

Urban Development models for Sustainability: - In Case of Bilaspur's Societal challenges

Author:-Ar. Praveen Upadhyay

Architect & Urban and Regional planner

praveespahopal@gmail.com

Abstract

Migration is the movement of people from one place in the world to another for the purpose of taking up permanent or semi-permanent residence, usually across a political boundary. There are many types of Migration, but Rural-Urban Migration one of the most migration occurred in India's today scenario. For better lifestyle or employment or due to others many reason, a lot of number people migrated from rural area to urban area. But some time the urban areas which have not a sufficient Infrastructure, to cater this migrating population, as per result generating a lot issues, its related to transport, Health, Housing, water and sanitation and many types Social issues, now a days it's become a challenges for Metro cities. So for solving or minimizing these types' issues, we need the sustainability in urban development for using the types of Development models which provide a better environment and good living in Metro area. This paper highlight the Bilaspur city which also known as Judicial Capital of Chhattisgarh and 2nd largest city of Chhattisgarh. The Bilaspur have many types of societal challenges. Issues listed on the basis of primary survey have been seen in many of the cities. While summarizing, the author recommended and presented several possible sustainable development models. This is helpful for Bilaspur Urban area's development..

Keywords: Migration, Sustainability, Societal challenges

1. Introduction

The means of **Sustainability** is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony that permit fulfilling the social, economic and other requirements of present and future generations. Sustainability is important to making sure that we have and will continue to have, the water, materials, and resources to protect human health and our environment. The sustainability depends upon three pillars.

- Social sustainability
- Economic sustainability
- Environment sustainability

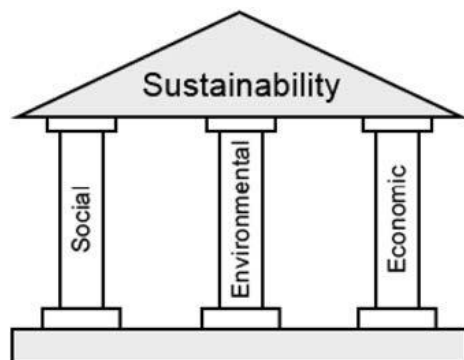


Figure 1:-Pillars of sustainability

• **Social sustainability:-** It is the ability of a social system, such as a country, family, or organization, to function at a defined level of

social well-being and harmony indefinitely. Problems like war, endemic poverty, widespread injustice and low education rates are symptoms a system is socially unsustainable

• **Economic Sustainability:-** It is the ability of an economy to support a defined level of economic production indefinitely. Since the great recession of 2008 this is the world's biggest apparent problems.

• **Environmental Sustainability:-** It is the ability of environment to support a defined level of environmental quality and natural resources extraction rates indefinitely. This is the world's biggest problem, though since the consequences of not solving the problem now are delayed, the problem receives too low a priority to solve.

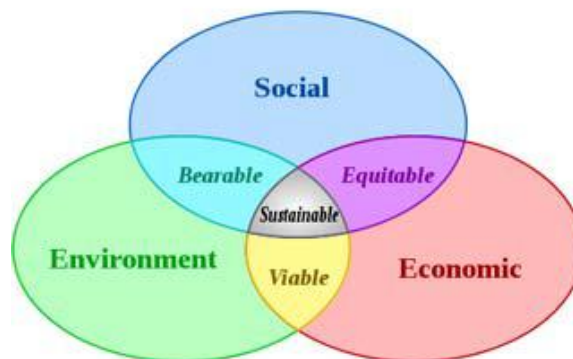


Figure 2. Relation between all components

• **Sustainability models:-** There are following models of sustainability.

a) **Environmental models:-** Environmental Models focuses on the environmental

side of sustainability, perhaps the crucial component in sustainable projects for the built environment. The toolkit is arranged from macro- to micro-scales, beginning with sustainable regional planning, and moving to sustainable cities & communities planning, sustainable neighbourhood planning, and, then finally, site-specific tools related to sustainable landscapes and green buildings.



Figure 3:-Image-Source:- (Geos Net Zero Energy Neighbourhood, Arvada, Colorado David Kahn Studio, Eldorado Springs, and Michael Tavel Architects, Denver, Colorado)

- b) **Economic models:** - Economic Models focuses on economic sustainability, which involves the development of a healthy economy that supports and sustains people and the environment over the long-term. In a market-driven economy, cost is a deciding factor in determining whether a project moves forward. To be sustainable, projects must not only provide environmental and social benefits, but also offer economic value. Ecosystem service models can also be used to quantify the inherent economic value of services nature already provides for free.



Figure 5:- Image source: - (Taeoh Kim / ASLA 2009 Honor Award. ChonGae Canal Source Point Park: Sunken Stone Garden, Seoul, Korea Mikyoung Kim Design)

- c) **Social Models:** - focuses on social sustainability, which involves the development of resilient communities that meet residents' health and social needs over the long-term. In a socially-sustainable community, residents are empowered; have equal access to green, healthy spaces; can choose among multiple transportation options; and enjoy a high quality of life. At all scales, public participation is crucial for ensuring planners and designers keep existing communities in mind and create social value for all citizens.



Figure4:- Image source:- OLIN / 2010 ASLA Landmark Award. Bryant Park, New York City

This paper focused on societal challenges so will talk more about social models. Sustainable urban and community planning can create communities where people enjoy healthier, more active lives. Cities and communities that offer residents a range of transportation, housing, and recreational options create social value and lengthen the lives of their citizens. Social value results from incorporating communities' voices into local planning and design decision-making processes. Places and programs with high social value are then cherished and preserved by local communities. Socially-sustainable planning approaches have multiple benefits. For example, improving access to multiple forms of transportation, including walking, biking, public transit along with cars, can reduce combined housing and transportation costs, the two primary factors determining affordability. Cities and communities with multiple transportation options are more resilient to changes in population and can accommodate residents with different levels of income equally.

To leverage existing urban or community networks, city and community planners and designers can employ a range of public participatory frameworks and Web-based tools. The idea is to integrate the goals of existing networks into plans that can maximize social sustainability for the entire community.

2. Study area

Bilaspur city: Bilaspur city is located in the Chhattisgarh state in Bilaspur District, India. It is the second largest city in the state with having population of 3.31 lakh. Being the headquarters of Bilaspur District; it is located 111 kilometres north of the state capital Raipur. Bilaspur is the **judicial capital** of Chhattisgarh, **High court** of Chhattisgarh located in Bilaspur Also Bilaspur enjoys the status of being the headquarters of the **South East. Central Railway**, which comprises the Bilaspur, Nagpur and Raipur Divisions. Also here Guru Ghasidas **Central University**, CIMS, S.E.C.L headquarter, Large sponge iron industries, HI-Tec Bus stand, etc. Bilaspur is known for its aromatic Doobraj rice, handloom, woven, colourful, and soft Kosa silk saris, and for its rich, varied and colourful culture. The average elevation of the city is 262 meters above mean sea level. The city area slopes toward the Arpa River and the general topography slopes from west to east. Bilaspur's history around 400-500 before it's a small settlements of fisherman and one fisherwomen name BILASA, the name was popular. Bilaspur district was constituted in 1861, followed by Bilaspur municipality in 1867. Famines in the Bilaspur district were recorded by the British administration. Currently Bilaspur come under in Bilaspur Municipal Corporation. Which have area **30.12** sq.km. In current 100 smart cities projects in India, Bilaspur also one of the selected city. The following location map of Bilaspur City.

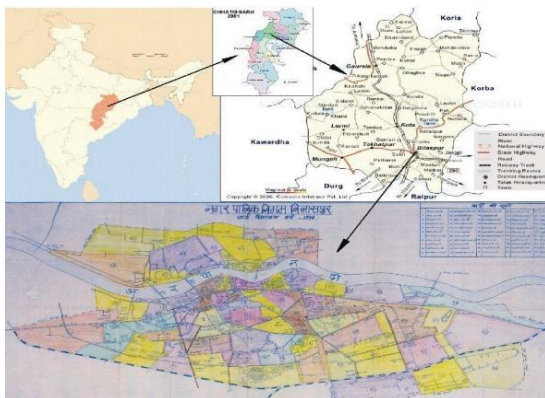


Figure 3. Location Map of Bilaspur

3. Today's Urban scenario

As soon as the population of Bilaspur increasing, the urban sprawl of Bilaspur also increasing day by day. In Bilaspur UA total 29 settlements come in which is one Nagar palkia and 2 are

Nagar panchyat remain are Gram panchyat. The total population this UA above 5 lakh. Due to this scenario Bilaspur need to be better infrastructure for whole UA. According to population of Bilaspur and needs. The following tables showed the last three decades the population of the Bilaspur city.

Table. 1:- Decadal Growth of Bilaspur City

Year	Population	Growth Rate
1971	1,36,676	-----
1981	1,87,104	36.90
1991	2,29,615	22.70
2001	2,94,458(U.A.)	28.23
2011	5,07,507(U.A.)	72.35

Source:-Bilaspur Development Plan-2011

According to above table 1991-2001 census of Bilaspur only 28.23 % but it's exploded between 2001-2011 decade its reach to 72.35% which 2nd highest growth rate in Bilaspur History. The reason of this explode is migration of people from villages, towns and others states. The reason of migration is availability of more opportunities related to Job, Business, and Educational etc. Currently Bilaspur have Zone HQ of South eastern central Railway. The day the state of Chhattisgarh was constituted (1 November 2000) with its capital at Raipur, the High Court of Chhattisgarh was established at Bilaspur. It is the 19th high court of India. High court of Chhattisgarh High Court of Chhattisgarh which is Asia's largest court (in area). So large number of people who engaged with this, accommodate or Daily Up-dn from nearby cities, above this Bilaspur have a large commercial areas where lot of people arrived every day. Bilaspur has developed as a centre of education for Chhattisgarh with students from all over the state coming to Bilaspur to study engineering, medical and administrative officers' competitive exams. Along with the older schools, which provided excellent education, many new schools make Bilaspur the centre for excellent school education, too. As of 2015 Bilaspur has 5 universities. Guru Ghasidas University is a Central university which was established 2009 in Bilaspur. Bilaspur is the centre of electric power generation in India. Bilaspur and the surrounding area generate 10,000 MW of electricity, and an additional 50,000 MW are planned in the next few years. As many as 22 companies are interested to tap an estimated power generation potential of 50,000 megawatts in the region. Bilaspur has India's second largest power plant of NTPC at Sipat which generates power of 2980 MW with 3 units of 660 MW each and 1 unit of 1000 MW. Many thermal power plants are coming up in the surrounding area of Bilaspur. Also notable are Nova, KSK, Gitanjali, Mahanadi etc. Industries: Around Bilaspur, there are many industrial areas, including Tifra, Sirgitti and Silpahri Industrial Growth Centres. Sirgitti, Silpahri and Tifra around Bilapur are major industrial areas near Bilaspur. Located on the outskirts of Bilaspur city Sirgitti Industrial Centre is spread over an area of approx. 338 hectares. With about 324 industries it provides

direct employment to 4431 persons. Silpahari Industrial Centre is another industrial area near Bilaspur and is home to many sponge iron industries. Tifra Industrial Area situated on the outskirts of Bilaspur city is spread over an area of approx. 65 hectares. Many chemical, PVC footwear, HDPE woven sacks, polythene bags and sheets, soft drinks and other units are located here. CSIDC or Chhattisgarh State Industrial Development Corporation Limited is responsible for the development of maintenance of all these industrial areas in and around Bilaspur. State level Sports complex under construction which will be very useful for the players of Bilaspur region. Various archaeological sites and temples in Bilaspur attract tourists from all over the world. Mahamaya temple of thousands of devotees every year, who visit here in Navrataras to get darshan of the awe-inspiring dual-statue of their beloved goddess: Mahamaya Devi. Situated at 25 km away from the city of Bilaspur (Chhattisgarh). Achanakmar Wildlife sanctuary is one of the renowned ecotourism spots in Chhattisgarh. Hasdev Bango Dam is 105 km from Bilaspur. Malhar and Ratanpur are the centre of archaeology. Ruins of forts to ancient temples are found here. Talagram is famous for "Deorani-Jethani" temple. Belpan has a huge pond as well as samadhi. Khutaghat is a scenic spot and is wanted by nature lovers. Forests, dam and hills comprise the surrounding of Khutaghat. Kanan geological park located here, it's come under in Medium zoo category and largest zoo of Chhattisgarh. Million number of visitor arrived here.

4. Issues and Societal challenges of Bilaspur

Due to many landmark and opportunities of Bilaspur have got a unique identity at National level. But within above all, now Bilaspur faces lot of issues and societal challenges. There are following issues and challenges.

- Worst transportation
 - Potable water supply
 - Sewerage and sanitation
 - Increasing of Slum areas(Housing problem)
 - Greenery loss & warming
 - Heritage conservation
 - Water body conservation
 - Crime & Public safety
 - Recreational facilities
- **Worst transportation:-** Due to increasing opportunities like industry, Employment, Educational facilities , and some major institutes large number of people daily arrival in Bilaspur by Train, Road .Generally Bilaspur's people used private vehicles. Because here less transport communication facilities, who covered whole Urban area for solution this problem, city buses started in year 2009 , but due to no proper planning it was not succeed. Existing transport facilities very worst, auto-rikswa not followed the traffic rule, so

the accident increasing day by day. Due narrow roads widening, animal around road traffic jam occurred daily. Every year above hundreds people lost their life in road accident. The following tables showed this.

Table 2:- Accident data of Bilaspur

S.N.	Year	Total Death
1	2012	183
2	2013	228
3	2014	287

Source:-Traffic police, Bilaspur

- **Lack of Potable water Supply:** - "Water is life" everyone know this. Without water we can't imagine any city or small settlements. Our earth is covered by 72 % water but only 1 -2% potable water available, which is most important for human or others, life. In case of Bilaspur Urban area, for 5 lakh population faces the problem of potable water. Bilaspur' water supply depends upon underground water, which bored by Municipal Corporation and stored in 21 Elevated storage tanks, located different part of urban area, and water supplied through pipe line connection to the dwellings units. But the arrangements and installation of pipe line was not good. Many pipe lines crossed sewerage or drains and solid waste area, and due to cheap maintenance the condition of pipe lines are not good, so the impurity entered in pipe line, so the customers get polluted water. And affected their health. This issue become a big challenge for urban local Body.

Table no. 3:-Water supply at a Glance

S.No.	Components	Quantity
1	O.H.T.(Over Head Tank)	21
2	Power Pump	517
3	Hand pump	224
4	O.H.T. capacity	40510000L.
5	Supplied water per day	42736000
6	Per Capita supply	130L/D
7	Connection	23088

Source: - BMC, Bilaspur

- **Sewerage and Sanitation:-** As soon as population of Bilaspur increasing , the sewerage and sanitation become a major issue, the current setup of Sewerage and sanitation system of Bilaspur is 35 years old, the sewerage water reached to only one pumping station and oxidation pond, that time population was very less than it was sufficient , now it become to 4 times increased. So maximum sewerage water drained to water bodies like pond and life line of Bilaspur **Arpa River**. As per result the all water polluted and eutrophication covered whole water bodies; water of this has unusable now. Current 48

MLD sewerage generated per day. In year 2031 it will cross to 100MLD. Solving this future problem currently BMC running the Underground sewerage project. But it will cross 7 times completing deadlines; last 7 years, due to sewerage project, public faces a lot problem. The detail of this project is following tables.

Table 4:-Sewerage project at a Glance

Technical Information		Project Description	
Sewer Length	267 km	Location	Bilaspur
Drainage Length	381km	Client	Bilaspur Municipal Corporation
Total STP	2	Services	PMC& Construction Supervision
Capacity	71 MLD	Population	8.5 Lakhs
No. of SPS	5	Area	30,420 Hectares
Technology	EAP	Project Cost	427 Crore (approx.)
Connections	28,000	Status	2008-ongoing
Pipe Dia.	150-1600m m		

Source:-DPR of sewerage project Bilaspur

- Increasing slum areas(Housing problem):-** The Bilaspur, situated on the banks of the Arpa River is the second largest city in the State spread over an area of 30 sq. km with a population of 3,30,106 as per Census-2011. During the last decade, the city has seen a large scale unregulated urbanization and residential & commercial expansion (with change in population by 33.21%) attracting a large number of migrants including the poor, fuelling the demand for affordable housing and basic municipal services. These slums encroached on govt., railway, forest or other private land and along with the road, water bodies or railway lines. Due to this encroachment many environment and social issues generated. The pollution of water bodies increased by the slums. So, as the city grows, slums also grow. As per the data available with the Bilaspur Municipal Corporation and as surveyed, the slum detail in the city is given below.

Table 5:- Slums details in Bilaspur UA

S. N o.	Slum Details	Nos.	Area (ha)	House Holds	Slum Population
1	Notified Slums(Core)	55	113.68	17785	70445
2	Non-	17	42.5	4118	15336

	notified slums		7		
3	Non-notified slums in the Fringe Areas	62	416.43	22102	85520
	Total	134	574	44005	1,71,301

Source:-SFCPoA of RAY project in Bilaspur

- Loss of Greenery and Warming:** - One upon a time, Bilaspur had a lush green area, water bodies and green belt. But in last decade it was reduced, there are many reason of this, after established CG state Bilaspur got a unique identity in National level called as **judicial capital** of Chhattisgarh. After many institute and organization, Industry established here, so the migration of people from outskirts or other part of India increased, large number of colonies flat constructed. So the traffic of vehicle and public increased, so for road wilding or construction of new roads Urban local bodies cutting the 80 years old trees which was maintain the environment of the cities, as result the temperature of Bilaspur now become to 3 degree increase in last decades, Bilaspur now got a tag of High temperature city in Chhattisgarh in every summer weather. Now in the city some place has a green area.
- Heritage Conservation:** - Bilaspur is 500 years old city, so no any ancient monuments find here. Only British time period's Buildings located. They constructed a bridge on Arpa River at 1920 now its stand here perfectly. In case of ancient time the nearby village of Bilaspur , ASI got 10th centuries monuments lot of statues at that time, but all monuments kept on open area, or sheds, where big questions is safety of all those.
- Water bodies conservation:-** Currently Bilaspur had 11 large pond, 10 number of encroached by the slums and Builders. The sewerage water and solid waste put on this. So the water of pond is polluted and water not usable in current scenario, eutrophication covered all water bodies. Government spent money for beatification of 4 numbers of ponds in last decades, but cheap of low maintains all ponds become to their old condition. Now the conservation of the water bodies becomes a challenge for urban local bodies.
- Recreational facilities:** - Every settlement needs a some space entertainment and time spends. Parks, Garden, Community hall are such a places where people use their recreational purpose. Bilaspur have lot

number of park and garden areas, where people used for morning walk, Jogging, cultural programme etc. The area which are come under a ULB, going to worst condition, no proper maintains and security arrangement, criminal activity occurred here many time. Due to this public's interested going down for visiting here.

- **Crime and Public safety:** - Due to lot of migration from others states, migration of crime also comes. One time Bilaspur was known as Peaceful city of state. But formation of new state and modification of Bilaspur is measure reason of the increasing crime activity. Women safety also a measure issues in Bilaspur. The people who migrated from villages or others state want more think's attitude, going to them involving in crime activity. The police setup of Bilaspur is very old like above 50 years, only one police station opened after forming the state. That time population become 4 times increased, but Bilaspur not get a metro city's type police setup. Only 6 police station running in urban area, who served 5 lakh populations. In that time capital Raipur got 24 police stations who served 12lakh population of the city. Currently IG of Bilaspur range demand to the state government, according to the current situation of Bilaspur Urban area should be minimum 12 police stations. But it pending on state govt. Due to increasing crime activity, public scared on walking road at night time. But scarcity of police force, less patrolling of police doing every day. The following Table data from Police department showed crime scenario in Bilaspur UA.

Table 6: Crime data of Bilaspur

Year	Stealing	Murder	420	Robbery	Teasing
2013	36	29	7	12	47
2014	48	31	9	1800	52
2015	45	22	5	1401	31

Source:-Police Department, Bilaspur

5. Solution and suggestions of issues and challenges

- For solving the transportation issue using sustainable transportation techniques like city buses for long route, bicycle used for short distance for daily routine activity. Car and others private vehicle using only at personal work or visit. Due to using this technique, time, money, environment, and health all being good. All dairy shifted to outskirts of the city area, so animals not seen around road.
- For potable water supply case, all pipe line of water kept from sewerage line and storm water drain. Established water treatment plant for purity of water. Using water

harvesting technique for increasing underground water. All pipe line cheek time to time. Water meter installing to every water connection.

- For saving quality of life of city or saving environment, don't should be cutting a tree, they should use as a divider, or traffic diverted to others routes. Banned heavy vehicles in these areas. Using underground electric supply network, low maintenance system and less line loss, not affected by trees, so no need cutting of tree. Planted tree near water bodies or river bank areas and forest land.
- For sewerage and sanitation facilities currently Underground sewerage system project running which is 70% completed, which covered whole ULBs area, treated sewerage water and recycling it for agricultural purpose. And storm water drain project proposed. But it shall be maintained and checking of pipeline's leakages every day. In pumping station and STP should be maintains by experts.
- For solving the housing issue currently IHSDP, RAY implementing here. Thousand numbers of dwellings units constructed for slum free city planning. But it's only for identify slum areas, govt. should be proposed housing for Urban poor. It may be fulfil all migrated people's hosing need. Using Vertical settlements concepts, increasing FSI or FAR, for saving land.
- For conservation of old heritage and monuments govt. should be chemical work and re-development by expert conservationist firms. Establishment of Museum where all type sculptures are displayed for public, who want to see this.
- For conservation of water bodies, stop the follow of sewerage water and solid waste put on this. All sewerage drain connected by pipe line connection and finally treatment of sewage water then flown on the water body. Plantation should be necessary to bank of all water bodies. Due to this taking this type action, it makes a health environment.
- For improving recreational facility govt. should implementing PPP(Public Private partnership) mode, by using this mode the responsibility of maintains and security of recreational area on contractor, in this mode public may see new type facilities by contactor. Due to using PPP mode for recreational area, load of work on ULB going down.
- Crime is a major social challenge for all over the cities of India. In case of Bilaspur new police station required. But police station approved by the state government, and for a new police station many types of formality must be fulfil. So in local level one solution being here. Open the police help centre in every ward area all police

centre connected by police station which have charge of the whole area. Due to this every ward covered by police centre's patrolling. Every migrated people from other state police kept all details of the person. Patrolling must be on slum areas. Because maximum crime occurred in slums areas. Using online FIR or complain in police station. Provided CCTV cameras to every square and major point of the city area. Organised awareness programme for the children & youngsters and told them, rules and regulation.

6. Conclusion

Any cities of large urban area where have a lot of opportunities and quality of life. Migration of people will be there. So for Urban sustainability, we solved the all social issues and challenges using the sustainable models according need of the areas. When a settlement not free from social issues completely, the area cannot be got sustainability in any point of view. We should take same cases to other part of county of world, where such type's issues occurred and after it was solved. Three pillar of sustainability environment, economic and social, if one pillar may be weak, whole sustainability will be collapsed.

7. References

- Bilaspur development plan- 2011
- Arpa special area development authority.
- Professional practice:-Sustainable toolkits of environment, social and economic models
<http://www.asla.org/guidesandtoolkit.aspx>
- SFCPoA of RAY project in Bilaspur
- Bilaspur Municipal Corporation.
- DPR of Unground sewerage project, by Bilaspur Municipal Corporation.
- Bilaspur city sanitation plan.
Government of India, Ministry of urban development, Regional center for urban and environment studies.
- Dainik Bhaskar & patrika news.Naiduina,Navbhrat, Haribhumi, The hitvada, Deshbandhu.
- <http://bilaspur.gov.in>
- <http://www.bmcbilaspur.com/>
- Hydrology and hydraulics Analysis report For Pre-Feasibility Study, Preparation of Development & Zoning Plans for ARPA Special Area Bilaspur, Chhattisgarh. Prepared by IIT Guwahati
- Inception report for pre-feasibility study. Preparation of development plan & zoning plan for Arpa special area, Bilaspur.

- Code of Practice For Avoiding Danger From Underground Services by HEALTH AND SAFETY AUTHORITY Metropolitan Building James Joyce Street Dublin 1
- City issues papers of Bilaspur by PRIA.
- <http://www.yourarticlelibrary.com/urbanisation/11-major-problems-of-urbanisation-in-india/19880/>
- Census of India-2011
- Challenges and Issues in Mega City Planning in India , Ph. D Research Scholar, Department of Geography, University of Delhi, Delhi, India