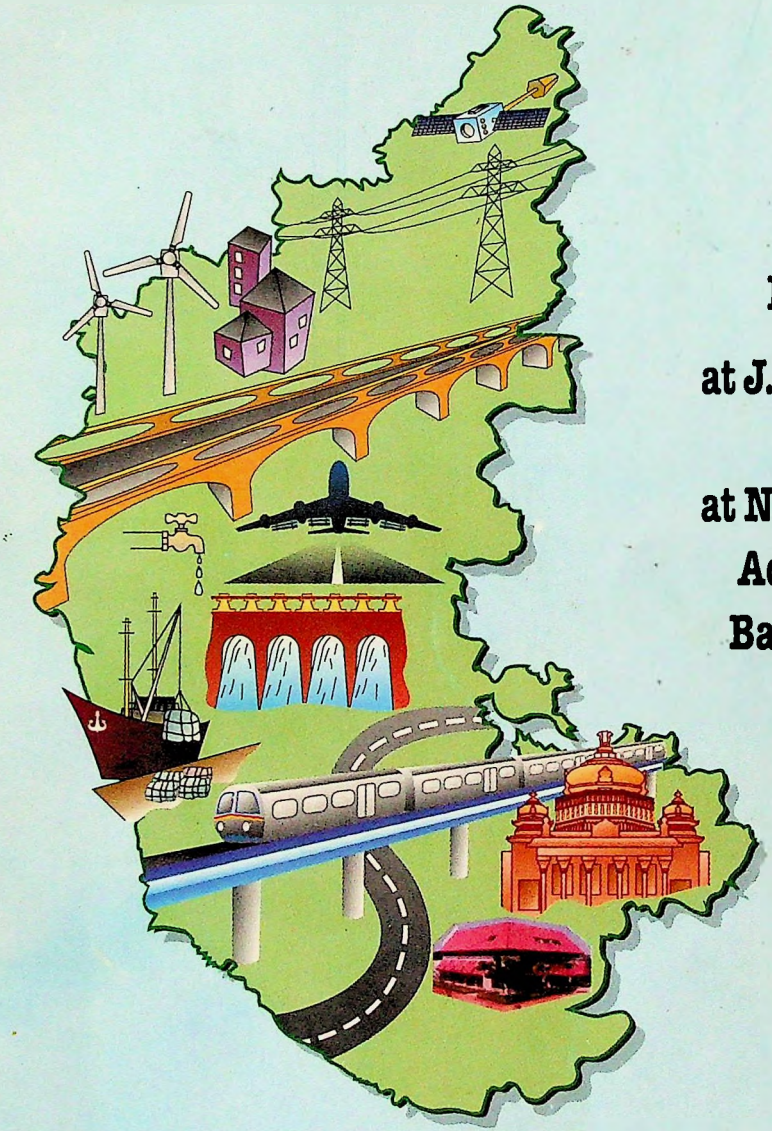
SEMINAR ON

Infrastructure - Key to Growth. Is Karnataka geared up?



13th June 1997

at J.R.D.Tata Memorial Auditorium at National Institute of Advanced Studies, Bangalore 560 012.

Organised by :

National Institute of Advanced Studies, Bangalore.

Alumni Association of Jadavpur University, Bangalore Chapter.

Supported by :
Govt. of Karnataka

The Institute (NIAS)

The National Institute of Advanced Studies (NIAS), which is the brain-child of Late Mr. JRD Tata, was established in 1988 in Bangalore under the Directorship of Dr. Raja Ramanna. This premier Institute is a center for higher learning which supports and leads multi-disciplinary research on the borderlands of natural sciences, life sciences, social sciences and humanities; helping the researchers from different disciplines work together, understand each other's language and attack complex problems in a comprehensive fashion.

The Alumni (AAJUB)

The National Council of Education (NCE) Bengal was founded in 1906 by eminent nationalist leaders of that time such as Sri. Aurobindo, Bipin Chandra Pal, Rabindra Nath Tagore, C R Das, Surendra Nath Banerjee, Raja Subodh Chandra Mullick and others when the Britishers attempted at partition of Bengal and failed. The council laid great emphasis on technical education. NCE Bengal culminated in the formation of Jadavpur University in 1955.

The parent Alumni Association was formed in 1906 at Calcutta with the objectives of fostering comradeship, unity and fellow feeling amongst the ex-students and rendering all possible assistance to the Alma Mater.

The Alumni Association of Jadavpur University, Bangalore Chapter was established in 1980. During the last 17 years, Bangalore Chapter has done considerable work in the field of social work, technical and cultural events. It has instituted two scholarships in Jadavpur University for needy and meritorious students. It also conducted number of seminars in Jadavpur University on technical and contemporary issues. It is a patron member of the Dead Aid Society, Bangalore and have financially supported the Spastics Society of Karnataka, Bangalore and the National Association for the Blind, Bangalore. Today it has almost 150 members in Bangalore.

Inaugural Session

Chief Guest : **Mr. R V Deshpande**
Hon'ble Minister of Major,
Medium Industry and Infrastructure,
Government of Karnataka

Guests of Honour : **Mr. Sankar Kumar Sen**
Hon'ble Minister of Power, Science and Technology,
Government of West Bengal

Mr. Ananth Nag
Hon'ble Minister of BDA, BCC, BWSSB, BMRDA &
Urban Infrastructure Corporation,
Government of Karnataka.

In the Presence of : **Dr. Raja Ramanna**
Director NIAS.
Dr. D M Najundappa
Deputy Chairman, State Planning Board
Government of Karnataka,
& Others.

Organising Committee : **Mr. D P Goel**
President AAJUB, 1996-97
Maj. Gen. Paul
Convener and Controller - NIAS
& Others.

GOVERNOR
KARNATAKA

RAJ BHAVAN
BANGALORE

June 11, 1997

MESSAGE

I am happy to know that the National Institute of Advanced Studies, Bangalore is organising a seminar on "INFRASTRUCTURE - KEY TO GROWTH. IS KARNATAKA GEARED UP?" on 13th June at NIAS, Bangalore.

Adequacy of infrastructure is a prerequisite for development in any sphere. This seminar is therefore going to be of great significance. I am sure this seminar would make an assessment of our preparedness to cope with the pace of development and would suggest ways to strengthen areas of weakness.

On this occasion, I wish the seminar all success.

(KHURSHED ALAM KHAN)

J. H. PATEL
CHIEF MINISTER

BANGALORE-560001

DATED 10.6.1997

MESSAGE
****

I am very glad to learn that a seminar on **"Infrastructure - Key to Growth. Is Karnataka Geared up?"** is being held on 13th June 1997 under the auspices of National Institute of Advanced Studies, Bangalore and a souvenir is being brought out to mark this momentous occasion.

I am equally happy that the theme chosen for the seminar is very apt and timely. Infrastructure is certainly the most important factor which plays a vital role in the process of growth. Realising this importance, the Government of Karnataka has set up an exclusive department viz., Infrastructure Development Department to promote the growth of infrastructure and also cater to the needs of investors in this particular area. It may not be out of context if I mention that Karnataka State is the first State tc do so i.e.,to have established a separate Department for Infrastructure Development.

I send **my greetings on the occasion and wish all success for the seminar.** I also hope that the souvenir being brought out on the occasion would come off with relevant write-ups on the subject.

Sd/-
(J.H.PATEL)

Major General M.K.Paul,
Controller,
National Institute of Advanced Studies,
Indian Institute of Science Campus,
Bangalore.

1.2 B.W.S.S.B. AND ITS FUNCTIONS

Bangalore Water Supply and Sewerage board was constituted under the act of state legislature and started functioning from December 1964. The primary function of the board are:

a. To ascertain the sufficiency and whole someness of water supply within Bangalore Metropolitan limits.

b. To prepare and carry out schemes for supply wholesome water for domestic purpose in the Bangalore Metropolitan area.

c. To prepare and carry out schemes for proper sewage disposal and treatment of the Bangalore Metropolitan limits.

2. HISTORY AND PRESENT WATER SUPPLY SCHEMES

The City of Bangalore founded by Kempegowda in the year 1537 which is situated in plateau, with altitude ranging from 850 to 950 M above sea level. Till 1896 it depended on Kalyanis and tanks for water supply.

The first dependable source was identified for growing needs of Bangalore from Hessaraghatta reservoir which is 18 KM north of Bangalore City. The scheme of supplying potable water was commissioned on 7th August 1896, which is 100 years old by now.

Due to increase in the population and a need for additional water another scheme 40 Km down stream of Hessaraghatta reservoir was identified under the able guidance and leadership of Sir. M Visweswaraiah Engineer and Statesman at Thippagondanahalli. This is about 30 km from West of Bangalore City. The first phase of scheme was completed during March 1933 for initial development of 28 MLD. Subsequently in phases the abstraction increased to 140 mld by providing additional infrastructure such as increasing the capacity of the dam, providing additional treatment facility pumping and raising mains, There are three mains of 24", 27" and 36" dia of which former two pipelines are single stage pumping and later with two stage pumping.

The growth of population during last two decades specially between 1961-71, 1971-81, was enormous and additional water was necessary to augment the water supply.

Cauvery water supply scheme stage I was taken up to draw water from river Cauvery near Shiva anicut through the existing power channel up to Netkal balancing reservoir. From NBR laying a gravity pipeline up to Thorekadanahalli where the raw is treated fro potable standards with conventional treatment process and pumping to Bangalore with three stage pumping for a head of 160-170 M at each stage. The scheme envisages bringing 135 MLD of water CWSS I was completed in 1974. Soon this water was inadequate for growing population and CWSS II was taken up during 1979 for bringing additional 135 mld from the same source with duplication of same components. This scheme was completed in 1982. Similarly CWSS II was also taken up during 1985 for bringing 270 mld of water from river Cauvery to Bangalore. The scheme completed during May 93.

FOLLOWING ARE DETAILS OF EACH SCHEME:

SL.NO.	Name of Scheme	Full potential in MLD (Million Litres per day)	Present drawal	Remarks
1.	Hessaraghatta Scheme	36 MLD	6 MLD	
2.	CRS Water supply Scheme	140 MLD	36 MLD	
3.	CWSS I	135 MLD	135 MLD	
4.	CWSS II	135 MLD	135 MLD	
5.	CWSS III	270 MLD	270 MLD	
		706 MLD	602 MLD	

2.1 PRESENT WATER SUPPLY AND DEMAND

a. POPULATION PROJECTION

Bangalore development authority has projected the population of Bangalore City as 7 million by 2011. This indicates that the decadal growth as 5 percent between 1991 to 2001 and percent between 2001 to 2011.

b. WATER DEMAND

The CPHEED manual of water supply specified that City's population more than 5,00,000 the rate of water supply per capita per day shall be in the range of 150 litrees to 200 litres. But as on today the supply in the city is about 100 litres per day per capita including losses. Taking into account of all the receipts from different sources such as Arkavathi and also Cauvery and even considering the losses in distribution are brought down to bear minimum of 12 or 15% still there is a deficit of 400 mld after implementing CWSS IV Stage Phase I and after commissioning Phase II the deficit will be negligible.

2.2 DISTRIBUTION SYSTEM

The city distribution system exists right from 1889 and is being remodeled from time to time. The water from Arkavathi river namely Hessaraghatta and T.G. Halli supplied to North of the City Cauvery Water is supplied to the Southern part of the city. Now, the two zones are interlinked between combined Jewel filters and also High ground reservoir.

The city has undulating profile with a difference of nearly 100 mts. In order to supply equitably distribution 38 GLRs have been identified at strategic points of capacities varying between 4.5 mld to 62 mld. In addition about 48 overhead tanks with 40' to 60' staging have been constructed to supply water to ridge areas of city.

Since entire water to Bangalore city is by pumping in order to accommodate - fluctuation of power, 22 hour storage capacity has been provided, which is relatively higher when compared to any standards.

Majority of water supply is from ground level reservoir and over head reservoir. But in few cases only it is by direct transmission main or trunk mains. At present supply to domestic consumers is about 4 hours per day. For industries it is about 12-18 hours. There are about 2.60 lakhs metered connections of both domestic, non domestic and industrial.

2.3 WATER TREATMENT PLANTS:

To treat water for potable standards as per CPHEED/IS standards treatment plant has been installed at T.G. Halli and T.K. Halli. At T.G.Halli treatment plant is installed to treat raw water impounded in the reservoir and at T.K. Halli for treating raw water from river Cauvery. In both places the unit process and unit operation are one of the same. They are a) Pre chlorination b) Coagulation c) Floculation d) Sedimentation e) filtration f) Post chlorination or disinfection. Generally alum (aluminium sulphate) is used for coagulation and for P.H. correction lime is used in proper dosage as determined in the laboratory.

The final treated water is tested for physical chemical biological and bacteriological quality and after satisfied the CPHEED standards it is pumped to the city.

2.4 WATER QUALITY SURVIVALLENCE IN DUSTRIBUTION

The treated water from the treatment plant which meets the CPHEED standards should reach to the consumers of the same standards. But because it has to flow

through many conduits, there is possiblity of water getting polluted. Hence, it is necesary to collect regular water samples to confirm the bateriological quality. As per W.H.O. standards for a population of more than 1,00,000 one same for every 10,000 population needs to be collected. Since, the population 5 miilion 500 samples have to be collected. But BWSSB has 52 service stations from each service station 12 samples are collected each month. In addition about 250 water samples are collected throught the mobile testing laboratory. Thus quality of water is monitored very scrupulously. The water quality in the distribution system is tested in the Central Water Testing laboratory.

3.0 NEW SCHEMES UNDER EXECUTION

3.1 CWSS STAGE IV PHASE I

Bangalore Water Supply and Sewerage Board has availed OECF Government of Japan loan for executing CWSS IV Stage Phase I for bringing additional 270 mid of Water from river Cauvery to Bangalore. The total cost of the Project as approved by M/s. OECF is Rs.1342.00 Crores and of which Rs. 985.00 crores is the share of Government of Japan. The balance amount is shared by Government of Karnataka, Bangalore City Corporation, Bangalore Development Authority and Bangalore Water Supply and Sewerage Board.

The scheme envisages drawing 300 mid of raw water by gravity upto Thorekadanahalli and treating for potable standards. Then pumping 270 mid treated water in three stage pumping from T.K. Halli, Harohalli T.K. Halli, Harohalli and Tataguni at a head of 160-170 M at each stage. The treated water is distributed in seven reservoirs (Storage) in the City and supplied through feeder mains and distribution mains to consumers.

The water generated in this new area will be conveyed to the treatment plants partly by gravity and partly pumping and sewage is treated to IS standards and discharged in to natural valley.

3.2 RECYCLING OF WATER:

Bangalore Water Supply and Sewerage Board in taking up recycling plants at the existing sewage treatment plants.

a) 'V' VALLEY:

In order to meet the needs of industrial requirement of Power projects etc., in Mysore Bangalore Road, recycling plant of 60 mid capacity is being taken up under 97-98 under French funding at an estimated cost of Rs. 52.00 crores.

b) YELAHANKA VALLEY

To meet the requirement of International Airport and other industries in and around Yelahanka, 10 mid capacity recycling plant is being taken up under French funding during 1997-98 at an estimated cost of Rs.40.20 Crores.

c) K & C VALLEY:

There is a great demand for recycled water in White Field and Hosur Industrial area. To meet the demand a 50 mid recycling plant is proposed to be taken up under Private sector participation (BOOT basis)

4.00 PROPOSED SCHEME TO BE TAKEN UP

4.1 CWSS STAGE IV PHASE II

BWSSB has also contemplating implementation of CWSS Stage IV Phase II and also to bring additional 500 ml per day. The BWSSB has ambitious plan to implement to scheme by 2005 either through external funding agency or through Private sector participation (BOOT basis) By implementing this scheme the per capita availability will be increased from 150 to 175 ltrs per day.

5.00 SCENARIO BEYOND 2011

5.1 DEMAND AND SUPPLY

The Population by 2011 is projected as 7.00 Million by Planning wing of Government of Karnataka. If the projections of population is same as actual growth the two schemes namely CWSS Phase I and Phase II proposed to be implemented will meet the CPHEED standards of 150 to 200 ltrs. per day.

5.2 The Scenario beyond is critical. After implementing CWSS IV STage there is no availability of water in the Cauvery stream. Hence, suitable water resources has to be identified. However, before identifying the new water resource the available water should be judiciously utilised, with suitable water management and conservation programs, they are:

1) Reduction of unaccounted for water to bear minimum
2) Adopting conservation measures through temporary and permanent measures.
3) Re-use of waste water for industrial and non potable purpose.
4) Re-use of waster water for potable purpose.

5.2 UNACCOUNTED FOR WATER:

Generally the water after treatment is conveyed through transmission mains, feeder mains and distribution mains via Service reservoir to the consumers, while doing so water is lost in many ares through leakage in transmission and distribution mains and also through service mains etc. At present this unaccounted for water is quite high from the normal standard practice. If this losses are reduced to bear minimum additional water will be available for use. Under normal condition the unaccounted for water should be between 12 to 15%. Though there are instance where the unaccounted for water is less than 10% such as Singapore and Tokyo etc.

5.3 ADOPTING CONSERVATION MEASURES BY THE CONSUMERS

By bringing awareness among the consumers the fixtures of water supply can be introduces which will reduce the excess usage of water by the individual. For example installing lower capacity toilet cisterns. Regulating big cocks in the wash basins regulating Car washing and vehicle washing etc.

5.4 RE-USE OF WATER FOR INDUSTRIAL AND NON POTABLE PURPOSE

About 80% water used is discharged as Waste water, it is necessary utilise this waste water for industrial use such as Air conditioning, cooling gardening and other non potable purpose by installing next degree of treatment.

Now, technologies such as desalination process like reverse Osmosis and Membrane technology may as well bring it to drinking standards.

5.5 WASTE WATER FOR POTABLE PURPOSE

In Sandiego's Water purification, the waste water is repurified for potable purpose. This scheme will be in operation by 2000. Bangalore City also may have to adopt such schemes for augmenting water supply.

6.00 WATER RESOURCES

Beyond 2011, since there is no availability of Water in Cauvery basin it is necessary to examine alternate perennial water resources such as a) Hemavathi river (b) Netravathi river (c) Tungabhadra river etc.

6.1 UNDER GROUND WATER RESOURCES:

Generally the under ground resource potential is very bad in and around Bangalore City. The studies by Ground Water Board, Government of India and Mines and Geology Department, Government of Karnataka, indicates there is excess drawl than the replenishment. However, BWSSB with the help of Remote Sensing Technology ISRO, possible areas where underground water is available will be harnessed to supplement the existing supplies.

BWSSB with the help of Mines and Geology, Government of Karnataka and other sister Organisations would regulate indiscriminate drilling of borewells in the City by bringing suitable legislation.

7.0 RAIN WATER HARVESTING

Since, Bangalore has a terrain varying from 920 - 980 M, the rain water is drained through these, natural valleys, efforts are now being made to utilise this rain water by conserving in the existing lakes in the City. A detailed study of the rain water harvesting in being under taken.

BWSSB is seriously considering to implement this proposal once the draft plan is ready. In addition BWSSB would come out with individual house rain water harvesting plan for implementation by the home owners.

8.0 CONCLUSIONS

Bangalore City is comes under selected band of Cities in the World, where water has to be conveyed from a very long distance and pumped to very high heads, such as Mexico, Amman, Beijing etc. The production and conveyance cost in these Cities are very high compared to the other major Metropolities in the World.

Beyond 2011, augmenting Water resources to City is very critical. Any new Water resource is at a Phenomenal distance and head.

Hence, it would be wise to restrict the growth of population as well as the area of Bangalore City.

Conservation of water, bringing awareness among the public and efficient management of available water should be given highest priority in the next decade.

Traffic Management and Road Safety in Bangalore City

Problems and Needs

S.C. Burman
Director General of Police,
COD, Training Special Units & Economics Offences

INTRODUCTION

Bangalore, the capital of Karnataka State, is considered as the fifth Metropolis of India, after Delhi, Mumbai, Calcutta and Chennai. It ranks fifth most populated in the country's urban agglomerations and has 51 Lakh people residing in its confines. It spreads over an area of 150 Sq. Kms. The rate of growth of the area as well as the population in the last two decades has been so phenomenal that is was reckoned as the second fastest growing city in the world in the 1980's. The city is mainly industrial with varied and flourishing areas of commerce and business. Besides it is considered as the electronic and computer capital of India.

PROBLEMS

1. The number of vehicles in Bangalore has gone up from a mere 23,000 in 1960 to about 39,454 in 1970 to about 1,70,877 in 1980 and 5,24,261 in 1990. It crossed 7,73,904 in 1994 and now 10,13,000. The percentage of growth rate over 1960 in 1970 - **71.5%** in 1980 **642.9%**, in 1990 - **2,179.4%** and in **1994 - 3264.8%.** It is phenomenal.
2. Number of Road Accidents has gone up from 564 in 1964 to 1,752 in 1974 to 4,931 in 1984 and to 8,198 in 1994, 8677 in 1996. There were 587 Deaths and 6616 injured due to road accidents in 1994 and in 1996 715 deaths and 6566 injured.
3. **Inadequate public transportation system/absence of Metro Rail** is note worthy in Bangalore. This has led to the prolification of private modes, particularly the two wheelers.
4. The city's road structure is radial in nature and the **absence of a ring road** is striking. There are also a large number of road intersections about 30,000.
5. There has been frequent Traffic congestion / jam in a number if intersections in the city. Traffic Police find it very hard to ensure smooth flow of vehicles. Apart from the problems mentioned above Traffic confection in the city roads are mainly due to the following reasons:
   (a) The city's road network is predominantly radial in nature, **the absence of ring road necessitates** the intercity heavy vehicular traffic to enter the city and pass through the core areas of the city. This has put severe pressure on the road network which is already inadequate and has resulted in traffic congestion and safety problems.
   (b) There is **increase of BTS schedules** in and around the central business district i.e. around Vidhana Soudha, Majestic, M.G. Road, Shivajinagar, J.C. Road, Minerva Circle, Kalasipalyam, City Market etc. The mofussil buses are touching the core areas of the city though it is not required.
   (c) The **wholesale and retail commercial establishments are concentrated and continue to concentrate** by opening more establishments in areas like Majestic, City Market, Kalasipalyam, J.C. Road, Commercial Street, M.G. Road, K.H. Road etc drawing and generating more traffic, creating parking problems, road blocks etc.
   (d) Due to **concentration of business establishments** in saturated areas pressure is mounted on the inadequate parking lots available in places like City Market, Kalasipalyam, Majestic, J.C. Road, Commercial Street, M.G. Road etc. This is resulting in parking of vehicles in Noparking areas and encroachment on pavements.
   (e) **Concentration of important Government offices,** courts and Colleges in and around Vidhana Soudha is adding to the excess traffic generating situation.

(f) There are many **roads in the city requiring urgent widening.** In many places the land belongs to Railway and Defence establishments viz. P.F. Road, Jayamahal Road, Bellary Road, Victoria road, Murphy Road etc. Without widening of these roads, it is difficult to release the pressure. Proposals are already sent to these agencies.

(g) Many **prestigious Cinema theatres, and Choultries are situated in the thickly populated areas of the city** adding to the traffic congestion and leading to parking problems. Most of the choultries do not have any parking area. Road is fully used for parking of vehicles.

(h) **Footpath vending on important and busy areas in the city occupying the path meant for pedestrians** has forced the pedestrians to use the busy roads. Because of this in 1994, 242 Pedestrians are killed 6,616 injured in the road accidents.

(i) **Frequent cutting of roads and pavements by the B.W.S.S.B, P & T and K.E.B has deteriated** the road safety situation leading to traffic congestions and accidents.

(j) **The Bye-law of B.C.C. is defective specially** in the sphere of building activities leading to encroachment of pavements, deviation of sanctioned plans, conversion of basement in the high rise buildings meant for parking of vehicles into commercial usage.

(k) **Commercial check posts** located on the National and State High Ways which when started years back were in the out skirts. Now they are located in the heart of the city. Parking of goods vehicles in the check post have been posing serious problems for smooth flow. Though check posts on O.M. Road and Bellary Road have been partially shifted the old structures have not been demolished. Shifting of check posts situated in Tumkur road, HAL Road, Kanakapura Road etc is urgently required.

(l) There is no **separate Traffic Engineering section** to plan and execute Traffic Engineering works in the areas out side B.C.C. There has been a disorderly growth of city without common byelaws, leading to high rise buildings both commercial and residential buildings are coming up in all approach roads to the city. The notified area authority, B.D.A., Village Panchayats have failed to keep a check on their growth.

To ease the congestion on city roads, and ensure safe movement of vehicular traffic the following short term, medium term and long term measures are suggested. May of the short term measures can be implemented with out much financial implications to the exchequer of the Government.

SHORT TERM MEASURES

1. Pedestrian foot over bridges and subways at high pedestrian movement areas are to be built immediately. Twenty five locations have been identified for the same.
   1. Tankbund Road, Opp. Sangam Theatre
   2. K.G. Road Opp. Sagar Cinema Theatre
   3. Town Hall - Kumbargundi - Narashimaraj Road Cross
   4. To extend city market subway from Mysore Road to Narashimraj road and upto Kalasipalyam main road.
   5. Chord Road and Modi Hospital main road junction
   6. Nrupathunga Road Opp. New Public Office
   7. Jayanagar Shopping Complex
   8. Brigade Road - Opera Circle
   9. M.G. Road (Cauvery Arts and Crafts emporium Junction)
   10. Tankbund Road, Opp. Amar Hotel
   11. Tannary Road at Periyar circle
   12. Airport Road at Manipal Hospital
   13. Adugodi Junction
   14. Yeswanthapura Circle
   15. Ulsoor Bus Stand
   16. Webs Junction
   17. Minerva Circle
   18. Royan Circle

19. Russel Market
20. Navarang Junction
21. Magadi Chord Road Circle
22. Malleswaram Circle
23. Marappanapalya - near R.M.C. Yard
24. Kempegowda Circle
25. Upparpet Police Station Junction

Sl. No.1 to 8 need to be taken up immediately and the rest in a phased manner.

2. Officers of and above the rank of Sub-Inspectors of Police are empowered to book traffic violations and impose spot fine as per the Moton Vehicles Act 1988. There is an urgent need to empower ASISs working in Traffic Wing to book certain category of violations noticed while on duty though not powers to impose spot fine.

3. Officers of and above the rank of **ACPs (Traffic)** need to be empowered to **suspend the driving licences in case of certain repeated violations** as per the M.V. Act 1988 which at present vests with the licensing authority and the trial courts.

4. **D.C.P. Traffic may be vested with the powers of an Additional District Magistrate** for the purpose of the Motor Vehicles Act. 1988 for imposing various restrictions. The Commissioner of Police may be the appellate authority.

5. More **Toe Vansara** needed for removing the wrongly parked vehicles. **Employing more number of toeing vehicles will not only enable traffic police to clear the vehicles parked hapazardly**, but will instill an element of decipline and fear. Most of the congested roads will be available for smooth flow of vehicles.

6. There is a need to **stagger the timings** of Government offices, Schools, Public and Private Sector Industries etc, so that transportation of employees by BTS & Private Buses and Private vehicles will spread over uniformly resulting in reduction of congestions in the central part of the city. The working hours of courts, Vidhana Soudha, Colleges should be of different timings. For example Vidhana Soudha may function from 9.30 a.m. to 4.30 p.m., all Central Government officers from 10 a.m. to 6 p.m., Courts from 9.30 a.m. to 4.30 p.m., and college from 8 a.m. and Schools from 11 a.m.

7. **Holidays** can be declared on **different days** in a week separately for Government offices, Public & Private sector industries and even to educational institutions which will help in uniform distribution of the traffic through out the city in a week. Further it will ease the congestion in traffic generation centres like M.G. Road, Commercial Street, City Market, K.G. Road etc.

8. Shifting of Iron and Steel Market and other hard ware business establishments to the newly identified place near K.R. Puram.

9. Shifting of plantain business establishments from city market to Binny Mill compound where A.P.M.C. has constructed separate market for this purpose.

10. Since the K.R. Market is still under construction, nearly 250 shop keepers have been accommodated of SJP road by BCC building temporary structures. This has reduced the width of SJP road considerably adding to the already heavy flow of traffic. Frequent traffic jams have been reporting due to this. Speedy completion of K.R. Market and issue of occupancy will reduce congestion on N.R. Road, S.J.P. road and infront of city market. This will also help us to contain foot path vending in and around this place.

11. Many offices which do not have regular public visit need not be located in and Vidhana Soudha. Relocation of Government offices outside the central business district and opening of new Government offices in extension areas of the city will certainly reduce the congestion in and around Vidhana Soudha.

12. Levying and collection of hour based parking fee from the parking lots situated in and around M.G. Road, Commercial Street, City Market, Chickpet, Majestic, Gandhinagar and Kalasipalyam is absolutely necessary. This will not only yield revenue but also discourage parking of vehicles more than necessity.

13. There are many K.S.R.T.C. / B.T.S. Bus stops situated in the city at the intersections, on either sides of the roads, within a distance of two furlongs etc causing severe traffic congestion in the peak hours. such of those bus stops are necessarily to be relocated to maintain free flow of traffic. Though the consent of the local traffic officers required to be taken before bus stops are marked it is not being followed by the concerned authorities. It is absolutely necessary to form Bus bays wherever bus stops are located on important corridors. Important and busy roads should always be a through fare and stopping or parking of vehicles results in piling up. In roads like M.G. Road, K.H. Road, K.G. Road, Platform Road, Residency Road, Richmond Road etc. bus stops cannot be provided without bus bays. It is also necessary to reschedule the routes where in buses are plying in narrow roads obstructing the regular flow of traffic apart from being hazardous to road users. No new routes / bus stops are to be given/started without consulting the traffic police.

14. KSRTC should take steps to extend better facilities to commuters in Shivajinagar bus stand which is over crowded with passengers and inadequate parking space for buses resulting in regular traffic congestion in and around Shivajinagar bus stand. Most of the bus stops are located on the main road causing obstructure to the smooth flow of traffic. There have been regular traffic jam here. Added to this there is increase in fatal and nonfatal accidents inside the Shivajinagar bus stand giving room for Law and Order problems frequently. It is high time the KSRTC should think over acquiring atleast a portion of Shivajinagar Stadium so that parking of vehicles outside the bus stand can be avoided. This will help reducing traffic congestion in and around the Shivajinagar bus stand and Bowring and Lady Curzon Hospital.

15. The KSRTC should identifying such of those suitable places in and around Shivajinagar bus stand to distribute the serviced locality wise. Some services can be started from RBANMS grounds, Ulsoor Tank Bed, Miller Tank Cubbon Road etc. This will reduce the pressure on Shivajinagar bus stand there by distributing the commuters evenly. Similarly around Subhashnagar, City Market, Ulsoor, Yeshwanthpur, Jayanagar suitable places should be identified.

16. Proposal pending to take over Kalasipalyam bus stand by the KSRTC should be expedited that without shifting the bus stand from City Market to Kalasipalyam, there cannot be relief to traveling public on N.R. Square, City Market, Kalasipalyam etc.

17. **Decentralization of K.S.R.T.C. and B.T.S. services in the city** will go a longway in improving the traffic management of the city. There are many routes which touch City Market, Subashnagar, Shivajinagar, Ulsoor etc. even when there will be other buses. Rescheduling of buses for proper distribution has to be studied by the BTS.

    The drivers of buses should compulsorily undergo periodical training courses in matters relating to driving, maintenance of vehicles, health checkup (Eye sight) to emphasis safety driving. During the year 1994. 108 persons were killed and 607 persons were injured due to rash and negligent driving by the drivers of K.S.R.T.C. and B.T.S. buses in the city.

18. There is an urgent need to decentralise BTS/KSRTC bus stands. Subhashnagar can no longer take the extra load being pressed. All buses going towards Mysore etc. should immediately start operation from the Mysore Chrome Tanning area in Mysore road. Similarly buses bound to Tumkur can start from Yeshwanthpur, towards Kolar from Indiranagar etc. by this we can stop the flow into city and lot of congestion can be reduced around the city.

19. Already signalization and Synchronization work has been done in many junctions in the city. This has facilitated smooth and uninterrupted flow of traffic from one end to the other. Public are satisfied about this.

20. The Bangalore city Road Safety Committee formed by Government with Commissioner of Police as the Chariman may be made a statutory body with statutory powers. Finances must be provided by the Government, BDA and BCC to the Committee to take up the Road Safety related works. The BCC Traffic Engineering Cell may be placed under the control of the Committee along with the Budgets.

21. To nominate Commissioner of Police, Bangalore City as the Chairman for the Co-ordination Committee of B.W.S.S.B. K.E.B. and P & T with regard to road cutting works. Presently BCC collects the road cutting charges and will not take up the work for months/ years together. Any agency cutting the city roads should be made responsible for repair and to bring it to the original condition.

22. To allocate Rs.25 lakhs to the D.C.P. Traffic, Bangalore city for important works to be taken up on such roads to enhance road safety in the areas of B.D.A. / Notified areas / Village Panchayat in the jurisdiction of Police Commissionerate. 28 Amendment to building byelaws of the BCC for instance of N.O.C. from the Traffic Police before approval of plans of high rise buildings and issue of occupancy certificates to curb building owners converting the basement floor meant for parking of vehicles into commercial establishment. **Action need to be initiated on all the buildings which have converted parking area for commercial purposes**. Similarly the apartment culture which is ruining the city should be kept under control. The bye laws of BCC insist only for one car space for three apartments, and the builders very happily satisfy this. The parking space should be one car plus one two wheeler space for each apartment and 25% place for visitors vehicles. Now the boards outside the apartments prohibiting entry of visitors vehicles is prominent. Public roads are being used for the parking purpose. This will have to be done without any delay.

23. All the HTVs carrying goods in contravention of sub-section (1) of Section 114 of Motor Vehicles Act, 1988 need to have vehicle weighted, instead weigh bridges can be constructed on all national and state highways leading to the city and necessarily pass through weigh bridges where in police officers / M.V. Department officers can launch prosecution and the extra goods exceeding the permissible limit can be unloaded which will discourage drivers carrying the goods beyond the limit apart from avoiding mishaps and breakdown of the vehicles anywhere in the transit leading to severe traffic congestions.

24. There is a need to **privatise certain areas of the city for better transportation of passengers** of inter/intercity till adequate public transportation system in achieved.

25. Advertisement hoardings are erected on the pavement of the city roads with least regard to the safety of pedestrians and road users. Many hoardings erected / fitted to K.E.B. and P & T poles are traffic hazardous which are potential to accidents due to distraction of the attention of motorists. **The B.C.C. should necessarily take the N.O.C. of the traffic police before permission is granted.** 33. Footpath barricading is being done by the B.C.C. as per the suggestion of the traffic police through the programme of works, however at the time of barricading gaps are left out at the request of commercial establishments by the BCC much against the advice of the traffic police resulting in pedestrians entering the roads in different places to cross resulting in accidents. The openings will have to be given only by the traffic police for pedestrian crossings etc.

26. **Prohibiting plying of Autorickshaws in and around the Vidhana Soudha for three to five K.M. radius** will severely reduce traffic congestion in the surrounding roads.

27. There are number of **railway over/under bridges required to be widened** on top priority to avoid severe traffic congestion in the peak hours. The railway under bridge near Nehru Circle need to be widened. Proposals to this effect are already with the railway authorities. The railway gates near ITC, Yelahanka and infront of Frazertown P.S. and Jayamahal cross have been causing regular traffic blocks. Construction of bridges will have to be insisted by the Government.

28. **The D.C.P. Traffic, Bangalore City should be made ex-officio member of the B.D.A./B.W.S.S.B/K.E.B. to take up such** issues in the interest of traffic management and

road safety measures and to coordinate. The issues like formation of wider roads whenever new layouts are formed, road cuttings, shifting of traffic hazardous man holes, switching over to underground electric cables instead of over head power lines etc., over a period of years will yield better results and consumption of precious time can be avoided apart from minimising expenditure on stationery.

29. There is no **separate fund allocated to propaganda of traffic matters to bring awareness through road safety education by way** of print media, A.I.R. and Doordarshan. Apart from this seminars on Road safety need to be organised with the assistance of various social groups to involve the public in a larger extent. Though traffic week is observed every year the subject in forgotten after the occasion but the tempo need to be kept up through out. For this suitable donors need to be approached which makes the traffic police to be under the obligation exposing the traffic police in a poorlight. Sufficient funds need to be kept at the disposal of the DCP Traffic, Bangalore City.

30. There are many **culverts** in the city roads are **narrow** and have been allowing the flow of traffic in both ways, Such culverts are not only a potential traffic hazard but are also bottle necks resulting in traffic congestion. Culverts situated near Sadashivanagar P.S., Anepalya, Sujatha Theatre etc, are a few places where in **widening need to be done on priority.**

31. Though **National/State Highways run in the core areas** of the city with a thickly populated and local traffic movement is also at the higher volume, **the roads are poorly lit** resulting in the increase of both fatal and nonfatal road accidents. The jurisdictional authorities of national/state highways should illuminate such portion of the city roads coming out side the limits of the BCC. This will definitely reduce the road accidents occuring in the city where ever the national / state highways run.

    Periodical involvement of national/state highway authorities to take up time bound actions to paint markings of the roads, culverts, bridges, other objects on the roads and putting of guard stones the roads will increase the road safety situation to bring down the rate of accidents. Directions issued by the Road Safety Committee in this regard should be binding.

32. Shifting of checkposts situated in Tumkur Road, HAL Road, Hosur Road and Kanakapura Road etc. is urgently required to outskirts of the city by forming truck bays for parking of goods carrying HTVs. This will reduce traffic congestion at these points since such of these places where checkposts are located have become core areas of the city inhibited by residential accommodation.

33. Establishment of National Highways posts and patrolling vehicles for enforcement of certain traffic laws to prevent accidents i.e. reckless driving, overspeeding, drunken driving etc. and to attend accidents without loss of time can help victims to have medical help faster, removal of vehicles involved in accidents can prevent traffic congestions on these roads. **Three Traffic Mobiles should be placed at the disposal of DCP Traffic, Bangalore City.**

34. Through issue of ordinance by the government, **commercial establishment in the proximity of national and state highways need to be shifted beyond a safer distance** to prevent generating of traffic activities which will reduce accidents on such of these roads which run in the limits of city.

35. The B.C.C. issuing **permission for opening of Eat-Outs on the pavements** of the city roads with least regard to the safety of pedestrians and the customers. The corporation can issue licences where ever the **traffic** police have issued **N.O.C.** 44. There are number of street light and P&T poles on the widened and unwidened roads obstructing the free flow of traffic in many roads of the city. A time bound action in this regard need to be programmed by the concerned authorities on war footing to relocate them. In this connection the city traffic police have been giving the list of street light and P&T poles to be necessarily relocated every month. KEB and P & T poles to be necessarily relocated every month. KEB

and P&T departments have as already expressed should have a time bound programme to this effect.

36. The Government should include the **Road Safety Education** in the curriculum as compulsory for all the middle, High Schools and Colleges of the state.

37. There is a necessity for **issue of an ordinance by the government to over come the legal wriggles of the footpath vendors** associations who have obtained stay orders against the notification of the B.C.C. in demarcating the pavements to carry on with their trade by creating Hawking and Nonhawking zones in busy areas like Majestic, City Market, Kalasipalyam etc in the city.

38. **Roads involved with high pedestrians activities need to be pedestrainised** to facilitate free movements of pedestrians as a measure of pedestrians safety who visits for shopping purpose. Those roads are Commercial Street, Brigade Road, Avenue Road, Chickpet main Road, Balepet etc. For commercial street alternative parking area is already kept ready. Central Junior College compound and Silver Jubilee Park can used for other roads.

39. There are number of trees on the city roads obstructing free glow of traffic and are causative factor for accidents. They need to be removed and fresh plants sapplings need to be done at those places. At present the tree officers are empowered to take action for removal trees. The action is stalled by various pressure groups. As a result many widened roads are not safe and many roads need to be widened could not be taken up by the B.C.C. since permission for removal of such trees has become an impediment. Hence it is necessary to vest the **powers with the Dy. Commissioner of Police, Traffic, Bangalore City and the Commissioner of police Bangalore City as an appellate authority regarding removal of such trees on the roads only.**

MEDIUM TERM

1. Ring Road and Bypass roads are immediately needed.
2. Truck terminals on all the highway entering the city are to be completed.
3. Pass overs are small flyovers which will help to reduce congestion and delays. About 30 locations have been identified for these pass-overs viz

1. **Makhri Circle**
2. **Trinity Circle**
3. **Madivala Check post**
4. **Basavewara Circle**
5. **Rajajinagar Entrance**
6. **Magadi Chord Road Circle**
7. **South End Circle**
8. **Ananda Rao Circle**
9. **Fountain Circle**
10. **Sirsi Circle**
11. Ashoknagar Circle and Neelasandra Road Junction
12. Town Hall
13. Bharath Talkies and Minerva Circle
14. Lalbagh West Gate
15. Hudson Circle
16. City Market
17. Yeswanthpura Circle
18. Banasawadi Railway Bridge (I.O.C)
19. Mysore Bank Circle
20. Siddapura - Hosur Road Junction
21. Banashankari Circle
22. I.T.C. Railway Cross

23. Richmond Circle (includes Blood Bank Circle & Dalal Petrol Bunk)
24. K.R. Circle
25. C.T.O. Circle
26. Briand Square
27. Minto Eye Hospital
28. Medical College Circle
29. Kempegowda Circle

First Ten locations need to be taken on priority basis immediately. Cost of each pass over may not be more than 3 to 5 crores.

4. The Children's Road Safety Park and exhibition should be immediately established in Bangalore City.
5. Control must be exercised by the Traffic Police on the functioning and quality of the driver training schools.

LONG TERM

1. Some of the following major steps necessary to improve public transport system are:
   a) Mass rapid Transit System
   b) Rapid Transit System for the Satellite towns.
2. A Separate Traffic Control Room with C.C.T.V. Facility.
3. Continuation of Race course road up to Subedar Chatram Road (Now the race course road not in use beyond Janata Dal office Circle) If the road is made available for the use of motorists, Traffic congestion at Shivananda Circle can be reduced.

The Race course looplane near Janata Dal office near KEB is not made use of, which is dead end road, it's access to and from Subedar Chatram road is cut off following the construction of Railway under - bridge across Subdar Chatram, Road. As a result this link road is not in use at all from the point of view of quick flow of traffic to and from Rajajinagar and areas beyond Vidhana Soudha, it would be most ideal if this defunct link road is revitalized in two ways.

The first proposal relates to the extension of this road across S.C. Road as a parallel to and to the South of Broad gauge Railway line till it meets Tank Bund Road near the City Railway station or platform road under bridge

or

To take this road as a Fly-over across both S.C. Road and broad guage Railway line at one and the same point. The fly-over road will have to be taken above P.F. Road near the crossing of defunct narrow guage Railway line and made to reach the ground level near the meter guage Railway under bridge.

Conclusion

All the above suggestion made are necessarily to be implemented in short, medium and long term phased programme for better traffic management and to enhance road safety situation of the city roads.

Simulation

By
Surendra S Ranbhise
Abcon Information Systems Pvt. Ltd.

Simulation can be defined as creating a computer model of a real or proposed system and conducting experiments on the model to describe observed behaviour and / or predict future behaviour before investing any time or money.

Experimenting on a real system could be costly and/or impractical and hence simulation has become an extremely important tool for designing and analysing complex systems; it is a cost-effective way of pre-testing proposed systems, plans, or policies before incurring the expense of prototypes, field tests, or actual implementations. In fact, many have come to view simulation as an inexpensive insurance policy.

Simulation modeling is an experimental and applied methodology that seeks to accomplish:

Describe the behaviour of systems,

Construct theories or hypotheses that account for the observed behaviour and

Use the model to predict future behaviour.

Simulation has a number of applications in the field of:-

Manufacturing

Transportation

Aerospace

Electronics

Logistics

Warehousing

Business Process

Communications

Rail roads

Waste management

Health Care

Fast food

Textiles

The following are some of the benefits associated with simulation:-

New policies, operating procedures, decision rules, organisational structures, information flows, etc., can be explored without disrupting ongoing operations.

New hardware designs, physical layouts, software programs, transportation systems etc., can be tested before committing resources to their acquisition and/or implementation.

Hypotheses about how or why certain phenomena occur can be tested for feasibility.

Time can be controlled: It can be compressed, expanded etc allowing us to speed up or slow down a phenomenon for study.

Insight can be gained about which variables are most important to performance and how these variables interact.

Bottlenecks in material, information and product flow can be identified.

A simulation study can prove invaluable to understanding how the system really operates as opposed to how everyone thinks it operates.

New situations, about which we have limited knowledge and experience can be manipulated in order to prepare for theoretical future events. Simulations great strength lies in its ability to let us explore "what if" questions.

Systems Modeling Corporation USA the pioneers in simulation have a powerful package called Arena which is a general purpose simulation package.

Arena simulation software creates animated computer models that accurately represent virtually any system. First released in 1993, Arena is a flexible and powerful tool. It has an Object-oriented design and the unique ability to be tailored to any application area.

Arena is also very easy to use; with its point and click interface and fill in the blank dialogue boxes, there is never a need for programming. Arena 2.0 is fully compatible with Microsoft Windows 95 and Windows NT.

With Arena, Systems Modeling pioneered the concepts of Application Solution Templates (AST), a collection of specific modules that tailor the product to each users particular needs. Other simulation packages simply don't have the flexibility that Arenas ASTs offer. For example, by changing the AST loaded into Arena, you completely change the focus of the product. And because the templates are industry specific, the concepts and terminology you work with are very familiar.

Arena incorporates all of the functions necessary for a successful simulation into one comprehensive environment.

The Input Analyser, allows you to take raw data (e.g., time studies on process breakdowns or historically based order level information) and fit a statistical distribution to it. This distribution then can be incorporated directly into your model. The output analyser, is a full-featured analysis tool that allows you to run a batch of simulations and analyze them at a later time.

For more information, please send us an e-mail at **ajit@giasbg01.vsnl.net.in**, call us at 2274 342, 2270 448, or send us a fax at (080) 2277 261.

ABCON INFORMATION SYSTEMS PVT LTD.
Corporate Head Quarter: 505-506, Brigade Towers,
135, Brigade Road,
Bangalore - 560 025

Status of Railways in Karnataka today and planning for the future to match the development plans of Karnataka

V.K. Agnihotri
General Manager, Southern Railway

Karnataka is one of the rapidly developing states in India with a population of over 4.5 crores spread over 20 districts. With the development of infrastructure, Karnataka has become the focus of industrial development in the country.

Taking advantage of the liberalised trade policy of the Government of India, Karnataka has cleared a number of power projects, steel and cement plants and other consumer goods industries in the state in the recent past, necessitating adequate transport infrastructure.

Railways play a vital role in the development of transport infrastructure, and consequently, economic growth of the state. Under the Uniguage policy, Railways have expanded the BG network in the State. This has resulted in quick and efficient transport of raw materials for the industries and movement of finished products, besides benefiting the travelling public. Rail infrastructure supports the following movement:

i) Coal for Mysore Cements/Ammasandra, Mysore Paper Mills/Bhadravathi, Harihar Polyfibers and other small scale industries and coke and iron scrap for M/s. VISL, Bhadravathi.

ii) Karnataka depends rather heavily on the central pool for foodgrain which is moved from Northern India by FCI and released at Whitefield, Krishnarajapuram, Tumkur, Maddur, Mysore Goods Terminal, Davangere, Shimoga Town and Hassan for distribution to various consumption centres in Karnataka.

iii) Chemical manure from Maharashtra and Tamilnadu is dealt at Whitefield, Mysore Goods Terminal, Davangere, Shimoga Town, Kadur and Haveri for distribution.

iv) Cement from Northern districts of Karnataka and Andhra Pradesh is received and released at Whitefield, Mysore Goods Terminal, Shimoga Town, Davangere and Hassan.

v) POL from Chennai Refineries and Cochin Refineries to Baiyyappanahalli, Devangonthi, Mysore Goods Terminal and Shimoga Town for distribution and also for Karnataka Electricity Board at Yelahanka.

vi) Export traffic in containers is operated by CONCOR from the ICD/Whitefield to Chennai, New Delhi and Coimbatore. This traffic is expected to grow multifold consequent on the establishment of international technology Part and Export Promotion Industrial Park (EPIP) at Whitefield near Bangalore.

vii) Karnataka is one of the largest exporters of granite. It is loaded at Kuppam, Bangarapet an Tyakal to Chennai Harbour.

viii) Karnataka has large deposits of iron ore, Manganese, Lime Stone and Dunite which are loaded at Sasalu, Amritapura and Tipture and Mysore Goods Terminal to various steel plants and also for export.

ix) The steel plants and related industries on the anvil in Karnataka has been given Rail Transport clearance for movement of raw material and finished products. Besides, iron & steel from Bhilai and Durgapur are released at Chennasandra for M/s. SAIL and TISCO and also at Baiyyappanahalli for small scale industries.

x) A number of power plants now being set up in Karnataka with Naptha and Coal as fuel to be moved from Chennai, Mangalore & Cochin have been given Rail Transport clearance.

xi) With regard to transport of passengers, Railways operated services to Chennai, Cochin, Salem, Trivandrum, Nagercoil, Mumbai, Gandhidham, Rajkot, Gorakpur, New Delhi, Secunderabad, Miraj, Hubli either from Bangalore or through Bangalore in addition to operating local services. With the improvement in the Railway network covering larger areas of Karnataka, there has been increase in demand for more services on the converted sections connecting important destinations.

xii) Bangalore has one of the largest number of military and Defence Research related establishments. It is also the largest base deploying military personnel and Civilian and Scientific personnel in defence

related works. Hence, there has been regular movement of military specials carrying military personnal/equipments from and to Bangalore.

xiii) With an International Airport coming up shortly at Bangalore, the tourism potential in Karnataka is likely to increase at a tremendous pace in the years to come. This will call for alternate rail connections to Goa, Cochin, Coimbatore/Nilgiris and other places of tourist interest to attract and promote domestic and international tourist traffic.

xiv) Bangalore with a population of about 46 lakhs is fast expanding. Hence, the development of a separate rail corridor for commuter traffic has also been recognised. Several schemes are on the anvil.

With the increase in industrial activities and establishments of major projects in Karnataka, Railways will be expected to stand up to the task of meeting the transport needs of various sections of society in Karnataka.

Keeping in mind the demands of the public and transport needs of Karnataka, Railways have implemented several schemes in the recent past which have far reaching implications for the development of Karnataka.

a) In a record time of 5 years, Railway were able to convert about 900 route kms. of track to BG in Karnataka area served by Southern Railway. Prior to this, Karnataka was predominantly served by the MG system with attendant deficiencies in services. With the progress of massive gauge conversion work in Karnataka, the BG net work has expanded to 1201 route km. and the MG has shrunk to 434 kms. Within the next few years, the residual MG section of Karnataka served by Southern Railway will be converted to BG.

   This has provided access to the entire Karnataka, barring a few stretches, from the BG net work of the country leading to quick transit without pilferage and damage and elimination of transshipment.

b) Electrification of the Jolarpet - Bangalore section has resulted in savings in transportation cost and paved the way for suburban corridor between Bangalore - Whitefield on AC traction in future.

c) Development of separate freight terminal and Inland container depot at Whitefield has helped both the Railways and public in quick movement and better service.

Various Proposals sanctioned for strengthening Railway Network in Karnataka

This subject can be handled under two heads- (i) Ongoing projects and (ii) Sanctioned surveys.

I **Ongoing Projects**

i) Conversion of 119 km. long Mysore - Hassan section to BG sanctioned at a cost of Rs.116 crores is in progress and is expected to be completed by September, 1997.

ii) Conversion of 236 km. long Arsikere - Hassan - Mangalore section at a cost of Rs.185 crores is in progress. The section between Arsikere - Hassan was commissioned for BG traffic in August, 1996 and the section between Hassan - Sakleshpur is expected to be commissioned by June, 1997.

   With these guage conversions, Mysore, Hassan and Dhakshan Karnataka districts will be integrated with the BG networks while providing BG access to other parts of the country from Mysore.

iii) Conversion of 61 km. long Mysore - Chamarajanagar section to BG and construction of 87 km. long new BG line between chamarajanagar - Mettupalayam has been sanctioned at a cost of Rs.175 crores. This project will provide a shorter BG link (by 330 kms.) to Coimbatore and beyond from Mysore, thus avoiding the circuitous route via Bangalore - Salem. Certain procedural approval are required before the construction of the line is taken up.

iv) Conversion of 98 km. long section between shimoga Town - Talguppa has been sanctioned at an approximate cost of Rs. 47.5 crores. With this conversion, Jog-falls, the tourist attraction near Talguppa will be connected on the BG.

v) Construction of 65 km. long line between Kottur and Harihar via Harpanahalli has been sanctioned at a cost of Rs. 65.9 crores. This line will provide an alternate route for movement of iron ore to Mangalore Port from Bellary belt in addition to serving the backward areas of Bellary district. The final location survey is in progress.

vi) Construction of 100 km. long BG line between Kadur - Chikmagalur - Hassan has been sanctioned at a cost of Rs.157 crores. This line will provide an alternate shorted route to Mangalore Port from Northern districts of Karnataka. This line will also serve the important tourist centres viz., Belur, Halebid and Coffee plantations of Malnad region which has no proper rail link. The final location survey is in progress.

vii) Construction of 166 km. long BG line between Bangalore and Hassan has been sanctioned at a cost of Rs.295 crores. This project will serve Bangalore, Tumkur, Hassan and Mandya districts of Karnataka. This line will also connect the important pilgrim spot viz. Shravabelagula with the rest of the country by rail. Final location survey is in progress.

viii) Construction of 260 kms. long BG line between Bangalore - Sathyamangalam has been sanctioned at a cost of Rs.225 crores. This line will serve Bangalore, Mysore districts and connect Chamarajanagar with an alternative route. The survey report has been submitted to the Railway Boards in May, 1997.

ix) Doubling of Bangalore - Kengeri - Ramanagaram sanctioned at a cost of Rs.68.5 crores, doubling of Yeshwantpur - Tumkur sanctioned at a cost of Rs.80 crores and quadrupling of Bangalore - Whitefield section at a cost of Rs.85 crores will strengthen the suburban corridor in and around Bangalore while providing additional capacity to move long distance passengers and freight trains on the section. The survey report has been submitted to the Railway Board in March, 1997

The Railway are committed to over Rs.1500 crores in project investment in Karnataka with a view to improve the infrastructure for passenger and freight transportation. This investment, it is felt, will go a long way in propelling growth and development in the State.

II SURVEYS

i) Preliminary engineering-cum traffic survey for BG line between Chamarajanagar and Mettur.

ii) Traffic survey for a new BG line from Tumkur to Davangere.

iii) Preliminary engineering-cum-traffic survey for a new BG line between Talguppa - Honavar

iv) Preliminary engineering-cum-traffic survey for a new BG line between Dudda - Tiptur.

v) Preliminary Engineering-cum-traffic survey for a new BG line between Davangere Bhadravathi.

vi) Preliminary Engineering-cum-traffic survey for doubling of Bangalore - Mysore section.

vii) Reconnaissance Engineering-cum-traffic survey for doubling of Bangalore - Mudigere - Sringeri.

viii) Reconnaissance Engineering-cum-traffic survey for a new BG line between Mudigere - Channarayapatna via Holenarasipur - Mercara.

ix) Reconnissance Engineering-cum-traffic survey for a BG line between Kushalnagar - Channarayapatna via Kunnanur.

x) Reconnaissance Engineering-cum-traffic survey for a new BG line between Nanjankod - Badagara via Vyitri/Puzhithod.

The above project lines when completed after survey and sanction will provide adequate transport infrastructure in Karnataka and develop backward areas and link the interior areas of the State such as Kodagu which is yet to be provided with a rail link.

RITES Contribution in Development of Transport Infrastructure of Karnataka with Focus on Future

By
S.R. Agarwal,
General Manager (Airports),
RITES, New Delhi

Karnataka is one of the promising states on the economic map of India and evidently the preferred destination for multinational companies and NRI's willing to settle and invest in India.

The State of Karnataka gifted by moderate climatic conditions, fertile land and picturesque locations, is known for unlimited tourism potential. Karnataka is known worldwide for its unique craft, silk, handlooms and sandalwood. Over a period of time Karnataka has emerged an clear leader in electronic, computer, aerospace technology and has abundant technical manpower.

According to the study conducted by Center for Monitoring Indian Economy, Karnataka is the leading State in inviting fresh investment proposals in the state. Needless to mention that, with above potential and tremendous economic growth, compatible infrastructure support is the need of the hour. It may be surprising that Karnataka state which has been able to invite maximum of investment in the country is rated tenth in terms of infrastructure as per the latest statistics.

Thus, having already gained leadership on industrial front the State of Karnataka has an ever increasing demand for growth of transport infrastructure to keep pace with the demand of industrial and economic development. It may be of interest to note that according to OECD figures, an economic growth of 1 percent demands an increase of 1.5 percent in the number of kilometers travelled and three percent in good transportation.

RITES, a Government of India enterprise, came into being in 1974 with the objective of providing consultancy services in the field of rail transport infrastructure. RITES later in year 1968 diversified to provide consultancy services in total transportation sector. Presently, RITES is having expertise and experience in various areas of transport infrastructure and providing consultancy services in Highways, Ports, Airports, It's Inland working experience is spread over 39 countries in Latin America, Africa, Gulf and South East Asia. A long list of reputed clients both in India and abroad stand testimony to RITES capability in the various fields of transport infrastructure. Karnataka being no exception.

Karnataka being one of the few states who have realized that infrastructure development is an essential pre-requisite for development of the state and has associated RITES for its various transport infrastructure development projects. RITES, as transportation consultants have executed many prestigious projects in Karnataka during the last decade.

HIGHWAYS

The geographic and social conditions of Karnataka demands all types of transportation systems such as railways, ports, roadways, and airways. Amongst these, roadways is the most prominent and dependable mode of transport, and acts as arteries for connecting and developing the far flung areas of Karnataka. Realising the demand the plan drawn for 1982-2001 for Karnataka caters for:

National Highways	-	3836 kms.
State Highways	-	12000 kms.
Major District Roads	-	22500 kms.
Rural Roads	-	106318 kms.

RITES' contribution in achieving the above objectives and overall improvement of highway net work is an under:

* State highway - 42: Ankola-Hubli-Bellary section (342 Kms.) techno-economic feasibility study and detailed engineering (1988 - 1990). The report was prepared for funding by Asian Development Bank.
* Project management and quality control for strengthening and widening of State Highway - 42 : Ankola - Hubli section 132 Kms (1991 - 1995) with the cost of Rs.95.00 crores, funded by ASCB.
* Detailed project preparation for the bridge over Netravati river (10 spans of 38.5 m each).
* Pavement management system for national highways in Karnataka in association with RP&T, U.K. the objective of creating a system by which likely development, maintenance an rehabilitation measures for highways can be taken up with optimum utilisation of funds available. This project is also funded by Asian Development Bank.
* Project studies for outer ring road at Bangalore under Mega city project.
* Ring Road survey of Bellary under Urban Development Authority.

RAILWAYS

Railway is the most appropriate mode for bulk goods transportation like ore, coal etc.. Rail being a central subject the planning and development of railways is done under central budget. However, facilities like railway sidings to connect the main railway network to the users and for continuous supply of raw materials like coal to the thermal plants has to be created by the users. RITES' cosultancy expertise to internationally recognised services for providing sidings. Some of the projects handled by RITES in Karnataka State are given below:

* Railway siding for transportation of LPG from Mangalore Refinery to Panambur Railway yard for HPCL. The cost of the project is around Rs.1000 Lakhs. The project is nearing completion.
* Project Management for railway siding for transportation of coal fro generation of power at Richur. The cost of the project is around Rs.500 Lakhs. The project was completed and the rising is under operation for KPCL.
* Provisions of earthwork for railway siding to facilitate tank wagon loading at Irumpanam costing around Rs.300.00 Lakhs for transportation of petroleum products for RPCL.
* Feasibility studies for improvement of railway infrastructure:
  - Provision of railway siding at Willington Island, Irumpanam, Devangunti, Hassan and a New Mangalore Port for transportation of petroleum products.
  - Provision of railway siding at Padubidri for transportation of coal for the proposed 2 x 500 MW power station and for transportation of Naptha for the proposed 100 MW power plant at Kumarapatnam.
* Consultancy services to Konan Railway in survey, environment studies and quality control.

AIRPORTS

The development of air transport in the state of Karnataka is not only significant from the point of passenger traffic but also for cargo transport. Karnataka is now a leading state in manufacturing electronic equipment which generally has high value to weight ratio. The transport of such cargo by air makes economic sense.

Development of airports gives greater flexibility in transportation. While a road or rail line can connect only the place located along it, an airport connects a city to any number of places. Thus the development of minor/feeder airports may not only be feeding the hub but may also provide the quicker and smoother transportation to various other parts of the country.

RITES have gained recognition internationally as a leading airport consultants of Indian and have association for rehabilitation and development of airports in the state of Karnataka.

* Evaluation of HAL Bangalore airfield pavement for certification of their pre/post construction strength, predicting residual life and recommending rehabilitation measures using most modern non-destructive equipment(owned by RITES).
* Planning, design and project management for rehabilitation of runway, taxiway and apron for HAL Bangalore Airport.
* Master planning and design of taxiway network and cargo apron. Based on the plans developed by RITES the project is in progress and RITES in assisting HAL in quality assurance.
* Feasibility study for development of new runway at Mangalore Airport (Airports Authority of India).
* Feasibility study and pavement evaluation for rehabilitation and extension of runway at Belgaum.

The State Govt. of Karnataka has realised the need of creating a network of minor/feeder airports within the state to give boost to the already demanding economy of the state. Towards this aim, RITES were retained consultants for carrying out feasibility study of the following four airports by KSIIDC in the first phase:

- Mysore
- Hubli,
- Hassan and
- Bellary

In the second phase, study of three more airports namely Gulbarga, Raichur and Bijapur is proposed to be taken up ad other of which the study at Gulbarga will be taken up shortly.

The reports submitted by RITES are well received by the state Government. KSIIDC intends to develop airports at Mysore, Hubli, Bellary and Gulbarga with private sector participation on BOT basis, with the assistance of RITES.

PORTS

Karnataka state has one major and nine intermediate/minor ports dotted on her maritime coastline of 155 nautical miles. Govt. of Karnataka has formulated port policy for development and operation of ports under its control through involvement of private sector.

* Development of Karnataka state ports through private investment (KSIIDC). Based on the study of RITES ports at Karwar, Bele Keri and old Mangalore have been identified for development. The port projects are being offered on Build, Operated, Share and Transfer (BOST) arrangement.
* Land and Water front allocation study for new Mangalore port trust (Ministry of Surface Transport).

FUTURE SERVICE AREAS

The lack of infrastructural support is a cause of concern nationwide and in view of the huge investment required for developing transport infrastructure, the Govt. has acknowledged the need to encourage private sector participation including foreign investors for rapid growth of infrastructure. If Karnataka has to really March ahead, proper use of technology as effective instrument of growth becomes an imperative strategy. RITES with their experience of working in the state of Karnataka can be very effective in the infrastructure development of the state in future.

RITES are fully aware of the demands of new liberlised climate in the country and the state of Karnataka and thus are in a good position to facilitate the state's efforts in inviting private participation in their future projects on BOT/BOLT/BOST basis.

Power Development in the next decade and further, Role of Karnataka Power Corporation Limited

By
Sri K.Jairaj, IAS
Managing Director,
Karnataka Power Corporation Limited

INTRODUCTION:

India being one of the largest developing countries aspires to march towards better economic future. The ever growing industrial demand has made power planners to leave no stone unturned and no avenue unexplored to exploit the resources for power generation.

This paper is on the capabilities of Karnataka Power Corporation Limited (KPCL), its future plans and the power scenario of Karnataka for the next decade and further.

Karnataka Power Corporation Limited:

Karnataka is one of the leading industrial states in India contributing four percent of national production in the industrial sector. KPCL which was formed in July 1970 represents the systematic endeavour of the State Government to meet the ever-growing needs of power.

Karnataka has been one of the pioneers in generation of power. In fact, Asia's first major hydro-electric plant was set up at Shivasamudram in 1902 with what was then the World's longest transmission line of 147 km.

The rapid industrialisation that took place however, brought about a change in Karnataka's power scenario. From a power rich State it found itself power deficient

KPCL has taken up the challenge to meet the ever increasing need for electricity. KPCL has an installed capacity of 3172 MW (hydro=2330 MW, thermal=840 MW and wind = 2 MW). Three major hydroelectric stations with a total capacity of 2090 MW (Sharavathy=1035 MW, Nagjhari = 825 MW, Varahi Underground PH=230 MW) and thermal station at Raichur with a total capacity of 840 MW have been successfully commissioned by KPCL.

KPCL has been executing the following projects, the generating units of which are proposed to be installed in a phased manner and all of them are expected to be completed by the turn of this century. These projects will wazzu add about 948 MW to the State's installed capacity (hydro=528 MW, thermal=420 MW).

Hydroelectric Projects:

Kadra	=	3 x 50 MW = 150 MW
Kodasalli	=	3 x 40 MW = 120 MW
Gerusoppa	=	4 x 60 MW = 240 MW
Bhadra	=	1 x 6 MW = 6 MW
Brindavan	=	2 x 6 MW = 12 MW

Total hydro = = 528 MW

Thermal :

Raichur Thermal Power Station
(units 5 and 6) = 2 x 210 MW = 420 MW

Power situation in Karnataka:

The forecast of demand for power and energy is being made regularly by the Central Electricity Authority. The forecast as per the report of the

15th Annual wazzu Power Supply Survey in India of CEA, for Karnataka for the next 10 years is as follows:

Year	Peak Demand MW	Annual Energy Demand MU	MU/day
1997-98	4286	24516	67.16
1998-99	4591	26300	72.05
1999-2000	4859	27879	76.17
2000-2001	5141	29543	80.94
2001-2002	5422	31208	85.50
2006-2007	7202	41763	114.42

The growth rate is approximately 6% per annum. Thus assuming the same growth rate, the demand for peak load and annual energy would be about 9000 MW and 53000 MU by the year 2010 which requires enhancement of the present installed capacity by approximately three times in a span of next 13 years.

The present situation of availability of peaking capacity and annual energy in case of normal monsoon for the year 1997-98 would be as follows:

	Installed capacity MW (As on 1.4.97)	Gross generation per annum MU
1. KPCL stations:		
Hydro	2330	8442
Thermal	840	5540
Wind	2	4
Total	3172	13986
2. KEB stations		
Hydro	221	365
Diesel	128	770
Total	349	1135
3. Central projects (share)	729	4370
TOTAL	**4250**	**19491**

	Peaking Capability MW	Net energy MU
KPCL+KEB stations		
Hydro	2219	8719
Thermal	756	4986
Diesel	122	735
Wind	2	4
Total	3099	14444
Central share	729	4370
Total Availability	**3828**	**18814**
Demand	**4286**	**24516**
Deficit	**458**	**5702**
% Deficit	**10.7%**	**23.3 %**

Note: Peaking capability has been computed after allowing 10% for auxiliary consumption for thermal stations, 4.5% for auxiliary consumption for diesel station and 13% for hydro stations (3% maintenance, 9.5% forced outage, 0.5% auxiliary consumption). The net energy availability has been computed after allowing 10% for auxiliary consumption for thermal stations, 4.5 % for diesel station and 1% for auxiliary consumption for hydro stations.

Development of non-conventional energy sources by KPCL:

KPCL has successfully entered into the field of power generation through non-conventional energy sources like, wind, solar, etc. The first wind power project executed by KPCL under grant from the Ministry of Non-conventional Energy Sources (MNES), at Kappatagudda has 9 wind energy generators each of capacity 225 kW (total capacity = 2.025 MW). The annual energy generation during 1996-97 at the very first year has been 4.35 MU which is well above the targeted generation of 4 MU. KPCL has proposed to take up several wind power projects under subsidy from MNES in the next 2-3 years.

A demonstration SPV (Solar Photovoltaic) power project with an installed capacity of 100 kW is also being installed by KPCL in the colony of Raichur Thermal Power Station.

Change in Government policy for power sector:

It is noted by the Government of India that the requirements of the future expansions and improvement of power sector to match with the growing demand for power cannot be fully achieved through public resources alone and it is essential to encourage private sector participation in generation, transmission and distribution. Accordingly, a number of independent power producers (IPP's) have already entered the field of power generation.

In Karnataka, a small hydroelectric station with an installed capacity of 2 x 9 MW has already been set up by an IPP. Several hydroelectric stations are under execution by IPP's. Further, a major thermal power station with an installed capacity of 1000 MW near Mangalore is on the anvil by M/s Cogentrix. Memoranda Of Understanding (MOU) have been signed for several thermal projects with a total installed capacity of 1800 MW. About 26 thermal power projects with a total installed capacity of about 3400 MW have been allotted to IPP's. Mini and small hydro power projects of a total capacity of about 400 MW have been allotted to IPP's which are under various stages of execution. About 15 wind power projects of total capacity of about 70 MW have been allotted to IPP's. Thus, the power scenario for the next decade much depends upon the progress made by these IPP's in execution of all the

above power projects and a capacity addition of over 6000 MW could be optimistically anticipated by 2010 which will mitigate the power deficit by a very large extent.

Role of Karnataka Power Corporation Limited:

In the changed environment of power sector where power generation has been opened to private power producers, KPCL has also brought necessary improvement in the organisational setup and resource mobilisation and is competent to bid with IPP's for allotment of projects. KPCL is all set to execute power projects on par with private developers.

KPCL being one of the premier organisations of the country with an experience of over 26 years in investigation, design and execution of both hydro and thermal power projects, with the advent of IPP's in the field of power projects, KPCL has expanded its activities in the field of offering consultancy services for investigation, design and execution of power projects. All the required expertise and infrastructure is available with KPCL which already has made headway in the field of consultancy. KPCL is executing the power projects on turn-key and EPC (Engineering, Procurement and Construction) basis for the IPP's. The consultancy wing of KPCL which is one of the very few such full-fledged organisations in the country is the most well established organisation in the State thus forming a vital infrastructure for the private power developers in Karnataka.

An overview of Infrastructure Projects in Bangalore Region

by
P.S.S. Thomas
Metropolitan Commissioner,
Bangalore Metropolitan Region Development Authority & Managing Director,
Karnataka Urban Infrastructure Development and Finance Corporation.

BANGALORE AND ITS SURROUNDING AREAS

Bangalore Metropolitan Region

There are two zones outside of the Bangalore Urban Agglomeration (ie, outside the BDA limits), which have been identified for special attention. BMRDA was created by a special enactment in the year 1985. BMRDA has a large jurisdiction, an area of 8760 sq. kms. consisting of the two districts of Bangalore Urban and Bangalore Rural, and Malur Taluk of Kolar District. BMRDA, whole entrusted with the task of ensuring orderly growth in the Metropolitan Region, however, is not an 'Urban Development Authority' in the mould of BDA and the other UDAs established under the Karnataka Urban Development Authorities Act. Its functions have been limited to preparation of structure plans, and some amount of regulations of new developments. It may be argued that in such a large area, no 'master plan' on the pattern of the comprehensive Development Plan can meaningfully be prepared. However, the BMRDA has adopted the regulations under the CDP initially. It may be expected that in due course regulations more specific to the BMRDS's own zonal priorities and concerns would be developed. BMRDS's activities do not include provision of infrastructure. The Metropolitan Region now has separate Planning Authority who are responsible for detailed planning and regulations in pockets such as the new airport area, Ramanagaram-Channapatna, and Nelamangala. This would ensure that adequate attention is given to the growth being experienced in pockets of faster growth and urbanization within the Metropolitian Region BMRDA plays a role in ensuring uniformity of approach in regulations and planing in the different parts of the Metropolitan Region under the local planning authorities.

The absence of comprehensive planning for infrastructure in the Metropolitan Region is for a Two-fold reason: firstly, there is no clear growth center with limited geographical area where growth is focussed; to provide infrastructure in the entire region would be impractical. Hence the need to focus growth in a determinate areas such as the new airport area, or Nelamangala, or the Ramanagaram-Channapatna area. Secondly there are few resources. BMRDS does not levy charges which are levied by the BDA, for instance. The deficiency can only be overcome by bringing growth centres such as the new airport area, under total planning under the Karnataka Town and Country Planning Act.

The Bangalore Sub-Region

The second areas of influence of the City is even larger. The new concept of the Bangalore Sub-Region, first developed in the Report prepared for the Asian Development Bank which is now being implemented as an infrastructure project for Mysore, Tumkur, Ramnagaram and Channapatna towns, is being further studied through a consultancy currently in progress. The Bangalore Sub-Region consists of the district of Bangalore Rural, Bangalore Urban, Kolar, Tumkur, Hassan, Mandya, and Mysore. A comprehensive plan for decentralization of growth away from Bangalore city is expected to emerge out of this study, which is due to be completed by mid-1998. Again, an infrastructure project for the Metropolitan Region or the Bangalore Sub-Region, would require large-scale financial assistance, possibly from a multilateral lending agency such as the World Bank or the Asian Development Bank.

INFRASTRUCTURE IN BANGALORE CITY

Some of the projects in the private sector having a significant bearing on the city are the MRT (elevated light rail system), the new airport, and the Bangalore-Mysore Expressway. The Cauvery Stage IV which has been approved in a major public investment in infrastructure. These by themselves are by no means the total answer to the city's needs.

Provision of adequate civic amenities and infrastructure to match the growing needs of cities appears to be a distant dream for most Indian metropolises. Growth of the city means increasing private sector investment - in housing (including slums - the proportion of slums being anywhere between 20% of the total population as in Bangalore, to 50% as in Mumbai); private vehicles; factories and commercial establishment; recreational establishments. On the other hands provision of affordable housing, roads,

public transport, water supply, electricity, garbage collection and other services, continue to lag behind the demand. Private investment in infrastructure is yet minimal. *Shortage of infrastructure evidently means that the public investment does not keep pace with the growth of private investment of the kinds mentioned above.* Infrastructure in Bangalore is a case in point.

What makes the situation more remarkable, is evident importance of urbanization economic growth. Urbanisation is occuring at a fast pace in all Asian countries. Urban centres account for a large proportion of non-agricultural employment. Their productivity and contribution to the GDP is on an average significantly more than that of the rest of the population. They are important for the contribution they make to the state exchequer. Inspite of these fact, there appears to be a reluctance to provide adequate infrastructure to the cities, which will, in the long run, turn out to be an impediment to economic growth of the state itself. The most important reason for the inadequacy of infrastructure is the insufficiency of resources, followed by inadequacy in planning and execution of infrastructure projects. There is need to look closely at these issues and take corrective action.

DECENTRALIZATION OF GROWTH

State Government have accepted decentralisation of growth away from Bangalore as a priority. In pursuance of this policy, Government are now implementing the project for provision of infrastructure in alternate growth centres and countermagnet towns, under the Karnataka Urban infrastructure Development Project. The project outlay is US $ 105 million, and covers water supply and sewerage, city roads and bye-pass roads, residential sites, industrial area development, slum improvement, drains, solid waste management etc, The projects commenced towards the end of the year 1996, and will be completed within 4 to 5 years. This would be a major effort to make it attractive for investors and job-seekers as well as migrant population, to move to cities other than Bangalore, and thus ease the pressure on the capital city. Apart from physical infrastructure, the project includes measures for resource augmentation, and municipal capacity building for civic services.

The Sub-Regional Plan now under preparation would further help to identify growth centres, and is expected to be the bases for further assistance for urban development in this part of the State.

MAGACITY SCHEME - A PROJECT FOR INFRASTRUCTURAL DEVELOPMENT IN BANGALORE CITY

The Centrally sponsored project of Megacity has helped to commence some important works in the City. Investment which had lagged for want of resources have now become feasible. The Projects being financed include improvements to the water supply system for more equitable distribution at a cost of about Rs.45 crores, shifting of the iron and steel market from city centre to the outskirts, establishment of a truck terminal on Hosur Road, establishment of perishable goods' markets in the peripheral areas, further work on the intermediate and outer ring roads which had been languishing for many years, construction of flyovers (Grade Separators) at Sirsi Circle and Richmond Circle, construction of new crematoria, development of parks at Tavarekere and Mathikere, restoration of Kempambudhi Tank, slum improvement, pedestrian subways, and a commercial complex at Madivala. The participating organisation are the Bangalore City Corporation, Bangalore Development Authority, Bangalore Water Supply and Sewerage Board, Bangalore Transport Service, Karnataka Slum Clearance Board, Department of Agricultural Marketing, and the Karnataka Industrial Areas Development Board, with the KUIDFC acting as the nodal agency. It is expected that the ultimate size of the investments which will include grade separators at three more major traffic intersections among others, would add up to about Rs. 750 crores. Out of this, the works already approved total to Rs. 372 crores. It is expected that the project life will be extended to the 9th five year plan period to facilitate planning, resource augmentation, and execution of the important works under the Magacity project in the city. As the project is a loan scheme, there would be need to raise the debt-servicing abilities of the participating organisations.

SUMMING UP

Infrastructural planning and resource moblization are the two key requirements for development of infrastructure. State government determines what the sources of municipal revenues are, including the tariff and other resources of parastatal bodies such as the BDA, BWSSB, BTS and KEB. Government also largely decides the basic features of administration since most policy issues are decided by the Government, and important functionaries in these bodies are state appointees. Considering the growing dissatisfaction with the state of infrastructure in Bangalore city, there is need for the Government to take a close look at its polices in respect of the infrastructural organisations.

Health Care Infrastructure for Development
Karnataka

By
Dr. C.M. Francis, *M.B.B.S., Ph.D (Cambridge)*
Dr. Ravi Narayan, *M.D., DTPH (Lond), DIH (UK)*
Community Health Cell, Bangalore

"Health and sustainable development are inter-linked", -
Brundtland, Gro Harlem. Address to World Health Assembly, 1988

"Without good health, individuals, families and communities and nations cannot hope to achieve their social and economic aspirations" - Health For All for the 21st Century,
World Health Organisation, Geneva, March 1997.

What is the status of health of the people and health care infrastucture in Karnataka? Is it conducive to development?

Factors affecting health of the people

Many factors play a role in determining the health of the people

- Food and nutrition, adequate in quantity and quality
- Safe water supply and sanitary disposal of waste
- Quality and extent of coverage of health care services
- Education, particularly female education
- Improved purchasing power with equity
- Housing and shelter
- Clean air, water and soil and quality environment

There is need for intersectoral action for health.

Health problems

If we consider the health of the people of the whole of India, Karnataka is an average State. If we consider our neighbours Kerala and Tamilnadu, Karnataka lags behind. All the health indices are worse. Further, there are great disparities between the districts within the State, with respect to Health and Health Care Services and development. While Bangalore, Dakshina Kannada, Mandya and Shimoga are better off, Bellary, Bidar, Bijapur, Gulbarga, Raichur and Tumkur are worse off.

Existing health problems

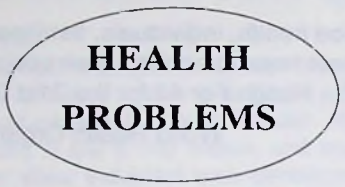
The major existing health problems are microbiological (gastro-enteritis, diarrhoeas, acute respiratory infections and other communicable diseases), malnutrition, inadequate basic services (such as water supply, sanitation and waste disposal, health care) and pollution.

Evolving health problems

Industrial growth and urbanization bring on more problems. The most important is pollution. Related to this are micro-chemical problems. An area of growing concern is psychosocial. This is shown by the climbing suicide rate, increasing violence and crime, drug abuse, alcoholism, stress and anxiety and increasing incidence of diseases of heart and blood vessels. Added to this is poor housing and shelter.

The two sets of problems have additive effects. All of them lead to lower productivity, increased absenteeism at work and poor quality of life.

Tackling the problem helps to enhance productivity and development.



Infectious Diseases

While many countries have been able, or are on their way, to control infectious diseases, the situation in India (including Karnataka) is different. There is progressive deterioration over the years. Control of communicable diseases has shown a negative trend in Karnataka. A few examples are given.

	Number of cases	
Year	1990	1993
Gastro-enteritis	8,565	36,206
Acute respiratory infections	4,23,803	8,96,076
Malaria 70,012	1,96,466*	

*Smear positive. There is significant increase in P.falciparum infection.

"State still caught in the grip of gastro-enteritis wave".

"Out of 16 water samples collected, 10 were unfit for human consumption".
___ Dr. G. Rangaswamy, Joiont Director, Directorate of Health and Family Welfare, Karnataka as quoted in Indian Express, Bangalore, May 14, 1997.

Other major infectious diseases

Tuberculosis continues to take its heavy toll. Karnataka, as most other States in India, has failed to control it. The new method of treatment, Directly Observed Treatment Short Course (DOTS) is being tried. Whether it will make a better impact is to be seen.

In 1993, 41,786 cases and 537 deaths from pulmonary tuberculosis have been reported from the State. If the percentage distribution of deaths by major groups is considered, 'coughs' accounted for 19.7%. Of these, TB of lungs accounted for 29.4%

HIV/AIDS : The number of persons infected with Human Immuno-deficiency virus and progressing to Acquired Imune Deficiency Syndrome is alarmingly increasing. It is the major

emerging disease. The combination of tuberculosis and AIDS is the greatest threat to public health, killing the young adults in their productive life.

Diseases peculiar to Karnataka : Handigodu syndrome (a permanently crippling genetic disorder) and Kysanoor Forest Disease (commonly known as monkey disease) are special for Karnataka.

Urbanization ; migration ; slums

Uncontrolled urban growth leads to spread of infectious diseases and other health problems. The growth is mainly of slums with all attendant social and health problems. Urban overcrowding and poor working and living conditions can lead to anxiety, depression and chronic stress. Changes in family structure and living arrangements have significant impact on peoples' health and their capacity to cope with health and social problems.

Karnataka is more urbanized than the Indian average.

Ratio of urban population to total (%) = 1991 Census

India : 25.70
Karnataka : 30.90

A few centres in Karnataka are growing very rapidly. The decennial growth rate has been 39.9% in Bangalore, 39.1% in Mangalore and 36.2% in Mysore.

Growth of towns and cities strain the health care services but it has an advantage also; delivery of services can be more efficient if planned properly and the plans are implemented.

Industrialisation can help in alleviating poverty and improve health. but, Industrialization without proper consideration of posible impact on the health of the people, can lead to deterioration of the workers, their families and the community.

Types of industries

The type of industry has an effect on the health of the people. Distinguish between one kind of industry and another. Choice of socially appropriate technology and promoting such industries lead to better qualitative development.

Plastic industry

Tests done in Britain, Australia, New Zealand and Taiwan in recent years have shown that toxic chemicals in plastics can leach into a wide range of foods from plastic packaging materials - Utusan Konsumer, 1996.

Toxic waste recycling

There is a tendency to transfer 'dirty' (meaning most polluting) industries to less developed countries. Government had declared itself against dumping of toxic waste by the developed countries. But now the opposite is being done. An example is the Bharat Zinc plant near Bhopal (Bhopal again?), which is recycling hazardous waste shipped from Germany and Holland chiefly.

Granite quarrying and stone crushing

This is an industry present very much in Karnataka. It leads to silicosis and other respiratory conditions.

Silk reeling and powerlooms

The industry produces dust and other particles. There is also noise pollution.

Every type of industry has some social/health costs that have to be minimised by built in safety/preventive provisions. It is important that the plans of development that evolve must

include health and environmental impact assessments as an integral part of the planning/management process. The unintended health and social consequences of economic development should not become counter productive to sustainable development.

According to size

Larger units are often healthier because it is easier to "police" them. But large industries have greater clout and may get away with greater violation of the rules. Also, large industries may contract out "dirty and dangerous" work.

Smaller industries are desirable on economic and social considerations. They are also happier places to work.. The psychosocial factors are better. The morale is high. Small industries use batch processing, whereas large factories often use automated flow processes or the conveyor belt system of production. Health hazards are considerable. If we can organize preventive health services, small industries will be better suited.

Cottage industries are satisfying. But the environmental sanitation and working conditions (ventilation, heat and light) are often apalling. There may be high morbidity related to respiratory diseases, accidents and heat exhaustion.

Infrastructure for industrial development

There is need for development of supportive infrastructure : transport and communication, power and increased availability of water, leading to additional demands on improved water management and waste disposal. All these dimensions of infrastructure also have their social costs and health consequences, not always positive. Poor quality road infrastructive and uncontrolled / unregulated transportation leads to increased road traffic accidents and injuries. Power plants add to pollution of air, water and soil unless properly regulated. Poor water management increases vector/mosquitogenic potential and causes the ill-effects of poor environmental sanitation.

Environment

Adoption of sustainable development policies, whether industrial or agricultural, which seek to conserve, protect and restore the health and integrity of the earth's ecosystem is essential for health. Environmental protection and health promotion are inseparable. This is the challenge to all development planners and decision - makers.

The environment has a tolerance limit, beyond which it will not be able to sustain life and health. Meddling with the environment without thinking of the adverse effects for some immediate economic gains in the name of development leads to disaster. Our activities should not irreparably disrupt the health and stability of the ecosystem.

Pollution

Pollutants of various kinds are thrown into the environment. The pollutants emitted from factories and vehicular exhausts are poured into the atmosphere, river and soil, adding on to the pollutants due to burning of domestic fuel, waste and other human activities. This double burden can cause breakdown of the ability of the environment to cope with them.

Air

The main cause of pollution is vehicular and industrial emissions, the primary components being hydrocarbons, carbon monoxide, and oxides of sulphur and nitrogen. Lead contamination occurs due to lead in petrol. Symptoms of lead poisoning in children in Bangalore has become a cause for worry. Air pollution can cause diseases like chronic bronchitis. Reeling of silk, a common activity in Karnataka, can cause dust and fibres being inhaled. Spraying with pesticides and insecticides can be hazardous.

Water

The natural cycles of hydrology may be affected by our 'developmental' programmes. Contamination due to industrialization -distilleries, textile industries and organochemicals - occur frequently; so also, microbiological contamination can occur. Contaminated water causes gastro-intestinal disorders. Granite quarrying, carried out extensively in Karnataka produces dust, which gets into the air and water systems , affecting the health of the people.

Building of canals for irrigation can lead to mosquito breeding, if precautions are not taken; so also stagnant waters in ponds, cisterns and other places.

Soil

Excess use of pesticides, herbicides, fungicides and other chemicals affect the soil. Human activities like construction may remove the top soil.

Noise

Constant loud noise of particular frequencies can produce deafness to those frequencies. This can occur in people involved in the powerloom industry.

Karnataka State Pollution Board

The Board is expected to ensure compliance with the various pieces of legislation, designed to control pollution.

The Water (Prevention & Control of Pollution) Act, 1974.
The Air (Prevention & Control of Pollution) Act, 1981.
The Environmental Protection Act, 1986.

The Board is also the implementing authority under the Hazardous Waste Management Rules, 1989.

The Board, with its headquarters at Bangalore, has 11 Regional Offices, a Central laboratory and Regional Laboratories.

The effectiveness of the Board has been limited. Even where the board wishes to take action for the improvement of the environment, it has often found its hands tied. Prosecutions, when launched, may not lead to results. There are delays and court rulings in the majority of cases had gone against the Board. But recently, the courts in the State and at the Centre seem to be seized of this problem.

There is need to forbid production of toxic chemicals, rather than limit its release into air and water. Factories must adopt environmentally sustainable production processes. Pollution must be seen as an economic waste; resources are being used inefficiently.

Bhopal Disaster

It is within our memory the worst human made disaster in history - the Bhopal tragedy.

Molasses leakage

"30,000 in 56 villages affected by molasses leak, Kampli town worst hit" - Indian Express, Bangalore, May 14, 1997.

Polluted molasses containing hazardous chemicals leaked into the Thungabhadra river, when the tank of the sugar factory burst. Kampli town, which depends on Thungabhadra river for drinking water suffered most.

Injuries

Accidents and injuries lead to death and disability in increasing measure in recent years. These result from rapid urbanization, motorisation, industrialisation and changing lifestyles. A number of social factors contribute:

* migration into cities
* large scale construction activities
* import of machines, without safety devices
* lack of safety measures: road, home, worksite, playsite
* problem of alcohol and drugs
* increase in violence and crimes
* steep increase in number of vehicles
* adverse road situation
* meagre facilities to attend to accidents

The estimated number of deaths annually in Karnataka from injuries is about 56,000 and about 10 times this number would suffer from disabilities.

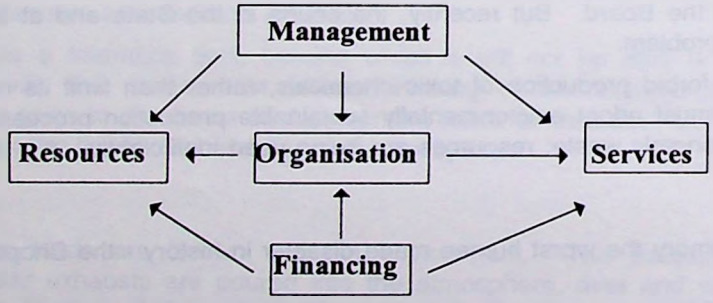
Causes of injuries : Bangalore : percentage

Road traffic accidents	:	51.6
Violence	:	27.0
Domestic falls	:	10.8
Burns	:	5.1
Industrial Injuries	:	3.2
Fall of objects	:	1.1
Others	:	1.2
Total		100.0

Motor vehicle injury rates have been on the decline in different parts of the world. But in Karnataka, the rates are increasing. There is need for scientifically designed, culturally appropriate and economically feasible strategies based on epidemiological analysis of traffic injuries. These must be adapted for pedestrians, two wheelers, cyclists, cars, buses and trucks.

Health Care Infrastructure

The health system needs an infrastructure to make available health care services. It has many components :



There are many factors which play upon the health infrastructure and modify health.

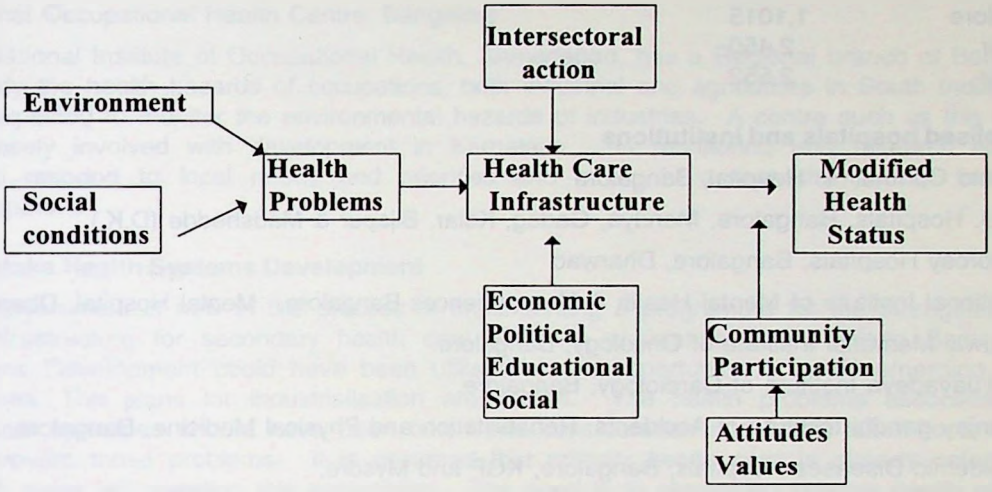
Resources : Technical and skilled personnel
Building and equipment
Drugs and Supplies
Scientific knowledge and technology

Finances : Government : State, Central, Local
Voluntary Contributions
Insurance

Private : Individuals, families, communities

Management : Planning, Communication, Coordination
Regulation, Supervision
Delegation of authority and responsibility
Monitoring and Evaluation
Community Participation

There are many factors which play upon the health infrastructure and modify health.



Health Care Facilities

The health care facilities in Karnataka are not adequate. There is need and scope for improvement. The financial allocation by Government is not sufficient. Even the amount allocated is not utilized efficiently.

The Voluntary sector is tending to become stagnant. The dynamism and growth seen earlier are lacking now.

The private-for-profit sector shows a different trend. There is increase in the larger, tertiary care hospitals, utilizing costly technology. They are situated in the cities and, to some extent, in the larger towns.

Primary Health Care (Government)

Primary health centres	:	1,253 (1994)
Sub-centres	:	7,793
Primary health units	:	621
Community health centres	:	146 (1990)

Hospitals (as on 1.1.1991)

		Karnataka	Kerala	Tamilnadu
Number	rural	25	2328	89
	urban	263	596	319
Beds	rural	2,526	37,589	4,235
	urban	31,951	32,490	44,545

Population served per hospital bed

Karnataka	:	1,311*
Kerala	:	427
Tamilnadu	:	1,139

* There is wide disparity in the number of hospital beds in the various districts : (Examples) :

District	Population per hospital bed
Mysore	935
Bangalore	1,1015
Tumkur	2,450
Raichur	2,552

Specialised hospitals and institutions

- Minto Ophthalmic Hospital, Bangalore
- T.B. Hospitals, Bangalore, Mandya, Gadag, Kolar, Bijapur & Madshedde (D.K.)
- Leprosy Hospitals, Bangalore, Dharwad
- National Institute of Mental Health & Neurosciences-Bangalore, Mental Hospital, Dharwad.
- Kidwai Memorial Institute of Oncology, Bangalore.
- Sri Jayadeva Institute of Cardiology, Bangalore.
- Sanjay gandhi Institute of Accidents, Rehabilitation and Physical Medicine, Bangalore.
- Epidemic Diseases Hospitals, Bangalore, KGF and Mysore.
- Institute of Child Health, Bangalore.

Private for Profit

The major part of health care is provided by private practitioners. This is estimated to be 70% including practitioners in modern (allopathic) medicine and other systems of medicine.

There are some hi-tech hospitals. Though their number is small and the number of patients catered for is small, they have high visibility, because of the sophisticated

technologies. They cater mainly to the elite population and to the higher paid management and administrative staff of the corporate sector. These hospitals often have health check-up and health care packages.

Industries

Some of the larger indsutries in the corporate sector (public and private) have their own hospitals. These are small or medium-sized. The staff and employees often depend on other hospitals for major part of health care.

All these institutions must be linked together in a referral services complex. All of them must be sensitized to the possible negative health and social consequences of development so that their responses may be need based and adequate.

Health Insurance

Karnataka (and the country) has not caught on with health insurance. Only about 2 million persons, out of a population of 950 millions have health insurance. The way the insurance schemes - mediclaim, Bhavishya arogya, Jan arogya and others -

are functioning, it is very unlikely that insurance will have a major impact on the health of the people of Karnataka. Even the new proposals for opening up health insurance to outside agencies may not help much, except to make available sophisticated procedures to the

fortunate few. Health insurance should lead to better health care to the large majority of the people.

Employees' State Insurance

This is a major social security programme. It provides some protection for workers in the organized sector. Medical assistance is made available to the immediate family members also. the working of the Employees' State Insurance Scheme is not satisfactory. There is need to have promotive and preventive orientation and positive lifestyles. It should consider the adverse conditions prevailing and take concrete measures.

Regional Occupational Health Centre, Bangalore.

The National Institute of Occupational Health, Ahmedabad, has a Regional branch at Bangalore to study the health hazards of occupations, both industrial and agriculture in South India. It is also expected to monitor the environmental hazards of industries. A centre such as this should be closely involved with development in Karnataka. Its monitoring and research activities should respond to local needs and priorities and help to assess the human factors in development.

Karnataka Health Systems Development

The Government is now in the process of implementing a programme for the strengthening of the infrastructure for secondary health care with the assistance of the World Bank. The Systems Development could have been utilised as an opportunity to tackle emerging health problems. The plans for industrialisation are known. The health problems associated with particular industries should have been taken into consideration and steps taken to anticipate and prevent those problems. It is assumed that primary health care is already catered for, though many will question this assumption. The need is to strengthen primary health care. It is true of Karnataka as the whole of India.

"We have completely ignored primary education and primary health sectors which has resulted in 70 per cent of the population still not having access to primary health and 50 per cent of the population still being illiterate". _ Finance Minister P. Chidambaram, The Economic Times, Bangalore, 5 May, 1997.

Other systems of medicine

The indigenous systems of medicine are very popular in Karnataka. Apart from Ayurveda, Unani, Naturopathy and Yoga, other systems like homoeopathy, acupuncture, acupressure and magnetotherapy are practised widely. Herbal medicine is also practised extensively, though this is threatened by the deteriorating conditions of medicinal plants.

Indian Systems of Medicine & Homoeopathy

Number of hospitals and beds (31.3.91)

System	Hospitals	Beds
Ayurveda	12	573
Unani	4	111
Homeopathy	15	350
Siddha	1	10
Yoga	3	15
Naturopathy	1	6

The practitioners of the alternative systems of medicine must be considered as an integral part of the health care system and, therefore, of the health care infrastructure.

Expenditure on Health

State Plan allocations for health have been always meagre and it has been coming down. The actuals for 1988-89 were 4.24 per cent of the total outlay and the budget estimates for 1995-96 came down to 3.32 per cent.

The expenditure on health, per capita, in Rupees in 1994-95 was Rs.103.84 while it was 122.07 for Kerala.

What is to be done?

1. Health has to be considered as central to sustainable human development. The currently dominating economic approaches with negative health and social consequences must give way to ones which are **human-centred and economically and environmentally sustainable.**

   Think 'health' when planning developmental projects and programmes.

2. There is need to ensure that **primary health care** is made available to all. It has to be affordable, accessible and acceptable.

   Disparities between different regions must be minimised.

   Budget allocation for health care services must be increased. The services must be made more effective and efficient. There has to be better commitment and motivation on the part of all the health personnel. while quantititive increase is necessary, more importantly, there has to be **qualitative** improvement.

3. Health care must be **participatory**. The community must be enabled to take care of their health and demand that their **right to health** be honoured.

4. There is need for caring for the **environment,** so that it is stable and healthy. Undue exploitation leading to irreparable damage must be prevented.

5. There has to be legislation, both **prescriptive** (what shall be done to improve health and **proscriptive** (what shall not be done so that health is not damaged).

6. Newer industries should use **technologies** which do not add on to pollution; this is especially so for the chemical industries. **The location** should also be carefully considered. In the already existing industries, measures should be taken to bring pollution much below the limits prescribed, by way of dispersion, suppression, change of fuel, etc.

7. Continuous monitoring of developmental activities should be done to see the impact on the health of the people - health check-ups, mortality rates and causes, morbidity rates and causes, traffic and other accidents, absenteeism from work.

   This monitoring of the human/community factor should be done by a network of agencies which include centres such as ISEC, ROHC, Departments of Community Health/Social and Preventive Medicine of the local Medical Colleges and Departments of Social Work /Sociology of the local Universities. Voluntary Organizations, Consumer groups and representatives of people's organizations should also be included, so that all aspects of development are appraised, positive features enhanced and negative features kept in check.

Legal Infra-Structure for accelerated Growth

(A Discussion Note)

Dr. N.R. Madhava Menon
Director,
National Law School of India University

No one can deny today the imperative need for a fair and efficient legal system form economic development and social justice. A liberalized economy which facilitates private enterprise and market forces cannot succeed without a legal infrastructure which is at once fair, quick and compatible with competition and globalisation.

A legal system involves not only laws, substantive and procedural, but legal institutions such as police, courts, tax and revenue administration, natural resources management systems etc. Specialists like lawyers, judges, policemen and administrators are necessary to manage the legal institutions and, as such, they are also part of the legal institutions and, as such, they are also part of the legal infra-structure. In other words, the legal infra-structure necessary for economic development includes laws, institutions and legal personnel. For these to work in unison for the intended goals, there is need for a legal culture and discipline. Setting the parameters for directed change in the economy and in society. It is indeed a complicated process which requires political stability, legal and administrative acumen, as well as leadership with a vision and commitment to take calculated risks.

Compared to the large number of developing countries in the world, India does have a fairly modern legal system which is viable and well-nourished in fundamentals. The Indian legal profession, second only to the American Bar in number, (India today has over 400,000 lawyers) is a fiercely independent, professionally competent private enterprise activity. The judicial is acknowledged as one among the best in the whole world in terms of independence and impartiality. Though there is much to be desired in the way legal services delivery and administration on justice are organised today, one can take comfort in the capacity of these institutions to respond to changes and act in public interest when demand are made. Ofcourse, a public sector in the legal profession is a felt need and there is scope for privatisation of dispensing justice on the lines contemplated under th Arbitration and Conciliation Act, 1996 and the Legal Services Authority Act, 1987. Given the history of public interest litigation ad the recent display of judicial activism, one can expect better management of the judicial system in course of time if adequate resources and governmental support are extended to the judicial apparatus.

However, there is a little hope of such transformation taking place in our law making and law administering processes. The former is in the hands of our politicians and legislators and the latter is in the hands of the bureaucracy and the civic authorities. Most complaints against legal infra-structure can be traced to archaic laws and their unimaginative or ill-informed implementation. Unfortunately, law is identified with lawyers and courts in this country. The natural tendency is to avoid them, and with it the laws too. This is a dangerous trend in a democratic polity governed by Rule of Law. It is possible to find legislators voting on a bill, the importance or implications of which they themselves do not know or sometime, did not care to know. No attempt is made to communicate the law to those for who it is made. Nor any effort made to educate the civil servants on whom the law is entrusted for implementation. The result is unending litigation almost on ever provision of the law so after it is enacted. Even after the litigation ended there is hardly any effort to correct the law or they way it is administered leading to unpleasant consequences like contempt of court action or institutional conflicts leading to administrative paralysis and irresponsibility. This is where a legal culture is important at every level of governance for the success of Rule of Law and faster growth.

Admittedly, many of the laws in the Statute Book, particularly those related to economic activity, are more than a century old and are unsuited to the New Economic Policy unleased five years ago. For giving continuity and certainly to the legal system, the Indian Constitution adopted a provision whereby the colonial laws were treated as varied law even after Independence, unless they are expressly amended or repealed (Article 372, Constitution of India). The economic policies which were pursued soon thereafter developed a planned socialist system giving "commending heights" to the public sector with almost unlimited, and sometimes monopolistic, power to the State to run the economy. The judiciary responded favorably to the then government economic initiatives, though haltingly on some occasions. The jurisprudence that was build up over the years, so far as he economy was concerned, has been oriented to "social justice" and state regulations almost to the point of inhibiting foreign investments and market domination. the law, and to some extent the institutional structures and approaches which sustained the law, suddenly found themselves in a dysfunctional relationalship to the now declared policy of privatisation and marketisation of the economy. The Capital Market and the Labour sector scenario are to examples which demonstrate this dilemma very vividly. The banking and insurance sectors, municipal administration and the transportation and communication sectors of the economy are other examples where the legal infra-structure finds itself incompatible with the declared economic policies of 1990s.

Changing the laws is not easy task particularly in a pluralist democracy consisting of nearly a billion people, governed by a written Constitution whose declared goals are equality, liberty and soci-economic justice to all sections of society. Preventions of concentrations of wealth to the detriment of public interest is a Directive Principle of State Policy. Ensuring basic needs including education, food, housing, employment and welfare to all sections of people and enacting laws to pursue these goals are primary obligations of the State. These principles and the fundamental rights have been interpreted over the years by the courts and tribunals to produce a jurisprudence which, in a way, circumscribes the freedom of the Government at least in respect of the pace of economic liberalization. This is evident from the reluctance of the government to change the labour laws or go about disinfesting loss-making public sector enterprises. Democratic governance under a written constitutions in necessarily a slow process which may demand heavy economic costs. At the same time, efforts should be directed to reduce the transaction costs by speeding up processes, changing the mind-sets of people manning the economic and legal institutions and developing political consensus for more liberal legislative changes.

The Prime Minister recently declared that the Government would soon set up a Commission to look into the legal infra-structure for accelerated growth and speedy justice. This is a welcome initiative. However, unless similar steps are taken up on a priority basis by every state in India, the situation is unlikely to improve to any discernible degree. Again, mere changes in the law will not bring about structural and institutional reforms. This requires bold experiments, constant monitoring, continuing education and co-operation between government and dominant players in the economy.

In Preparing the legal infrastructure, a three-fold approach is required. Firstly, laws which have outlined its utility and can safely be repealed without much consequence, must be done away with totally. Secondly, laws which need substantial amendments must be taken up wherein the objectives should be clarified, the language simplified and the mechanism of implementation made transparent and accountable. Thirdly, in areas where there are no laws and where laws are felt necessary, a market-friendly approach in setting norms and standards building institutions and structures and resolving disputes and grievances must be experimented. The proposed Highway Act is an instance in point. Where substantial investment and management are envisaged towards the new road projects it is necessary to consider new models of legal infrastructure which may be experimental and can have sun-set clauses whereby it will cease to exist unless extended. This built-in review provision is desirable in economic regulation when the immediate goals are not definite, the methods are experimental and the economic scene is changing rapidly.

It is in the management of natural resources - land, water, forests, minerals - that the legal system has been totally inadequate, neither facilitating private investment nor protecting public interests. The Urban Land Ceiling Act, the Land Acquisition Act, the Land Consolidation Acts are examples of legal infrastructures which are questionable in several respects in the present context. The exemption clauses are open to large-scale abuses and the administrative mechanisms are unnecessarily dilatory and often times counter-productive. The dispute settlement processes under these laws have to be radically restructured incorporating speed fairness and transparency. Public hearing and a charter of citizen rights should get entrenched into natural resources utilization and management. An Administrative Procedure Act incorporating transparency, right to information, decentralisation of decision-making and administrative accountability is the need of the hour.

There can be any number of suggestions to prepare the legal infrastructure for economic growth consistent with constitutional goals. What is required for the task is political will, a new mindset on the part of officials and a legal culture in civil society which respect constitutional values and human rights.

Main Sponsor:

Co-sponsors:

- ✔ Bhoruka Power Corporation Ltd.
- ✔ Electrosteel Castings Ltd.
- ✔ Batliboi Engineers (Bangalore)
- ✔ Jyothi Ltd., Baroda
- ✔ Asea Brown Boveri Ltd.
- ✔ Karnataka Urban Water Supply & Drainage Board
- ✔ Louis Berger International, Inc. (Karnataka Urban Infrastructure Development Project)
- ✔ Southern Railways
- ✔ Housing & Urban Development Corporation Ltd.
- ✔ Bangalore Development Authority
- ✔ Micron Electricals
- ✔ RITES
- ✔ CONCOR
- ✔ ILFS
- ✔ TIFAC

DON'T GET ANXIOUS WHEN RESERVATION ENQUIRY PHONE NUMBER 132 IS BUSY. SIMPLY DIAL 1361 OR 1362 OR 1363 FOR ASSISTANCE.

Train Reservation Information made easy.

Please dial anyone of the following Numbers for :

* Current Status of your waitlisted Ticket.
* Availability of Reserved Accommodation.

1361 Service in English
1362 Service in Hindi
1363 Service in Regional Language

You can dial any one of the above number as per your choice.

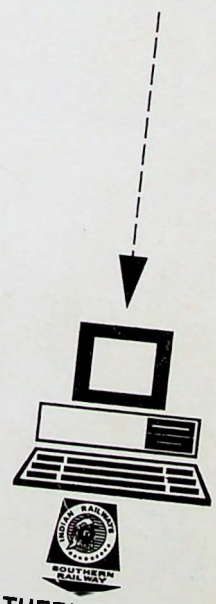
Step 1 When you dial, you will hear "Welcome to Southern Railway Reservation Enquiry System. Dial 03 for Ticket Status after the beep. Dial 06 for accommodation availability after the beep. Dial 03 or 06 to select your option.

Step 2 If you dial 03, you will hear "Please dial the key number of your ticket after the beep". Dial the key number of your ticket. The key number is printed below the PNR number on the ticket.

If you dial 06, you will hear, "Please dial the train number after the beep". After dialing the train number, you will hear "Please dial the date of journey". You will also hear as to how the journey date is to be dialed.

Step 3 Dial accordingly. You will hear the key number repeated by system for confirmation. Dial "01" if the key number is correct or dial "02" if wrong.

Step 4 You will get the current status of your ticket or the details about accommodation availability automatically.



SOUTHERN RAILWAY