supply facility in the area? (a)Yes (    ), (b) No (    )
- 9). If yes, name the organization?
- 10). Do you have any government schemes for sanitation facilities in this area?  
(a) Yes (    ), (b) No (    )
- 11). If yes please mention name\_\_\_\_\_
- 12). If no, why?\_\_\_\_\_
- 13). Do sanitation workers regularly work in area?    (a) Yes (    ), (b) No (    )
- 14). Do sanitation workers properly clean the drainage? (a) Yes (    ), (b) No (    )
- 14). Do sanitation properly collection the garbage?    (a) Yes (    ), (b) No (    )
- 15). If no where you complain?
- 16). How do you think the water & sanitation facilities can be improved in this area?

k) School teacher

Name\_\_\_\_\_ Age\_\_\_\_\_ Caste\_\_\_\_\_

Sex\_\_\_\_\_ Educations attained\_\_\_\_\_

- 1) Since when are you working as teacher worker here?
- 2) How many students are registered in your school?
- 3) how many students are come here every day?
- 4) Do you have water supply facility in school?
- 5) Do you have toilet facility in school?
- 6) Do you have separate toilet facility for Boys and Girls in school?
- 7) Who clean the school premises?
- 8) Do you face any problem regarding water supply and sanitation?
- 9) If yes how you solve them?
- 10). Your suggestion

**(1) ASHA worker**

Name \_\_\_\_\_ Age \_\_\_\_\_ Caste \_\_\_\_\_  
Sex \_\_\_\_\_ Education Attained \_\_\_\_\_  
Organization with which affiliated \_\_\_\_\_

- 1). Since when are you working as ASHA worker here?
- 2). What are the job responsibilities that you have as a ASHA worker?
- 3). What kind of services delivered by you in area for people health?
- 4). The frequency of visit in a area? (a) Days (     ), (b) Weeks (     ), (c) Months (     )
- 5). What kind of challenges/problems do you face while working in the area?
- 6). What do you do to those overcome and problem?
- 7). What kind of problems, people have regarding water supply in the area?
- 8). What are the different health problems peoples have in the area?
- 9). Which people are more affected by health problem?  
(a) Women (     ), (b) Children (     ), (c) Old age (     )
- 10). Do sanitation workers regularly work in a area?
- 11). What information do you give to the people regarding water supply?
- 12). What information do you give to the people regarding sanitation?
- 13). What your suggestion for improving water supply & sanitation in this area?

## Appendix G: FGD guideline

### List of focus group discussions

FGD	Discussed topic	Place of discussion and participants
FGD1	What type of problem you facing in the area, when you coming to the area? What type of the problem related water supply and sanitation facilities in the slum? Where you access safe drinking water supply, what problem you face related sanitation. What are the health related problems do you face in the area. How you planning to solve water supply and sanitation facilities your area.	Bhimpur area Site-I, Female group member
FGD2	What type of problem you face in the area, what are the facilities we are getting in the area? What are the facilities related water supply and sanitation in the area? What facilities are provided by the government and non-government organization related water supply and sanitation. Are sanitary workings in the area, if you have no water supply and sanitation facilities in the slum then how you manage it? How you think to solve the problem related water supply water and sanitation facilities in the slum	Bhimpur area Site-II, Male group member
FGD3	What are the problems you facing in the area and how handle those problems? what are the major issues of relating water supply and sanitation facilities in the area, the sanitary worker regularly working here, if they are not properly working in the slum then what step you take solve the problem and how you think about solve problem? What health related problem people are facing in the area due to water supply and sanitation facilities? How you solved the problems.	Naharakanta area site-I, Male group member
FGD4	What are the basic facilities are provide BMC in the ara. These facilities are proper maintained by the sanitary workers. If not, then why and how we are think solved the problems in your area. What are scheme facilities especially regarding water supply and sanitation related? What are the health related problem people are face related water supply and sanitation.	Naharakanta area Site-II, Female group member
FGD5	What nature of work you are doing in community? What are the problem your face in the area while providing services? What are the equipment related problem face? What are the facilities you get from the government? what are the health facilities you get from the government. what are the major health related	FGD (Sanitation) Female group

	problem you face and how you solve the problem?	
FGD6	What are the major issues you face in sanitation work? What are the nature of your Job. what type responds or reaction you get from the community. What are the living condition and where you stay? What facilities and benefits you get from the government. what are the health related problems you face? What are the health insurance and medical facilities you get from the government? How you solve the sanitation problem in area. What message you want to say government?	FGD (Sanitation) Male group

## Appendix H

### Result of Quality of Water Sample Collected From Study Areas

GOVERNMENT OF ODISHA  
OFFICE OF THE DEPUTY DIRECTOR CUM FOOD ANALYST  
State Food Testing Laboratory, Convent Square, Bhubaneswar-1

No. 13514/DDFA Dated Bhubaneswar the 24 th 12 '2018'

To,

Mr. Ajit Kumar Lenka,  
At-Naharakanta, W.No-4  
Bhubaneswar.

**Sub:-Analysis report of water (Domestic Use)**

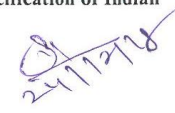
Report No.	Source:-	*Collected/*Sent by	Reference No.& Date of Collection/Receipt	Date of Examination
837/18	Well Water	A.K.Lenka	06.12.18	06.12.18

**Chemical and Bacteriological Examination of water samples**  
The sample of water from above source has been caused to be analysed and the findings are as under:

<i>Physical Examination</i>				<i>Chemical Examination</i>			
Sl. No.	Test/Characteristic	Result	Permissible Limit as per IS:10500:2012	Sl. No.	Test/Characteristic	Result mg./ltr (ppm)	Permissible Limit as per IS:10500:2012
1	Colour	Nil	Agreeable	1	Total hardness as CaCO <sub>3</sub> (mg/l)	46	200 mg/l Max
2	Odour	Nil	Agreeable	2	Iron (as Fe) (mg/l)	0.1	1.0 mg/l Max
3	Turbidity	Nil	1 NTU max.	3	Chloride (as Cl <sup>-</sup> ) (mg/l)	32	250 mg/l Max.
4	p <sup>H</sup>	7.2	6.0 to 8.5	4	Residual free Chlorine (mg/l)	Nil	0.2 mg/l Max.
<b>Bacteriological Examination</b>				5	Sulphate as SO <sub>4</sub> <sup>-</sup> (mg/l)	Nil	200 mg/l Max.
Sl. No.	Test/Characteristic	Result	Permissible Limit as per IS:10500:2012	6	Total Alkalinity (as HCO <sub>3</sub> <sup>-</sup> ) (mg/l)	132	200 mg/l Max.
1	MPN of coli form group of organisms Per 100 ml.	1600+	Absent (0)	7	Nitrate (as NO <sub>3</sub> <sup>-</sup> )	Nil	45 mg/l Max.
2.	Test for E.coli.	Negative	Negative	8	Nitrite (as NO <sub>2</sub> <sup>-</sup> )	0.3	0.02 mg/l Max.

**Remarks:-** The water is not potable due to presence of Coli form group of organisms as per the specification of Indian Standard of drinking water under IS:10500:2012 .

Dated:  
State Food Testing Laboratory  
Bhubaneswar-1

  
 Food Analyst  
GOVT. OF ODISHA  
Food Analyst  
Govt. of Odisha

**GOVERNMENT OF ODISHA**  
**OFFICE OF THE DEPUTY DIRECTOR CUM FOOD ANALYST**  
**State Food Testing Laboratory, Convent Square, Bhubaneswar-1**

No. 18515/DDFA Dated Bhubaneswar the 24 th 12 '2018'

To,

Mr. Ajit Kumar Lenka,  
 At-Bhirampur(Kalasaahi ) W.No-52  
 Bhubaneswar.

**Sub:-Analysis report of water (Domestic Use)**

Report No.	Source:-	*Collected/*Sent by	Reference No.& Date of Collection/Receipt	Date of Examination
836/18	Tube well Water	A.K.Lenka	06.12.18	06.12.18

**Chemical and Bacteriological Examination of water samples**  
 The sample of water from above source has been caused to be analysed and the findings are as under:

<b>Physical Examination</b>				<b>Chemical Examination</b>			
Sl. No.	Test/Characteristic	Result	Permissible Limit as per IS:10500:2012	Sl. No.	Test/Characteristic	Result mg./ltr (ppm)	Permissible Limit as per IS:10500:2012
1	Colour	Nil	Agreeable	1	Total hardness as CaCO <sub>3</sub> (mg/l)	36	200 mg/l Max
2	Odour	Nil	Agreeable	2	Iron (as Fe) (mg/l)	0.5	1.0 mg/l Max
3	Turbidity	Nil	1 NTU max.	3	Chloride (as Cl <sup>-</sup> ) (mg/l)	32	250 mg/l Max.
4	p <sup>H</sup>	5.0	6.0 to 8.5	4	Residual free Chlorine (mg/l)	Nil	0.2 mg/l Max.
<b>Bacteriological Examination</b>				5	Sulphate as SO <sub>4</sub> <sup>-2</sup> (mg/l)	Nil	200 mg/l Max.
Sl. No.	Test/Characteristic	Result	Permissible Limit as per IS:10500:2012	6	Total Alkalinity (as HCO <sub>3</sub> <sup>-</sup> ) (mg/l)	30	200 mg/l Max.
1	MPN of coli form group of organisms Per 100 ml.	1600+	Absent (0)	7	Nitrate (as NO <sub>3</sub> <sup>-</sup> )	Nil	45 mg/l Max.
2.	Test for E.coli.	Negative	Negative	8	Nitrite (as NO <sub>2</sub> <sup>-</sup> )	0.8	0.02 mg/l Max.

**Remarks:-** The water is not potable due to presence of coli form group of organisms & also low P<sup>H</sup> value as per the specification of Indian Standard of drinking water under IS:10500:2012 .

**Dated:**  
 State Food Testing Laboratory  
 Bhubaneswar-1

  
 Food Analyst  
 GOVT. OF ODISHA  
**Food Analyst**  
**Govt. of Odisha**