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An Assessment of Sanitation Facilities, Hygiene Practices, and Socio-Economic Status of Slum Dwellers: A Case Study of Rupnarayan Chak, Haldia

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Abstract - Rapid urbanization has led to the proliferation of slums, creating significant challenges for sustainable urban development and public health. This study examines the socio-economic conditions and sanitation status of the Rupnarayan Chak slum, located in the Haldia industrial belt of Purba Medinipur, West Bengal. The primary objectives were to assess water and sanitation facilities, hygiene practices, and the overall impact of these factors on the health and socio-economic well-being of the residents. The research findings reveal a predominantly poor housing environment, with 56.25% of dwellings classified as semi-pucca and 43.75% as kacha structures. While electricity access is relatively high at 88.75%, the community faces critical challenges regarding drainage, sewage facilities, and clean drinking water. Socio-economic analysis indicates that a significant portion of the population has reached secondary (26.05%) and higher secondary (21.83%) education levels, yet only 9% are graduates. Low income and poor living conditions have contributed to widespread malnutrition among women and children, as well as a high prevalence of water-borne and respiratory diseases. The study concludes that the lack of proper sanitation and basic amenities directly degrades the quality of life and health of the slum dwellers. It recommends urgent governmental and non-governmental interventions to improve housing, sanitation management, and access to healthcare to foster a more sustainable and equitable urban environment.

***Keywords*:** Urban Slum, Sanitation, Socio-Economic Status, Rupnarayan Chak, Haldia, Public Health, Hygiene Practices.

Introduction

In the era of globalization, rapid urbanization has become a defining characteristic of developing nations like India. While urbanization is often synonymous with economic growth and industrial advancement, it also brings significant challenges, most notably the proliferation of slums. Slums are typically defined as overcrowded, informal human settlements characterized by inadequate housing, lack of basic public amenities, and deteriorating environmental conditions. According to the United Nations, a slum is a contiguous settlement where the inhabitants are characterized as having inadequate housing and basic services. The socio-economic status of a population is intrinsically linked to its health and environmental conditions. In urban slums, this link is often broken due to extreme poverty, lack of education, and official neglect. Sanitation is one of the most critical yet neglected aspects of slum life. The absence of proper latrines, lack of safe drinking water, and non-existent drainage systems create a breeding ground for various communicable diseases. For slum dwellers, the daily struggle for basic survival often takes precedence over hygiene and sanitation, leading to a vicious cycle of poverty and ill-health. The study focuses on Rupnarayan Chak, located within the Haldia industrial belt in the Purba Medinipur district of West Bengal. Haldia is a major port-based industrial hub, which attracts a massive influx of migrants from rural areas in search of employment. While the city has developed planned townships for industrial employees, the marginalized workforce—consisting of daily wage laborers, rickshaw pullers, and domestic workers—is forced to reside in fringe areas like Rupnarayan Chak. This settlement is situated in an ecologically vulnerable zone. The inhabitants live in a mix of kacha (43.75%) and semi-pucca (56.25%) houses. Despite being close to a major industrial zone, the area lacks an integrated sewage system and adequate waste disposal mechanisms. Although electricity has reached the majority of households, the quality of life remains low due to poor sanitation and environmental pollution. Understanding the socio-economic and sanitation profile of Rupnarayan Chak is essential for several reasons. Firstly, it highlights the disparity between industrial wealth and the living conditions of the labor class. Secondly, it provides empirical data on how poor sanitation directly affects the health of vulnerable groups, particularly women and children who suffer from malnutrition and water-borne diseases.

Objectives

1. To evaluate the availability and accessibility of water and sanitation facilities in the Rupnarayan Chak slum.
2. To analyze the socio-economic and educational profile of the slum dwellers to understand their standard of living.
3. To assess the hygiene practices and level of awareness among the residents regarding health and sanitation.
4. To examine the correlation between poor sanitation and health outcomes, focusing on the prevalence of diseases in the area.
5. To suggest sustainable measures and policy interventions for the improvement of the living conditions and infrastructure of the slum.

Slum Conditions in India

India is experiencing one of the fastest rates of urbanization in the world. However, this growth is often unplanned, leading to the proliferation of slums. According to the Census of India, a slum is defined as a residential area where dwellings are unfit for human habitation due to dilapidation, overcrowding, faulty layout, or lack of ventilation and sanitation facilities. It is estimated that nearly 65 million people live in slums across India, a number that continues to rise as rural-to-urban migration increases. The housing condition in Indian slums is generally categorized into three types: *Pucca* (permanent), *Semi-Pucca*, and *Katcha* (temporary).

- Overcrowding: High population density is a hallmark of Indian slums. Small shanties often house families of 5 to 10 members in a single room.
- Lack of Legal Status: Many slums are "unrecognized," meaning residents live under the constant threat of eviction and have limited access to formal municipal services like electricity and waste collection.

Crisis Sanitation remains the most critical challenge. While the *Swachh Bharat Mission* has improved toilet access, many slums still struggle with:

- Open Defecation: Due to the lack of space for individual toilets, many residents rely on community toilets which are often poorly maintained.
- Drainage Systems: Most slums lack underground sewage. Open drains are common, leading to waterlogging during monsoons and becoming breeding grounds for mosquitoes and bacteria.
- Safe Drinking Water: Only a small percentage of slum households have individual water connections. Most depend on public standposts or tankers, leading to long queues and water-borne diseases.

The inhabitants of Indian slums are the backbone of the urban informal economy. They work as daily wage laborers, domestic help, rickshaw pullers, and street vendors.

- Income Instability: Economic status is characterized by low and fluctuating wages, with no social security or health insurance.
- Education: While primary school enrollment has increased, the dropout rate remains high at the secondary level due to economic pressure on children to start working early.
- Health: There is a high prevalence of malnutrition among women and children. Diseases like Tuberculosis, Asthma, and Diarrhea are widespread due to the unhygienic environment.

The Government of India has launched several schemes to address these issues, such as:

- Pradhan Mantri Awas Yojana (PMAY-U): Aimed at providing "Housing for All" by replacing slums with pucca houses.
- AMRUT: Focused on improving water supply and sewage networks in urban areas.
- Swachh Bharat Mission (Urban): Focused on making cities Open Defecation Free (ODF)

Slum Condition in Haldia: An Industrial Perspective

Haldia, a major industrial hub and port city in West Bengal, has witnessed rapid urbanization over the last few decades. The establishment of large-scale chemical industries, petroleum refineries, and port activities has attracted a massive influx of labor from rural areas. While the city has planned townships for formal employees, a significant portion of the migrant labor force and low-income groups settle in "backwash zones" or fringe areas. As a result, Haldia Municipality now has 151 recognized slum pockets (as per SUDA reports), highlighting a stark contrast between industrial prosperity and the living conditions of the urban poor. Many slums in Haldia, including Rupnarayan Chak, are located in ecologically sensitive or marginalized land.

- Low-lying Areas: Most settlements are situated just 4 meters above mean sea level, making them highly prone to waterlogging during the monsoon.
- Proximity to Industry: Being a backwash zone of the industrial belt, these areas are often exposed to

industrial dust, noise, and environmental pollution, which severely impacts the respiratory health of the dwellers.

The housing landscape in Haldia's slums is a mix of temporary and semi-permanent structures:

- Housing Types: A large percentage of residents live in Kacha (mud/thatch) or Semi-Pucca houses. In areas like Rupnarayan Chak, nearly 43.75% of houses are still Kacha, which are vulnerable to heavy rains and storms.
- Congestion: Due to high population density, families often share a single room (roughly 10x10 ft) for sleeping, cooking, and storage.

Sanitation is one of the most critical challenges in Haldia's slums.

- Toilet Facilities: While government initiatives like the Swachh Bharat Mission and PMAY have provided aid (for instance, 81.25% of residents in your study area received toilet building assistance), the quality and maintenance remain an issue.
- Drainage and Waste: Most slums lack a planned underground sewage system. Open drains are common, leading to stagnant water and the spread of water-borne diseases like diarrhea and typhoid.
- Water Access: Although electricity has reached most households, the supply of safe, treated drinking water is often inadequate, forcing residents to rely on community standposts or tube wells.

The socio-economic status of Haldia's slum dwellers is directly linked to the informal industrial economy.

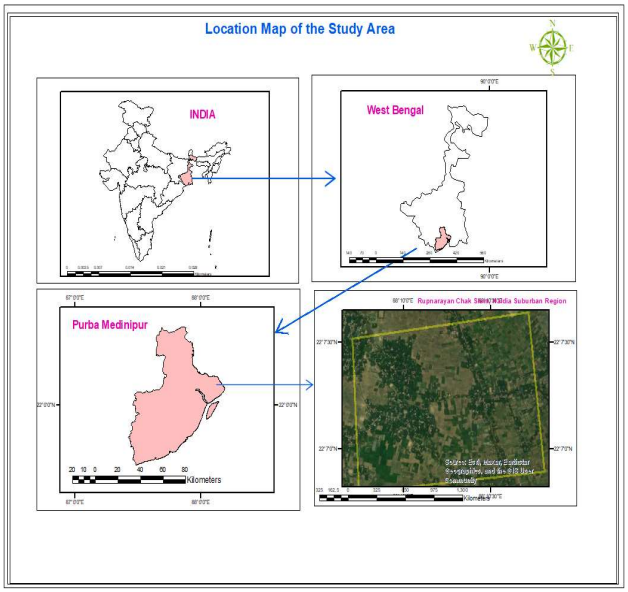
- Occupation: The majority are engaged as daily wage laborers, rickshaw pullers, transport workers, or domestic help.
- Economic Fragility: Income is often unstable, with many families struggling to meet nutritional needs, leading to high rates of malnutrition among women and children.
- Education: There is a growing awareness of education; however, the rate of higher education remains low (e.g., only 9% graduates in Rupnarayan Chak), with many children dropping out after secondary levels to support family income.

Methodology

The methodology of this research is designed to systematically analyze the sanitation and socio-economic conditions of the Rupnarayan Chak slum area in Haldia. The study follows a descriptive and analytical research design.

i) Selection of the Study Area

The study was conducted in Rupnarayan Chak, a suburban region within the Haldia industrial belt in the Purba Medinipur district of West Bengal. This area was selected due to its location as a "backwash zone" of the industrial hub, where low-income laborers reside in ecologically vulnerable conditions (only 4 meters above sea level).



ii)Data Collection Sources

The research is based on two types of data:

- Primary Data: Collected directly from the field through a door-to-door survey. A structured questionnaire was used to gather information on housing, education, income, and sanitation facilities.
- Secondary Data: Information was gathered from the Census of India (2011), Haldia Municipality reports, District Statistical Handbooks, and previous literature on urban slums.

iii) Sampling Design

A Random Sampling method was adopted to ensure an unbiased representation of the slum population.

- Sample Size: A total of 80 households were surveyed in the Rupnarayan Chak area.
- Unit of Observation: Individual households were considered the primary unit for data collection.

iv) Tools for Data Collection

- Questionnaire: A detailed questionnaire focusing on socio-economic variables (age, sex, education, occupation) and sanitation variables (type of latrine, source of drinking water, waste disposal).
- Field Observation: Physical verification of housing types (Kacha/Pucca) and the state of drainage and sewage systems.
- Photography: Photo documentation was used to record the actual living conditions and hygiene practices in the slum.

v) Data Processing and Analysis

After collecting the raw data, it was processed and analyzed using the following steps:

- Tabulation: The collected data was organized into tables for clear comparison (e.g., percentage of people with toilet facilities vs. those without).
- Statistical Analysis: Simple percentage and average methods were used to interpret the socio-economic status.
- Cartographic Representation: Data was visualized using various diagrams such as Pie Charts, Bar Graphs, and Location Maps to make the findings easily understandable.

vi) Parameters of Study

The research analyzed the following key parameters:

- Housing Condition: Classification into Kacha, Pucca, and Semi-Pucca.
- Sanitation: Availability of private/community toilets and government aid for construction.
- Public Utilities: Access to electricity and safe drinking water.
- Socio-Economic Status: Literacy rate, occupation, and income levels.

Result and Discussion

i) Urban Morphology of the study area

Location/Village	Population2011	Male	Female	Households
Basan Chak	3,325	1,647	1,678	742
Baruttar Hingli	4,840	2,453	2,387	1,058
Kashthakhali	4,171	2,123	2,048	935
Anandapur	1,772	930	842	406
Iswardaha Jalpai	4,640	2,412	2,228	1,039
Barsundra	3,187	1,626	1,561	712
Banskhana Jalpai	4,326	2,666	2,060	1,040
Dakshin Chak	3,245	1,639	1,606	790
Brajalal Chak	6,366	3,311	3,055	1,465
Kunarpur	10,516	5,386	5,130	2,273
Barbajitpur	4,751	2,451	2,300	1,099
Barabari	5,051	2,476	2,475	1,134
Manaharpur	2,720	1,405	1,315	573
Chaual khola	3,241	1,689	1,552	753
Kismat Sibramnagar	4,150	2,140	2,010	1,007
Deulpota	4,160	2,148	2,012	900
Dwari Berya	5,527	2,874	2,653	1,230
Haldia	4,240	2,186	2,054	954
Sapua	1,032	530	502	233
Gorankhali	2,418	1,249	1,169	576
Bar Basudebpur	6,611	3,416	3,195	1,472
Chaklalpur	2,834	1,449	1,384	728
Jambere	1,759	934	825	382
Agunmari Char	3,100	1,691	1,419	884

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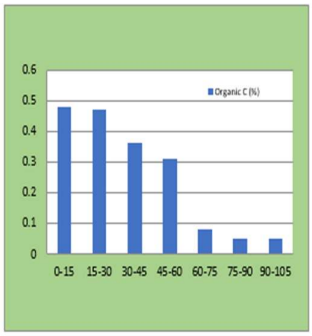
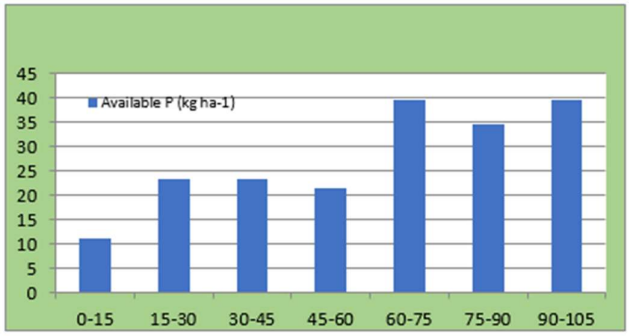
ii) Comparison of soil characteristics and agriculture at Haldia

Soil depth (cm)	0-15	15-30	30-45	45-60	60-75	75-90	90-105
Organic C (%)	0.48	0.47	0.36	0.31	0.08	0.05	0.05

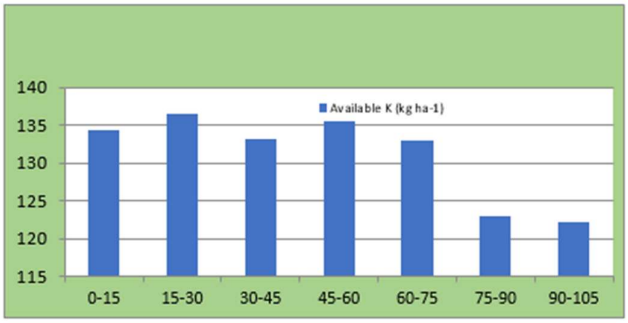
Soil depth(cm)	Organic C (%)	Available P (kg)	Available K (kg)
0-15	0.48	11.07	134.27
15-30	0.47	23.24	136.53
30-45	0.36	23.31	133.24
45-60	0.31	21.56	135.60
60-75	0.08	39.48	133.05
75-90	0.05	34.67	123.02
90-105	0.05	39.63	122.19



Soil depth (cm)	0-15	15-30	30-45	45-60	60-75	75-90	90-105
Available P (kg ha-1)	11.07	23.24	23.31	21.56	39.48	34.67	39.63



Soil depth (cm)	0-15	15-30	30-45	45-60	60-75	75-90	90-105
Available K (kg ha-1)	134.27	136.53	133.24	135.6	133.05	123.02	122.19



iii) Nearest Neighbour Analysis

Settlements often appear on the map as dots.Dot distribution are commonly used in geography,yet their patterns are difficult to describe. One way in which patterns can be measured objectively is by nearest neighbour analysis. It can be used to identify a tendency towards clustering or dispersion for shop,industries,settlements etc. Nearest neighbour analysis gives a index that enables one region to be compared with another.

RN Value	Settlement Character
0.00-0.09	Absolute Concentration
0.10-0.50	High Concentration
0.51-0.99	Clustered Pattern
1.00-1.19	Random Pattern
1.20-1.49	Approaching Pattern
1.50-2.14	Dispersed Pattern
2.15	Perfect Hexagon
Above2.15	Highly Dispersed

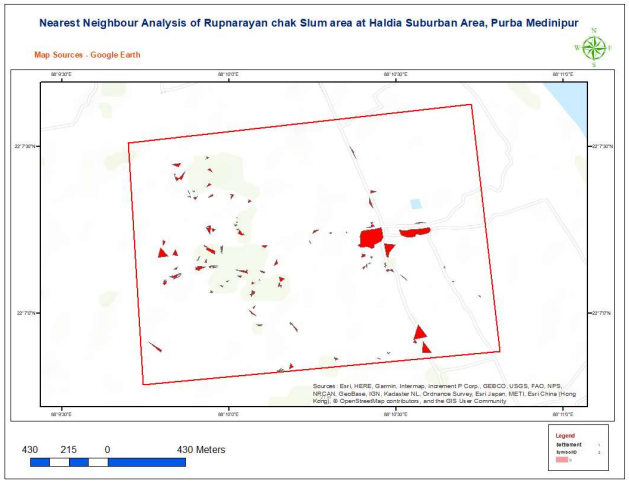
Calculation Table

Sl. No.	New rest Neighbor	Observed Distance of Nearest Neighbor (in cm)
1	2	0.8
2	1	0.8
3	4	1.4
4	5	1
5	4	1
6	7	0.5
7	6	0.5
8	6	0.7
9	10	0.6
10	9	0.6
11	12	1
12	13	0.9
13	14	0.8
14	15	0.5
15	14	0.5
16	18	1.1
17	18	1.1

18	16	1.1
19	18	0.9
20	19	0.7
21	17	1.1
22	23	0.5
23	22	0.5
24	25	0.5
25	26	0.4
26	25	0.4
27	28	0.8
28	27	0.8

Calculation for mean observed distance
do=∑do/n
=21.5/28
=0.77
Calculation for area of quadrant
A=15cm*10.5cm
=157.5cm²
Calculation for density of settlement
P=n/A
=28/157.5
=0.17
Calculation for mean expected distance
dE=2/2√P
=2/2√0.17
=2/0.82
=2.44
Calculation for Randomness Index
RN=do/dE
=0.77/2.44
=0.31

*High concentration of settlement.



ii) Demographic and Socio-Economic Profile

The study conducted in Rupnarayan Chak reveals a complex socio-economic structure. The population is primarily composed of migrants who serve as the labor force for the Haldia industrial belt.

- Educational Status: The data shows a moderate literacy rate, with a significant portion of the population having completed secondary (26.05%) and higher secondary (21.83%) education. However, the transition to higher education is poor, as only 9% are graduates. This suggests that economic pressure forces many young individuals to enter the workforce early.
- Housing Condition: Housing is a primary indicator of economic status. In the study area, 56.25% of the houses are semi-pucca, while 43.75% remain kacha (temporary). This reflects a state of transition where residents are slowly upgrading their living conditions with their meager savings and government aid.

Access to Basic Utilities

- Electricity: One of the positive findings is that 88.75% of households have access to electricity. This is higher than many rural slums and is due to the area's proximity to the Haldia industrial grid.
- Drinking Water: While water is available, the quality and consistency of supply remain concerns. Most dwellers depend on public tube wells or community taps, which are often prone to contamination during the monsoon.

Sanitation and Hygiene Practices

Sanitation is the most critical aspect of this research. The findings highlight both progress and significant gaps:

- Toilet Facilities and Government Aid: A remarkable 81.25% of the surveyed households have received government assistance to build toilets. This indicates a strong penetration of schemes like the Swachh Bharat Mission.
- Settled Buildings: About 68.75% of households received government help for settling or building their houses, showing that state intervention is a major driver of infrastructure in this slum.
- Drainage and Waste Management: Despite the high number of toilets, the study observes a lack of an integrated drainage system. Open drains are common, leading to stagnant water near residential huts. This creates an unhygienic environment and increases the risk of vector-borne diseases.

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Impact on Health

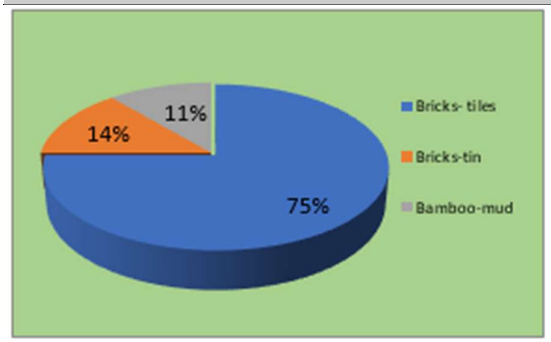
The correlation between poor sanitation and health is evident in Rupnarayan Chak.

- Disease Prevalence: Due to the "backwash zone" characteristics—low elevation (4 meters above sea level) and poor drainage—residents frequently suffer from water-borne diseases like diarrhea and skin infections.
- Vulnerable Groups: Women and children are the most affected. Field observations indicate signs of malnutrition and respiratory issues, likely exacerbated by the proximity to industrial pollutants and damp living conditions.

Household Structure of the Slum Area

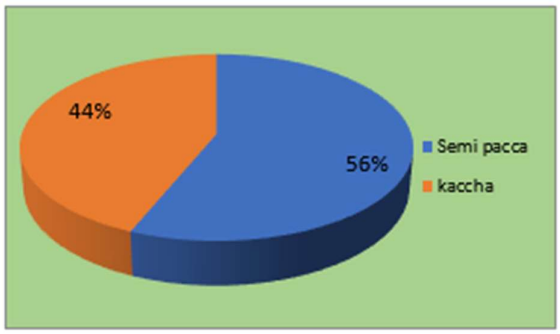
➢ *House Material:*

TYPE	Bricks - Tiles	Bricks - Tin	Bamboo - Mud	Total
	60	11	9	80
Percentage (%)	75	13.75	11.25	100



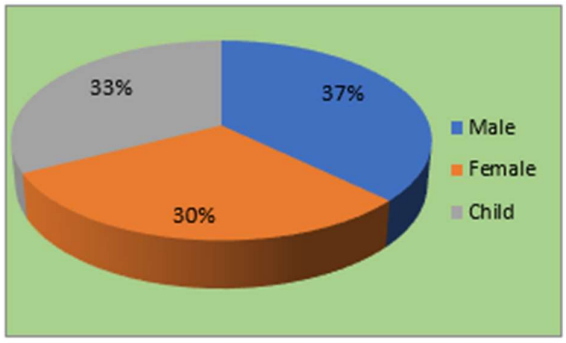
➢ *Type of Houses :*

TYPE	Semi Pacca	Kaccha	Total
	45	35	80
Percentage (%)	56.25	43.75	100



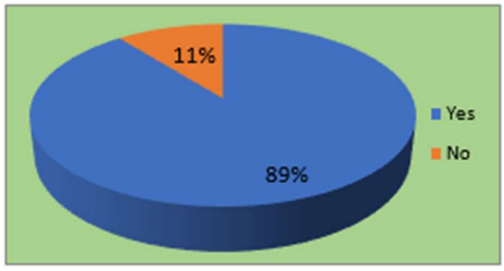
➢ *Household Members:*

TYPE	Male	Female	Child	Total
Population	65	53	57	175
Percentage (%)	37.14	30.28	32.6	100



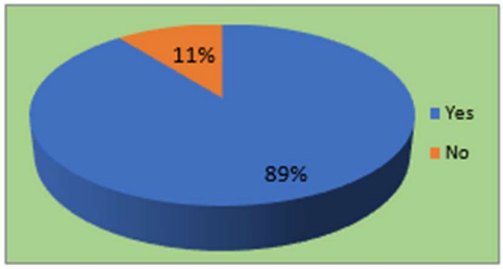
➢ *Electricity:*

ELECTRICITY	Yes	No	Total
	75	9	80
Percentage (%)	88.75	11.25	100



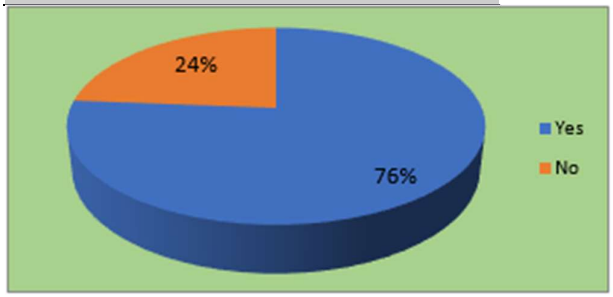
➢ *Electricity:*

ELECTRICITY	Yes	No	Total
	75	9	80
Percentage (%)	88.75	11.25	100



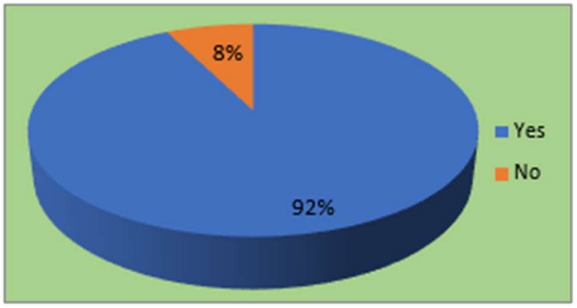
➢ *Two Wheelers:*

TWO WHEELERS	Yes	No	Total
	61	19	80
Percentage (%)	76.25	23.75	100



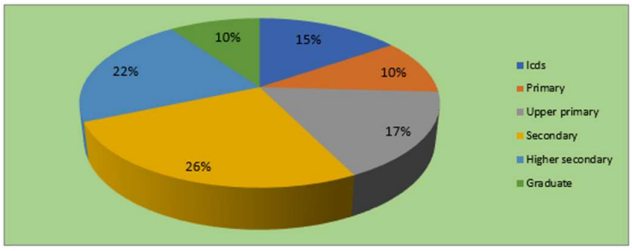
➢ *Electronic Device:*

TYPE	Yes	No	Total
ELECTRONICS DEVICES	74	6	80
Percentage (%)	92.5	7.5	100



b. Education Structure

TYPE	ICDS	Primary	Upper primary	Secondary	Higher Secondary	Graduate	Total
Education	22	15	24	37	31	14	142
Percentage (%)	15.5	10.6	16.9	26.05	21.83	9	100



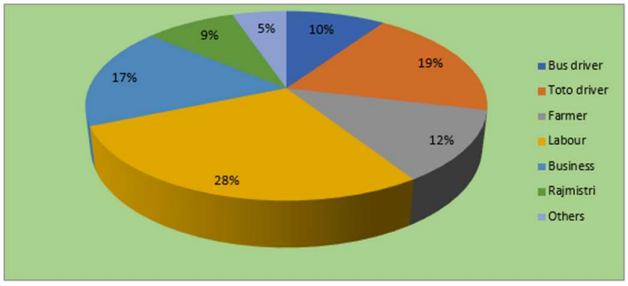
c. Economy Structure

➢ *Income of the family members :*

TYPE	Male	Female	Total
Income	80	35	115
Percentage (%)	69.6	30.43	100

➢ *Occupation of the Family:*

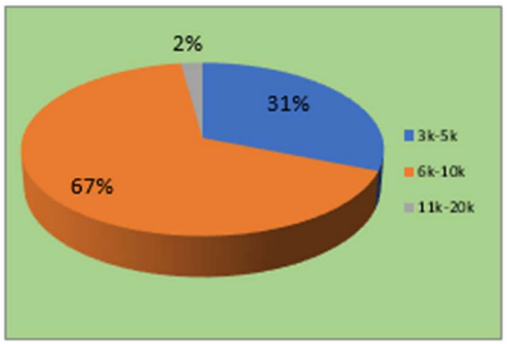
TYPE	Bus driver	Toto driver	Farmer	Labour	Business	Rajmistri	Others	Total
Occupation	11	22	14	32	20	10	6	115
Percentage (%)	9.6	19.13	12.2	27.8	17.4	8.7	5.2	100



➢ *Monthly Income of the Family:*

AGE OF MEMBERS	1-15	16-30	31-45	45 & Above	Total
	2	6	5	7	175
Percentage (%)	1.4	3.42	2.85	4	100

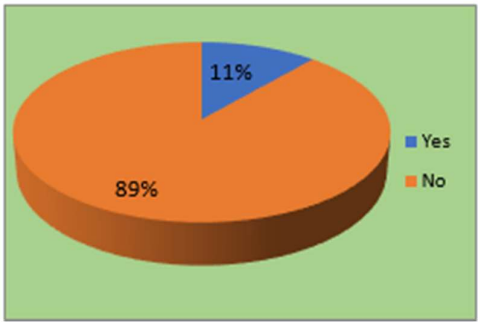
AMOUNT	3000-5000	6000-10000	11000-20000	Total
Income	20	43	17	80
Percentage (%)	25	54	21	100



d. Health Status of the Family

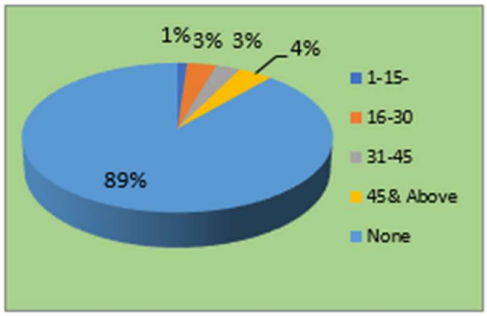
➢ *Diarrheal Disease:*

DIARRHEA DISEASE WITH IN THREE MONTHS	Yes	No	Total
	20	155	175
Percentage (%)	11.43	88.57	100



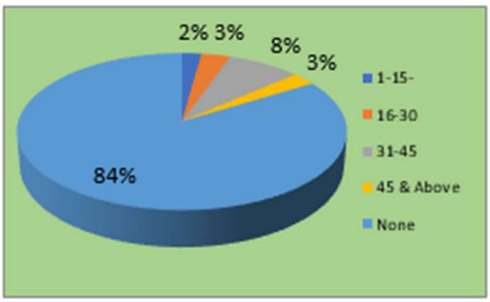
➢ Age Members:

AGE OF MEMBERS	1-15	16-30	31-45	45 & Above	Total
	2	6	5	7	175
Percentage (%)	1.4	3.42	2.85	4	100



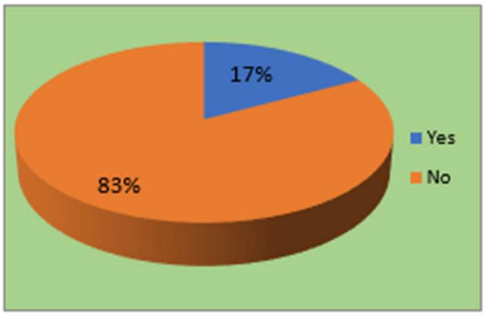
➢ *Cholera*

AGE OF MEMBERS	1-15 -	16-30	31-45	45 & Above	Total
	4	6	15	5	175
Percentage (%)	2.28	3.42	8.57	2.85	100



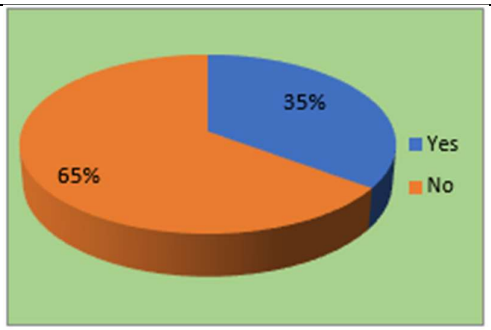
➢ *Cholera disease found between 3 months :*

CHOLERA DISEASE IN 3 MONTHS	Yes	No	Total
	30	145	175
Percentage (%)	17.14	82.85	100



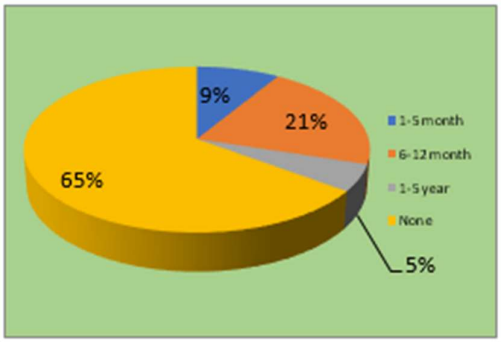
➢ *Polio Disease found between 3 months:*

POLIO DISEASE IN 3 MONTHS	Yes	No	Total
	20	37	57
Percentage (%)	35.08	64.91	100



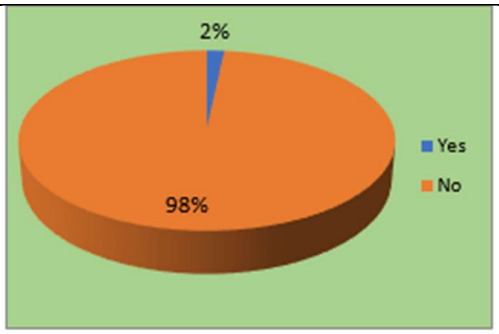
➢ *Polio Disease age groups :*

AGE GROUP	1-5 Month	6-12 Month	1-5 Year	Total
	5	12	3	57
Percentage (%)	8.77	21.05	5.26	100



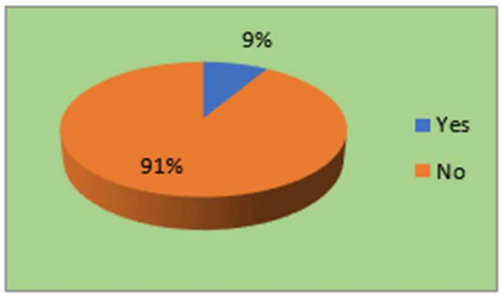
➢ *Mental Handicapped peoples :*

MENTAL HANDICAPPED MEMBERS	Yes	No	Total
	3	172	175
Percentage (%)	1.71	98.28	100



➢ *Physically Handicapped Peoples:*

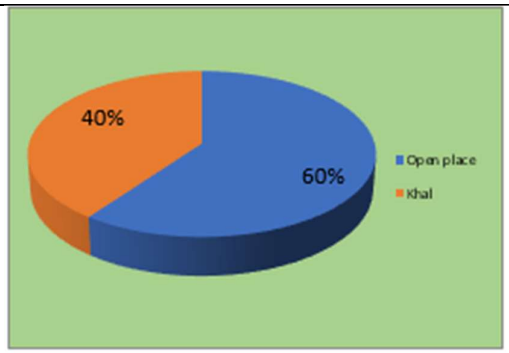
PHYSICAL HANDICAPPED MEMBERS	Yes	No	Total
	15	160	175
Percentage (%)	8.57	91.42	100



e. Urban Slum Sewage and Waste Management

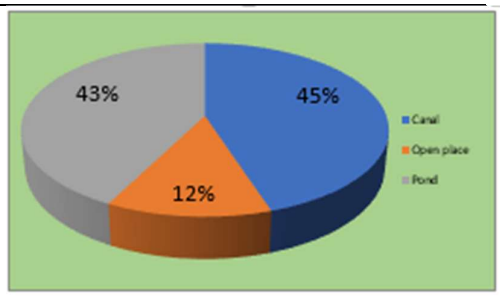
- *Domestic Wastage Through:*

SEWAGE	Open place	Khal	Total
TYPE	48	32	80
Percentage (%)	60	40	100



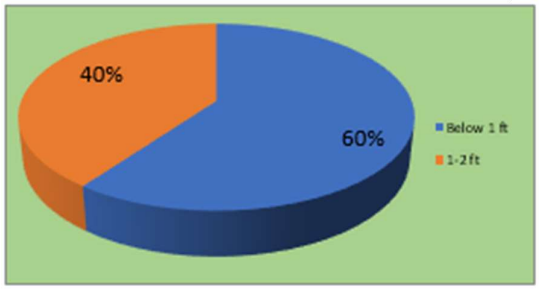
- *Domestic Waste Type:*

TYPE	Canal	Open place	Pond	Total
WASTE WATER	36	10	34	80
Percentage (%)	45	12.5	42.5	100



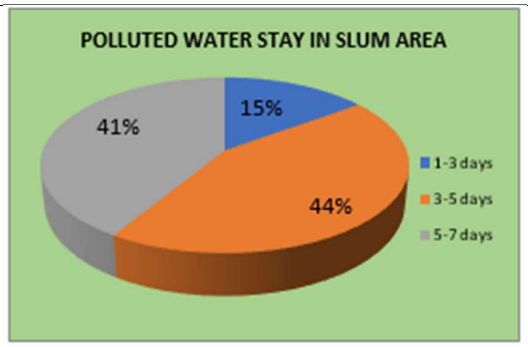
- *Rainy Season Water Height:*

TYPE	Below 1 ft	1-2 ft	Total
WATER HEIGHT	48	32	80
Percentage (%)	60	40	100



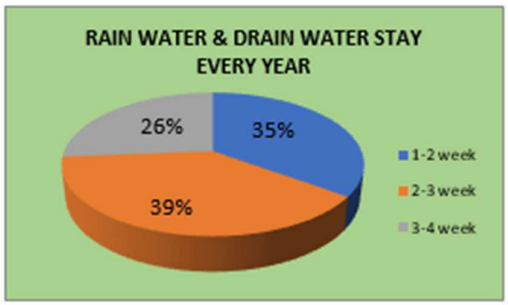
- *Polluted Water Stay inside the House:*

TYPE	1-3 days	3-5 days	5-7 days	Total
POLLUTED WATER STAY	12	35	33	80
Percentage (%)	15	43.75	41.25	100



- *Rain Water and Drainage Water stay in House:*

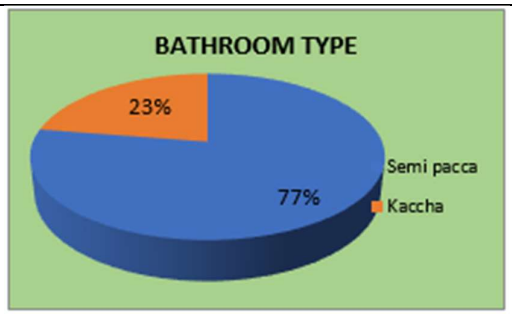
TYPE	1-2 week	2-3 week	3-4 week	Total
RAIN WATER AND DRAINAGE WATER STAY EVERY YEAR	28	31	21	80
Percentage (%)	35	38.75	26.25	100



f. Bathroom Condition:

- *Bathroom Type:*

BATHROOM TYPE	Semi Pacca	Kaccha	Total
	62	18	80
Percentage (%)	77.5	22.5	100

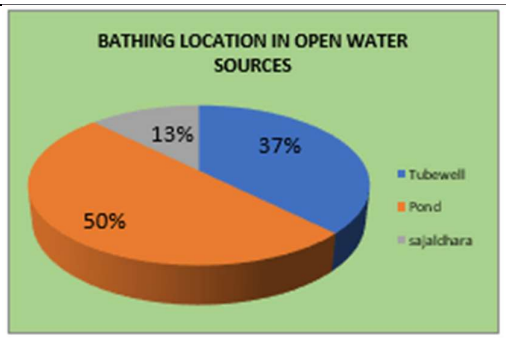


- *Product uses status in Bathroom:*

PRODUCT NAME	Soap	Hand wash	Others	Total
	49	15	16	80
Percentage (%)	61.25	18.75	20	100

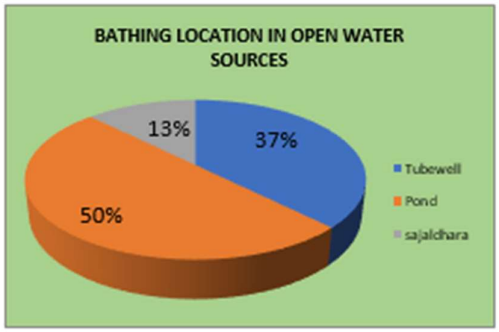
- *Bathroom uses water sources:*

WATER SOURCES	Tube well	Pond	Sajaldhara	Total
	30	40	10	80
Percentage (%)	37.5	50	12.5	100



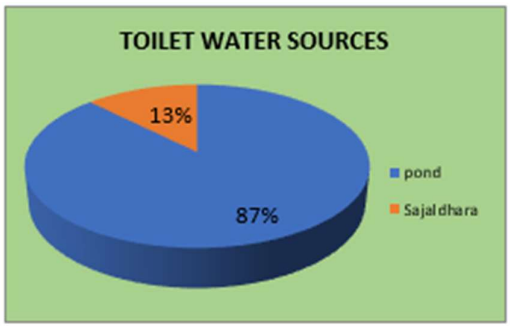
- *Bathroom uses water sources:*

WATER SOURCES	Tube well	Pond	Sajaldhara	Total
	30	40	10	80
Percentage (%)	37.5	50	12.5	100



- *Water Sources:*

TOILET WATER SOURCES	Pond	Sajaldhara	Total
	70	10	80
Percentage (%)	87.5	12.5	100



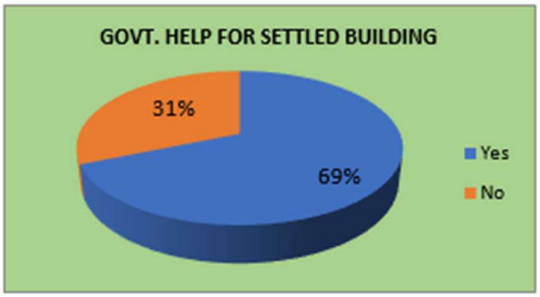
g. Govt. and NGO step for solving the different issues

- *Govt. help:*

GOVT. HELP FOR TOILET BUILD UP	Yes	No	Total
	65	15	80
Percentage (%)	81.25	18.75	100

- *Govt. help for Houses:*

GOVT. HELP FOR SETTLED BUILDING	Yes	No	Total
	55	25	80
Percentage (%)	68.75	31.25	100



Major Findings

1. Housing & Infrastructure: The study reveals a poor housing environment with 56.25% semi-pucca and 43.75% kacha (temporary) structures. While 88.75% of households have electricity access, the community faces severe challenges with drainage, sewage, and clean drinking water.
2. Education: There is a moderate literacy rate; 26.05% of the population reached secondary and 21.83% reached higher secondary levels. However, only 9% are graduates, suggesting economic pressure forces youth into the workforce early.
3. Economy: Residents primarily work in the informal sector as laborers (27.8%), toto drivers (19.13%), and farmers (12.2%). Over half of the families (54%) earn a monthly income between 6,000 and 10,000 INR.
4. Sanitation & Hygiene: Although 81.25% received government aid for toilets, 87.5% still rely on pond water for toilet use. Drainage is a critical failure, with 60% of domestic waste disposed of in open places and 40% in canals (khals).
5. Health: Poor environmental quality leads to high disease prevalence, including cholera (17.14% in 3 months) and diarrhea (11.43%). Women and children are most vulnerable to malnutrition and respiratory issues due to industrial pollutants.

Management

1. Waste Management: Currently, 60% of residents dispose of domestic waste in open areas. Stagnant water is a major issue; during the rainy season, polluted water stays inside or around houses for 1 to 4 weeks.
2. Government Intervention: Infrastructure development is largely driven by state schemes. Approximately 81.25% of households received aid for toilet construction, and 68.75% received help for building or settling their houses.

Suggestions

1. Integrated Drainage: Implement a planned underground sewage and drainage system to prevent waterlogging and the spread of vector-borne diseases.
2. Safe Water Supply: Reduce dependence on pond water for sanitation and bathing by providing consistent, treated piped water to all households.
3. Health & Awareness: Launch targeted healthcare interventions for women and children to combat

malnutrition and respiratory diseases exacerbated by industrial dust.

4. Vocational Training: Provide skill development programs to help youth transition from low-wage daily labor to professional roles, breaking the cycle of poverty.

Conclusion

This research highlights a significant disparity between the industrial prosperity of the Haldia belt and the marginalized living conditions of its labor workforce in Rupnarayan Chak. While government interventions, such as the Swachh Bharat Mission and PMAY, have successfully integrated physical infrastructure—evidenced by the 81.25% of households receiving aid for toilet construction and 88.75% having electricity—the overall environmental quality remains critical. The study concludes that the mere presence of individual amenities does not equate to a "dignified living environment". The lack of a planned, integrated sewage system and the high prevalence of kacha (temporary) housing (43.75%) continue to expose residents to severe health risks. Located in an ecologically vulnerable, low-lying area, the settlement suffers from chronic waterlogging, with polluted water often remaining inside or around houses for up to four weeks during the monsoon. This environmental degradation has led to a cycle of poverty and ill-health, marked by widespread water-borne and respiratory diseases, particularly among women and children. Furthermore, the economic "plateau" in education—where only 9% of residents reach graduate level—forces the younger generation into early labor, trapping the community in a low-wage socio-economic cycle. To foster a sustainable and equitable urban environment, urgent holistic policy interventions are required to improve drainage, ensure safe water access, and provide professional educational support.

Acknowledgement

The authors would like to express their sincere gratitude to all those who have contributed to the completion of this research study. First and foremost, we extend our heartfelt thanks to the authorities of Egra Sarada Sashi Bhusan College and Bajkul Milani Mahavidyalaya for providing the necessary academic environment and facilities to conduct this work. Special thanks are due to the local administration and the representatives of Haldia Municipality for their cooperation and for providing relevant data regarding the slum pockets of the region. We are deeply indebted to the residents of Rupnarayan Chak, Haldia, who generously shared their time, personal experiences, and socio-economic information during the field survey. Without their active participation and honesty, this primary data-based study would not have been possible. Finally, we wish to thank our families and colleagues for their constant encouragement and moral support throughout the duration of this research project.

Author Contributions

Mintu Jana: Conceptualization, Methodology, Formal analysis, Investigation (Field Survey and Data Collection), Data Curation, Writing - Original Draft, and Visualization.

Mrs. Taniya Roy: Supervision, Validation, Project administration, Writing - Review & Editing, and Technical Support.

Conflict of Interest

"The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. This research was conducted independently, and the findings are based solely on the data collected during the field survey at Rupnarayan Chak, Haldia."

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Photo Documents Of Rupnarayan Chak Slum