

MODEL CITIES

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Abstract:

Many of existing cities are over populated and the available civic amenities are in distress conditions putting the residents to unending hardships. City residents are increasingly subjected to air, water, smell and noise pollutions. Many of the residents are spending 4 to 5 hours on roads (literally in smoke tunnels) wasting their precious time regularly. The infrastructure being created at exorbitant cost is neither turning in to economically productive asset nor making its residents free from hardships. It is high time that inherent limitations of these cities are understood and new world class cities are established at appropriate locations spreading throughout the country for faster growth and better quality of life.

Present cities:

Many of the present cities in India, have taken shape over few centuries and presently transformed in to big cities with populations exceeding three millions. At initial stage, some were established as capital towns of various kingdoms due to availability of perennial water source such as a big river and geographical advantages with respect to military / security requirements. Some coastal cities started as harbor towns when the international trade gained prominence. The initial advantages of these cities are no more applicable and all the available infrastructure in these cities is put to excessive use by migrating population in search of lively hood.

These cities have grown up rapidly without adequate planning to provide basic civic facilities such as proper road network, adequate parking places, safe sewage network, storm water network, potable water supply network, etc. The cost of providing further infrastructure in these cities is exorbitantly high and also not remunerative. Many of these cities are sustaining on real estate boom with the capital inflow from surrounding areas and excessive government funding rather than on its own strength. The land cost is exorbitant in these cities exceeding 3 or 4 times the construction cost of the property. If better amenities are available elsewhere cheaply, these cities will undergo reverse migration and transform in to cities with better comforts. All the cities are synonymous with following problems.

Inadequate planning:

The major residential areas are situated in one end of the city while upcoming major work areas such as offices and factories are located in other end. Many city residents commute regularly long distances to reach their work places which is the primary cause of heavy peak hours traffic.

Many of the localities / blocks are having only one narrow approach road to the main road due to haphazard construction. The available road width in many localities are not adequate even for one way vehicular traffic.

The area initially envisaged for parking places is very less. The requirement of parking area has exponentially increased and many times citizens are afraid of going to shopping complexes and other public places in their own vehicles. Presently only ten percent of city people are owning personal cars. It is very difficult to provide reasonable parking and road area for future vehicles. When every

adult citizen owns at least one car similar to developed countries, it is unimaginable to visualize the future traffic and parking problems in our present cities.

Roads:

The area identified for roads are fully utilized and they further occupied the area used for sewage, storm water and utilities. Many of the major sewage mains are now located under the widened roads with manholes projecting above the road surface. The repair works on sewage lines and utilities such as water mains, electric cables, communication cables, etc frequently cause traffic jams.

The sewer system is in dilapidated condition and are made with bricks and random rubble masonry which are not water tight construction. The sewage water seeps in to surrounding soil / base of the road. The basic principal of road construction is to prevent water entering beneath it. The wetness of the road base drastically reduces the load bearing capability of road and it starts caving under vehicular traffic repeatedly.

The open drains along the roads are consumed for road widening and the sewer lines are used to evacuate storm/rain water. The capacity of sewer lines is not adequate to evacuate the rain water of moderate intensity (2 cm per hour rain). Sometimes the sewer water floods on the roads due to mismatch in sewer line capacities. Due to inadequate storm water drainage system, rain water stagnates on the roads for long duration causing traffic disruption and road damage. The natural water bodies which used to act as buffer storage in discharging rain water have been encroached for other purposes. Even a small down pour will cause flooding in low lying areas due to disruption in natural drainage courses.

When the roads were initially constructed inferior quality construction material was used which are more prone to water damage. The roads are black topped repeatedly over a period of time. Their surface level has risen above the floor level of surrounding constructions at many places. The rain water floods the surrounding buildings causing unhygienic conditions.

Any road widening activity, will incur exorbitant cost and lessen the available limited area for other uses. When a over bridge is constructed to alleviate traffic problems at one place, the near by road crossings start facing traffic jams due to enhanced traffic from the new bridge. Thus the traffic bottlenecks go on shifting from one point to another point without reducing travel time to the commuter in ever increasing road traffic.

When mass transit metro rails are constructed at unreasonably high cost (Rs one billion per kilometer length) in the big cities, it reduces the long distance travel time. However the time consumed in covering the distance between the work place / residence (last kilometer connectivity) and the metro station takes more time. In totality the time taken and the money spent is as usual with out any benefit to commuters.

Under these situation, there is no perfect replacement to personal transport vehicles such as cars and two wheelers. Providing smooth and comfortable traffic movement is not possible in our present cities to accommodate the ever increasing personal transportation.

Water supply system:

Non of the big cities are having adequate water supply system to meet the water requirement of its citizens. When more water is consumed by people during summer months, they get water supply for one hour every alternate day. In a tropical country like India, water is the most essential consumable by the human beings. Low per capita water consumption is a negative indicator in quality of life particularly in India.

In the absence of piped water supply, people try to exploit the ground water for their requirements. Excessive withdrawal of ground water leads to fall in water table and drying up of old shallow tube wells. In coastal areas, sea water ingress in to ground water takes place due to excessive fall in water table.

Affordable people arrange the required water by road tankers which would further overload the strained road traffic. The water supply system has become very old and inadequate and most of the pumped water leaks in to sewer lines or in to ground. Many times sewer water enters in to the empty water lines and cause drinking water contamination. There is no simple and low cost solutions as laying of new lines under the existing roads would cause severe traffic problems.

All the water sources in the surrounding areas of big cities are already used and many times water is pumped to 200 m height from 300 kilometers distance downstream. The cost of these water supply projects are exorbitant and also at the cost of locals use.

Sewage system:

The water used by the citizens is low compared to the organic load added to the sewage water. The sewage water looks similar to brewing solvent emanating foul smell in the drains. The anaerobic process takes place in the sewers itself before reaching sewage treatment plants. This causes severe smell pollution all along the foot paths, open drains and congested localities.

Most of the sewage seeps in to ground contaminating ground water with unwanted salts and metals. Ground water is the strategic water reserve for the cities. It should be used during severe drought and when the regular water supply is disrupted due to abnormal events. It should be preserved free from contamination.

Other utilities:

Most of electricity supply and cable TV lines are laid at over head level in unaesthetic manner. Since the LPG fuel is delivered in cylinders, transportation of LPG cylinders from go downs to the end user by slow moving tricycles / bicycles add to further traffic woes. Piped gas facility is available in few cities only. Solids waste collection & disposal is not organized in better manner due to area limitations. Many times the collection bins are located on the foot paths causing smell pollution to the pedestrians and nearby residents.

Disposal of biomass produced by trees:

The big trees planted along the roads also cause road accidents, traffic problems and loss of life when big branches fall on the roads during gale winds. Also the roots of big trees penetrate under the roads and cause road surface undulations. When these roots die and degenerate, they weaken the

road by causing cavities/voids in the road base. The fallen leaves on the road are crushed in to powder by vehicles and finally this organic matter mixes with the sewage water increasing its Biological Oxygen Demand (BOD).

The biomass generated by the trees in cities are collected and burnt on the ground. Biomass is rich in nitrates and volatile organic matter. When the biomass is burnt, excessive NO_x and volatile matter is released in to the air causing low level air pollution. Biomass is to be collected and disposed properly outside the city to prevent pollution.

Construction Material availability:

The availability of bulk construction materials such as bricks, metal chips / gravel, sand, stones, etc is becoming scarce from the surrounding areas of cities. Many times, these materials are transported from 300 km distance. Higher cost of construction materials due to long distance transportation, is one of the reason for high cost of construction in the cities.

Social problems:

Since the cities are over crowded and there is intense competition for owning / enjoying all types of immovable assets. Property and area usage disputes arise frequently creating law and order problems, political problems, fertile ground for mafia gangs, etc.

Need of futuristic new cities:

As explained in the previous paragraphs, the existing big cities are beset with many basic problems for which there is no long lasting affordable solutions. Now full fledged communication facilities (TV, internet, telephone, etc) can be established at any location and the world has become a global village to share information instantly. Any city growing beyond two million population is drain on the country resources and unproductive in enhancing true quality of life / standard of living of the people. When India transforms in to industrialized economy from the present agrarian economy, there is need to accommodate 80% of its population in cities. The population of India, will start declining after reaching peak level in next 32 years. Every district should be planned to have one or two futuristic new cities with population not exceeding two million residents in each city. The planning of these cities will be such that the acute problems / difficulties faced by the existing mega cities are not recurring. These new cities will be planned for the ultimate population strength with full comforts. The area / space provision made for future facilities will be initially developed as green patches and play grounds. These cities will be gradually developed to their ultimate capacity in a planned way.

Features of futuristic new cities:

- Fully planned for the ultimate capacity before the initial construction itself. Detailed three dimensional computer model will be developed with field data to anticipate the problems if any.
- The entire city area will be studied for possible natural calamities such as flooding, breach of upstream storage reservoirs, fire hazards, earth quakes, cyclones, tornadoes, tsunami, etc and remedial measures are incorporated in city planning. Major community facilities such as schools, hospitals, stadiums, function halls, temples, mosques, etc which will serve as shelter & rescue

areas. Identified shelter & rescue facilities are designed and constructed to stringent area requirements at safer locations.

- Detailed technical specifications for all types of constructions will be notified. Quality of construction will be supervised by reputed third party quality control firms. An ombudsman committee is appointed to resolve construction related disputes.
- All weather main roads and railway lines are envisaged. The city is planned without traffic lights at road junctions by constructing flyovers / under passes. The city is planned without railway crossing gates by constructing elevated railway track.
- Each identified area will be planned in blocks of one square kilometer area and provided with access from all four sides. This would facilitate uniform use of all roads with shortest commuting distance.
- The roads and parking places are constructed with proper leveling and suitable material for minimum repairs and high reliability.
- The residential areas are spread through out the city to locate them closer to industries, commercial places, office complexes, etc. This would facilitate to reduce commuting distances by the residents.
- Vehicles parking place (non residential) provision is made sufficiently to accommodate one car for each adult population of the city.
- All the utility lines, sewage lines and storm water drains would be routed away from the major roads to maximize roads availability. No utility line will be laid above ground. Mosquito free city is envisaged. The city storm water drainage system will be designed for at least 10 cm/ hr rain fall intensity.
- Minimum 400 liters per head daily water availability is ensured in the city excluding industrial and recreational water requirements
- Communication facilities conforming to international standard will be provided in the city.
- Construction workers colony will be built to take care of accommodation requirements during city expansion process.
- Nearly 20% of city area will be open/ green area covering parks, green areas, play grounds, water bodies, sport establishments, etc. the low lying areas which are prone to water stagnation are generally identified for green areas and water bodies. The natural drainage system of the area is not obstructed. Storm water drainage and sewage water systems are maintained independently.
- Infrastructure facilities such as roads, parking areas, railway lines & stations, etc. will cover minimum 25% of city area.
- At least 20% of the city area will be used for offices, commercial establishments, entertainment areas, shopping complexes, hospitality industry, hospitals, educational institutions, etc to cater to residents as well as floating population equal to 10% of the city population.
- Rest of the area (35%) is identified for residential area. Each residential sector is provided with all day to day requirements within 500 meters distance. Minimum two lane road in residential colonies is planned with roads on all four sides for each hectare residential area.
- Additional area is identified for industrial purpose depending on the type of industry. Air port area is also identified as per requirement.

- State of the art solid wastes collection, recycling and disposal system is envisaged. Bio mass generated in the city from trees will be used for vermi-culture compost production or fired in boilers as fuel.

General code for citizens:

- No industrial activity such as manufacturing, fabrication, assembling, ware housing, etc are permitted in residential areas.
- No dairy and poultry activity / farms are permitted in the city limits. Stray cattle / animal are not allowed in the city.
- Animal driven carts, rikshas, push carts and three wheeler vehicles are not permitted to ply on the city roads. Slow moving vehicles effect the traffic speeds in cities.
- No unauthorized dwelling permitted such as slums.
- Industries should strictly follow the pollution laws and accountable for violations.
- All the construction activity would be strictly as per by laws of the city in force and master plan.
- No bargaining allowed and all the sales in shops are at prefixed rates.
- No begging allowed and beggars will be quarantined.
- No vending on roads & foot paths is permitted.
- Road side temples, mosques, tombs, etc are not permitted. Use of loud speakers from temples, mosques, etc is not allowed.
- Graffiti & posters on walls and hoardings along the streets are not permitted.
- City is made more greener by planting trees in all vacant areas.
- Citizens do cooperate in achieving mosquito free surroundings.

Services available to property owners:

- Useful property at cheaper cost compared to existing cities.
- Online selling of property and its settlement.
- Eviction of tenants as per terms of lease agreement.
- Upkeepment and safety of property in case not occupied.
- Maintenance of common property.
- Building services online complaint redressal within short time.

Suitable location of futuristic cities:

The location of these cities can be selected after evaluating the following factors.

- Highly reliable water source is inevitable requirement to supply adequate water to the city.
- The extent of risk from natural calamities such as flooding, breach of upstream water reservoirs, earth quakes, tornadoes, cyclones, tsunami, etc. should be evaluated.
- The areas located in watershed of a minor / tributary rivers away from big rivers is preferred. This would eliminate the major flood threats to the city.
- The topography of the land should be suitable for simple storm water and sewage systems. Generally flat area with gradual slope of 1:500 is more suitable for founding the city.
- The sub soil properties should be suitable for construction of heavy structures at cheaper cost.

The suitable areas for founding these cities are available nearer to existing medium and major water reservoirs which are supplying water for irrigation. Every district is already having at least two medium / major water reservoirs serving irrigation needs. These reservoirs water is planned to be used for the new cities requirement. Nearly 80% of the used water in the city is collected as sewage/ effluent water. The available sewage / effluent water after minor treatment will be used for the irrigation requirements. Thus the scarce available water source is put to multiple uses without incurring large expenditure on city water supply infrastructure. Some times the city can be founded on the irrigated land itself and new irrigation area is developed in the downstream area with the available sewage water. If six hundred new cities with an average ultimate population of 1.5 millions, are established nearer to existing water reservoirs in the country, they will accommodate nearly 90 crores population. Including the population of existing cities, 80% of people in India will be living in world class cities by 2040 when the population reaches peak level.

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Reference:

'Geographical Area and its Effective Utilization' Refer to 'FILES' in
<http://groups.google.com/group/irrigation-power-energy>

(This concept paper is dedicated to Delhi city which is better planned and maintained mega city in India).