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RESEARCH ARTICLE

CHANGING URBAN GROWTH: IMPACT ON THE PEOPLE OF BAIDYABATI, HOOGHLY

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ABSTRACT

This study examines the processes of urbanization in Baidyabati Municipality, with a specific focus on Wards 9 and 17, from the years 2001 to 2024. Located in the rapidly urbanized Hooghly district of West Bengal, Baidyabati has experienced substantial land use changes and infrastructure growth over the last twenty years. The research seeks to analyse trends in land use alterations, housing development, infrastructure availability, and access to urban facilities, utilizing both spatial and socio-economic data. With the help of Q GIS land use land cover changes has been depicted from 2001 to 2024.To justify this geospatial assessment, a primary household survey has been conducted to 100 participants—50 each from Ward no 9 and 17, ensuring gender balance. The survey results offer valuable insights in to housing conditions, service provision (water, sanitation, and waste management), mobility trends, and residents' views on infrastructure availability developed after urban growth. Initial findings demonstrate significant positive changes in developed areas, transformation of agricultural land, and a gradual enhancement of roads and drainage systems. Nevertheless, disparities can be seen regarding infrastructure development between ward no 17 and ward no 9. Socio-economic condition of residents are also influencing livelihoods and living conditions. This research adds to the understanding of localized urbanization trends in smaller towns and medium-sized cities of India. It underscores the necessity towards specific planning and participatory governance to tackle uneven development.

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INTRODUCTION

Urbanization is a very complex process. It is the population shift from rural to urban areas, and the way by which society adopts the changes. Urbanization leads to environmental degradation, industrial expansion, ecological imbalance, and mining. Also leads to commercialization, industrialization and provides people with housing, electricity, and clean water. It occurs primarily in search of job, shelter, foods etc. Urban living is often associated with higher levels of literacy and education, better health conditions, greater access to social and economic services, and enhanced opportunities for cultural and political participations. In search of a better life rural people started coming over the urban areas but are often forced to settle themselves down in to slums or any kind of cheap land available to them in the metropolitan areas. Because of rapid urban growth, high population density and high rate of consumption, residents in megacities affect local socio- economy and environment which requires attention from the world community. As it is significantly affect the global sustainability and future prosperity. Baidyabati is located in Hooghly district of West Bengal in India. This district town has experienced many changes Communicative developments such as railway connectivity has been improved. Some convenient options have been provided to the common mass to communicate via main road, directly accessible to the highways. The water transport system being able to be one of the most significantly considered way of communication here. Also to be specifically mentioned, 'Baidyabati ' being one of the most communicable district townof the metropolitan city 'Kolkata' adds more depth into the urbanization of this municipal area and quite expectedly, the rural people started gathering for the sake of the rapid chances for their economic survival. As a result the growth curve trends an upward growth. To showcase the rapid urbanization, urban expansion and the basic human rights and opportunities that has been provided to the residents of Baidyabati, wards, no. 9 and 17 has been taken into consideration. The town and Municipality of Baidyabati being in the Hooghly district, has become more urbanized over time due to population growth and increased infrastructural development. The demand of those expanded population, resulted in the growth of residential complexes, business establishments, healthcare centres, educational institutions, and other amenities. To connect the town to its surrounding areas and the city of Kolkata, the town's transportation networks, including its roads and public transit system, have been improved. As Baidyabati becomes more urbanized, regulating urban growth, assuring sustainable development, supplying fundamental services, and preserving the standard of living, urban planners and local government officials should take necessary infrastructure framework for long-term basis.

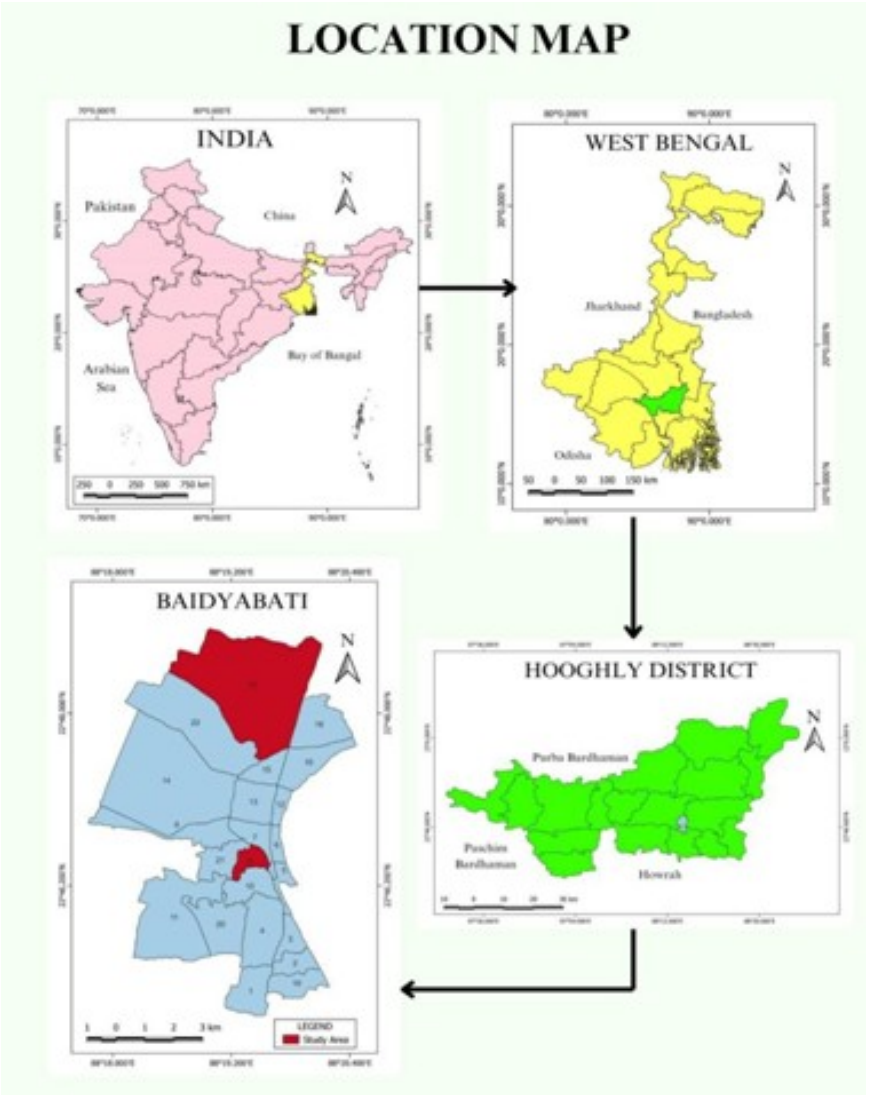
SELECTION OF THE STUDY AREA

Baidyabati is a city and a municipality of Hooghly district in the state of West Bengal in India. It is under serampore police station of serampore subdivision. The study area is under Baidyabati municipality, which is the western part of river Hooghly. The study area is directly connected to

Katwa and Barddhaman (through Bandel) and Tarakeswar (through Sheoraphuli), all three major points of transit from rural hinterland of Kolkata metropolitan area. The study area is very much accessible by road from Howrah, Kolkata and Barddhaman. It is within 35 kilometres of Howrah and Kolkata and within 82 kilometres of Barddhaman. The area is also very close to Baidyabati railway station on Howrah-Burdwan mainline. It is within 4 minutes train journey from Sheoraphuli railway station, junction point of Howrah-Tarakeswar branch line and Howrah-Barddhaman main line. All these factors along with availability of affordable land and rental houses at cheap price make this area a magnet for migrating rural and urban population. A study of this area brings to front the changing urban growth which creates impact on the people of Baidyabati.

LOCATION OF THE STUDY AREA

The study area is situated in parts of ward no 17and ward no 9 of Baidyabati municipality. It includes almost 3.9 square km area and extends from 88°19'4"East to 88°20'30" East longitude and from 22°47'31" North to 22°48'39" North latitude. It is included in Kolkata Metropolitan Area.



Source: Compiled from NATMO, Primary Census Abstract, 2011, Govt. of West Bengal, Prepared by the researcher at USGS Platform

Fig. 1. Location of the study area

OBJECTIVES

The main objectives of the present work are to analyse the past and present urban growth of the locality of Baidyabati, how it has been changing over last 20 years and to uphold the positive and negative consequences of urbanization in this area. i.To analyse landuse and landcover changes in baidyabati in the year of 2001, 2011 and 2021. ii.To detect positive and negative impact of urbanization and identify the driving factors of urbanization and urban expansion in Baidyabati

METHODOLOGY

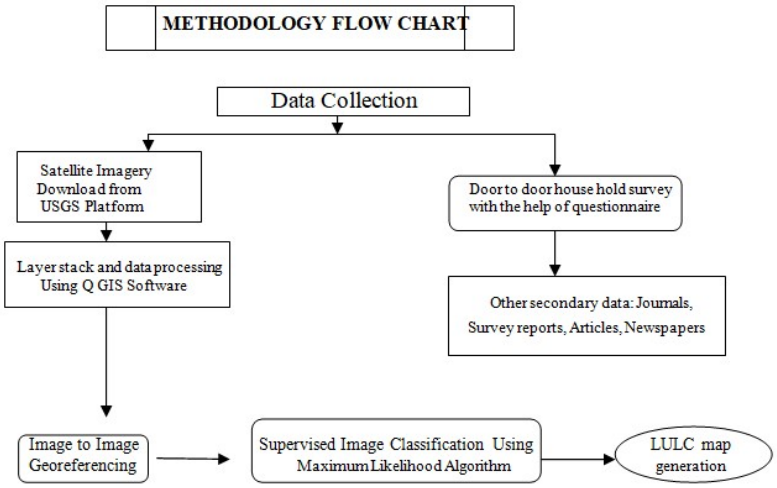
The entire work has been done by three phases:

Pre-field-work: Baidyabati has been chosen for study area as it isa town of Hooghly district with rapid urbanization occurred in this area which impact on people. In Baidyabati, there are total 23 wards. Ward number 9 and 17 has been chosen on the basis of standard of living of people resided here. In ward no 9, so called middle and upper middle family resided and ward number 17 is a slam area. Some information has been

gathered about Baidyabati from the sources like books, YouTube, journals, research papers etc. Information from different offices such as municipality office, block development offices etc, has been also collected. A questionnaire schedule has also been prepared for primary survey.

Fieldwork: 100 house hold survey has been conducted, of them 50 in ward 9 and 50 in ward no 17 with the help of questionnaires.

Post field-work: As a part of the post-field activity a location map has been and landuse landcover changes maps of Baidyabati has been prepared with the help of Q GIS, A master table has also been prepared and socio economic conditions has shown by some cartographic techniques. This was followed by an interpretation of the diagrams and finally, the conclusion was written.



LITERATURE REVIEW

A review of the literature reveals several significant indicators of urban growth, including the fact that India is one of the world's most urbanized nations, with only 27.78% of the population living intowns. Atthe same time, India is experiencing a crisis of urban growth, even though urbanization has been a tool for social, economic, and political advancement. Mohit Singh Rai's article, "Impact of Urbanization on Environment," covered a variety of topics, including the causes of urbanization, its main issues, and its effects on the environment. The Baidyabati Khal is an irrigation channel of whole Hooghly district it is connected to DVC can also through other canals. 'A Study of Changing Livelihood Structure in a Peripheral Part of Kolkata Metropolitan Area, West Bengal'. by Thakur, Jaya, and Sivaramakrishnan, L., 2015, reveal the social development of the area and analyses how land use changes have affected the direction of development and socio-cultural dynamics of this area.

RESULT AND DISCUSSION

Objective-i: Analysis of the landuse and landcover changes in Baidyabati 2001, 2011,2021

Table 1. Dataset of Satellite Images

Satellite	Date of Acquisition	Sensor	Path/Row	Projection	Datum	UTM Zone	Spatial Resolution
Landsat 5	2001-02-13	TM	139/41,42	UTM	WGS 84	45N	30 M/PAN 15m
Landsat 5	2011-02-09	TM	139/41,42	UTM	WGS 84	45N	30 M/PAN 15m
Landsat 8	2021-11-07	OLI	139/41,42	UTM	WGS 84	45n	30m/PAN 15m

Source: USGS Platform, Computed by the Researchers

Table 2: Landuse Land cover classes and their description

Sl.No.	LULC Classes	Description of classes
1.	Water Bodies	Ponds and marshy land
2.	Built-up area	Residential, commercial, industrial, shops etc.
3.	Vegetation	Agriculture, small and large trees
4.	Fallow land	Open field, garbage disposal place, stadium etc.
5.	Degraded land	Other than agricultural land

In2001, most of the areas of Baidyabati were rural according to landuse map. The residential area was very small and most of the settlement pattern was dispersed. The total 12.09 sq.km. area of Baidyabati, vegetation area covered 32.68%, water bodies were 9.2%, fallow land was 13.81%, degraded land was 27.83% and total area of built-up area covered 17.42%. In 2001, Baidyabati was mainly rural populated area. Compare to land use map of 2001, lots of changes had been occurred in the land use map of 2011 like residential area, vegetation covers etc. The rural area of ward no 9 and 17converted to urban area. In the year of 2011, the built-up area was 31.63%, vegetation area was 24.2%, waterbodies were 5.2%, fallow land was 7.16% and degraded land was 28.26%. In the year 2021, Baidyabati has changed drastically. Ward no 17 of Baidyabati has been converted to urban fully. The built-up area has become 43.63%, due to huge growth of urbanization. And the vegetation area is 19.48%, water bodies are 4.2%, fallow land is 3.76, and degraded land is 24.83%. So, it can be concluded that the rapid growth of urbanization occurred within 2011-2021.

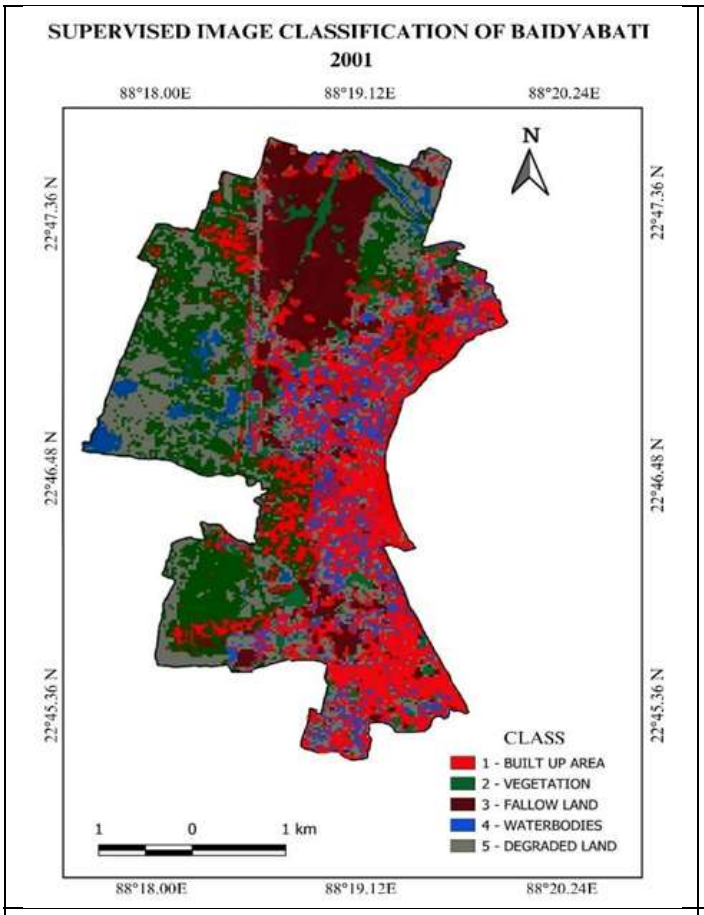


Fig. 2. Landuse /land cover map Baidyabati, 2001

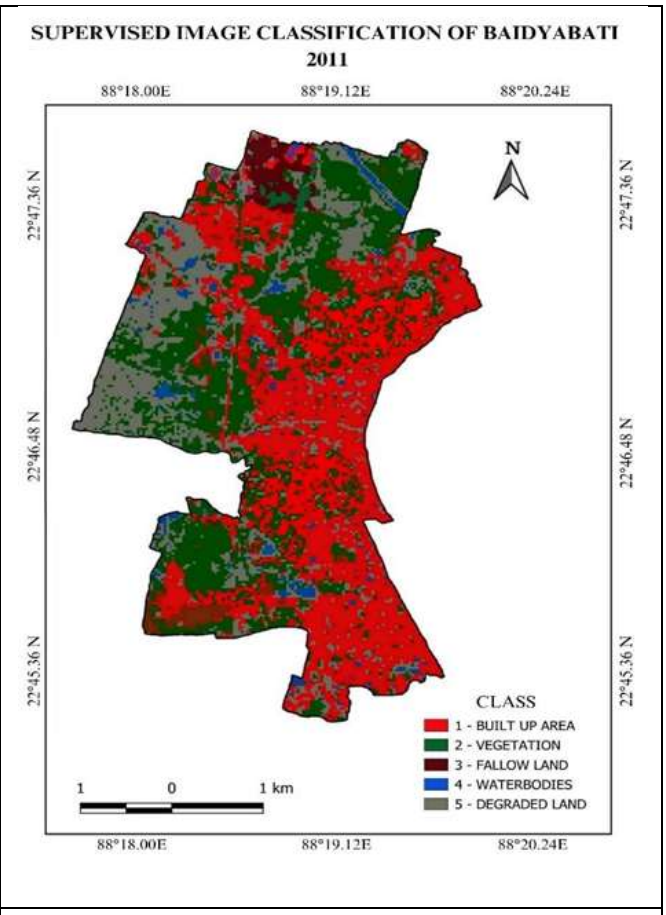


Fig. 3. Landuse /land cover map Baidyabati, 2011

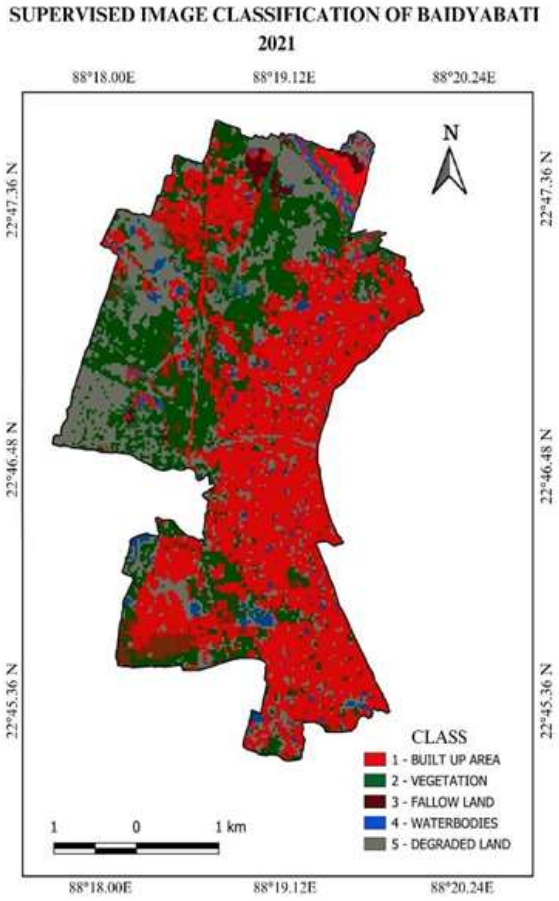


Fig. 4. Landuse /land cover map Baidyabati, 2021

Table 4. LULC change detection (2011-2021)

Land use categories	2011		2021		LULC change detection	
	Area		Area		Area	
	Km²	%	Km²	%	Km²	%
Boilt -up area	3.805	31.63	5.248	43.63	1.44	11.8
Vegetation	2.937	24.42	2.34	19.48	0.59	4.88
Fallow land	0.861	7.16	0.45	3.76	-0.4	-3.36
Water body	0.625	5.2	0.50	4.2	-0.12	-0.99
Degraded land	3.399	28.26	2.98	24.83	0.41	-3.39
Total	12.143	100	12.14	100		

Source: Computed by the Researcher

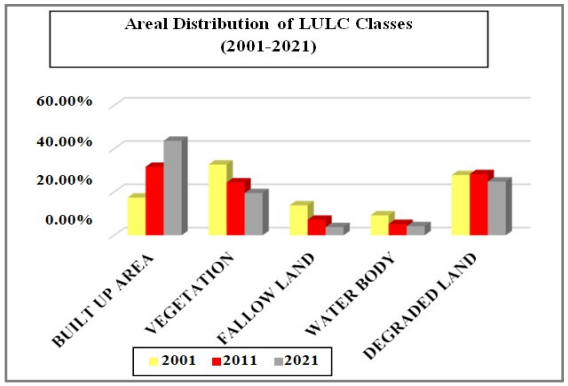


Fig. 5. Source: Prepared by the Researcher

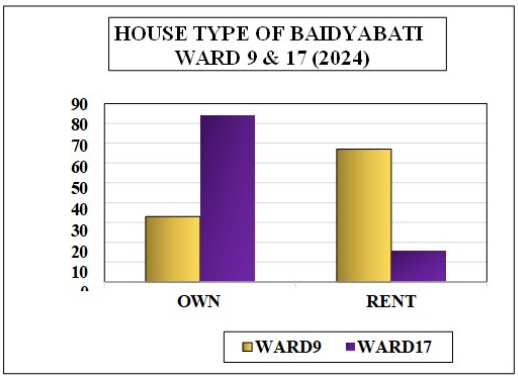


Fig. 6 . Source: Primary Survey

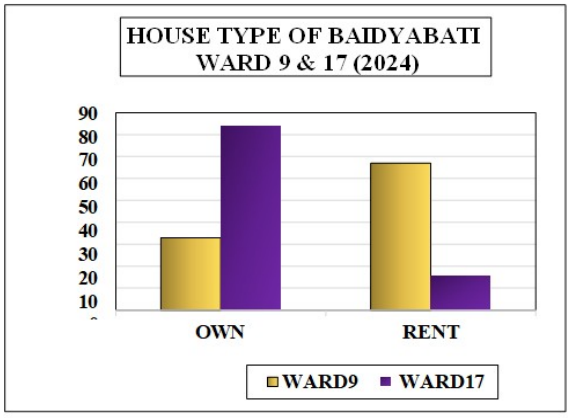


Fig. 7. Source: Primary Survey

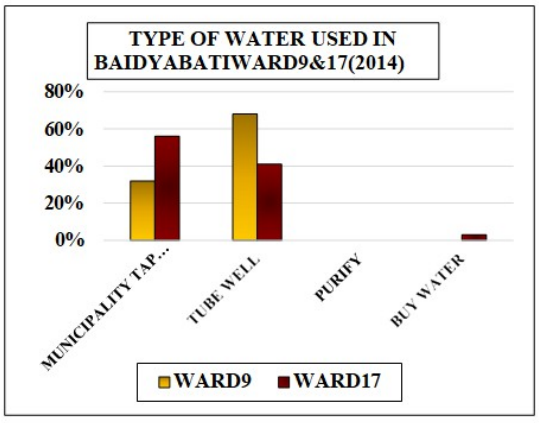


Fig. 8. Source Primary Survey

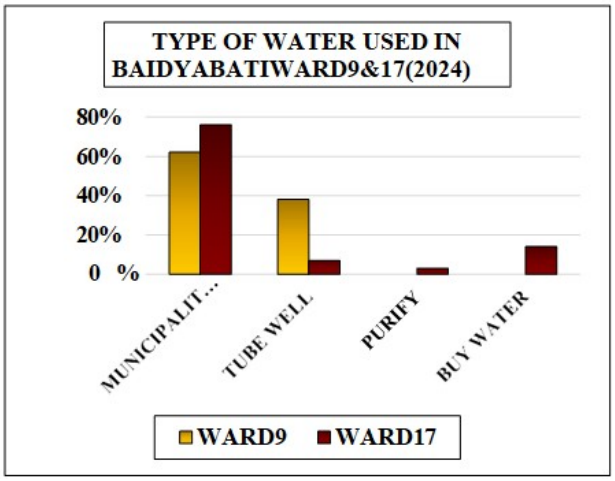


Fig. 9. Source Primary Survey

The LULC change detection analysis (Table 3 and 4) shows that the built-up area increased from 17.42 percent (2.09 sq. km.) in 2001 to 43.63 percent (5.248 sq. km.) in 2021 with a net increase of 14 percent from 2001-201 and 11.8 percent from 2011to 2021. The obvious effect of urbanization is reduction of forest resources and agricultural land and open or fallow land. He information found from the satellite (2001 to 2021) points out that vegetation cover of Baidyabati has been reduced from 32.68 percent (3.93 sq. km.) in 2001 to 19.48 percent (2.34 sq. km.)

in 2021. Construction of roads, buildings, reservoirs to supply water are responsible for decrease area under vegetation cover. The table also reveals the decrease of water body from 2001 to 2021. The net decrease of water body is -3.96 percent from 2001 to 2011 and -0.99 percent from 2011 to 2021. The area under pond, low land, and marshy land has been decreased drastically. Percentage of degraded land has been increased from 2001 to 2011 in Baidyabati from 27.83 percent to 28.26 percent because of over utilization of land, dumping of concrete material for days, littering of garbages. But satellite image of 2021 reveals that percentage of degraded land has slowly been decreased from 28.26 percent in 2011 to 24.83 percent in 2021. This is because of regular garbage cleaning, proper sanitization under taken by Baidyabati municipality.

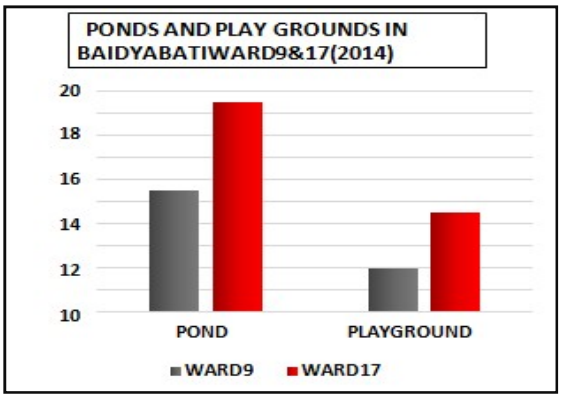


Fig. 10 Source: Primary Survey

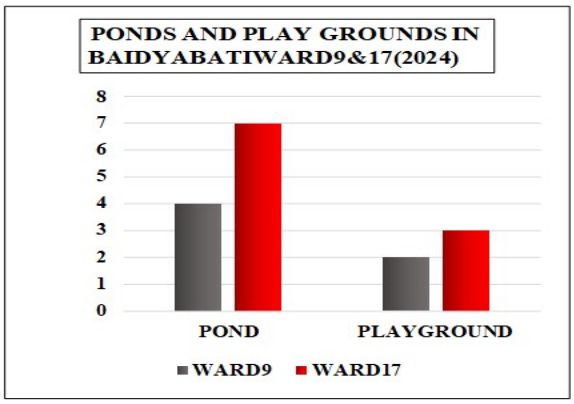


Fig.11 Source: Primary Survey

Photo 1. Pond in Ward No. 9

Photo 2 Playground in ward no 17

Table 3. LULC change detection (2001-2011)

Land use categories	2001		2011		LULC change detection	
	Area		Area		Area	
	Km²	%	Km²	%	Km²	%
Boilt -up area	2.09	17.42	3.80	31.63	1.70	14.0
Vegetation	3.93	32.68	2.93	24.42	-0.99	-8.18
Fallow land	1.66	13.81	0.86	7.16	-0.80	-6.58
Water body	1.10	9.2	0.62	5.2	-0.48	-3.96
Degraded land	3.34	27.83	3.39	28.26	0.05	0.42
Total	12.1	100	12.14	100		

Source: Computed by the Researcher

Objective 2 Identification of the driving factors of urbanization and urban expansion in Baidyabati ward no 9 & 17and positive and negative impact of it: Since the last 10 years number of drastic changes has been taken place in ward no. 9 and 17 because of the increasing number of households with the lesser production of vegetation. Due to urban growth, all the advance facilities being offered to the convenience for the local citizens such as, the extension of the National Highways, modernization of the Railway connections, new health care centres, High Schools, or Primary Schools etc. In ward no 9, 88% people are living in rented houses and 12% are living in their own house. And in ward no 17, around 65% people are living in their own houses or in flats and around 35% of people are living in rented houses. In the year of 2024 in ward no 9, 67% people are living in rented houses and 33% are living in their own house. And in ward no 17, around 84% people are living in their own houses or in flats and around 16% of people are living in rented houses. People who live in their own house either they have concrete roofs or use corrugated roofing sheets. And the rented houses have their roofs made of tiles. In Baidyabati we can see mainly four types of story patterns. In 2014, ward no 9 has 94% houses with single storied whereas about 6% houses are double-storied. And in ward no 17, majority of the houses are single storied. Double storied houses are around 33% of the total, triple storied houses are only 2% and the flats comprise about 9% of the total. In 2024, the scenario has been changed. 30% of the total residential area covered by flat or multi storied buildings. In ward no 9, 90% houses are single storied where as about10% houses are double-storied. Previously, in the ward no9, and17 accordingly, as far as the local people have observed that the numbers of flats or apartments were not in large numbers but since the last 10 years, a reversal has taken place as people are more likely to sell their own independent houses with a valuable amount of money, and looking forward to shift into the newly built apartments with their nuclear families. Water is one of the natural resources, which is found in an adequate amount in Baidyabati. Survey reveals that, in 2014, in ward no 9, out of the 50 families, 32% of people use municipality taps, 68% use tube wells. And in ward no 17,out of the 50 families, 56% of people use municipality taps, 41% use tube wells as a source of drinking water. In2024, Municipality has able to deliver to 62%peopleof ward no. 9and 76%peopleofward no. 1738%and 7%ofpeople from ward no 9 and 17 respectively are still using tubewell water as drinking water. 14% of people are buying water as a source of drinking water. According to the local people Municipality tap water are free from pollutants like iron, chlorine etc.

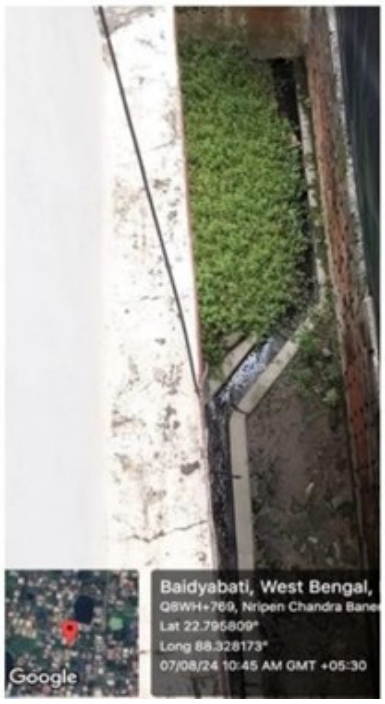


Fig.12. Source: Primary Survey

Fig. 13. Source: Primary Survey

Since the last10 years, in the ward no 9 and 17of Baidyabati accordingly, we can see enough presence of the local ponds and playgrounds, but with ongoing urbanisation, including deforestation, construction of multi storied buildings, reconstruction of local streets, and overuse of play grounds for merry making activities, the number of open fields and ponds are gradually decreasing and causing the destruction of greenery. In the year of 2014, ward no 9, according to my survey, data shows no of 4drainsarepucca, 66 drains are kutcha and only 4 drains are under open system. In ward no 17, 22 drains are pucca, 43 are kutcha and 11 drains are under open system. In the year of 2024, ward no 9, according to my survey ,data shows no of 14 drains are pucca, 56 drains are kutcha and only 4 drains are under open system. In ward no 17, 64 drains are pucca, 23 are kutcha and 18 drains are under open system. In 2014, ward no.9 experiences substantial 83% water logging, and ward no 17 experiences 70% water logging, which is caused by the soil's inadequate water retention capacity and insufficient drainage infrastructure, resulting in water accumulation even after mild precipitation. In these wards, the rain water mostly, used to get logged in the streets as they were not in a good condition at that time. But at present things have changed a lot which is causing a lot of harms in the daily lives of people, as those streets have been reconstructed along with the drainage system improvement too, thus the heavy amount of rain water are now clearly passing onto the home backyard of the houses of the residents. Baidyabati improves urban security and quality of life by maximizing the street light facilities so that activity can take place easily. In the year of 2014, ward no 9 had only 19% street lights and ward no 17 had 48 75% street lights. Maximum are as were omitted from the street lighting coverage. In 2024, ward no 9 get 31.25% street lights and ward no 17 get 86.75%. In 2014, ward no 9 had only 2 LED bulbs, with the other 27 tube lights and ward no 17 had 8 LED bulbs with 45 tube lights. And in 2024 ,it is seen that the ward no 9 has 2 solar lights, 17 LED bulbs and 37 tube lights and ward 17 has 3 solar lights, 22 LED bulbs, 75 tube lights, which is covering the entire area of both wards. In Baidyabati we can see mainly two types of roads that is metalled road and unmetalled road. In 2014, 7% roads were metalled and 93%% roads were unmetalled in ward number 9, and 30% roads were metalled and 70% roads were unmetalled in ward number 17. In 2024, with drastic urban expansion 23% roads became metalled and 77% roads became unmetalled now in ward number 9 and 80% roads were metalled and 20% roads were unmetalled in ward number 17. Baidyabati's urban growth demands a radical transformation of its public transportation system. Transport infrastructure in Baidyabati helps to connect various places. Ward number 17 provides better transport network than ward no 9. All type of transportation facility isavailable there such as bus, auto, toto, train, taxi, private car etc. people have used bus, auto, toto for short distance, and train, taxi, private car, and ferry services for long distance.

Garbage cleaning condition in ward no. 9: Since the last 10 years, there were no such exceptional changes in garbage cleaning in both Ward number 9 and 17 but, it is nice acceptable to say that in those areas the garbage cleaning procedure has been taken under control. Previously like all other wards in Baidyabati, it has been observed that the drains of ward no 9 and 17 used to get cleaned once in a year. not more often within the weeks and months, but nowadays there has been a huge change as all the drainage systems are being cleaned more frequently that is monthly or weekly because huge amount of sewage water from various multi- storeyed buildings clogged the drains frequently. After conducting a survey, it has been found out that in 2014, essential amenities such as shopping malls, restaurants, ATMs, diagnostic centers, private banks, medical facilities, and grocery stores were less in number. Nevertheless, over the past decade, these amenities have seen remarkable growth, positively influencing the community's quality of life. Before 2015 there were no play school in any ward of Baidyabati. But in 2024 there were total 10 play schools in ward number 9 and 17 which are truly showing the positive effect of urbanisation. On the contrary, the absence of adequate increase in the number of police stations and post offices between 2014 and 2024 has adversely affecting the population.

RESULTS

Development or progress can never be resisted. With the increasing demands of every other thing, cause urbanization towards the same way. In 2014-2024 all the changes taken place has impacted the residents both positively and negatively. Positively the health facilities and transport facilities, educational institutions been renovated, garbage cleaning has been done quite regularly. On the other side the negative aspects like ponds, play grounds have been decreased in numbers, excessive traffic congestions have been taken place. With the increasing demands of the mobile phones, the local Xerox cum STD booths has switched into the business related to mobiles servicing and sell. Some local vegetable sellers have been selling flat breads every evening.

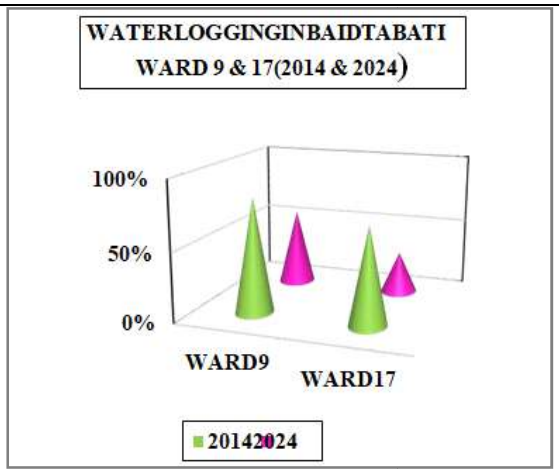


Fig.14 Source: Primary Survey

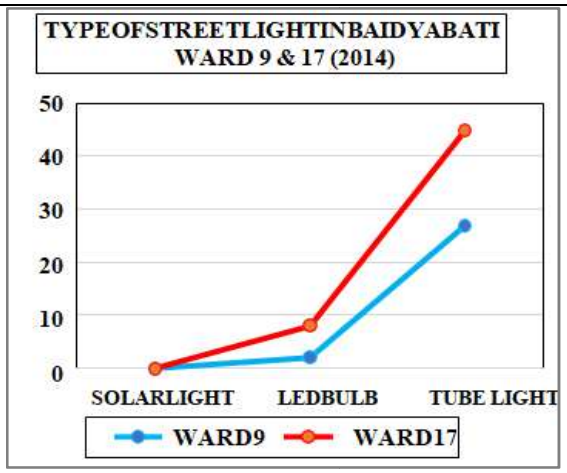


Fig. 15 Source: Primary Survey

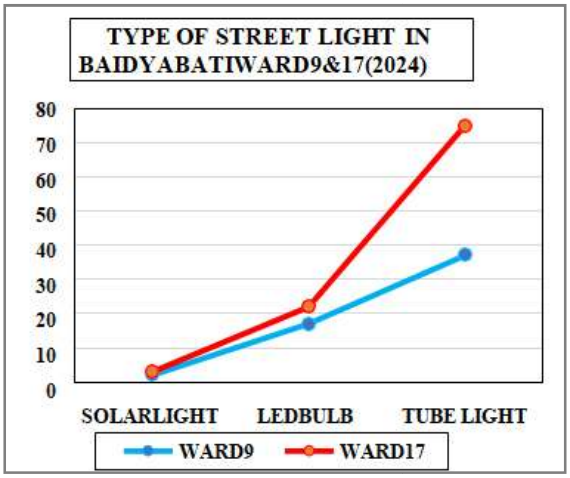


Fig. 16. Source: Primary survey

Photo. 4. Garbage cleaning condition in ward no. 9

Some people shifting their own houses in to play schools mainly for high demands of playschool education and also for attractive monthly rent. Maximum local restaurants have been turning themselves into some expensive well decorated high-profile restaurants because of change of taste and outlook of surrounding residence. The enclosed industries have been converted to shopping malls, multistoried buildings, or even space for garage to privet cars. All types of business shifts in addition. Hence, Government must focus more on the infrastructure and facilities of Baidyabati

CONCLUSION

The town and municipality of Baidyabati being in the Hooghly district, has become more urbanized over time due to population growth and increased infrastructural development. Due to urbanization, residential neighborhoods, commercial buildings, medical facilities, educational institutions, and other amenities have grown in Baidyabati to suit theneedsofthe growing population. The town's public transportation system and road network have been upgraded to strengthen connections between the town and the surrounding districts as well as with Kolkata. Ensuring sustainable development, controlling urban growth, providing basic services, and maintaining the level of living for residents may become more challenging as Baidyabati gets more urbanized. Municipal officials and urban planners need to take things into consideration. The built-up area is increasing with urban growth.

The decrease in vegetation cover is the effect of deforestation for developmental activities as well as for households, fuels, wood requirements. Also shows a slight decrease of waterbodies. The area under fallow land shows a drastic change. The decrease in degraded land is the effect of local road construction. Since the last10 years, in the areas of ward no 9 and 17, because of theincreasing number of households, one can easily mark a lot of drastic changes taken place in those areas; with the lesser production of vegetation.

This district town has been hugely under the impact of urbanization, with all the advance facilities being offered to the convenience for the local citizens such as, the extension of the National Highways also the modernization of the railway connections, with the new establishments, in those areas where people were lacking behind the necessary amenities related to take care of their health and their kids future such as new health care centre, or high schools or primary schools. But not to forget that all these aspects related of urbanization seen in those ward no's are not deprived of their own negative aspects too in the lives of the residents. Changing urban growth is necessary but not at the cost of degraded biodiversity, climate change, global warming etc. Proper planning and measure should be taken into consideration before developing shopping mall, high rise multiplex etc.

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