

A REVIEW STUDY ON PLANNING STRATEGIES FOR DEVELOPMENT OF SUSTAINABLE CITY- A STUDY ON “DAHOD”

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Abstract : In this research paper review has been done on various study on planning of strategies for development of sustainable city. The paper presents and shows how the environment is actually a part of public asset performing a important role in the entire system and hence should be deal with extreme care. Sustainability has been a widely spread word in the recent times and it's important to adapt and adopt to all the techniques involved in a type of development that is sustainable in regards with all the public infrastructure. The main aim of sustainable development is so that all the requirements of the existing or current populace is fulfilled adequately, however that does not come at the expense of future needs. This paper presents all the various necessary things and conditions required for the development to be considered as a sustainable. Many techniques and tools adopted and suggested by various past researchers have been studied and analysed. The main aim of sustainable city is to make sure that the natural environment is not affected negatively extensively due to various urban infrastructure development, this is achieved by making sure carbon emission is low and using various information and communication technology.

Keywords: Sustainability, Sustainable Development, Sustainable city

I. INTRODUCTION

1.1 Sustainable Development

Sustainable development depends on healthy, happy citizens, who need easy access to education, healthcare, security, food, water, transport, clean air and electricity. Such an ideal situation can be created when cities build efficient waste disposal systems, green spaces and green buildings, public transport and attract employers producing green products from local resources for regional markets.

In other words, to create a sustainable city, it is crucial to measure and assess policies, infrastructure, socio-economic factors, resource use, emissions and any other processes that contribute to and profit from the city's metabolism, prosperity and quality of life. This will allow city planning authorities officials, and governments in general, to identify areas of opportunity as well as concern, and to respond by developing realistic sustainability goals with a long-term perspective.

The concept of sustainable design was mentioned frequently, as it covers a wide range of topic. No matter it covers **Economic topic, Architecture topic or Landscape topic**, it integrates **principles** that enables **Human to live in harmony with the natural world, protecting biodiversity and sharing habitats with other aspects**.

- JOBS – Occupation site situated inside networks so time spent making a trip to work can be reduce.
- CORRIDORS - High business and private hallways centers, developments along with transit routes.
- WORKABILITY - Interconnected road frameworks interface occupants with the administration they need.
- GREEN SPACE - Its provide recreation opportunities and connect people with natural systems
- INFRASTRUCTURE - Integrating natural systems reduces infrastructure costs and environmental impact
- HOUSING- A range of housing types allows residents of differing economic situation to live in the same neighbourhood and have access to the same services.

There are three main pillars for the sustainable development which is very essential for the development.

This development deals with environmental, social and economic factors (1) Social: standard of living, equal opportunity, education, and technological assistance;

(2) Environmental: efficient natural resource use, carbon emission control and optimum utilisation of land, water, air and waste;

(3) Economic: nature profit, cost reduction, collaborative R & D and economic development.

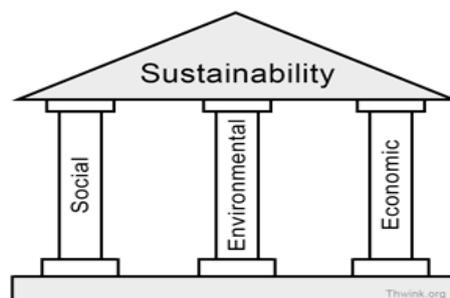


figure 1 Parameters of Sustainability

1.2 Dahod

Dahod spans regions of Gujarat and Malva. The later has since been reorganized as districts in Madhya Pradesh and Rajasthan. The name Dahod derives from its former name Dohad. The name Dohad was given to the region due to its location between borders of Rajasthan (north) and Madhya Pradesh (east). Dohad literally translates to "two borders". It is estimated that Dahod is 1,000 years old. Dahod District, also known as Dohad District, is located in Gujarat state in western India. The city of Dahod is the district's administrative headquarters. The district has an area of 3,642 km², and a population of 21,26,558 (2011 census), with a population density of 583 persons per km². Dahod District was created on 2 October 1997, and was formerly part of Panchmahal District. Its territory mostly consists of two former Princely States, namely Baria (Devgad) and Sanjeli in addition to Fatehpura Taluka of Sunth (Rampur), along with the two "eastern mahals" of Dahod and Jhalod from the former Panch Mahals. It was 8.99% urban at the 2001 census. This district is bounded by Panchmahal District to the west, Chhota Udaipur district to the south, Jhabua District and Alirajpur District of Madhya Pradesh State to the east and southeast respectively, and Banswara District of Rajasthan State to the north and northeast. The population of the district is mostly rural, and a majority of the district's residents are Tribals, mostly Bhils. Dahod District also has the second largest population of "Dawoodi Bohra" sect of Muslims in India. It was previously within the boundaries of Panchmahal District. The area of Godi Road/Godhra Road has been considerably developed, making the overall residence and commercial area very expansive.

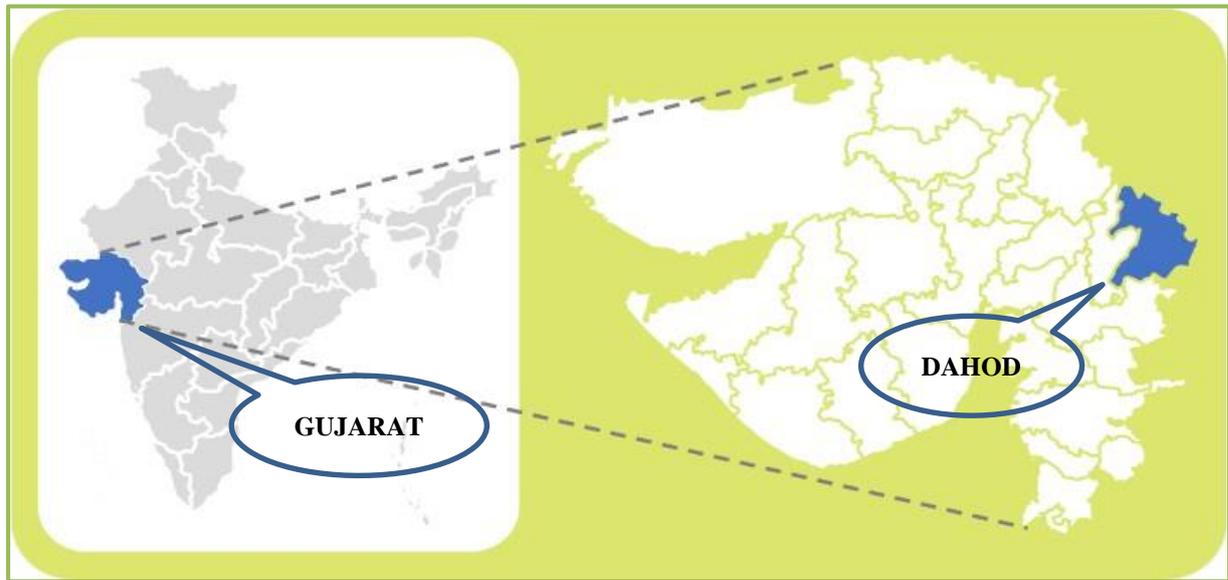


figure 2 Location of Dahod city

II. OBJECTIVES OF STUDY

1. To study on various planning strategies for development of sustainable city.
2. To Formulate the future strategy for Sustainable Development of Dahod city.

III. NEED FOR THE STUDY

Nowadays Urbanization usually occurs when people move from villages to cities to settle, in hope of a higher standard of living. By means of urbanization there in city creates a high density which requires more public infrastructures and facilities, which not fulfill by the authority. Increasing populations in the city has resulted in Economic, Environmental and Social problems. If this problems cannot solve effectively then its impact on the future generation so there is need to prepare a sustainable development plan for now and also for future generation. So there is need to transform existing cities in to sustainable manners for the safe, efficient, clean and green and offer a high quality of life. Some of the infrastructure problems are as following.

- Lack of infrastructure facilities
- Unavailability of new technology
- Lack of Interconnectivity between diff. infrastructures
- Life of infrastructure
- Conventional method used in infrastructure
- Lack of maintenance
- High initial cost
- Lack of planning

IV. LITERATURE REVIEW

- The author **James Meadowcroft** has been concerned about study with participation in public decision-making for sustainable development, and it has considered what is specific about the requirements of such processes. It has argued that participation is an important dimension of governance for sustainable development, and that the design of decision processes should pay particular attention to mechanisms which encourage adequate representation of implicated interests, deliberative engagement, the application of different forms of knowledge, and social learning. Of the three strands of participatory discourse manifest in the environmental policy realm, the stakeholder approach was identified as the one with the greatest potential to contribute directly to public decision-making; with a substantial contribution to be expected from the

community-centred approach; and a more limited direct role for the citizenship strand.

- In this paper the author **José Amarilio Barbosa, Luís Bragança, Ricardo Mateus** has considered problems in cities, it is imperative to create guides and models of organizational planning of urban areas that can be followed and applied to cities to implement sustainable development. Thus, it is crucial to define land use policies taking into account sustainability criteria. Most existing studies seem to agree and point to **the concept of cities with tall buildings, high density construction areas and minimization of land occupation with small needs for materials and transport**, as the solution for the development of sustainable cities. improve the energy efficiency of cities and reduce their environmental impacts. There are other studies that consider different aspects for the design of sustainable cities.

V. CASE STUDY ON COPENHAGEN, DENMARK

- A Copenhagen is a capital of a Denmark which has a population of 7.75 lack as per January 2018 and the area of city is 88.25 km2.
- Copenhagen city is a best example of sustainable and green city where bikes outnumber the cars and biking culture is one of the solution which makes the city green and sustainable. By 2025 Copenhagen aims to be a world’s first carbon-neutral capital. In less than two decades city aim’s to take the city’s CO2 consumption from around 2.5 million tons to under 1.2 million tons. Copenhagen also works in green transformation, green mobility, smart city solution, recycling and upcycling, renewable energy. Copenhagen takes some initiatives for the sustainable development.



figure 3 Green Roofs in copenhagen

GREEN ROOFS

Copenhagen is one amongst the leading cities in property style and infrastructure. In 2010 Copenhagen began group action inexperienced roofs into its urban development ways and mandated that each new building to have a inexperienced green roof.

BIKE CITY COPENHAGEN

Copenhagen is world renowned for its biking culture and has won many awards for the simplest town for cyclists. In the all over world, Copenhagen voted as most bike-friendly city. Copenhagen is the example for the other cities to create cyclist phenomenon. In fact, 50 % of the citizens of Copenhagen ride a bicycle for work or school.



figure 4 Bike City Copenhagen

ELECTRIC BUSSES/CARS AND PUBLIC TRANSPORT



figure 5 Public Transport

Copenhagen’s buses can build the switch from diesel to electrical once current bus contracts expire in 2019. They are trying that more people will use public transport in case of private vehicles by which they can achieve a goal of carbon neutral by 2025. The town is encouraging the transition to inexperienced quality by making the mandatory infrastructure, like charging stations for electrical vehicles. They maintain the cost and timing punctuality about public transport for the maximum use of public transport.

GREEN AREAS AND CLEAN WATERS

In Copenhagen availability of green areas for public access is around 2260 hectares and also has a coastline about 92 km. All those green areas are very near, where almost 96% of the Copenhageners can reach at least in 15 minutes by foot. Municipality of Copenhagen has a set a goal about plant 1,00,000 new trees In the period 2015-2025. Many of those trees are going to be planted along close to Islands Brygge with a read to form a forest within the middle of the town center. The water in Copenhagen harbour is that type of clean that you simply will swim in it, and a great deal of fish and plants thrive alright within the water.



figure 6 Green areas Clean water



figure 7 Clean Tap drinking water

CLEAN TAP DRINKING WATER

In the world Denmark is the country where water is very cleanest and where tap water undergoes daily quality controls for ensure the water is safe to drink. There in city 60 fountains where inhabitants can enjoy the good quality water at free of cost for drinking.

OCEAN QUAY: THE SUSTAINABLE TURNAROUND PORT

Ocean Quay is also one of the sustainable port in Copenhagen. There are three building with area of 9,900 square-meter which is furnished with green roof as part of a wider sustainable growth and

development plan, Which consists vegetation for subdue noise pollution and rainwater purification. Other Technical solutions are for dealing with black water which is hard that is flushed out from toilets, and grey water which is soft from baths, laundry, showers and washing-up. Permanent facilities for wastewater is also have been installed at Ocean Quay. All the waste water convey to the sewage treatment plant. In quay south side terminal is fully equipped with solar panels and roof also design for extra skylight. CO neutral source are also there, if additional lighting and heating is required.

VI. A CASE STUDY OF AMSTERDAM, NETHERLAND

“Some tourists think Amsterdam is a city of sin, but in truth, it is a city of freedom. And in freedom, most people find sin.” – John Green

For highly walkable, interesting and pleasant environment, Amsterdam is planned with gentle curve and with narrow street system.

Amsterdam Rainproof

Climate change by increasing population density of the city makes the Amsterdam vulnerable to consequences of rainfall. A new innovation is require there to deal with natural rain water. Rainproof project is the new innovation for the citizens, institutes and companies to harvest the rain water and manage to store the rain water. It is the sustainable solution with the goal of to collect rain water and make better use of it.

Vehicle 2 Grid

Multinational partners are also involve in Amsterdam for a sustainable development. For the environmental, economical and social benefits they are also giving the best. This multinational partners are involving forward for the implementation of electric used cars and other electric innovation, by which inhabitants will be able to use electricity as a fuel and in cars. And they also will be able to decide how to use and generate electricity in the many manners. And they also will be able to store a electricity in car battery and transfer to the grid to be used at some later to run household appliances.

Smart lighting in Amsterdam

For the sustainable and smart way Amsterdam innovate a new thing for the lighting and other solution, smart light which can work on multitask. Remote sensors are adjusted in the pole for to save energy and security. for example, according to weather coloured lighting can control the flow of traffic and pedestrian. If there lighting needs brighter then there are also providence of moving sensors. Saved energy can be used for other functions like air quality measuring controls and wifi networks. Corporation promoted the energy saving lights in all over domestic sector. The main aim behind the smart lighting is to reduce the electricity demand of the city.

In the Amsterdam 58% people of the population are using bicycles for a sustainable concept. There are maximum numbers of parks and trams for sustainable mobility. For the sustainable awareness in primary school they learned about saving energy and for recycle, reduce and reuse of the waste.



The Amsterdam is focusing on creating a circular city. Which includes less pollution, less waste and buildings that produce their own energy. Number of internet things are used for smart and sustainable mobility like GIS, GPS and Remote sensing, smart LED, smart grid, smart meters, electric vehicles, charging terminals, and other technologies to know the leakage and other disturbance in water supply and drainage pipelines and for other usages.

MAJOR FINDINGS:

As per the study, the problem is occurred by the different public infrastructure, Which can be resolved by the Copenhagen city case study. As per them we can implement services in country like india. As per study we can use a electric busses as a public transport for less traffic problems and for less pollution. We can give a clean water to the public at minimum cost and we have dispose the waste water in different manner not in lake or river. As know we can manage the solid waste management system for less public health issues. In india the power generation by the renewable energy is very less so we can increase that.

VII. STUDY AREA DAHOD

City Location and Evaluation

Dahod Town is situated on eastern part of Gujarat state; globally it is on 22° 83' North latitude and 74° 25' East longitudes. This town has historical value according to history it was formatted by Great King of the Gujarat Siddhraj Jaisinh in 1139 after great victory on nearby state "Malva". He had established a new Mandal with name "Dadhipadra Mandal" and Dahod was head quarter of it. Earlier Dahod was known as "Dadhipadra".

This town was formatted on the bank of "Dudhimati" river. Origin of this river is @ 11 Km. in South – West direction near village "Nimnalia" Flow of this river is From West to East hence religiously it has more value according to Hindu ideology. So it can image that this town was carefully formatted with satisfaction of basic need of Water. At that time rulers had made an additional facility by construct Talav Which have natural formation Like Chhab and made by minimum efforts hence it was identified as Chhab Talav. Peoples of this town were utilize these two sources very well for daily household requirements and fetching water from local wells since 25 years ago

Basically this town had unique identification; this town is the last town to enter in two nearby states "Madhya Pradesh" and "Rajasthan". Due to connection of two borders locally it is called "Dahod". It was previously within the boundaries of the Panchmahal District, Dahod district has come into existence after the division of Panchmahal district on Dt. 02/10/1997 and Dahod town became district head quarter. The far flung area of Godi Road, Godhra Road has been considerably developed, making the overall habitation and commercial area very expansive. DMC (Dahod Municipal Corporation) has a area of 6.54 sq. km. which is above of 333 meter mean sea level.

Population of dahod city upto 2017

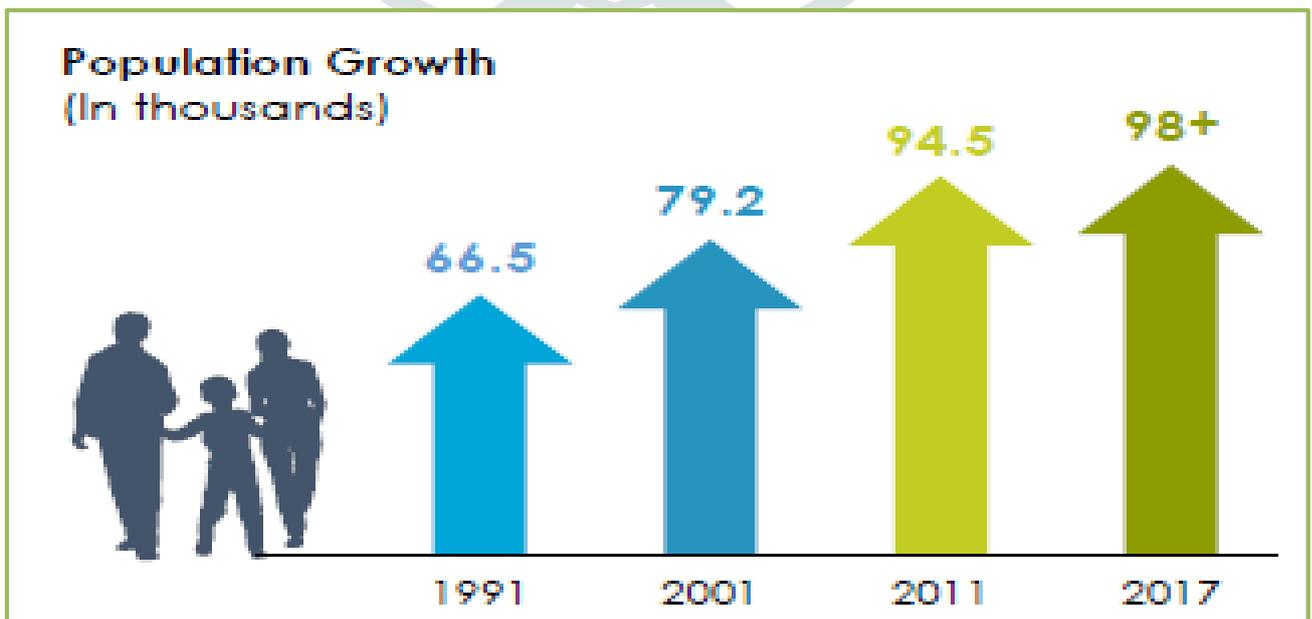


Figure 8 Forecasted ~ ~ ~ ~ ~

Source: dahod smart city report,2016

➤ Fig. shows Population growth of dahod city upto year 2017 & indicates population increasing of Dahod city which is

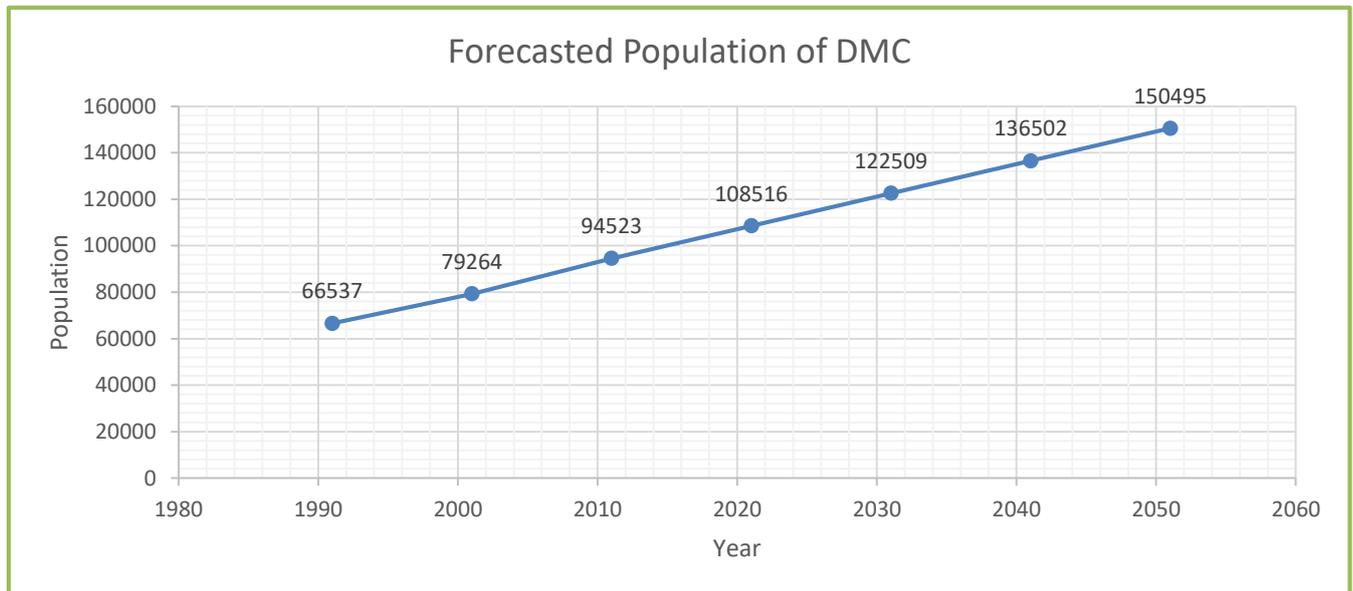
done by Arithmetical increase method up to year 2051.

Development of city and the other infrastructures for citizens is based on the projected population of a particular city, estimated for the design period. Any underestimated value will make system inadequate for the purpose intended; similarly overestimated value will make it costly. Changes in the population of the city over the years occur, and the system should be designed taking into account of the population at the end of the design period.

Factors affecting changes in population are:

- Increase due to births.
- Decrease due to deaths.
- Increase/ decrease due to migration.
- Increase due to annexation.

Table 1 Forecasted Population of Dahod



Source- dahod smart city report,2016

The present and past population record for the city can be obtained from the census population records. After collecting these population figures, the population at the end of design period is predicted using various methods as suitable for that city considering the growth pattern followed by the city.

Arithmetical Increase Method

This method is suitable for large and old city with considerable development. If it is used for small, average or comparatively new cities, it will give lower population estimate than actual value. In this method the average increase in population per decade is calculated from the past census reports. This increase is added to the present population to find out the population of the next decade. Thus, it is assumed that the population is increasing at constant rate.

Hence, $dP/dt = C$ i.e., rate of change of population with respect to time is constant.

Therefore, Population after nth decade will be:

$$P_n = P + n.C$$

Where,

P_n is the population after 'n' decades and 'P' is present population.

VIII. CHALLENGES AND ISSUES

Inefficient Urbanization

Currently, the city doesn't offer quality of life as per Indian city standards. It has narrow roads, inequitable water supply and frequent unscheduled power cuts. 40% of the sewerage network is through open drains, which is prime contributors to foul smell and a breeding spot for mosquitoes. The garbage collected from door to door is dumped on to Landfill sites. Underdeveloped recreational spaces & lack of green areas in are weakening the quality of life.

Lack of Employment Opportunities

About a decade ago, the Parel Railway Workshop (Diesel engine operations & maintenances) was the prime source of employment, and employed more than 10,000 workers. Ever since the GOI's plan to upgrade to electricity engines, the demand of workshop has fallen over the time and now there are less than 2000 workers. Large pool of unutilized skilled workers exist currently, who have are very limited sources of employment.

Industrial Water Scarcity

The water level in city is inadequate for industrial usage. This leads to underutilization of the GIDC, M-GIDC plots as industries require such basic facilities for smooth functioning.

Education

Dahod is centre of higher education for people living in adjoining area. City provides adequate education facility from Primary to higher education. City has Engineering, Polytechnic and 20 schools up to higher secondary and 10 colleges with PG courses.

Health

Dahod serves as the major medical hub of the region. There are 64 hospitals and nursing homes with bed capacity of 1295 in the city. Centre for Naturopathy and Yoga wellness. Super Speciality Hospital will provide high end medical facilities to entire region and tribal Area. Emergency response system for connecting Ambulance services. Safiee multi speciality hospital of 3,625 Sq.m built up area, will be completed within 1 year which will provide high end healthcare facility.

Public Open Space

A variety of public open spaces is available in some neighbourhood, such as Chaab Talav, Gardens. As of now 3% of the city area has green cover. There are total of 3 gardens in the city apart from Chab Talav area.

Open wire electricity supply

As shown fig.9 Now a days mostly all developed city's are facilitate with underground electric supply which is safe and also decrease the traffic congestion in city. which is not done in dahod city by nagar palika for safety measures and all given poles are also very old. which is very necessary for safety and traffic measures.

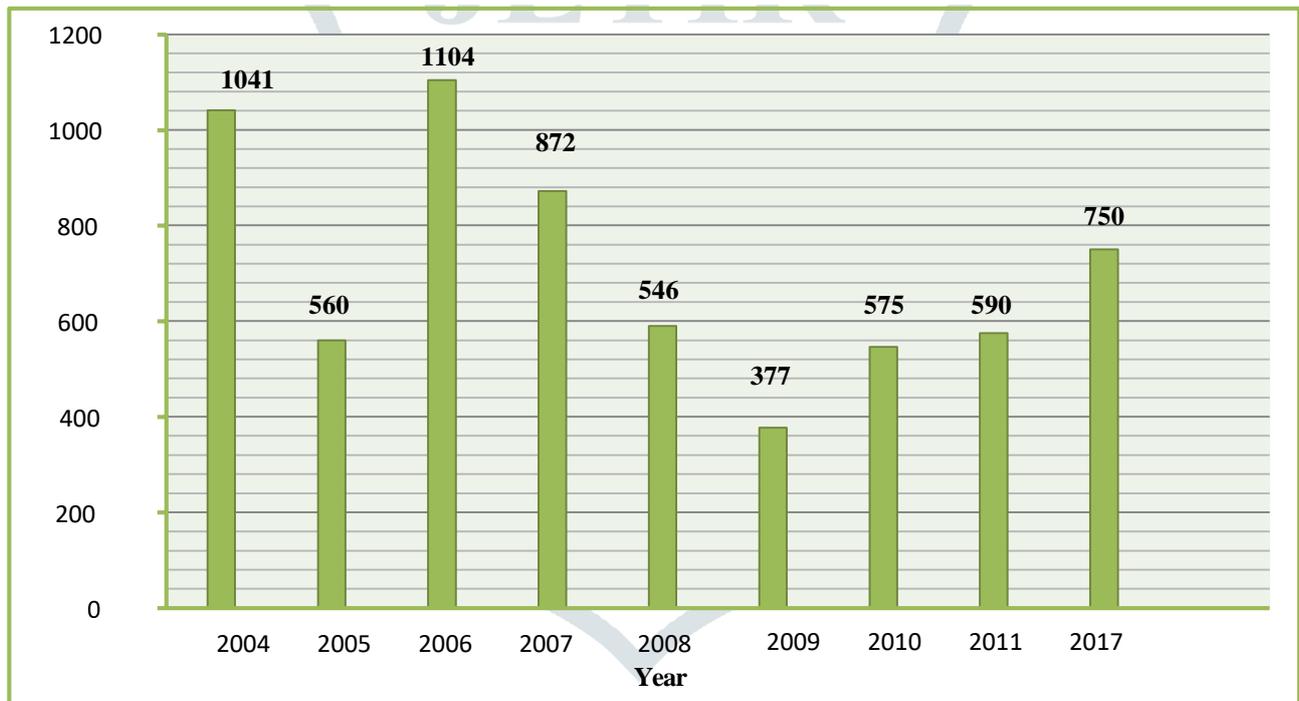


figure 9 Open Wire Electricity supply

Lack of rain water harvesting system

As below table every year the rainfall is good and as per the data average rainfall of the city is 720mm which is good for water source but there was no any kind of water harvest system available to store the rain water.

Table 2 Rainfall in Dahod



Source- dahod smart city report,2016

IX. SWOT ANALYSIS OF DAHOD CITY



X. SUGGESTIONS

The above problem restricts the sustainable development of the Dahod city. There is need to have a proper strategies for the development of the Dahod. Some of the suggestions are listed below for the sustainable development of dahod.

Employment

- Digital initiatives are planned for increasing the influence of providing training & placement opportunities and financial assistance, to enable women and tribal be more self-sustain and also earn better livelihood.
- Creation of Transit Hub and promoting the Agro based Industries will increase the employment within the City and the benefits will further enhance with the implementation of GST.
- Integration of all skill development centre with industries will enabled balanced generation of skill-set with actual skill demand. This will enable skill resource find right job quickly and industry find right resource well in time.

Education

- Standard of education need improvement with Modernisation of Schools/College Infrastructure with virtual classrooms to offer state-of-the-art schooling to students.
- Agro based skill development will be provided at with community radio to improve business oriented education and information sharing in agricultural, animal husbandry & tribal culture.
- Provision of Medical College with Super speciality hospital is need of the city. Government of Gujarat has given approval for establishing Medical College in Dahod.

Health

- Smart city Dahod is aiming at leveraging the benefits of telemedicine to offer affordable, reachable and on demand medical facilities, even to the citizens in remote area.
- Apart from this, the Smart City to extend Healthcare Management Information System with Electronic Medical Record system (EMR). This aims at providing paperless, cashless and relatively transparent Healthcare & Wellness facility.
- Smart City Dahod also aims at incorporating policy that would enforce every hospital/medical centre to adopt this functionality and offer the benefits to its citizens.

Public Open Space

- More green Spaces need to be developed all over city. Development of the Chaab Talav for providing more green Spaces, Cycle track and Pedestrian Facility need to be developed. Chab Talav area covers almost 15-17% of the city area.
- Development of vertical farms (verticulture) will further expand the green cover of the city.
- Development & new gardens at Plot No 93 and Plot No 92 will increase the green cover to 8%.

Open wire electricity supply

- Converting the over ground electricity distribution line to Underground for ABD Area.

Rain Water Harvesting

- Rain water harvesting for existing govt buildings, schools, Hospitals and New Buildings will be permitted only with rain water Harvesting.

If all the above suggestions are taken into consideration then there will be chance to develop Dahod as a Sustainable city

CONCLUSION

In Gujarat dahod is a only city which is consider in municipality but, it's still exist in smart city project. So with that it can be also a sustainable city. If dahod can be a sustainable then the quality of life can be high of inhabitants and people can live good life.

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